Chapter 4.0: Environmental Consequences and Mitigation

Introduction

This chapter describes the potential direct, indirect, and cumulative environmental effects that could occur as a result of implementation of either the No-Action Alternative or any of the build alternatives. Alternative 5A has been identified as the Preferred Alternative. Direct impacts are those that are caused by the action and occur at the same time and place as the implementation of an alternative. Indirect effects are caused by the action but occur later in time or are farther removed in distance, but are still reasonably foreseeable. The methodology for assessing indirect effects is described in Section "Approach to Indirect Effects Assessment," page 4-2. A cumulative impact is "the impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (federal or non-federal) or person undertakes such other actions." Cumulative impacts are discussed in Section 4.23, page 4-161.

Mitigation measures are identified for direct impacts associated with the build alternatives. The mitigation sections include mitigation measures that are appropriate, reasonable, and feasible for implementation by, and that are the responsibility of, the Federal Highway Administration (FHWA) for impacts caused by the construction of a build alternative. Also listed are mitigation measures that could be implemented by others, in particular land use planning boards and elected councils or commissioners, to mitigate indirect and cumulative effects related primarily to supportive growth that fall under other agency jurisdictions. Section "Approach to No-Action Alternative Impacts Assessment," page 4-2, defines the projects and activities assumed to occur as part of the No-Action Alternative.

This chapter is organized by resource. Issues unique to each build alternative are discussed under each alternative heading. Sections discussing impacts common to all build alternatives include improvements along Old US 93 and the adjacent intersections of Old US 93/Brooks, Old US 93/Reserve Street and Brooks Street/Reserve Street since they are included in each build alternative. In addition, impacts common to the bridge and new roadway alternatives are discussed separately to keep the assessments concise and reduce redundancy. To assist in reviewing this chapter, elements common to each build alternative are shown in **Table 4-1**.

Table 4-1
Elements of Build Alternatives

Element	Alt. 2B N. Lower Miller Creek Grade-Separated Intersection	Alt. 3B Blue Mtn. Road Grade-Separated Intersection	Alt. 4C S. Lower Miller Creek Interchange	Alt. 5A Miller Creek Road At-Grade Intersection (Preferred Alternative)
Old US 93 Improvements and adjacent intersections	●	●	●	●
Bridge over Bitterroot River and new roadway	●	●	●	
Miller Creek Road Limited Improvements	●	●	●	
Stand-Alone Improvements to Miller Creek Road				●

Approach to Indirect Effects Assessment

Because of the limited nature of the available data, indirect effects were identified in a qualitative manner for most of the resources assessed within the project area. Resources were assessed quantitatively in those instances where more defined data was available. Indirect effects from the proposed action are assumed to be primarily associated with the increase in traffic to areas accessed by new or improved roads; by any new US 93 connection; and any supportive development that would occur as a result of a new connection or improved highway access condition. According to the study *Guidance for Estimating the Indirect Effects of Proposed Transportation Projects* [Transportation Research Board, National Cooperative Highway Research Program (NCHRP) Report 403, 1998], supportive development is new development and/or infrastructure that is likely to occur near new highway interchanges/intersections or transportation improvements. It can include gas stations, rest stops, motels, fast food establishments, etc. It would typically be located in close proximity to the highway interchange/intersection. For the project area, this type of supportive development may include destination businesses or services that would be supported by Miller Creek and Blue Mountain residents (i.e., dry cleaners, newsstand/bookstore). However, future population growth and related development in any location is dependent on a number of variables that would shape the look, density, timing, and viability of that development. Some of these factors include the strength of the general economy, interest rates, the price of automobile fuel, the availability and price of building supplies, new industry or services, availability of housing, and personal preferences. Transportation improvements are also a factor that could influence the location and timing of future development depending on where and when improvements are constructed.

Given the planning scale of this assessment and limited availability of future development plans, the appearance and density of any future development is not easily determined. Since most future assumptions are based on a 2025 design year, many variables will change from year to year that would individually or collectively influence a different set of circumstances. Local governments, zoning and/or architectural ordinances, and water and infrastructure availability are some tangible methods to shape and control the future development. Those typically are the responsibility of the local jurisdictions.

As discussed in Chapter 1.0, the purpose for this project is to provide safe and improved access between the Miller Creek area and US 93.

Approach to No-Action Alternative Impacts Assessment

The No-Action Alternative assumes completion of those reasonably foreseeable transportation, development, and infrastructure projects that are already in progress; have committed funds for improvements; are programmed by the Montana Department of Transportation (MDT) or FHWA, Missoula County, the City of Missoula; or are reasonably foreseeable as part of the Miller Creek area build-out. These projects are discussed in Section 4.23, page 4-161. For purposes of the analysis of impacts associated with the No-Action Alternative, it is assumed these projects would be constructed whether or not any other actions are taken in conjunction with this Environmental Impact Statement (EIS). Residential and commercial development, improvements to Miller Creek Road and the north "Y" (see **Figure 2-4, page 2-18** for No-Action improvement assumptions to Miller Creek Road), and required sewer system expansion within the Miller Creek area under approved development plans are expected to occur with the No-Action Alternative.

Quantity estimates for the locally funded No-Action improvements to Miller Creek Road and the north "Y" have been provided as a comparison for the build alternatives along Miller Creek Road.

Activities implemented as part of the No-Action Alternative may cause conversion of land from a natural state to a developed one, with potential impact to wetlands, wildlife habitat, farmland, noise, aquatic resources, water quality and quantity, and area mobility. The impacts estimated

for the No-Action Alternative are based on known area comprehensive and development plans and typical impacts expected to occur with these types of development.

Mitigation of impacts associated with the No-Action Alternative would be the responsibility of local jurisdictions responsible for reviewing and approving any transportation, development, or infrastructure projects.

4.1 Land Use Impacts and Mitigation

4.1.1 Land Use Impacts Alternative 1: No-Action

Projected residential and commercial development in the Miller Creek area would continue under the No-Action Alternative. The land use character of the area would continue to change from rural to suburban. Planned development would be connected to City of Missoula services as buildings are constructed. Most of the Miller Creek area lies within the City's wastewater service area and designated urban growth area, with the exception of the Blue Mountain areas north of US 93 and west of the Bitterroot River. Full build-out of the Miller Creek area is reasonably foreseeable to reach approximately 3,000 dwelling units by 2025. Approximately 1,200 acres are proposed to be residential and commercial developments as part of the future Miller Creek area build-out.

Traffic volumes would continue to increase as planned development is constructed. Traffic conditions along Miller Creek Road at the north "Y" would continue to further deteriorate under the No-Action Alternative until the planned locally funded improvements are made.It is estimated that approximately 3.7 acres of land would be converted to a transportation use due to the widening improvements of Miller Creek Road by the City of Missoula or Missoula County, and developer. Over the next 20 years traffic and safety conditions would continue to deteriorate as the Miller Creek area reaches full build-out.

The No-Action Alternative would not change population growth trends or development patterns within the project area, nor would it facilitate any changes to the existing land uses and zoning designations.

4.1.2 Land Use Impacts on Old US 93 and Adjacent Intersections Common to All Build Alternatives

Improvements along Old US 93 and the intersections of US 93/Miller Creek Road, Old US 93/Brooks/Reserve Streets, and Brooks/Reserve Street are the same with all of the build alternatives, as shown in **Figure 2-7, page 2-23**. These improvements would result in the direct conversion of land from a commercial use to a transportation use. Approximately 1.0 acre of land along Old US 93 and Brooks/Reserve Streets would be acquired for right-of-way use. These plans would be consistent with the current land use planning for this corridor and would not cause any zoning or land use changes.

4.1.3 Land Use Impacts Common to Bridge Alternatives (2B, 3B, 4C)

Direct Impacts

The bridge crossing alternatives are consistent with local plans, such as the *1997 Miller Creek Area Comprehensive Plan Amendment*, that indicate a second access.

While these alternatives would not directly impact zoning, there would be a change from some current land use to a transportation use in the near term. However, the Miller Creek area is planned to be converted to residential, commercial, and associated transportation uses with the completion of the proposed development plans. Changes in land use would occur as the roadway and associated US 93 connection configuration are built on what currently is vacant agricultural or open space land and as residential development fills in. In some cases along US 93, land may be converted from residential or business use to a transportation use. A 20-foot-wide envelope under the southern abutment of the proposed bridge across the Bitterroot River is proposed to allow for a multi-use trail that would also result in a direct conversion of land in this area, while not changing the character. The trail would be constructed and maintained by others.

Realignment or extension of roads near the junction of the North Lower Miller Creek alignment and Lower Miller Creek Road/Maloney Ranch Road would convert agricultural land, open space, and undeveloped land to a transportation use.

The *1997 West Miller Creek Comprehensive Plan Amendment* shows two dwelling units per acre (medium-density) residential development south of the Old Bitterroot Road. However, no proposed developments are currently identified for this area. Any future development would need to be designed to accommodate the proposed new road associated with the bridge alternative if it occurred prior to construction of the proposed action.

Indirect Effects

While the new road into the Miller Creek area could support additional residential development, it could also help create access to economic development opportunities in the Miller Creek area and along US 93. Both the *1997 Miller Creek Area Comprehensive Plan Amendment* and the *Missoula Urban Comprehensive Plan* (1998 update) show small neighborhood commercial development interspersed with higher density housing within the Miller Creek area.

Indirect effects associated with the second access could include Miller Creek area residential build-out occurring more quickly than originally anticipated in City of Missoula and Missoula County growth plans. Lands adjacent to US 93 may redevelop depending on the access connection to US 93. Constructing a second access to the Miller Creek area is expected to alleviate congestion at the Miller Creek Road/US 93 intersection and the north "Y" intersection, which may expedite future development south of the south "Y" intersection south of Miller Creek. The proposed access to the area is shown on the *Missoula Urban Area Comprehensive Plan* and is consistent with the *2004 Missoula Urban Transportation Plan Update*, the *1997 Miller Creek Area Comprehensive Plan Amendment,* and the *Maloney Ranch: Miller Creek Area Transportation Study*. These plans include discussion of a possible second access to the Miller Creek area to relieve congestion at Miller Creek Road, accommodate future development, and to address the concerns of emergency service provider access to the area.

Miller Creek Road Limited Improvements

Direct Impacts

The Limited Improvements to Miller Creek Road would result in a direct conversion of land use from residential and commercial use to a transportation use. Approximately 6.5 acres of land along Miller Creek Road would be acquired for right-of-way use. This acquisition consists of relocating one single-family residence and partial acquisitions of 12 other properties along Miller Creek Road (see Section 4.5, page 4-56 for right-of-way impacts).

There would be little or no difference in the compatibility of these improvements with the existing plans for the area. With the exception of right-of-way acquisition, these improvements would not cause any changes to existing land uses and zoning designations.

Indirect Effects

It is not likely that the current residential areas adjacent to Miller Creek Road would convert to commercial or another use. The property adjacent to Wal-Mart is a likely parcel to be converted to another use.

4.1.4 Land Use Impacts Alternative 2B: North Lower Miller Creek Grade-Separated Intersection

Direct Impacts

Approximately 24.2 acres of land would be acquired for a transportation use. One residence and an undeveloped parcel would be acquired and converted to right-of-way. The land adjacent to the proposed intersection and new roadway is currently undeveloped and is zoned for agricultural/rural residential and PUD special use. The land between the Bitterroot River and US 93 is a riparian/floodplain zone.

Indirect Effects

The new intersection at US 93 could promote new development in the undeveloped areas north of US 93. The intersection would be located in County Zoning District 39. The types of uses permitted under this zoning district could include, but are not limited to, single-family residences, schools, churches, parks, libraries, community halls, and planned unit development. There are no commercial uses permitted under this designation. Any development that occurred in the intersection area would occur within the designated City of Missoula and Missoula County urban growth area as designated in the *Missoula Urban Comprehensive Plan* (1998 update). Urban areas are designated as future growth areas by 2025. Supportive development near the proposed intersection/interchange could occur soon after project completion and would change the rural character that exists in that area today.

4.1.5 Land Use Impacts Alternative 3B: Blue Mountain Road Grade-Separated Intersection

Direct Impacts

Alternative 3B would have 35.8 acres of land converted to a transportation use. Four commercial properties and two residences would be acquired and relocated for right-of-way purposes.

Impacts to the Montana Health Club include property acquisition, impacts to the drainfield, and access becoming more difficult because of increased traffic on Blue Mountain Road. Several local access changes and restrictions to US 93 could alter the future redevelopment potential for lands adjacent to US 93 and the intersection. Business access to US 93 in the northwest quadrant would be consolidated to a frontage road that would access Blue Mountain Road. Traffic heading southbound on US 93 would travel north on Blue Mountain Road to the access ramp. Traffic heading northbound on US 93 would travel south on the new bridge over US 93 and use the access ramp to enter US 93. Business accesses south of US 93 would be consolidated to a frontage road which would access US 93 via the access ramps.

The proposed new Blue Mountain Road extension for this alternative would tie into the proposed neighborhood feeder roadway network included on future development plans (see **Figure 2-3,**

page 2-5). Some land that is currently used for agricultural/ranching purposes would be converted to a transportation use.

Indirect Effects

The area between US 93 and the Bitterroot River is currently developed with commercial establishments. In the future, it may redevelop with supportive development typically associated with urban intersections. The area surrounding the intersection is under Missoula County jurisdiction and currently is zoned for light industrial, institutional, commercial, and residential. Therefore, based on current zoning status, commercial development would be permitted in this area. The land in the northwest quadrant is not zoned. Development that could occur in the US 93 area as an indirect effect includes commercial, residential, and supportive development. Commercial development may consist of retail businesses, offices, and service-related businesses. Residential development may occur at various densities. Supportive development is considered to be gas stations, motels, fast food establishments, etc., located in close proximity to an interchange or intersection.

Residents along Blue Mountain Road have expressed concern that the proposed action would change the character of their neighborhoods from a rural environment to a more urban one because of increased traffic on Blue Mountain Road. Based on current zoning of this area as low-density rural residential, the density and character would not likely change to a very urban setting. Growth in the Blue Mountain area due to a connection to the Miller Creek area is not likely, since a connection at US 93 already exists and the additional amount of traffic estimated to travel Blue Mountain Road is not substantial. A minimal amount of recreation traffic to USFS land would be generated by a modified access. More likely, impacts would be associated with use of Blue Mountain Road as a bypass option to the congested Reserve Street, which is an existing connection.

4.1.6 Land Use Impacts Alternative 4C: South Lower Miller Creek Interchange

Direct Impacts

Alternative 4C would have the greatest impact to land use character. There would be 15 business or residential relocations required for construction of the interchange, including two social organization buildings, and partial acquisitions from nine other parcels. Compared to the Alternatives 2B and 3B intersections with US 93, this location is the most densely populated, which means that right-of-way acquisition would be the greatest. Alternative 4C impacts would be similar to those described in Section 4.1.3, page 4-3, with the exception that Alternative 4C would require 66.7 acres of land converted to a transportation use.

This alternative would bisect one of the parcels designated as a conservation easement for Maloney Ranch (*Maloney Ranch Conservation Easement Report*, Land and Water Consulting, December 1995) and convert a portion of it to a transportation use. The intent of the conservation easement is to provide open space for the residents of the Miller Creek area. While this alternative would not preclude the use of this parcel as a conservation easement, it could diminish the undeveloped open space function of the parcel.

Indirect Effects

The amount of land converted to right-of-way for the interchange could limit the flexibility of future redevelopment of remaining land in this area.

4.1.7 Land Use Impacts Alternative 5A: Miller Creek Road At-Grade Intersection — Preferred Alternative

Direct Impacts

Alternative 5A would result in a direct conversion of 7.9 acres of land use from residential and commercial use to a transportation use. This acquisition consists of relocation of one single-family residence and partial acquisitions from 14 other properties along Miller Creek Road and US 93. See Section 4.5, page 4-56, for right-of-way impacts.

There would be little or no difference in the compatibility of this alternative with the existing plans in the area because the proposed action does not preclude a future second access bridge crossing. With the exception of the conversion of right-of-way, Alternative 5A would not cause any changes to existing land uses and zoning designations.

Indirect Effects

There are fewer indirect effects associated with Alternative 5A compared to the other build alternatives. The land along Miller Creek Road is fully developed. Therefore, zoning changes and supportive development are not anticipated in this area. However, a wider Miller Creek Road could perpetuate and/or accelerate growth in the Miller Creek area.

4.1.8 Land Use Impacts Summary

Table 4-2 provides a summary of land use impacts. Impacts shown for the No-Action Alternative include impacts associated with planned locally funded improvements to Miller Creek Road, which are not a part of this federally funded project. Impacts shown for Alternatives 2B, 3B, and 4C include the impacts for the intersection/interchange with US 93, the bridge crossing and new roadway, improvements on Old US 93, and the Limited Improvements on Miller Creek Road. Impacts shown for Alternative 5A include impacts on Old US 93 and Miller Creek Road.

Table 4-2
Land Use Impacts Summary

Land Use Evaluation Criteria	Alt. 1 No-Action	Alt. 2B N. Lower Miller Creek Grade-Separated Intersection	Alt. 3B Blue Mtn. Road Grade-Separated Intersection	Alt. 4C S. Lower Miller Creek Interchange	Alt. 5A Miller Creek Road At-Grade Intersection (Preferred Alternative)
Compatible with local plans and policies	Yes	Yes	Yes	Yes	Yes
Direct conversion of land to another use	Yes, as part of locally sponsored Miller Creek Rd. improvments.	Would be a change from some current land use to a transportation use.	Same as Alt 2B. Some open space and undeveloped land near Blue Mtn. Rd. and Lower Miller Creek Rd./Maloney Ranch Rd. would be converted to transportation use.	Has greatest impact to land use character due to right-of-way acquisitions. Would bisect one parcel designated as conservation easement and convert a portion of it to a transportation use.	Right-of-way required would convert residential land use to a transportation use.

4.1.9 Land Use Mitigation

No mitigation for direct or indirect land use effects will be required of FHWA.

4.2 Farmland Impacts and Mitigation

Impacts to farmland, as defined by the Farmland Protection Policy Act of 1981, occur when land with soils classified as Prime, Unique, or of Statewide or Local Importance are paved with impervious surface, covered by fill, or removed to accommodate the installation of proposed improvements. Potential impacts to Prime and Unique Farmland can be either direct through purchase, or indirect through restricted access. Areas that are developed or planned for development are not considered Prime and Unique Farmland. This is under the assumption that lands designated for development or purchased for roadway right-of-way preclude the use of the area for agricultural purposes in the future.

4.2.1 Farmland Impacts Alternative 1: No-Action

Under the No-Action Alternative, and based on the *West Miller Creek Comprehensive Plan Amendment*, full build-out of the Miller Creek area is expected by 2025. Under the No-Action Alternative, no land with soils classified as Prime, Local Farmland of Importance would be converted to a residential, commercial, or transportation use.

4.2.2 Farmland Impacts on Old US 93 and Adjacent Intersections Common to All Build Alternatives

There would be no direct or indirect effects to farmland associated with the improvements along Old US 93 and the intersection of Old US 93 and Brooks/Reserve Streets because the land has already been converted to an urban use and farmland soils are not present.

4.2.3 Farmland Impacts Common to Bridge Alternatives (2B, 3B, 4C)

Direct Impacts

According to the Natural Resources Conservation Service (NRCS) farmland soil survey, soils classified as Prime Farmland if Irrigated, Farmland of Statewide Importance, and Farmland of Local Importance are located along US 93 and within the project area (see **Figure 3-3, page 3-10**).

Coordination with the NRCS Field Office in Missoula was conducted to complete "Form AD-1006: Farmland Conversion Impact Rating" (see **Appendix A**). The impact rating scores for Alternatives 2B, 3B, and 4C are 109, 114, and 26, respectively, out of a possible 260 points. Since these scores did not exceed the 160-point criteria indicating substantial impact, it was determined that none of the bridge alternatives would substantially impact farmlands within the project area.

Indirect Effects

Indirect effects for bridge alternatives due to supportive development may occur on designated farmland or agricultural land adjacent to the new road. As development occurs, access for farming vehicles may become more restricted or difficult.

Miller Creek Road Limited Improvements

No farmlands would be directly or indirectly impacted by the Limited Improvements along Miller Creek Road because the land has already been converted to an urban use and farmland soils are not present.

4.2.4 Farmland Impacts Alternative 2B: North Lower Miller Creek Grade-Separated Intersection

Direct Impacts

Approximately 7.6 acres of soils classified as Farmland of Local Importance would be directly affected by Alternative 2B associated with the bridge crossing and new roadway. However, this area is expected to be converted to residential use in the next 20 years according to the *1997 Miller Creek Area Comprehensive Plan Amendment.*

Indirect Effects

A property in agricultural/ranching use (5080 Old Bitterroot Road) located east of the Bitterroot River would be bisected by the proposed North Lower Miller Creek alignment. The property is approximately 100 acres. By dividing the property, a portion of the current farming/ranching operation would likely be lost. Some designated farmland soils could be converted by supportive development along the new road.

4.2.5 Farmland Impacts Alternative 3B: Blue Mountain Road Grade-Separated Intersection

Direct Impacts

Approximately 4.8 acres of Farmland of Local Importance would be directly affected by Alternative 3B associated with the bridge crossing and new roadway. Direct access to the Blue Mountain Road extension would be made through existing east/west roadways in the immediate area. The Blue Mountain Road extension south also would require the relocation of an irrigation ditch that intercepts the Bitterroot River on the south side at approximately where the new bridge would touch down. The irrigation ditch would be relocated to the east of the bridge and its use maintained.

Indirect Effects

The Blue Mountain Road extension south and east of the Bitterroot River would bisect two agricultural/ranching properties located adjacent to each other (north to south). The northern property is at 5080 Old Bitterroot Road; the southern property is at 5905 Lower Miller Creek Road. The southern property includes two parcels under the same owner. By dividing the property, a portion of the current farming operation would be lost. Some designated farmland soils could be converted by supportive development along the new road.

4.2.6 Farmland Impacts Alternative 4C: South Lower Miller Creek Interchange

Direct Impacts

No designated farmland would be converted by Alternative 4C because the land has already been committed to development.

Indirect Effects

No indirect effects to farmland would occur because the designated farmland has already been committed to development.

4.2.7 Farmland Impacts Alternative 5A: Miller Creek Road At-Grade Intersection — Preferred Alternative

Direct Impacts

There are no direct impacts to farmlands associated with Alternative 5A because the area is fully developed and already converted to an urban use.

Indirect Effects

There are no indirect effects to farmlands associated with Alternative 5A because the area is fully developed and has already been converted to an urban use.

4.2.8 Farmland Impacts Summary

Table 4-3 provides a summary of farmland impacts. Impacts shown for the No-Action Alternative include impacts associated with planned locally funded improvements to Miller Creek Road, which are not a part of this federally funded project. Impacts shown for Alternatives 2B, 3B, and 4C include the impacts for the intersection/interchange with US 93, the bridge crossing and new roadway, improvements on Old US 93, and the Limited Improvements on Miller Creek Road. Impacts shown for Alternative 5A include impacts on Old US 93 and Miller Creek Road.

4.2.9 Farmland Mitigation

All irrigation pipes and ditches will be replaced in-kind.

Table 4-3
Farmland Impacts Summary

Farmland Evaluation Criteria	Alt. 1 No-Action	Alt. 2B N. Lower Miller Creek Grade-Separated Intersection	Alt. 3B Blue Mtn. Road Grade-Separated Intersection	Alt. 4C S. Lower Miller Creek Interchange	Alt. 5A Miller Creek Road At-Grade Intersection (Preferred Alternative)
Impacts to Prime and Unique Farmland soils, or Farmland of Statewide or Local Importance soils	None	7.6 acres of Farmland of Local Importance soil.	4.8 acres of Farmland of Local Importance soil.	None	None
Impacts to agricultural operations	None	Bisects 100-acre agricultural/ranching property causing portion of current operation to be lost.	Bisects 2 agricultural/ ranch properties, causing portion of current operation to be lost. Approximately 8 acres of this property would be acquired.	None	None

4.3 Social Impacts and Mitigation

4.3.1 Social Impacts Alternative 1: No-Action

The No-Action Alternative would not change projected population increases or planned development patterns in the project area. Demand for community facilities to accommodate planned developments would continue to increase in the future.

With the No-Action Alternative, the existing congestion caused by the bottleneck at the northern intersections of Upper Miller Creek Road and Lower Miller Creek Road and Miller Creek Road and US 93 would worsen over time until the locally planned improvements to Miller Creek Road are constructed. For this reason, access to community facilities from the Miller Creek area could be hampered.

Environmental Justice

Identification of Environmental Justice impacts and potential mitigation measures involves analysis of whether disproportionately high and adverse effects to minority and low-income populations exist and, if so, how these impacts may be avoided, minimized, or mitigated.

Research showed that low-income households are dispersed throughout the county. Contact with local sources did not indicate specific low-income households in the project area or within the potential area of impact.

Direct Impacts

Traffic congestion and safety would worsen on the project area roadways with the No-Action Alternative. This congestion could hinder access to housing, community facilities, and the provision of emergency services for minority populations, as well as the overall community. The lack of a multimodal facility through the area prohibits safe and effective movement of transit providers, bicyclists, and pedestrians. In addition, minority populations in the area that would benefit

from transit service would not experience an improvement. This condition would continue with the No-Action Alternative.

As a result of the No-Action Alternative, there would be no disproportionate impacts to minority populations. Under the No-Action Alternative, right-of-way would be needed to make the proposed locally funded improvements to Miller Creek Road. The No-Action Alternative would not benefit minority populations with the enhancements proposed by the build alternatives, such as improvements to safety, access, connectivity, and congestion. However, all populations would be treated equally in this regard.

Indirect Effects

The indirect effect of the No-Action Alternative on the housing values minority households is difficult to assess. If the current growth and development of the project area continues as projected, it is likely that housing and property values under the No-Action Alternative could increase; however, in contrast, traffic congestion levels would increase, ultimately hindering accessibility to employment and housing. No new or additional employment opportunities for minority households are expected to result from the No-Action Alternative.

4.3.2 Social Impacts on Old US 93 and Adjacent Intersections Common to All Build Alternatives

Old US 93 and Adjacent Intersections

Improvements along Old US 93 and the intersection at Old US 93 and Brooks/Reserve Streets are the same with all of the build alternatives. The widening of Old US 93 from two lanes to three lanes would provide the businesses located south of Old US 93 with improved access and visibility. The widening would improve traffic flow and capacity along Old US 93. Sidewalks and bicycle lanes would be added along Old US 93, which would accommodate bicyclists and pedestrians accessing business establishments along Old US 93 (see **Figure 2-5, page 2-19**).

Residents of the Miller Creek area traveling toward Missoula would be able to bypass US 93 by using Old US 93 as an alternative route. Improvements to the Reserve Street/Old US 93 intersection would increase the capacity at the intersection and provide a safer and more efficient route than the existing configuration.

The left-turn movement from Old US 93 to US 93 would be maintained during non-peak hours; however, it may be restricted in the future depending on intersection operations. With projected traffic increases, it may eventually be necessary to provide more efficient use of the available capacity of the Old US 93/Miller Creek Road/US 93 intersection.

The proposed build alternatives are designed to benefit existing and proposed neighborhoods and to provide connections between neighborhoods. Future accessibility to schools, recreation activities along the Bitterroot River, churches, and police stations would be enhanced through additional capacity improvements in the area. A multimodal access provides for safe and efficient movement through the area for bicyclists and pedestrians.

Cold Springs Elementary School

Regardless of the action taken, traffic in the Miller Creek area is predicted to grow substantially over the next 20 years and traffic by the Cold Springs Elementary School is going to increase. Traffic volumes on Briggs Street east of Miller Creek Road are expected to increase by 148 percent between 2003 and 2025 for the No-Action Alternative (see **Table 3-9, page 3-28**)

All of the build alternatives evaluated would reduce traffic on Briggs Street compared to the No-Action Alternative. Average daily traffic (ADT) percent change is presented in **Table 4-4**. 2025 ADT for Briggs Street directly east of Miller Creek Road is 6,350 vehicles per day (vpd) under the No-Action Alternative. The ADT volumes on Briggs Street east of Miller Creek Road would be reduced with the build alternatives.

Table 4-4
2025 Volume/Percent Change from No-Action Alternative Along Briggs Street (East of Miller Creek Road)

	Alt. 1 No-Action	Alt. 2B N. Lower Miller Creek Grade-Separated Intersection	Alt. 3B Blue Mtn. Rd. Grade-Separated Intersection	Alt. 4C S. Lower Miller Creek Interchange	Alt. 5A Miller Creek Rd. At-Grade Intersection (Preferred Alternative)
ADT	6,350	-10%	-18%	-15%	-12%
AM Peak Hour*	685	-12%	-19%	-12%	-10%
PM Peak Hour*	605	-10%	-17%	-15%	-12%

*See *Transportation Analysis Technical Report* (Amended March 2006) Figure 5-6 for volumes.

The No-Action Alternative and all build alternatives assume a signal at the intersection of Miller Creek Road and Briggs Street. Signals will encourage cut-through traffic, particularly at Briggs Street and Miller Creek Road. However, the Preferred Alternative improves traffic movements during the AM and PM peak periods so that cut-through traffic is reduced when compared to the No-Action Alternative. All of the build alternatives are anticipated to reduce the number of neighborhood cut-through trips on Briggs Street, Gharrett Street, and 39th Street to and from the Miller Creek area compared to the No-Action Alternative. This is because the build alternatives would provide increased capacity on Miller Creek Road as the primary access route that would move traffic more efficiently into and out of the Miller Creek area. Therefore, all build alternatives are anticipated to result in a small reduction in traffic passing the school compared to the No-Action Alternative.

4.3.3 Social Impacts Common to Bridge Alternatives (2B, 3B, 4C)

Direct Impacts

Local school representatives confirmed that a build alternative with a second access (Alternatives 2B, 3B, and 4C) to connect US 93 and Lower Miller Creek Road would improve the school bus route that currently services the area. According to school officials, a new access could make the existing system more "manageable." A new road with bicycle and pedestrian facilities would provide an alternate route to both schools that serve the Miller Creek area.

Indirect Effects

Construction of this build alternative could accelerate the rate of development and build out of the Miller Creek area. Existing residences and neighborhoods adjacent to the North Miller Creek alignment may experience additional noise and traffic.

Miller Creek Road Limited Improvements

Direct Impacts

Some existing residential accesses to Miller Creek Road would be closed and/or relocated. The Miller Creek Road Limited Improvements would not isolate or separate existing neighborhoods.

Indirect Effects

Existing residences along Miller Creek Road and the adjacent neighborhoods would likely experience the indirect effects of increased traffic and new signalized intersections, such as more access control and increased noise.

Environmental Justice

Direct Impacts

Research showed that minority populations are dispersed throughout the county. Contact with local sources did not indicate specific minority populations in the project area or within the potential area of impact. Therefore, there are no disproportionate impacts to minority populations as a result of the bridge alternatives.

Indirect Effects

Potential noise and air quality impacts could result from vehicle queues at the proposed intersection signal at US 93. These impacts are not disproportionate to minority populations.

In the long term, changes in access to residential and commercial areas would be improved with each build alternative. Alternative configurations may change the accesses and circulation for some residences and businesses. These impacts are the same for minority neighborhoods and businesses as those for non-minority neighborhoods and businesses. Slight indirect effects related to property values and population growth are anticipated with the bridge alternatives. Many of the benefits associated with the addition of a new roadway to connect with US 93 could increase the value of properties in the area. The close proximity of enhanced bicycle and pedestrian facilities, as well as the potential for future transit improvements, could increase property values for surrounding residences and businesses in the long term. Overall, there would be no adverse effects predominantly borne by minority populations, and no minority populations would suffer greater or more severe impacts than non-minority populations.

4.3.4 Social Impacts Alternative 2B: North Lower Miller Creek Grade-Separated Intersection

Direct Impacts

This alternative includes a grade-separated intersection at US 93. Direct impacts north of US 93 include a change in access and road closure at Yuhas Ranch Lane. Yuhas Ranch Lane intersects with US 93 west of the proposed new road and east of the Centennial Homes Sales Center. The proposed design would require relocation of the existing access point where Yuhas Ranch Lane intersects with US 93.

Indirect Effects

There are no additional effects to those described in Section 4.3.3.

4.3.5 Social Impacts Alternative 3B: Blue Mountain Road Grade-Separated Intersection

Direct Impacts

The accesses to US 93 for the businesses northwest of the Blue Mountain Road/US 93 intersection would be consolidated to a frontage road parallel to US 93 (see **Figure 2-13, page 2-29**). The frontage road would access Blue Mountain Road, and motorists would use the intersection ramps to access US 93. Alternative 3B includes realigning Buckhouse Lane farther north to intersect Blue Mountain Road across from Evergreen Road, approximately 700 feet north on Blue Mountain Road. This would affect the property owner who uses this road to access to their home. The residential access off Buckhouse Lane would be shortened to access the realigned Buckhouse Lane. The Emmanuel Baptist Church located on Blue Mountain Road would not experience direct property impacts from Alternative 3B. This alternative would somewhat disrupt the cohesiveness of the businesses and residences south of US 93 at Blue Mountain Road, as well as businesses northwest of the intersection.

A bridge over the Bitterroot River connects Blue Mountain Road south to the existing and proposed development of the Miller Creek area, providing connectivity between areas north and south of US 93. The Blue Mountain Road extension is proposed to intersect with Old Bitterroot Road where an intersection/entry node would be provided for access east into the Miller Creek area. The Blue Mountain Road extension is proposed to be aligned south to connect to the proposed roadway network of the future Miller Creek area development, but is flexible to be modified as needed.

Indirect Effects

An indirect effect would result from the removal of the signal and associated gap in the traffic it creates at Blue Mountain Road. Residents along US 93 near Blue Mountain Road, Hayes Creek Road, and the adjacent area across US 93 would have a more difficult time accessing and crossing US 93. Speeds on southbound lanes may be higher than currently exist because there would be no signal to stop traffic at Blue Mountain Road. This would make access to and from these neighborhoods and business areas more challenging due to increased delays.

4.3.6 Social Impacts Alternative 4C: South Lower Miller Creek Interchange

Direct Impacts

Alternative 4C has the most social impacts of the build alternatives because of the number of residential and commercial relocations. Section 4.5.6, page 4-64, details the right-of-way impacts. Most of the residences in this area have shared access roads to US 93. As part of the interchange constraints, the accesses to US 93 would be consolidated and relocated. The Blue Mountain Trailer Park is located south of the commercial properties and the proposed interchange. Impacts to the trailer park include the addition of a frontage road along US 93. This would require the relocation of one trailer home and may include a minor property acquisition to accommodate the frontage road width.

Indirect Effects

Future redevelopment potential would be limited because of the proximity of the river, limited availability of developable land, and limited access to US 93.

4.3.7 Social Impacts Alternative 5A: Miller Creek Road At-Grade Intersection — Preferred Alternative

Direct Impacts

Alternative 5A would not relocate any commercial properties, but would relocate one residential property. Property acquisition from 8 residential and 14 commercial properties would be required. Compared to the other build alternatives, Alternative 5A has fewer impacts to community facilities, commercial entities, and existing transportation routes.

The residential neighborhoods situated between US 93 and the north "Y" intersection could experience increased noise levels as traffic volumes increase over time. Alternative 5A would require right-of-way acquisition affecting multiple properties. One residential property relocation would be required west of the north "Y" intersection.

Alternative 5A would not separate or isolate existing neighborhoods. With increased capacity along Miller Creek Road and improvements to the intersection at Miller Creek Road and US 93, transportation connections and accessibility would be improved for residents and visitors to the area.

Indirect Effects

The indirect effects for Alternative 5A would be similar to Alternative 2B. Alternative 5A would accommodate the increased traffic volumes projected on Miller Creek Road in the future. Residents of the Miller Creek area are currently required to use Miller Creek Road to access US 93 and Missoula.

Environmental Justice

Adverse impacts to minority populations are not anticipated with Alternative 5A. Efforts have been made to avoid property impacts to residences and businesses along US 93, Miller Creek Road, and Old US 93. Minority populations that live within the project area would benefit from improved access, safer and more efficient vehicular travel, and improved bicycle and pedestrian facilities.

4.3.8 Social Impacts Summary

Table 4-5 provides a summary of social impacts. Impacts shown for the No-Action Alternative include impacts associated with planned locally funded improvements to Miller Creek Road, which are not a part of this federally funded project. Impacts shown for Alternatives 2B, 3B, and 4C include the impacts for the intersection/interchange with US 93, the bridge crossing and new roadway, improvements on Old US 93, and the Limited Improvements on Miller Creek Road. Impacts shown for Alternative 5A include impacts on Old US 93 and Miller Creek Road.

Table 4-5
Social Impacts Summary

Social Evaluation Criteria	Alt. 1 No-Action	Alt. 2B N. Lower Miller Creek Rd. Grade-Separated Intersection	Alt. 3B Blue Mtn. Rd. Grade-Separated Intersection	Alt. 4C S. Lower Miller Creek Rd. Interchange	Alt. 5A Miller Creek Rd. At-Grade Intersection (Preferred Alternative)
Community Facilities	No effect	No effect	No effect	No effect	No effect
Public Safety	Increased capacity on Miller Creek Rd. by locally funded improvements allows improved access and safety at reconfigured north "Y"	Limited Improvements on Miller Creek Rd. improve access and signalized pedestrian crossings.	Limited Improvements on Miller Creek Rd. improve access and signalized pedestrian crossings.	Limited Improvements on Miller Creek Rd. improve access and signalized pedestrian crossings.	Miller Creek Rd. improvements provide additional lane on Miller Creek Rd. for improved access and signalized pedestrian crossings.
Cold Springs Elementary School	Traffic increase on Briggs Street.	Traffic reduction on Briggs Street	Traffic reduction on Briggs Street	Traffic reduction on Briggs Street	Traffic reduction on Briggs Street
Neighborhoods	Right-of-way and access changes as part of locally funded project.	Some additional right-of-way and access impacts along Miller Creek Rd.	More residential right-of-way and access impacts than Alt. 2B.	Greatest amount of residential relocations. Neighborhood west of interchange would be largely displaced.	Less overall right-of-way and access impacts than other build alternatives.
Environmental Justice	None	None	None	None	None

4.3.9 Social and Environmental Justice Mitigation

Mitigation for potential relocations is discussed in Section 4.5.9, page 4-67, Right-of-Way and Utilities Mitigation.

Impacts that require the removal of local access to US 93 (for business and residences not being relocated) will be reconfigured and new access points identified, consistent with the future US 93 Access Management Plans being prepared by MDT.

During construction, communication will be maintained with the communities and residents regarding road delays, access changes, and special construction activities. Radio and public announcements, newspaper notices, and on-site signage could be used.

Environmental Justice

Overall, low-income households and minority populations are dispersed throughout the county. Contact with local sources did not indicate specific low-income households or minority populations in the project area or within the potential area of impact. Because impacts would be distributed across the community, they would not be predominantly borne by minority or low-income populations, nor would they be appreciably more severe or greater in magnitude than those impacts suffered by non-minority/non-low-income populations. Therefore, no mitigation is required.

4.4 Transportation Impacts and Mitigation

The alternatives transportation analysis presented in this section is summarized from the *Transportation Analysis Technical Report* (November 2004, amended March 2006). It addresses the transportation-related effects of the alternatives described in Chapter 2.0. The analysis is based on updated 2025 forecasted traffic conditions. The transportation analysis addresses vehicular travel, including project area mobility, average daily traffic volume and peak-period traffic operations forecasted for the major roadway network and intersections in the project area, safety, and other transportation considerations, such as the relationship of the alternatives to potential future transit service and non-motorized travel in the project area.

4.4.1 Roadway Operations

For the purpose of comparing alternatives on the basis of common mobility measures, the Missoula urban area travel demand model was utilized to provide a general comparison of effects upon vehicle miles of travel (VMT), vehicle hours of travel (VHT), and capacity deficiencies on major roadway segments for the No-Action Alternative and the build alternatives.

VMT and VHT are common transportation system mobility measures that represent the overall amount of VMT and VHT. VMT and VHT output from the Missoula travel demand model based on future (2025) daily travel was used for comparing alternatives. The model was used to compare alternatives at the regional level that accounts for the entire Missoula urban planning area and at the project area level.

The operating capacity of US 93 through the project area is related to the signal timing and the geometric characteristics of the highway, as well as the volume and composition of traffic on the highway. Traffic signals constrain capacity at intersection approaches by allocating time among conflicting travel movements that utilize a common space at an intersection. While traffic volumes on US 93 are projected to increase over time, the capacity of the highway is assumed to remain the same.

The projected increases in population for Missoula County and the project area will require transportation system improvements to support expected growth. Even with provision of increased capacity of the existing roadway network, transit system and service expansion, and non-motorized system improvements recommended in the *2004 Missoula Urban Transportation Plan Update*, VMT, VHT, and capacity deficiencies on major roadway corridors are projected to increase.

4.4.1.1 Roadway Operations Impacts Alternative 1: No-Action

Traffic Flow and Roadway Volumes

In 2025, traffic flow patterns on US 93 and Miller Creek Road through the project area are expected to be similar to the current patterns, with predominantly northbound (eastbound) flow toward the Missoula urban core occurring during the typical weekday AM peak period, and predominantly southbound (westbound) flow occurring during the PM peak period. Completion of planned development in the Miller Creek area expected to occur within the next 20 years would result in an overall increase in travel within the western portion of the project area. Nearly all traffic generated by this new development would use the existing access at Miller Creek Road to US 93.

A comparison of existing average daily traffic (ADT) volumes with forecasted 2025 ADT volumes reveals that traffic volumes are expected to increase on all major roadway segments that serve

the Miller Creek area, and that some roadway segments would experience substantially increased volumes over the next 20+ years (see **Table 4-6, page 4-22** and **Figure 4-1**).

By 2025, traffic volumes on the segments of US 93 that serve the project area are expected to increase by more than 16,000 vehicles per day (vpd) west of Blue Mountain Road and by more than 17,000 vpd on Reserve Street. This represents increases of about 54 percent to 72 percent over existing volumes. Traffic along Old US 93 is expected to more than double between 2005 and 2025. The Old US 93 link between US 93 and Reserve Street is approximately 3,500 feet in length. In the AM, queues in the southbound direction at US 93 are approximately 300 feet, while queues in the northeastbound direction at Reserve Street are approximately 3,500 feet. During the PM, the queues in the southbound direction at US 93 are approximately 3,350 feet, while queues in the northeastbound direction at Reserve Street are approximately 2,625 feet.

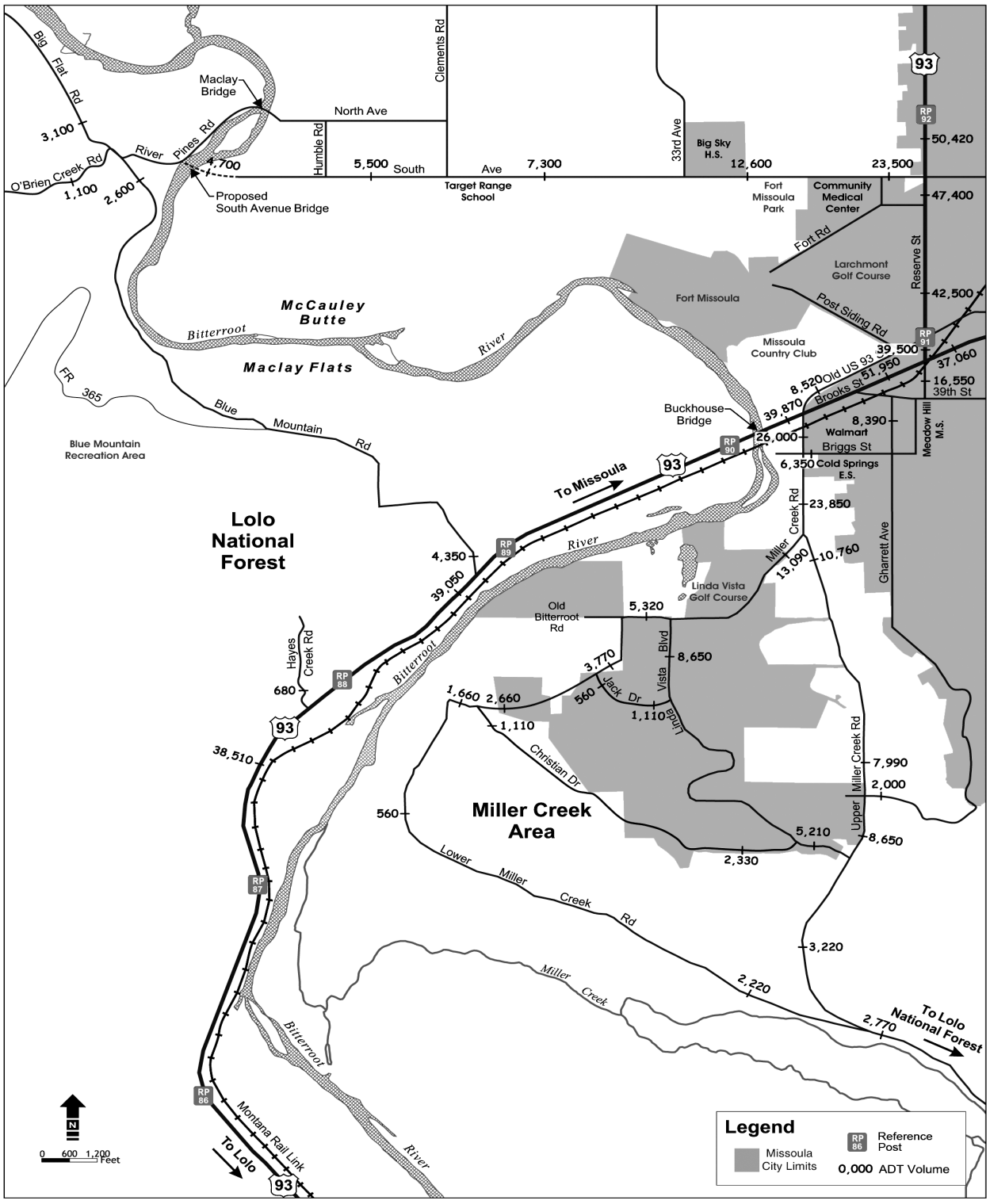
Compared to 2003 ADT volumes, volumes on Miller Creek Road are expected to double by 2025 under the No-Action Alternative primarily due to the planned build-out of the Miller Creek area. ADT on Miller Creek Road between US 93 and Briggs Street is expected to increase by approximately 14,000 vpd, a 117 percent increase over the existing daily volume; and ADT on Miller Creek Road between Briggs Street and the north "Y" intersection is expected to increase by approximately 11,850 vpd, a 99 percent increase over the existing daily volume. Daily volumes on Upper Miller Creek Road are projected to increase between 1,200 vpd on the segment between Linda Vista Boulevard and the south "Y" intersection and 3,150 vpd on the segment south of the north "Y" to Gharrett Street.

The most substantial increases over existing residential volumes are forecasted for Lower Miller Creek Road and Linda Vista Boulevard by 2025. Each of these roadways will serve traffic generated by planned development on the west side of the Miller Creek area. Daily volumes on Lower Miller Creek Road are projected to increase between 2,145 vpd on the segment west of the south "Y" intersection and 8,590 vpd (191 percent) on the segment west of the north "Y." ADT volumes on Linda Vista Boulevard are projected to increase between 3,280 vpd (170 percent) at the approach to Upper Miller Creek Road and 5,690 vpd (192 percent) on the approach to Lower Miller Creek Road. Christian Drive, which will be extended to intersect Lower Miller Creek Road, and Jack Drive will both provide direct connections between Lower Miller Creek Road and Linda Vista Boulevard. Both of these roads, which currently convey less than 500 trips per day, are expected to collect traffic from surrounding development, and the forecasted volumes on these roads will range between 560 and 2,330 vpd, consistent with other residential roads in the area.

Other key project area roadways that will experience an increase in daily traffic volume by 2025 under the No-Action Alternative include Briggs Street and Gharrett Street near the Miller Creek area, and Blue Mountain Road, Big Flat Road, and South Avenue that serve the west portion of Missoula, including the Target Range area. Some of the traffic growth forecasted for Briggs Street and Gharrett Street under the No-Action Alternative would result from traffic diverting from Miller Creek Road, particularly during the peak AM and PM traffic periods, but also due to Wal-Mart improvements or access changes. 2003 ADT volumes on Blue Mountain Road range from approximately 2,140 vpd directly north of US 93 to 1,000 vpd south of the intersection with Big Flat/River Pines/O'Brien Creek roads. Under the No-Action Alternative, 2025 ADT volumes on Blue Mountain Road are projected to increase by 2,210 vpd (103 percent) north of US 93 and by 1,600 vpd (160 percent) south of the Big Flat/River Pines/O'Brien Creek intersection compared to existing conditions. An increase in traffic is anticipated as a result of multiple factors, including:

- Increased travel demand generated by planned growth in the western part of the Missoula area.
- Current and planned development near the US 93/Blue Mountain Road intersection.
- Increased use of recreation areas served by Blue Mountain Road.

Figure 4-1
No-Action Alternative: 2025 ADT Volumes



- Use of Blue Mountain Road, Big Flat Road, and South Avenue as alternate travel routes by some drivers seeking to avoid more congested travel on US 93.

Table 4-6 provides a comparative summary of forecasted 2025 ADT volumes for major project area roadway segments for all of the alternatives. 2025 forecasted ADT volumes are summarized by alternative in the sections that follow **Table 4-6**. The following roadways were found to have no noticeable change in traffic volumes in the future for any of the build alternatives when compared to the No-Action Alternative and are therefore not presented in **Table 4-6**.

- Brooks Street (east of Reserve Street)
- Reserve Street (north of South Avenue)
- Reserve Street (south of South Avenue)
- Reserve Street (north of Old US 93)
- Lower Miller Creek Road (south of south "Y")

Mobility

VMT and VHT in the Missoula urban area and in the project area are expected to increase as population, employment, and traffic growth occurs. Planned growth and development of the roadway system as part of the planned Miller Creek area build-out would increase project area VMT and VHT. 2025 VHT for the region is forecasted to be approximately 1.3 million; project area VHT is forecasted to be about 90,200, or about 7 percent of the regional total. Under the No-Action Alternative, lengthy delays and long queues are expected as the street system becomes saturated with traffic and movement becomes very difficult. Congested conditions on Old US 93 without capacity improvements, including left turn provisions, would make access to and from adjacent businesses and Post Siding Road difficult.

The *2004 Missoula Urban Transportation Plan Update* used 2000 as the base/existing year and 2025 as the future year for the capacity analyses conducted. Adjustments were made to the 2025 plan analysis results based on model refinements conducted for the No-Action Alternative. **Table 4-7** summarizes the 2025 No-Action Alternative analysis compared to the existing (2000) congestion analysis for key roadways that serve the project area.

The results show that segments of US 93/Reserve Street north and south of South Avenue are projected to deteriorate from average daily *at capacity* and *approaching capacity* congestion deficiency levels to *over capacity* conditions by 2025. Brooks Street east of US 93/Reserve Street is projected to deteriorate from *approaching capacity* to *over capacity* conditions.

Within the Miller Creek area, Miller Creek Road between US 93 and the north "Y" intersection is projected to remain at an average daily *at capacity* congestion level condition. Changes in congestion from current acceptable conditions are expected to occur on Lower Miller Creek Road between the north "Y" and Linda Vista Boulevard intersections, where 2025 daily congestion levels are expected to degrade to *at capacity* conditions.

Capacity deficiencies on South Avenue from 33rd Avenue to 0.25 mile west of Reserve Street, 39th Street east of US 93/Brooks Street, and Gharrett Street between 39th and Briggs Streets are projected to degrade from *approaching capacity* to *at capacity* congestion levels.

4.4.1.2 Roadway Operations Impacts Common to All Build Alternatives

Traffic Flow and Roadway Volumes on Old US 93

Additional lanes on Old US 93 and on Reserve Street between US 93 and Old US 93 add capacity to serve the northbound and southbound peak travel under all of the build alternatives. The

Table 4-6
2025 ADT Volume/Percent Change from No-Action Alternative

Road Segment	Alt. 1 No-Action	Alt. 2B N. Lower Miller Creek Grade-Separated Intersection	Alt. 3B Blue Mtn. Rd. Grade-Separated Intersection	Alt. 4C S. Lower Miller Creek Interchange	Alt. 5A Miller Creek Rd. At-Grade Intersection (Preferred Alternative)
Brooks St. (E. of Miller Creek Rd.)	51,950	-24%	-24%	-23%	-24%
US 93 (S. of Miller Creek Rd.)	39,870	23%	19%	16%	0%
US 93 (S. of Blue Mountain Rd.)	39,050	0%	0%	17%	0%
Reserve St. (Old US 93-US 93)	39,500	-29%	-29%	-29%	-29%
Reserve St. (S. of US 93)	16,550	-4%	-3%	-2%	-3%
Old US 93 (N. of US 93)	8,520	**138%**	**138%**	**138%**	**138%**
Miller Creek Rd. (US 93-Briggs St.)	26,000	**-43%**	**-37%**	**-30%**	7%
Miller Creek Rd. (Briggs St.-north "Y")	23,850	**-42%**	**-37%**	**-30%**	7%
Upper Miller Creek Rd. (S. of north "Y")	10,760	-3%	-1%	-5%	11%
Upper Miller Creek Rd. (N. of Gharrett St.)	7,990	-20%	-20%	-20%	0%
Upper Miller Creek Rd. (S. of Gharrett St.)	8,650	-25%	-25%	-25%	0%
Upper Miller Creek Rd. (Linda Vista-Lower Miller Creek Rd.)	3,220	-4%	-7%	0%	0%
Briggs St. (E. of Miller Creek Rd.)	6,350	-10%	-18%	-15%	-12%
Lower Miller Creek Rd. (W. of north "Y")	13,090	**-75%**	**-66%**	**-50%**	4%
Lower Miller Creek Rd. (W. of Linda Vista)	5,320	**30%**	22%	**-44%**	0%
Lower Miller Creek Rd. (S. of Old Bitterroot Rd.)	3,770	**-73%**	**-70%**	**-44%**	0%
Lower Miller Creek Rd. (E. of Christian Dr.)	2,660	**65%**	**-32%**	**32%**	0%
Lower Miller Creek Rd. (W. of Christian Dr.)	1,660	**33%**	**45%**	**298%**	0%
Lower Miller Creek Rd. (S. of sharp curve)	560	**96%**	**132%**	**150%**	0%
Lower Miller Creek Rd. (W. of south "Y")	2,220	0%	8%	17%	0%
Linda Vista Blvd. (S. of Lower Miller Creek Rd.)	8,650	14%	21%	4%	0%
Linda Vista Blvd. (W. of Upper Miller Creek Rd.)	5,210	**-37%**	**-33%**	-29%	0%
Old Bitterroot Rd. (W. of Lower Miller Creek Rd.)		**5,950%**	**5,850%**	0%	0%
Jack Dr. (S. of Lower Miller Creek Rd.)	560	**204%**	**61%**	**213%**	0%
Jack Dr. (W. of Linda Vista)	1,110	8%	-28%	0%	0%
Christian Dr. (S. of Lower Miller Creek Rd.)	1,110	**98%**	**125%**	**206%**	0%
Christian Dr. (W. of Linda Vista.)	2,330	**-53%**	**-53%**	-6%	0%
Gharrett St. (S. of 39th St.)	8,390	-12%	-8%	-3%	-11%
Gharrett St. (E. of Upper Miller Creek Rd.)	2,000	-15%	-15%	-5%	-25%
Blue Mountain Rd. (N. of US 93)	4,350	6%	11%	6%	0%
Blue Mountain Rd. (S. of River Pines Rd.)	2,600	8%	15%	8%	0%
Proposed South Ave. Bridge	4,700	2%	4%	2%	0%
South Ave. (W. of Clements)	5,500	2%	4%	2%	0%
South Ave. (E. of Clements)	7,300	1%	3%	1%	0%
South Ave. (E. of 33rd)	12,600	1%	2%	1%	0%

Segments with substantial (>30%) increase or decrease are in bold.
ADT = Average Daily Traffic.

0%-10% increase/decrease = minimal change.
11%-30% increase = moderate increase.
>30% increase = substantial increase.
11%-30% decrease = moderate decrease.
>30% decrease = substantial decrease.

Table 4-7
Roadway Segment Capacity Deficiencies—Existing and 2025 No-Action Alternative

Roadway	Segment	Existing Capacity Deficiency	2025 No-Action Alternative Capacity Deficiency
US 93/Reserve St.	South Ave. north to South 3rd West	At Capacity (v/c 1.01-1.19)	Over Capacity (v/c >1.20)
US 93/Reserve St.	South Ave. south to Brooks St.	Approaching Capacity (v/c 0.8-1.0)	Over Capacity (v/c >1.20)
US 93	Reserve St. south to Lolo	Approaching Capacity (v/c 0.8-1.0)	Over Capacity (v/c >1.20)
Miller Creek Rd.	US 93/Brooks St. to north "Y"	At Capacity (v/c 1.01-1.19)	At Capacity (v/c 1.01-1.19)
Upper Miller Creek Rd.	North "Y" to south "Y"	Approaching Capacity (v/c 0.8-1.0)	Approaching Capacity (v/c 0.8-1.0)
Lower Miller Creek Rd.	Linda Vista Blvd. to north "Y"	No Capacity Deficiency (v/c <0.8)	At Capacity (v/c 1.01-1.19)
Brooks St.	East of Reserve St.	Approaching Capacity (v/c 0.8-1.0)	Over Capacity (v/c >1.20)
Reserve St.	US 93/Brooks St. to 39th St.	Approaching Capacity (v/c 0.8-1.0)	Approaching Capacity (v/c 0.8-1.0)
South Ave.	1/4-mile west of US 93/Reserve St. to US 93/Reserve St.	At Capacity (v/c 1.01-1.19)	At Capacity (v/c 1.01-1.19)
South Ave.	33rd Ave. to 1/4-mile west of US 93/ Reserve St.	Approaching Capacity (v/c 0.8-1.0)	At Capacity (v/c 1.01-1.19)
39th St.	East of US 93/Brooks St.	Approaching Capacity (v/c 0.8-1.0)	At Capacity (v/c 1.01-1.19)
Gharrett St.	39th Street to Briggs St.	Approaching Capacity (v/c 0.8-1.0)	At Capacity (v/c 1.01-1.19)
Gharrett St.	Briggs Street to 55th St.	Approaching Capacity (v/c 0.8-1.0)	Approaching Capacity (v/c 0.8-1.0)

Sources: *2004 Missoula Urban Transportation Plan Update* and refined project area estimates by David Evans and Associates, Inc.

capacity added through the new lanes relieves a bottleneck on US 93 at its intersection with Miller Creek Road and Reserve Street. Traffic operations on the primary roadways improve with the removal of the bottleneck on US 93.

Old US 93 would receive an additional northbound travel lane. This improvement to Old US 93 improves traffic flow along all study area roadways (US 93, Miller Creek Road, Reserve Street, Old US 93).

Major travel movements are improved through the addition of intersection approach lanes, and improved traffic signalization for US 93/Old US 93/Miller Creek Road, US 93 (Brooks)/Reserve, and Reserve/Old US 93. Traffic patterns would be more evenly distributed between US 93 and Old US 93. Evenly distributed traffic would provide for a more efficient network, reduce intersection queuing, and reduce travel delay.

Improvements to Old US 93 and the adjacent intersections are the same with all of the build alternatives. The segment of Old US 93 north of US 93 would have traffic volume increases by more than 11,700 vehicles per day compared to the No-Action Alternative.

Under all of the build alternatives, traffic operations for the major traffic movements would be improved over the No-Action Alternative. Traffic queues along Old US 93 under Alternative 5A are expected to be as follows:

AM Peak Period:

- Old US 93 and Reserve Street: At the intersection of Old US 93 and Reserve Street, the northbound queue would extend approximately 400 feet on Old US 93 from the intersection during the AM Peak period. This queue would impede access to business driveways near the Old US 93 and Reserve Street intersection.
- US 93/Miller Creek Road/Old US 93: At the intersection of US 93/Miller Creek Road/Old US 93, the southbound queue would extend approximately 300 feet along Old US 93 during the AM Peak period. The queue would end short of the Missoula Country Club entrance that is located 400 feet north of US 93.

PM Peak Period:

- Old US 93 and Reserve Street: At the intersection of Old US 93 and Reserve Street, the southbound queue would extend approximately 400 feet along Reserve Street during the PM peak period.
- US 93/Miller Creek Road/Old US 93: At the intersection of US 93/Miller Creek Road/Old US 93, the southbound queue would extend approximately 600 feet north along Old US 93 during the PM Peak period. This queue would impede access to the Missoula Country Club golf course.

Traffic Flow and Roadway Volumes Common to Bridge Alternatives

Based upon the projected increase in traffic on US 93, the majority of traffic exiting the Miller Creek area via the bridge/second access onto US 93 during the AM peak period would be forced to merge into a long queue of traffic extending to, or past Blue Mountain Road. Furthermore, most drivers would still have to travel through the Miller Creek Road intersection. Traffic modeling shows that with a bridge at Blue Mountain Road, the AM Peak queue would extend to Blue Mountain Road.

All of the bridge and new roadway alternatives (2B, 3B, 4C) would experience a substantial (greater than 30 percent) increase in daily traffic volumes compared to the No-Action Alternative for the following roadway segments:

- Lower Miller Creek Road (west of Christian Drive)
- Lower Miller Creek Road (south of sharp curve)
- Jack Drive (south of Lower Miller Creek Road)
- Christian Drive (south of Lower Miller Creek Road)

All of the bridge and new roadway alternatives (2B, 3B, 4C) would experience a substantial (greater than 30 percent) reduction in daily traffic volumes compared to the No-Action Alternative for the following roadway segments:

- Miller Creek Road (US 93-north "Y")
- Lower Miller Creek Road (west of north "Y")
- Lower Miller Creek Road (between Old Bitterroot Road and Jack Drive)

Mobility

Despite the increase in vehicle lanes included with all of the build alternatives, each of the alternatives would result in a small reduction in regional and project area VMT compared to the No-Action Alternative. This reduction is due to a shift in traffic to shorter, more direct travel routes for the majority of trips in and out of the Miller Creek area. Existing and forecasted traffic volumes under any of the build alternatives do not appear to warrant an additional travel lane or turn-lane capacity for motorized vehicle travel on Blue Mountain Road beyond the modifications proposed under each build alternative near the junction with US 93.

None of the build alternatives are expected to result in a notable change in regional VMT and VHT compared to the No-Action Alternative. As described in the following sections, each alternative would contribute to slightly different levels of change in VMT for the Miller Creek area. All of the build alternatives would reduce VHT for the Miller Creek area. All of the build alternatives would result in a substantial reduction in overall time spent traveling within the project area.

Compared to the No-Action Alternative, each of the build alternatives would enhance mobility for vehicular and non-motorized travel modes by providing improvements that conform to current standards and meet forecasted travel demands on affected roadways, including portions of US 93, Miller Creek Road, and Old US 93.

Each of the build alternatives would provide signal-protected access from Old US 93 to Reserve Street, including a non-motorized crossing of Reserve Street on the south side of the intersection that would be accessible to pedestrians and bicyclists.

4.4.1.3 Roadway Operations Impacts Alternative 2B: North Lower Miller Creek Grade-Separated Intersection

Traffic Flow and Roadway Volumes

Figure 4-2 shows forecasted 2025 ADT volumes on major project area roadway segments under Alternative 2B and illustrates daily volume change on different roadways compared to the No-Action Alternative. **Table 4-6** provides a comparative summary of forecasted 2025 ADT volumes for all the alternatives.

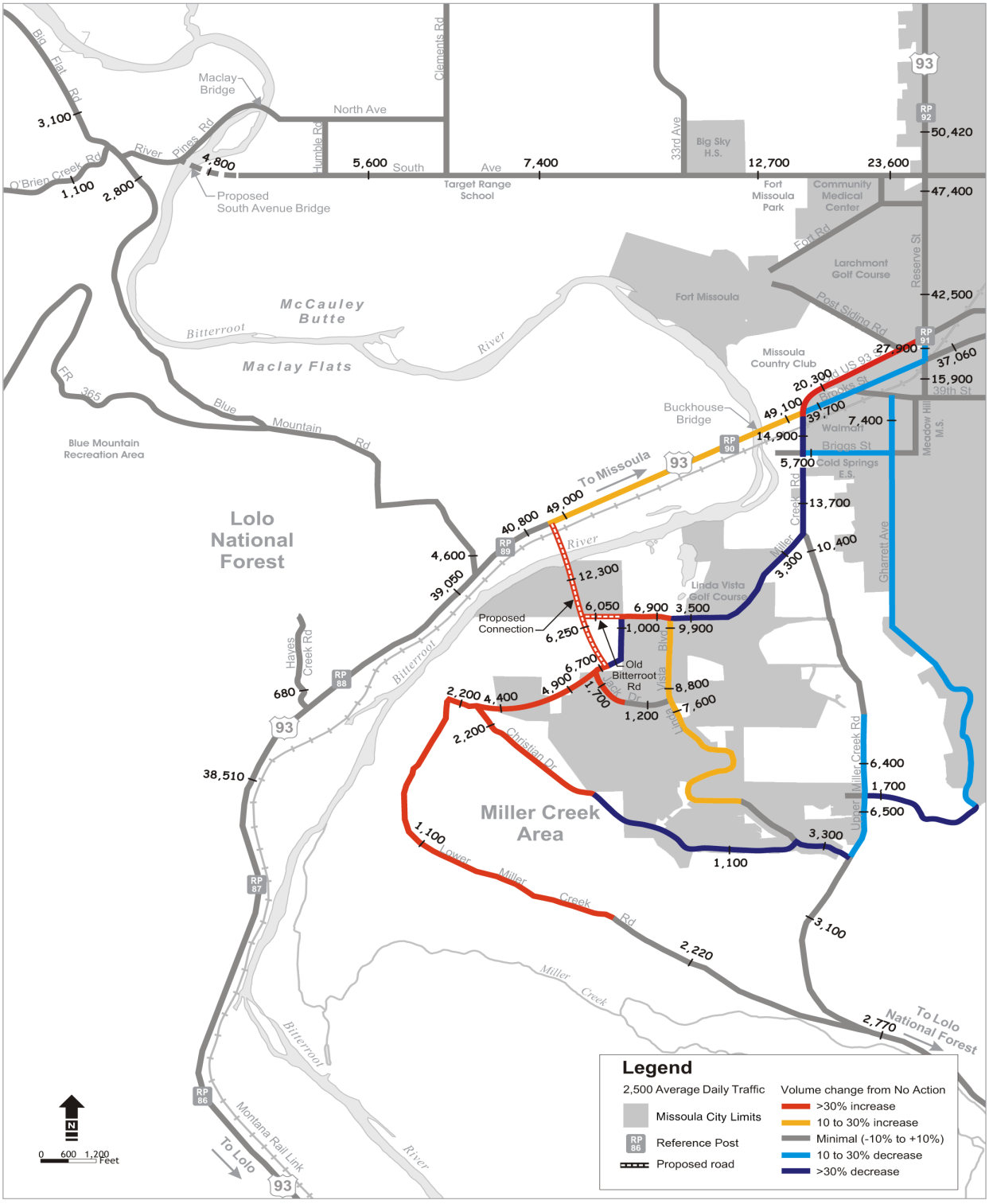
Construction of a new two-lane roadway connecting Lower Miller Creek Road to US 93 at the North Lower Miller Creek alignment is expected to result in a shift of traffic within the Miller Creek area. Under this alternative, drivers entering and exiting the area to and from US 93 are expected to distribute at nearly equal volumes between Miller Creek Road and the proposed North Lower Miller Creek roadway connection. As a result of the shift in traffic from Miller Creek Road to the proposed North Lower Miller Creek connection, the future daily volume on the segment of US 93 between the new connection and the intersection with Miller Creek Road is forecasted to increase by 23 percent, approximately 9,230 vpd compared to the No-Action Alternative.

The forecasted 2025 ADT for Miller Creek Road is approximately 11,100 fewer vpd under Alternative 2B compared to the No-Action Alternative. Approximately 12,300 vpd are forecasted to use the proposed Alternative 2B connection between US 93 and Old Bitterroot Road (an existing residential driveway that would be reconstructed as a two-lane approach road west of Lower Miller Creek Road to the new road connecting to US 93); and 6,050 vpd are forecasted to use the proposed approach road extending south from Old Bitterroot Road to Lower Miller Creek Road.

Section 4.4.1.2, page 4-21 describes traffic impacts common to the bridge and new roadway alternatives. In addition, substantial (greater than 30 percent) increases in daily traffic volumes would occur on major roadway segments in the project area under Alternative 2B, including:

- Old Bitterroot Road would increase by more than 5,950 vpd.
- The segment of Lower Miller Creek Road between Old Bitterroot Road and Linda Vista Boulevard would experience an increase of 1,740 vpd.
- Lower Miller Creek Road from east of Jack Drive to Christian Drive on the west side of the Miller Creek area would experience increases of 560 vpd (west of Christian Drive) to 1,740 vpd (east of Jack Drive).

Figure 4-2
Alternative 2B: North Lower Miller Creek: 2025 ADT Volumes



Compared to the No-Action Alternative, substantial (greater than 30 percent) reduction in daily traffic volumes would occur on major roadway segments in the project area, including Miller Creek Road (as noted above), and these segments:

- The segment of Upper Miller Creek Road between Gharrett Street and Linda Vista Boulevard would experience a decrease of 1,900 vpd.
- The segment of Linda Vista Boulevard between Christian Drive and Upper Miller Creek Road would experience a decrease of 1,910 vpd.
- The east end of Christian Drive at the approach to Linda Vista Boulevard would experience a decrease of 1,230 vpd.

Blue Mountain Road and South Avenue would likely experience minimal change under Alternative 2B compared to the No-Action Alternative. ADT volume would increase by approximately 200 vpd on Blue Mountain Road and 100 vpd on South Avenue from the South Avenue Bridge to Reserve Street, representing an increase of 6 to 8 percent on Blue Mountain Road and no more than 2 percent on South Avenue.

Mobility

Compared to the No-Action Alternative, Alternative 2B would reduce regional VMT by less than 1 percent, and VMT within the Miller Creek area by approximately 4 percent. This reduction results from the shorter distance for travel on the local and collector roads for more trips in the Miller Creek area using the North Lower Miller Creek connection to US 93 compared to Alternative 4C. Compared to the No-Action Alternative and Alternative 5A, Alternative 2B would contribute to a more even distribution of travel through the area. Alternative 2B would increase VMT on US 93 by approximately 4 percent by shifting traffic from the local/collector network to the highway.

4.4.1.4 Roadway Operations Impacts Alternative 3B: Blue Mountain Road Grade-Separated Intersection

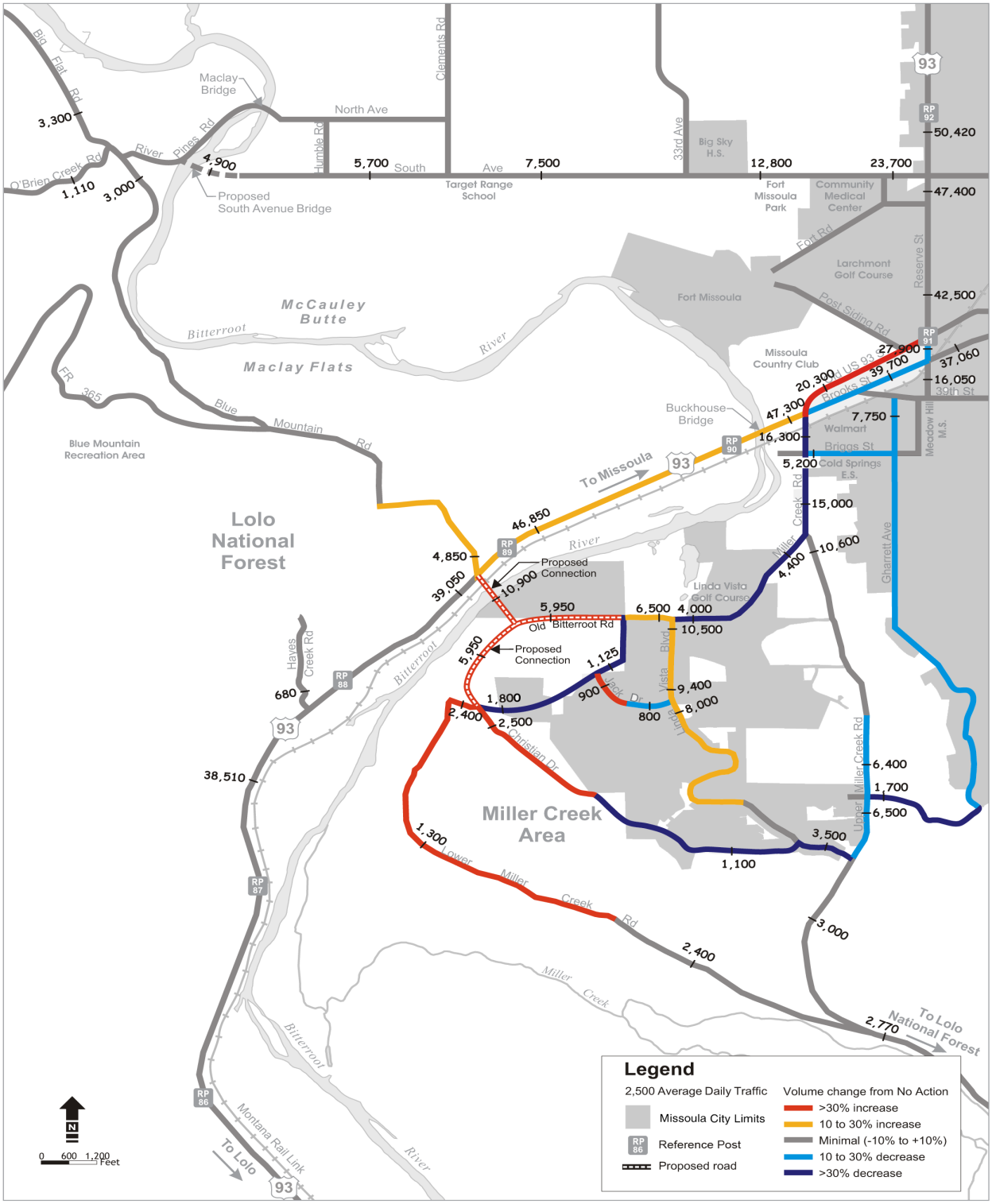
Traffic Flow and Roadway Volumes

Figure 4-3 shows forecasted 2025 ADT volumes on major project area roadway segments under Alternative 3B and illustrates percentages of daily volume change on different roadways compared to the No-Action Alternative. **Table 4-6, page 4-22** provides a comparative summary of 2025 forecasted ADT volumes for all the alternatives.

Construction of a new two-lane roadway connecting Lower Miller Creek Road to US 93 at the Blue Mountain Road alignment is expected to result in a shift of traffic entering/exiting the Miller Creek area. A portion of drivers entering and exiting the area to and from US 93 would shift from the existing access at Miller Creek Road to the proposed road extension at Blue Mountain Road. Under Alternative 3B, 2025 ADT volumes on Blue Mountain Road are projected to increase by 500 vpd (11 percent) north of US 93 and by 400 vpd (15 percent) south of the Big Flat/River Pines/O'Brien Creek intersection compared to the No-Action Alternative. Even the highest projected 2025 volumes for Blue Mountain Road under Alternative 3B would not be close to the capacity of this two-lane rural roadway. However, as previously described, local improvements would be necessary to address safety issues that currently exist.

As a result of the shift in traffic from Miller Creek Road to the proposed Blue Mountain Road connection, the future daily volume on the segment of US 93 between Blue Mountain Road and the intersection with Miller Creek Road is forecasted to increase by approximately 6,980 to 7,430 vpd, or approximately 19 percent, compared to the No-Action Alternative. Compared to Alterna-

Figure 4-3
Alternative 3B: Blue Mountain Road:
2025 ADT Volumes



tive 2B, this represents a smaller increase in volume, but would affect a longer segment of US 93 west of Miller Creek Road.

Forecasted 2025 ADT for Miller Creek Road is 8,850 to 9,700 less vpd, representing a 37 percent decrease in traffic under Alternative 3B compared to the No-Action Alternative. The second access proposed at Blue Mountain Road under Alternative 3B would attract 10,900 vpd, approximately 1,400 fewer daily trips than the proposed connection under Alternative 2B. This is due to an approximately 0.5-mile increase in out-of-direction travel that would be required under Alternative 3B for some trips between the Miller Creek area and the Missoula urban core area. Approximately 5,950 vpd are forecasted to use the proposed approach road extending south from Old Bitterroot Road to Lower Miller Creek Road.

Alternative 3B would experience substantial (greater than 30 percent) increases in daily traffic volumes on Old Bitterroot Road. Current volumes are less than 100 vehicles per day and would increase by more than 5,850 vpd.

Compared to the No-Action Alternative, substantial (greater than 30 percent) reduction in daily traffic volumes would occur on major roadway segments in the project area, including Miller Creek Road (as noted previously), and these segments:

- The segment of Linda Vista Boulevard between Christian Drive and Upper Miller Creek Road would experience a decrease of 1,710 vpd, or a 33 percent decrease in traffic.
- The east end of Christian Drive at the approach to Linda Vista Boulevard would experience a decrease of 1,230 vpd, or a 53 percent decrease in traffic.

Compared to the No-Action Alternative, ADT volumes would increase on Blue Mountain Road by 400 to 500 vpd and on South Avenue by approximately 200 vpd from the South Avenue Bridge to Reserve Street. This represents increases of 11 percent to 15 percent on Blue Mountain Road and no more than 4 percent on South Avenue. However, there would be a 1 percent traffic increase on South Avenue west of Reserve Street and on O'Brien Creek Road. Big Flat Road (north of River Pines Road) would experience a 6 percent increase in traffic over the No-Action Alternative with Alternative 3B, whereas there is no noticeable increase with the other build alternatives.

Mobility

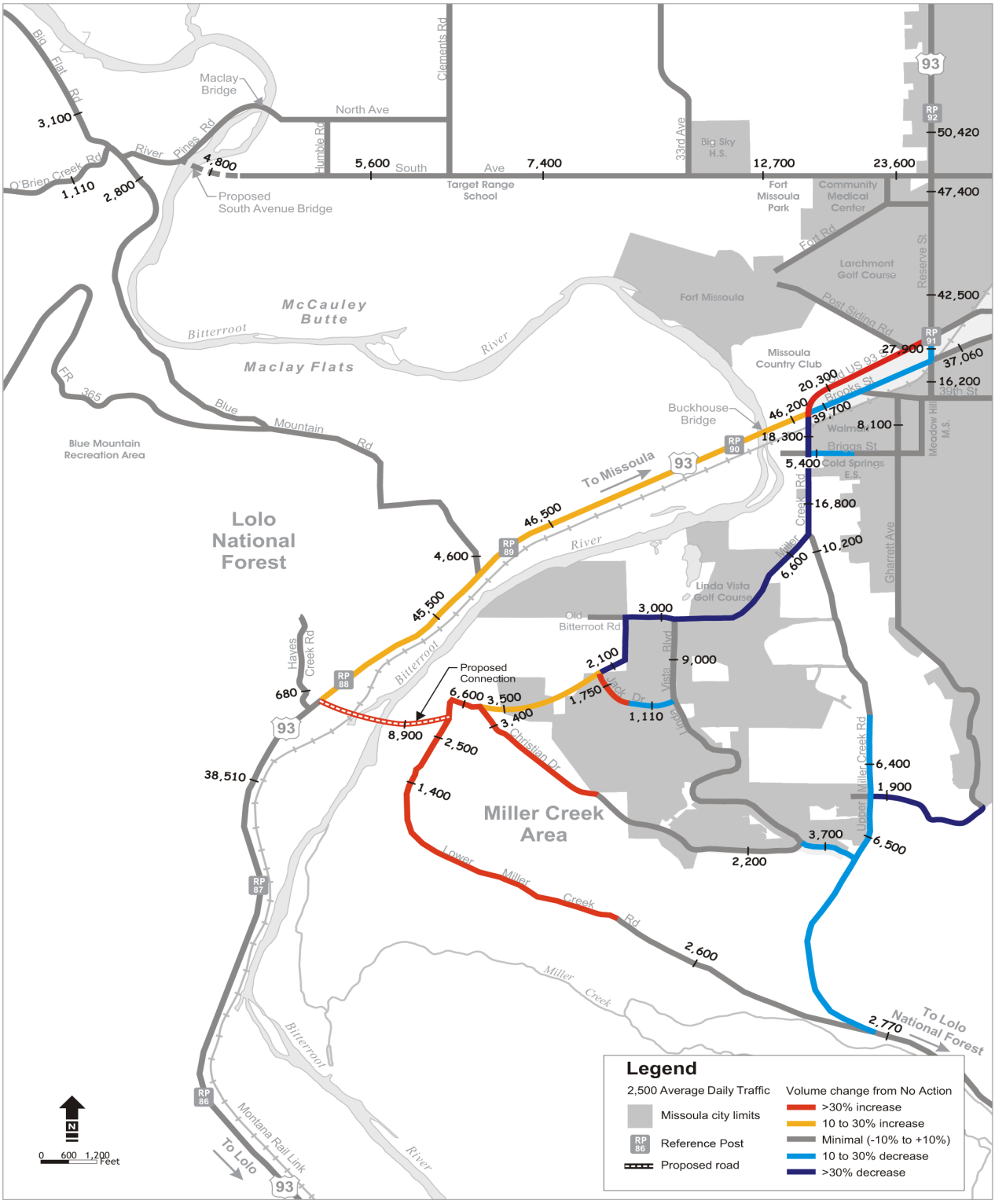
Compared to the No-Action Alternative, Alternative 3B would reduce regional VMT by approximately 1 percent. Similar to Alternative 2B, Alternative 3B would reduce VMT within the Miller Creek area by approximately 4 percent. This reduction results from the shorter distance for travel on the local and collector roads for more trips in the Miller Creek area using the Blue Mountain Road connection to US 93 compared to Alternative 4C. Compared to the No-Action Alternative and Alternative 5A, Alternative 3B would contribute to a more even distribution of travel through the area. Alternative 3B would increase VMT on US 93 by approximately 7 percent by shifting traffic from the local/collector network to the highway.

4.4.1.5 Roadway Operations Impacts Alternative 4C: South Lower Miller Creek Interchange

Traffic Flow and Roadway Volumes

Figure 4-4 shows forecasted 2025 ADT volumes on major project area roadway segments under Alternative 4C and illustrates percentages of daily volume change on different roadways compared to the No-Action Alternative. **Table 4-6, page 4-22** provides a comparative summary of forecasted 2025 ADT volumes for all the alternatives.

Figure 4-4
Alternative 4C: South Lower Miller Creek: 2025 ADT Volumes



Construction of a new two-lane roadway connecting Lower Miller Creek Road to US 93 at a South Lower Miller Creek interchange is expected to result in a shift of traffic entering/exiting the Miller Creek area as a portion of drivers entering and exiting the area to and from US 93 shift from the current access at Miller Creek Road to the proposed South Lower Miller Creek connection.

As a result of the shift in traffic from Miller Creek Road to the proposed South Lower Miller Creek connection, the future daily volume on the segment of US 93 between the new South Lower Miller Creek connection and the US 93 intersection with Miller Creek Road is forecasted to increase by approximately 6,330 to 6,630 vpd, or 16 percent, compared to the No-Action Alternative. Compared to Alternatives 2B and 3B, this represents a smaller increase in volume, but would affect a longer segment of US 93 west of Miller Creek Road and would load additional traffic onto US 93 south of the signalized intersection at Blue Mountain Road.

The forecasted 2025 ADT for the existing access at Miller Creek Road is 7,050 to 7,700 fewer vpd under Alternative 4C compared to the No-Action Alternative. Approximately 8,900 vpd are forecasted to use the new South Lower Miller Creek connection between US 93 and Lower Miller Creek Road. The second access into the Miller Creek area proposed under Alternative 4C would attract approximately 3,400 fewer daily trips than the proposed connection under Alternative 2B, and approximately 2,000 fewer daily trips than the proposed connection under Alternative 3B due to a 1.0-mile to 1.5-mile increase in out-of-direction travel that would be required under Alternative 4C for some trips between the Miller Creek area and the Missoula urban core area.

In addition to the description in Section 4.4.1.2, page 4-21, Alternative 4C would experience a substantial (greater than 30 percent) increase in daily traffic volumes on Lower Miller Creek Road from east of Christian Drive (32 percent).

Compared to the No-Action Alternative, substantial (greater than 30 percent) reduction in daily traffic volumes would occur on Lower Miller Creek Road west Linda Vista Boulevard, representing an approximate 44 percent decrease in traffic.

Compared to the No-Action Alternative, ADT volumes would increase on Blue Mountain Road by 200 vpd and on South Avenue by approximately 100 vpd from the South Avenue Bridge to Reserve Street. This represents increases of 6 percent to 11 percent on Blue Mountain Road and no more than 2 percent on South Avenue.

Mobility

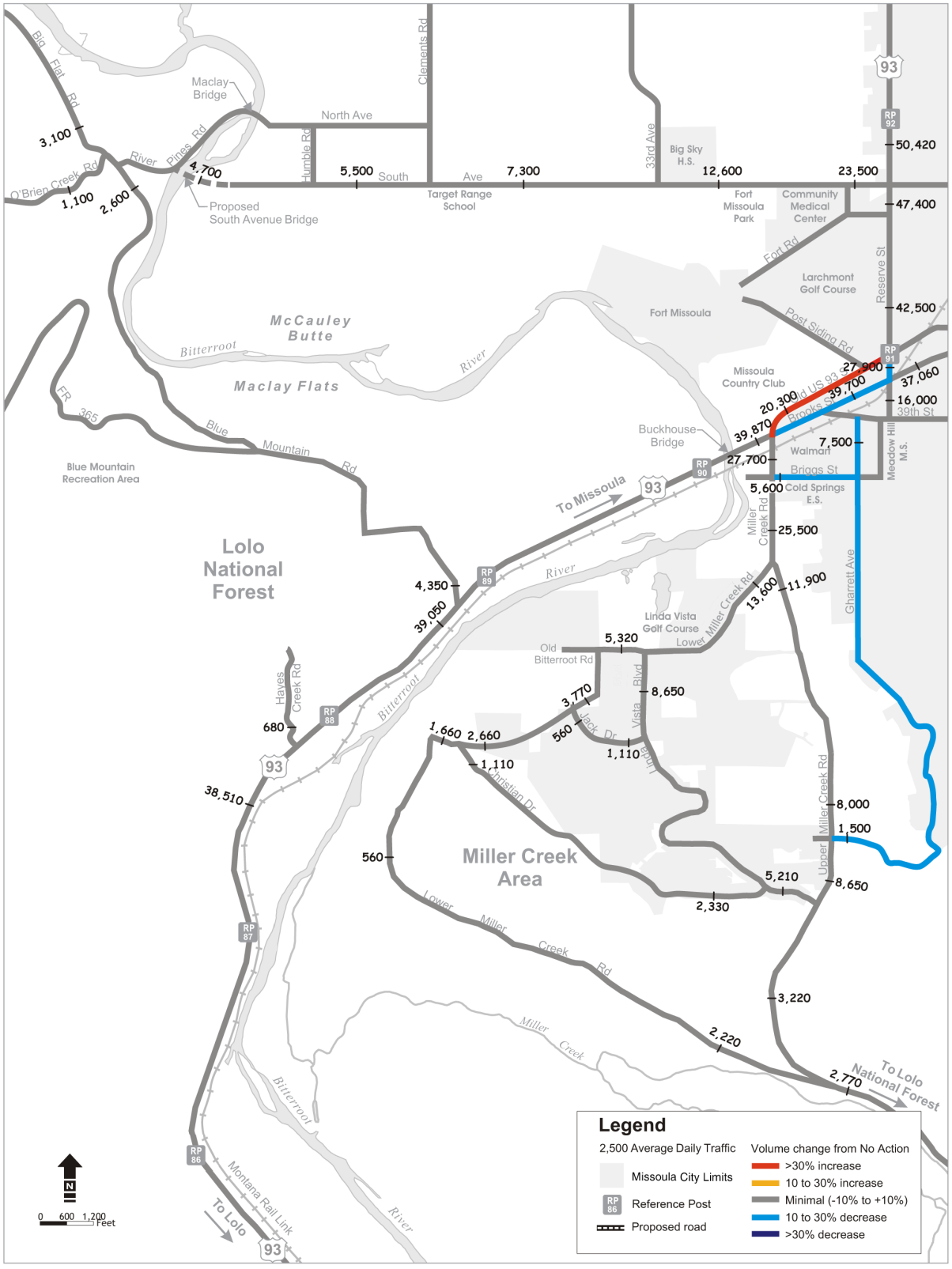
Compared to the No-Action Alternative, Alternative 4C would reduce regional VMT by less than 1 percent and VMT within the Miller Creek area by approximately 3 percent. Compared to the No-Action Alternative and Alternative 5A, Alternative 4C would contribute to a more even distribution of travel through the area, but would reduce VMT less than Alternatives 2B and 3B because of the greater distance and required out-of-direction travel for a portion of trips in and out of the Miller Creek area. Of all the build alternatives, Alternative 4C would result in the greatest shift of VMT from the collector/local roadway network to US 93. VMT on US 93 within the project area is projected to increase by approximately 8 percent under Alternative 4C compared to the No-Action Alternative.

4.4.1.6 Roadway Operations Impacts Alternative 5A: Miller Creek Road At-Grade Intersection — Preferred Alternative

Traffic Flow and Roadway Volumes

Figure 4-5 shows forecasted 2025 ADT volumes on major project area roadway segments under Alternative 5A and illustrates daily volume changes on different roadways compared to the

Figure 4-5
Alternative 5A: Miller Creek Road At-Grade Intersection — Preferred Alternative 2025 ADT Volumes



No-Action Alternative. **Table 4-6, page 4-22** provides a comparative summary of forecasted 2025 ADT volumes on these segments for all alternatives.

Alternative 5A would maintain the current traffic patterns surrounding the Miller Creek area. The future daily volume on the segment of US 93 between the intersection of Miller Creek Road with Reserve Street is expected to decrease by 12,250 vpd compared to the No-Action Alternative. Compared to Alternatives 2B, 3B, and 4C, this represents a large decrease in volume, but affects a shorter segment of US 93 east of Miller Creek Road and loads additional traffic onto Old US 93. Old US 93 is expected to increase by 11,780 vpd. The forecasted 2025 ADT for Miller Creek Road is 1,650 to 1,700 more vpd under Alternative 5A compared to the No-Action Alternative.

Alternative 5A would optimize overall traffic operations along existing routes through the most congested roadway segments in the project area by improving traffic flow with additional travel and turn lanes, signals, and signal coordination.

Compared to the No-Action Alternative, substantial (greater than 30 percent) increases or decreases in daily traffic volumes would not occur on major roadway segments in the project area under Alternative 5A, other than those already discussed.

South Avenue would have a relatively high traffic volume but would likely experience minimal change under Alternative 5A compared to the No-Action Alternative. ADT volumes would not be expected to increase, and could decrease slightly on South Avenue from the South Avenue Bridge to Reserve Street.

Mobility

Compared to the No-Action Alternative, Alternative 5A would result in no measurable change in regional VMT, and would increase project area VMT by less than 1 percent. Alternative 5A would add vehicle lane capacity, but would reduce traffic diversion to longer, out-of-direction routes, such as Gharrett Street, for a portion of trips particularly during peak periods. No notable change in VMT on US 93 is projected under Alternative 5A.

4.4.2 Intersection Operations

Year 2025 AM and PM peak-hour operations were analyzed for future (new or modified) project area roadway segments and intersections under the No-Action Alternative and all build alternatives. The signal operations of all alternatives (No-Action and build) will be optimized to provide the most efficient flow along US 93. Intersection operations are the primary influence on roadway operations on most of the key roadways that serve the project area, including segments of US 93 and Miller Creek Road. As with the existing conditions, level of service (LOS) D was used as the transportation system performance measure for roadway segments and intersections under 2025 peak-hour operating conditions (see **Figure 3-8, page 3-30** and **Figure 3-9, page 3-31** for graphic representations of level of service conditions).

This section describes general operating conditions on US 93 in the critical northbound (eastbound) direction in the 2025 AM peak hour, and in the critical southbound (westbound) direction in the PM peak hour under each alternative. **Table 4-8** provides a summary of these findings. Overall 2025 peak-hour intersection operations and LOS for critical turn movements at key intersections are also described for each alternative. Intersections not addressed in this section were estimated to operate at acceptable LOS. The *Transportation Technical Report* (DEA, 2004, as amended 2006) prepared for this EIS provides greater detail of this analysis. **Figure 4-6** presents intersection lane configurations for all alternatives.

Table 4-8
Summary of US 93 AM/PM Intersection Level of Service (LOS)

Location	Alt. 1[(1)]	Alt. 2B	Alt. 3B	Alt. 4C	Alt. 5A (Preferred Alternative)
Major Intersection LOS					
Old US 93/Reserve St.	(2)	B/B	C/B	C/B	B/A
US 93/Reserve St.	E/F	D/C	D/D	D/D	D/D
US 93 at Miller Creek Rd./ Old US 93	F/F	D/C	D/C	D/C	D/E
US 93 at Blue Mountain Rd.	A/C	A/A	(3)	C/C	A/B
Miller Creek Rd. at Briggs St.	B/C	A/B	A/B	A/B	A/A
North "Y"	B/B	A/A	A/A	B/A	A/B

(1) No-Action assumes locally funded reconstruction project of Miller Creek Road.
(2) Unsignalized intersection, critical eastbound and westbound approaches estimated to operate at LOS E or F.
(3) Unsignalized intersection would operate at improved levels, with uninterrupted flow for travel between US 93 and the grade-separated intersection connection. Acceleration and deceleration lanes would operate at acceptable LOS C or better.

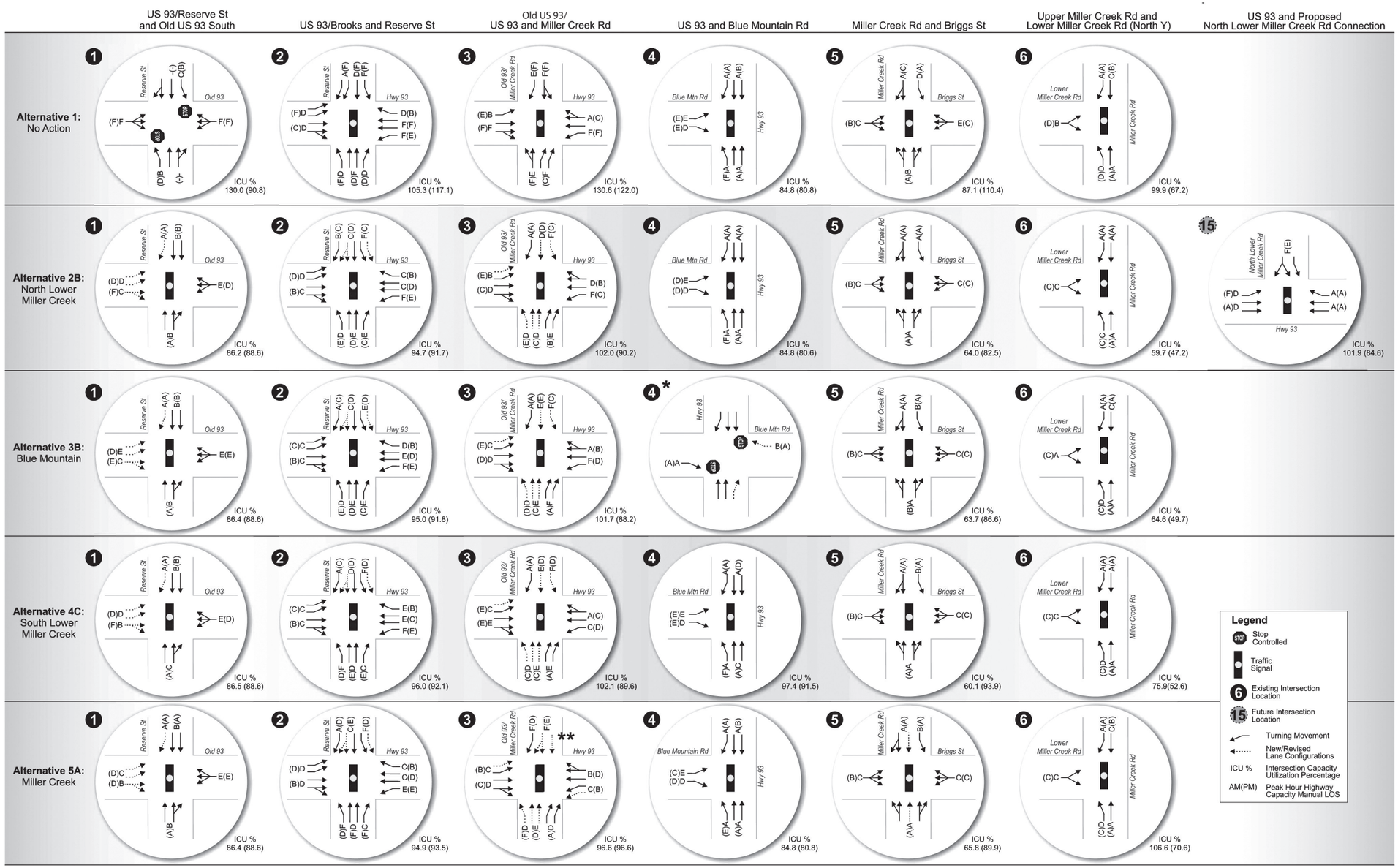
4.4.2.1 Intersection Operation Impacts Alternative 1: No-Action

Under the No-Action Alternative, no construction improvements would occur on Old US 93. However, traffic volumes will continue to increase as discussed in Section 4.4. Under the No-Action Alternative, the critical travel movements and overall operations at intersections on US 93 in the project area for year 2025 AM and PM peak hour are expected to deteriorate to failed conditions. Intersection operation failure is defined as lengthy delays resulting in long vehicle queues where the street system is totally saturated with traffic and movement is very difficult.

Under the No-Action Alternative, the critical movement/overall intersection operations findings for the **2025 AM peak hour** include:

- **Old US 93 at Reserve Street**. At this unsignalized intersection, the eastbound approach to Reserve Street is expected to remain at LOS F with a greater delay. The westbound approach to Reserve Street is expected to deteriorate from LOS C to LOS F.
- **US 93/Brooks Street at Reserve Street**. Overall LOS at this signalized intersection is estimated to deteriorate from LOS C to LOS E. The critical northbound (eastbound) left-turn movement from Brooks to Reserve Street is expected to continue to operate at LOS D. The eastbound through movement on Brooks Street would degrade from LOS B to LOS D.
- **US 93 at Miller Creek Road/Old US 93**. Operations at this signalized intersection are expected to deteriorate to an overall LOS F. The critical eastbound through/right movement on US 93 is expected to deteriorate from LOS E to LOS F. The critical northbound right-turn movement from Miller Creek Road to US 93 would deteriorate from LOS D to LOS F.

Figure 4-6
Intersection Lane Configurations for All Alternatives



* Grade-Separated Intersection, Right-in, Right-out with no signal.
Modeled as two separate intersections slightly offset, combined operations not available.

** The left-turn movement will be allowed during non-peak hours until such time that it is operationally necessary to be removed completely.

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- **US 93 at Blue Mountain Road**. The overall intersection would continue to operate at an acceptable LOS A. The southbound left turn from Blue Mountain Road to US 93, however, would operate at LOS E compared to LOS C under current conditions.
- **Miller Creek Road at Briggs Street**. With a traffic signal (assumed to be in place at this intersection by 2025 under all alternatives) this intersection would operate at an overall LOS B. The eastbound and westbound approaches would continue to operate at LOS C and E, respectively.
- **Upper Miller Creek Road at Lower Miller Creek Road (north "Y")**. With a traffic signal (assumed to be in place at this intersection by 2025 under all alternatives) this intersection would operate at an overall LOS B. As a result of the signal, the eastbound left turn from Lower Miller Creek Road to northbound Miller Creek Road would improve from a current LOS F to LOS B.

Under the No-Action Alternative, the critical movement/overall intersection operations findings for the **2025 PM peak hour** include:

- **Old US 93 at Reserve Street**. The eastbound approach to Reserve Street is expected to continue to operate at LOS F, while the westbound approach to Reserve Street is expected to deteriorate from LOS C to LOS F.
- **US 93/Brooks Street at Reserve Street**. This intersection is estimated to deteriorate from overall LOS D to LOS F. The critical southbound (westbound) right-turn movement from Reserve Street to Brooks Street is expected to deteriorate from LOS D to LOS F. The northbound (eastbound) left-turn movement would degrade from LOS E to LOS F and the southbound (westbound) through movement would deteriorate from LOS D to LOS F.
- **US 93 at Miller Creek Road/Old US 93**. Overall LOS at this intersection is expected to deteriorate from LOS C to LOS F. The critical southbound (westbound) left-turn movement from Brooks Street to Miller Creek Road is expected to degrade from LOS C to LOS F. The southbound (westbound) through/right-turn movement on Brooks Street would remain at an acceptable operating condition, degrading from LOS B to LOS C.
- **US 93 at Blue Mountain Road**. The overall intersection is estimated to deteriorate from LOS A to LOS C. The southbound left turn from Blue Mountain Road to US 93, however, would degrade to LOS E compared to LOS C under current conditions.
- **Miller Creek Road at Briggs Street**. The overall signalized intersection is estimated to operate at LOS C. The westbound left/through/right movement from Briggs Street to Miller Creek Road would operate at LOS C, representing an improvement from existing conditions.
- **Upper Miller Creek Road at Lower Miller Creek Road (north "Y")**. This intersection would operate at an acceptable LOS when signalized under this alternative.

4.4.2.2 Intersection Operational Impacts Common to All Build Alternatives

Signal Improvements

Traffic signal improvements provide coordination and timing of groups of traffic signals along a road, which improves traffic flow with minimal stops. The goal of signal coordination is to get the greatest number of vehicles through multiple intersections with the fewest stops. The two closely-spaced signals along Reserve Street at US 93 and at Old US 93 would operate as an integrated signal system. The new signal at Old US 93 and Reserve Street will be coordinated with the existing signal at US 93 and Reserve Street.

In general terms, signal synchronization functions as follows: For example, a motorist is stopped at a signalized intersection and traffic is also stopped at the signalized intersection ahead. The signal at the intersection ahead turns green and traffic starts moving through it. Then the motorist's intersection signal turns green and traffic moves through it and is also able to move through the intersection ahead because it still has a green light. This way traffic moves continuously through both intersections without stopping. Red light signal timing is also synchronized to prevent vehicle queues from blocking intersections.

Signal and capacity improvements along Reserve Street and Old US 93 provide for better utilization of the existing street network. The combination of improvements would improve travel speed and reduce intersection delays. Signal coordination on Reserve Street would be most efficient with the proposed improvements to Old US 93 due to the more balanced dispersion of traffic through these coordinated intersections that would occur with the additional capacity on Old US 93.

Traffic signal coordination would reduce the number of stops, thereby reducing the crash potential at intersections. Signal coordination can also have a positive effect on air quality because moving vehicles produce fewer emissions in an area than vehicles idling in congested traffic conditions.

US 93/Old US 93 Intersection

In the DEIS, it was proposed that the southbound left-turn movement from Old US 93 to US 93 be eliminated for Alternative 5A. That movement could be maintained during non-peak hours; however, it may need to be restricted in the future depending on intersection operations. While the exclusive left-turn lane is provided in other build alternatives (2B, 3B, and 4C); this left-turn movement under Alternative 5A is designed to occur as a shared left/through traffic lane when not restricted. This condition would result in increased delay for through traffic on Old US 93 destined to the Miller Creek area as drivers wait for left-turn movements to occur. The difference between Alternative 5A and the No-Action Alternative is that Alternative 5A would provide additional capacity in the form of an adjacent southbound through lane into the Miller Creek area, whereas the shared left/through lane provides the only through movement capacity under the No-Action Alternative.

With projected traffic increases, it will eventually be necessary to further increase or provide more efficient use of the available capacity of the Old US 93/Miller Creek Road/US 93 intersection. Increasing the capacity using available approach lanes would require a longer signal cycle length, beyond what may be acceptable to most drivers and to affected jurisdictions. Alternatively, it is possible to maximize the available capacity by removing an underutilized turn movement from the intersection. The left-turn lane from Old US 93 to US 93 has a low volume during peak and off-peak periods compared to other movements. Complete restriction of this left-turn movement may be warranted in the future at the discretion of the Montana Department of Transportation (MDT), who has jurisdiction of US 93.

4.4.2.3 Intersection Operation Impacts Alternative 2B: North Lower Miller Creek Grade-Separated Intersection

Under Alternative 2B, the critical movement/overall intersection operations for the **2025 AM peak hour** include:

- **Old US 93 at Reserve Street**. Under Alternative 2B, this intersection would be signalized to accommodate a shift in turn movements from US 93/Miller Creek and Reserve/Brooks into sections. The overall intersection would operate at LOS B. The critical eastbound left-turn movement would operate at LOS D, and the critical northbound through movement would operate at LOS B.

- **US 93/Brooks Street at Reserve Street**. Under Alternative 2B, this signalized intersection is forecasted to operate at LOS D, an improvement from the No-Action Alternative LOS E. The critical eastbound left-turn movement from Brooks to Reserve Street would operate at LOS D. The eastbound through movement on Brooks Street is estimated to operate at LOS C.
- **US 93 at Miller Creek Road/Old US 93**. Under Alternative 2B, this signalized intersection is forecasted to operate at LOS D, an improvement from the No-Action Alternative. The critical eastbound through/right movement on US 93 would operate at LOS D, and the northbound right-turn movement from Miller Creek Road to US 93 would operate at LOS E.
- **US 93 at Blue Mountain Road**. Under Alternative 2B, the intersection operations would be relatively similar with those in the No-Action Alternative.
- **Miller Creek Road at Briggs Street**. The eastbound approach to Miller Creek Road would operate similarly under Alternative 2B compared to the No-Action Alternative. The westbound left/through/right movement would operate at LOS C, an improvement from the No-Action Alternative. The intersection would operate with an overall LOS of A.
- **Upper Miller Creek Road at Lower Miller Creek Road (north "Y")**. The overall intersection operations improve from LOS B to LOS A under Alternative 2B compared to the No-Action Alternative.

Under Alternative 2B, the proposed roadway connecting US 93 to the Miller Creek area would cross over US 93 and provide a new approach to US 93 on the north side of the highway with an at-grade, signalized intersection. During the AM peak hour, this new intersection is predicted to operate at an overall intersection LOS D. The critical northbound (eastbound) through movement on US 93 would operate at LOS D and the northbound (eastbound) left turn from US 93 to the new road would operate at LOS D. The southbound left/right-turn movement from the proposed new road to US 93, which accommodates a primary AM peak-hour traffic flow from the Miller Creek area, would operate at LOS F.

Under Alternative 2B, the critical movement/overall intersection operations for the **2025 PM peak hour** include:

- **Old US 93 at Reserve Street**. Under Alternative 2B, the overall intersection operations improve from LOS F to LOS B. The critical southbound through movement would operate at LOS B and the southbound right-turn movement would operate at LOS A. The eastbound left-turn would improve to LOS D.
- **US 93/Brooks Street at Reserve Street**. Under Alternative 2B, this signalized intersection is estimated to operate at an improved condition compared to that forecasted to occur under the No-Action Alternative. This intersection would operate at an overall LOS C, with the critical southbound right-turn movement from Reserve to Brooks Street operating at LOS C. The westbound through movement on Brooks Street would operate at LOS D.
- **US 93 at Miller Creek Road/Old US 93**. Under Alternative 2B, this signalized intersection is estimated to operate at an improved condition compared to that forecasted to occur under the No-Action Alternative. The overall intersection would operate at LOS C. The critical westbound through/right movement on US 93 would operate at LOS B, and the westbound left-turn movement from US 93 to Miller Creek Road would operate at LOS C.
- **US 93 at Blue Mountain Road**. Under Alternative 2B, the overall intersection and critical westbound through movements would operate at LOS A. The critical southbound left turn from Blue Mountain Road to US 93 would improve from LOS E, under the No-Action Alternative, to LOS D.

- **Miller Creek Road at Briggs Street**. The eastbound approach to Miller Creek Road, under Alternative 2B, is estimated to operate at very similar conditions to those forecasted to occur under the No-Action Alternative, LOS B. The westbound left/through/right movement would operate at LOS C. The overall intersection would operate at LOS of B. This is a slight improvement from the No-Action Alternative.
- **Upper Miller Creek Road at Lower Miller Creek Road (north "Y")**. The overall intersection operations would improve from LOS B to LOS A under Alternative 2B compared to the No-Action Alternative.

Under Alternative 2B, the proposed new intersection of US 93 and North Lower Miller Creek is predicted to operate at an overall intersection LOS B. The critical westbound through movement on US 93 would operate at LOS A, and the westbound right-turn movement would operate at LOS A. The southbound left-turn movement from the proposed new road to US 93 would operate at LOS E.

Under Alternative 2B in 2025, the new intersections of Old Bitterroot Road and Lower Miller Creek Road with the proposed North Lower Miller Creek alignment are estimated to operate at acceptable levels during both AM and PM peak periods.

4.4.2.4 Intersection Operation Impacts Alternative 3B: Blue Mountain Road Grade-Separated Intersection

Under Alternative 3B, the critical movement/overall intersection operations for **2025 AM peak hour** include:

- **Old US 93 at Reserve Street**. Under Alternative 3B, this intersection would be signalized to accommodate a shift in turn movements from US 93/Miller Creek and Reserve/Brooks intersections. The overall intersection would operate at LOS C. The critical eastbound left-turn movement would operate at LOS E, and the critical northbound through right-turn movement would operate at LOS B.
- **US 93/Brooks Street at Reserve Street**. Under Alternative 3B, this signalized intersection is estimated to operate at slightly improved conditions compared to those that are forecasted to occur under the No-Action Alternative. This intersection would operate at an overall LOS D, with the critical eastbound left-turn movement from Brooks to Reserve Street operating at LOS C, a slight improvement over the No-Action Alternative. The eastbound through movement on Brooks Street is estimated to operate at LOS C.
- **US 93 at Miller Creek Road/Old US 93**. Under Alternative 3B, this signalized intersection is estimated to operate at improved conditions compared to those forecasted under the No-Action Alternative. The overall intersection would operate at LOS D. The critical eastbound through/right movement on US 93 would operate at LOS D, and the northbound right-turn movement from Miller Creek Road to US 93 would operate at LOS F.
- **US 93 at Blue Mountain Road**. Under Alternative 3B, the unsignalized intersection would operate at improved levels, with uninterrupted flow for travel between US 93 and the grade-separated intersection connection. The critical northbound movement from Blue Mountain Road to US 93 would operate at LOS B.
- **Miller Creek Road at Briggs Street**. The westbound approach to Miller Creek Road would improve slightly under Alternative 3B compared to the No-Action Alternative. The intersection would operate with an overall LOS of A. This is a slight improvement from the No-Action Alternative.
- **Upper Miller Creek Road at Lower Miller Creek Road (north "Y")**. The overall intersection operations improve from LOS B to LOS A under Alternative 3B compared to the No-Action Alternative.

Under Alternative 3B, the critical movement/overall intersection operations for **2025 PM peak hour** include:

- **Old US 93 at Reserve Street**. Under Alternative 3B, the overall intersection operations improve from LOS F to LOS B. The critical south through movement would operate at LOS B and the southbound right-turn movement would operate at LOS A. The eastbound left-turn movement would improve to LOS D.
- **US 93/Brooks Street at Reserve Street**. Under Alternative 3B, this signalized intersection is estimated to operate at an improved condition compared to the No-Action Alternative. This intersection would operate at an overall LOS D.
- **US 93 at Miller Creek Road/Old US 93**. Under Alternative 3B, this signalized intersection is estimated to operate at an improved condition compared to that forecasted under the No-Action Alternative. The overall intersection would operate at LOS C. The critical westbound through/right movement on US 93 would operate at LOS B, and the westbound left-turn movement from US 93 to Miller Creek Road would operate at LOS D.
- **US 93 at Blue Mountain Road**. As during the AM peak hour under Alternative 3B, the unsignalized intersection would operate at improved levels, with uninterrupted flow for travel between US 93 and the grade-separated intersection. The critical southbound movement from Blue Mountain Road to US 93 would operate at LOS A.
- **Miller Creek Road at Briggs Street**. The eastbound approach to Miller Creek Road under Alternative 3B is estimated to operate at very similar conditions to those forecasted to occur under the No-Action Alternative. The westbound left/through/right movement would operate at LOS C. The intersection would operate with an overall LOS of B.
- **Upper Miller Creek Road at Lower Miller Creek Road (north "Y")**. The LOS C, at the eastbound approach to this signalized intersection would be a slight improvement compared to the No-Action Alternative with a LOS D. The overall intersection would improve from LOS B under the No-Action Alternative to LOS A under Alternative 3B.

Under Alternative 3B in 2025, the proposed new intersections of Lower Miller Creek Road at Christian Drive and Blue Mountain Road at Old Bitterroot Road are estimated to operate at acceptable levels during both AM and PM peak periods.

4.4.2.5 Intersection Operation Impacts Alternative 4C: South Lower Miller Creek Interchange

Under Alternative 4C, the critical movement/overall intersection operations for the **2025 AM peak hour** include:

- **Old US 93 at Reserve Street**. Under Alternative 4C, this intersection would be signalized to accommodate a shift in turn movements for US 93/Miller Creek and Reserve/Brooks intersections. The overall intersection would operate at LOS C. The critical eastbound movement would operate at LOS D, and the critical northbound through movement would operate at LOS C.
- **US 93/Brooks Street at Reserve Street**. Under Alternative 4C this signalized intersection is estimated to operate at slightly improved conditions compared to those that are forecasted to occur under the No-Action Alternative. This intersection would operate at an overall LOS D, with the critical eastbound left-turn movement from Brooks to Reserve Street operating at LOS C.
- **US 93 at Miller Creek Road/Old US 93**. Under Alternative 4C, this signalized intersection is estimated to operate at an improved condition compared to that forecasted under the No-Action Alternative. The overall intersection would operate at LOS D. The critical eastbound through/right movement on US 93 would also operate at LOS D, and the

northbound right-turn movement from Miller Creek Road to US 93 would operate at LOS D.

- **US 93 at Blue Mountain Road**. Under Alternative 4C, this signalized intersection would deteriorate from the conditions under the No-Action Alternative with an overall intersection LOS C. The southbound left turn from Blue Mountain Road to US 93 would operate similarly to the No-Action Alternative at LOS E. The main reason for the degradation is the increased cycle length, which is caused by an overall net increase in traffic volumes.
- **Miller Creek Road at Briggs Street**. The westbound approach to Miller Creek Road would improve under Alternative 4C compared to the No-Action Alternative. The westbound left/through/right movement would operate at LOS C. The overall intersection would operate at LOS of A.
- **Upper Miller Creek Road at Lower Miller Creek Road (north "Y")**. Under Alternative 4C, there would be no change in traffic operation from that of the No-Action Alternative.

Under Alternative 4C, the northbound through movement on US 93 and the northbound off-ramp and on ramp at the interface with US 93 and the proposed South Lower Miller Creek interchange are expected to operate acceptably.

Under Alternative 4C, the critical movement/overall intersection operations for the **2025 PM peak hour** include:

- **Old US 93 at Reserve Street**. Under Alternative 4C, the overall intersection operations improve from LOS F to LOS B. The critical southbound through movement would operate at LOS B and the southbound right movement would operate at LOS A. The eastbound left-turn would improve to LOS D.
- **US 93/Brooks Street at Reserve Street**. Under Alternative 4C, this signalized intersection is estimated to operate at an improved condition compared to that forecasted to occur under the No-Action Alternative. This intersection would operate at an overall LOS D, with the critical southbound right-turn movement for Reserve to Brooks Street operating at LOS C. The westbound through movement on Brooks Street would operate at LOS C.
- **US 93 at Miller Creek Road/Old US 93**. Under Alternative 4C, this signalized intersection is estimated to operate at an improved condition compared to that forecasted under the No-Action Alternative. The overall intersection would operate at LOS C. The critical westbound through/right movement on US 93 would operate at LOS C, comparable to the No-Action Alternative.
- **US 93 at Blue Mountain Road**. Under Alternative 4C, the overall intersection operations degrade from LOS A under the No-Action Alternative to LOS C. The critical westbound through movement would operate at LOS D. The southbound left turn from Blue Mountain Road to US 93 would operate at LOS E. Because of increased westbound traffic volumes, the eastbound left-turn vehicles need a protected phase, which decreases the overall green time for other movements. This results in the degraded intersection operations compared to the No-Action Alternative.
- **Miller Creek Road at Briggs Street**. The eastbound approach to Miller Creek Road under Alternative 4C is estimated to operate at similar conditions to those forecasted to occur for the No-Action Alternative at LOS B. The westbound left/through/right movement would operate at LOS C. The intersection would operate with an overall LOS of B.
- **Upper Miller Creek Road at Lower Miller Creek Road (north "Y")**. The eastbound approach to this signalized intersection would operate at slightly improved LOS compared to the No-Action Alternative at LOS C. The overall intersection would improve slightly from LOS B to LOS A.

Under Alternative 4C, the southbound through movement on US 93 and the southbound off-ramp and on ramp at the interface with US 93 and the proposed South Lower Miller Creek interchange would operate at acceptable levels.

Under Alternative 4C in 2025, the new intersection of South Lower Miller Creek and Lower Miller Creek Road are estimated to operate at acceptable levels during both AM and PM peak periods.

4.4.2.6 Intersection Operation Impacts Alternative 5A: Miller Creek Road At-Grade Intersection — Preferred Alternative

Under Alternative 5A, the critical movement/overall intersection operations for the **2025 AM peak hour** include:

- **Reserve Street at Old US 93**. Under Alternative 5A, this intersection would be signalized to accommodate a shift in turn movements from the US 93/Miller Creek and Reserve/Brooks intersections. The overall intersection would operate at LOS B. The critical eastbound left-turn movement would operate at LOS C, and the critical northbound through/right movement would operate at LOS B.

  Although signalizing this intersection results in two closely spaced intersections along Reserve Street, both intersections are estimated to operate effectively because of balanced traffic flows and operational improvements (extra eastbound to northbound left-turn lane from Old US 93 and removal of northbound and southbound left-turn movements).

- **US 93/Brooks Street at Reserve Street**. Under Alternative 5A, this signalized intersection is estimated to operate at slightly improved conditions to those that are forecasted under the No-Action Alternative (due to the reallocated signal timing). This intersection would operate at an overall LOS D, with the critical eastbound left-turn movement from Brooks to Reserve Street operating at LOS D.
- **US 93 at Miller Creek Road/Old US 93**. Under Alternative 5A, this signalized intersection is estimated to operate at an improved condition compared to that forecasted under the No-Action Alternative. The overall intersection, which is optimized for US 93 traffic flows, would operate at LOS D. The critical eastbound left-turn from US 93 would operate at LOS C, the through/right movements on US 93 would operate at LOS D, and the northbound right-turn movement from Miller Creek Road to US 93 would operate at LOS D.
- **US 93 at Blue Mountain Road**. Under Alternative 5A, this signalized intersection would operate similar to the conditions under the No-Action Alternative with an overall intersection LOS A. The southbound left turn from Blue Mountain Road to US 93 would operate at LOS E.
- **Miller Creek Road at Briggs Street**. The westbound approach to Miller Creek Road would improve under Alternative 5A compared to the No-Action Alternative, LOS C. The eastbound left/through/right movement would operate at LOS C. The overall intersection would operate with an overall LOS of A.
- **Upper Miller Creek Road at Lower Miller Creek Road (north "Y")**. The eastbound approach to this signalized intersection would degrade from the No-Action Alternative with a LOS C. The overall intersection would remain the same with a LOS B.

Under Alternative 5A, the critical movement/overall intersection operations for the **2025 PM peak hour** include:

- **Old US 93 at Reserve Street**. Under Alternative 5A, the overall signalized intersection would operate at LOS A. The critical southbound through movement would operate at LOS A and the southbound right turn would operate at LOS A. The eastbound left turn

would improve to LOS D. Again, the closely spaced intersections along Reserve Street are estimated to operate acceptably because of the ability to split the traffic between US 93 and Old US 93.

- **US 93/Brooks Street at Reserve Street**. Under Alternative 5A, this signalized intersection is estimated to operate at improved conditions compared to those forecasted under the No-Action Alternative. This intersection would operate at an overall LOS D, compared to LOS F under the No-Action Alternative. The critical southbound right-turn movement from Reserve to Brooks Street would be comparable to the LOS D under the No-Action Alternative.
- **US 93 at Miller Creek Road/Old US 93**. Under Alternative 5A, this signalized intersection is estimated to operate at an improved condition compared to that forecasted under the No-Action Alternative. The overall intersection, which is optimized for US 93 traffic flows, would operate at LOS E. Based on delay, this intersection is only slightly above the cut-off for LOS D. However, if optimized to give a larger proportion of green time to the side streets, LOS D may be achieved. Operational improvements under Alternative 5A include a second left-turn lane from westbound US 93 to southbound Miller Creek, resulting in an improvement from LOS F to LOS B. The critical westbound through/right movement on US 93 would operate at LOS D. The southbound through movement would operate at LOS E, compared to LOS F under the No-Action Alternative. The southbound right-turn would operate at LOS D, compared to the LOS F under the No-Action Alternative.
- **US 93 at Blue Mountain Road**. Under Alternative 5A, this signalized intersection would degrade slightly compared to the conditions under the No-Action Alternative with an overall intersection LOS B. The southbound left turn from Blue Mountain Road to US 93 would operate at LOS C.
- **Miller Creek Road at Briggs Street**. Under Alternative 5A, both eastbound and westbound approaches to Miller Creek Road would be comparable to the No-Action Alternative, LOS B and LOS C, respectively. The intersection would operate with an overall LOS of A.
- **Upper Miller Creek Road at Lower Miller Creek Road (north "Y")**. The intersection is expected to operate similarly to the condition under the No-Action Alternative, at LOS B.

4.4.3 Safety

4.4.3.1 Safety Impacts Alternative 1: No-Action

Planned local improvements to Miller Creek Road under the No-Action Alternative would enhance overall safety, but would not be sufficient to maintain acceptable traffic operating conditions on the primary access route serving the Miller Creek area, particularly during the critical AM and PM peak periods. Traffic congestion on Miller Creek Road, Upper Miller Creek Road, and Lower Miller Creek Road east of Linda Vista Boulevard would be worse under this alternative. As traffic volumes increase on Miller Creek Road, the number of potential rear-end and angle collisions would likely increase as a result of traffic turning in and out of driveways from a through traffic lane. Because of congestion on the primary route with the No-Action Alternative, more drivers would divert to Gharrett Street and Briggs Street, resulting in the highest traffic volumes of all alternatives on these and other streets that serve the residential neighborhood located east of Miller Creek Road.

The No-Action Alternative would require much of the traffic to access the Miller Creek Area via Miller Creek Road, Lower Miller Creek Road, and Upper Miller Creek Road. Upper Miller Creek

Road has poor horizontal and vertical alignments, limited sight distance, a number of existing driveways and intersecting roads, and no provisions for pedestrian and bicycle access. The crash history for the most recent five-year period available (between 1999 and 2003) along Upper Miller Creek Road is shown in **Table 3-12, page 3-39**. The number of crashes does not exceed the statewide average for similar roads, but is higher than corresponding sections of Miller Creek Road and Lower Miller Creek Road. The recent crash history does not provide justification for safety improvements, but increasing traffic volumes (see **Table 4-6, page 4-22**) will likely worsen the situation.

With the No-Action Alternative and all of the alternatives, improvements to Miller Creek Road between US 93 and the north "Y" intersection would improve safety for all travel modes. Bicycle lanes and sidewalks would provide a safe travel route for non-motorists. Addition of a traffic signal at the Miller Creek Road intersection with Briggs Street and a signal plus reconfiguration of the skewed north "Y" intersection would provide a safer crossing location and would separate turning vehicles from through traffic at these locations.

Blue Mountain Road

Blue Mountain Road is a narrow, two-lane paved rural collector roadway that follows a curvilinear alignment and is situated within a narrow corridor between steep slopes at the base of Blue Mountain and the meandering Bitterroot River. A relatively high number of crashes on Blue Mountain Road indicates a safety issue, and the projected increase in traffic volumes on the roadway will exacerbate this problem.

In 2001, Missoula County Public Works completed a minor realignment and widening project on a 1.17-mile section of Blue Mountain Road extending from the intersection with Forest Hills Lane and Blue Mountain Recreation Area parking lot/trailhead north to Maclay Flats. The upgraded roadway along this segment consists of a 24-foot-wide asphalt paved surface with 2-foot-wide graded gravel shoulders. North of the realigned segment, Blue Mountain Road is a substandard, curvilinear road with a paved width of 22 feet and no graded shoulder area. A substantial amount of earthwork, including excavation, slope stabilization, erosion control, and drainage work, would be needed to provide adequate space to provide shoulders and/or guardrail.

The crash history for the most recent five-year period available (between 1999 and 2003) along Blue Mountain Road is shown in **Table 3-13, page 3-39**. The signalized intersection of Blue Mountain Road with US 93 also has a relatively high crash history with 27 crashes occurring at this location. The number of crashes between US 93 and Forest Hill Lane and between FR 365 (road leading to Blue Mountain Recreation Area) and Forest Hill Lane were less than 1 per year. The segment between FR 365 and the O'Brien Creek Road averaged more than 5 per year. Of the 27 crashes recorded within this segment, 19 occurred at or near a 90-degree curve that is approximately 0.25 miles southeast of the intersection with Big Flat/River Pines/O'Brien Creek roads. As a result of the disproportionately high number of crashes at this curve relative to the rest of this segment, Missoula County recommended improvements and nominated the project for funding through the State Hazard Program. On December 10, 2004, the Montana Transportation Commission approved funding for reconstructing this 90-degree curve on Blue Mountain Road. The project schedule, extent, and design have not been determined.

The recent crash history provides justification for safety improvements on Blue Mountain Road (e.g., installation of guardrail, signing, striping, and lighting), with or without implementation of any of the proposed alternatives.

4.4.3.2 Safety Impacts Common to All Build Alternatives

Congested signalized intersections and street corridors can cause trips to shift from the arterial street to the neighborhood street, which is a concern particularly at Briggs Street and Miller

Creek Road. All of the build alternatives would reduce the number of neighborhood cut-through trips on Briggs Street, Gharrett Street, and 39th Street to and from the Miller Creek area compared to the No-Action Alternative by providing increased capacity on Miller Creek Road as the primary access route that will move traffic more efficiently into and out of the Miller Creek area.

Under the build alternatives, 2025 forecasted traffic volumes are expected to be reduced on Briggs Street and Gharrett Street when compared to the No-Action Alternative (see **Table 4-6**). On Briggs Street, volumes would be reduced between 10 percent and 18 percent, and on Gharrett Street south of 39th Street volumes would be reduced between 3 percent and 12 percent, depending on the alternative. For Alternative 5A (the Preferred Alternative), the forecasted traffic volumes on Briggs Street and Gharrett Street would be expected to be reduced by 12 percent and 11 percent, respectively. This reduction in traffic volumes is expected to improve conditions over the No-Action Alternative, resulting in less traffic on Briggs Street and Gharrett Street.

Regardless of the alternative selected, traffic in the Miller Creek area is predicted to grow substantially over the next 20 years as development continues to occur, and traffic by the Cold Springs Elementary School is going to increase whether or not improvements are made to the Miller Creek Road system. Traffic volumes on Briggs Street south of 39th Street are expected to increase by 139 percent between 2003 and 2025 for the No-Action Alternative (see **Table 3-9, page 3-28**). For all build alternatives, there would be a small reduction in traffic past the school over the No-Action Alternative.

4.4.3.3 Safety Impacts on Old US 93 and Adjacent Intersections Common to All Build Alternatives

Compared to existing conditions, the potential number of conflicts between vehicles, between vehicles and non-motorists, and between vehicles and animals would likely increase under all of the alternatives. This is because of future traffic volume growth forecasted on major roadways and at critical intersections throughout the project area. Potential conflicts based on total volumes would be similar under all of the alternatives at the intersection of US 93 and Miller Creek Road. Increased traffic volumes and deteriorating operations on US 93 and Miller Creek Road would likely result in an increase in collisions associated with turn movements and interaction of vehicles traveling at different speeds. Safety problems would be exacerbated by increased volumes on substandard rural road segments, including Upper and Lower Miller Creek Roads and Blue Mountain Road.

Improvements along Old US 93 and the intersection of Old US 93/Brooks/Reserve Streets are the same with all of the build alternatives. The number of vehicle lanes on Old US 93 would be increased to three through lanes. The additional through lanes would increase the potential for sideswipe crashes resulting from vehicles changing lanes. Traffic growth and the change in traffic patterns will cause turning movements to increase. These movements would likely require additional turn lanes and signal changes at intersections to improve operations and safety. The additional traffic and the resulting changes in traffic patterns increase the potential for intersection crashes. All of the build alternatives would enhance safety for non-motorized travel by the provision of sidewalks and bicycle lanes along Miller Creek Road and Old US 93. The traffic signal at the intersection of Reserve Street and Old US 93 would provide a pedestrian-activated (push button) signal phase to allow protected crossings of Reserve Street and Old US 93 at this location.

All build alternatives include improvements to Old US 93 that would eliminate the Bitterroot Motors off-loading area. Improved driveways with large turning radii can be provided to allow trucks to enter that property for off-loading if there is available space. Otherwise, off-loading would need to occur in the legally available area in front of that business.

4.4.3.4 Safety Impacts Common to Bridge Alternatives

Miller Creek Road Limited Improvements

The number of vehicles lanes on Miller Creek Road would increase to three through lanes. With the Limited Improvements, the additional through lanes would increase the potential for side-swipe crashes resulting from vehicles changing lanes. Pedestrians attempting to cross Miller Creek Road between signalized intersections would need to cross three lanes of traffic.

4.4.3.5 Safety Impacts Alternative 2B: North Lower Miller Creek Grade-Separated Intersection

Minor approaches on both sides of US 93 through the project area are expected to experience excessive delay at intersections with US 93 where through-traffic volumes are expected to increase. This excessive delay could add to safety problems as drivers attempt to access the highway.

On US 93, Alternative 2B would introduce a new major roadway approach to a rural, high-speed section that experienced a relatively high number of crashes during the five-year period from 1999 through 2003. The new approach to US 93 would increase potential for rear-end and side-swipe collisions at the location of the new approach because of the merge and diverge movements on and off the highway. Potential merge/weave conflicts would be mitigated by adding acceleration and deceleration lanes designed to current standards on the US 93 approaches to the new roadway connection. By interrupting highway traffic flow and accommodating left turns at a new signal located in the higher-speed segment of US 93 between Blue Mountain Road and Miller Creek Road, Alternative 2B would increase potential conflicts in this area to a greater extent than any of the other alternatives.

In the Miller Creek area, this alternative would result in the smallest increase in volumes associated with critical/conflicting movements at the north "Y" intersection of Upper/Lower Miller Creek Roads, and would reduce potential conflicts associated with turns to and from secondary approaches on Miller Creek Road. Alternative 2B would alter travel patterns and reduce traffic volumes and potential crashes on roads serving the east side of the Miller Creek area, including Miller Creek Road and segments of Upper and Lower Miller Creek Road. Conversely, this alternative would shift traffic from Miller Creek Road to US 93 and alter travel patterns within the Miller Creek area such that traffic volumes and potential crashes on US 93 west of Miller Creek Road, and on roads serving the west side of the Miller Creek area, would increase.

The potential for conflicts at a new intersection with US 93 would be greatest under Alternative 2B because it is forecasted to attract the highest volumes of any of the build alternatives, and there would be an additional signalized intersection with turn provisions.

Alternative 2B would improve access for non-motorists crossing between the north side of US 93 and Lower Miller Creek Road at the proposed new crossing location. This alternative would not provide safer non-motorized access between the north and south sides of US 93 at the proposed new connection location.

Alternative 2B would enhance emergency service access and could reduce response time by providing a second connection between US 93 and the Miller Creek area.

Alternative 2B would provide a grade-separated crossing of the railroad track, thus reducing the potential of vehicle/railcar collisions.

4.4.3.6 Safety Impacts Alternative 3B: Blue Mountain Road Grade-Separated Intersection

Alternative 3B would reduce potential vehicle-vehicle conflict points more than any of the other alternatives by eliminating the signalized intersection at US 93 and Blue Mountain Road (no left-turning and stopping vehicles at the intersection) and closing six minor approaches on the west/north side of US 93 and three minor approaches on the east/south side of US 93. With Alternative 3B, travel flow through the high-speed section of US 93 south/west of Buckhouse Bridge would no longer be interrupted by a signal, and left-turn movements between US 93 and Blue Mountain Road would be prohibited. Elimination of the signal at Blue Mountain Road would reduce the number of stopped vehicles per hour through the project area, thus reducing potential rear-end collisions. Alternative 3B would support MDT's access management plans for US 93 by reducing the number of minor approaches and demand for turn movements on US 93 near Blue Mountain Road. However, elimination of the signal at Blue Mountain Road would result in higher speed free-flow conditions and would reduce the frequency of acceptable gaps created by this signal. It also would reduce the ability of drivers to safely enter US 93 from secondary approaches located approximately one mile north and south of the US 93/Blue Mountain Road intersection. The effectiveness of this signal at providing gaps is limited beyond a general distance of one-mile north and south of the signal due to dispersion of vehicle platoons (groups of vehicles) on this high-speed highway segment.

Alternative 3B would introduce new approaches (intersection access roads) on both sides of a rural, high-speed section of US 93, increasing the potential for rear-end and sideswipe crashes at the location of each new approach caused by merge and diverge movements on and off the highway. Potential merge/weave conflicts would be mitigated by addition of acceleration and deceleration lanes designed to current standards on the US 93 approaches to the new roadway connection. Compared to Alternative 4C, the roadway approaches to US 93 would be more perpendicular under Alternative 3B, allowing greater sight distance for drivers and providing standard acceleration lanes for high-speed merging onto the highway. Under Alternative 3B, the grade-separated intersection approaches from the highway would also be designed for lower speeds that are more compatible with the local roadway network served by the proposed connection. The connection to US 93 would be channelized at its intersection with US 93 to guide vehicles turning onto US 93. A raised island would be used to direct vehicles onto US 93 in a manner that would discourage wrong way turn movements.

Alternative 3B would require new roadway connections to Lower Miller Creek Road and other local roads in the Miller Creek area. Compared to the No-Action Alternative and Alternative 5A, a new connection would increase the potential for conflicts between vehicles and between vehicles and non-motorists along the alignment within the Miller Creek area. Alternative 3B would alter travel patterns and reduce traffic volumes and potential crashes on roads serving the east side of the Miller Creek area, including Miller Creek Road and segments of Upper and Lower Miller Creek Road. Conversely, this alternative would shift traffic from Miller Creek Road to US 93 and alter travel patterns within the Miller Creek area such that traffic volumes and potential crashes on US 93 west of Miller Creek Road, and on roads serving the west side of the Miller Creek area, would increase.

Alternative 3B would provide the most direct route with the lowest number of potential conflict points for non-motorists crossing US 93 to Blue Mountain Road, and would provide a safer, non-motorized connection between the Miller Creek area and both sides of US 93.

Alternative 3B would enhance emergency service access and reduce response time by providing a second connection between US 93 and the Miller Creek area.

Alternative 3B would require an at-grade crossing of the Montana Rail Link (MRL) track. The alternative would reduce the number of minor approaches crossing the MRL track by directing traffic onto a frontage road and to the new intersection access road. The access road would include a new rail crossing with crossing signals and gates. The potential for vehicle/train con-

flicts would be greater than Alternative 2B because of the at-grade intersection. Traffic turning right from US 93 onto the access road would be required to queue for trains in the deceleration lane.

4.4.3.7 Safety Impacts Alternative 4C: South Lower Miller Creek Interchange

Alternative 4C would introduce new ramp approaches to a rural, high-speed section of US 93 with increased potential for rear-end and sideswipe crashes at the location of each new approach caused by merge and diverge movements on and off the highway. Potential merge/weave conflicts would be mitigated by addition of acceleration and deceleration lanes designed to current standards on the US 93 approaches to the new roadway connection. The roadway approaches to US 93 would be more angled under Alternative 4C, allowing less sight distance for drivers compared to Alternative 3B. Under Alternative 4C, the interchange approaches from the highway would be designed for higher speeds than those provided by Alternatives 2B and 3B. These ramp connections could contribute to drivers entering the local roadway network served by the proposed connection in the Miller Creek area at speeds that exceed those desirable for local streets.

Alternative 4C would close multiple minor approaches and provide a safe new connection to Hayes Creek Road for motorists and non-motorists by relocating the existing Hayes Creek Road approach to US 93.

Alternative 4C would shift a substantial portion of traffic from the current primary access route, Miller Creek Road, to a new two-lane road designed to current City of Missoula standards with bicycle lanes and sidewalks. Compared to the No-Action Alternative, Alternative 4C would result in the smallest reduction of traffic on the current primary access route. Alternative 4C would alter travel patterns and reduce traffic volumes and potential crashes on roads serving the east side of the Miller Creek area, including Miller Creek Road and segments of Upper and Lower Miller Creek Road. Conversely, this alternative would shift traffic from Miller Creek Road to US 93 and alter travel patterns within the Miller Creek area such that traffic volumes and potential crashes on US 93 west of Miller Creek Road and on roads serving the west side of the Miller Creek area, would increase.

Compared to the other build alternatives, Alternative 4C would be least compatible with safe, non-motorized travel along US 93 because of potential conflicts at ramp junctions with the new roadway extension and the ramp merge and diverge areas with pedestrian and bicycle movements across the interchange ramp connections. Alternative 4C would provide a grade-separated crossing of the railroad track thus reducing the potential vehicle/train conflict.

Alternative 4C would enhance emergency service access and reduce response time by providing a second connection between US 93 and the Miller Creek area. Alternative 4C would provide a grade-separated crossing of the MRL railroad track, reducing potential vehicle/train conflicts at the location of the new connection.

4.4.3.8 Safety Impacts Alternative 5A: Miller Creek Road At-Grade Intersection — Preferred Alternative

Alternative 5A would maintain existing general travel patterns in the Miller Creek area, but would alter travel patterns on Reserve Street by redirecting traffic onto Old US 93. This alternative would attract the highest traffic volumes on Miller Creek Road, Lower Miller Creek Road, and Upper Miller Creek Road (see **Table 4-6, page 4-22**) and would increase the number of vehicle lanes on Miller Creek Road to four through lanes. With this alternative, the additional through lanes would increase the potential for sideswipe crashes resulting from vehicles changing lanes. Pedestrians attempting to cross Miller Creek Road between signalized intersections would need to cross four lanes of traffic, compared to the three travel lanes under the other build alternatives.

Alternative 5A would require much of the traffic to access the Miller Creek area via Miller Creek Road, Lower Miller Creek Road, and Upper Miller Creek Road. Upper Miller Creek Road, which has poor horizontal and vertical alignments, limited sight distance, and multiple driveways and intersecting roads, would experience the greatest increase in future traffic volumes and a resulting increase in potential vehicular conflicts at intersecting roads and driveways. The crash history for a recent five-year period along Upper Miller Creek Road is shown in **Table 3-12, page 3-39**. The number of crashes does not exceed the statewide average for similar roads, but is higher than corresponding sections of Miller Creek Road and Lower Miller Creek Road. While increasing traffic volumes will likely worsen the situation the recent crash history does not provide justification for safety improvements beyond those planned for Upper Miller Creek Road in concert with future extension of water and sewer lines.

Non-motorists attempting to cross Miller Creek Road at or between signalized intersections would need to travel farther and cross more travel lanes than they would under the other build alternatives.

Alternative 5A would enhance emergency service access and response time for the Miller Creek area by increasing capacity on the primary access route.

Alternative 5A would require an additional lane (right-turn lane) crossing the MRL track at the existing Miller Creek Road approach to US 93.

4.4.4 Non-Motorized (Pedestrian and Bicycle) Travel

This section addresses non-motorized travel considerations not described above that are associated with each alternative.

4.4.4.1 Non-Motorized Travel Impacts Alternative 1: No-Action

With the No-Action Alternative, non-motorized travel in and out of the Miller Creek area would improve compared to existing conditions with the provision of bicycle lanes and sidewalks on Miller Creek Road as part of the City of Missoula and Missoula County improvements.

4.4.4.2 Non-Motorized Travel Impacts Common to All Build Alternatives

With the exception of the safety problems affecting non-motorized travel as described in Section 4.4.3, page 4-44, each of the build alternatives would provide a safer route between the Miller Creek area and US 93 by means of an improved existing route (all build alternatives) or a new roadway connection (Alternatives 2B, 3B and 4C) that would incorporate standard bicycle lanes and sidewalks. The proposed signalized intersection at Old US 93 and Reserve Street would provide a push button-activated pedestrian crossing signal phase to facilitate non-motorized crossing of Reserve Street, and would address a critical gap in the non-motorized transportation system in the southwest part of Missoula.

4.4.4.3 Non-Motorized Travel Impacts Common to Bridge Alternatives

With exception of the safety problems affecting non-motorized travel as described in Section 4.4.3, page 4-44, each of the build alternatives would provide a more efficient route between the Miller Creek area and US 93 by means of either a new roadway connection (Alternatives 2B, 3B, and 4C) or an improved existing route (Alternative 5A) that would incorporate standard bicycle lanes and sidewalks. Alternatives 2B, 3B, and 4C would each provide a 20-foot-wide area with adequate vertical clearance to accommodate equestrians at the south end of the pro-

posed bridge structure crossing the Bitterroot River. This area could accommodate a potential future non-motorized trail parallel to the river.

The creation of a multimodal network that accommodates bicyclists, pedestrians and other modes of travel is important to the local community. The proposed build alternatives are designed to facilitate connectivity through the addition of bicycle/pedestrian trails on both sides of the roadway alignment. In addition, the proposed bridge designs include an attached five-foot bicycle lane and separate walkway on each side. Enhanced bicycle/pedestrian facilities serve to increase community cohesion and connections between neighborhoods. The incorporation of multimodal facilities allows residents the access to commercial and community facilities through modes other than single-occupancy vehicles.

For the river crossing alternatives, the new roadway connecting the Miller Creek area to US 93 would include new intersections at Old Bitterroot Road and at Lower Miller Creek Road. At the proposed junction of the new road and Lower Miller Creek Road, approximately 700 feet of Lower Miller Creek Road east of the new road would be closed, and a new connection with better sight distance and geometry would be provided. A new access road would be provided approximately 400 feet north on the new road with Old Bitterroot Road. These proposed roads would provide improved access from the neighborhood to the new US 93 intersection.

Miller Creek Road Limited Improvements

Residents and businesses in the Miller Creek area would experience improved access to US 93 and some relief of congestion along the existing Miller Creek Road. This benefit would help to partly offset the addition of traffic and noise through the Miller Creek area, since new development is expected to proceed regardless of this proposed action.

4.4.4.4 Non-Motorized Travel Impacts Alternative 2B: North Lower Miller Creek Grade-Separated Intersection

Alternative 2B would provide a grade-separated crossing between the north side of US 93 and the Miller Creek area. However, non-motorists traveling on the south side of US 93 would not have safe access to this connection. Non-motorists traveling on the north side of US 93 between the Miller Creek area and Blue Mountain Road would be required to travel along the shoulder of US 93 under the bridge crossing over US 93.

4.4.4.5 Non-Motorized Travel Impacts Alternative 3B: Blue Mountain Road Grade-Separated Intersection

Alternative 3B would provide the most direct connection between the Miller Creek area and recreation and commercial destinations located near or accessed via Blue Mountain Road.

4.4.4.6 Non-Motorized Travel Impacts Alternative 4C: South Lower Miller Creek Interchange

Impacts of this alternative are similar to those described for Alternative 2B. However, Alternative 4C is considered less compatible with alternative modes such as bicycles and pedestrians. The high-speed design of the ramps would create a less desirable condition for non-motorists compared to the other alternatives that would provide lower speed connections between US 93 and Lower Miller Creek Road.

4.4.4.7 Non-Motorized Travel Impacts Alternative 5A - Preferred Alternative: Miller Creek Road At-Grade Intersection

In the Miller Creek area, non-motorized travel impacts of Alternative 5A would be similar to the No-Action Alternative. Compared to existing conditions, Alternative 5A would enhance travel conditions for non-motorists on Miller Creek Road, and would allow for future provision of a regional non-motorized trail through the Miller Creek area.

4.4.5 Public Transportation and Transportation Demand Management (TDM)

4.4.5.1 Public Transportation and TDM Impacts Alternative 1: No-Action

The No-Action Alternative would be the least compatible with potential future transit (bus) service to the Miller Creek area. Under the No-Action Alternative, transit vehicles would be required to use the Miller Creek Road route. The congested traffic conditions during peak commute times would not be conducive to providing safe and reliable transit service to the Miller Creek area. Of the alternatives considered, the No-Action Alternative is most likely to contribute to modification of driving habits by the Miller Creek area residents who may seek to avoid driving in and out of the Miller Creek area during the most congested peak traffic periods without a viable second access. However, this alternative is least compatible with provision of efficient vanpool or carpool services in the Miller Creek area that would operate during the peak AM and PM periods.

4.4.5.2 Public Transportation and TDM Impacts Common to All Build Alternatives

New development proposals for the Miller Creek area would benefit from access to transit as part of the design of neighborhood roads and residential density. With the number of people and housing units expected in the area, use of transit will reduce vehicle miles and congestion and provide a viable alternative to the single-occupant (SOV) vehicle. The Missoula Urban Transportation District (MUTD) has expressed interest in expanding into the project area. A second access and other road improvements in the project area could promote and enhance the potential for a transit route circulating through the Miller Creek area, thereby providing a means for transit service to expand in one of the fastest growing areas in the county. The Environmental Protection Agency (EPA) encourages formation of a Transportation Management Association (TMA) as recommended in the 1996 *Maloney Ranch Transportation System Study* to increase use of ridesharing, transit, and other non-SOV modes of travel, and to reduce traffic congestion.

Compared to the No-Action Alternative, each of the build alternatives would better support transit and TDM, such as potential bus and other ridesharing modes, by providing increased capacity and efficiency for travel on the primary route serving the Miller Creek area. Each of the build alternatives would support potential transit service utilizing Old US 93 by providing improvements that conform to current standards, including lane and shoulder widths that would accommodate bus travel and potential pull-out areas, signalized access for buses and non-motorized transit users at the intersection of Reserve Street and Old US 93, and accommodations for non-motorized access to potential transit stops on Old US 93. Enhanced mobility, such as access for transit and non-motorized uses along Old US 93, would likely result in a shift in travel mode choice for some trips to, from, and within the project area.

4.4.5.3 Public Transportation and TDM Impacts Alternative 2B: North Lower Miller Creek Grade-Separated Intersection

Alternative 2B would support future transit (bus) service to the Miller Creek area because it would likely be situated within the potential expanded service area of Mountain Line. Transit and

potential TDM services, such as carpools and vanpools, would benefit from this alternative that would provide a second access and that could facilitate a one-way route through the Miller Creek area for picking up and dropping off riders.

4.4.5.4 Public Transportation and TDM Impacts Alternative 3B: Blue Mountain Road Grade-Separated Intersection

Alternative 3B would support future transit (bus) service to the Miller Creek area because it would likely be situated within the potential expanded service area of Mountain Line. Alternative 3B would provide the most direct connection to mixed-use activities in the Miller Creek area. Alternative 3B also would provide the most direct connection to the Montana Athletic Club, adjacent commercial property, and nearby recreation areas with a potential future transit stop near Blue Mountain Road. Alternative 3B could facilitate carpool and vanpool service originating and destined to Lolo and the Bitterroot Valley.

4.4.5.5 Public Transportation and TDM Impacts Alternative 4C: South Lower Miller Creek Interchange

Alternative 4C would be the least compatible with potential future transit (bus) service to the Miller Creek area. Alternative 4C would likely be located outside the potential expanded service area of Mountain Line. Even if this location were to be incorporated into the future transit district, it would require substantial out-of-direction travel for transit vehicles and would attract lower ridership than the other build alternatives. Alternative 4C would support TDM services, such as carpools and vanpools, by providing a second access to the Miller Creek area that could facilitate pickup and dropoff service within the Miller Creek area. Alternative 4C would facilitate carpool and vanpool service originating and destined to Lolo and the Bitterroot Valley.

4.4.5.6 Public Transportation and TDM Impacts Alternative 5A: Miller Creek Road At-Grade Intersection — Preferred Alternative

Compared to the other build alternatives that would provide a second access to US 93, Alternative 5A would limit potentially viable circulation routes options for transit service and other ride sharing modes between US 93 and the Miller Creek area.

4.4.6 Rail Service

4.4.6.1 Rail Service Impacts Alternative 1: No-Action

The No-Action Alternative would not change existing travel patterns and no new at-grade railroad crossing would result from this alternative. As traffic volumes and congestion increase on Miller Creek Road and US 93, the potential for vehicles to be trapped on the tracks and unable to clear off the crossings would increase. However, since rail service is limited to once weekly for the majority of the year and the train speeds are approximately 10 mph at these crossings, the risk of increasing train-related crashes would be very low.

4.4.6.2 Rail Service Impacts Common to All Build Alternatives

Compared to the No-Action Alternative, all build alternatives would divert some traffic from Brooks Street (US 93) onto Old US 93, resulting in a decrease in traffic crossing the MRL track at the Brooks Street/Reserve Street intersection (see **Table 4-6, page 4-22**). This would result in a reduction in the potential for vehicle/train conflicts at the Brooks Street/Reserve Street inter-

section. Additionally, the MRL crossing of Miller Creek Road would be reconstructed so that the traffic signal at the Miller Creek Road/US 93 intersection has a clear-out cycle that provides a green light to clear traffic off the railroad crossing prior the crossing gates going down. This clear-out cycle would run in conjunction with the left-turn lane signal on US 93 defaulting to a stop condition to prevent drivers turning into the railroad crossing.

4.4.6.3 Rail Service Impacts Common to Bridge Alternatives

All bridge alternatives would divert some traffic from Miller Creek Road to US 93 (see **Table 4-6, page 4-22**). This would decrease the traffic volumes crossing the MRL track on Miller Creek Road and would result in a reduction in the potential for vehicle/train conflicts at this location.

4.4.6.4 Rail Service Impacts Alternative 2B: North Lower Miller Creek Grade-Separated Intersection

Alternative 2B would have the fewest impacts to rail service of the build alternatives. No new at-grade crossing would result from this alternative. This alternative would direct traffic from both Miller Creek Road and from the Brooks Street/Reserve Street intersection and the new access road to US 93 would cross over the MRL track, avoiding an at-grade crossing.

4.4.6.5 Rail Service Impacts Alternative 3B: Blue Mountain Road Grade-Separated Intersection

Alternative 3B would direct traffic from both Miller Creek Road and from the Brooks Street/ Reserve Street intersection, and would result in a modified at-grade crossing of the MRL track. This crossing would be located on the one-lane access ramp to US 93 on the south side of the intersection. An existing crossing near the access ramp would be closed and local traffic directed to the new crossing. Traffic volumes at the new crossing would be much higher than those of the existing crossing and the potential for vehicle/train conflicts would be greater than those for Alternatives 2B and 4C.

4.4.6.6 Rail Service Impacts Alternative 4C: South Lower Miller Creek Interchange

No new at-grade crossing is included in Alternative 4C. This alternative would divert some traffic from both Miller Creek Road and from the Brooks Street/Reserve Street intersection, but to a lesser extent (see **Table 4-6, page 4-22**) than Alternatives 2B or 3B. The new access road to US 93 would cross over the MRL track, avoiding an at-grade crossing.

4.4.6.7 Rail Service Impacts Alternative 5A - Preferred Alternative: Miller Creek Road At-Grade Intersection

No new at-grade crossing is included in Alternative 5A. Compared to the other build alternatives, Alternative 5A would result in the greatest increase in traffic on Miller Creek Road and would increase the number of lanes on Miller Creek Road by two lanes compared to the other alternatives. This would result in an increased risk of vehicle/train conflicts at the MRL crossing on Miller Creek Road.

4.4.6.8 Rail Service Mitigation

The MRL crossing of Miller Creek Road would be reconstructed so that the traffic signal has a "clear-out" cycle that provides a green light to clear traffic off the railroad crossing prior to the crossing gates going down. This "clear-out" cycle would run in conjunction with the left-turn lane

signals defaulting to a stop condition preventing turning movements off US 93 into the railroad crossing.

4.4.7 Emergency Service Provider Access

The new fire station (completed in March 2007) within the Miller Creek area greatly enhances fire and emergency response capability within the area. Missoula County was contacted regarding their Disaster Plan and evacuations. The plan contains broad information, such as which agencies are responsible for certain areas and which agencies have authority during an emergency/disaster, etc. Detailed evacuation plans for areas like the Miller Creek area have not been prepared because of the difficulty involved in planning for every type of emergency or disaster. There are several areas in Missoula with a similar situation as the Miller Creek area - that of an isolated residential area that backs up to open space with one primary access road.

4.4.7.1 Emergency Service Provider Access Impacts Alternative 1: No-Action

As congestion continues to increase, emergency vehicle response time to and from the area could increase. However, the new fire station (completed in March 2007) within the Miller Creek area would alleviate some fire protection concerns and emergency response time.

4.4.7.2 Emergency Service Provider Access Impacts Common to All Build Alternatives

While the new fire station (completed in March 2007) in the Miller Creek area would alleviate some fire protection concerns and reduce emergency response time within the Miller Creek area, all build alternatives would also provide additional capacity to the intersection of US 93 and Miller Creek Road, which would enhance access for emergency vehicles along Miller Creek Road.

4.4.7.3 Emergency Service Provider Access Impacts Common to Bridge Alternatives

The bridge alternatives provide a second connection from US 93 to Lower Miller Creek Road and would allow emergency service providers another access to the Miller Creek area. However, the new fire station (completed in March 2007) within the Miller Creek area would alleviate some fire protection and emergency response time concerns.

Miller Creek Road Limited Improvements

Access for emergency service providers would be improved with the increased capacity and intersection improvements along Miller Creek Road.

4.4.7.4 Emergency Service Provider Access Impacts Alternative 2B: North Lower Miller Creek Grade-Separated Intersection

There are no additional impacts to those described in Section 4.4.7.3.

4.4.7.5 Emergency Service Provider Access Impacts Alternative 3B: Blue Mountain Road Grade-Separated Intersection

There are no additional impacts to those described in Section 4.4.7.3.

4.4.7.6 Emergency Service Provider Access Impacts Alternative 4C: South Lower Miller Creek Interchange

Since Alternative 4C is the build alternative that is farthest south from Missoula along US 93, a second access to the Miller Creek area at this location would cause some out-of-direction travel for emergency service providers, which could in turn lengthen response time.

4.4.7.7 Emergency Service Provider Access Impacts Alternative 5A - Preferred Alternative: Miller Creek Road At-Grade Intersection

In the short term, access for emergency service providers would be improved with the increased capacity and intersection improvements along Miller Creek Road. The new fire station (completed in March 2007) within the Miller Creek area will alleviate some fire protection and emergency response time concerns. Unlike the other build alternatives, a second access into Miller Creek is not included as part of Alternative 5A. As traffic volumes continue to increase with further development in the Miller Creek area, additional pressure would be placed on Miller Creek Road, Upper Miller Creek Road, and Lower Miller Creek Road.

4.4.8 Transportation Impacts Summary

Table 4-9 provides a comparison of transportation impacts by alternative. Impacts shown for the No-Action Alternative include impacts associated with planned locally funded improvements to Miller Creek Road that are not a part of this federally funded project. Impacts shown for Alternatives 2B, 3B, and 4C include the impacts for the intersection/interchange with US 93, the bridge crossing and new roadway, improvements on Old US 93, and the Limited Improvements on Miller Creek Road. Impacts shown for Alternative 5A include impacts on Old US 93 and Miller Creek Road.

4.4.9 Transportation Mitigation

Measures to minimize adverse transportation impacts are incorporated into the conceptual design of each of the alternatives. No additional transportation mitigation measures have been identified.

4.5 Right-of-Way and Utilities Impacts and Mitigation

4.5.1 Right-of-Way and Utilities Impacts Alternative 1: No-Action

The No-Action Alternative may include new right-of-way, easements, construction permits, relocations, or utility easements or relocations, as part of the Miller Creek build-out. No federally funded transportation improvements are proposed as part of this project under the No-Action Alternative; therefore, no right-of-way acquisitions, easement, construction permits, or utility relocations would occur as a result of this project. However, right-of-way would be needed to construct the proposed locally funded improvements to Miller Creek Road. These are estimated to include relocation of one residence, partial acquisition of seven residences (totaling 2.4 acres) and 0.2 acre of railroad easement, for a total of 3.7 acres.

Table 4-9
Transportation Impacts Summary

Transportation Evaluation Criteria	Alt. 1 No-Action	Alt. 2B N. Lower Miller Creek Grade-Separated Intersection	Alt. 3B Blue Mtn. Rd. Grade-Separated Intersection	Alt. 4C S. Lower Miller Creek Interchange	Alt. 5A Miller Creek Rd. At-Grade Intersection (Preferred Alternative)
Roadway Volumes and Operation	Greatest diversion of traffic from Miller Creek Rd. to local roads. Worst for overall mobility because of constrained capacity.	Reduces traffic volume along Miller Creek Rd. to greatest extent. Worst impact to US 93 traffic flow. Most evenly distributes traffic between Miller Creek Rd. and second access.	Least impact to US 93 traffic flow in rural section south of Buckhouse Bridge. Best for operations on major roadways in Miller Creek area.	Least shift of traffic from Miller Creek Rd. to second access. Greatest travel shift from local system to US 93. Worst roadway operations of build alternatives.	Best overall traffic performance, including least impact to US 93 traffic volumes and flow. Maintains current travel patterns in area.
Intersection Volumes and Operations	Worst overall roadway and intersection operations.	Worst operations on US 93.	Best operations at major intersections in Miller Creek area.	Worst intersection operations of build alternatives.	Best operations at US 93/Miller Creek Rd. intersection.
Safety*	Lowest extent of system improvements to accommodate forecasted travel demand.	Adds signal and potential conflict locations at new intersection on US 93. Reduces travel across railroad track.	Introduces traffic to high-speed section of US 93. Eliminates signal, secondary approaches, and provides grade-separated access to Blue Mtn. Rd. Adds at-grade railroad crossing.	Introduces traffic to high-speed section of US 93. Provides grade-separated access to Hayes Creek Rd.	Highest volumes at US 93/Miller Creek Rd. intersection. Greatest number of travel lanes on Miller Creek Rd. crossing railroad track.
Non-Motorized (Pedestrian and Bicycle) Travel	Would not provide safe access across US 93 for non-motorists west of Miller Creek Rd. or across Reserve St. at Old US 93.	Provides additional grade-separated crossing of US 93.	Provides best access between Miller Creek area and Blue Mtn. Rd. with grade-separated crossing.	Provides best access between Miller Creek area and Hayes Creek Rd. High-speed interchange not desirable for non-motorized travel.	Greatest width and number of lanes to cross on Miller Creek Rd. Would not provide additional access across US 93 for non-motorists west of Miller Creek Rd.
Public Transportation and TDM	Lowest extent of system improvements to accommodate transit and ridesharing.	Enhances potential transit and ride-sharing route options and circulation.	May provide best potential transit route circulation in Miller Creek area.	Second access likely outside MUTD Provides best access to Hayes Creek Road for ride-sharing.	Route options for future bus access to/from the Miller Creek area would be limited to Miller Creek Rd.

Table 4-9
Transportation Impacts Summary (Continued)

Transportation Evaluation Criteria	Alt. 1 No-Action	Alt. 2B N. Lower Miller Creek Grade-Separated Intersection	Alt. 3B Blue Mtn. Rd. Grade-Separated Intersection	Alt. 4C S. Lower Miller Creek Interchange	Alt. 5A Miller Creek Rd. At-Grade Intersection (Preferred Alternative)
Rail Service	Potential for vehicles to get trapped on tracks would increase as traffic volume and congestion increase.	Would divert traffic from Brooks St. onto Old US 93 to decrease traffic crossing MRL tracks at Brooks/Reserve St. intersection. Least impacts to rail service. No new grade crossing.	Would divert traffic from Brooks St. onto Old US 93 to decrease traffic crossing MRL tracks at Brooks/Reserve St. intersection. New modified at-grade MRL track crossing. Potential for vehicle/train conflicts greater due to higher traffic volumes at new crossing.	Would divert traffic from Brooks St. onto Old US 93 to decrease traffic crossing MRL tracks at Brooks/Reserve St. intersection. New access road to US 93 would cross over MRL track, avoiding an at-grade crossing.	Would divert traffic from Brooks St. onto Old US 93 to decrease traffic crossing MRL tracks at Brooks/Reserve St. intersection. Increase in traffic and number of lanes on Miller Creek Road would result in increased risk of vehicle/train conflicts at MRL crossing on Miller Creek Rd.
Emergency Service Provider Access	Minimal to no improvement to emergency access.	Second access would improve emergency access.	Second access would improve emergency access.	Second access would improve emergency access.	Miller Creek Road improvements provide additional lane on Miller Creek Road for improved emergency access. Does not provide second access.

* Considers vehicle conflict point/areas at intersections, number of travel lanes crossing railroad track, and pedestrian and bicycle safety.

4.5.2 Right-of-Way and Utilities Impacts on Old US 93 and Adjacent Intersections Common to All Build Alternatives

As part of the impacts assessment, a relocation specialist analyzed each of the alternative design footprints in the field. The probable impact of the design was estimated for each of the impacted parcels to determine whether the alternative would require any residential or business acquisitions, and whether the remaining property on partial acquisitions would become "uneconomic," suggestive of a full acquisition.

All of the build alternatives include improvements to Old US 93 and the adjacent intersections. Old US 93 would be widened to provide an additional northbound through travel lane and turning lanes at its intersection with Reserve Street and US 93.

Some of the improvements along Reserve Street and the Reserve Street/Brooks Street intersection would occur outside of the existing right-of-way. The only impact along Post Siding Road would be paving a new approach (±10 feet) for the tie-in to Old US 93.

Improvements would also affect access to businesses along Brooks Street. Parking along the Old US 93 gravel shoulder in the right-of-way adjacent to the businesses on the south side of Old US 93 would be eliminated.

On Reserve Street between Old US 93 and Brooks Street, widening would impact properties on both sides of Reserve Street and several existing parking spaces at the business located in the southwest corner of the Old US 93/Reserve Street intersection. Much of the additional widening along Reserve Street would be accommodated by removing the existing left-turn lane on Reserve Street between the Old US 93 and Brooks Street. Widening would not impact buildings or the large parking area for the car dealership on the east side of Reserve Street. On Reserve Street south of Brooks Street, widening would require a minor amount of right-of-way to accommodate new sidewalks, but there would be no impact to any buildings or site improvements. Access to and from Reserve Street to businesses would not be altered except for the prohibition of left turns as noted above.

On Brooks Street, widening would require a minor amount of right-of-way from businesses near the intersections of Brooks Street and Reserve Street and near the Miller Creek Road intersection. Right-of-way impacts would be minor and would not impact any buildings or site improvements, except that a new sidewalk would be required directly in front of businesses in the southwest corner of the Brooks Street/Reserve Street intersection, and access to these businesses would be limited to right-in/right-out movements because of changes to the intersection. No other access changes would be required.

Impacts Associated with Modified Old US 93 Design

Based on public concerns regarding impacts to the Missoula Country Club, the Old US 93 typical section was revised to minimize impacts to the Missoula Country Club. The revised design for Old US 93 is described below and in Section ES.2, page ES-3, and Section 2.6.2.1, page 2-19 of this FEIS. These revisions to the Old US 93 proposed typical section meet City of Missoula Standards and reduce impacts to properties adjacent to Old US 93 compared to the design proposed in the DEIS.

The modified typical section for Old US 93 eliminates the proposed drainage ditch and eight-foot shoulder and replaces it with an underground stormwater system with curb and gutter and a five-foot bicycle lane. The five-foot bicycle lane would replace the existing shoulder that may be used currently as a bicycle lane. Low retaining walls approximately three feet high would be used behind the curb to further reduce right-of-way impacts, but the actual need for, and location of the retaining walls will be determined during final design. These revisions to the proposed typical section would reduce the impacts to the Missoula Country Club.

The revised construction footprint would result in the following impacts to the Missoula Country Club property:

- From the existing driveway entrance along the southwest property line toward US 93, approximately 30 feet of right-of-way would be acquired from the Country Club in order to accommodate the additional turning lanes at the Old US 93 and US 93 intersection. As shown on **Figure 4-7**, the area impacted is the landscaped area adjacent to the parking lot and entrance road. No impacts would occur to the parking lot.
- The existing entrance road to the Country Club would remain in its current location but would be shortened by approximately 30 feet to match the new Old US 93 edge of pavement.
- The only holes in the vicinity of Old US 93 are holes 8 and 9. The only impact that would occur to the Country Club along the southern property line east of the entrance road in the area of holes 8 and 9 fairway and rough is to portions of the vegetative hedge or gravel maintenance area. In order to accommodate the wider Old US 93 typical section, an area of right-of-way approximately 250 feet long by five feet wide would be acquired as permanent right-of-way. No impacts to the 8th and 9th holes, fairways, or trees along the fairways would occur.

- For the remainder of the property line to Post Siding Road, all permanent improvements would remain within the existing highway right-of-way. However, to provide access for construction of the improvements, a five- to ten-foot temporary construction easement may be needed from the Missoula Country Club. It is not anticipated that use of the golf course would be limited by the construction easement. The temporary construction easement would be defined during final design and coordinated between the property owner and the project owner.

  A temporary construction easement may be necessary because the implementation of Alternative 5A (Preferred Alternative) would temporarily disturb land on the Missoula Country Club due to construction of a retaining wall(s). A temporary construction easement would allow construction access onto the Missoula Country Club property for a specific time and use. The property owner retains ownership and use of the property and may be compensated depending on the terms of the easement agreement. No permanent structure (wall or fence) would be located within the easement boundaries.

This modified design of Old US 93 reduces the estimated right-of-way impacts along Old US 93 from 2.3 acres to approximately 1.0 acre, of which 0.2 acre represents impacts to the Missoula Country Club. Impacts to the Missoula Country Club associated with the modified Old US 93 are shown on **Figure 4-7**

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Figure 4-7
Impacts to Missoula Country Club Associated with Modified Old US 93 Design

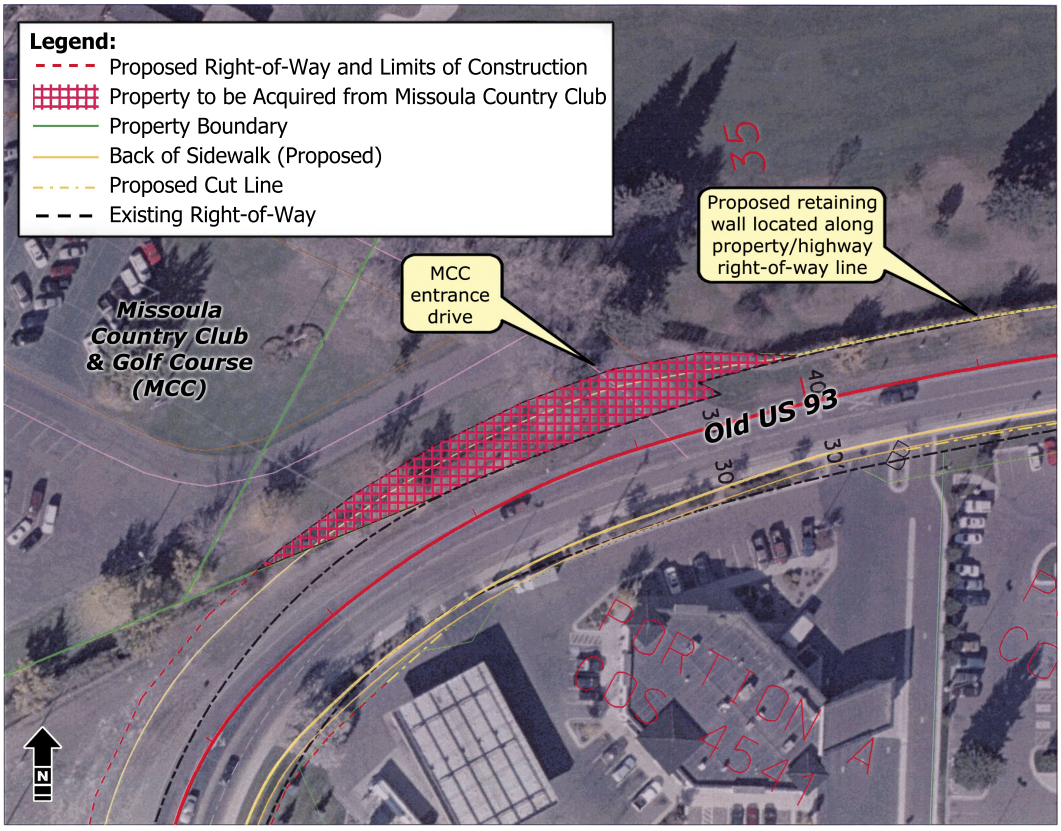


Table 4-10 identifies the right-of-way impacts associated with the transportation improvements proposed along Old US 93 and at the intersection of Old US 93 and Brooks/Reserve Streets.

Table 4-10
Old US 93 and Adjacent Intersections Right-of-Way/Relocation Impacts

Parcel Status	Number and Use of Parcel	Total Area of Parcel Impacted
Relocations/total acquisition	None	None
Partial right-of-way acquisitions	11 - Commercial/institution	1.0 acre
Total	11	1.0 acre

All of the alternatives were designed to minimize the number of relocations and full property acquisitions required. Numerous properties would require access relocation or consolidation as a result of project impacts. In addition, access management for US 93 from border to border is being pursued by MDT under a separate project [NH 0002(606), Access Control US 93 N&S]. The intent of the access control project is to make the entire US 93 corridor a limited-access facility. Under the MDT Access Management Plan, every attempt will be made to provide every parcel with reasonable access to US 93. The locations of accesses agreed to during right-of-way negotiations for the proposed action would be coordinated with the recommendations developed in the MDT Access Management Plan.

Similar to railroads such as Burlington Northern Santa Fe Railroad and Union Pacific Railroad, MRL issues an easement for a road encroachment while retaining ownership of the right-of-way. This includes both at-grade crossings, aerial crossings, and parallel roads. MRL would charge a one-time easement fee based on an appraisal value.

Utility relocations and easements may be required and may include relocating or establishing new power lines, telephone lines, fiber-optic cable lines, and underground gas lines. Coordination with the appropriate utility service provider would occur during final design as necessary. Brief interruption of services is expected during reconnection of utilities and could result in minor inconvenience to local residents. Utility customers would receive notification well in advance of interruption in service. Utility companies are responsible for obtaining applicable permits and clearances from MDT and other agencies, as necessary, prior to relocating the utilities.

4.5.3 Right-of-Way and Utilities Impacts Common to Bridge Alternatives (2B, 3B, 4C)

Miller Creek Road Limited Improvements

The Limited Improvements along Miller Creek Road would require the relocation of one residence but no businesses. These improvements would require the partial acquisition of seven residences, one business (consisting of two parcels), and one church. In addition, an easement would be required from the Montana Rail Link for the expansion and reconstruction of the rail crossing. These impacts are included in the summary included in **Table 4-11** and **Table 4-16, page 4-66**. Approximately 6.5 acres would be acquired to construct the Limited Improvements along Miller Creek Road. These impacts are common to all the bridge alternatives (2B, 3B, and 4C).

Table 4-11
Miller Creek Road Limited Improvements Right-of-Way/Relocation Impacts

Parcel Status	Number and Use of Parcel	Total Area of Parcel Impacted
Relocations/total acquisition	1 - single-family residence	1.1 acres
Partial right-of-way acquisitions	7 - single-family residential 3 - commercial/institution	2.8 acres 2.3 acres
Easements	1 - Railroad	0.3 acre
Total	12	6.5 acres

4.5.4 Right-of-Way and Utilities Impacts Alternative 2B: North Lower Miller Creek Grade-Separated Intersection

The North Lower Miller Creek new roadway alignment would not require the relocation of any residences or businesses. As part of the North Miller Creek alignment and US 93 intersection design, Yuhas Ranch Lane access to US 93 would be relocated with the new road connection. An easement would be required from the MRL to accommodate the bridge crossing the MRL right-of-way.

Alternative 2B would affect utilities along Lower Miller Creek Road, Old Bitterroot Road, US 93, Old US 93, and Miller Creek Road. At Lower Miller Creek Road, the design would affect utilities along the connections with Maloney Ranch Road, Jordan Court, and Lower Miller Creek Road to the west and northeast. Utilities include an underground cable TV line, a four-inch gas line, a sanitary sewer line, water lines, overhead power, and telephone lines. Utility service lines to new lots in the area are not identified, but could also be affected. Within the existing Old Bitterroot Road right-of-way are a four-inch gas line, overhead powerlines, and overhead telephone lines.

At US 93, overhead power lines are located along the south side of the MRL right-of-way. There are two buried telephone lines, including fiber-optic lines—one along the north side of the highway and the other on the south side from the west ending approximately 150 feet west of the new road alignment. A four-inch gas line is located from 12 to 17 feet south of the north highway right-of-way. Alternative 2B would primarily affect utilities on the north side of the highway.

Table 4-12 provides the total amount of right-of-way impacts associated with Alternative 2B. Alternative 2B is estimated to require 24.2 acres of new right-of-way or easements to construct the new North Lower Miller Creek roadway and the Bitterroot River bridge crossing, Limited Improvements along Miller Creek Road, and the improvements along Old US 93.

4.5.5 Right-of-Way and Utilities Impacts Alternative 3B: Blue Mountain Road Grade-Separated Intersection

The Blue Mountain Road alignment, as shown on **Figure 2-13, page 2-29**, would require the relocation of four businesses: a tattoo business, one used vehicle business, a hardwood floor/lumber company, a decking business, and the relocation of one single-family residence that is a part of one of the business parcels to be acquired. Right-of-way acquisition and/or easement would be required from 11 other parcels in the area of the Blue Mountain Road/US 93 intersection and roadway extension. The commercial businesses and properties located south of US 93 and east of Superior Hardwood and Millwork (a hardwood floor/lumber business) would be impacted by a change in access with the intersection. In addition, the intersection configuration would require direct accesses to US 93 to be consolidated and/or relocated. These businesses would access US 93 via an extended frontage road. The structures that are part of the used vehicle business east of Superior Hardwood and Millwork would be acquired and relocated to accommodate the access road between US 93 and Blue Mountain Road.

Table 4-12
Alternative 2B Right-of-Way/Relocation Impacts

Parcel Status	Old US 93 and Adjacent Intersections	Miller Creek Limited Improvements	Alt. 2B Roadway and Bridge Crossing	Total for Alt. 2B
Relocations/total acquisition				
Single-family residential	None	1 (1.1 acres)	None	1 (1.1 acres)
Commercial/institution	None	None	None	None
Undeveloped/farmland	None	None	1 (0.3 acre)	1 (0.3 acre)
Partial right-of-way acquisitions				
Single-family residential	None	7 (2.8 acres)	3 (0.5 acre)	10 (3.2 acres)
Commercial/institution	11 (1.0 acre)	3 (2.3 acres)	1 (0.1 acre)	15 (3.4 acres)
Undeveloped/farmland	None	None	6 (15.7 acres)	6 (15.7 acres)
Railroad easement	None	1 (0.3 acre)	1 (0.1 acre)	2 (0.4 acre)
Total	11 (1.0 acre)	12 (6.5 acres)	12 (16.7 acres)	35 (24.2 acres)

An easement would be required from the MRL to accommodate the bridge crossing and at-grade railroad crossing for the access ramp. Business access to US 93 from the businesses in the northwest quadrant would be consolidated to a frontage road that would access US 93 from the access ramps that would be located to the east of the current intersection. Right-of-way would be required from the businesses abutting the proposed/extended frontage road. Parking areas in front of two of the businesses would be impacted by the reduction of available parking space. To determine impacts resulting from a change in access, the highest and best use (HBU) of the site is evaluated. Access changes can be compensated if the change alters the HBU of the site. Generally, a frontage road does not change the HBU and is not compensated for as long as new access is "reasonable."

A direct-bury cable television (TV) line is located on the north side of US 93 running west from Blue Mountain Road. Buried telephone lines, including fiber-optic lines, are located along both sides of US 93 and also possibly along both sides of Blue Mountain Road, and along the east easement line of the Big Flat Canal and the southerly line of Buckhouse Lane. There is an overhead power line along the south side of the MRL right-of-way; and a spur line crosses the highway west of the alignment, runs north across Blue Mountain Road and Buckhouse Lane, then follows the west side of Buckhouse Lane. Several gas lines up to four inches in diameter are along both sides of US 93, both sides of the railroad, and both sides of Blue Mountain Road. The bridge over US 93 would impact the overhead power lines. The likely consequence would be that the power lines would be placed underground through the area.

Alternative 3B would affect the outfall of a large storm drain ditch along the south side of the Bitterroot River and utilities at Old Bitterroot Road, such as a four-inch gas line and overhead power and telephone lines.

This alternative does not require lowering US 93, so underground utilities along the highway would not be affected. Alternative 3B requires construction north of US 93 and impacts utilities along Blue Mountain Road and Buckhouse Lane. The ramp to the north side of US 93 would disrupt all four private sanitary drainfields for the Montana Athletic Club, as well as parking lot lighting. The new frontage road on the west side of Blue Mountain Road would affect utilities along US 93.

The Montana Athletic Club drainfield would be impacted by Alternative 3B and would require relocation. The northern ramp would result in the impact on approximately 1,000 linear feet of drainfield covering an area of approximately 7,000 square feet. The existing area of the drainfield covers 20,000 square feet. A replacement drainfield would need to be identified that is

equal to the area of the main drainfield. Depending on the condition of the existing drainfield and the nature of the in situ soil, a worst-case scenario would involve replacing the entire drainfield. Additionally, the complete replacement of the septic tank and lift station may be required. There is insufficient area within Montana Sports Center's parcel of property to accommodate the new and replacement drainfields. An alternative to a conventional drainfield is a recirculating sand filter. Depending on the in situ soil conditions, this filter could decrease the necessary drainfield areas by 50 percent. There is sufficient area within the parcel for this type of system. Information gathered from the recent septic design at Loren's House of Carpet indicates percolation rates are conducive to this type of design.

At the Loren's House of Carpet site there would be impacts to a portion of the parking lot, drainfield, and internal traffic circulation patterns. Revisions to the property site plan would need to maintain access around the buildings.

Table 4-13 summarizes the total right-of-way impacts estimated for Alternative 3B. The total includes the new road along the Blue Mountain Road extension, Bitterroot River bridge crossing, Limited Improvements along Miller Creek Road, and improvements along Old US 93.

Table 4-13
Alternative 3B Right-of-Way/Relocation Impacts

Parcel Status	Old US 93 and Adjacent Intersections	Miller Creek Limited Improvements	Alt. 3B Roadway and Bridge Crossing	Total for Alt. 3B
Relocations/total acquisition				
Single-family residential	None	1 (1.1 acres)	1 (0.0 acre*)	2 (1.1 acres)
Commercial/institution	None	None	4 (4.9 acres)	4 (4.9 acres)
Undeveloped/farmland	None	None	None	None
Partial right-of-way acquisitions				
Single-family residential	None	7 (2.8 acres)	None	7 (2.8 acres)
Commercial/institution	11 (1.0 acre)	3 (2.3 acres)	6 (3.6 acres)	20 (6.9 acres)
Undeveloped/farmland	None	None	4 (19.2 acres)	4 (19.2 acres)
Railroad easement	None	1 (0.3 acre)	1 (0.6 acre)	2 (0.9 acre)
Total	11 (1.0 acre)	12 (6.5 acres)	16 (28.3 acres)	39 (35.8 acres)

* One single-family residence would be relocated as part of one of the commercial property acquisitions.

4.5.6 Right-of-Way and Utilities Impacts Alternative 4C: South Lower Miller Creek Interchange

The South Lower Miller Creek interchange, as shown on **Figure 2-15, page 2-32**, would require the greatest number of residential and commercial relocations. It would require the relocation of 11 single-family residences, 3 businesses (including 2 retail antique/furniture stores), a Honda motorcycle dealership, and the Nordic Pines Hall and Missoula Loyal Order of Moose Lodge No. 556 (future home of the Humane Society). Full acquisition of two undeveloped/vacant parcels also would be required. Right-of-way acquisition would be required from 9 additional parcels in the interchange and new roadway area.

A trailer home park is located east of US 93 and south of the Moose Lodge. A change in access would be required to accommodate the proposed frontage road system to access the interchange. One mobile home adjacent to US 93 may need to be relocated. An easement would be required from the MRL to accommodate the bridge crossing the railroad right-of-way.

Alternative 4C would affect utilities along US Highway 93, Old US 93, and Miller Creek Road. On the north side of the highway are a buried telephone line (including fiber-optic line), a direct-bury cable TV line, and a four-inch gas line. Along the south side of the highway is an overhead powerline with four service lines, three of which cross the highway. One of those service lines continues north after crossing the highway. Another buried fiberoptic line, a four-inch gas line, and smaller service line also lie to the south of the highway. Several buildings would be acquired, so the utilities serving them would no longer be needed. South of the river at Lower Miller Creek Road the proposed right-of-way is at the corner of an existing leased utility site.

Table 4-14 summarizes the right-of-way estimated to be required for Alternative 4C. In total, Alternative 4C is estimated to require 66.7 acres of new right-of-way or easements to construct the new South Lower Miller Creek roadway, bridge crossing and interchange, improvements along Old US 93, and Limited Improvements along Miller Creek Road.

Table 4-14
Alternative 4C Right-of-Way/Relocation Impacts

Parcel Status	Old US 93 and Adjacent Intersections	Miller Creek Limited Improvements	Alt. 4C Roadway and Bridge Crossing	Total for Alt. 4C
Relocations/total acquisition				
Single-family residential	None	1 (1.1 acres)	11 (22.9 acres)	12 (24.0 acres)
Commercial/institution	None	None	3 (9.9 acres)	3 (9.9 acres)
Undeveloped/farmland	None	None	2 (13.5 acres)	2 (13.5 acres)
Partial right-of-way acquisitions				
Single-family residential	None	7 (2.8 acres)	1 (0.5 acre)	8 (33 acres)
Commercial/institution	11 (1.0 acre)	3 (2.3 acres)	1 (0.1 acre)	15 (3.4 acres)
Undeveloped/farmland	None	None	7 (12.0 acres)	7 (12.0 acres)
Railroad easement	None	1 (0.3 acre)	1 (0.3 acre)	2 (0.6 acre)
Total	11 (1.0 acre)	12 (6.5 acres)	26 (59.2 acres)	49 (66.7 acres)

* One crossing at Miller Creek Road and the second at the new road crossing.

4.5.7 Right-of-Way and Utilities Impacts Alternative 5A: Miller Creek Road At-Grade Intersection — Preferred Alternative

Numerous properties would have a change in access resulting from improvements associated with Alternative 5A. Alternative 5A, as shown on **Figure 2-18, page 2-35**, would require the relocation of one residence. There would be no access control changes for this alternative, although a number of driveways would be relocated by the new right-of-way limits. Right-of-way acquisition and/or easement would be required from 24 properties, including the Missoula Country Club (a privately-owned property), Wal-Mart, one church, and nine residences. An easement would be required from the MRL to accommodate the reconstructed at-grade railroad crossing. Right-of-way impacts for Alternative 5A are summarized in **Table 4-15**. The total includes improvements along Miller Creek Road and Old US 93 and at the intersection of Old US 93/ Brooks/Reserve Street.

Approximately 7.9 acres are required for Alternative 5A. Alternative 5A would improve existing roads that contain many existing utilities. Most improvements would nearly match existing roadway grades; therefore, many utilities may be modified in place (e.g., by adjusting manhole rim and valve cover elevations).

Table 4-15
Alternative 5A (Preferred Alternative) Right-of-Way/Relocation Impacts

Parcel Status	Old US 93 and Adjacent Intersections	Alt. 5A (Miller Creek Road)	Total for Alt. 5A
Relocations/total acquisition			
Single-family residential	None	None	None
Commercial/institution	None	None	None
Undeveloped/farmland	None	1 (1.1 acres)	1 (1.1 acres)
Partial right-of-way acquisitions			
Single-family residential	None	8 (3.0 acres)	8 (3.0 acres)
Commercial/institution	11 (1.0 acre)	3 (2.5 acres)	14 (3.5 acres)
Undeveloped/farmland	None	None	None
Railroad easement	None	1 (0.3 acre)	1 (0.3 acre)
Total	11 (1.0 acre)	13 (6.9 acres)	24 (7.9 acres)

* One crossing at Miller Creek Road and the second at the new road crossing.

Miller Creek Road, Upper Miller Creek Road, and Lower Miller Creek Road contain a gas line and an underground communications line, as well as overhead power and communications lines that would require relocation. Lower Miller Creek Road also contains a ten-inch sanitary force main that continues up Miller Creek Road to Briggs Street. Miller Creek Road crosses two 36-inch corrugated metal pipe (CMP) culverts and contains a two-inch sanitary force main. The railroad crossing signals would need to be modified.

A storm drain line exists along the centerline of Highway 93 with two catch basins in the existing intersection. A six-inch sanitary force main along the north highway right-of-way line east of the intersection is assumed unaffected. Utilities along Old US 93 and at the intersection with Reserve Street would be impacted by Alternative 5A.

4.5.8 Right-of-Way Impacts Summary

Table 4-16 summarizes right-of-way impacts for all alternatives. Impacts shown for the No-Action Alternative include impacts associated with planned locally funded improvements to Miller Creek Road, which are not a part of this federally funded project. Impacts shown for Alternatives 2B, 3B, and 4C include the impacts for the intersection/interchange with US 93, the bridge crossing and new roadway, improvements on Old US 93, and the Limited Improvements on Miller Creek Road. Impacts shown for Alternative 5A include impacts on Old US 93 and Miller Creek Road.

Table 4-16
Right-of-Way Impacts Summary

Right-of-Way Evaluation Criteria	Alt. 1[(1)] No-Action	Alt. 2B N. Lower Miller Creek Grade-Separated Intersection	Alt. 3B Blue Mtn. Rd. Grade-Separated Intersection	Alt. 4C S. Lower Miller Creek Interchange	Alt. 5A Miller Creek Rd. At-Grade Intersection (Preferred Alternative)
Acreage acquired for right-of-way	3.7 acres	24.2 acres	35.8 acres	66.7 acres	7.9 acres

[(1)]Estimates are related to locally funded Miller Creek Road Improvements.

4.5.9 Right-of-Way and Utilities Mitigation

The acquisition of land or improvements for highway construction is governed by federal laws and regulations designed to protect both the landowners and the taxpaying public. Landowners affected are entitled to receive fair market value for any land or buildings acquired and any damages to remaining land caused by highway construction. This proposed action will be developed in accordance with the Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970 (PL 91-646 as amended), (42 USC 4601, et. seq.) and the Uniform Relocations Act Amendments of 1987 (PL 100-17).

None of the alternatives will create a demand for replacement housing that could not be readily supplied by the existing market. The quantity of available housing in a variety of types, locations, and prices provides reasonable assurance that adequate housing exists to meet the needs of those who will be displaced by the proposed action. In addition, the supply of commercial land and buildings available for sale is considered adequate to relocate the displaced businesses.

Utilities will be relocated as required in accordance with state and federal regulations. Based on the noise analysis in Section 4.8, page 4-82, it was found that there were no noise impacts at the Missoula Country Club.

Mapping and aerial photography show that the existing Missoula Country Club fence lies on the Old US 93 right-of-way line. Aerial photography also indicates that the hedge is located within the Old US 93 right-of-way. Where new right-of-way or a construction easement is needed on Missoula Country Club property and the fence or hedge is impacted, replacement fencing and landscaping would be provided by the project. Where existing fence and hedge are located on Old US 93 right-of-way and are impacted but right-of-way and construction easement are not needed, replacement fence and landscaping would be the responsibility of the Missoula Country Club.

4.6 Economic Impacts and Mitigation

The discussion of direct economic impacts from each build alternative includes impacts to the local and regional economy and the existing and planned highway businesses. Indirect effects are associated with the increase in traffic to areas near each alternative and any supportive development that could occur.

4.6.1 Economic Impacts Alternative 1: No-Action

The No-Action Alternative would not impact existing economic growth trends or facilities in or adjacent to the project area. As described in Land Use, Section 4.1, page 4-3, it is reasonably foreseeable that full build-out will occur with new residential and commercial development planned for the Miller Creek area. While minor locally funded improvements are proposed to Miller Creek Road in the near term, these would not accommodate the 2025 traffic estimates. During the most congested periods, travelers might avoid certain areas and choose other routes through adjacent residential areas to the east. In addition, as further development occurs in the Miller Creek area, the demand for convenient additional services and commercial facilities is expected to increase.

4.6.2 Economic Impacts on Old US 93 and Adjacent Intersections Common to All Build Alternatives

Improvements along Old US 93 and adjacent intersections are the same with all of the build alternatives. The businesses between US 93 and Old US 93 currently have dual visibility and

access via these two roadways. Generally speaking, Old US 93 would be widened 15 to 20 feet closer to the existing businesses located between Old US 93 and US 93. The proposed design would eliminate parking that is occurring on the gravel shoulder within the existing Old US 93 right-of-way. Because the roadway improvements occur within the existing right-of-way along the southern right-of-way line, the proposed design does not require additional right-of-way from the businesses along the south side of Old US 93, with the exception of one business at the extreme southeast side of the proposed improvement. Internal circulation of businesses is not expected to change. However, some turning movements along Brooks/Reserve Streets may be restricted to right-in/right-out due to changes at the intersection.

Under all of the build alternatives, access to adjacent businesses would be maintained. Southbound drivers attempting to access businesses along Old US 93 and northbound drivers turning into the Missoula Country Club and onto Post Siding Road would be accommodated with a protected left-turn lane. Right-turn access onto Old US 93 from adjacent businesses would improve due to the addition of a second northbound travel lane on Old US 93 that would disperse traffic queues compared to the No-Action condition. Left turns onto Old US 93 from adjacent businesses and left turns onto Old US 93 from the Missoula Country Club and from Post Siding Road would become increasingly difficult due to increased traffic under all alternatives. Additionally, left turns onto Old US 93 from adjacent businesses would be difficult due to the additional northbound travel lane. However, it is expected that the new signal at the intersection of Reserve Street and Old US 93 would create gaps in southbound traffic that would allow this left-turn access. It is recognized that bicyclists and pedestrians utilizing designated bike lanes or sidewalks may have out-of-direction travel by using the Old US 93/Reserve Street signal.

All build alternatives include improvements to Old US 93 that would eliminate the Bitterroot Motors off-loading area on Old US 93. Improved driveways with large turning radii can be provided to allow trucks to enter onto that property for off-loading if there is available space. Otherwise, off-loading would need to occur in the legally available area in front of that business.

At the intersection of Old US 93 and Reserve Street, the northbound queue would extend approximately 400 feet on Old US 93 from the intersection during the AM peak period. This queue would impede access to business driveways near the Old US 93 and Reserve Street intersections. At the intersection of US 93/Miller Creek Road/Old US 93, the southbound queue would extend approximately 600 feet north along Old US 93 during the PM peak period. This queue would impede access to the Missoula Country Club golf course.

In the DEIS, it was proposed that the left-turn movement from Old US 93 to US 93 be eliminated for Alternative 5A. That movement could be maintained during non-peak hours; however, it may need to be restricted in the future depending on intersection operations. While the exclusive left-turn lane is provided in other build alternatives (2B, 3B, and 4C); this left-turn movement under Alternative 5A is designed to occur as a shared left/through traffic lane when not restricted. This condition would result in increased delay for through traffic on Old US 93 destined to the Miller Creek area as drivers wait for left-turn movements to occur. The difference between Alternative 5A and the No-Action Alternative is that Alternative 5A would provide additional capacity in the form of an adjacent southbound through lane into the Miller Creek area, whereas the shared left/through lane provides the only through movement capacity under the No-Action Alternative.

With projected traffic increases, it will eventually be necessary to further increase or provide more efficient use of the available capacity of the Old US 93/Miller Creek Road/US 93 intersection. Increasing the capacity using available approach lanes would require a longer signal cycle length, beyond what may be acceptable to most drivers and to affected jurisdictions. Alternatively, it is possible to maximize the available capacity by removing an underutilized turn movement from the intersection. The left-turn lane from Old US 93 to US 93 has a low volume during peak and off-peak periods compared to other movements. Complete restriction of this left-turn movement may be warranted in the future at the discretion of the Montana Department of Transportation (MDT), who has jurisdiction of US 93.

Short-term economic impacts during construction would occur with all of the build alternatives. Access to businesses in the construction zone and surrounding area may be temporarily closed, relocated, or reconfigured, resulting in the potential for business patrons to shop elsewhere. Since the majority of businesses in the project area are light industrial or manufacturing, the potential to offset losses through sales to construction workers (restaurants, gasoline stations, etc.) is not probable.

In the long term, the build alternatives would improve access, and ease some roadway congestion within the Miller Creek area, which would produce a positive effect on current and future area businesses. These factors might also lead to increased sales and revenue, as well as increased property values for commercial establishments with favorable access.

4.6.3 Economic Impacts Common to Bridge Alternatives (2B, 3B, 4C)

Direct Impacts

The bridge alternatives would improve connectivity between Missoula and the Miller Creek area. The local and regional economy would benefit through increased travel efficiency, some ease of congestion, and safety improvements. The bridge alternatives are not expected to cause a substantial shift in development patterns or planned locations of economic growth.

Within the Miller Creek area east of US 93, the location of planned commercial areas has not yet been approved. Therefore, economic impacts cannot be clearly identified for this area. In general, a second access from US 93 to the Miller Creek area would improve accessibility by relieving the bottleneck along Upper Miller Creek Road. The second access would accommodate future commercial uses as development proceeds. Under Alternatives 2B and 3B, Miller Creek residents would have more direct access to businesses along US 93. This could improve economic vitality for these businesses.

Indirect Effects

Indirect effects are unique to each bridge alternative, and are discussed in their respective sections.

Miller Creek Road Limited Improvements

Direct Impacts

The Limited Improvements along Miller Creek Road would not require the relocation of any businesses, but would require some property of one business (currently Wal-Mart) for right-of-way purposes.

Indirect Effects

The area surrounding the north "Y" intersection, Miller Creek Road and US 93/Old US 93 is primarily built out and would not experience much future economic development. The area includes lands under either City of Missoula or Missoula County jurisdiction. The recent Wal-Mart addition east of the US 93/Miller Creek Road is the only planned commercial zoning in the immediate area. Therefore, the Miller Creek Road Limited Improvements are not anticipated to promote unforeseen growth in the project area. Overall, the improvements would accommodate future traffic volumes and would provide a safer and more efficient access to Miller Creek Road and Wal-Mart.

4.6.4 Economic Impacts Alternative 2B: North Lower Miller Creek Grade-Separated Intersection

Direct Impacts

Partial right-of-way acquisitions from 15 commercial properties are estimated to be required along US 93 with Alternative 2B. Full acquisitions/relocations of businesses are not anticipated. The US 93/Yuhas Ranch Lane access east of Centennial Homes Sales Center would be relocated. Centennial Homes Sales Center, a mobile home sales business, is located northwest of the proposed intersection. No direct impacts to the business are anticipated. The current access to US 93 and existing circulation would be retained. Aside from the Centennial Homes Sales Center, no identified business establishments are located north of US 93 at the proposed intersection. Therefore, the road closure and change of access point would not impact existing or planned businesses in the area. No other economic impacts were identified for Alternative 2B.

Indirect Effects

The new road along the North Lower Miller Creek alignment and US 93 intersection would be located in County Zoning District 39, which does not permit commercial uses. Therefore, Alternative 2B would not impact planned economic growth or access to new commercial entities in the intersection area. See Section 4.1, page 4-3, Land Use, for a discussion of future supportive development that could occur in the project area.

4.6.5 Economic Impacts Alternative 3B: Blue Mountain Road Grade-Separated Intersection

Direct Impacts

An economic impact of Alternative 3B would be the relocation of four businesses. Right-of-way impacts were identified in Section 4.5, page 4-56. The business accesses to US 93 northwest of the intersection would be consolidated as a result of the grade-separated intersection. The businesses located in the immediate Blue Mountain Road intersection area do not function as an established business district, although the businesses west of Blue Mountain Road have shared accesses and parking areas. A commercial development, including Loren's House of Carpet, is located east of the Montana Athletic Club and north of US 93. Access to Loren's House of Carpet would be maintained. Alternative 3B would impact a portion of the parking lot and internal circulation, but would not affect access to the building.

Because of the bridge crossing over US 93 at the existing signal location, access to US 93 would shift to a new access aligned behind the Montana Athletic Club and east of Blue Mountain Road. The addition of an access road around the Montana Athletic Club would require a partial acquisition of right-of-way along the north and east borders of the property. Access into and out of the Montana Athletic Club from Blue Mountain Road would remain in approximately the same location but shift approximately 150 feet north to the northern access point. However, clients using the health club would likely experience difficulty in turning left out of the parking lot in the evening due to increased traffic on Blue Mountain Road. Overall, impacts to the Montana Athletic Club property would not result in substantial changes in travel patterns and accessibility to the facility.

The commercial businesses south of US 93 and east of Superior Hardwood and Millwork, a hardwood floor/lumber business, would be affected by a change in access with Alternative 3B. These business accesses to US 93 would be consolidated by an extended frontage road. The structures

that are part of the auto salvage yard east of the hardwood floor/lumber business would be acquired or relocated to accommodate the fill for the access road between US 93 and Blue Mountain Road.

Changes in business access could result in a temporary loss of business and revenue to the existing establishments since patrons would need to utilize alternate routes. There is potential for economic losses both during construction and after construction. Concern has been expressed by local business owners that greater out-of-direction travel caused by loss of direct access to US 93 and the proposed frontage road access could result in a loss of business. This alternative somewhat disrupts the cohesiveness of the businesses and residences south of US 93 at Blue Mountain Road, as well as businesses northwest of the intersection.

Indirect Effects

In terms of future development, the area surrounding the intersection is under Missoula County jurisdiction and is currently zoned for Planned Unit Development (PUD) or residential. However, no development plans currently exist for this area. Therefore, commercial development and redevelopment, including supportive development typically associated with intersections, might occur after the intersection is built.

An indirect impact resulting from Alternative 3B and the removal of the signal located at Blue Mountain Road would be the loss of the gap in traffic that results from the signal. Business owners and patrons in the Blue Mountain Road intersection area, as well as in the Hayes Creek Road area, may find it more difficult to access the businesses located along US 93. Additionally, if the four businesses acquired are not relocated, job losses could result.

4.6.6 Economic Impacts Alternative 4C: South Lower Miller Creek Interchange

Direct Impacts

Alternative 4C would require the relocation of three businesses, a car dealership, and two social organization buildings. With Alternative 4C, the proposed interchange area would change dramatically from rural residential and commercial to being primarily oriented to transportation. The area to the east of US 93 is composed of primarily commercial establishments. The area includes furniture stores, a lodge, warehouses, and other commercial properties. Most of these businesses would be acquired or relocated due to loss of access to US 93. A Humane Society is planning to relocate a new shelter east of the Missoula Loyal Order of Moose Lodge No. 556 along US 93. With Alternative 4C, this nonprofit organization would be precluded from relocating because of the ramps for the interchange. Other losses to business include access changes, which would be either reconfigured or eliminated.

Within Missoula County, there are properties available in areas permitted for commercial and industrial use that could provide suitable relocation sites. However, it cannot be assumed that these relocation sites would be within the South Lower Miller Creek interchange area because of limits on available property zoned vacant properties. The land use surrounding the interchange location is constrained by the Lolo National Forest to the west and the Bitterroot River to the east. If the three businesses to be acquired are not relocated, job losses could result.

4.6.7 Economic Impacts Alternative 5A: Miller Creek Road At-Grade Intersection — Preferred Alternative

Direct Impacts

Alternative 5A would not adversely affect existing commercial and industrial areas located along US 93 and Old US 93. With the widening of Miller Creek Road and improvements to the north "Y" intersection and the US 93/Old US 93/Miller Creek Road intersection, traffic operations would become more efficient, allowing better access for customers of existing businesses.

No businesses would be relocated with Alternative 5A, although property acquisition from 14 commercial properties would be required (3 along Miller Creek Road and 11 as part of the Old US 93 improvements). The proposed improvements to Miller Creek Road also include a slightly modified access to Wal-Mart, rather than a new access. The existing access is proposed to be relocated approximately 100 feet away from the Miller Creek Road and US 93 intersection to better accommodate proposed turning lanes and the intersection. Additionally, it is recommended that turn movements from this relocated access be restricted to right-in/right-out only.

Indirect Effects

The indirect effects of Alternative 5A are the same as those described for the Miller Creek Road Limited Improvements in Section 4.6.3, page 4-69.

4.6.8 Economic Impacts Summary

Table 4-17 summarizes economic impacts. Impacts shown for the No-Action Alternative include impacts associated with planned locally funded improvements to Miller Creek Road, which are not a part of this federally funded project. Impacts shown for Alternatives 2B, 3B, and 4C include the impacts for the intersection/interchange with US 93, the bridge crossing and new roadway, improvements on Old US 93, and the Limited Improvements on Miller Creek Road. Impacts shown for Alternative 5A include impacts on Old US 93 and Miller Creek Road.

Table 4-17
Economic Impacts Summary

Economic Evaluation Criteria	Alt. 1 No-Action	Alt. 2B N. Lower Miller Creek Grade-Separated Intersection	Alt. 3B Blue Mtn. Road Grade-Separated Intersection	Alt. 4C S. Lower Miller Creek Interchange	Alt. 5A Miller Creek Road At-Grade Intersection (Preferred Alternative)
Effect to existing and planned businesses on highway	None	More direct access to businesses along US 93 would be provided at new road and intersection. No business relocations. Partial acquisition of 15 commercial properties.	Would provide both impacts and benefits to area businesses. Access to businesses located along US 93 at Blue Mtn. Rd. may be more difficult. 4 businesses would be relocated. Property acquisition would be required from 20 commercial properties.	3 business relocations. Property acquisition from 15 businesses. Requires out-of-direction travel for Miller Creek area residents.	No business relocations. Partial acquisition of 14 commercial properties.

4.6.9 Economic Mitigation

Measures for economic mitigation include providing appropriate signage to notify travelers of access changes and to direct patrons to businesses at the Blue Mountain Road extension. Replacement parking will be provided, as determined feasible.

Mitigation for both permanent and construction-related economic impacts includes maintaining accurate and up-to-date information for businesses and the public via public announcements and other means of communications. Accesses will remain open to the maximum extent possible, and closures kept to a minimum. Notices of changes will be communicated to affected parties and the general public in a timely manner.

4.7 Air Quality Impacts and Mitigation

Three signalized intersections that would be affected by the Miller Creek Road project are located on or inside the Missoula non-attainment area for fine particulate matter less than 10 microns in diameter (PM_{10}) and carbon monoxide (CO). Therefore, a quantitative analysis was performed for CO impacts and a qualitative analysis was performed for PM_{10} impacts.

A quantitative CO hot spot analysis for localized impacts was performed for the Preferred Alternative (Alternative 5A). The results of the hot spot analysis show that exceedances of the 1-hour and 8-hour CO standards are not predicted under the No-Action Alternative or the build alternatives. Generally, intersections that do not warrant traffic signals do not have high enough traffic volumes to result in CO impacts.

A qualitative PM_{10} hot spot analysis was conducted for project-affected roadways located inside the PM_{10} nonattainment area boundary. Based on a comparison of future average daily traffic (ADT) data under the build alternatives and existing ADT near a local PM_{10} monitor, the relative locations of the project and the PM_{10} monitor, and the inclusion of project design elements that are likely to reduce PM_{10} emissions, exceedances of the PM10 NAAQS are not anticipated as a result of the proposed action.

The ADT volume predicted on roadways associated with the proposed action falls below levels that are considered significant in terms of mobile source air toxics (MSAT). Greater potential for MSAT effects typically occur for roadways that have an ADT volume of 140,000 to 150,000 vpd or greater in the design year. As stated above, the ADT for affected roadways under the build alternatives in 2025 ranges between 100 and 51,950 vpd. Therefore, a qualitative analysis was conducted for air toxics.

4.7.1 Air Quality Impacts Alternative 1: No-Action

Direct Impacts

Under the No-Action Alternative, congestion at most of the signalized intersections in the project area is predicted to be approximately the same or worse, when compared to the build alternatives. Increased congestion can lead to higher localized pollutant concentrations, particularly during winter months. The Miller Creek area build-out, which is anticipated to occur as part of the No-Action Alternative, would likely generate additional pollutant emissions from increased traffic and development in the project area.

Results of the CO hot spot analysis for the No-Action Alternative showed the same or higher levels of localized CO concentrations when compared with the Preferred Alternative (Alternative 5A).

Indirect Effects

Indirect air quality effects that may result from changes in the pattern of land use, population density, or growth rate that are associated with the No-Action Alternative could include increased emissions from the following sources:

- Natural gas space and hot water heating systems installed in new residential, commercial, recreation, and industrial facilities.
- New commercial and industrial facilities that provide increased employment in the region.
- Electric generating systems needed to serve the projected growth.
- New home heating fireplaces and outdoor barbecue appliances.
- Additional lawn mower usage.
- Manufacturing processes.

4.7.2 Air Quality Impacts on Old US 93 and Adjacent Intersections Common to All Build Alternatives

Improvements along Old US 93 and adjacent intersections are the same with all of the build alternatives. High concentrations of carbon monoxide typically occur during winter inversion weather conditions and near heavily congested intersections controlled by traffic signals. The air quality analysis did not show air quality impacts at the worst performing intersections within the carbon monoxide non-attainment area. Future year (2011 and 2025) carbon monoxide concentrations were shown to be substantially lower than existing levels at the worst intersections in the non-attainment area. This pattern of decreased levels results from lower emissions from vehicles and should occur throughout the project area. Generally, intersections that do not warrant traffic signals do not have high enough traffic volumes to result in CO impacts. In addition, well-performing intersections with a LOS of A, B, or C do not generally cause CO impacts. Analysis of unsignalized and well-performing intersections is not required under the hot spot methodology. Six intersections affected by the proposed action are signalized. Only the intersection of US 93 and Reserve Street and the intersection of US 93 and Miller Creek Road are predicted to operate below LOS D, E, or F under some conditions. **Table 4-18** summarizes the LOS and delay at the Old US 93/Brooks/Reserve Streets intersection for the alternatives.

Table 4-18
LOS and Delay at the Intersection of US 93 and Reserve Street

Alternative	AM Peak Hour		PM Peak Hour	
	LOS	Delay (seconds)	LOS	Delay (seconds)
Existing Conditions (2003)	D	39	D	48
Alternative 1: No-Action (2025)	E	56	F	92
Alternative 2B: North Lower Miller Creek Grade-Separated Intersection (2025)	D	40	C	34
Alternative 3B: Blue Mountain Road Grade-Separated Intersection (2025)	D	43	D	38
Alternative 4C: South Lower Miller Creek Interchange (2025)	D	42	D	35
Alternative 5A: Preferred Alternative: Miller Creek Road At-Grade Intersection (2025)	D	49	D	39

US 93 at Reserve Street would have higher congestion during the PM peak hour than the AM peak hour under the No-Action Alternative, and higher congestion during the AM peak hour than the PM peak hour under the build alternatives. **Table 4-18** shows that congestion under the No-Action Alternative would be greater than that predicted under any of the build alternatives. The

LOS and levels of delay are similar for this intersection for all the build alternatives, with the North Lower Miller Creek alternative showing slightly less congestion and delay. It is unlikely that the magnitude of the changes in congestion between different build alternatives at this intersection would have much effect on CO concentrations.

Air quality impacts to the Missoula Country Club for all build alternatives were evaluated using standard methods, as discussed in Section 4.7, and no air quality impacts were identified for any of the build alternatives.

Indirect Effects

The build alternatives would experience the indirect effects described under the No-Action Alternative.

4.7.3 Air Quality Impacts Common to Bridge Alternatives (2B, 3B, 4C)

Direct Impacts

Construction of the build alternatives would alleviate traffic congestion on neighborhood roads, possibly resulting in improvements in CO concentrations generated by delayed vehicles waiting at congested intersections. A new connection to US 93 would be expected to increase traffic volumes and delay in locations that previously did not experience congestion. Air quality impacts due to construction are discussed in Section 4.19.2.1, page 4-153.

Miller Creek Road Limited Improvements

US 93 at Miller Creek Road would have higher congestion during the AM peak hour than the PM peak hour for the bridge alternatives. **Table 4-19** summarizes the LOS and delay at the US 93 and Miller Creek Road intersection for the alternatives. **Table 4-19** shows that the build alternatives would improve the intersection's performance (reduced congestion) relative to the No-Action Alternative. It is unlikely that the magnitude of the changes in congestion between different build alternatives at this intersection would have much effect on CO concentrations.

Table 4-19
LOS and Delay at the Intersection of US 93 and Miller Creek Road

Alternative	AM Peak Hour		PM Peak Hour	
	LOS	Delay (seconds)	LOS	Delay (seconds)
Existing Conditions (2003)	D	48	B	19
Alternative 1: No-Action (2025)	F	119	F	96
Alternative 2B: North Lower Miller Creek Grade-Separated Intersection (2025)	D	38	C	23
Alternative 3B: Blue Mountain Road Grade-Separated Intersection (2025)	D	46	C	27
Alternative 4C: South Lower Miller Creek Interchange (2025)	D	47	C	29
Alternative 5A: Preferred Alternative: Miller Creek Road At-Grade Intersection (2025)	D	41	E	55

4.7.4 Air Quality Impacts Alternative 2B: North Lower Miller Creek Grade-Separated Intersection

Alternative 2B would include a new signalized intersection at US 93 and North Lower Miller Creek connection where currently there is none. This would likely result in increased CO concentrations

at this location. However, congestion would be reduced at the intersections of US 93 and Miller Creek Road, US 93 and Reserve Street, US 93 and Blue Mountain Road, Briggs Street and Miller Creek Road, and Upper Miller Creek Road and Lower Miller Creek Road under this alternative compared with the No-Action Alternative. This is likely to result in decreased CO concentrations at these locations.

4.7.5 Air Quality Impacts Alternative 3B: Blue Mountain Road Grade-Separated Intersection

With Alternative 3B, congestion at the signalized intersections of US 93 and Miller Creek Road, US 93 and Reserve Street, Briggs Street and Miller Creek Road, and Upper Miller Creek Road and Lower Miller Creek Road would improve compared with the No-Action Alternative. This would potentially result in an overall net decrease in localized CO concentrations in the vicinity of these intersections. The current signal at the intersection of US 93 and Blue Mountain Road would be removed, creating a more free-flow condition and reducing the exhaust emissions of traffic along US 93, including trucks that would be stopping, starting, and waiting at the traffic signal.

4.7.6 Air Quality Impacts Alternative 4C: South Lower Miller Creek Interchange

Alternative 4C shows increased congestion at the intersection of US 93 and Blue Mountain Road in the AM peak hour, when compared to the No-Action Alternative. This intersection would operate at LOS C in the AM peak hour for Alternative 4C and would not be expected to result in enough congestion to cause air quality issues. Congestion and delay would be reduced at other signalized intersections in the vicinity of the proposed action.

4.7.7 Air Quality Impacts Alternative 5A: Miller Creek Road At-Grade Intersection — Preferred Alternative

A quantitative hot spot analysis was performed for Alternative 5A at the three intersections that would be signalized under the build alternatives (US 93 and Miller Creek Road, US 93 and Reserve Street, and Old US 93 and Reserve Street) that are located within the CO non-attainment boundary. The intersections were analyzed for the existing year, the year of construction (2011) under the build and No-Action conditions, and the design year (2025) under the build and No-Action conditions where the intersection LOS was D, E, or F. The EPA MOBILE 6.2 model was used to calculate vehicle emission rates for the analysis. The EPA dispersion model CAL3QHC was used to estimate CO concentrations near the intersection. As shown in **Table 4-19**, Alternative 5A shows the least improvement over the No-Action Alternative in LOS and congestion in the PM peak hour.

The one-hour and eight-hour results of the analysis are shown in **Table 4-20** and **Table 4-21**. The eight-hour CO concentrations were calculated from the predicted one-hour concentrations, using a persistence factor of 0.7. The results of the hot spot analysis are compared to the one-hour CO NAAQS of 35 ppm, and the eight-hour CO NAAQS of 9 ppm.

Table 4-20
Maximum Predicted 1-hour CO Concentrations (ppm)

Intersection	Existing	No-Action 2011	Build 2011	No-Action 2025	Build 2025
Old US 93 and Reserve St.	Unsignalized*	Unsignalized*	AM Peak Hour LOS A PM Peak Hour LOS A	Unsignalized*	AM Peak Hour LOS B PM Peak Hour LOS A
US 93 and Reserve St.	11	7	AM Peak Hour LOS C PM Peak Hour LOS C	6	5
Old US 93 and US 93 and Miller Creek Rd.	9	5	AM Peak Hour LOS B PM Peak Hour LOS C	5	4

ppm = parts per million
*A detailed analysis was not performed for unsignalized intersections or intersections with a level of service of A, B, or C because these intersections are not likely to have air quality issues.

Table 4-21
Maximum Predicted 8-hour CO Concentrations (ppm)

Intersection	Existing	No-Action 2011	Build 2011	No-Action 2025	Build 2025
Old US 93 and Reserve St.	Unsignalized*	Unsignalized*	AM Peak Hour LOS A PM Peak Hour LOS A	Unsignalized*	AM Peak Hour LOS B PM Peak Hour LOS A
US 93 and Reserve St.	8	5	AM Peak Hour LOS C PM Peak Hour LOS C	4	3
Old US 93 and US 93 and Miller Creek Rd.	6	4	AM Peak Hour LOS B PM Peak Hour LOS C	4	3

ppm = parts per million
*A detailed analysis was not performed for unsignalized intersections or intersections with a level of service of A, B, or C because these intersections are not likely to have air quality issues.

The predicted CO concentrations are all well below the 1-hour and 8-hour national ambient air quality standards (NAAQS) for CO. CO air quality impacts are not anticipated as a result of Alternative 5A. Air quality impacts due to construction are discussed in Section 4.19.2.1, page 4-153.

4.7.8 Qualitative PM_{10} Hot Spot Analysis

The state of Montana has an EPA-approved conformity SIP. Section 17.8.1310 of the Administrative Rules of Montana (ARM 17.8.1310, *Special Issues*) includes requirements for quantitative PM_{10} hot spot analyses for projects located at sites in PM_{10} nonattainment areas (NAAs) that have vehicle and roadway emission and dispersion characteristics that are essentially identical to those at sites for which violations have been verified by monitoring. The Administrative Rules of Montana do not include analysis requirements for projects that do not meet these conditions.

MDEQ maintains two ambient PM_{10} monitors in Missoula. One is located in Boyd Park at 3100 Washburn Street, and the other is located at the Missoula City-County Health Department's building at 301 West Alder Street. A summary of ambient PM_{10} concentrations recorded at these locations between 1994 and 2005 is shown in **Table 3-16, page 3-51**. Since 1994, there has

been one day at each of these monitoring locations when the recorded 24-hour PM_{10} concentration was over the 24-hour standard of 150 ug/m3. This occurred during a heavy Bitterroot Valley wildfire period during early August 2000. However, for an exceedance of the NAAQS to occur, two or more days when the 24-hour PM_{10} concentration is in excess of the 150 ug/m3 standard must occur within any year. Therefore, no exceedances of the NAAQS have been recorded in Missoula since 1994.

A qualitative PM_{10} hot spot analysis was performed for the Miller Creek Road Improvement Project as required by the Montana conformity regulations and the federal transportation conformity rule. ADT volumes for the No-Action Alternative and for the four build alternatives were used to determine how future vehicle trips would be allocated on project-affected roadways that are located in the vicinity of the PM_{10} NAA. The majority of the project is located outside of the PM_{10} NAA. The only roadways that are located inside the PM_{10} NAA boundary are a section of US 93/Brooks Street (east of Miller Creek Road), Old US 93, and Reserve Street.

Table 4-22 shows the ADT volumes under different conditions for roadways in the vicinity of the PM_{10}.

Table 4-22
ADT for Project-Affected Roadways

Roadway	Alt. 1	Alt. 2B	Alt. 3B	Alt. 4C	Alt. 5A (Preferred Alternative)
US 93 (west of Miller Creek Road)	39,870	49,100	47,300	46,200	39,870
US 93 (east of Miller Creek Road)	51,950	39,700	39,700	39,700	39,700
Miller Creek Road (south of US 93)	26,000	14,900	16,300	18,300	27,700
Old US 93	8,520	20,300	20,300	20,300	20,300
Reserve Street (north of Brooks Street)	39,500	27,900	27,900	27,900	27,900

Table 4-23 shows the percentage change from the No-Action Alternative of ADT on the roadways included in the analysis.

Table 4-23
Percentage Change in ADT from the No-Action Alternative

Roadway	Alt. 1	Alt. 2B	Alt. 3B	Alt. 4C	Alt. 5A (Preferred Alternative)
US 93 (west of Miller Creek Road)	-	+23	+19	+16	0
US 93 (east of Miller Creek Road)	-	-24	-24	-24	-24
Miller Creek Road (south of US 93)	-	-43	-37	-30	+7
Old US 93	-	+138	+138	+138	+138
Reserve Street (north of Brooks Street)	-	-29	-29	-29	-29

Table 4-23 shows that in the majority of cases, the numbers of trips on roadways located within the NAA are being reduced under the build alternatives and are being, to some extent, redistributed via the new proposed Bitterroot Bridge crossings to the section of US 93 (west of Miller Creek Road) that is located outside of the NAA. The exception to this is Old US 93 that is pre-

dicted to have a substantial amount of additional trips under the build alternatives. Miller Creek Road (located just outside the PM_{10} NAA) is predicted to have a slight increase in ADT of seven percent under Alternative 5A.

Traffic characteristics on Old US 93 were therefore compared to traffic conditions in the vicinity of existing PM_{10} ambient air quality monitoring stations in Missoula to evaluate the potential for exceedances of the PM_{10} NAAQS to occur at this location as a result of the project.

The monitor located at the Missoula City-County Health Department building was selected for comparison purposes as it is exposed to traffic conditions similar to Old US 93.

Automatic traffic counter (ATR) data at the east end of the Orange Street Bridge for 2005 was obtained from the Montana Department of Transportation (MDT) to compare traffic conditions in the vicinity the monitoring location with conditions on Old US 93. The Health Department PM_{10} monitor is located approximately one block east of Orange Street, a heavily trafficked arterial in Missoula. The 2005 ADT data for Orange Street shows average weekday ADT volumes of 23,469 vehicles per day. These volumes were compared to the predicted future ADT volumes for Old US 93 in the year of peak PM_{10} emissions identified in the most recent conforming transportation plan [the *2004 Missoula Urban Transportation Plan Update* (MUTP)]. The year of peak PM_{10} emissions identified in the MUTP is 2025. Predicted ADT in 2025 for Old US 93 under all build alternatives is 20,300 vehicles per day.

Heavy truck percentages of total traffic on Old US 93 in 2025 are predicted to be approximately two percent. Existing truck percentages for Orange Street were not available. However, the 2004 MUTP identifies Orange Street as a City of Missoula truck route. Old US 93 is not identified as either a City of Missoula, or an interstate, truck route in the MUTP.

The project-affected roadways that are within the PM_{10} NAA are located on the outskirts of the City of Missoula. The Health Department PM_{10} monitor is located near the downtown area of the City of Missoula. Therefore, PM_{10} background concentrations are likely to be lower in the project area because of the lower density of roadway, business, and residential sources of PM_{10} compared to the vicinity of the monitor.

In addition, the proposed action includes commitments for design elements that will reduce PM_{10} emissions, such as paving shoulders, and adding curbs.

Based on the traffic data, the relative locations of the project and the PM_{10} monitor, and the inclusion of project design elements that are likely to reduce PM_{10} emissions, exceedances of the PM_{10} NAAQS are not anticipated in the vicinity of Old US 93 as a result of the proposed action.

4.7.9 Mobile Source Air Toxics (MSATs)

Unavailable Information for Project-Specific MSAT Impact Analysis

This section provides a basic discussion of the issues associated with MSAT emission impact analyses for projects such as the proposed action. Available technical tools do not enable prediction of project-specific health impacts resulting from the emission changes associated with the design alternatives. Because of these limitations, the following discussion is included in accordance with Council on Environmental Quality (CEQ) regulations [40 CFR 1502.22(b)] regarding incomplete or unavailable information.

Unavailable or Incomplete Information

Evaluating the environmental and health impacts from MSATs on a proposed highway project would involve several key elements, including emissions modeling, dispersion modeling to esti-

mate ambient concentrations resulting from the estimated emissions, exposure modeling in order to estimate human exposure to the estimated concentrations, and then final determination of health impacts based on the estimated exposure. Each of these steps is encumbered by technical shortcomings or uncertain science that prevents a more complete determination of the MSAT health impacts of this proposed action.

Emissions

The EPA tools to estimate MSAT emissions from motor vehicles are not sensitive to key variables determining emissions of MSATs in the context of highway projects. While MOBILE 6.2 is used to predict emissions at a regional level, it has limited applicability at the project level. MOBILE 6.2 is a trip-based model that projects emission factors based on a typical trip of 7.5 miles, and on average speeds for this typical trip. This means that MOBILE 6.2 does not have the ability to predict emission factors for a specific vehicle operating condition at a specific location at a specific time.

Dispersion

The tools to predict how MSATs disperse are also limited. The EPA's current regulatory models, CALINE3 and CAL3QHC, were developed and validated more than a decade ago for the purpose of predicting episodic CO concentrations to determine compliance with the NAAQS. The performance of dispersion models is more accurate for predicting maximum concentrations that can occur at some time at some location within a geographic area. This limitation makes it difficult to predict accurate exposure patterns at specific times at specific highway project locations across an urban area to assess potential health risk. The NCHRP is conducting research on best practices in applying models and other technical methods in the analysis of MSATs. This work also will focus on identifying appropriate methods of documenting and communicating MSAT impacts in the National Environmental Policy Act (NEPA) process and to the general public. Along with these general limitations of dispersion models, the FHWA is faced with a lack of monitoring data in most areas for use in establishing project-specific MSAT background concentrations.

Exposure Levels and Health Effects

Finally, even if emission levels and concentrations of MSATs could be accurately predicted, shortcomings in current techniques for exposure assessment and risk analysis preclude reaching meaningful conclusions about project-specific health impacts. Exposure assessments are difficult because it is not easy to accurately calculate annual concentrations of MSATs near roadways, and to determine the portion of a year that people are actually exposed to those concentrations at a specific location. These difficulties are magnified for 70-year cancer assessments, particularly because unsupportable assumptions would have to be made regarding changes in travel patterns and vehicle technology (which affects emissions rates) over a 70-year period. There are also considerable uncertainties associated with the existing estimates of toxicity of the various MSATs because of factors such as low-dose extrapolation and translation of occupational exposure data to the general population. Because of these shortcomings, any calculated difference in health impacts among alternatives is likely to be much smaller than the uncertainties associated with calculating the impacts. Consequently, the results of such assessments would not be useful to decision-makers, who would need to weigh this information against other project impacts that are better suited for quantitative analysis.

For each alternative for the Miller Creek Road EIS, the amount of MSATs emitted would be proportional to VMT, assuming that other variables such as fleet mix are the same for each alternative. Section 4.4, page 4-18 (Transportation Impacts and Mitigation) of this document states that despite the increase in vehicle lanes resulting from each of the build alternatives, there would be a small reduction in regional and project-area VMT compared to the No-Action Alternative. Because none of the alternatives are expected to result in a notable change in regional VMT,

substantially higher levels of regional MSATs are not expected from the build alternatives compared to the No-Action Alternative. In addition, emissions would likely be lower than present levels in the design year (2025) as a result of EPA's national control programs that are projected to reduce MSAT emissions by 57 to 87 percent from 2000 to 2020. Local conditions may differ from these national projections in terms of fleet mix and turnover, VMT growth rates, and local control measures. However, the magnitude of the EPA-projected reductions is so great (even after accounting for VMT growth) that MSAT emissions in the project area are likely to be lower in the future in virtually all locations.

Because new roadways would be constructed where a road has not previously existed for Alternatives 2B, 3B, and 4C, areas in the immediate vicinity of the new roadways would experience increased MSAT emissions as well as likely increased concentrations.

4.7.10 Air Quality Impacts Summary

The results of the CO air quality analysis show that air quality impacts from increased CO concentrations are not anticipated under the build alternatives. Further, signalized intersection operation improves in almost all cases between the No-Action Alternative and the build alternatives.

The results of the qualitative PM_{10} analysis show that exceedances of the PM_{10} NAAQS, as a result of the proposed action, are not anticipated.

The proposed action is not anticipated to generate ADT levels large enough to trigger concerns for MSATs. Despite the increase in vehicle lanes resulting from each of the build alternatives, there would be a small reduction in regional and project-area VMT compared to the No-Action Alternative.

All build alternatives would be subject to potential short-term air quality impacts due to construction. These potential impacts would be similar under all build alternatives but would be located in different areas, depending on the build alternative selected.

There is generally little difference between the alternatives related to air quality. The degree to which differences in VMT and intersection operation vary under each alternative is relatively minor, and it is unlikely to have much effect on pollutant concentrations.

4.7.11 Air Quality Mitigation

No air quality impacts are predicted. However, certain mitigation strategies are required to reduce emissions of fugitive particulate matter within the PM_{10} nonattainment area. Chapter 8 of the *Missoula City-County Air Pollution Control Program* (Rev. 2000) governs fugitive particulate emissions. Section 8.104, *Construction Sites*, states that:

> (1) A person in charge of a construction project may not cause, suffer or allow dirt, rock, sand and other material from the site to be tracked out onto paved surfaces without taking all reasonable measures to prevent the deposition of the material and/or to promptly clean up the material. Reasonable measures include but are not limited to frequent cleaning of the paved roadway, paving access points, use of dust suppressants, filling and covering trucks so material does not spill in transit and use of a track out control device.
>
> (2) Temporary roads and parking areas at active construction sites do not need to be paved and are not subject to the permitting requirements of subchapter 2 of this Chapter. After construction is complete, temporary roads and parking areas must be permanently removed or closed off to traffic.

Impacts from MSATS are not anticipated as a result of this project. However, the FHWA *Interim Guidance on Air Toxic Analysis in NEPA Documents* (February, 2006) states that for projects which are expected to have substantial construction-related MSAT emissions, there are construction mitigation strategies available to reduce MSAT emissions. These include strategies that reduce engine activity or reduce emissions per unit of operating time. Operational agreements that reduce or redirect work or shift times to avoid community exposures can have positive benefits when sites are near vulnerable populations. For example, agreements that stress work activity outside normal hours of an adjacent school campus would be operations-oriented mitigation. Also, technological adjustments to equipment, such as off-road dump trucks and bulldozers, could be appropriate strategies. These technological fixes could include particulate matter traps, oxidation catalysts, and other devices that provide an after-treatment of exhaust emissions. The use of clean fuels, such as ultra-low sulfur diesel, also can be a very cost-beneficial strategy.

4.8 Noise Impacts and Mitigation

Noise impacts for future conditions are determined based on land use and the magnitude of predicted traffic noise levels. Using FHWA and MDT guidelines, a noise impact occurs for each residential, motel, church, or park property if noise levels projected at the commonly used exterior part of the property equal or exceed 66 decibels (dBA). A noise impact occurs for commercial properties if the noise level equals or exceeds 71 dBA. An impact also occurs if there is a projected increase of 13 dBA or more over existing noise levels.

Sound levels were predicted for the No-Action Alternative and the four build alternatives at the same receptor locations as those for the analysis of existing conditions. All of the build alternatives include improvements to the Old US 93 and the US 93/Brooks/Reserve Streets intersection. The 2025 PM peak hour traffic data were used in the noise model to predict future sound levels. **Table 4-24** provides results for those receptors predicted to experience noise impacts under the 2025 build alternatives only. This table includes the applicable threshold criteria for determining impacts, the existing noise level, and the No-Action Alternative noise level for each noise receptor. Noise impacts are shown in shaded cells. Results for all receptors (including non-impacted receptors) can be found in the *Miller Creek Road Technical Noise and Air Quality Analysis Report*.

Table 4-24
Existing and Future Noise Levels at Receptors Impacted under Build Alternatives (Peak Hour dBA)

Receptor	Units	Use	Threshold for Impact	Existing Year 2003 (modeled)	No-Action Alternative (2025)	Build Alternative (2025)
Alternative 2B: North Lower Miller Creek Grade-Separated Intersection						
MCR R4	1	Residential	66	**68**	**70**	**70**
MCR R9	3	Residential	66	**69**	**72**	**67**
MCR R11	1	Residential	66	65	**68**	**68**
MCR R13	1	Residential	66	**71**	**74**	**69**
MCR R14	2	Residential	66	**69**	**72**	**67**
MCR R15	2	Residential	66	**69**	**72**	**68**
MCR R19	1	Residential	66	**68**	**70**	**69**
NLMC R2	1	Residential	66	65	**67**	**67**
NLMC R16	1	Residential	66	57	65	**66**
NLMC R18	1	Residential	66	56	63	**66**
Alternative 3B: Blue Mountain Road Grade-Separated Intersection						
MCR R4	1	Residential	66	**68**	**70**	**70**
MCR R9	3	Residential	66	**69**	**72**	**68**

Table 4-24 (Continued)
Existing and Future Noise Levels at Receptors Impacted under Build Alternatives
(Peak Hour dBA)

Receptor	Units	Use	Threshold for Impact	Existing Year 2003 (modeled)	No-Action Alternative (2025)	Build Alternative (2025)
MCR R11	1	Residential	66	65	**68**	**68**
MCR R13	1	Residential	66	**71**	**74**	**69**
MCR R14	2	Residential	66	**69**	**72**	**68**
MCR R15	2	Residential	66	**69**	**72**	**68**
MCR R19	1	Residential	66	**68**	**70**	**69**
BLUE MTN. R4	2	Residential	66	**67**	**68**	**69**
BLUE MTN. R6	1	Residential	66	49	50	**62 (SUBST)***
BLUE MTN. C4	1	Commercial	71	69	**71**	**71**
BLUE MTN. C7	1	Commercial	71	70	**72**	**72**
BLUE MTN. C8	1	Commercial	71	**73**	**75**	**75**
Alternative 4C: South Lower Miller Creek Interchange						
MCR R4	1	Residential	66	**68**	**70**	**70**
MCR R9	3	Residential	66	**69**	**72**	**68**
MCR R11	1	Residential	66	65	**68**	**68**
MCR R12	1	Residential	66	**66**	**69**	**66**
MCR R13	1	Residential	66	**71**	**74**	**69**
MCR R14	2	Residential	66	**69**	**72**	**68**
MCR R15	2	Residential	66	**69**	**72**	**69**
MCR R19	1	Residential	66	**68**	**70**	**69**
SLMCR R2	1	Residential	66	64	65	**66**
SLMCR R3	4	Residential	66	**70**	**72**	**72**
SLMCR R4	3	Residential	66	64	**66**	**66**
SLMCR R11	1	Church	66	**67**	**68**	**68**
Alternative 5A: Miller Creek Road At-Grade Intersection (Preferred Alternative)						
MCR R4	1	Residential	66	**68**	**70**	**70**
MCR R5	1	Residential	66	64	**67**	**66**
MCR R6	1	Residential	66	65	**67**	**66**
MCR R7	1	Residential	66	65	**68**	**66**
MCR R8	1	Residential	66	**67**	**70**	**67**
MCR R9	3	Residential	66	**69**	**72**	**70**
MCR R10	1	Church	66	61	65	**67**
MCR R11	1	Residential	66	65	**68**	**70**
MCR R12	1	Residential	66	**66**	**69**	**67**
MCR R13	1	Residential	66	**71**	**74**	**71**
MCR R14	2	Residential	66	**69**	**72**	**70**
MCR R15	2	Residential	66	**69**	**72**	**70**
MCR R16	1	Residential	66	61	**66**	**66**
MCR R17	1	Residential	66	62	65	**66**
MCR R18	1	Residential	66	64	**68**	**68**
MCR R19	1	Residential	66	**68**	**70**	**70**

*(SUBST) = Represents substantial increase over existing noise levels (13 dBA).

For purposes of direct comparison between alternatives, **Table 4-25** shows a summary of total numbers of predicted noise impacts by property type (residential/church/commercial) for each alternative and the existing condition. The receptor locations are shown in **Figure 4-8**.

Figure 4-8
Modeled Noise Receptor Locations

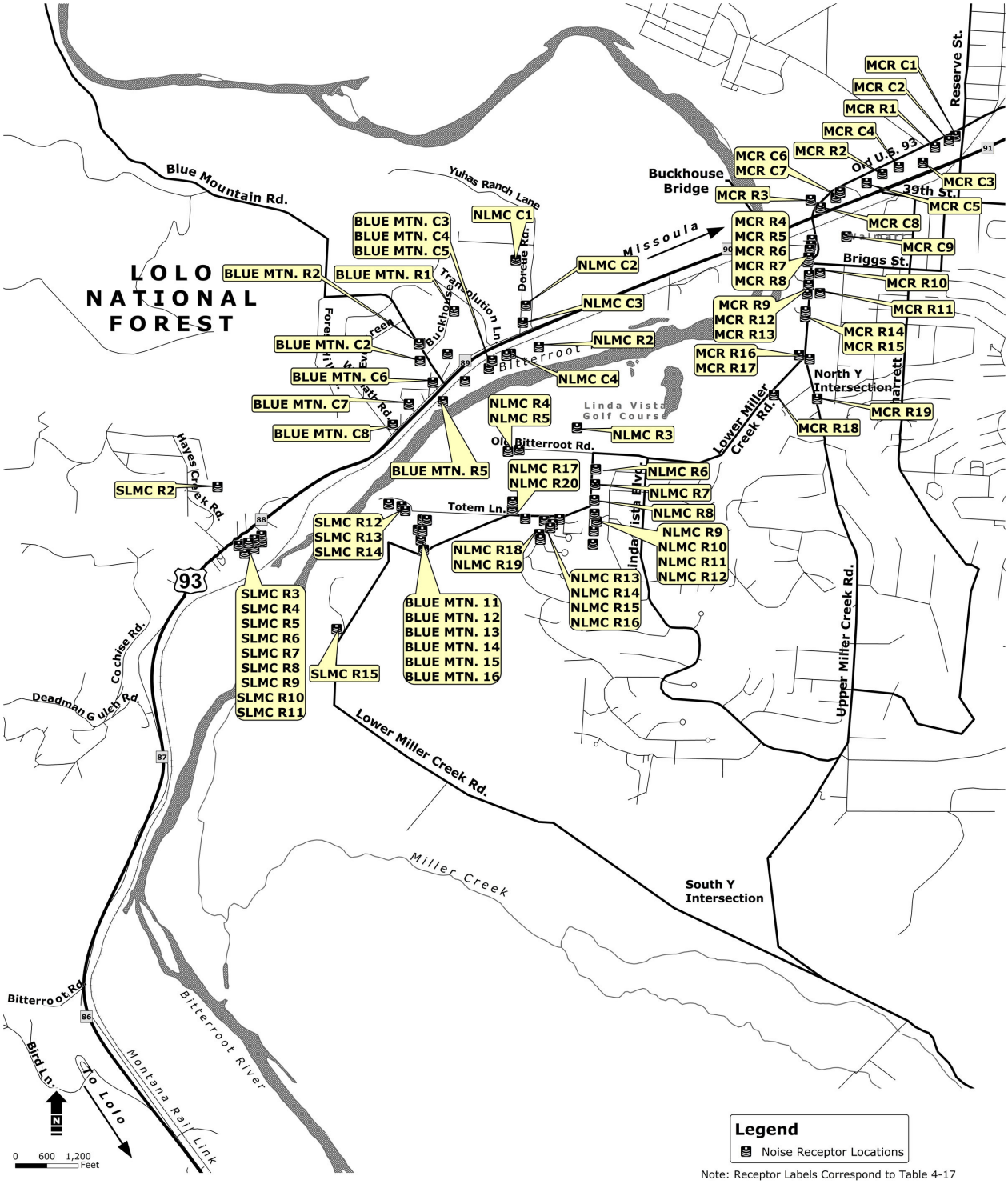


Table 4-25
Summary of Noise Impacts for Project Build Alternatives
(Residential/Church/Commercial)

Alternative	Impact Location	Existing	No-Action Alternative	Build Condition (2025)
Alternative 2B: North Lower Miller Creek Grade-Separated Intersection	North Lower Miller Creek Alignment Corridor	No impacts	1 residential	3 residential
	Miller Creek Rd. Limited Improvements & Old US 93 Improvements	12 residential	18 residential	11 residential
	Total Impacts under Alt 2B	**12 residential**	**19 residential**	**14 residential**
Alternative 3B: Blue Mountain Road Grade-Separated Intersection	Blue Mountain Rd. Alignment Corridor	2 residential 1 commercial	2 residential 3 commercial	3 residential 3 commercial
	Miller Creek Rd. Limited Improvements & Old US 93 Improvements	12 residential	18 residential	11 residential
	Total Impacts under Alt 3B	**14 residential** **1 commercial**	**20 residential** **3 commercial**	**14 residential** **3 commercial**
Alternative 4C: South Lower Miller Creek Interchange	South Lower Miller Creek Alignment Corridor	4 residential 1 church	7 residential 1 church	8 residential 1 church
	Miller Creek Rd. Limited Improvements & Old US 93 Improvements	12 residential	18 residential	12 residential
	Total Impacts under Alt 4C	**16 residential** **1 church**	**25 residential** **1 church**	**20 residential** **1 church**
Alternative 5A:Miller Creek Road At-Grade Intersection (Preferred Alternative)	Miller Creek Alignment Corridor & Old US 93 Improvements	**12 residential**	**18 residential**	**19 residential** **1 church**

Note that Alternative 3B has the least number of predicted noise impacts under the build condition; however, this is the only alternative that is predicted to experience a "substantial increase" noise impact.

4.8.1 Noise Impacts Alternative 1: No-Action

Based on the results of the noise analysis, 28 residential properties, 1 church, and 3 commercial properties are predicted to have noise levels exceeding the MDT noise impact criteria under the No-Action Alternative in 2025.

These No-Action Alternative impacts include 18 residential impacts adjacent to Miller Creek Road and Old US 93; 1 residential impact in the North Lower Miller Creek alignment corridor; 2 residential and 3 commercial impacts in the Blue Mountain Road alignment corridor; and 7 residential and 1 church impact in the South Lower Miller Creek alignment corridor.

This represents an increase of 10 residential properties and 1 commercial properties over the number of properties predicted to be impacted under the existing condition. Noise level increases over existing conditions are below the 13-dBA substantial increase criterion at all locations. Noise levels increases under the No-Action Alternative result from natural traffic volume

growth over time, and from increased traffic volumes in the project area as a result of the construction of the Maloney Ranch subdivisions.

4.8.2 Noise Impacts Associated with Old US 93 Improvements Common to all Build Alternatives

For purposes of a noise impact analysis, the land use for the Missoula Country Club is a privately-owned golf course; therefore Activity Category "B" ("Picnic areas, recreation areas, playgrounds, active sports areas, parks, residences, motels, hotels, schools, churches, libraries, and hospitals") was used for the Missoula Country Club in evaluating impacts for all build alternatives.

The noise analysis followed standard FHWA and EPA guidance for analysis methods The sound levels predicted at the Missoula Country Club are 62 dBA for year 2025, which is 4 dBA below the 66 dBA noise abatement criteria. Therefore, the Preferred Alternative would not require noise abatement to the Missoula Country Club.

Noise Measurement Site 9 (shown on **Table 3-20, page 3-53** and **Figure 3-16, page 3-55**) is a commercial area (Activity Category C) across the street and to the east of the Missoula Country Club. The measurement was used to validate the Traffic Noise Model (TNM). Measurements do not need to be taken at all sites because the model allows the reasonable prediction of impacts at non-measurement locations. Noise levels for the Missoula Country Club were predicted at location MCR-R3, shown on **Figure 4-8**. The location is east of the club house at the Missoula Country Club. Although Noise Measurement Site 9 is an Activity Category "C," the noise impact criteria used to evaluate impacts at the Country Club was a Category "B" "recreation area" level of 66 dBA. Noise levels at the Missoula Country Club for all project alternatives are predicted to be below the noise impact criteria.

No noise impacts are predicted for locations along Old US 93, including receptors MCR R1, MCR R2, MCR R3, MCR C1, MCR C2, MCR C3, MCR C4, MCR C5, MCR C6, MCR C7, or MCR C8 along Old US 93 (see **Figure 4-8** for receptor locations).

4.8.3 Noise Impacts Alternative 2B: North Lower Miller Creek Grade-Separated Intersection

Analysis of the predicted noise level results indicate that no properties are predicted to be noise-impacted under existing conditions; one residential property is predicted to be noise-impacted under the No-Action Alternative; and three residential properties are predicted to be impacted under the Alternative 2B in 2025. Projected noise levels at all impacted properties exceed the absolute impact criteria of 66 dBA for residential properties.

The increases in noise levels at Alternative 2B receptors between the existing condition and the future build condition in 2025 are between 1 and 10 dBA. The No-Action Alternative shows an increase over existing noise levels of between 1 and 8 dBA in 2025. The change in noise levels between the No-Action Alternative and Alternative 2B ranges from a reduction of 7 dBA to an increase of 6 dBA. The greatest increases in noise levels over existing conditions under this alternative occur at residences close to the intersection of the new roadway connection and the existing Lower Miller Creek Road.

No substantial direct or indirect noise impacts would occur to the future planned Maloney Ranch Park.

Indirect Impacts

Regarding indirect impacts to housing values related to noise, the most substantial increase in traffic is expected to occur on Old US 93 where there are no residences. for all other affected road segments, 2025 traffic volumes do not increase substantially over those predicted for the No-Action Alternative. Traffic is expected to increase on all road segments due to projected growth in the area and not as a result of the project.

4.8.4 Noise Impacts Alternative 3B: Blue Mountain Road Grade-Separated Intersection

One additional residential property is predicted to be impacted in 2025 under Alternative 3B than under the No-Action Alternative. The additional impact is an exceedance of the substantial increase criterion of 66 dBA for residential properties.

The increases in noise levels at Alternative 3B receptors between the existing condition and the future build condition in 2025 are between zero and 13 dBA. The No-Action Alternative shows an increase over existing noise levels of between 1 and 6 dBA in 2025. The change in noise levels between the No-Action Alternative and Alternative 3B ranges from a reduction of 2 dBA to an increase of 12 dBA. The greatest increases in noise levels over existing conditions under this alternative occur at the residence on Old Bitterroot Road adjacent to the proposed alignment of the Blue Mountain Road extension.

Indirect Impacts

Indirect impacts would be the same as Alternative 2B.

4.8.5 Noise Impacts Alternative 4C: South Lower Miller Creek Interchange

Four residential properties and one church are predicted to be noise-impacted under existing conditions; seven residential properties and one church are predicted to be noise-impacted under the No-Action Alternative; and eight residential properties and one church are predicted to be noise-impacted under Alternative 4C in 2025. Projected noise levels at all impacted properties exceed the absolute impact criteria of 66 dBA for residential properties.

The increases in noise levels at Alternative 4C receptors between the existing condition and the future build condition in 2025 are between 1 and 7 dBA. The No-Action Alternative shows an increase over existing noise levels of between 1 and 5 dBA in 2025. The change in noise levels between the No-Action Alternative and Alternative 4C ranges from a reduction of 1 dBA and an increase of 6 dBA.

The greatest increases in noise levels over existing levels under this alternative occur at the residence labeled SLMCR R1, which is located just north of the proposed interchange ramps.

Indirect Impacts

Indirect impacts would be the same as Alternative 2B.

4.8.6 Noise Impacts Alternative 5A: Miller Creek Road At-Grade Intersection — Preferred Alternative

Twelve residential properties are predicted to be noise-impacted under existing conditions; 18 residential properties are predicted to be noise-impacted under the No-Action Alternative; and 19 residential properties and one church are predicted to be noise-impacted under Alternative 5A in 2025. Projected noise levels at all impacted properties exceed the absolute impact criteria of 66 dBA for residential properties.

The increases in noise levels at Alternative 5A receptors between the existing condition and the future build condition in 2025 are between zero and 6 dBA. The No-Action Alternative shows an increase over existing noise levels of between 2 and 5 dBA in 2025. The change in noise levels between the No-Action Alternative and Alternative 5A ranges from a reduction of 3 dBA to an increase of 2 dBA.

Reductions in noise levels at certain receptors under Alternative 5A, compared to the No-Action Alternative, is the result of minor alignment changes to Miller Creek Road under Alternative 5A. The greatest increases in noise levels over the existing condition occur at the church located just south of Briggs Street on the east side of Miller Creek Road.

Indirect Impacts

Indirect impacts would be the same as Alternative 2B.

4.8.7 Noise Impacts Summary

Table 4-26 summarizes noise impacts for each alternative. Impacts shown for the No-Action Alternative include impacts associated with planned locally funded improvements to Miller Creek Road, which are not a part of this federally funded project. Impacts shown for Alternatives 2B, 3B, and 4C include the impacts for the intersection/interchange with US 93, the bridge crossing and new roadway, improvements on Old US 93, and the Limited Improvements on Miller Creek Road. Impacts shown for Alternative 5A include impacts on Old US 93 and Miller Creek Road.

The number of impacts for the existing condition and the No-Action Alternative are included for informational purposes. For ease of comparison, the numbers of impacted properties under the existing condition and the No-Action Alternative are only shown for the receptors in each alignment corridor. The numbers of impacted properties for Alternatives 2B, 3B, and 4C include impacts that would occur adjacent to the improvements on Miller Creek Road and Old US 93.

Table 4-26
Noise Impacts Summary

Alternative	Existing	No-Action Alternative	Build Condition (2025)
Alternative 2B: North Lower Miller Creek Grade-Separated Intersection	12 residential	19 residential	14 residential
Alternative 3B: Blue Mountain Road Grade-Separated Intersection	14 residential 1 commercial	20 residential 3 commercial	14 residential 3 commercial
Alternative 4C: South Lower Miller Creek Interchange	16 residential 1 church	25 residential 1 church	20 residential 1 church
Alternative 5A: Miller Creek Road At-Grade Intersection (Preferred Alternative)	12 residential	18 residential	19 residential 1 church

4.8.8 Noise Mitigation

Noise abatement is generally considered only where noise impacts affect areas with frequent human use. A number of noise mitigation measures were considered for reduction of noise levels at impacted properties. These included truck restrictions, speed restrictions, alignment changes, and traditional noise barriers. Mitigation of the traffic noise impacts through truck or speed restrictions, or changes in the horizontal or vertical alignment was considered but rejected as inconsistent with the purpose and need of the project.

Lower noise levels resulting from noise mitigation must be shown to be of benefit to the impacted receptor(s). There are two main elements in the consideration of noise abatement: feasibility and reasonableness. Feasibility addresses the engineering considerations involved with implementation of noise mitigation: (1) Can a noise barrier be constructed? (2) Can a noise reduction of 6 dBA (insertion loss) be obtained with a noise barrier? (3) Are there safety limitations or maintenance issues?

Reasonableness considerations are as follows:

- Does the cost of a noise barrier exceed the cost-effectiveness-index (CEI) standard?
- How do the existing noise levels compare to future noise levels?
- Were impacted receptors in existence prior to the original construction or widening of Miller Creek Road or US 93?
- Would the noise barrier be in use for at least 15 years? Do the impacted residents want a noise barrier?

Further detail about mitigation recommendations is presented in the *Technical Noise Analysis and Air Quality Report* (TWE 2004, amended 2006). The following information summarizes the preliminary recommendations that resulted from this noise analysis. Final decisions on construction of noise abatement will be made during final design of the proposed action.

Noise Mitigation for Old US 93 Improvements Common to All Build Alternatives

Temporary noise impacts may occur during the construction phase of improvements. The operation of heavy equipment (e.g., bulldozer) or use of power tools (e.g., jackhammer) in close proximity to the residences within the construction area may create an undesirable noise condition. In an effort to limit construction noise impacts, it is recommended that standard methods for the control of noise sources during construction be used. These include good community notifications of scheduled noisy work; design considerations (such as siting noise equipment in less sensitive areas and turning off idling equipment when not in use); the use of well-maintained equipment with the latest mufflers; and performing work during daytime hours to the extent practical.

Noise Mitigation Common to Miller Creek Road Limited Improvements

Minor differences in traffic data for the bridge alternatives result in slight differences in noise levels and numbers of noise impacts predicted at receptors in the vicinity of the Miller Creek Road Limited Improvements. In general, however, the same groups of properties are impacted in each case. Properties predicted to experience noise levels exceeding noise criteria in this area are represented by receptors labeled MCR R4, MCR R9, MCR R11, MCR R12, MCR R13, MCR R14, MCR R15, and MCR R19.

Traffic noise abatement for receptor MCR R4 was determined not to be feasible because this property is an isolated noise impact and because single residences are generally unable to meet the feasibility criteria for noise walls and minimum required noise reduction while also satisfying

the reasonableness (cost-effectiveness) criterion. Therefore, noise abatement is not recommended in this case.

Traffic noise abatement for receptors MCR R9, MCR R11, MCR R12, MCR R13, MCR R14, MCR R15 and MCR R19 was determined not to be feasible because these properties have direct access onto Miller Creek Road, and barriers with breaks in them generally cannot achieve noticeable noise reductions.

Noise Mitigation Alternative 2B

There is one noise-impacted residence (receptor NLMC R2) located at the north end of the proposed build alignments, near US 93. The dominant traffic noise source in this location is US 93. Traffic noise abatement at this location was determined not to be feasible because the property has direct access to US 93 and barriers with breaks in them generally cannot achieve noticeable noise reductions.

The other two noise-impacted residences (receptors NMCR R16 and R18) are located in the Maloney Ranch area, near the intersection of the proposed connector and Lower Miller Creek Road. Traffic noise abatement for these properties was determined not to be feasible because they are both single noise impacts, and single residences are generally unable to meet the feasibility criteria for noise walls and minimum required noise reduction while also satisfying the reasonableness (cost-effectiveness) criterion. Therefore, noise abatement is not recommended in this case.

Noise Mitigation Alternative 3B

Six properties are predicted to be noise-impacted under Alternative 3B. Two residential properties (represented by BLUE MTN R4,) are located at the north end of the proposed build alignments near US 93. They are located in a mixed residential and commercial use area and may not remain in residential use. The residences also have direct access to US 93, and noise abatement at this location was determined not to be feasible.

The other residential property predicted to be noise-impacted (BLUE MTN R6) is located on Old Bitterroot Road. Traffic noise abatement for this property was determined not to be feasible because this property is an isolated noise impact, and single residences are generally unable to meet the feasibility criteria for noise walls and minimum required noise-reduction while also satisfying the reasonableness (cost-effectiveness) criterion. Therefore, noise abatement is not recommended in this case.

The three commercial properties predicted to be noise-impacted are located at the north end of the proposed build alignments near US 93. All three have direct access onto US 93 or onto the frontage road running parallel to US 93. Barriers with breaks in them for access generally cannot achieve noticeable noise reductions. Commercial properties also benefit from visual exposure to the highway that will be impaired by the construction of a noise wall. Therefore, noise abatement is not recommended in this case.

Noise Mitigation for Alternative 4C

Eight residences and one church are predicted to be noise-impacted under Alternative 4C. All the residences (SLMCR R2, R3, and R4) are located at the north end of the proposed new roadway near US 93.

Traffic noise abatement for receptor SLMCR R2 was determined not to be feasible because this property is an isolated noise impact, and single residences are generally unable to meet the feasibility criteria for noise walls and minimum required noise reduction while also satisfying the reasonableness (cost-effectiveness) criterion. Therefore, noise abatement is not recommended in this case.

It is not feasible to construct a functional barrier for the mobile home park represented by SLMCR R3, and R4 because the property has direct access to US 93, and barriers with breaks in them generally cannot achieve noticeable noise reductions.

Noise Mitigation for Alternative 5A (Preferred Alternative)

Under Alternative 5A, 19 residences and one church are predicted to be noise-impacted. These properties are located adjacent to Miller Creek Road. Properties predicted to experience noise levels exceeding MDT criteria in this area are represented by receptors labeled MCR R4 through MCR 19.

Traffic noise abatement for receptors MCR R4 through MCR 9, MCR 11, and MCR 12 through MCR 19 was determined not to be feasible because these properties have direct driveway, frontage road, or side road access onto Miller Creek Road, and barriers with breaks in them generally cannot achieve noticeable noise reductions.

Traffic noise abatement for receptor MCR R10 was determined not to be feasible because this church is an isolated noise impact, and single properties are generally unable to meet the feasibility criteria for noise walls and minimum required noise-reduction while also satisfying the reasonableness (cost-effectiveness) criterion. Therefore, noise abatement is not recommended in this case.

4.8.9 Noise Compatible Land Use Planning

The results of this noise analysis should be considered for development or redevelopment of land parcels along the project alignments so that the information can be used in guiding local land use decisions. Land directly adjacent to US 93 has noise levels that are generally not suitable for residential development without the use of noise-reducing construction methods.

A significant area of currently undeveloped land within the project area is anticipated to be developed as residential housing as part of the Maloney Ranch development.

4.9 Water Resources and Water Quality Impacts and Mitigation

4.9.1 Water Resources and Water Quality Impacts Alternative 1: No-Action

No direct impacts to surface waters are anticipated with the No-Action Alternative.

4.9.2 Water Resources and Water Quality Impacts on Old US 93 and Adjacent Intersections Common to All Build Alternatives

Improvements along Old US 93 and adjacent intersections are the same with all of the build alternatives. The typical section for Old US 93 includes a curb and gutter and storm sewer connection along both sides of the roadway. Any other intersection improvements would maintain the existing water collection system. No direct impacts to surface drainage would occur with the Old US 93 improvements.

4.9.3 Water Resources and Water Quality Impacts Common to Bridge Alternatives (2B, 3B, 4C)

Direct Impacts

New bridges were designed to minimize disturbance to stream banks and channel and stream hydrology and sediment delivery during construction. Bridge designs will attempt to accommodate flood flows with no substantial changes to flood elevations, to match hydraulic traits of the natural stream, and to provide for fish passage.

Surface Water and Water Quality

Direct Impacts

Roadway drainage concepts for all of the bridge alternatives are based on FHWA Hydraulic Engineering Circular (HEC)-22 guidelines, FHWA's *Urban Drainage Design Manual*. A storm sewer system with curb inlets is anticipated to drain the travel and bicycle lanes of the new roadway. These would offer the least interference or safety hazard to bicyclists traveling in the bicycle lane. Systems would be provided for conveying drainage from adjacent land and others areas that would naturally drain to the roadway.

In accordance with HEC-22, it is anticipated that the water quality facilities to capture roadway runoff would be designed as bioswales, extended detention areas, or infiltration facilities. A storm sewer system would be used for all build alternatives.

Indirect Effects

Indirect effects to surface water resources and water quality would be associated with the roadway construction and increase in impervious surface areas associated with interchanges/intersections and new roadways. Stormwater discharges are generated by runoff from land and impervious surface areas such as paved streets, parking lots, driveways, and building rooftops during rainfall and snow events. They often contain sediment or pollutants in quantities that could adversely affect water quality. Indirect effects from the increase in imperviousness would result in more rainwater running off of the land and being conveyed by gutters and sewer systems, instead of filtering slowly into the surface waters or recharging the groundwater resources. Undeveloped land has a natural filtering function, absorbing precipitation and slowly releasing it into the ground. Without this natural, recharging filtration system, much of the groundwater upon which the Missoula Valley community depends would be nonexistent. It is important to note that increases in imperviousness and subsequent groundwater infiltration losses strongly correlate with the reduction in both surface water quality and the groundwater supply as a whole. Such effects to water resources and water quality could further impair one of the Bitterroot River's beneficial uses: aquatic life and coldwater fisheries. Potential indirect effects include:

- Minor, temporary sedimentation of the Bitterroot River could result from erosion of soils disturbed during construction of the bridge spanning the Bitterroot River and from minor filling of the area east/north of the river approaching the bridge. These impacts would be short term and would only occur during precipitation events until exposed fill slopes are revegetated (with the exception of Alternative 5A, in which the Bitterroot River would not be spanned).
- Water quality degradation resulting from hazardous materials and other contaminant releases related to increased traffic and associated accidents.

- Increase in stream temperatures resulting from impervious surface area runoff.
- Water quality degradation resulting from traction sand/de-icer application (sodium chloride, magnesium chloride, phosphorus, and trace metals).

The increase in impervious surface areas would vary with each bridge alternative. Build Alternatives 2B, 3B, and 4C would involve crossing the Bitterroot River and, as such, present the potential for direct runoff of hazardous materials/contaminants and sand/de-icers into the river.

Groundwater

Direct Impacts

The groundwater impacts considered include groundwater availability and supply, as well as quality. No direct impacts to groundwater availability and supply are anticipated to occur with any of the bridge build alternatives. Direct impacts on groundwater quality from any of the alternatives would be related to stormwater discharge from both the construction and the operation of the proposed improvements.

Direct impacts on groundwater quality from the proposed alternatives are related to stormwater discharge from construction, operation, and maintenance.

Indirect Effects

Indirect effects to groundwater would be associated with stormwater discharge from any new supportive development.

Missoula Valley Aquifer

Direct Impacts

Under the bridge alternatives, precipitation normally falling on the ground surface and eventually percolating downward to the Missoula Valley Aquifer would be intercepted by the impervious surfaces associated with the roadway, bridges, and interchanges. After contacting the impervious surfaces, this precipitation could contain roadway materials such as oil, grease, salts, heavy metals and other materials associated with the operation of vehicles and maintenance of roadways. A majority, if not all, of these materials would be filtered out as the runoff percolates through the alluvial materials before reaching the Missoula Valley Aquifer.

The design of Alternatives 2B, 3B, and 4C has incorporated measures to direct surface water runoff to bioswales (extended detention areas of infiltration facilities) as opposed to directly into the Bitterroot River. If runoff is directed to these areas, materials from vehicle operations would be treated prior to infiltration where it would be filtered through the alluvium before reaching the Missoula Valley Aquifer.

The volume of surface runoff from the impervious surfaces associated with each alternative and potentially requiring additional filtration (natural or fabricated) can be estimated by multiplying the average annual precipitation (1.125 feet) by the area of impervious surface for each alternative. **Table 4-27** presents the estimated volume of additional impervious surface runoff associated with each of the build alternatives. These estimates assume all bridge, roadway, and interchange surface runoff from Alternative 2B, Alternative 3B, and Alternative 4C bridge crossing and new roadway would be directed to the detention methods described previously.

Table 4-27
Estimated Annual Volume of Surface Water Runoff Generated from Impervious Surface Areas

Alternative	Volume of Additional Surface Water Runoff (acre feet)
2B	15
3B	21
4C	14
5A - Preferred Alternative	7

Indirect Effects

If the City of Missoula or Missoula County establishes a "dry well" system in the vicinity of the new roadway as part of the background roadway network, runoff from the impervious surfaces could be collected in the "dry wells" and then filtered through the alluvium before reaching the aquifer. Because the groundwater elevation at times may be 10 feet or less below the ground surface (depending on the time of year and recharge intensity), surface water entering the dry wells could come into direct contact with Missoula Valley Aquifer groundwater.

Miller Creek Road Limited Improvements

Direct Impacts

The Miller Creek Road Limited Improvements would not have any impacts to the Bitterroot River. The estimated increase in impervious surface is six acres. The runoff from US 93 would accumulate and drain in a similar manner to existing conditions and any improvements made as part of the locally funded improvements to Miller Creek Road under the No-Action Alternative.

Indirect Effects

No new development is anticipated as a result of the Limited Improvements to Miller Creek Road and, therefore, there would be no additional impervious surface or impacts to water quality.

4.9.4 Water Resources and Water Quality Impacts Alternative 2B: North Lower Miller Creek Grade-Separated Intersection

Direct Impacts

Alternative 2B would require the placement of two piers (each consisting of three columns) within the Bitterroot River. Each column is estimated to require six- by six-foot footings. Additionally, minor scouring and deposition of stream substrate is anticipated in the immediate vicinity of the column.

The estimated increase in impervious surface areas associated with Alternative 2B is 13.5 acres. At the north end of the alternative, runoff would drain to US 93. A water quality facility is recommended to be constructed in the vicinity of the intersection. Ultimate discharge would be to the

drainage ditch west of the proposed action. A detention pond is proposed to be constructed in the 100-year floodplain. Discharge to the river would be by ditch to the north. No scuppers are anticipated on the bridge. A scupper is an opening in the bridge curb or parapet to allow water to drain off from the deck. All bridge drainage would be carried off the bridge for treatment prior to discharge. No impacts to Big Flat Canal are anticipated.

Indirect Effects

Undeveloped land around the US 93/North Lower Miller Creek connection would be more likely to become developed due to the new highway access. This would lead to an increase in impervious surfaces and reduced area for natural percolation.

4.9.5 Water Resources and Water Quality Impacts Alternative 3B: Blue Mountain Road Grade-Separated Intersection

Direct Impacts

Alternative 3B would require the placement of two piers (consisting of three columns) within the Bitterroot River. Each column is estimated to require six-foot-by-six-foot footings. Additionally, minor scouring and deposition of stream substrate is anticipated in the immediate vicinity of the column.

The estimated increase in impervious surface areas associated with Alternative 3B is 19.0 acres. At the north end of the project including the bridge, runoff would drain near the intersection with US 93. Ultimate discharge would be to the drainage ditch east of the alternative. Bridge drainage would be conveyed to this detention pond for treatment prior to discharge. No scuppers are anticipated on the bridge. A water quality facility is proposed to be constructed near the intersection with Old Bitterroot Road in the 100-year floodplain. Discharge to the river would be by ditch to the north. No impacts to Big Flat Canal are anticipated.

Indirect Effects

Much of the land around the Blue Mountain Road intersection is developed and paved. Redevelopment of current properties could occur over time. Construction activities would be governed by best management practices (BMPs) to minimize indirect effects.

4.9.6 Water Resources and Water Quality Impacts Alternative 4C: South Lower Miller Creek Interchange

Direct Impacts

Alternative 4C would require the placement of three piers (each consisting of three columns) within the Bitterroot River below the ordinary high water mark (OHWM). Each column is estimated to require six- by six-foot footings. Additionally, minor scouring and deposition of stream substrate is anticipated in the immediate vicinity of the column. The estimated increase in impervious surface areas associated with Alternative 4C is 14.5 acres.

At the north end of the alternative, including the intersection bridge, runoff would drain near the intersection north of US 93. Bridge drainage would be conveyed to this facility for treatment prior to discharge. Ultimate discharge would be to the US 93 drainage. The middle of the bridge crossing the Bitterroot River would drain to a discharge pipe on a pier to a detention pond west

of the river in the 100-year floodplain. The facility would subsequently discharge to the river. No scuppers are anticipated on the bridge. A water quality facility also is recommended to be constructed on the east side of the river. The facility would then discharge to the river.

Indirect Effects

Creation of additional impervious surface caused by redevelopment or new development would be less likely with this alternative because of the restricted access to US 93 created by the interchange.

4.9.7 Water Resources and Water Quality Impacts Alternative 5A: Miller Creek Road At-Grade Intersection — Preferred Alternative

Direct Impacts

Alternative 5A would not require the placement of a bridge structure across the Bitterroot River or any other waterway. Therefore, no direct impacts to the Bitterroot River or other surface waters are anticipated.

Precipitation normally falling on the ground surface and eventually percolating downward to the Missoula Valley Aquifer would be intercepted by the impervious surfaces associated with the roadway. After contacting the impervious surfaces, this precipitation could contain roadway materials such as oil, grease, salts, heavy metals and other materials associated with the operation of vehicles and maintenance of roadways. A majority, if not all, of these materials would be filtered out as the runoff percolates through the alluvial materials before reaching the Missoula Valley Aquifer.

The estimated increase in impervious surface area associated with Alternative 5A is 6.0 acres. At the north end of the alternative, runoff would accumulate and drain from US 93 in a similar manner to existing conditions. Improvements to existing water quality facilities or a new detention pond would need to be constructed to handle the additional runoff volume created from the increased impervious surface area. Another water quality facility would also be needed along Miller Creek Road to treat the increased runoff volume from the increased impervious surface area. This facility is recommended to be constructed in the 100-year floodplain to the west of Miller Creek Road and would then discharge to the Bitterroot River after treatment.

Missoula Valley Aquifer

Dry wells are only one of a number of water quality treatment facilities that will be considered during final design. However, much of the stormwater runoff will be contained in the stormwater sewer system along Miller Creek Road and US 93. Inclusion of dry wells is primarily a concern with the bridge alternatives in the area of the Missoula Valley Aquifer. The selection of an appropriate water quality treatment facility or facilities will be made based their ability to meet EPA and Missoula Water Quality District requirements and ensure protection of the Missoula Valley Aquifer.

Indirect Effects

New supportive development is not likely to occur along Miller Creek Road because it is fully developed. Construction activities would be governed by BMPs to minimize indirect effects.

4.9.8 Water Resources and Water Quality Impacts Summary

Table 4-28 summarizes surface water, water quality, and groundwater impacts for each alternative. Impacts shown for the No-Action Alternative include impacts associated with planned locally funded improvements to Miller Creek Road, which are not a part of this federally funded project. Impacts shown for Alternatives 2B, 3B, and 4C include the impacts for the intersection/interchange with US 93, the bridge crossing and new roadway, improvements on Old US 93, and the Limited Improvements on Miller Creek Road. Impacts shown for Alternative 5A include impacts on Old US 93 and Miller Creek Road.

Table 4-28
Water Resources and Water Quality Impacts Summary

Water Resources and Water Quality Evaluation Criteria	Alt. 1 No-Action	Alt. 2B N. Lower Miller Creek Grade-Separated Intersection	Alt. 3B Blue Mtn. Rd. Grade-Separated Intersection	Alt. 4C S. Lower Miller Creek Interchange	Alt. 5A Miller Creek Rd. At-Grade Intersection (Preferred Alternative)
Piers below OHWM*	0	2	2	3	0
Increase in Impervious Surface	NA	13.5 acres	19.0 acres	14.5 acres	6.0 acres

*OHWM = Ordinary High Water Mark.

4.9.9 Water Resources and Water Quality Mitigation

Direct impacts and indirect effects to water resources and water quality of the area resulting from any of the alternatives will be avoided or minimized by design and incorporation of water quality facilities using BMPs. BMPs can also reduce construction and operational impacts when properly deployed. The use of silt detention structures and hydroseeding for rapid revegetation in areas where construction will disturb soils can avoid or minimize downstream sedimentation. Construction during low flow can minimize impacts related to scouring and the transport of sediment downstream.

Should the BMP selected to manage stormwater runoff for the Preferred Alternative include the use of a "dry well" system, additional EPA and Missoula Valley Water Quality District requirements may be necessary to ensure protection of the Missoula Valley Aquifer. Requirements may include submittal of construction plans, design capacities, inspection and maintenance requirements, and groundwater monitoring, if necessary. A concurrence letter has been received from the US EPA regarding the sole source aquifer (Missoula Valley Aquifer) and is included in **Appendix A**.

Regardless of which specific BMP is chosen to address runoff water quality, the final designs will comply with provisions of MDEQ's impaired water body designation and total maximum daily loads (TMDLs) for the Bitterroot River and the Missoula Valley Water Quality Ordinance for protection of the Missoula Valley Aquifer.

Highway maintenance will comply with city, county, and state standard maintenance practices.

Runoff from the impervious surface areas associated with the bridges in Alternatives 2B, 3B, and 4C will be planned to be intercepted and redirected to the detention systems south and east of the Bitterroot River to avoid contributions of contaminants to the Bitterroot River. Any improvements will be designed to be consistent with TMDLs and Water Quality Restoration Plans prepared in association with TMDLs that are in preparation by MDEQ.

Mitigation measures for direct impacts and indirect effects to water resources and water quality that will be implemented during construction include:

- All work in and adjacent to wetlands and water resources will follow state, federal, and local permit requirements.
- A Stormwater Pollution Prevention Plan (SWPPP) employing BMPs for controlling erosion and sediment transport will be implemented in the project area.
- Development of a revegetation plan, erosion control plan, and stormwater pollution prevention plan will be coordinated with appropriate permitting and resource agencies.
- Development of BMPs for winter maintenance operations.

4.10 Wetland Impacts and Mitigation

Wetland impacts were approximated by comparing preliminary conceptual designs to the actual wetland delineation (see **Figure 3-19, page 3-66**). The analysis recognizes the loss of wetland values due to discharge of dredged or fill material per 40 CFR Section 230.41 (b). Indirect effects to wetlands are those caused by construction activity or supportive development. US Army Corps of Engineers (USACE) jurisdiction concurrence was received on May 16, 2006, and has been used to identify impacts.

4.10.1 Wetlands Impacts Alternative 1: No-Action

Minor impacts to Wetland #13 may occur with the No-Action Alternative related to the local jurisdiction improvements to Miller Creek Road. This wetland is not under USACE jurisdiction.

4.10.2 Wetland Impacts on Old US 93 and Adjacent Intersections Common to All Build Alternatives

Improvements along Old US 93 and adjacent intersections would be the same with all of the build alternatives. No wetlands are located along Old US 93 or the intersection of Old US 93 and Brooks/Reserve Streets. Therefore, no impacts to wetlands would occur with these transportation improvements. **Figure 2-6, page 2-20**, shows the wetland locations in relation to the conceptual design along Old US 93.

4.10.3 Wetland Impacts Common to Bridge Alternatives (2B, 3B, 4C)

New bridges were designed to minimize disturbance to stream banks and channel and stream hydrology and sediment delivery during construction. Final design of bridges will attempt to accommodate flood flows with no substantial changes to flood elevations, and match hydraulic traits of the natural stream, and provide for fish passage.

Miller Creek Road Limited Improvements

Wetland #13, a non-jurisdictional wetland, would be filled in by widening of Miller Creek Road. Impacts are estimated to be 0.2 acre. No impacts to Wetland #14 are expected. However, a larger portion of Wetland #13 could be affected depending the wetland resilience to the disturbance. **Figure 2-6, page 2-20**, shows the wetland locations in relation to the conceptual design of the Miller Creek Road Limited Improvements.

4.10.4 Wetland Impacts Alternative 2B: North Lower Miller Creek Grade-Separated Intersection

Direct Impacts

No wetlands along the Bitterroot River would be directly impacted by Alternative 2B since the bridge is proposed to span the wetland areas along the Bitterroot River. However, minor, temporary sedimentation associated with construction of the bridge spanning the Bitterroot River and with filling the area east of the river approaching the bridge could temporarily impact Wetland #1 and Wetland #9, which are USACE jurisdictional wetlands. These impacts would be short term and would only occur during precipitation events until exposed fill slopes are revegetated. Wetland #2 is non-jurisdictional and is not expected to be impacted. **Figure 2-12, page 2-28**, shows the wetland locations in relation to the conceptual design.

Alternative 2B would require the excavation and fill of 2,700 cubic yards of material into the Bitterroot River, a Water of the United States, under the OHWM for construction of two piers (six columns).

Indirect Effects

Wetland #12, a non-jurisdictional wetland, occurs in an area that could become developed as a result of the new access to US 93. Wetland #12 is approximately 0.07 acre.

4.10.5 Wetland Impacts Alternative 3B: Blue Mountain Road Grade-Separated Intersection

Direct Impacts

Similar to Alternative 2B, no wetlands would be directly impacted by this alternative since the bridge is proposed to span the wetlands along the Bitterroot River. **Figure 2-13, page 2-29**, and **Figure 2-14, page 2-30**, show the wetland locations in relation to the conceptual design.

Alternative 3B would require the excavation and fill of 2,700 cubic yards of material into the Bitterroot River, a Water of the United States, under the OHWM for construction of two piers (six columns).

Indirect Effects

With Alternative 3B, minor, temporary sedimentation associated with construction of the bridge spanning the Bitterroot River and with filling the area east of the river approaching the bridge could temporarily impact Wetland #7 East and Wetland #10, which are USACE jurisdictional. These impacts would be short term and would only occur during precipitation events until exposed fill slopes are revegetated.

This alternative is not expected to result in substantive indirect effects to wetlands caused by supportive development at the intersection location. The area adjacent to the US 93/Blue Mountain Road intersection is mostly developed and has no wetland areas.

4.10.6 Wetland Impacts Alternative 4C: South Lower Miller Creek Interchange

Direct Impacts

Alternative 4C involves construction of a 1,270-foot bridge over the Bitterroot River. Support of this bridge would require the placement of six- by six-foot columns for the bridge piers. Three columns of one pier would be placed in Wetland #6, disturbing approximately less than 0.1 acre of emergent wetland. Wetland #6 is a Category I wetland and is under USACE jurisdiction. Impacts to Wetland #6 may also occur due to construction access. **Figure 2-15, page 2-32**, and **Figure 2-16, page 2-33**, show the wetland locations in relation to the conceptual design.

Alternative 4C would require the excavation and fill of 4,050 cubic yards of material into the Bitterroot River, a Water of the United States, under the OHWM for the construction of three piers (nine columns).

Indirect Effects

Minor, temporary sedimentation associated with construction of a bridge spanning the Bitterroot River and with filling areas adjacent to the river approaching the bridge could temporarily impact jurisdictional wetlands. These impacts would be short term and would only occur during precipitation events until exposed fill slopes are revegetated.

Alternative 4C is not expected to result in substantive indirect effects to wetlands caused by due to supportive development at the interchange location.

4.10.7 Wetland Impacts Alternative 5A: Miller Creek Road At-Grade Intersection — Preferred Alternative

Direct Impacts

Under Alternative 5A, less than 0.2 acre of Wetland #13, would be impacted to widen the existing Miller Creek Road. Wetland #13 is non-jurisdictional because the hydrology is derived from an irrigation ditch. A larger portion of Wetland #13 could be affected, depending on the wetland resilience to the disturbance. **Figure 2-18, page 2-35**, shows the wetland locations in relation to the conceptual design.

Indirect Effects

Minor, temporary sedimentation associated with widening Miller Creek Road and minor filling of the area east of the existing road could temporarily impact Wetlands #13 and #14. These impacts would be short term and would only occur during precipitation events, until exposed fill slopes are revegetated.

No indirect effects to wetlands would occur related to indirect supportive development because there are no adjacent wetland areas and no expectation for future adjacent development.

4.10.8 Wetland Impacts Summary

Table 4-29 provides a comparison of wetland impacts by alternative. Impacts shown for the No-Action Alternative include impacts associated with planned locally funded improvements to Miller

Creek Road, which are not a part of this federally funded project. Impacts shown for Alternatives 2B, 3B, and 4C include the impacts for the intersection/interchange with US 93, the bridge crossing and new roadway, improvements on Old US 93, and the Limited Improvements on Miller Creek Road. Impacts shown for Alternative 5A include impacts on Old US 93 and Miller Creek Road.

Table 4-29
Wetland and Waters of the United States Impacts Summary

Wetland Evaluation Criteria	Alt. 1 No-Action	Alt. 2B N. Lower Miller Creek Grade-Separated Intersection	Alt. 3B Blue Mtn. Rd. Grade-Separated Intersection	Alt. 4C S. Lower Miller Creek Interchange	Alt. 5A Miller Creek Rd. At-Grade Intersection (Preferred Alternative)
Quantity of direct wetland impacts (impacts to Wetland #13 are non-USACE jurisdictional)	minor <0.2 acres	0.2 acre	0.2 acre	0.3 acre	0.2 acre
Quantity of dredge/fill in Waters of the United States[1]	None	2,700 cu. yds.	2,700 cu. yds.	4,050 cu. yds.	None

[1]Material excavated from within the coffer dams will be temporarily stockpiled outside the OHWM. After completion of the pile driving operations and construction of the pier shafts, this same material would then be used for backfill within the confines of the coffer dams.

4.10.9 404 (b)(1) Evaluation

Early project scoping and coordination with the USACE and US Fish and Wildlife Service (USFWS) identified the importance of identifying alternatives to crossing and impacting the Bitterroot River, Miller Creek, and adjacent wetlands and riparian habitat. Both the USACE and USFWS have been serving as Cooperating Agencies for the Miller Creek Road project, pursuant to CEQ regulations (40 CFR 1501.5 and 1501.6(b) and 1508.5). In addition, any alternative that crosses the Bitterroot River would require a Section 404 Permit. The Section 404 Permit can be issued only after a Biological Opinion is received from the USFWS. The USACE representative has been involved from the beginning of the EIS, through development of alternatives, to screening the alternatives to be carried forward in the FEIS. As part of the public review process, a Notice of Intent was published in the Federal Register and numerous public meetings have been held that displayed and communicated the social, economic, and environmental resources of concern and how each alternative would affect those resources.

Section 2.4, page 2-2, of this document identifies the reasonable range of alternatives identified and screened as part of the project development. In addition, the bridge designs as part of the bridge alternatives (2B, 3B, and 4C) have been designed to avoid and minimize impacts to the Bitterroot River. Clear spanning the river is not feasible because the required length of the bridges to span the river and adjacent floodplain would be too great. Construction of a new bridge over the Bitterroot River is required with Alternatives 2B, 3B, and 4C. No new river crossing is necessary with Alternative 5A. The Section 404(b)(1) Guidelines for Specification of Disposal Sites for Dredged or Fill Material found at 40 CFR 230 states that "no discharge of dredged or fill material shall be permitted if there is a practicable alternative to the proposed discharge which would have less adverse impact on the aquatic ecosystem, so long as the alternative does not have other significant adverse environmental consequences." For the purpose of this requirement, practicable alternatives include, but are not limited to, activities which do not involve a discharge of dredged or fill material into the Waters of the United States or discharges of dredged or fill material at other locations in Waters of the United States. An alternative is practicable if it is "available and capable of being done after taking into consideration cost, existing technology, and logistics in light of overall project purposes."

Alternatives that require a new bridge over the Bitterroot River would require discharges of fill into Waters of the United States. Besides the direct impacts of the fill in the river, there would be adverse indirect and cumulative impacts on the riverine ecosystem as a result of the creation of a new transportation corridor across the riparian area of the Bitterroot River. These impacts are identified for the bridge construction activities for aquatic resources (Section 4.11.3, page 4-104), water quality and water resources (Section 4.9.3, page 4-92), threatened and endangered species (Section 4.14.1.3, page 4-120), floodplains (Section 4.12.3, page 4-115), and cumulative impacts (Section 4.23.3.3, page 4-165; Section 4.23.3.4, page 4-166; and Section 4.23.3.5, page 4-167). All of these adverse riverine and riparian impacts would outweigh the adverse effects of filling a small amount of wetland under Alternative 5A. These riverine and riparian impacts would be avoided by Alternative 5A because it requires no new river crossing. Alternative 5A appears to have no other substantial environmental consequences, and it is the least costly build alternative carried forward. Because Alternative 5A satisfies the project purpose and is the least environmentally damaging practicable alternative to the aquatic ecosystem, any of the build alternatives requiring a new bridge over the Bitterroot River would be less preferred. The USACE has stated that an alternative that includes a bridge over the Bitterroot River would not be permitted as long as a non-bridge alternative were feasible and met the project purpose and need.

Therefore, Alternative 5A was identified as the Preferred Alternative, since it is the least environmentally damaging, practicable alternative and includes elements that best meet the project purpose and need. The public will have the opportunity to comment on the alternatives and identified impacts of Alternative 5A and whether or not it should be the Preferred Alternative. Additional public involvement or notification may be required by the USACE and/or applicant for the Section 404 permit prior to construction The *404(b)(1) Evaluation* (2006) can be found in **Appendix D**.

4.10.10 Mitigation for Wetlands and Waters of the United States

All of the build alternatives are anticipated to impact a minor amount of wetlands. The alternatives that cross the Bitterroot River also include impacts to Waters of the United States. No compensatory mitigation is required for Wetland #13 (located along Miller Creek Road) because it is a human-induced non-jurisdictional wetland. Opportunities to provide for mitigation will be explored during final design if deemed necessary.

The 1990 *Memorandum of Agreement Between the Environmental Protection Agency and the US Army Corps of Engineers Concerning the Determination of Mitigation Under the Clean Water Act Section 404(b)(1) Guidelines* requires that wetland mitigation of jurisdictional wetlands and Waters of the United States be addressed in the following sequence:

1. Avoid potential impacts to the maximum extent practicable.

2. Minimize unavoidable impacts to the extent appropriate and practicable.

3. Compensate for unavoidable adverse impacts that remain after all appropriate and practicable minimization has been required.

Additionally, Department of Transportation Order 5660.1A, "Preservation of the Nation's Wetlands," provides guidance regarding construction in wetlands (jurisdictional and non-jurisdictional) falling under the scope of Executive Order (EO) 11990 must avoid impacts to those wetlands unless there is no practicable alternative to the construction and the proposed action includes all practicable measures to minimize harm (DOT 1978). Preliminary determinations as to whether given wetlands are likely jurisdictional, non-jurisdictional, and/or fall under the scope of EO 11990 are provided in **Table 3-23, page 3-67** or otherwise discussed previously. FHWA also will adhere to the FHWA 23 CFR 777, "Mitigation of Impacts to Wetlands and Natural Habi-

tats," on the eligibility of FHWA funds for mitigating impacts caused by federal transportation projects to wetlands and other natural habitats.

4.10.10.1 Avoidance and Minimization

For the bridge alternatives, impacts to wetlands and Waters of the United States have been minimized through design of bridge lengths to span the wetland areas, bridge span lengths to minimize number of piers in the river, and placement of abutments outside of wetland areas.

For Alternative 5A (Preferred Alternative), wetland impacts have been avoided and/or minimized by minimizing the proposed width of the typical section of Miller Creek Road. Avoidance and minimization of wetland impacts will continue in final design. There are no impacts to Waters of the United States with Alternative 5A.

To minimize sedimentation as well as construction hardship, construction in wetlands will be scheduled when these sites are dry as possible and as allowed by the construction schedule.

4.10.10.2 General Mitigation Measures

In addition to applicable measures listed under Section 4.9.9, page 4-97, Water Resources and Water Quality Mitigation and Section 4.11.9, page 4-113, Vegetation, Wildlife, and Aquatic Mitigation, the following general mitigation measures will minimize disturbance of wetlands and other Waters of the United States during construction:

- Acceptable erosion control devices and BMPs will be installed at the edges of wetlands and other Waters of the United States prior to construction. All exposed soils will be permanently stabilized at the earliest practicable date. A SWPPP will be prepared and submitted to MDEQ in compliance with their Montana Pollution Discharge Elimination System (MPDES) regulations. BMPs will be included in the design of this plan. The objective is to minimize erosion of disturbed areas during and following disturbance. Regular inspections of erosion control devices will be carried out in compliance with MPDES regulations.
- Temporarily disturbed wetland areas will be revegetated with desirable species at the earliest practicable date following disturbance and comply with MPDES and Section 404 permit conditions.
- All work in and adjacent to wetlands and water resources will follow state, federal, and local permit requirements.

4.11 Vegetation, Wildlife, and Aquatic Impacts and Mitigation

4.11.1 Vegetation, Wildlife, and Aquatic Impacts Alternative 1: No-Action

No federally funded transportation improvements would occur with the No-Action Alternative. Wildlife habitat, including dry native and introduced grasslands occurring in the vicinity of US 93 may be affected by the change in land use along US 93. As traffic volumes on US 93 increase in the future, wildlife mortality rates would be expected to increase as well. Minor impacts to vegetation, wildlife and aquatic resources would occur as part of the locally funded improvements to Miller Creek Road.

No direct impacts to aquatic resources are anticipated with the No-Action Alternative.

4.11.2 Vegetation, Wildlife, and Aquatic Impacts on Old US 93 and Adjacent Intersections Common to All Build Alternatives

Improvements along Old US 93 and adjacent intersections are the same with all of the build alternatives. No impacts to wildlife or aquatic resources are expected with the widening of Old US 93 and the intersection improvements. Some vegetation impacts would occur to the Missoula Country Club vegetative hedge. This hedge may serve as minor habitat for area species.

4.11.3 Vegetation, Wildlife, and Aquatic Impacts Common to Bridge Alternatives (2B, 3B, 4C)

Vegetation

Direct Impacts

Extent of vegetation disturbance is based on aerial photograph interpretation and field observations of existing vegetation. Disturbance of soils during construction of any of the bridge alternatives and new roadway increases the potential for the invasion of weeds, including noxious weeds, until seeded vegetation is established.

Indirect Effects

Some grassland species could be impacted as a result of any supportive development around the proposed intersection/interchange with US 93.

Wildlife

Direct Impacts

Direct impacts to terrestrial resources that may occur as a result of the bridge alternatives include loss of potential wildlife habitat and temporary disturbance during construction. The direct impacts to terrestrial species would be relatively similar for any of the bridge alternatives (Alternatives 2B, 3B, 4C) that involve constructing a bridge over the Bitterroot River. Construction disturbance is described under Temporary Construction Effects, page 4-106. The design of all the bridges crossing the Bitterroot River has been lengthened to minimize floodway impacts. This additional length also allows greater opportunity for wildlife passage under the bridges.

Habitat loss would occur as a result of the bridge alternatives. Riparian habitat adjacent to the Bitterroot River, which provides habitat for deer, reptiles, amphibians, bat species, and migratory birds, would be impacted as a result of construction. The remaining terrestrial habitat is agricultural (range) land fragmented by residential development. While this is not considered prime habitat for most species because of its disturbed condition, it is still utilized by white-tailed deer, migratory birds, and a variety of other common species.

Big Game Determination

The bridge alternatives would have no effect on winter range for moose, elk, and mule deer. However, winter range for white-tailed deer exists along the riparian zone of the Bitterroot River in the project area. The wintering habitat located along the Bitterroot River in the project area currently occupies a relatively disturbed area bordered by US 93, agricultural fields, and resi-

dences. While this area is utilized by white-tailed deer for wintering, more suitable habitat exists to the south along the Bitterroot River, away from US 93 and residences, in less disturbed habitat. However, only a minimal amount of riparian habitat would be lost to construct the bridge piers compared to the abundance of suitable habitat located to the south of the project area. Therefore, the proposed action may affect white-tailed deer individuals or their habitat should they be present.

Migratory Birds Determination

There has been no documentation of prairie falcons, golden eagles, Lewis' woodpecker, willow flycatcher, red-eyed vireo, pileated woodpecker, veery, and Barrow's goldeneye individuals in the project area, although habitat exists in the Bitterroot River riparian corridor. Some potential habitat for these species and other migratory birds may be impacted as a result of the bridge construction. However, only a minimal amount of riparian habitat would be lost to construct the bridge piers compared to the abundance of suitable habitat located to the south of the project area, along the Bitterroot River riparian corridor. The migratory bird habitat located along the Bitterroot River in the project area currently occupies a relatively disturbed area bordered by US 93, agricultural fields, and residences. The implementation of breeding bird surveys within habitats to be cleared and/or the restriction of clearing suitable nesting habitat during the breeding season will negate the proposed action from impacting species protected under the MBTA. Neither of the two documented osprey nests would be affected by any of the bridge alternatives.

Bat Species Determination

Habitat for little Yuma myotis, fringed myotis, California myotis, Townsend's big-eared bat, and the big brown bat (riparian habitat of the Bitterroot River) would be minimally impacted during bridge construction, but there is substantial bat habitat available in the project area along the Bitterroot River. Therefore, Alternatives 2B, 3B, or 4C may affect the above-listed bat species or their habitat should they be present, but is not likely to contribute to a trend toward Federal listing or loss of viability of the species. Additional information regarding impacts to bats can be found in the *Biological Resources Report* prepared for this EIS.

Reptiles and Amphibians Determination

Habitat for Columbia spotted frog, western toad, rubber boa, western terrestrial garter snake, and western skink may be present in the riparian zone of the Bitterroot River in the project area. This alternative may affect the above-listed species or habitat should they be present, but because the impact would be localized and cover a relatively small area, the impact is not likely to contribute to a trend toward federal listing or loss of viability of the species.

Because snake species, such as eastern racers and gopher snakes, occur in a variety of uncultivated upland areas within the project area, the proposed action may impact individuals or habitat should they be present, but is not likely to contribute to a trend toward federal listing or loss of viability of the species. Additional information regarding impacts to reptiles and amphibians can be found in the *Biological Resources Report* prepared for this EIS.

Indirect Effects

The indirect effects to terrestrial species (big game, migratory birds, bat species, reptiles, amphibians, and other terrestrial species) from the bridge alternatives are interrelated and may include habitat fragmentation and alteration, increased stormwater runoff, increased human use, and increased mortality from automobiles. The indirect effects to terrestrial species would be rel-

atively similar for any of the bridge alternatives because they possess similar biological characteristics.

In general, fragmentation reduces the number of species (species diversity) that occur in the habitat patch. Only certain species, such as those that are adapted to habitat edges or dependent upon human activity, are able to persist in these fragmented habitats. When a habitat is fragmented, the amount of edge habitat (the zone along the boundary of a habitat) increases, while the amount of interior core habitat decreases. Species dependent on interior habitat suffer, while edge-dependent species, such as invasive species and predators, thrive. The increase of edge habitat affects the habitat's microclimate (light, soil, temperature, moisture, and wind conditions), which, in turn, alters the composition of plant communities. Because different plant communities support different collections of wildlife and rare plant species, changes in habitat also shift and displace wildlife.

Stormwater runoff would increase as a result of the new areas of impervious surface. Most of the terrestrial species in the project area depend on the water in the riparian ecosystem of the Bitterroot River for survival. Stormwater from these bridges would not be allowed to directly enter the river. Heavy metals, gasoline additives, and hydrocarbons from vehicles would most likely accumulate directly adjacent to the road and in the detention ponds. While the creation of detention ponds may provide suitable habitat for species, such as white-tailed deer, migratory birds, bats, reptiles and amphibians, the level of heavy metals, gasoline, and hydrocarbons may be detrimental to the wildlife species utilizing these ponds. Gasoline can be carried in stormwater runoff, and hydrocarbons could harm terrestrial species. The increase in stormwater to these ponds is not likely to substantially alter terrestrial species populations because there is an abundance of suitable and accessible aquatic habitat adjacent to the Bitterroot River that would not be affected by the alternative. In addition, the species are more likely to utilize the river and associated riparian vegetation than a detention pond.

Trails and roads facilitate increased human access to formerly undisturbed areas. Although considered a benefit to the community, the construction of a bicycle or pedestrian path along the river with the bridge crossing alternatives may increase human disturbance in the area. The presence of automobiles and pedestrians along the new road and bridge also would contribute to an increase in human disturbance in the area. Increased human disturbance may inhibit migratory bird nesting and could disturb or displace wintering white-tailed deer and other wildlife that occur in proximity to the access road alignment.

The presence of a new road and bridge across the Bitterroot River riparian area may fragment suitable habitat causing wildlife to shift home ranges and alter their movement pattern, reproductive behavior, escape response, and physiological state. However, habitat for wildlife species (urban and rural wildlife species, deer, bat species, reptiles and amphibians, and migratory birds) already has been fragmented in the project area as a result of the initial construction of US 93 and residential and commercial development. Additionally, the bridge abutments on both sides of the Bitterroot River for the river crossing alternatives would allow for wildlife passage underneath the bridge along the river, particularly on the south where a 20-foot-wide envelope is included for a future trail. As such, the build alternatives are not anticipated to substantially contribute to fragmentation of available habitat for terrestrial species.

Temporary Construction Effects

All of the bridge alternatives would result in an increase in localized noise levels during construction. Noise produced by construction equipment would occur with varying intensity and duration. Wildlife populations present in the vicinity are likely to be accustomed to periodic noise intrusions of highway traffic, agricultural plowing equipment, and local residential activity. Some brief displacement of wildlife populations (urban and rural wildlife species, white-tailed deer, bat species, reptiles, amphibians, and migratory birds) may occur during construction. Noise from con-

struction may displace these types of wildlife temporarily, but the animals would likely return after construction is completed. Therefore, the noise impacts on these species would be minimal. Because of the relatively limited area that may be disturbed, none of the bridge alternatives are anticipated to substantially impact terrestrial wildlife.

Stormwater treatment and use of BMPs would be incorporated into the proposed action, so short-term water quality impacts would be minimized and would not have a substantial effect on terrestrial species. The impacts to water resources and water quality are discussed in more detail in Section 4.9, page 4-91.

All construction activity could result in direct wildlife mortality, primarily to those species with limited mobility and/or those that could conceivably be occupying their burrows or nests at the time of construction (e.g., mice, voles, young birds/eggs, frogs, salamanders, snakes, and badgers). More mobile species, such as deer, coyotes, and most adult birds, would be able to avoid direct mortality by moving into adjacent habitat. Additional information regarding impacts to terrestrial wildlife can be found in the *Biological Resources Report* prepared for this EIS.

Aquatic

Direct Impacts

In general, direct impacts to aquatic resources within the project area for the bridge alternatives would be similar to those presented for the bull trout (see Threatened, Endangered or Sensitive Species, Section 4.14.1.3, page 4-120).

The extent of impacts to aquatic resources within the project area would be related to the number and location of piers below the OHWM, extent of floodplain impacts (see Section 4.12, page 4-114), water quality stormwater treatment methods, riparian and wetland impacts, and the amount of additional impervious surface. Increased span length could reduce the number or need to place piers below the OHWM of the Bitterroot River. An elevated span height could reduce the degree of alteration to flood flows. However, the Bitterroot River and its associated floodplain are relatively wide and make the likelihood of being able to cross both without working below the OHWM remote. Therefore, based on current design for the bridge alternatives, each pier is assumed to be at least three 4-foot diameter round columns with six- by six-foot footings. Total new impervious surface includes the area associated with the roadway, interchange or intersection, and bridge. See Section 4.9, page 4-91 for a discussion of new impervious surface quantities and water quality impacts. Impacts to riparian vegetation include shrubs and trees within 200 feet of the OHWM. Disturbance below the OHWM is considered to have the greatest direct impacts to aquatic resources and to the river itself. Quantities of dredge and fill material into the Bitterroot River related to bridge pier construction are described in Section 4.10, page 4-98. Furthermore, impacts to various fish species would be influenced by the abundance of each species during construction, impacts to prey species, and impacts to habitat (spawning habitat versus rearing habitat).

Potential direct impacts include sedimentation of substrate, turbidity, and loss of habitat (spawning, cover, and forage) within the Bitterroot River. Additional direct impacts to aquatic resources could include the scouring of the riverbed adjacent to and downstream from the piers. The scouring would eliminate benthic invertebrate habitat (fish forage) and increase sedimentation downstream; however, it would also potentially create pools for cover. The degree of impact may vary among species. This depends on which species spawn in the Bitterroot River mainstem and are more abundant throughout the year and, therefore, would likely be present during in-water construction activities.

Brown trout and mountain whitefish are the only salmonids known to spawn in the mainstem of the Bitterroot River. Tributaries to the Bitterroot River provide the predominant trout spawning

habitat. Therefore, brown trout and mountain whitefish potentially could experience a minor reduction in the amount of available spawning habitat should piers be placed in spawning habitat. Sculpin are also likely to spawn in the mainstem of the Bitterroot River and could experience a minor reduction in available spawning habitat.

Rainbow trout are the most abundant salmonid in the project area and occur at a rate of 350 to 500 fish per mile, while brown trout and cutthroat trout occur at a rate of 5 to 20 fish per mile. Therefore, based on abundance, rainbow trout would most likely experience the greatest degree of displacement. If present, brown trout and cutthroat trout also would be impacted.

Indirect Effects

Indirect effects to aquatic resources under any of the bridge alternatives are similar to those discussed for bull trout in Section 4.14.1.3, page 4-120. In summary, indirect effects to fisheries resources that could be degraded under the bridge alternatives include increased contaminant input, increased water temperature, and alteration to species integration/habitat conditions.

Temporary construction effects from any of the bridge alternatives may include temporary displacement of fish from the project area during construction due to construction noise generated during pier construction and water quality degradation (increased turbidity) from construction activities in and near the Bitterroot River.

Turbidity and noise produced by construction equipment during in-water construction activity would occur with varying intensity and duration. Fish present in the vicinity are likely accustomed to periodic fluctuations in turbidity due to natural variations that occur seasonally. Noise and turbidity created during construction may displace fish, but they would likely return after construction is completed.

Miller Creek Road Limited Improvements

Vegetation

Direct Impacts

Much of the existing vegetation along Miller Creek Road is non-native residential lawns rather than native species. The potential for further establishment of noxious weeds due to construction activity could occur. These transportation improvements would not disturb any riparian vegetation.

Indirect Effects

Indirect effects to vegetation due to supportive development are anticipated to be minimal for improvements along Miller Creek Road since the area is fully developed.

Wildlife

Direct Impacts

The land converted to right-of-way for the Miller Creek Road Limited Improvements is disturbed by residential lawns and is considered minor habitat for most species. It is utilized by white-tailed deer, migratory birds, and a variety of other terrestrial species.

Indirect Effects

Minimal indirect effects to wildlife due to supportive development are anticipated with the Miller Creek Road Limited Improvements because of the overall low habitat quality in the project area.

Aquatic

No aquatic habitat or species are located within the irrigation ditch that crosses Miller Creek Road. There is no river crossing proposed with the Miller Creek Road Limited Improvements. Therefore, there would be no direct impacts or indirect effects to aquatic resources.

4.11.4 Vegetation, Wildlife, and Aquatic Impacts Common to Alternative 2B: North Lower Miller Creek Grade-Separated Intersection

Vegetation

Direct Impacts

Alternative 2B would result in the permanent loss of grassland habitat estimated to be 15 acres and 0.1 acre of riparian vegetation.

Indirect Effects

There would be no additional effects to those described in Section 4.11.3, page 4-104.

Wildlife

Direct Impacts

Approximately 0.1 acre of riparian vegetation, which serves as wildlife habitat, is estimated to be impacted by Alternative 2B. However, this loss would be minimal compared to the availability of similar habitat outside the immediate area of construction.

Indirect Effects

There would be no additional effects to those described in Section 4.11.3, page 4-104.

Aquatic

Direct Impacts

Approximately 13.5 acres of new impervious surface is estimated for Alternative 2B.

Indirect Effects

There would be no additional effects to those described in Section 4.11.3, page 4-104.

4.11.5 Vegetation, Wildlife, and Aquatic Impacts Alternative 3B: Blue Mountain Road Grade-Separated Intersection

Vegetation

Direct Impacts

Alternative 3B would result in the permanent loss of grassland habitat estimated to be 19 acres and 0.2 acre of riparian vegetation.

Indirect Effects

There would be no additional effects to those described in Section 4.11.3, page 4-104.

Wildlife

Direct Impacts

Terrestrial wildlife impacts resulting from Alternative 3B would be slightly greater than those discussed in Section 4.11.3, page 4-104 because of the larger disturbance area. However, this is a small percentage of the total available similar habitat along the Bitterroot River riparian corridor, and the impact would be minimal.

The safety analysis presented in Section 3.4.3, page 3-35, indicates that 33 percent of crashes west of Buckhouse Bridge involving an animal currently occur at the Blue Mountain Road intersection area. Wildlife mortality can expected to increase in the proximity of Alternative 3B because of increased traffic volumes over the next 25 years. **Table 3-13, page 3-39** indicates a higher percentage of crashes involving an animal south (west) of Blue Mountain Road.

Indirect Effects

There would be no additional effects to those described in Section 4.11.3, page 4-104.

Aquatic

Direct Impacts

Within this alternative's footprint, there is a high level of existing disturbance along the left bank, agricultural/ranching activities along the right bank of the Bitterroot River, and lack of unique or high-value habitat features (side channels, islands, log jams, etc.). However, the riparian zone between the river and the agricultural field along the right bank is rated as "good" since it was thickly vegetated and approximately 75 feet wide. The increase in impervious surface is estimated to be 19.0 acres, the largest amount of the build alternatives.

Indirect Effects

There would be no additional effects to those described in Section 4.11.3, page 4-104.

4.11.6 Vegetation, Wildlife, and Aquatic Impacts Alternative 4C: South Lower Miller Creek Interchange

Vegetation

Direct Impacts

Alternative 4C would permanently impact 28 acres of grassland and approximately 0.3 acre of riparian vegetation. Although a greater quantity of impact than the other alternatives, the loss of riparian habitat would be minimal compared to the availability of similar habitat along the Bitterroot River riparian corridor to the south. In addition, coniferous forest impacts could result from implementation of Alternative 4C at the western edge of the alternative's impact area near the Lolo National Forest boundary.

The construction of the proposed interchange would include potential minor disturbance of riparian areas associated with the bridge construction over the Bitterroot River and of ponderosa pine forest associated with the development of the US 93 southbound off ramp.

Indirect Effects

There would be no additional effects to those discussed in Section 4.11.3, page 4-104.

Wildlife

Direct Impacts

Big game winter range for elk, mule deer, and white-tailed deer occurs in the project area on the western side of US 93 in the vicinity of Alternative 4C. Wildlife mortality impacts would be similar to those described for the other bridge alternatives, however possibly in greater quantity because of Alternative 4C's closer proximity to wildlife habitats (see discussion of wildlife and vehicle conflicts in Section 3.4.3, page 3-35).

Indirect Effects

There would be no additional effects to those discussed in Section 4.11.3, page 4-104.

Aquatic

Direct Impacts

The amount of new impervious surface, estimated to be 14.5 acres for Alternative 4C, poses the greatest potential impact to aquatic resources because of the greatest number of piers required below the OHWM.

Indirect Effects

There would be no additional effects to those discussed in Section 4.11.3, page 4-104.

4.11.7 Vegetation, Wildlife, and Aquatic Impacts Alternative 5A: Miller Creek Road At-Grade Intersection — Preferred Alternative

Vegetation

Direct Impacts

The potential for further establishment of noxious weeds (spotted knapweed, leafy spurge, orange hawkweed, St. Johnswort, Tall buttercup, field bindweed, and rush skeletonweed) exists with construction of this alternative. This alternative would not disturb riparian areas. Vegetation impacts would primarily be associated with residential landscaped areas.

Indirect Effects

The indirect effects would be the same as those described for the Miller Creek Road Limited Improvements in Section 4.11.3, page 4-104.

Wildlife

Direct Impacts

The majority of the land to be acquired for right-of-way primarily consists of residential lawns and rangeland. While this is not considered prime habitat for most species because of its disturbed condition, it is still utilized by white-tailed deer, migratory birds, and a variety of other common terrestrial species.

Indirect Effects

The indirect effects would be the same as those described for the Miller Creek Road Limited Improvements in Section 4.11.3, page 4-104.

Migratory Bird Determination

There has been no documentation of prairie falcons, golden eagles, Lewis' woodpecker, willow flycatcher, red-eyed vireo, pileated woodpecker, veery, and Barrow's goldeneye individuals in the project area, although habitat exists in the Bitterroot River riparian corridor. The implementation of breeding bird surveys within habitats to be cleared and/or the restriction of clearing suitable nesting habitat during the breeding season will negate the proposed action from impacting species protected under the MBTA.

Aquatic

Direct Impacts

No direct impacts to aquatic resources are anticipated with this alternative, since there is no proposed river crossing. The increase in impervious surface is estimated to be 6.0 acres.

Indirect Effects

The indirect effects would be fewer than those described for the bridge alternatives, because of the fully developed state of the surrounding area.

4.11.8 Vegetation, Wildlife, and Aquatic Impacts Summary

Table 4-30 provides a comparison of vegetation, terrestrial wildlife, and aquatic impacts by alternative. Impacts shown for the No-Action Alternative include impacts associated with planned locally funded improvements to Miller Creek Road, which are not a part of this federally funded project. Impacts shown for Alternatives 2B, 3B, and 4C include the impacts for the intersection/interchange with US 93, the bridge crossing and new roadway, improvements on Old US 93, and the Limited Improvements on Miller Creek Road. Impacts shown for Alternative 5A include impacts on Old US 93 and Miller Creek Road.

Table 4-30
Vegetation, Wildlife, and Aquatic Impacts Summary

Vegetation, Wildlife, and Aquatic Evaluation Criteria	Alt. 1 No-Action	Alt. 2B N. Lower Miller Creek Grade-Separated Intersection	Alt. 3B Blue Mtn. Rd. Grade-Separated Intersection	Alt. 4C S. Lower Miller Creek Interchange	Alt. 5A Miller Creek Rd. At-Grade Intersection (Preferred Alternative)
Vegetation Impacts: Loss of Riparian and Grassland	No riparian and grassland impacts.	15 acres grassland and 0.1 acre riparian.	19 acres grassland and 0.2 acre riparian.	28 acres grassland and 0.3 acre riparian.	No riparian and grassland impacts.
Terrestrial Wildlife Impacts	Minor wildlife habitat impacts along Miller Creek Rd. with locally funded improvements.	Riparian zone along Bitterroot River is winter range for deer and other wildlife.	Same as Alt. 2B. Wildlife mortality along US 93 could increase with Alt. 3B.	Same as Alt. 3B.	Minor impacts similar to the Alt. 1.
Aquatic Impacts: Construction in Bitterroot River	None	2 piers in river below OHWM.	2 piers in river below OHWM.	3 piers in river below OHWM.	None
Aquatic Impacts: Increase in Impervious Surface	NA	13.5 acres (1) (2)	19.0 acres (1) (2)	14.5 acres (1) (2)	6.0 acres(2)
Aquatic Impacts: Floodplain Impacts	0.5 acres	3.1 acres	4.1 acres	0.7 acres	0.6 acre

(1) Includes quantities associated with Miller Creek Road Limited improvements.
(2) Includes quantities associated with Old US 93 and adjacent intersection improvements.

4.11.9 Vegetation, Wildlife, and Aquatic Mitigation

The following mitigation measures have been identified to compensate or alleviate impacts to vegetation, wildlife, and/or aquatic resources.

- Appropriate measures will be taken to prevent the introduction or spread of noxious weeds; however, project-specific control methods are not identified in this document. In accordance with 7-22-2152 MCA and 60-2-208 MCA, any disturbed areas will require the establishment of a permanent desirable vegetation community. A set of revegetation special provisions for noxious weed control will be developed. The seeding provisions developed for the proposed action will be forwarded to the Missoula County weed board for approval.

- Weed management activities will occur at borrow pits, aggregate sources, staging and storage areas, pavement processing plant sites. These activities will be coordinated with the county weed board. The weed board determines any weed management requirements.
- Stormwater treatment and use of BMPs will be incorporated into construction documents to reduce impacts to the aquatic environment, thereby minimizing impacts to fisheries resources that rely on the water quality and riparian habitat of the Bitterroot River. Providing adequate floodwater flow-through culverts under roadways placed within the floodplain of the Bitterroot River can reduce hydrologic impacts. BMPs, when properly deployed and maintained, can minimize construction and operation-related impacts to aquatic resources. Areas of most concern include stabilizing disturbed soils, containment of contaminants and debris, and treatment of stormwater runoff.
- In order to avoid impacts to nesting birds protected under the MBTA, vegetated areas will be cleared and grubbed by early-April, prior to the establishment of nests. A biologist will survey areas to be cleared prior to early-April to verify that early nesting activities did not occur in the project area and to verify that no migratory bird nests have been established in areas to be cleared. Areas that have been surveyed during the nesting season and found not to contain breeding birds could be cleared during the nesting season under direction of an on-site biologist.
- Where new right-of-way or a temporary construction easement is needed on Missoula Country Club property for completing improvements and the fence or hedge is impacted, replacement fencing and landscaping would be provided by the project. Where existing fence and hedge located on Old US 93 right-of-way is impacted, but right-of-way and construction easement are not needed, replacement fence and landscaping would be the responsibility of the Missoula Country Club.

Other Mitigation Identified for the Bridge Alternatives

- Permits for in-water work will be required and will likely require work to occur during low flow periods. Conducting in-water work during the low-flow period in mid-summer can reduce impacts to aquatic resources (typically outside the spawning season). Conducting in-water work during the low-flow period results in diminished erosive force of the water on in-water structures during construction, simplified construction of cofferdams, and overall simplification of the construction process. This can result in a reduction in time required to construct structures below the OHWM.
- Riparian habitat will be reestablished by replanting desirable vegetation to mitigate impacts that will occur from bridge construction.

Enhancements Identified for the Bridge Alternatives

- Enhancements will include the incorporation of bat-friendly habitat features as feasible. These measures could include the incorporation of crevices suitable for roosting on the underside of the bridge or the attachment of bat boxes to the bridge.

4.12 Floodplains Impacts and Mitigation

4.12.1 Floodplain Impacts Alternative 1: No-Action

The No-Action Alternative has no impacts to the Bitterroot River 100-year floodplain in terms of changes to the capacity of the floodplain or through an increase in the total volume of water being conveyed by the floodplain within the project area. The locally funded improvements along Miller Creek Road were estimated to impact 0.5 acre of floodplain. However, under this alternative, growth in the Missoula area would continue, presumably toward the west and the Bitterroot

River. This growth may result in the construction of structures within the 100-year floodplain, which, in turn, may modify floodwater elevations of the Bitterroot River and Miller Creek.

4.12.2 Floodplain Impacts on Old US 93 and Adjacent Intersections Common to All Build Alternatives

Improvements along Old US 93 and adjacent intersections are the same with all of the build alternatives. No floodplains would be impacted as a result of the Old US 93 and intersection improvements.

4.12.3 Floodplain Impacts Common to Bridge Alternatives (2B, 3B, 4C)

Direct Impacts

Base floodplains and regulatory floodways, as recognized by both Federal Emergency Management Agency (FEMA) and Missoula County, are present and would be impacted by the bridge alternatives. Potential impacts to the 100-year floodplain were modeled using an updated floodplain analysis prepared for FHWA for the Bitterroot River and adjacent drainage basins. Additional information on the potential hydraulic impacts to the Bitterroot River resulting from the proposed action can be found in the *Hydraulics Report* (DEA, 2004).

100-year floodplain impacts can generally occur in two forms: directly through changes to the capacity of the floodplain (e.g., bridge piers, roadway fill, new development); or indirectly through an increase in the total volume of water arriving at and being conveyed by the floodplain. Both impacts could result in an alteration of the water surface elevation. Increases in water surface elevations could result in an increase in the area inundated by the 100-year flood and flooding of structures previously located outside the 100-year floodplain.

Currently, Missoula County and City of Missoula have adopted floodplain regulations that allow permitting of artificial obstructions and nonconforming uses in the floodplain, but discourage highway and stream crossing encroachment into the floodway (i.e., the channel of the stream and the adjacent overbank areas that must be reserved in order to discharge the 100-year flood event without cumulatively increasing the water surface elevations more than 0.5 foot). The floodplain regulations, Section 5.02, do permit use of supporting bridge piers within the floodway and allow for other encroachments when specific conditions listed in the regulations are met, including a requirement that no reasonable alternative exists. Further, floodway regulations require that crossings not substantially increase stream velocities.

Additionally, FHWA floodplain regulation 23 CFR 650 A further regulates floodplain encroachments and requires an evaluation of whether these encroachments are significant as defined by 23 CFR 650.105(q). The new roadway and intersection/interchange as part of Alternatives 2B, 3B, and 4C include bridge structures over the Bitterroot River, but result in encroachments into the 100-year floodplain. Bridge abutments and roadway approaches to these structures are located within the floodplain. These encroachments are quantified in the summary in **Table 4-32, page 4-119** and have been evaluated for significance according to 23 CFR 650 A. These encroachments are not significant as defined by 23 CFR 650.105(q). Section "q" defines significant as follows:

> "(q) Significant encroachment shall mean a highway encroachment and any direct support of likely base flood-plain development that would involve one or more of the following construction- or flood-related impacts:
>
> (1) A significant potential for interruption or termination of a transportation facility which is needed for emergency vehicles or provides a community's only evacuation route.

(2) A significant risk, or
(3) A significant adverse impact on natural and beneficial flood-plain values."

The alternatives would be above the 100-year floodplain elevation and would remain operational during a 100-year flood. As demonstrated in the *Hydraulics Report*, June 2004, there would be no significant adverse impacts on the floodplain values. Increases in water surface elevation and local velocities are nominal and would not result in any adverse effects.

All proposed bridges over the Bitterroot River have bridge lengths that span the floodway avoiding encroachments but require bridge piers that are located within the floodway. Water surface impacts from Alternatives 2B, 3B, and 4C indicate that the rise in the 100-year calculated water surface elevation level (WSEL) is, in all cases, less than 0.25 feet. All alternatives meet the Missoula County Floodplain Ordinance requirements, which limit the rise in water surface elevations in the floodway to 0.5 foot. The rise in water surface elevations from the alternatives is not expected to have any substantive effect on structures or result in a measurable change to the floodplain limits. Hydraulic modeling of Alternative 2B indicates that changes to the normal or flood stage stream velocities are not anticipated and the alternative is not likely to cause a problematic change in erosion or deposition patterns of the river.

None of the bridge alternatives increase flood stage stream velocities, increase bank erosion, or alter bedload or sediment transport characteristics. **Table 4-31** provides calculated main channel velocity increases for the river crossing alternatives:

Table 4-31
Bridge Alternatives (2B, 3B, 4C) Estimated Channel Velocities

Alternative	Existing Baseline Velocity (fps)	Bridge Alternative Calculated Velocity Increase (fps)	Percent Difference
Alternative 2B: North Lower Miller Creek Grade-Separated Intersection	5.51	5.70	3.4%
Alternative 3B: Blue Mountain Road Grade-Separated Intersection	7.33	7.50	2.3%
Alternative 4C: South Lower Miller Creek Interchange	6.05	6.05	0.0%

fps = feet per second.

Indirect Effects

This alternative would result in minor, temporary negative effects to floodplain water surface elevation due to increased sediment runoff and deposition during construction. These effects would be minimized by the revegetating disturbed areas and by implementing temporary and permanent BMPs.

Miller Creek Road Limited Improvements

The Limited Improvements to Miller Creek Road would impact 22 square feet of Zone AE and 0.6 acre of Zone AO.

4.12.4 Floodplain Impacts Alternative 2B: North Lower Miller Creek Grade-Separated Intersection

Direct Impacts

Alternative 2B has bridge-supporting piers within the regulated floodway of the Bitterroot River, as well as the construction of bridges, bridge approaches, and roadway (including stormwater facilities) within the 100-year floodplain of the Bitterroot River. The floodplain width at this crossing is approximately 2,000 feet. Fill required to accommodate the roadway across the Bitterroot River 100-year floodplain could potentially impact the floodplain water surface elevation upstream from the project area. This impact would be minor, particularly in areas where the 100-year floodplain is more expansive and not contained within the channel. The new roadway and bridge crossing portion of Alternative 2B is estimated to fill 2.5 acres of floodplain.

Alternative 2B would require the placement of two piers within the Bitterroot River channel and eight piers within the floodway. The placement of the eight piers would result in an increase in 100-year floodwater surface elevation of less than 0.25 feet immediately upstream of the structures, which is within the allowable increase regulated by Missoula County and the City of Missoula floodplain regulations. The piers are also anticipated to create occasional debris jams that would result in minor impacts to floodplain surface water elevations immediately upstream from the pier. No impacts to existing structures are anticipated.

Indirect Effects

There would be no additional impacts to those described in Section 4.12.3.

4.12.5 Floodplain Impacts Alternative 3B: Blue Mountain Road Grade-Separated Intersection

Direct Impacts

Alternatives 3B requires bridge structures over the Bitterroot River and within the floodplain. Design of the bridge structures specifies that the abutments be placed outside of the floodway, such that the only components of the bridge obstructing river flow are the piers. All of the river crossing bridge alternatives have bridge lengths which span the floodway avoiding encroachments but require bridge piers that are located within the floodway and are consistent with floodplain regulations. Discussions in Section 4.12.3 are consistent with Alternative 3B with the exception of the floodplain width where Alternative 3B crosses the Bitterroot River is approximately 1,280 feet. Alternative 3B would require the placement of two piers within the Bitterroot River channel and four piers within the floodway. The floodplain width at this crossing is approximately 1,280 feet. The placement of the piers in the floodplain would result in an increase in 100-year floodwater surface elevation of less than 0.25 foot immediately upstream of the structures. The piers are also anticipated to create occasional debris jams that would result in minor impacts to floodplain surface water elevations immediately upstream from the pier. No impacts to existing structures are anticipated. Alternative 3B is estimated to place fill in the floodplain, which impacts 4.1 acres of floodplain.

Indirect Effects

There would be no additional effects to those described in Section 4.12.3, page 4-115.

4.12.6 Floodplain Impacts Alternative 4C: South Lower Miller Creek Interchange

Direct Impacts

The floodplain width where Alternative 4C crosses the Bitterroot River is approximately 800 feet. Alternative 4C would require the placement of three piers within the Bitterroot River channel and four piers within the floodway. The placement of the four piers within the floodway would result in an increase in 100-year floodwater surface elevation of less than 0.25 foot immediately upstream of the structures. The piers are also anticipated to create occasional debris jams that would result in minor impacts to floodplain surface water elevations immediately upstream from the pier. No impacts to existing structures are anticipated. Alternative 4C fill would impact less than 0.7 acre of floodplain Zone AE.

Indirect Effects

There would be no additional effects to those described in Section 4.12.3, page 4-115.

4.12.7 Floodplain Impacts Alternative 5A: Miller Creek Road At-Grade Intersection — Preferred Alternative

Direct Impacts

Alternative 5A improvements along Miller Creek Road fall within the Bitterroot River 100-year floodplain Zone AO and the 500-year floodplain Zone X. Approximately 0.6 acre of Zone AO would be filled with this alternative. This area would receive shallow flooding or sheet flow on steep terrain. Construction of Alternative 5A would alter the terrain in those floodplain areas.

Indirect Effects

No indirect effects to the Bitterroot River 100-year floodplain are anticipated with Alternative 5A because no supportive development is anticipated.

4.12.8 Floodplain Impacts Summary

Table 4-32, page 4-119 summarizes impacts to the 100-year floodplain relative to each alternative. Impacts shown for the No-Action Alternative include impacts associated with planned locally funded improvements to Miller Creek Road, which are not a part of this federally funded project. Impacts shown for Alternatives 2B, 3B, and 4C include the impacts for the intersection/interchange with US 93, the bridge crossing and new roadway, improvements on Old US 93, and the Limited Improvements on Miller Creek Road. Impacts shown for Alternative 5A include impacts on Old US 93 and Miller Creek Road.

4.12.9 Floodplain Mitigation

Coordination will continue to occur with the City of Missoula Floodplain Administrator: the Missoula County Floodplain Administrator: Montana Fish, Wildlife & Parks (MFWP): FEMA: and the USACE to ensure compliance with regulations and that mitigation measures are included in the construction plans. Designs and recommendations will comply with FHPM 6-7-3-2 "Location and

Table 4-32
Floodplain Impacts Summary

Floodplain Evaluation Criteria	Alt. 1 No-Action	Alt. 2B N. Lower Miller Creek Grade-Separated Intersection	Alt. 3B Blue Mtn. Rd. Grade-Separated Intersection	Alt. 4C S. Lower Miller Creek Interchange	Alt. 5A Miller Creek Rd. At-Grade Intersection (Preferred Alternative)
Approximate Bridge Length[1] (ft.)	NA	1,558	1,026	1,270	NA
Piers in Channel Under OHWM	NA	2	2	3	NA
Piers in Floodway[3]	NA	8	4	4	NA
Floodplain Impacted (acres)	0.5	3.1	4.1	0.7	0.6
Increase in Water Surface Elevation[2] (ft.)	NA	<0.25	<0.25	<0.25	NA

[1] Bridge lengths include bridge over Bitterroot River and US 93.
[2] Rise in 100-year water surface elevation immediately upstream from the proposed bridge resulting from piers and roadway fill within the floodplain.
[3] includes piers in channel.
NA - Not applicable (Alternatives 1 and 5A do not include bridges or piers in the Bitterroot River).

Hydraulic Design of Encroachments of Floodplains" (now referenced as 23 CFR 650 A) and Executive Order 11988.

To comply with the Montana Floodplain and Floodway Management Act (Title 76, Chapter 5 MCA), floodplain development permits will be required from the City of Missoula (Title 18 of the City of Missoula Code) and Missoula County (Missoula County Floodplain Regulations) for the floodplain encroachment associated with the construction of piers and roadway fill within the Bitterroot River 100-year floodplain. In addition, the floodplain permit cannot be issued without a Section 404 permit being issued.

BMPs will be followed to reduce any temporary or permanent impacts to the Bitterroot River 100-year floodplain as a result of the transportation improvements evaluated in this EIS. Specific BMPs to be used in the project area will be determined at the time of final design. Impacts to floodplains will be minimized by following standard stream crossing design criteria, avoiding direct encroachments on the river channel, and adjusting the stream crossing alignment where possible. Bridge and roadway designs will seek to minimize impacts to floodplains in compliance with FHWA requirements, including efforts to have bridge lengths which span the floodway avoiding encroachments but require bridge piers that are located within the floodway. Final design will follow FHWA, FEMA, and Missoula County requirements.

4.13 Wild & Scenic Rivers Impacts and Mitigation

Since the Bitterroot River and Miller Creek within the project area are not designated as Wild and Scenic Rivers, nor are other streams in the project area, the proposed action would have no effect on Wild and Scenic Rivers.

4.14 Threatened, Endangered, or Sensitive Species Impacts and Mitigation

Based on the lack of suitable habitat in the project area and the potential for only intermittent or rare occurrence in the project area, the proposed action would have no effect on grizzly bear, gray wolf, Canada lynx, and yellow-billed cuckoo. Critical habitat has been proposed for Canada lynx, but none exists within the action area. Therefore, the proposed action would not destroy or

adversely modify proposed Canada lynx critical habitat. Should critical habitat for Canada lynx be designated prior to completion of the project, the proposed project would have no effect on designated critical habitat.

The impacts to bull trout, designated critical habitat for bull trout, and bald eagles are summarized in this section. This discussion and analysis are documented in the project *Biological Resources Report (DEA, 2004)*. Informal consultation with the USFWS has been completed and a letter of concurrence is included in Appendix A. This letter concurred with FHWA's determination that the Preferred Alternative would have no effect on bull trout, bull trout critical habitat, Canada lynx, grizzly bear, and gray wolf. The USFWS also concurred that the Preferred Alternative would not be likely to adversely affect bald eagle.

The evaluation of potential habitat and the survey conducted for four state sensitive plant species (as listed in **Table 3-24, page 3-76**) with documented occurrences within the general project area concluded that these species would not be affected by any of the build alternatives.

4.14.1 Bull Trout

4.14.1.1 Bull Trout Impacts Alternative 1: No-Action

Direct Impacts

No direct impacts or indirect effects to bull trout are anticipated with the No-Action Alternative as part of the proposed action.

4.14.1.2 Bull Trout Impacts on Old US 93 and Adjacent Intersections Common to All Build Alternatives

Improvements along Old US 93 and adjacent intersections are the same with all of the build alternatives. No impacts to bull trout would occur as a result of widening Old US 93 or Old US 93/Brooks/Reserve Streets intersection improvements.

4.14.1.3 Bull Trout Impacts Common to Bridge Alternatives (2B, 3B, 4C)

Direct Impacts

Direct impacts to bull trout from the bridge alternatives are expected to be adverse but minor based on the current low density of this species (one to two fish per mile September through June) and the lack of suitable spawning habitat for this species within the project area.

Direct impacts to bull trout and their designated critical habitat would primarily result from bridge and road construction within the floodplain, but could also result to a lesser degree from road construction near the Bitterroot River. Although many of the direct impacts would be short term during the construction period and would result in insignificant and discountable impacts to bull trout, bridge construction would result in long-term, localized habitat impacts and could directly impact individual bull trout if they are present during the construction time frame. Bridge construction would result in permanent loss of riparian habitat and river substrate. Permanent loss of this habitat would contribute to the incremental degradation of habitat that is occurring along the Bitterroot River. However, the loss of riparian habitat would be minimal compared to the availability of similar habitat along the Bitterroot River riparian corridor.

Additional direct impacts to bull trout may result from construction activities below the OHWM and in adjacent riparian areas. Increased sediment and turbidity could impact bull trout if they are present in the area during construction. These conditions also could force bull trout out of the area, thereby rendering the habitat within the area temporarily unusable. Since bull trout are rare within the mainstem of the Bitterroot River, and may not be present during the summer because of elevated water temperatures (when in-water construction would occur), impacts from construction appear to be unlikely.

Indirect Effects

Potential indirect effects to bull trout and designated critical habitat include increased contaminant input, such as heavy metals associated with highway runoff and herbicide and pesticide application, paint application and removal, and operation of equipment in or near water; increased water temperature resulting from increase of impervious surfaces and clearing of riparian vegetation; change in peak/base flows resulting from the placement of piers/columns in the Bitterroot River; and alteration to species integration/habitat conditions.

The extent of the impacts vary with regard to the number of piers that would be constructed below the OHWM, the area of riparian habitat removed, and the area of additional impervious surface resulting from bridge and roadway construction (see **Table 4-33**).

Table 4-33
Estimated Bull Trout Impacts

Alternative	Number of Piers below OHWM	Riparian Habitat Impacted (acre)	Impervious Surface (acre)
1: No-Action	0	0	NA
2B: North Lower Miller Creek Grade-Separated Intersection	2	0.1	13.5(1)
3B: Blue Mountain Rd. Grade-Separated Intersection	2	0.2	19.0(1)
4C: South Lower Miller Creek Interchange	3	0.3	14.5(1)
5A: Preferred Alternative: Miller Creek Rd. At-Grade Intersection	0	0	6.0(2)

NA = Not available.
(1) Includes increase in impervious surface related to the Old US 93 and Miller Creek Road Limited Improvements and bridge over the Bitterroot River plus new roadway.
(2) Includes increase in impervious surface related to the Old US 93 improvements and Miller Creek Road widening.

Miller Creek Road Limited Improvements

All of the bridge alternatives (2B, 3B, and 4C) include the Limited Improvements along Miller Creek Road. No direct or indirect impacts to bull trout would occur with the Miller Creek Road Limited Improvements.

4.14.1.4 Bull Trout Impacts Alternative 2B: North Lower Miller Creek Grade-Separated Intersection

Direct Impacts

Alternative 2B would require the construction of two piers within the Bitterroot River, the removal of approximately 0.1 acre of riparian habitat, and the addition of approximately 13.5

acres of impervious surface associated with the bridge and roadway. However, runoff from the impervious surface area associated with the bridge is planned to be intercepted and redirected to the floodplain detention areas south of the Bitterroot River to avoid contributions of contaminants to the Bitterroot River. Therefore, the overall potential impacts to bull trout are expected to be relatively minor.

Indirect Effects

There would be no additional effects to those described in Section 4.14.1.3, page 4-120

4.14.1.5 Bull Trout Impacts Alternative 3B: Blue Mountain Road Grade-Separated Intersection

Direct Impacts

Alternative 3B would require the construction of two piers within the Bitterroot River. This alternative would result in 19.0 acres of additional impervious surface and 0.2 acre of riparian impacts. However, as with the Alternative 2B, runoff from the impervious surface area associated with the bridge would be intercepted and redirected to the floodplain detention ponds south of the Bitterroot River near Old Bitterroot Road to avoid contributions of contaminants to the Bitterroot River.

Indirect Effects

There would be no additional effects to those described in Section 4.14.1.3, page 4-120.

4.14.1.6 Bull Trout Impacts Alternative 4C: South Lower Miller Creek Interchange

Direct Impacts

Alternative 4C requires the greatest number of piers below the OHWM and impacts the greatest area of riparian habitat. Although the overall impacts to bull trout associated with this alternative are expected to be minor, Alternative 4C presents potentially greater impacts to bull trout compared to the other build alternatives. This alternative would result in 14.5 acres of additional impervious surface.

Indirect Effects

There would be no additional effects to those described in Section 4.14.1.3, page 4-120.

4.14.1.7 Bull Trout Impacts Alternative 5A: Miller Creek Road At-Grade Intersection — Preferred Alternative

Direct Impacts

No direct impacts to bull trout are anticipated with Alternative 5A. This alternative would result in 6.0 acres of additional impervious surface.

Indirect Effects

No indirect effects to bull trout are anticipated with Alternative 5A.

4.14.1.8 Bull Trout Conservation Measures

Alternative 5A does not cross or impact the Bitterroot River and does not impact bull trout; therefore, Alternative 5A would not require the identified conservation measures for bridge activities.

The bridge alternatives (2B, 3B, 4C) would require work below the OHWM of the Bitterroot River, increase the amount of new impervious surface in the project area, and facilitate increased development within the floodplain. Therefore, conservation measures intended to minimize the chances of impacting bull trout are warranted. Some of the conservation measures designed to reduce potential impacts to bull trout are outlined below. Additional conservation measures may be specified in the project-specific permits from MFWP and the state and federal agencies with jurisdiction.

1. There will likely be in-water work timing restrictions to minimize potential impacts to bull trout. In-water work will likely be restricted to mid-summer when water temperatures are at their peak, stream flow is reduced, and the likelihood of bull trout being present is at its lowest.

2. A SWPPP employing BMPs for controlling erosion and sediment transport will be implemented to ensure that all pollutants and products are controlled and contained.

3. Acceptable erosion control devices and BMPs will be installed at the edges of wetlands and other Waters of the United States prior to construction. All exposed soils will be permanently stabilized at the earliest practicable date. A SWPPP will be prepared and submitted to Montana Department of Environmental Quality (MDEQ) in compliance with the MPDES regulations. The objective is to minimize erosion of disturbed areas during and following disturbance. Regular inspections of erosion control devices will be carried out in compliance with MPDES regulations.

4. Development of a revegetation plan, erosion control plan, and SWPPP will be coordinated with appropriate permitting and resource agencies.

5. Temporarily disturbed wetland areas will be revegetated with desirable species as specified by FHWA at the earliest practicable date following disturbance and will comply with MPDES and Section 404 permit conditions.

6. Any restrictions on work near streams or in wetlands will be specified as terms of water-related permits obtained from MDEQ, MFWP, and the USACE.

7. All temporary material storage piles will be protected by appropriate BMPs to prevent sediments from leaving the pile, i.e., placement of silt fencing around storage piles.

8. Concrete truck chute cleanout areas will be established to properly contain wet concrete and wash water.

9. The contractor will protect all inlets and catchments from fresh concrete, tackifier, paving, or paint striping.

10. All equipment that is used for working below the OHWM will be cleaned prior to operations below OHWM elevation to avoid spread of whirling disease or noxious weeds. Exter-

nal grease and oil will be removed from machinery off site prior to operation below the OHWM. Hydraulic mechanisms will use vegetable oil whenever feasible.

11. When practicable, all fueling and maintenance of equipment will occur more than 100 feet from the Bitterroot River.

12. Boundaries of clearing limits associated with site access and construction will be flagged to prevent ground disturbance outside of the limits.

13. Vegetation will only be grubbed from areas undergoing permanent alteration. No grubbing will occur in areas slated for temporary impacts.

4.14.1.9 Bull Trout Determination of Effect

Based on the above analysis, Alternatives 2B, 3B, and 4C *may affect, and are likely to adversely affect* bull trout. The analysis considers whether the project would result in a *take* - a formal term under Section 7. *Take* is defined as: to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect or attempt to engage in any such conduct. *Harm* is further defined by USFWS to include significant habitat modification or degradation that results in death or injury to listed species by significantly impairing behavioral patterns, such as breeding, feeding, or sheltering. Alternative 5A would have *no effect* on bull trout. Alternatives 2B, 3B, and 4C may affect bull trout because:

- In-water work is proposed for pier construction and pile driving.
- The amount of new impervious surface in the project area would increase.
- Impacts to riparian habitat would occur in the vicinity of the bridge abutments.
- Impacts to stream hydrology would occur from the placement of piers/columns within the OHWM.
- Impacts to water quality would occur from new impervious surface.

Alternatives 2B, 3B, and 4C are likely to adversely affect bull trout and could result in a "take" because:

- Bull trout could be present in the action area during in-water work.
- Work below the OHWM would likely increase sedimentation and turbidity and result in decreased foraging opportunities for bull trout.
- The permanent loss of riparian and river substrate habitat would contribute to the incremental degradation of bull trout habitat in the project area.
- The resulting underwater shock wave from pile driving could stun or injure bull trout in the project area and/or displace them from portions of the project area.

Critical Habitat for Bull Trout Determination of Effect

Based on the above analysis, Alternatives 2B, 3B, and 4C *may affect*, and *would likely adversely affect* designated critical habitat for bull trout. Based on the above analysis, Alternative 5A would have *no effect* on designated critical habitat. Alternatives 2B, 3B, and 4C may affect critical habitat because:

- In-water work would alter the stream substrate.
- Impacts to riparian habitat would occur in the vicinity of the bridge abutments.

- Impacts to stream hydrology would occur from the placement of piers/columns below the OHWM, abutments near the river bank, and roadway in the floodplain.
- Impacts to water quality would occur from runoff associated with construction and new impervious surface.
- Impacts to floodplain would occur from the flow constraints caused by the bridge.

4.14.2 Bald Eagle Impacts

The bald eagle was removed from the list of federally listed threatened species on August 8, 2007, but the species will continue to be protected by the Migratory Bird Treaty Act (MBTA) and the Bald and Golden Eagle Protection Act (BGEPA). Under the MBTA, it is illegal to pursue, hunt, take, capture, kill, possess, sell, barter, purchase, export, or import migratory birds, their parts, nests or eggs, except as permitted by regulation. "Take" is defined under the MBTA as "pursue, hunt, shoot, wound, kill, trap, capture, possess, or collect." The BGEPA prohibits the take, possession, sale, purchase, barter, offer to sell, purchase, or barter, transport, export or import, of any bald or golden eagle, alive or dead, including any part, nest, or egg, unless allowed by permit [16U.S.C 668(a); 50 CFR 22]. "Take" is defined as "pursue, shoot, shoot at, poison, wound, kill, capture, trap, collect, molest or disturb" a bald or golden eagle. The term "disturb" under the BGEPA was recently defined via a final rule published in the Federal Register on June 5, 2007 (72 Fed. Reg. 31332). "Disturb" means to agitate or bother a bald or golden eagle to a degree that causes, or is likely to cause, based on the best scientific information available, 1) injury to an eagle, 2) a decrease in its productivity, by substantially interfering with normal breeding, feeding, or sheltering behavior, or 3) nest abandonment, by substantially interfering with normal breeding, feeding, or sheltering behavior.

4.14.2.1 Bald Eagle Impacts Alternative 1: No-Action

No direct impacts to bald eagles would result from the No-Action Alternative. No removal of riparian habitat or disturbance to the floodplain of the Bitterroot River would occur under this alternative. Therefore, no direct permanent impacts to potential nesting, wintering, or foraging habitat for bald eagles are anticipated.

Indirect effects to bald eagles would be associated with the increase in traffic on adjacent roadway resulting from new roadway connections and resulting supportive development that may occur. This would include loss of vegetation and foraging habitat.

4.14.2.2 Bald Eagle Impacts Common to All Build Alternatives

Direct Impacts

Direct impacts to bald eagles within the project area as a result of any of the build alternatives is expected to be minimal based on the lack of nesting activity and the availability of alternate foraging areas throughout Bitterroot River corridor. However, impacts to bald eagles may include elimination of suitable perching, roosting, or nesting habitat within riparian areas adjacent to the Bitterroot River; disturbance from construction; and temporary displacement of potential prey resources.

Temporary construction impacts to bald eagles may include noise disturbance and water quality degradation. Construction activities would increase noise levels in the area and may temporarily displace bald eagles (if present). Sedimentation and turbidity within the Bitterroot River as a result of the erosion of soils disturbed during bridge and roadway construction may temporarily impact bald eagle forage species, such as fish or waterfowl, inhabiting the area. However, more

suitable foraging habitat exists along the Bitterroot River outside the project area. If bald eagles were displaced, they would likely return to areas of the river near the newly constructed bridge after construction is complete.

Indirect Effects

Indirect effects to bald eagles include disturbance as a result of vehicle use on the new road, and long-term impacts to prey resources from habitat alteration as undeveloped land is converted to residential and other uses. The establishment of a new bridge and access roads in the vicinity of the Bitterroot River would result in increased noise and visual disturbance. This increased disturbance likely would reduce the suitability of the area for bald eagles along the Bitterroot River in the immediate vicinity.

The build alternatives would contribute to the habitat fragmentation caused by past development in the vicinity. This fragmentation would result in an incremental degradation of habitat suitability for bald eagles. Such habitat degradation could cause a reduction in carrying capacity of wintering eagles and could reduce the chances for bald eagles to establish nesting in the vicinity. Because the proposed action would affect a relatively small segment of the Bitterroot River corridor and no active nesting has been documented in the project area, overall effects to the bald eagle are expected to be minor.

4.14.2.3 Bald Eagle Impacts Common to Bridge Alternatives (2B, 3B, 4C)

Riparian habitat would be impacted with Alternatives 2B, 3B, and 4C. The elimination of this habitat is expected to result in minor impacts to the bald eagle considering the overall availability of such habitat throughout the Bitterroot River riparian corridor.

The establishment of a new bridge and roadways in the project area could result in water quality degradation. The increase in impervious surface could increase runoff and water temperatures in the Bitterroot River. Runoff from these surfaces could also introduce pollutants into the river, impacting the bald eagle forage base (fish). Toxic compounds could also be passed on to bald eagles through the consumption of contaminated prey species. Potential impacts to water quality are described in more detail in Water Resources and Water Quality Impacts and Mitigation Section 4.9, page 4-91, and Bull Trout Section 4.14, page 4-119.

Indirect Effects

There would be no additional effects to those described in Section 4.14.2.2, page 4-125.

4.14.2.4 Bald Eagle Impacts Alternative 2B: North Lower Miller Creek Grade-Separated Intersection

Alternative 2B would require the removal of approximately 0.1 acre of riparian habitat or potential perching, roosting, wintering, or nesting habitat, resulting from the construction of the bridge and roadway. The overall potential impacts to bald eagles as a result of Alternative 2B are expected to be minor. The stormwater treatment incorporated into the design of Alternative 2B would minimize the long-term impacts to water quality in the Bitterroot River.

Indirect Effects

There would be no additional effects to those described in Section 4.14.2.2, page 4-125.

4.14.2.5 Bald Eagle Impacts Alternative 3B: Blue Mountain Road Grade-Separated Intersection

The construction of the bridge and roadway with Alternative 3B would result in the impact of approximately 0.2 acre of riparian habitat. The overall potential impacts to bald eagles as a result of Alternative 3B are expected to be minor. The stormwater treatment incorporated into the design of Alternative 3B would minimize the long-term impacts to water quality in the Bitterroot River.

Indirect Effects

There would be no additional effects to those described in Section 4.14.2.2, page 4-125.

4.14.2.6 Bald Eagle Impacts Alternative 4C: South Lower Miller Creek Interchange

Direct Impacts

The total riparian shrub and tree habitat loss from Alternative 4C would be approximately 0.3 acre. The loss of riparian habitat would be minimal compared to the availability of similar habitat along the Bitterroot River riparian corridor. Nevertheless, Alternative 4C would have comparatively the greatest potential direct, permanent effect to potential wintering and foraging habitat for bald eagles because more Bitterroot River riparian habitat would be impacted by bridge construction. Alternative 4C would impact the greatest amount of land of all build alternatives, and has more mature roost trees associated with the Bitterroot River. Alternative 4C may not incorporate the same level of stormwater treatment into the design as the other build alternatives because of bridge design constraints.

Indirect Effects

There would be no additional impacts to those described in Section 4.14.2.2, page 4-125.

4.14.2.7 Bald Eagle Impacts Alternative 5A: Miller Creek Road At-Grade Intersection — Preferred Alternative

Direct Impacts

The impacts would be the same as described in Section 4.14.2.2, page 4-125.

Indirect Effects

A wider Miller Creek Road width may perpetuate growth in the Miller Creek area. The indirect effects to bald eagles that may occur from Alternative 5A include impacts to bald eagle prey species (fisheries), such as sedimentation within the Bitterroot River and tributaries, from construction activities associated with the development of the Miller Creek area; and long-term impacts to prey resources from habitat alteration as undeveloped land is converted to residential and other uses.

4.14.2.8 Bald Eagle Conservation Measures

Construction timing restrictions are not anticipated because no nests are known to occur in the project area and there is an abundance of suitable wintering habitat adjacent to and outside of the project area.

In accordance with current policy, rural overhead power lines that are relocated will be raptor-proofed. The current policy requires that any overhead electrical facilities that are relocated within the public right-of-way must be raptor-proofed, except those in specifically designated urban areas. Any overhead electrical facilities that are relocated on private right-of-way will be recommended to be raptor-proofed.

The location for construction-related activities, such as staging and borrow/gravel source activities, will be independently determined by the construction contractor, who will be responsible for compliance with all laws and activities associated with those activities. If FHWA becomes aware of any bald eagles located in the vicinity of these activities, they will inform the contractor of those locations and of potential restrictions that may be associated with avoiding impacts to those species. FHWA will contact and coordinate with the USFWS.

4.14.2.9 Bald Eagle Determination of Effect

Based on the previous analysis, all build alternatives *may affect, but not likely to adversely affect*, bald eagles.

This proposed action may affect bald eagles because:

- Bald eagles are year-round residents in the action area and could be present during construction.
- Suitable roosting, nesting, and foraging habitat occurs in the action area.
- Suitable roosting habitat may be impacted from removal of riparian vegetation (would not occur under Alternative 5A).
- Construction and operation of the bridge would generate noise and disturbance that would exceed ambient levels (would not occur under Alternative 5A).
- In-water work is proposed that could impact potential food resources (would not occur under Alternative 5A).

This proposed action would not likely adversely affect bald eagles because:

- Most construction-related activities would occur outside the wintering season.
- No documented nests occur within one mile of the project area.
- Impacts to bald eagle habitat would be localized and affect a small amount of available suitable habitat in the proposed action area (would not occur under Alternative 5A).
- Impacts to water quality would be minimized through design and implementation of BMPs.

4.14.3 Threatened, Endangered, or Sensitive Species Impacts Summary

Table 4-34 below provides a comparison of threatened or endangered species impacts. Impacts shown for the No-Action Alternative include impacts associated with planned locally funded improvements to Miller Creek Road, which are not a part of this federally funded project. Impacts shown for Alternatives 2B, 3B, and 4C include the impacts for the intersection/interchange with US 93, the bridge crossing and new roadway, improvements on Old US 93, and the

Limited Improvements on Miller Creek Road. Impacts shown for Alternative 5A include impacts on Old US 93 and Miller Creek Road.

Table 4-34
Threatened or Endangered Species Impacts Summary

Threatened or Endangered Species Evaluation Criteria	Alt. 1 No-Action	Alt. 2B N. Lower Miller Creek Grade-Separated Intersection	Alt. 3B Blue Mtn. Rd. Grade-Separated Intersection	Alt. 4C S. Lower Miller Creek Interchange	Alt. 5A Miller Creek Rd. At-Grade Intersection (Preferred Alternative)
Bull trout habitat impacted	No effect	May affect, likely to adversely effect	May affect, likely to adversely effect	May affect, likely to adversely effect	No effect
Bald eagle habitat impacted	No effect	May affect, not likely to adversely effect	May affect, not likely to adversely effect	May affect, not likely to adversely effect	May affect, not likely to adversely effect

4.15 Cultural Resource Impacts, Section 4(f) *De Minimis*, and Mitigation

4.15.1 Cultural Resources Impacts Alternative 1: No-Action

One National Register of Historic Places (NRHP)-eligible property impacted by the No-Action Alternative, as part of the locally funded improvements to Miller Creek Road by the local developer and the City of Missoula and Missoula County, would be the Miller-Kelley and Cave-Gannon Ditch (24M0520). The Miller-Kelley and Cave-Gannon Ditch would be affected by the north "Y" reconfiguration as part of the locally funded improvements.

4.15.2 Cultural Resource Impacts on Old US 93 and Adjacent Intersections Common to All Build Alternatives

Improvements along Old US 93 and adjacent intersections are the same with all the build alternatives. There are no NRHP-eligible historic properties that are affected by the Old US 93 or intersection improvements for any of the build alternatives.

4.15.3 Cultural Resource Impacts Common to Bridge Alternatives (2B, 3B, 4C)

All of the bridge alternatives require an easement from the MRL railroad for Site 24M0718, the Bitterroot Branch of the Northern Pacific Railroad, due to existing railroad crossing reconstruction, crossing closure, or new bridge construction over the railroad. The impacts are discussed under each alternative.

Miller Creek Road Limited Improvements

The Miller Creek Road Limited Improvements require reconstruction (widening) of the MRL railroad crossing (Site 24MO718) at Miller Creek Road and a culvert extension of the Miller-Kelley and Cave-Gannon Ditch (Site 24MO520), which crosses Miller Creek Road. The ditch alignment, function, or use would not change.

4.15.4 Cultural Resources Impacts Alternative 2B: North Lower Miller Creek Grade-Separated Intersection

Direct Impacts

One NRHP-eligible property is located in the vicinity of Alternative 2B: the Bitterroot Branch of the Northern Pacific Railroad (Site 24MO718). The grade-separated intersection of the new North Lower Miller Creek roadway would not directly impact the railroad property. The bridge over the Bitterroot River is proposed to be lengthened to extend over the railroad and US 93. However, an easement would be required for pier or bridge abutment construction to occur within the railroad right-of-way. The new US 93 intersection occurs east of the Big Flat Canal (Site 24MO587) and, therefore, would not impact the Big Flat Canal.

Indirect Effects

No indirect effects to historic properties would occur with this alternative.

4.15.4.1 Determination of Effect

The Bitterroot Branch of the Northern Pacific Railroad (Site 24MO718) is in active use and the functioning of the rail line would be maintained during and after construction of the new roadway and bridge. The impacts associated with the addition of an overpass in the new roadway location would not adversely affect the features of this resource that define its historic character.

The Miller Creek Road Limited Improvements would require the reconstruction of the railroad crossing at Miller Creek Road. This would not adversely affect the features of this resource that define its historic character.

Lengthening the culvert of the Miller-Kelley and Cave-Gannon Ditch is not considered to be an adverse effect since it is currently culverted and the alignment of the ditch would not change.

This information, along with determinations of *no effect or no adverse effect* (with *de minimis* finding), was contained in a letter from FHWA to the State Historic Preservation Officer (SHPO) dated June 12, 2006 (see **Appendix A**). Concurrence from SHPO was received on June 27, 2006, with the determination of effect on the Bitterroot Branch of the Northern Pacific Railroad and Miller-Kelley and Cave-Gannon Ditch.

4.15.5 Cultural Resources Impacts Alternative 3B: Blue Mountain Road Grade-Separated Intersection

Direct Impacts

There are two NRHP-eligible properties and one historic property recommended to be eligible for NRHP listing are located in the vicinity of Alternative 3B: the Bitterroot Branch of the Northern Pacific Railroad (Site 24MO718), Miller-Kelley and Cave-Gannon Ditch (Site 24MO520), and the Big Flat Canal (Site 24MO587). Alternative 3B would directly impact the railroad property (Site 24MO718) by removing and consolidating two at-grade railroad crossings and adding a new one for the new roadway intersection access road (ramp) on the south side of US 93. No impacts to the Big Flat Canal (Site 24MO587) are anticipated.

Indirect Effects

No indirect effects to historic resources would occur with this alternative.

4.15.5.1 Determination of Effect

The Bitterroot Branch of the Northern Pacific Railroad (Site 24MO718) is in active use, and the functioning of the rail line would be maintained during and after construction of the new roadway and bridge. The impacts associated with the addition of an overpass, closure of two at-grade crossings, and reconstruction of the crossing at Miller Creek Road would not adversely affect the features of this resource that define its historic character.

No impacts to the Big Flat Canal would occur with this alternative.

Lengthening the culvert of the Miller-Kelley and Cave-Gannon Ditch is not considered to be an adverse effect since it is currently culverted and the alignment of the ditch would not change.

This information, along with determinations of *no effect or no adverse effect* (with a *de minimis* finding), was contained in a letter to the SHPO dated June 12, 2006 (see **Appendix A**). Concurrence from SHPO was received on June 27, 2006, with the determination of effect on the Bitterroot Branch of the Northern Pacific Railroad and Miller-Kelley and Cave-Gannon Ditch.

4.15.6 Cultural Resources Impacts Alternative 4C: South Lower Miller Creek Interchange

Direct Impacts

Two NRHP-eligible properties and one potentially NRHP-eligible cultural resource property were identified in the vicinity of the new road along the South Lower Miller Creek alignment. These are the Bitterroot Branch of the Northern Pacific Railroad (Site 24MO718), Miller-Kelley and Cave-Gannon Ditch (Site 24MO520), and the prehistoric South Miller Creek site (Site 24MO583). The prehistoric site is considered "an area of interest" by the Confederated Salish and Kootenai Tribes (CS&KT). The bridge over the Bitterroot River would span the railroad (Site 24MO718) without a direct impact. However, an easement would be required for pier or bridge abutment construction to occur within the railroad right-of-way. The South Miller Creek site would not be directly impacted.

Indirect Effects

The indirect effects would occur to the area of special interest identified by the CS&KT along the eastern bank of the Bitterroot River as a result of supportive development. Bridge and road construction activities could disturb the current condition of the vegetation and introduce construction debris to the area.

4.15.6.1 Determination of Effect

The Bitterroot Branch of the Northern Pacific Railroad (Site 24MO718) is in active use, and the functioning of the rail line would be maintained during and after construction of the new roadway and bridge. However, an easement from MRL would be required for bridge abutment or pier construction within the railroad right-of-way. The impacts associated with the addition of an overpass and crossing reconstruction at Miller Creek Road would not adversely affect the features of this resource that define its historic character.

Lengthening the culvert of the Miller-Kelley and Cave-Gannon Ditch is not considered to be an adverse effect since it is currently culverted and the alignment of the ditch would not change.

The South Miller Creek site (Site 24MO583) is eligible for listing in the NRHP. This buried campsite is located in the vicinity of Alternative 4C but would not be directly impacted by the proposed action and should be avoided during construction-related activities. Because of tribal concerns, Alternative 4C should be considered the most sensitive and least desirable build alternative with regard to cultural resource issues.

This information, along with a determination of *no effect or no adverse effect* (with a *de minimis* finding) for the Bitterroot Branch of the Northern Pacific Railroad, Miller-Kelley and Cave-Gannon Ditch, and South Miller Creek site, was contained in a letter from FHWA to the SHPO dated June 12, 2006 (see **Appendix A**). Concurrence from SHPO was received on June 27, 2006, with the determination of effect on the Bitterroot Branch of the Northern Pacific Railroad, Miller-Kelley and Cave-Gannon Ditch, and South Miller Creek site.

4.15.7 Cultural Resources Impacts Alternative 5A: Miller Creek Road At-Grade Intersection — Preferred Alternative

Direct Impacts

There are one NRHP-eligible property and one historic property recommended to be eligible for listing are located in the vicinity of Alternative 5A: the Bitterroot Branch of the Northern Pacific Railroad (Site 24MO718) and the Miller-Kelley and Cave-Gannon Ditch (Missoula Irrigation District Canal) (Site 24MO520).

The Miller Creek Road improvements would require reconstruction of the at-grade railroad (Site 24MO718) crossing.

The Miller-Kelley and Cave-Gannon Ditch (Site 24MO520) is currently culverted under Miller Creek Road. The culvert would be lengthened as the road is widened, but the alignment would not change.

Indirect Effects

No indirect effects to historic properties would occur with this alternative.

4.15.7.1 Determination of Effect

Although the Bitterroot Branch of the Northern Pacific Railroad (Site 24MO718) already has been determined eligible for listing in the NRHP, it is unlikely that the construction of Alternative 5A would constitute an adverse effect to the property as a whole. The railroad is in active use, and the functioning of the rail line would be maintained during and after construction.

This information, along with a determination of *no effect or no adverse effect* (with a *de minimis* finding) for the Bitterroot Branch of the Northern Pacific Railroad and the Miller-Kelley and Cave-Gannon Ditch was contained in a letter to the SHPO from FHWA dated June 12, 2006 (see **Appendix A**). Concurrence from SHPO was received on June 27, 2006, with the determination of effect on the Bitterroot Branch of the Northern Pacific Railroad and the Miller-Kelley and Cave-Gannon Ditch.

4.15.8 Cultural Resources Impacts and Section 4(f) *De Minimis* Summary

Table 4-35 provides a comparison of cultural resource impacts by alternative. Impacts shown for the No-Action Alternative include impacts associated with planned locally funded improvements to Miller Creek Road, which are not a part of this federally funded project. Impacts shown for Alternatives 2B, 3B, and 4C include the impacts for the intersection/interchange with US 93, the bridge crossing and new roadway, improvements on Old US 93, and the Limited Improvements on Miller Creek Road. Impacts shown for Alternative 5A include impacts on Old US 93 and Miller Creek Road.

Table 4-35
Cultural Resources Summary of Determination of Effects

Site Number	Site Name	Alt. 1 No-Action	Alt. 2B N. Lower Miller Creek Grade-Separated Intersection	Alt. 3B Blue Mtn. Rd. Grade-Separated Intersection	Alt. 4C S. Lower Miller Creek Interchange	Alt. 5A Miller Creek Rd. At-Grade Intersection (Preferred Alternative)
24MO520	Miller-Kelley and Cave-Gannon Ditch (Missoula Irrigation District)	Extension of existing culvert(1) **No effect**	Extension of existing culvert **No effect**	Extension of existing culvert **No effect**	Extension of existing culvert **No effect**	Extension of existing culvert **No effect**
24MO718	Bitterroot Branch of the Northern Pacific Railroad (MRL)	Widening of existing at-grade crossing(1) **No effect**	Bridge over railroad grade Possible pier within railroad right-of-way **No adverse effect**	Bridge over railroad grade Possible pier within railroad right-of-way **No adverse effect**	Bridge over railroad grade Possible pier within railroad right-of-way **No adverse effect**	Widening of existing at-grade crossing **No effect**
24MO587	Big Flat Canal	No impact	No impact	No impact	No impact	No impact
24MO583	Prehistoric Encampment South Miller Creek Site	**No Effect**	**No Effect**	**No Effect**	No direct impact construction in the vicinity **No effect**	**No effect**

(1) = Impacts associated with the City of Missoula and Missoula County's locally funded improvements to Miller Creek Road.

The FHWA has requested concurrence from the Montana SHPO for a determination of effect to historic resources that would result from implementation of the build alternatives. The FHWA also requested that the SHPO concur with the decision to use *de minimis* for purposes of Section 4(f) of the Department of Transportation Act, as recently amended by Congress. The FHWA is also consulting with the SHPO pursuant to the Section 106 of the National Historic Preservation Act (NHPA) on the potential effects to historic resources for the build alternatives.

The FHWA has determined that the impacts to the historic properties, while causing *no effect* or *no adverse effect* for purposes of the National Historic Preservation Act (NHPA), would nonetheless be *uses* for purposes of Section 4(f) because they would require the permanent incorporation of small areas of Section 4(f) land into highway right-of-way. Congress recently amended Section 4(f) by adding a new subsection that authorizes the FHWA to approve a project that uses Section 4(f) lands that are part of a historic property, without preparation of an Avoidance Analysis, if it makes a finding that such uses would have *de minimis* impacts upon the resource. The

FHWA has received concurrence from the SHPO that the uses of historic Section 4(f) properties that would be affected would cause *no effect* or *no adverse effect* for purposes of Section 106 of the NHPA (see **Appendix A**). Based on these determinations, FHWA has determined that a *de minimis* finding satisfies the Section 4(f) provisions added by Section 6009 of SAFETEA-LU at 23 U.S.C. § 138(b)(2)(A) and 49 U.S.C. § 303(d)(2)(A). These findings reflect a conclusion that for each Section 4(f) historic resource impacted, those impacts will not alter, directly or indirectly, any of the characteristics of [the] historic property that qualify the property for inclusion in the National Register in a manner that would diminish the integrity of the property's location, design, setting, materials, workmanship, feeling, or association.

The historical property impact assessment reflects the use of *de minimis* with regards to the Section 4(f) assessment and, therefore, eliminates a separate Section 4(f) individual resource evaluation.

4.15.9 Cultural Resources Mitigation

No mitigation measures are identified for cultural resources.

In the event that previously unrecorded cultural material is found during construction, activities in the immediate area will be halted and the project archaeologist will be contacted to assess the find.

4.16 Hazardous Waste Impacts and Mitigation

Hazardous waste sites are regulated by the Resource Conservation and Recovery Act (RCRA) and the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA). The potential for encountering hazardous waste and/or hazardous materials during construction was evaluated for the Miller Creek Road EIS. A Phase I Environmental Site Assessment was conducted in August 2003 and updated in November 2004. The objective of the Phase I Environmental Site Assessment was to identify recognized environmental conditions in connection with the project area.

For a complete description of hazardous waste sites identified in the project area and their locations, please refer to Section 3.16, page 3-80 and **Figure 3-21, page 3-81**.

4.16.1 Hazardous Waste Impacts Alternative 1-No-Action

While there are no federally funded transportation projects with the No-Action Alternative, the locally funded improvements to Miller Creek Road could impact the following hazardous waste sites:

- Site #4: MRL right-of-way. This site is listed as a State Hazardous Waste Site.
- Site #18: 4595 Miller Creek Road—residence with underground storage tank (UST).

4.16.2 Hazardous Waste Impacts on Old US 93 and Adjacent Intersections Common to All Build Alternatives

Direct Impacts

Improvements to Old US 93 and adjacent intersections are common to all of the build alternatives. Construction of any build alternative could affect the following hazardous waste sites located along Old US 93:

- Site #14: 3848 Brooks Street—Big O Tire, leaking underground storage tank (LUST) site.
- Site #15: 3943 Brooks Street—Bitterroot Motors, LUST site.
- Site #17: 4055 US 93 South—gas station and convenience store with UST.

Table 4-36
Impacted Hazardous Waste Sites

	Alternative				
Site No.	No-Action	2B	3B	4C	5A (Preferred Alternative)
4	●	●	●	●	●
6			●		
7			●		
8			●		
11				●	
13				●	
14		●	●	●	●
15		●	●	●	●
16			●		
17		●	●	●	●
18	●	●	●	●	●
Total Sites Impacted	2	5	9	7	5

All alternatives within the project area have a moderate environmental risk. A moderate risk rating denotes that there are known or suspected environmental concerns that may warrant further investigation. The amount of further investigation would depend on the extent of the construction disturbance created by the alternative. These conclusions were based on a limited site inspection and research of public documents pertaining to the project area. Conclusions drawn by others from the results of this assessment should recognize the limitations of the methods used.

Table 4-36 lists hazardous waste sites impacted by each alternative.

Indirect Effects

Indirect effects to the hazardous waste sites along Old US 93 and adjacent intersections due to new development are not expected because the area is fully developed.

4.16.3 Hazardous Waste Impacts Common to Bridge Alternatives (2B, 3B, 4C)

Direct Impacts

All the bridge alternatives would impact one potential hazardous waste site during construction activities for the new or reconstructed intersection or interchange with US 93. This is Site #4 (MRL right-of-way), which is listed as a State Hazardous Waste Site.

Miller Creek Road Limited Improvements

The Miller Creek Road Limited Improvements would impact the following potential hazardous waste sites:

- Site #4: MRL right-of-way, where the railroad crosses Miller Creek Road. The MRL is listed as a State Hazardous Waste Site.
- Site #18: 4595 Miller Creek Road—residence with UST.

Indirect Effects

Indirect effects to hazardous waste sites are not expected since the areas adjacent to Miller Creek Road are fully developed.

4.16.4 Hazardous Waste Impacts Alternative 2B: North Lower Miller Creek Grade-Separated Intersection

Direct Impacts

No known hazardous waste sites are located in the intersection/interchange area at US 93 and the new North Lower Miller Creek roadway.

Indirect Effects

No indirect effects are anticipated since the only hazardous waste sites for this alternative are along Miller Creek Road and minimal to no supportive development is anticipated.

4.16.5 Hazardous Waste Impacts Alternative 3B: Blue Mountain Road Grade-Separated Intersection

Direct Impacts

Alternative 3B would impact the following potential hazardous waste sites because they are in the vicinity of the reconstructed intersection with US 93 and the Blue Mountain Road extension:

- Site #6: 5120 US 93 South—Superior Hardwoods & Millwork. May require further investigation regarding any chemicals stored at facility and building material itself (i.e., asbestos-containing materials).
- Site #7: 5050 US 93—auto salvage yard.
- Site #8: 5055 US 93 South—trailer salvage yard.
- Site #16: 4985 Blue Mountain Road—drums containing unknown contents.

This alternative appears to impact or may require acquisition of commercial properties, such as an automobile salvage yard or the railroad. Inspections of buildings or contents were not within the scope of this EIS process. Sites #6 and #7 were not found on any hazardous waste lists. The Blue Mountain Road alignment would include the closure of two existing railroad (Site #4) crossings, reconstruction of another railroad crossing, and construction of the bridge crossing over the railroad.

Indirect Effects

Indirect effects would be associated with redevelopment of the US 93 intersection area near hazardous waste sites.

4.16.6 Hazardous Waste Impacts Alternative 4C: South Lower Miller Creek Interchange

Direct Impacts

Alternative 4C would impact the following potential hazardous waste sites because they are in the vicinity of the new US 93 interchange and new roadway:

- Site #11: 5655 US 93 South—former heating oil UST located at this site.
- Site #13: 5850 US 93 South—former heating oil UST located at this site.

Sites #11 and #13 have had a residential fuel tank removed and have a MDEQ "No Further Action" status or no other information was available. They are not registered as LUSTs, and therefore, pose a low threat under this alternative. Further investigation of the reports on file with the state should be conducted to determine whether contamination has been documented in areas where improvements are planned.

Indirect Effects

Indirect effects would be associated with redevelopment of the US 93 interchange area near hazardous waste sites.

4.16.7 Hazardous Waste Impacts Alternative 5A: Miller Creek Road At-Grade Intersection — Preferred Alternative

Direct Impacts

Construction activities associated with Alternative 5A could impact the following hazardous waste sites adjacent to Miller Creek Road:

- Site #4: MRL right-of-way, where the railroad crosses Miller Creek Road. The MRL is listed as a State Hazardous Waste Site.
- Site #18: 4595 Miller Creek Road—residence with UST.

Indirect Effects

Indirect effects to hazardous waste sites are not expected since the areas adjacent to Miller Creek Road and Old US 93 are fully developed.

4.16.8 Hazardous Waste Impacts Summary

Table 4-37 provides a comparison of hazardous waste site impacts by alternative. Impacts shown for the No-Action Alternative include impacts associated with planned locally funded improvements to Miller Creek Road, which are not a part of this federally funded project. Impacts shown for Alternatives 2B, 3B, and 4C include the impacts for the intersection/interchange with US 93, the bridge crossing and new roadway, improvements on Old US 93, and the

Limited Improvements on Miller Creek Road. Impacts shown for Alternative 5A include impacts on Old US 93 and Miller Creek Road.

Table 4-37
Hazardous Waste Impacts Summary

Hazardous Waste Evaluation Criteria	Alt. 1 No-Action	Alt. 2B N. Lower Miller Creek Grade-Separated Intersection	Alt. 3B Blue Mtn. Rd. Grade-Separated Intersection	Alt. 4C S. Lower Miller Creek Interchange	Alt. 5A Miller Creek Rd. At-Grade Intersection (Preferred Alternative)
Number of hazardous waste sites potentially impacted	2	5	9	7	5

4.16.9 Hazardous Waste Mitigation

To mitigate direct impacts to hazardous waste sites, further environmental investigation of the properties with potential environmental risks will be conducted prior to construction of the proposed action. If it appears that these hazardous waste sites will be within or directly adjacent to the area of disturbance or property acquisition is planned, then Phase II soil and groundwater sampling will be completed. Further investigation may consist of a regulatory report review to determine if any contamination plumes caused from the above-referenced sites will be encountered during construction, or that the appropriate regulatory agency considers the contamination to be remediated to the extent of requiring no further remedial action. Prior to any demolition activities, formal asbestos-containing material and lead-based paint surveys will be performed by a certified professional.

If the removal of any USTs and/or UST systems is required, the removal work will be conducted as per the Montana Code Annotated 75-10-701 et seq., Comprehensive Environmental Cleanup and Responsibility Act (CECRA); and Administrative Rules of Montana (ARM) Title 17, Chapter 58 and Chapter 56, Sub-Chapters 5, 6, and 7, Rule 17.56.702, Permanent Closure and Changes-In-Service. This rule provides specific procedures for the closure and handling of a UST system and associated materials, and provides procedures for the proper management of workers and public safety during construction.

Special provisions will detail proper handling of anticipated and unanticipated contaminated materials during the construction phase of the project. A site-specific Health and Safety Plan will be required as part of the contractor submittals for work involving known contaminated materials. Any excavation, pumping, and/or dewatering activities of contaminated soils or waters will require proper treatment and disposal.

Mitigation required for indirect effects associated with potential new development in the project area is the responsibility of the developers who are required to conduct risk assessments prior to site development.

4.17 Visual Impacts and Mitigation

Visual impacts of the proposed transportation improvements were determined by comparing conceptual design plans with the existing visual character features documented in photographs and field visits.

4.17.1 Visual Impacts Alternative 1: No-Action

The No-Action Alternative does not include any federally funded projects as part of this project. However, it does include the locally funded improvements to Miller Creek Road. The resulting visual impacts could have loss of vegetation and conversion of land to a transportation use. The City of Missoula and Missoula County agree the improvements would be consistent with current boulevard standards with urban treatments.

4.17.2 Visual Impacts on Old US 93 and Adjacent Intersections Common to All Build Alternatives

Improvements along Old US 93 and adjacent intersections are the same with all of the build alternatives. The typical section for Old US 93 includes a curb and gutter with sidewalk and bike lane.

The widening of Old US 93 in the area of the Missoula Country Club would impact portions of the vegetative hedge that is located along the southern property line of the Missoula County Club golf course. Low retaining walls approximately three feet high would be installed to minimize impacts to the Missoula Country Club property.

The visual impacts also include the widened pavement along Old US 93 and Brooks/Reserve Streets. A retaining wall is committed to along the Larchmont Golf Course property to avoid Section 4(f) impacts.

4.17.3 Visual Impacts Common to Bridge Alternatives (2B, 3B, 4C)

Direct Impacts

The visual impacts common to the bridge alternatives are from the bridge over the Bitterroot River and over US 93. The bridge would introduce a new structure and cause partial obstruction of the view of downstream from a river floater's viewpoint. Although bridge design style has not been determined, it would likely be similar to other recent bridges in the area. The bridge is proposed to be long enough to include a 20-foot envelope for a recreation trail on the southern bank of the river and would have enough height clearance to accommodate equestrian use. This longer bridge would minimize the impact to streamside wetlands and riparian vegetation, which will maintain the natural river character. The bridge length would cross US 93, the railroad, the land between the railroad and the river, and the Bitterroot River. The bridge would create some shading at various times of the day. Bridge piers and columns would likely interrupt some views. For motorists traveling on US 93, the bridge over US 93 would interrupt some views.

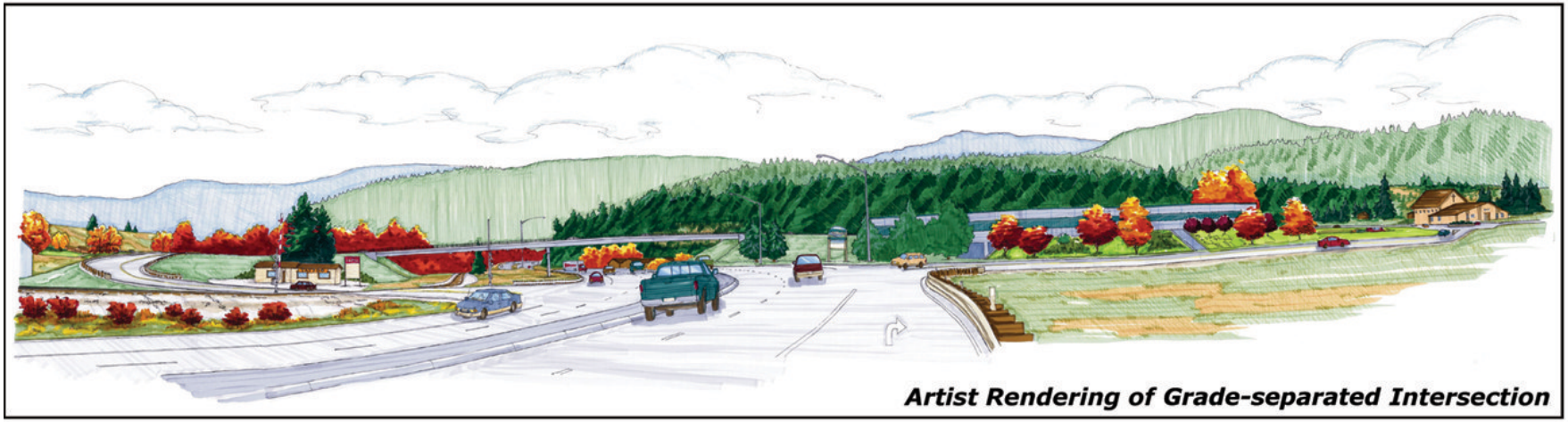
An artist’s rendering that illustrates an example of a grade-separated intersection at US 93 and Blue Mountain Road is shown on **Figure 4-9** to represent conditions for the bridge alternatives.

Indirect Effects

Indirect effects to visual conditions would result from road construction activities and any new supportive development that would occur in the intersection area. Visual conditions associated with supportive development and/or indirect development at the connection with US 93 could include commercial signs, additional paved areas for parking and/or circulation, landscaped area, utilities and lighting, varied architectural styles, building heights and colors, and the potential for varied commercial and residential developments. Supportive and/or indirect development

Figure 4-9
Visual Simulation of Grade-Separated Intersection

Photo of Existing Conditions



Artist Rendering of Grade-separated Intersection

at the intersection of the new road with the existing Lower Miller Creek Road and/or Old Bitterroot Road may include commercial or development signs, utilities and lighting, paved areas for parking and/or circulation, and landscaped area.

Examples of supportive development that could occur in the project area are depicted in **Photos A** and **B**:

Photo A

Photo B

Examples of typical supportive development occurring at intersections.

Miller Creek Road Limited Improvements

Visual impacts related to the Miller Creek Road Limited Improvements would include an increased pavement width for additional lanes along Miller Creek Road. The widening would be minor but noticeable in addition to what is proposed by the City of Missoula and Missoula County locally funded project. There would be additional loss of vegetation by conversion of landscaped areas to a transportation use and loss of private property. However, the typical section would be consistent with the County's standard boulevard treatment and include some landscape buffer areas, sidewalk, and bike lanes as public amenities. The intersection improvements would be very similar to that which exist today.

4.17.4 Visual Impacts Alternative 2B: North Lower Miller Creek Grade-Separated Intersection

Direct Impacts

Visual impacts unique to Alternative 2B include a new road along the North Lower Miller Creek alignment into Miller Creek area. The road extension from US 93 over the railroad would be a new alignment and cause a new construction impact. In the near-term, the residence west of the proposed road extension and north of the Bitterroot River would experience a new source of traffic adjacent to their home and loss of trees resulting from the road construction, right-of-way clearing, and grading. The road extension south of the Bitterroot River would be a new alignment and cause a new construction impact. In the near term, the residences east of the proposed road extension would experience a new source of traffic near their homes. Construction is expected to require cut and fill grading to achieve the desired profile. A landscaped median is initially proposed for the new road, consistent with local boulevard standards.

The grade-separated intersection at US 93 and the North Miller Creek alignment would include grading and fill material to transition the grade from the bridge to an at-grade signal. The project impacts include loss of grass-vegetated open land due to clearing and grading.

Indirect Effects

No additional indirect effects would occur beyond those discussed in Section 4.17.3, page 4-139.

4.17.5 Visual Impacts Alternative 3B: Blue Mountain Road Grade-Separated Intersection

Direct Impacts

The visual impacts associated with the Blue Mountain Road extension include displacement of some landscaping adjacent to the Montana Athletic Club and Blue Mountain Business Center. The Blue Mountain Road extension from US 93 over the railroad would be a new alignment and create a new construction impact. The existing business may be displaced by construction of the new Blue Mountain Road extension south. The road extension south of the Bitterroot River would be a new road with typical roadway amenities, such as signing. The rural residences located east and west of the proposed road extension would experience visually a new source of traffic near their homes. Construction is expected to require cut and fill grading to achieve the desired profile which would impact vegetation and topography. There would be additional new signing for Blue Mountain Road extension south into the Miller Creek area.

Miller Creek and other traffic would access US 93 at an intersection from the north offset on the east side of the Montana Athletic Club. The access road grade would transition to the grade from a bridge structure to the at-grade right in/right out intersection on the north. The east and north views out of the Montana Athletic Club would be maintained, but would include additional pavement from the intersection access road. On the south of US 93, grading and fill material would impact a number of properties. The land between the railroad and the river would include a filled area to accommodate the access road. Some highway elements that may be included as part of this alternative are median barrier and "No left turn" signs at each of the right in/right out intersections with US 93. No signal is included with this alternative.

Indirect Effects

No additional indirect effects would occur beyond those discussed in Section 4.17.3, page 4-139.

4.17.6 Visual Impacts Alternative 4C: South Lower Miller Creek Interchange

Direct Impacts

The visual impacts associated with Alternative 4C include the new road along the South Lower Miller Creek alignment into Miller Creek area and an interchange at US 93.

The road extension from US 93 over the railroad would be a new alignment and new construction impact. Current development plans for the land on the eastern bank of the river include residential home sites. The new road would connect into the roadway network proposed with this future development.

The US 93 interchange includes loop (partial clover) ramps on the east and west side of US 93. These ramps would displace numerous residences, businesses, and vegetation. The interchange loop ramps would be partially elevated on fill slope, then transition to a structure to intersect with the bridge over US 93. On the east side of US 93, grading and fill material to approximately 20 feet in height would visually impact a number of properties where the northbound on ramp and local access for the existing trailer home community connect with the new road along the

South Lower Miller Creek alignment. Some land between the northbound on ramp and the railroad would become vacant as a result of the businesses being displaced because of loss of access. In addition, existing residences in the Hayes Creek Road area and US 93 users would have a direct view of the new interchange at US 93.

Indirect Effects

No additional indirect effects would occur beyond those discussed in Section 4.17.3, page 4-139.

4.17.7 Visual Impacts Alternative 5A: Miller Creek Road At-Grade Intersection — Preferred Alternative

Direct Impacts

Visual impacts unique to the widening of Miller Creek Road as part of Alternative 5A would include the increased pavement width viewed by adjacent residents and regular motorists. Loss of vegetation would be evident along Miller Creek Road because of road widening. Missoula County standards for boulevard treatments, which include vegetative buffers, would be utilized.

The at-grade intersection at US 93 and Miller Creek Road would look similar to the existing intersection, with additional signage and a signal at the north "Y."

Some grade modifications to accommodate proposed road profiles and cross-sections would along Miller Creek Road, Lower Miller Creek Road, and Upper Miller Creek Road.

Indirect Effects

Indirect effects would be minimal because the area is already being developed and minimal supportive development is likely.

4.17.8 Visual Impacts Summary

Table 4-38 provides a comparison of visual impacts by alternative. Impacts shown for the No-Action Alternative include impacts associated with planned locally funded improvements to Miller Creek Road, which are not a part of this federally funded project. Impacts shown for Alternatives 2B, 3B, and 4C include the impacts for the intersection/interchange with US 93, the bridge crossing and new roadway, improvements on Old US 93, and the Limited Improvements on Miller Creek Road. Impacts shown for Alternative 5A include impacts on Old US 93 and Miller Creek Road.

4.17.9 Visual Mitigation

Mitigation measures for direct impacts to the visual character resulting from the construction of the build alternatives could include:

- Bring architectural interest or color into retaining wall design, bridges and other structural features to blend with natural surroundings and/or complement images or entry themes consistent with the project area development.
- Design all new structures, signing, lighting, etc., related to future highway improvements to be consistent with local standards and guidelines, and safety specifications.

Table 4-38
Visual Impacts Summary

Visual Evaluation Criteria	Alt. 1 No-Action	Alt. 2B N. Lower Miller Creek Grade-Separated Intersection	Alt. 3B Blue Mtn. Rd. Grade-Separated Intersection	Alt. 4C S. Lower Miller Creek Interchange	Alt. 5A Miller Creek Rd. At-Grade Intersection (Preferred Alternative)
Visual Impacts: Old US 93 Improvements	None	Widening for Old US 93 impacts Missoula Country Club and Golf Course vegetative hedge; one- to three-foot high retaining wall along Missoula Country Club property; widened pavement along Old US 93 and Brooks/ Reserve Streets; retaining wall along the Larchmont Golf Course property.	Same as Alt. 2B	Same as Alt. 2B	Same as Alt. 2B
Visual Impacts: Bridge Alternatives	None	New bridge structure may block views and cause shading beneath it; length of bridge accommodates recreation trail and wildlife corridor.	Same as Alt. 2B	Same as Alt. 2B	None
Visual Impacts: Miller Creek Road	Locally funded project would cause some vegetation loss due to wider pavement; north 'Y' intersection would be reconfigured.	Limited Improvements along Miller Creek Rd. would cause additional loss of some vegetation and convert land to a transportation use resulting in wider pavement; includes sidewalk and bike lanes with boulevard treatment.	Same as Alt. 2B	Same as Alt. 2B	Same as Miller Creek Limited Improvement, with the exception of a wider pavement section due to additional lanes.

- Revegetate disturbed areas as soon as practicable consistent with adjacent landscape features and with desirable species, while adhering to safety requirements necessary in clear zones. Coordinate with local municipalities and other landowners to replace important landscaping features lost to construction impacts. New landscaping will be consistent with City of Missoula and Missoula County boulevard landscaping standards.
- Where the vegetative hedge is impacted on Missoula Country Club property, replacement vegetation will be coordinated with the property owner during final design. Where vegetation exists on public property, the vegetation will be maintained where feasible and practicable.

4.18 Parks and Recreation Impacts and Mitigation

This section describes impacts to parks and recreation facilities within the project area. Parks and recreation opportunities are heavily dependent on the existing and future transportation network. Over the next 20 years, parks and recreation sites located near the project area would attract a growing number of visitors, because of the general growth in Missoula, Missoula County, and the Bitterroot Valley.

For purposes of the Section 4(f) evaluation analysis, four publicly owned properties within the alternative's impact areas were considered protected under Section 4(f), two of which are undeveloped as of the writing of this document. An undeveloped park/common area has been platted to be developed as part of the new Maloney Ranch development. It has been referred to as the Maloney Ranch Future Park. One property includes four undeveloped parcels totaling approximately 98 acres owned by Montana Fish, Wildlife and Parks (MFWP) located along the Bitterroot River. There are no plans or funding for formal development of these parcels. The publicly owned Larchmont Golf Course, which is also known as the Missoula County Municipal Golf Course, is located along Old US 93. The Blue Mountain Recreation Area is a part of the Lolo National Forest and is located north of the study area along Blue Mountain Road. Because the Missoula Country Club, located along Old US 93, and the Linda Vista Golf Course are privately owned, they were not considered Section 4(f) resources. A retaining wall has been utilized along Old US 93 to avoid and minimize impacts to the Larchmont Golf Course and Missoula Country Club.

There were no direct use or constructive use identified that would cause substantial impairment for any of these public park or public recreation areas and, therefore, no formal Section 4(f) evaluation documented in this FEIS.

4.18.1 Parks and Recreation Impacts Alternative 1: No-Action

No direct impacts or indirect effects, such as enhanced access to regional recreation areas or parks and recreation resources in the project area, would occur as a result of the No-Action Alternative. The Maloney Ranch future park may be developed as part of the anticipated Miller Creek build-out.

4.18.2 Parks and Recreation Impacts on Old US 93 and Adjacent Intersections Common to All Build Alternatives

Improvements along Old US 93 and adjacent intersections are the same with all of the build alternatives. The widening along Old US 93 borders Missoula Country Club (private golf course) and the Larchmont Golf Course (also known as the Missoula County Municipal Golf Course, a public facility). Improvements would include a sidewalk and bike lane along Old US 93 and curb and gutter along both sides of the roadway (see **Figure 2-5, page 2-19**).

Approximately 0.2 acre of right-of-way would be acquired from the privately owned Missoula Country Club for the widening of Old US 93.

Missoula Country Club golf course holes eight and nine would not be impacted with the Old US 93 improvements nor in the area of the eighth and ninth hole tee boxes or fairways. To the west of the Missoula Country Club entrance drive, adjacent to the parking area, the proposed improvements to Old US 93 would extend approximately 30 feet onto Missoula Country Club property for the distance between the driveway and US 93 right-of-way due to the addition of turn lanes at the intersection of Old US 93 and US 93. This will impact the entrance drive and landscaping. However, the parking area and parking spaces will be not disturbed. Where vegetation exists on public property, the vegetation will be maintained where feasible and practicable.

Final design activities will include details for modified driveways and entrances to properties affected by construction. The details for a modified entrance to Missoula Country Club would consider the delivery truck-sized vehicle turning radii. Impacts to the Missoula Country Club associated with the modified Old US 93 Design are shown in **Figure 4-7, page 4-60**.

No impacts to the Larchmont Golf Course are anticipated. A short (one to three feet in height) retaining wall would be incorporated into the final design of the proposed action to avoid the Larchmont Golf Course, a Section 4(f) property.

4.18.3 Park and Recreation Impacts Common to Bridge Alternatives (2B, 3B, 4C)

Direct Impacts

There are no direct impacts to any current public parks or future planned and funded public parks located in the vicinity of the bridges or new roadway alignments. Access to parks and recreation destinations for bicyclists and pedestrians would be expected to be improved with any of the bridge and new roadway alternatives as connector roads and access are improved. However, a future open space/common area is proposed to be located immediately southwest of the intersection of the new road along the North Lower Miller Creek alignment and Lower Miller Creek Road (see **Figure 4-10**). No direct impacts to public facilities would occur. The right-of-way for the proposed intersection on Lower Miller Creek Road would be in close proximity to the proposed public park in this area. This park is being built as part of the Maloney Ranch Development and would be deeded to the City of Missoula.

The Lolo National Forest land southeast of the project area would not be affected directly by the project from a parks and recreation perspective.

The proposed action includes a longer bridge length over the Bitterroot River to accommodate a 20-foot wide envelope for a trail under the bridge along the southern bank of the Bitterroot River. The trail would be constructed and maintained by others.

Indirect Effects

Providing a second access between US 93 and the Miller Creek area may result in accelerated land development within the Miller Creek area and additional traffic to USFS land. This, in turn, could indirectly increase usage numbers at the Blue Mountain Recreation Area north of the highway and the other recreation amenities in the Lolo National Forest northwest of the highway. This increase is expected to be minimal since access already exists from US 93 to the Lolo National Forest. None of the build alternatives would provide a direct access to the Lolo National Forest land.

Indirect noise effects to the future planned Maloney Ranch Park would be approximately 7-8dBA increase over existing levels with Alternative 2B, but below the FHWA NAC of 66 dBA (see **Table 4-24, page 4-82** for receptors modeled near the future park). This indirect impact would not substantially impair the use of the park and therefore is not considered a constructive use.

Miller Creek Road Limited Improvements

There are no public park or public recreation areas directly impacted by the Miller Creek Road Limited Improvements. The improvements would include addition of a sidewalk and bike lane constructed adjacent to Miller Creek Road.

Figure 4-10
Alternative 2B: North Lower Miller Creek Grade-Separated Intersection at the Maloney Ranch Future Park

4.18.4 Parks and Recreation Impacts Alternative 2B: North Lower Miller Creek Grade-Separated Intersection

Direct Impacts

A future public open space/common area is proposed to be located immediately southwest of the intersection of the new road along the North Lower Miller Creek alignment and Lower Miller Creek Road (see **Figure 4-10**). No direct impacts would occur. The right-of-way for the proposed intersection on Lower Miller Creek Road would be in close proximity to the proposed public park in this area. This park is being built as part of the Maloney Ranch Development and would be deeded to the City of Missoula.

Indirect Effects

There is a potential for indirect effects to the future Maloney Ranch open space with the new roadway associated with Alternative 2B. These indirect effects could incur a constructive use under Section 4(f) only if they are deemed a substantial impairment to the use of the property. The proposed new road and the intersection would be directly east of the future park parcel potentially increasing the noise levels (approximately 7-8dBA, but below the 66 dBA NAC) and traffic near the future park (named future Maloney Ranch open space). Because the park is not existing, but planned, and no site plans have been identified, the activities are assumed to consist of open space, bike path, and an active playground use area. This park would be categorized as Activity Category B of the NAC with a noise threshold of 66 dBA. The above indirect effects are considered minor and would not impair the use of the park or constitute "constructive use" of a Section 4(f) property.

4.18.5 Parks and Recreation Impacts Alternative 3B: Blue Mountain Road Grade-Separated Intersection

Direct Impacts

The Blue Mountain Road extension would be located considerably east of the undeveloped Maloney Ranch future park, as shown on **Figure 4-11**. Access to the parcel would be enhanced by Alternative 3B. There are no direct impacts to this property.

Two properties owned by the MFWP (Buckhouse Bridge Boat Camp and Parcel 4) are located immediately southwest of Alternative 3B alignment and adjacent to the Bitterroot River. There would be no direct impacts to these properties with this alternative. Three MFWP sites along this stretch of the Bitterroot River are currently used for informal fishing access; however, there is no formal public access. Discussions have taken place with MFWP representatives regarding the incorporation of a formal fishing access to Parcel 4 as part of the bridge construction; however, there are no plans or funding for these improvements. The alternative includes a longer bridge length over the Bitterroot River to accommodate a 20-foot-wide envelope for a trail under the bridge along the southern bank of the Bitterroot River. The trail would be constructed and maintained by others. No direct impacts to the Blue Mountain Recreation Area are expected.

Indirect Effects

Minor indirect noise effects to the future Maloney Ranch Open Space may occur as a result of Alternative 3B. Providing a second access between US 93 and the Miller Creek area may result in

Figure 4-11
Alternative 3B: Blue Mountain Road Grade-Separated Intersection at the Maloney Ranch Future Park

accelerated land development within the Miller Creek area and additional traffic to USFS land. This, in turn, could indirectly increase usage numbers at the Blue Mountain Recreation Area north of the highway and the other recreation amenities in the Lolo National Forest northwest of the highway. This increase is expected to be minimal since access already exists from US 93 to the Lolo National Forest. None of the build alternatives would provide a direct access to the Lolo National Forest land.

There may be indirect effects to the MFWP-owned Parcel 4 caused by the increased noise from nearby traffic and changes to the visual character of the river corridor from the new bridge crossing. However, these would not hinder the use of the property or constitute "constructive use" of a Section 4(f) property.

4.18.6 Parks and Recreation Impacts Alternative 4C: South Lower Miller Creek Interchange

Direct Impacts

There would be no direct impacts to any public parks or public recreation resources under Alternative 4C, as shown on **Figure 4-12**. However, this alternative would bisect one of the parcels designated as a conservation easement along the Bitterroot River. The conservation easement runs along the east bank of the Bitterroot River. The intent of the conservation easement is to provide open space value for residents of the Miller Creek area. While this interchange option would not preclude the use of this parcel as a conservation easement, it could depreciate the open space value of the parcel by having a bridge and new road running through it.

The bridge across the Bitterroot River would be in close proximity to the northernmost MFWP Parcel 4 on the north/west side of the Bitterroot River owned by the MFWP. The alternative includes a longer bridge length over the Bitterroot River to accommodate a 20-foot-wide envelope for a trail under the bridge along the southern bank of the Bitterroot River. The trail would be constructed and maintained by others.

Indirect Effects

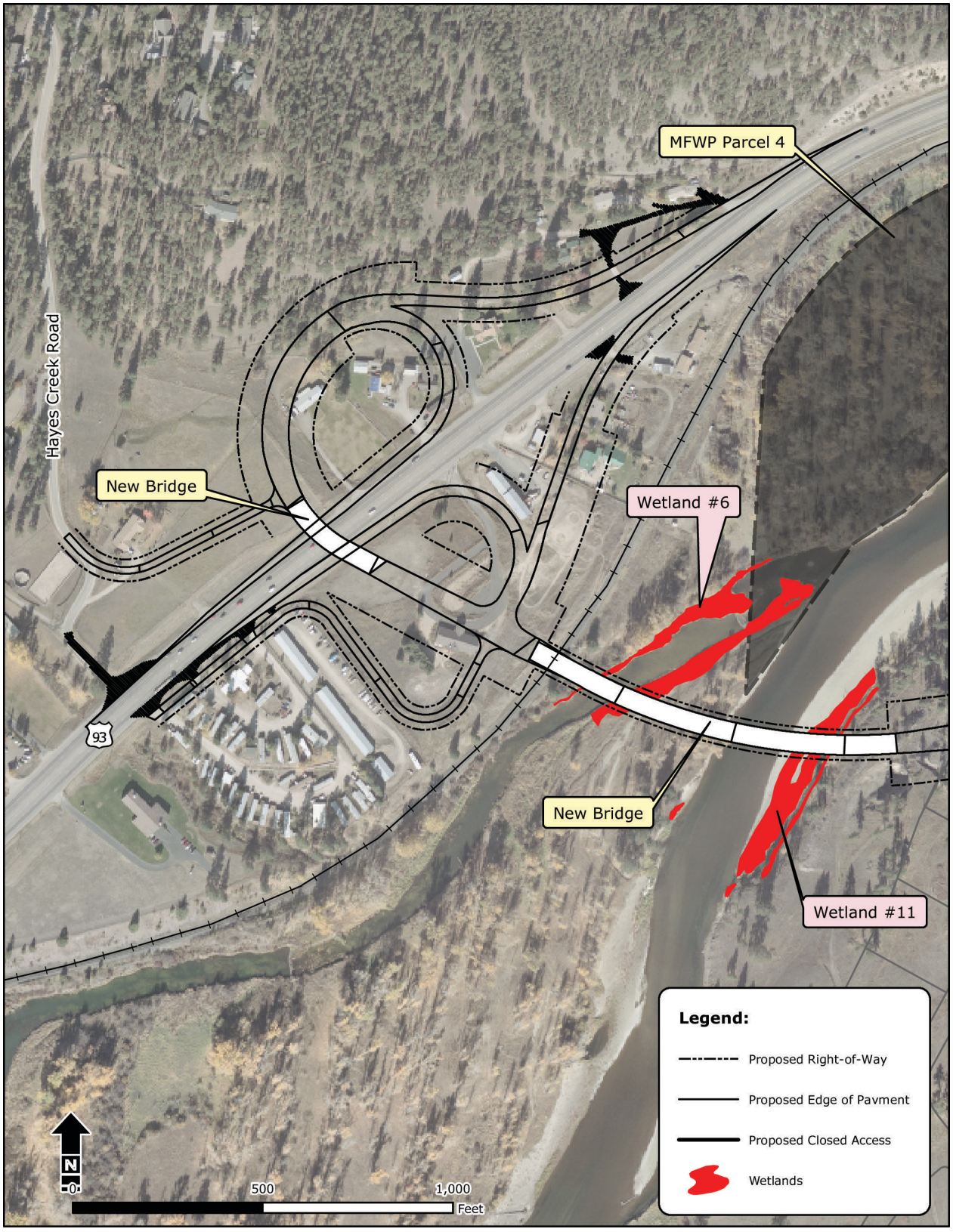
There may be indirect effects to the MFWP-owned Parcel 4 caused by the increased noise from nearby traffic and changes to the visual character of the river corridor from the new bridge crossing.

4.18.7 Parks and Recreation Impacts Alternative 5A: Miller Creek Road At-Grade Intersection — Preferred Alternative

Direct Impacts and Indirect Effects

Under Alternative 5A, improvements to Miller Creek Road would provide improved access to park and recreation properties in the project area. There are unavoidable direct impacts to the Missoula Country Club entrance drive and the landscaped hedge along Old US 93. The widening of Miller Creek Road includes the addition of sidewalks and bike lanes (see typical section, **Figure 2-5, page 2-19**). There would be no direct or indirect effects to the future Maloney Ranch Park associated with Alternative 5A.

Figure 4-12
Alternative 4C: South Lower Miller Creek Interchange, MFWP Parcel 4



4.18.8 Parks and Recreation Impacts Summary

Table 4-39 provides a summary of parks and recreation impacts. Impacts shown for the No-Action Alternative include impacts associated with planned locally funded improvements to Miller Creek Road, which are not a part of this federally funded project. Impacts shown for Alternatives 2B, 3B, and 4C include the impacts for the intersection/interchange with US 93, the bridge crossing and new roadway, improvements on Old US 93, and the Limited Improvements on Miller Creek Road. Impacts shown for Alternative 5A include impacts on Old US 93 and Miller Creek Road.

Table 4-39
Parks and Recreation Impacts Summary

Parks and Recreation Evaluation Criteria	Alt. 1 No-Action	Alt. 2B N. Lower Miller Creek Grade-Separated Intersection	Alt. 3B Blue Mtn. Rd. Grade-Separated Intersection	Alt. 4C S. Lower Miller Creek Interchange	Alt. 5A Miller Creek Rd. At-Grade Intersection (Preferred Alternative)
Direct conversion of park land use and indirect effects	None	No impacts to Lolo National Forest or Blue Mtn. Recreation Area. Minor indirect effects related to noise at future Maloney Ranch Park.	No impacts to Lolo National Forest or Blue Mtn. Recreation Area. Indirect effects to Buckhouse Bridge Boat Camp and MFWP Parcel 4.	No impacts to Lolo National Forest or Blue Mt. Recreation Area. Indirect effect to MFWP Parcel 4.	No impacts to Lolo National Forest or Blue Mtn. Recreation Area.
Old US 93 and Adjacent Intersections Impacts	None	Missoula Country Club landscaping and entrance drive. No impact to Larchmont Golf Course.	Same as Alt. 2B.	Same as Alt. 2B.	Same as Alt. 2B.

4.18.9 Parks and Recreation Mitigation

Where the vegetative hedge is impacted on Missoula Country Club property, replacement vegetation will be coordinated with the property owner during final design.

Design and construction of any improvements along Old US 93 would include appropriate signage to alert drivers on Old US 93. Such signage could likely include a "Do Not Block Driveway" sign on Old US 93 to alert southbound (westbound) drivers of the need to maintain access to the Missoula Country Club driveway. A traffic management plan may be needed if large events like tournaments are expected to start or end during rush hour. This is true of all alternatives.

4.19 Construction Impacts and Mitigation

4.19.1 Construction Impacts Alternative 1: No-Action

The No-Action Alternative would involve construction impacts related to the reasonably foreseeable projects that are currently planned, programmed, approved, and funded by FHWA, MDT, the City of Missoula, and Missoula County. Construction of the No-Action Alternative would include clearing, grading, surfacing, drainage, and signal installation work. Additional work would involve sidewalk, curb and gutter, signing and striping, and landscaping work. Road closures would be kept to a minimum and access to and from Miller Creek area would be maintained at all times. This would require temporary disruption of traffic along Miller Creek Road, and Upper and Lower Miller Creek Roads.

4.19.2 Construction Impacts Common to All Build Alternatives

The construction contractor would determine construction methods during or after development of the final construction plans. In general, highway construction could involve the following types of action: pile driving and bridge construction; excavation and grading; new roadway construction with a paved surface; signal construction; curb and gutter and sidewalks; landscaping; culvert modifications; irrigation ditch relocations; utility relocations; placement of retaining walls, storm sewers; and pavement.

This section discusses construction impacts that may occur with any of the build alternatives. Construction along US 93, interchange/intersection construction and bridge construction create the potential for decreased mobility during construction, dust, noise, runoff, traffic congestion, temporary access restriction, and visual intrusions to motorists and residents. Additionally, construction presents the potential for the accidental spill of hazardous materials, such as fuel or oil.

Because of weather constraints, the construction season would primarily occur during the summer months, except when restricted by proposed conservation measures (such as restricted timing for in-water work to minimize aquatic impacts), and would likely be expected to last for up to two years with a winter shut-down between the seasons.

Emergency access would be maintained during construction.

4.19.2.1 Construction Impacts Related to Air Quality

Localized impacts from particulate matter can occur as a result of construction activities, such as excavation and grading, and from heavy equipment operations. Impacts can also result from construction-related traffic congestion and delays. Areas that are non-attainment for particulate matter may require extra precautions for dust control during construction. These requirements would be incorporated into the specifications and plans for the project construction.

Localized impacts from CO can occur from heavy equipment operations, and from construction related traffic congestion and delays.

Construction activity may also generate a temporary increase in MSAT emissions, as well as emissions of other air pollutants.

Construction emissions are temporary in nature and do not result in long-term air quality impacts from a project.

4.19.2.2 Construction Impacts Related to Noise

Construction noise would present the potential for localized, short-term impacts to those receptors located along the proposed build alignment and along designated construction access and detour routes. The primary source of noise is expected to be diesel-powered construction equipment, such as trucks, earthmoving, and grading equipment. Pile driving is expected to be the loudest single construction operation at bridge and wall construction sites.

If there is a possibility of impacts to noise-sensitive receptors, the policies and standards contained in 23 CFR 772.19 *(Construction Noise)* and FHWA Technical Advisory T6160.2 *(Analysis of Highway Construction Noise)* are applicable. There are no local City of Missoula ordinances that specifically address noise from construction.

4.19.2.3 Construction Impacts to Water Quality

Construction activities have the potential to cause sediment erosion beyond natural conditions. Stormwater runoff and the deposition of sediments from a construction site present the potential for violations of water quality standards in adjacent waterways and groundwater. The main waterway of concern for any of the build alternatives is the Bitterroot River. Without mitigation measures, stormwater runoff could cause erosion and sedimentation and transport spilled fuels or other hazardous materials to the river. Specific water quality impacts are described in the Water Resources and Water Quality Impacts and Mitigation Section 4.9, page 4-91.

4.19.2.4 Construction Impacts to Traffic

Construction delays are expected to create short-term impacts to local and regional traffic circulation and cause congestion. The traveling public and emergency service vehicles could experience delays, and local residents likely would be inconvenienced. Reduced speed limits, short-term travel on unpaved surfaces, and temporary lane closures on US 93 could be expected during construction activities. Temporary lane closures and delays would impact business access at a limited number of locations and result in short-term economic impacts. Temporary lane closures could occur at various times throughout the day during construction. Although delays can be expected, access to and from the Missoula Country Club golf course property will be maintained.

4.19.2.5 Construction Impacts to Visual Quality

Short-term, construction-related visual impacts are likely to occur. These impacts include the presence of construction equipment and excavated materials, temporary barriers, guardrail, detour pavement and signs, temporary shoring and retaining walls, and removal of vegetation along the Bitterroot River, particularly riparian vegetation. In addition, dust and debris are often associated with construction activities.

4.19.3 Construction Impacts Common to Bridge Alternatives (2B, 3B, 4C)

Miller Creek Road Limited Improvements

Construction of the Miller Creek Road Limited Improvements would involve clearing, grading, surfacing, drainage, signal installation, rail crossing, and utility relocation work. Additional work would involve sidewalk, curb and gutter, signing and striping, and landscaping work. There is the potential for retaining wall construction along portions of Miller Creek Road. Lane closures would be kept to a minimum, and access to and from the Miller Creek area would be maintained at all times. This would require detours and temporary disruption of traffic along Old US 93, Miller Creek Road, and Upper and Lower Miller Creek Roads. Although comprised of fewer lanes from the "Y" to US 93 than Alternative 5A, this alternative holds the potential to temporarily impact ingress/egress points for residents and business interests along Miller Creek Road and Old US 93.

4.19.4 Construction Impacts Alternative 2B: North Lower Miller Creek Grade-Separated Intersection

Construction of the North Lower Miller Creek grade-separated intersection in Alternative 2B would involve construction of a new road along the North Lower Miller Creek alignment north to US 93 east of Yuhas Ranch Lane. In addition to the new roadway, this alternative would involve the construction of a bridge across the Bitterroot River, the railroad, and US 93; signal construc-

tion at the new intersection with US 93; and road construction activities (i.e., paving, grading, filling, pile driving, curb and gutter, sidewalks, landscaping, drainage, etc.). This would require detours and temporary disruption of traffic along US 93 and Lower Miller Creek Road. Increases in local fugitive dust emissions are also possible. The new roadway intersection with Old Bitterroot Road would be in the configuration of a modern roundabout.

Alternative 2B would have the fewest construction-related traffic impacts to local businesses and residences.

4.19.5 Construction Impacts Alternative 3B: Blue Mountain Road Grade-Separated Intersection

Construction of Alternative 3B would involve a new roadway from Lower Miller Creek Road north to US 93 at Blue Mountain Road. The new roadway would include constructing new intersections at Old Bitterroot Road, modifying the Blue Mountain Road/US 93 intersection by removing the signal on US 93, and road construction activities (i.e., paving, curb and gutter, sidewalks, landscaping, drainage, etc.). The unsignalized grade-separated design of this intersection would involve construction of bridges over US 93, the railroad, and the Bitterroot River, and the relocation of Buckhouse Lane. This new access roadway would provide right-in/right-out access at US 93 east of Blue Mountain Road. The construction activities required could include grading, filling, paving, pile driving, compaction, irrigation ditch relocation, and bridge construction over US 93, the railroad, and the Bitterroot River. This would require detours and temporary disruption of traffic along Lower Miller Creek Road, Totem Lane, and US 93. Increases in local fugitive dust emissions are also possible. Two at-grade railroad crossings would be consolidated to one new crossing. Traffic control mechanisms, such as flashing signals and crossing gates, signage, and pavement striping, would be applied at the railroad crossing. Construction in the Blue Mountain Road area would have the greatest construction-related traffic impacts to local businesses and residences.

4.19.6 Construction Impacts Alternative 4C: South Lower Miller Creek Interchange

Construction of Alternative 4C would involve a new roadway from Lower Miller Creek Road west to US 93 east of Hayes Creek Road. The new roadway would cross two channels of the Bitterroot River. In addition to the new roadway, this alternative would include new interchange construction at US 93 and road construction activities (i.e., paving, curb and gutter, sidewalks, landscaping, drainage, etc.). Both northbound and southbound US 93 on- and off-ramps would be included under this alternative. The construction activities required could include bridge construction over US 93, the railroad, and the Bitterroot River, as well as grading, filling, paving, pile driving, and compaction. This would require detours and temporary disruption of traffic along US 93 and access to businesses and residences in the immediate vicinity of the interchange. Increases in impacts of noise and local fugitive dust emissions to local residences and businesses are also likely. In addition, the higher traffic speeds through this area could increase the potential for accidents to occur with the work zone on US 93.

4.19.7 Construction Impacts Alternative 5A: Miller Creek Road At-Grade Intersection — Preferred Alternative

Construction of this alternative would involve clearing, grading, surfacing, drainage, signal installation, rail crossing, and utility relocation work. Additional work would involve sidewalk, curb and gutter, signing and striping, and landscaping. There is the potential for retaining wall construction along portions of Miller Creek Road. Lane closures would be kept to a minimum and

access to and from the Miller Creek area would be maintained at all times. This would require temporary disruption of traffic along Old US 93, Miller Creek Road, and Upper and Lower Miller Creek Roads. Grading and drainage work holds the potential to temporarily impact ingress/ egress points for residents and business interests along Miller Creek Road and Old US 93.

4.19.8 Construction Impacts Summary

Table 4-40 provides a comparison of construction impacts by alternative. Impacts shown for the No-Action Alternative include impacts associated with planned locally funded improvements to Miller Creek Road, which are not a part of this federally funded project. Impacts shown for Alternatives 2B, 3B, and 4C include the impacts for the intersection/interchange with US 93, the bridge crossing and new roadway, improvements on Old US 93, and the Limited Improvements on Miller Creek Road. Impacts shown for Alternative 5A include impacts on Old US 93 and Miller Creek Road.

Table 4-40
Construction Impacts Summary

Construction Evaluation Criteria	Alt. 1 No-Action	Alt. 2B N. Lower Miller Creek Grade-Separated Intersection	Alt. 3B Blue Mtn. Rd. Grade-Separated Intersection	Alt. 4C S. Lower Miller Creek Interchange	Alt. 5A Miller Creek Rd. At-Grade Intersection (Preferred Alternative)
Construction impacts	No impacts.	Average traffic related impacts and time frame to construct.	Worst construction-related traffic impacts.	Would have the longest time frame to construct.	Fewest construction-related traffic impacts of build alternatives.

4.19.9 Construction Mitigation

Construction Mitigation Measures for Air Quality

The following measures will be included in the final design to mitigate construction impacts on air quality.

- Suppress dust through watering or dust palliative.
- Revegetate areas disturbed by clearing and grubbing activities as soon as practicable.
- Minimize off-site tracking of mud and debris by stabilizing temporary construction access roads.

Construction Mitigation Measures for Noise

The following measures will be incorporated into the final design to mitigate noise due to construction.

- Communicate early on with the general public to reduce the number of noise complaints. Inform the public of any potential construction noise impacts and the measures that will be employed to reduce these impacts. Also, establish and publicize a responsive complaint mechanism for the duration of the construction.
- Coordinate with the construction contractor and residents or business owners to limit noise impacts to certain times of the day.
- Avoid nighttime activities in residential areas as much as possible.

- Minimize construction duration in residential areas as much as possible.
- Reroute truck traffic away from residential streets where possible.
- Combine noisy operations to occur in the same time period.
- Conduct pile driving and other high-noise activities during daytime construction (generally 7:00 AM to 7:00 PM), when possible.
- Use quiet-use generators.
- Request equipment operators to minimize use of reverse gear, lift rather than drag materials, and avoid mechanical scraping or banging activities that could otherwise be reasonably performed by quieter manual methods.
- Use well-maintained equipment equipped with modern mufflers.

If construction time is restricted to certain daytime hours, the overall project construction schedule will likely lengthen.

Construction Mitigation Measures for Water Quality

The following measures will be incorporated to prevent negative impacts to water quality and violation of water quality standards to waterways near construction. Appropriate measures will be included in the construction special provisions and could be requirements identified in the permitting process. All work in and adjacent to wetlands and water resources will follow state, federal, and local permit requirements.

- Implement temporary and permanent BMPs for drainageway protection and erosion and sediment control as required by local and state permitting.
- Avoid indirect and temporary impacts to wetlands or other areas of important habitat value in addition to those impacted by the project itself.
- Implement temporary and permanent BMPs that may be required as mitigation for potential construction impacts related to the wetlands associated with the Bitterroot River.
- Control and prevent concrete washout and construction wastewater. As project plans are finalized, the proper specifications will be adhered to and reviewed to ensure adequacy in the prevention of water pollution by concrete washout.

Construction Mitigation Measures for Traffic Control

The following measures will be incorporated into the final design to minimize impacts to traffic circulation during construction.

- Develop traffic management plans.
- Coordinate with emergency service providers to minimize delays and ensure access to properties.
- Maintain traffic flow during peak travel times by minimizing lane or roadway closures, if possible. MDT will likely require all traffic lanes be kept open on US 93 during peak traffic periods.
- Coordinate detour routes to avoid overloading local streets with detour traffic where possible.
- Maintain access to local businesses and residences.
- Use signage, TV, and radio to announce and advertise timing of road closures.

- During peak travel time, keep as many lanes as possible open by temporarily shifting lanes within the existing framework of the roadway.
- Develop detour routes for potential nighttime closures of US 93.

Construction Mitigation Measures for Visual Quality

The following mitigation measures will be incorporated into the final design:

- Store equipment and materials in designated areas only.
- Remove any unused detour or pavement signs.
- Revegetate disturbed areas as soon as practicable.

4.20 Permits and Approvals

This section describes those permits that would be required for the development of the build alternatives. Alternative 5A would not require river-related permits. The permits would be acquired prior to any relevant disturbance.

- MDT approval and permitting for any new access to US 93 and approval of any roadway modifications to US 93 and intersection with US 93/Reserve Street.
- A weed control plan approved by Missoula County.
- Effective March 10, 2003, construction activity that results in the disturbance of equal to or greater than one acre of total land area would require permit coverage under MDEQ's "General Permit for Stormwater Discharges Associated with Construction Activity."
- Coordinate with MDEQ for concurrence of proposed activities related to MDEQ TMDL development for impaired 303(d) listed waterbodies.
- A 124SPA Stream Protection permit from the MFWP. Proposed development activities (by government agencies) in or near streams that may affect the beds or banks are governed by the Montana Stream Protection Act. The MFWP administers this law, and its purpose is to preserve and protect fish and wildlife resources in their natural existing state.
- A 318 Authorization for short-term turbidity. If required, this authorization would be obtained from the MDEQ's Water Protection Bureau prior to the start of any highway construction.
- A floodplain development permit from Missoula County is required for any construction within the floodplain. A Conditional Letter of Map Revision and Final Letter of Map Revision are required. In addition, the floodplain permit cannot be issued without a Section 404 permit being issued.
- All build alternatives would require the following permits under the Clean Water Act (33 USC 1251-1376):
    - A Section 402/MPDES permit from the MDEQ's Permitting and Compliance Division. A Notice of Intent (NOI) for Stormwater Discharges under the MPDES and a General Permit (MTR 100000, effective June 8, 2002) would be required with the MDEQ for the control of water pollution for both specific and non-point sources.

      The goal of the MPDES regulation program (ARM 16.20.1314) is to control point source discharges of wastewater such that water quality of the receiving streams is protected. All point sources of wastewater discharge are required to obtain and comply with MPDES permits. Any interchange construction project would typically require coverage under the MPDES "General Permit for Stormwater Discharges Associated

with Construction Activity." This permitting process would serve only as a notice of intent to discharge, rather than a submittal for agency review or approval of a SWPPP.

- A Section 404 permit from the USACE for filling jurisdictional wetlands within and adjacent to the Bitterroot River and for the placement of pier structures for the bridges associated with all bridge alternatives.

  The construction contractor would be required to exercise reasonable precautions during construction to prevent pollution of all waters located in the project area. The contractor also would be required to meet the requirements of the applicable regulation of the MFWP, MDEQ, and other local, state, or federal regulation for the prevention or abatement of water pollution. These include applicable regulations under the Clean Water Act of 1987 as well as the Montana Environmental Policy Act.

- All build alternatives may require the following permit for air quality from the MDEQ:
  - Air and Waste Management Bureau, asphalt plant and crusher permit.
- All alternatives may require the following permits, if applicable, for relocation of utilities, from the Montana Department of Transportation's Missoula District:
  - RW131 permit for utilities located in the right-of-way.
  - RW20 permit for encroachment in the right-of-way.
  - RW20S permit for attachment of utilities to structures.
  - Approach permit for access to US 93.
- Migratory bird survey prior to construction and obtain necessary permits and approvals prior to construction or disturbance.

4.21 Relationship Between Local Short-term Uses of the Environment and the Maintenance and Enhancement of Long-term Productivity

4.21.1 Alternative 1: No-Action

The No-Action Alternative could require the following local or short-term uses of the environment. It would not result in enhancement of long-term productivity.

- Increased noise and air pollution during construction due to residential construction.
- Vegetation loss due to ongoing development construction.
- Some loss of wildlife habitat due to ongoing development construction.
- Temporary riparian impacts.

Traffic mobility, access, safety, emergency service provider response time, and bicycle/pedestrian connectivity would continue to decline.

4.21.2 Build Alternatives

The build alternatives would have similar impacts in terms of short-term uses of the environment and the maintenance and enhancement of long-term productivity. The transportation improvements are based on local comprehensive planning which consider the need for present and future traffic requirements within the context of present and future land use development.

Local short-term uses of the environment that would occur with the build alternatives include:

- Increased noise and air pollution during construction.
- Vegetation loss due to construction.
- Impacts to some agricultural/ranching activity.
- Small area of wetland loss.
- Some loss of wildlife habitat.
- Some wildlife displacement during construction.
- Temporary riparian and aquatic impacts (including bull trout) with bridge construction.
- Temporary increase in sedimentation during construction.

Long-term productivity that would be maintained or enhanced by the build alternatives include:

- Improved safety and mobility.
- Improved access for emergency service providers.
- Improved use of energy for vehicular fuel consumption due to decrease in congestion.
- Improved provisions for bicycles, pedestrians, and transit.
- Replacement of all wetland values lost.

4.22 Irreversible and Irretrievable Commitment of Resources

4.22.1 Alternative 1: No-Action

With the No-Action Alternative, the commitment of resources for maintenance and repairs would continue and would likely increase as traffic increases. Land that is converted to full build-out of the Miller Creek area would involve an irreversible commitment of resources since it is unlikely that this land would ever be converted to another use.

4.22.2 Irreversible and Irretrievable Commitment of Resources Common to All Build Alternatives

Implementation of the build alternatives would involve a commitment of a range of natural, physical, human, and fiscal resources. Land used in the construction of a build alternative would be roadway facility. However, if a greater need arises for use of the land or if the transportation improvements are no longer needed, the land can be converted to another use. At present, there is no reason to believe such a conversion would ever be necessary or desirable.

Considerable amounts of fossil fuels, labor, and construction materials, such as cement, aggregate, and bituminous material would be irretrievably expended in the construction of the build alternatives. In addition, considerable amounts of labor and natural resources would be used in the fabrication and preparation of construction materials. These materials are generally not retrievable. However, they are not in short supply and their use would not have an adverse effect upon continued availability of these resources. Construction also would require a substantial one-time expenditure of funds.

The commitment of resources would be based on the assumption that existing and future residents in the immediate area and the region would benefit by the improved quality of the transportation system. Benefits would include improved accessibility and safety, savings in travel time, and greater availability of services. Overall, the benefits are anticipated to outweigh the commitment of these resources.

4.23 Cumulative Impacts and Mitigation

This section addresses the cumulative impacts associated with the alternatives presented in Chapter 2.0. A cumulative impact is "the impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (federal or non-federal) or person undertakes such other actions" (40 CFR 1508.7). This cumulative impacts analysis takes into account the past, present, and future action in the project area, regardless of responsible party, along with the proposed alternatives, to determine the impacts to the environment as a result of all of these actions.

The methodology followed for the EIS cumulative impact assessment is:

- **Scoping**. Various state and federal agencies were sent letters requesting formal scoping input and their participation on the Interdisciplinary (ID) Team. Written and verbal responses were received from the following agencies:

  - US Environmental Protection Agency
  - US Fish and Wildlife Service
  - US Army Corps of Engineers
  - US Forest Service
  - Montana Department of Environmental Quality
  - Montana Historical Society

  Copies of letters received in response to the requests are in **Appendix A**.

  The specific areas of concern analyzed for cumulative impacts were derived from these letters, scoping meetings, and input from the ID Team. All social, economic, and environmental resources were considered before identifying the significant issues within the Miller Creek area. The identified areas of particular concern within the project area are land use (growth), water resources and water quality, and ecological resources, such as wildlife, aquatic, and wetlands.

- **Geographic Boundary**. The geographic boundary used for this cumulative impacts analysis is based on the identified resources of concern and the potential impacts under a build alternative. For example, river and wetland impacts were assessed on a larger scale and included the watershed. The project area is located in the Missoula Valley and is constrained to the east and west by the mountains. This valley area was the primary focus for assessing cumulative impacts taking into account the watershed that includes the Bitterroot and Clark Fork Rivers.

  A larger boundary was established to account for cumulative effects on land use, social, economic, and traffic issues in neighboring communities, including the residents along Blue Mountain Road.

- **Time Period**. The time frame for the analysis of cumulative impacts is approximately 40 years in the past based on available data concerning growth and development in the valley, including the construction of US 93. The present to future time frame is to the year 2025, the planning horizon for this EIS.

- **Resource Data**. Information was collected for the resources of concern from readily available data sources at the City of Missoula and Missoula County. These sources include city, county, regional and vicinity plans. Planners and developers in the cumulative impacts project area were contacted directly.

The environmental impacts addressed in this section are those that could result from implementation of the proposed action. The cumulative analysis addresses the "incremental impacts" of the proposed action related to the resources identified as significant issues for the proposed

action. To determine the impacts to the specific resources on a cumulative basis, a baseline condition is established. This baseline includes development from a specified period of time for past actions, added to present and reasonably foreseeable future actions that are assumed for the No-Action condition. The impacts of the proposed action are then added to this baseline as the incremental impacts of the action.

4.23.1 Historical Setting

By 1860 Missoula was a major commercial center strategically located at the mouth of five valleys. For centuries the area had been heavily traveled and utilized by Native Americans. When gold was discovered in the area, Missoula became a major thoroughfare for thousands traveling to gold rush sites. Soon the Hellgate Trading Post and Missoula Mills were established. In 1877 Fort Missoula was constructed by the US Army and became a source of economic stability for the town between the end of the Placer Mining Era and the coming of the railroad.

In 1883, the Northern Pacific Railroad was completed through Missoula (the same year the city was incorporated). The area grew rapidly and the economy expanded to include timber and agriculture in addition to trade and commerce. Agriculture attracted thousands to the area in the early 1900s with the promotion of homesteading and the construction of the Chicago, Milwaukee, St. Paul and Pacific Railroad through Missoula.

Following the depression, World War II, and the construction of US 93, the area experienced another boom as soldiers returned to the area. Soon lands primarily used for agriculture and ranching were converted to subdivisions in the Missoula Valley and in the Miller Creek area. US 93 provided a link to land through the Missoula and Bitterroot Valleys converting much of it to new commercial and residential development. The first Linda Vista neighborhoods were platted in 1956, changing the character of the area. Since then, suburban development has continued throughout the Miller Creek area.

4.23.2 Reasonably Foreseeable Projects Within the Project Area

One assumption for the Miller Creek Road project is that population growth and new development is going to continue and that full build-out of the Miller Creek area is reasonably foreseeable to occur regardless of the proposed action. Residential and commercial development, improvements to Miller Creek Road and the north "Y", and required sewer system expansion within the Miller Creek area under approved development plans are expected to occur with the No-Action Alternative. Additionally, it was assumed that selection of a build alternative as the preferred alternative could accelerate the development of the Miller Creek area and the area south of Miller Creek, but would not cause or induce additional development. Identification of the potential nature and location of the future development was identified in local development plans in conjunction with the Missoula County and City of Missoula comprehensive and growth plans, transportation plans, and US Census Bureau projections for 2025.

Planned development projects within the project area include full build-out of the Miller Creek area by 2025. The planned development consists primarily of residential with some commercial land uses. New roadways connecting to existing roads in the area would be constructed as part of the development. Along with the planned development, city services (water and sewer) would be extended to serve the development, as this area lies within the wastewater facilities service area boundary. Annexation of the area by the City of Missoula is expected to occur as development is completed and would eventually correspond with the wastewater service area boundary. This development would not result in new net growth to Missoula County; rather, it would result in a redistribution of growth from other areas.

Between 1990 and 2001, the number of acres in approved subdivisions increased by 12,206 acres of which 10,682 acres were in subdivisions (4,634 lots) located outside Missoula city limits. Within the city, 1,131 acres were approved for subdivisions creating 1,524 lots. Only 6.7 percent of the County is zoned, most of which is within city limits. Almost 91 percent of the county is not regulated through zoning compliance or building permit review.

Transportation and infrastructure (sewer and water) projects within the project area are associated with the development plans for the Miller Creek area. Improvements to Miller Creek Road and the north "Y" intersection are expected to occur in the near future and are currently listed as a recommended project in the *2004 Missoula Urban Transportation Plan Update*. The improvements are necessary to accommodate the future development in the area. Sewer and water upgrades and expansions would occur concurrently with roadway improvements and are required for development plans to move forward. Improvements to Lower Miller Creek Road and Upper Miller Creek Road will be required to accommodate the full build-out sometime in the future.

The following projects are identified in the *2004 Missoula Urban Transportation Plan Update* as recommended plan projects. These projects address a transportation need within the 20-year planning horizon; however, funding is not yet available. Projects within or adjacent to the project area are:

- Reconstruct Miller Creek Road from Brooks Street to the "Y."
- Improve Reserve Street pedestrian/bicycle crossings from Brooks Street to Mullan Road.
- Replace South Avenue bridge (Maclay Bridge).
- Install sidewalks in the South Hills area.
- Develop county on-street bicycle system from Reserve Street to the Bitterroot River: 3rd Street, Tower Road, Clements, Spurgin Avenue, North Avenue and Maclay Bridge.
- Construct Miller Creek Road bridge across the Bitterroot River.

Committed projects in the project area that are identified in the *2004 Missoula Urban Transportation Plan Update* include Brooks Street overlay from Reserve to Mount Avenue, raised medians on Brooks Street from Dixon to Miller Creek Road, and improvements at Brooks Street/South Avenue/Russell Street. Projects within this category are included in either an approved county, city, or MDT capital improvement plan or State Implementation Plan.

4.23.3 Environmental Consequences

4.23.3.1 Land Use (Growth) Impacts

The Missoula Valley and the Miller Creek area, in particular, have experienced tremendous growth in the last 50 years. This trend is expected to continue whether or not improvements in access to the Miller Creek area are made. This anticipated growth is evidenced in both City of Missoula and Missoula County plans. Development proposed in the Miller Creek area has been platted and approved by the City of Missoula and by Missoula County. Many areas would be annexed by the City as sewer and water infrastructure and housing fill in.

The 2025 Missoula County population is projected to be 132,250, according to the Montana Department of Commerce. This is an increase of 36,448 from the 2000 population or a 38 percent increase. This translates to a total number of dwellings in 2025 of 63,200. Within the Miller Creek area by 2025, approximately 3,000 housing units would exist at full build-out, representing an increase in population of approximately 7,863. This growth is projected to occur whether or not any improvements in access are made between the Miller Creek area and US 93.

The past, present, and future developments have and would continue to convert acres of undeveloped agricultural land from a natural or rural state to a developed one. Other impacts associated with development are increased impervious surface (roads, driveways, rooftops, parking lots, etc.), loss of rural open lands, loss of agricultural lands, loss of wildlife habitat, fragmentation of wildlife habitat, degradation of water quality, loss of wetlands and aquatic resources, and stress on the area's water availability and supply. Improving access to the Miller Creek area either by the addition of a bridge crossing or improvements to Miller Creek Road, is consistent with local area planning; therefore, the incremental impacts of the improved access would be a relatively minor portion of the total development planned for the Miller Creek area. Residential development in the area would follow extension of city services, generally moving in a westerly direction from the current city limits. At the location of a bridge connection to US 93 (Alternatives 2B, 3B, 4C and 5A) redevelopment may occur and include supportive development (see Section "Approach to Indirect Effects Assessment," page 4-2 for a discussion of supportive development).

A second access point at Blue Mountain Road (Alternative 3B) would not cause new residential/commercial development north of US 93. The majority of land in this area is under state or federal ownership with a small percent available for private development. However, a moderate increase in traffic volume of 10 percent with this alternative compared to the No-Action Alternative (an increase of approximately 500 vehicles per day over the No-Action Alternative) would occur on Blue Mountain Road just north of US 93 by 2025. The growth in population alone results in a 103 percent increase of vehicles per day by 2025.

4.23.3.2 Transportation Impacts

The nature of the Miller Creek area is unique in regards to the direct, indirect, and cumulative impacts that the proposed action would have on the surrounding area. Essentially, the area is constrained by the Bitterroot River and US 93 to the north and the west, by USFS land and Plum Creek Timber land to the southeast, and the topography directly south. Once full build-out is reached (2025 or sooner), no additional growth and development are expected to occur in the area. The population and dwelling units and, therefore, travelers to and from the Miller Creek area will be constrained. At full build-out in 2025, the area is projected to contain approximately 3,000 dwelling units and more than 7,000 people. This includes the area south of Miller Creek.

The majority of people using the improved access would be those residing in the area and commuting to Missoula in the AM and returning in the PM. This also would improve access to the National Forest System land located southeast of the Miller Creek area and recreation travel heading north on US 93 for all build alternatives, and to the Blue Mountain Recreation area under Alternative 3B. Access to recreation areas north on Blue Mountain Road would be improved only for those traveling there from the Miller Creek area. People from other parts of the region currently have access at the signalized Blue Mountain Road and US 93 intersection. It is estimated that only a small percentage of people coming from the Miller Creek area would use Blue Mountain Road for recreation or commuting purposes.

Residents of the Blue Mountain Road area have expressed concern over an improved access from the Miller Creek area being located at Blue Mountain Road (Alternative 3B). Their concern is that more traffic from the Miller Creek area would use Blue Mountain Road as a result of the proposed connection.

Under the No-Action Alternative, 2025 traffic volumes are expected to increase by 103 percent over 2000 volumes on Blue Mountain Road. This is because of the general increase in population in Missoula and Ravalli Counties. By 2025 traffic volumes on Blue Mountain Road would increase an additional 13 percent because of construction of a bridge from the Miller Creek area at Blue Mountain Road, which is 6 percent more than the other alignments. In other words, if nothing is done by 2025, there will be 36 percent more traffic than there currently is on Blue Mountain

Road. A new connection from the Miller Creek area to US 93 would increase that number by 7 percent with Alternatives 2B or 4C and by another 6 percent, for a total of 13 percent, with Alternative 3B. This amounts to a moderate increase over what is expected by 2025 under the No-Action Alternative.

4.23.3.3 Wetland Impacts

According to the *National Wetlands Inventory*, approximately 3,337 acres of riverine wetlands, 1,592 acres of palustrine wetlands, and 6 acres of lacustrine wetlands are present within the Miller Creek cumulative impacts project area (Bitterroot River from the confluence with the Clark Fork River west of Missoula to just south of Conner). Wetlands of the Bitterroot River and its tributaries are generally a mosaic of wet meadows with cattail, bulrush and sedge; streambank stands of sandbar willow; and black cottonwood forest terraces with an understory of red-osier dogwood, water birch, and alder. The Bitterroot River is a free-flowing river.

Human activities, such as agriculture, grazing, timber harvest, urban development, and road and railroad construction, have resulted in wetland and riparian losses and alterations within the cumulative impacts project area. Wetland and riparian areas also have been lost or damaged by placement of fill, ditching and draining, stream damming, water diversion, noxious weed invasion, devegetation, and depletion of natural springs. Pollutants, such as fertilizers, pesticides, sediments, and salts, have diminished wetland water quality over the past 100 years. Approximately 27 percent of Montana wetlands present prior to 1800 have been converted to other land uses. Wetlands comprise less than 1 percent of the total surface area of the state.

From 1990 through 2001, the USACE issued a total of 106 Clean Water Act Section 404 Permits for projects within the project watershed (see **Table 4-41** and **Table 4-42**). The average number of nationwide permits issued per year rose from 3.3 permits during the time period of 1990 through 1996 to 12.6 permits during the time period of 1996 through 2001. The number of individual permits issued per year also rose from the early 1990s through 2001.

Table 4-41
Number of Section 404 Permits Issued by the US Army Corps of Engineers from 1990 through 2001 in the Cumulative Impacts Project Area

Year	Individual Permits	Nationwide Permits	General Permits
1990	1	4	0
1991	1	2	1
1992	1	0	0
1993	0	3	0
1994	0	5	0
1995	1	5	0
1996	2	4	0
1997	3	11	0
1998	2	11	2
1999	2	12	0
2000	1	16	0
2001	3	13	0
Total	17	86	3

Source: Data from the US Army Corps of Engineers Helena Office Regulatory Analysis and Management System

Assumptions concerning wetland and riparian area impacts from future development in the cumulative impacts project area are based on land use development plans obtained from local planners and on population growth statistics. As residential and commercial developments spread out from Missoula and other southwest Montana population centers, future disturbances to wetland and riparian areas are expected to occur within the cumulative impacts project area. Based on *Census 2000* data, the population of Ravalli County grew by 44 percent from 1990 to 2000, and many of the towns located on US 93 adjacent to the Bitterroot River experienced population growth of 20 to 35 percent. Additionally, impacts to wetlands and riparian areas are anticipated in the Clark Fork watershed north of the cumulative impacts project area.

Table 4-42
Impact Totals for Nationwide Permits, 1990 Through 2001

Nationwide Permit Type	Total Linear Feet	Total Acres
NW 03 - Maintenance	5,300	0
NW 06 - Survey Activities	140	0
NW 12 - Utility Line Activities	50	0.38
NW 13 - Bank Stabilization	7,017	0
NW 14 - Linear Transportation Projects	469	0.18
NW 18 - Minor Discharges	10	0.01
NW 23 - Approved Categorical Exclusion	0	0.08
NW 26 - Headwaters and Isolated Water (not used since 2000)	0	0.69
NW 27 - Stream and Wetland Restoration Activities (area impacted equals area restored for this permit)	206,760	24.87
NW 33 - Temporary Construction, Access, Dewatering	6,600	0.25
NW 36 - Boat Ramps	12	0
NW 37 - Emergency Watershed Protection, Rehabilitation	1,500	0
NW 39 - Residential, Commercial, Institutional Developments	0	0.22
NW 42 - Recreation Facilities	75	0.08
Grand Total	**227,933**	**26.76**

Source: Data from the US Army Corps of Engineers Helena Office Regulatory Analysis and Management System.
Note: Impacts are minimum values. Some project impacts were reported either as linear feet or acres.

No permanent wetland impacts are anticipated for the No-Action Alternative. However, the locally funded widening of Miller Creek Road would impact less than 0.2 acre of a non-jurisdictional wetland. Alternatives 2B, 3B and 5A would impact approximately 0.2 acre of wetlands due to the Miller Creek Road widening. Potential permanent wetland impacts are less than 0.3 acre for Alternative 4C, which would occur because of bridge construction and the widening of Miller Creek Road. Impacts from Alternative 4C would be to Category I wetlands adjacent to the Bitterroot River. Impacts from Alternatives 2B, 3B, and 5A would be to Category IV wetlands.

Potential permanent riparian impacts from the proposed action are 0.1 acre for Alternative 2B; 0.2 acre for Alternative 3B; and 0.3 acre for Alternative 4C.

4.23.3.4 Water Quality/Resources Impacts

Growth in the Miller Creek area would continue, presumably toward the west and south, increasing the amount of impervious surfaces. With this residential growth, light industry and other businesses would be expected to increase along US 93.

Changes in land use, increased growth, and the conversion of agricultural lands to developed lands can collectively impact water quality and water resources over time. Indirect effects, such as sedimentation within the Bitterroot River and tributaries, are likely to result from construction activities associated with the increasing residential development of the Miller Creek area. This has caused concern related to water quality impacts. City of Missoula and Missoula County planners have indicated that future development in the Miller Creek area would be on an expanded wastewater system. **Figure 3-18, page 3-61** depicts the boundary of the City of Missoula's wastewater service area. Development rapidly consumes and converts natural landscapes to impervious surfaces, such as parking lots, roads, and rooftops, while resulting in a loss of groundwater infiltration. Water runs off these impervious surfaces, carrying pollutants directly into water bodies instead of filtering through the soil into underground aquifers. As growth and development increase, detrimental cumulative effects on the quality of local water resources can result from individually minor but collectively greater increases in impervious surfaces over a period of time.

Cumulative impacts to aquatic life could result from excess runoff containing increased sediment loads, and/or water laden with metals and pollutants. Sediment loads increase turbidity, which could eventually lead to aquatic habitat impairment and changes in the physical and hydrologic characteristics of the receiving waters. Sediment deposits can smother eggs and larvae of benthic and other small aquatic life once settled. Reductions in the health and quantity of aquatic organisms could place stress on wildlife that depend upon aquatic organisms for survival. Contaminated runoff laden with metals, toxins, and pesticides could pollute receiving waters and aquatic habitat, consequently resulting in impairment to the health of aquatic life and the aquatic system as a whole. Increase in contaminated runoff is a result of an increase in population and the subsequent increase in development.

The largest contributor to cumulative impacts in the project area would be the development already approved for the Miller Creek area. With the projected number of residences and the additions to the road network, the amount of associated impervious surface areas would have a greater impact on the surrounding area than the addition of a new access road between the Miller Creek area and US 93 or the widening of Miller Creek Road. This increase in impervious surface area is assumed to be reasonably foreseeable regardless of the proposed action. The proposed action would contribute, though not substantially, to the cumulative impacts within the project area.

A majority of the project area is within an area that is experiencing commercial and residential growth. The growth areas would be supported by the City of Missoula infrastructure of water supply and, as such, would not require wells. However, some areas (e.g., south of Miller Creek) may require the use of wells for water supply. It is the responsibility of the Missoula Wastewater Service Organization to assure adequate collection and treatment of wastewater from new development.

The Montana Water Law would limit any impacts from new public or commercial supply wells drilled in the project area, due to the fact that any new wells which would pump at rates over 35 gallons per minute (GPM) and/or withdraw more than 10 acre feet per year would be required to obtain a Beneficial Water Use Permit from the Department of Natural Resource Conservation (DNRC). To obtain a Beneficial Water Use Permit, the applicant must prove by a preponderance of evidence that the water is physically available, and that there would be no adverse effect on prior users (appropriators). Montana Water Law (Section 85-2-311, MCA) provides the laws that would prohibit a new water user (greater than 35 GPM and/or 10 acre feet a year) from causing an adverse effect to prior water users, thus limiting indirect effects. Existing water users can file objections if they feel the new appropriation would impact their water supply. However, the exception is in the case of individual wells withdrawing 35 GPM or less. Outside of controlled groundwater areas, the DNRC has no authority to deny a permit application for these smaller yield wells if the proper forms have been completed.

The primary potential for new development to impact groundwater quality is from the discharge of septic effluent from sewage drainfields. The Montana Non-Degradation Law prohibits drainfield effluent from exceeding 5 milligrams/liter (mg/l) nitrate at the end of the mixing zone (7.5 mg/l for level two treatment systems), and prohibits phosphorous to "break through" to the nearest surface water body within 50 years. Montana's Non-Degradation Law defines impacts that comply with the standards described above as "Non Significant." The Montana Non-Degradation Law is vigorously and effectively enforced by MDEQ. Therefore, any new development indirectly associated with the selected alternative utilizing on-site sewage treatment systems and associated drainfields would have a "Non Significant" impact on water quality.

4.23.3.5 Ecological Resources Impacts

Cumulative impacts to threatened or endangered species or other biological resources resulting from the proposed improvements could occur in conjunction with other proposed or recently

completed transportation, residential, commercial, and agricultural projects in the project area. Past and future population growth and development in the project area have and would continue to impact wildlife habitat, dispersal, productivity, and mortality for the build alternatives as well as the No-Action Alternative. Undeveloped land in the Miller Creek area and nearby areas would be more likely to be developed, resulting in loss of open space and wildlife habitat due to improved road access and relieved traffic congestion. As described in the last two paragraphs of Section 3.4.1, page 3-19, wildlife mortality is one of the primary impacts that would result from the proposed action, particularly Alternative 3B or 4C. Alternative 3B would remove the signal at Blue Mountain Road, thereby allowing increased speeds on US 93. The increase in speeds coupled with projected traffic increases related to general population growth would create a difficult situation for wildlife attempting to cross US 93 from National Forest land to the Miller Creek and Bitterroot River drainages. As growth continues in the Miller Creek area, natural habitat will be minimized, perhaps isolating some wildlife populations.

4.23.4 Cumulative Impacts Summary

The cumulative environmental impacts result from the incremental impact of growth and development that when added to past, present, and reasonably foreseeable future increases in growth and development, would result in cumulative impacts to the surrounding area. The majority of the cumulative impacts to land use, wetlands, water resources and water quality, and ecological resources are more a result of the growth and development already expected to occur in the area whether or not the proposed action is constructed. Since the Preferred Alternative (Alternative 5A) causes minor impacts to wetlands and makes changes to US 93 operations (i.e., increased speeds with Alternative 3B), it contributes to cumulative impacts, though to a lesser extent than with the bridge alternatives.

By directing growth to communities where people already live and work, the number of newly paved and other impervious surfaces that cover the landscape can be limited, making existing communities more attractive and discouraging new infrastructure that alters natural hydrologic functions and increasing taxpayer burdens. Smart growth strategies generally entail integrating planning and incentives with infrastructure investments to revitalize existing communities, prevent leapfrogging sprawl, provide more transportation choices, and protect open space.

4.23.5 Cumulative Impacts Mitigation

Restoration projects are anticipated to occur in the cumulative impacts project area under the Bitterroot Watershed Partnership, a group of state and federal agencies and non-profit groups.

Development in the Miller Creek area is expected to have a greater cumulative impact than the proposed action. Potential temporary or permanent impacts to water quality and water resources as a result of improvements in access will be mitigated through the use of BMPs. Structural and non-structural BMPs will be utilized to control roadway runoff and prevent erosion of sediments.

Any work occurring within or near receiving waters will not proceed until all appropriate permits are obtained and measures are included in plans to protect water quality, vegetation, and wetlands.

Selection of a preferred alternative that minimizes impacts will be consistent with minimizing cumulative impacts.

4.24 Summary of Impacts

Table ES-2, page ES-13 summarizes the comparative impact ratings described in this FEIS for the No-Action Alternative, Alternative 2B, Alternative 3B, Alternative 4C, and Alternative 5A (Preferred Alternative).