APPENDIX F

CLEAN WATER ACT SECTION 404(b)(1) EVALUATION

404(b)(1) EVALUATION for

BILLINGS BYPASS

NCPD 56 (55) Control Number 4199

Yellowstone County, Montana

Prepared for:

Montana Department of Transportation

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September 2013

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1.0 INTRODUCTION

This 404(b)(1) Evaluation was completed for the proposed Billings Bypass project. The Montana Department of Transportation (MDT) in cooperation with the Federal Highway Administration (FHWA) is proposing alternatives for a new principal arterial connecting I-90 east of Billings with Old Highway 312 (Old Hwy 312) in order to improve access, connectivity, and mobility in the eastern area of Billings. The evaluation was completed to identify the proposed disposal sites for the direct discharge of dredged or fill material, to identify potential project effects, and to address appropriate and practicable conditions to minimize adverse effects in compliance with the requirements and the guidelines of Section 404 of the Clean Water Act (CWA).

The 404(b)(1) guidelines included in Title 40 of the Code of Federal Regulations, Part 230, provide the substantive criteria used in evaluating discharges of dredged or fill material in waters of the United States (U.S.) under Section 404 of the CWA. These criteria are applicable to all 404 permit decisions. The 404(b)(1) guidelines establish that dredged or fill material should not be discharged into the aquatic ecosystem unless it can be demonstrated that such discharges would not have unacceptable adverse impacts either individually or in combination with known and/or probable impacts of other activities affecting the ecosystem.

Section 230.10 of Subpart B of the 404(b)(1) guidelines establishes four conditions that must be satisfied to make a finding that a proposed discharge complies with the guidelines. These conditions include:

a) Except as provided under Section 404(b)(2), no discharge of dredged 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;

b) No discharge of dredged or fill material shall be permitted if it violates state water quality standards, Section 307 of the CWA, or the Endangered Species Act of 1973;

c) No discharge of dredged or fill material shall be permitted which would cause or contribute to significant degradation of the waters of the U.S.; and

d) Except as provided under Section 404(b)(2), no discharge shall be permitted unless appropriate and practicable steps have been taken which would minimize adverse impacts of the discharge on the aquatic ecosystem.

Adverse impacts may be offset by compensatory mitigation to bring the proposed project into compliance with the 404(b)(1) guidelines. Impacts must be avoided to the maximum extent practicable and remaining unavoidable impacts would then be mitigated to the extent appropriate and practicable by taking steps to minimize impacts and compensate for the loss of aquatic resource functions and values.

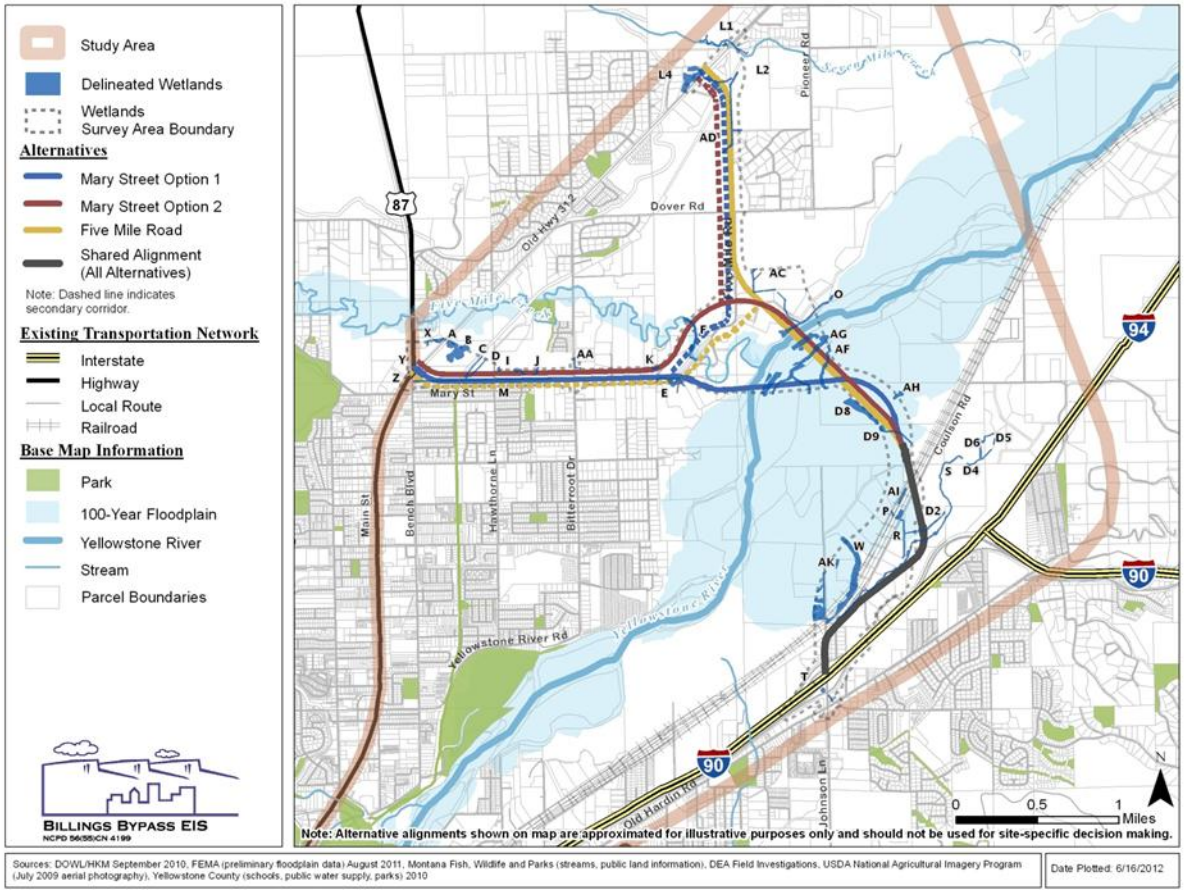
Section 230.11 sets forth the factual determinations, which must be considered in determining whether a proposed discharge satisfies the four conditions of compliance. These determinations are contained in the following sections of this evaluation.

2.0 PROJECT DESCRIPTION

2.1 LOCATION

The proposed project is located in Yellowstone County, Montana, in the northeastern portion of the Billings urban area. The project study area is bounded by I-90/I-94 to the south, Old Hwy 312 to the northwest, and US 87 to the west. The Yellowstone River flows in a northeasterly direction through the length of the study area. **Figure 1** shows the project vicinity, study area, aquatic resources, and the build alternatives of the proposed project.

Figure 1. Project Vicinity and Study Area Map



2.1.1 PROJECT BACKGROUND

A 1996 capacity analysis for the Billings roadway network indicated that North 27th Street was nearing capacity between Montana Avenue and 4th Avenue and exceeding capacity north of 4th Avenue. High accident rates and peak period congestion prompted an alternatives study for the intersection along 27th Street/MT 3. The study recommended that the intersection should be improved to address safety and mobility issues, and be targeted for capacity improvements.

North 27th Street/MT 3 are along the route for the Camino-Real International Trade Corridor. As roadway capacity became an issue along the Billings section of the trade corridor, Yellowstone County applied for a federal grant to study options for improving conditions. A feasibility study was authorized by a September 28, 1999 Funding Agreement between MDT and the Billings City – Yellowstone County Planning Board. The Billings North Bypass Feasibility Study, which was completed by HKM Engineering (now DOWL HKM) in 2001, investigated a bypass in the Billings area as part of the Camino-Real International Trade Corridor connecting Canada to Mexico. The feasibility study used a 5-mile-wide corridor north of Billings as the area within which to assess the economic and engineering feasibility of a bypass. This study area was selected by the consultant team and approved by the project steering committee. The study concluded that the bypass was feasible and recommended continued project development including a location study and preparation of an appropriate environmental document.

In 2003, MDT selected a consultant team to complete a location study and prepare an Environmental Impact Statement (EIS) for the proposed bypass. Prior to preparing this EIS, MDT updated and refined the Billings Area traffic model to be consistent with the 2005 Billings Urban Area Transportation Plan and to validate the study area used in the feasibility study. Based on the refined traffic model, MDT verified the geographic limits of the proposed study area within which alternatives for the proposed bypass alignments were reasonable.

In 2008, the FHWA provided MDT with guidance on the relationship between the National Environmental Policy Act (NEPA) approvals and planning requirements, which were issued by FHWA in January that year. According to this guidance, a project must (1) meet air quality conformity regulations, (2) be consistent with the fiscally-constrained Metropolitan Transportation Plan (MTP), and (3) be consistent with the fiscally-constrained State Transportation Improvement Plan (STIP) to meet the new NEPA approval requirements and obtain a Record of Decision (ROD). Based on this guidance, all project phases planned within the life of the MTP must be included in the "fiscally-constrained" MTP in order for FHWA to sign the ROD. As proposed, the Billings Bypass project did not have sufficient funding to be included in the "fiscally-constrained" Billings Urban Area Transportation Plan.

The funding constraints prompted MDT to coordinate with the local Policy Coordinating Committee (PCC) on potential approaches to proceed with the project. In November of 2009, the PCC provided input that the project should be re-scoped to focus on the eastern segment of the proposed project between the interstate and Old Hwy 312. Based on this input, in a letter dated February 8, 2011, the U.S. Army Corps of Engineers (COE) commented that the project purpose and need, as submitted to cooperating and participating agencies for review precluded a "no-bridge alternative." The Environmental Protection Agency (EPA) supported this request. FHWA legal counsel confirmed that the minor refinements to the purpose and need should be made to allow for consideration of no-bridge alternatives. As a result, the project team refined the purpose and need, identified three no-bridge alternatives, and rescreened all of the project alternatives using criteria based on the refined purpose and need. The following contains a summary of the no-bridge alternative screening process that is contained in the EIS. Section 4.1.3 of this

evaluation addresses the alternative considered but eliminated from further review. See **Appendix A** of this evaluation for the No-Bridge Alternatives Screening Memorandum that includes the detailed evaluation, maps, and screening matrix of all project alternatives.

Three existing Yellowstone River crossings were identified as no-bridge alternatives, and alternatives using these three crossings were developed. The Level 1 screening eliminated alternatives that were not consistent with the re-scoped project; i.e., did not provide a connection between I-90 and Old Hwy 312. Three no-bridge alternatives were carried to the next level of screening.

Level 2 screened alignments to determine how well they met the identified purpose and need of the project, and evaluated for community and environmental impacts that could be considered a fatal flaw. Level 2A screening criteria focused on evaluating key benefits related to the purpose and need and cultural and floodplain impacts that could be a fatal flaw. Two no-bridge alternatives were advanced to the next level of screening. Level 2B screening included development of horizontal design and right-of-way (ROW) boundaries of the alternatives. The screening criteria consisted of travel time benefits, ROW/private property impacts, floodplain impacts, and other potential issues that could be a fatal flaw.

The no-bridge alternatives were considered but rejected during the Level 2B screening of alternatives process. None of the no-bridge alternatives were advanced to the Level 3 screening. They were screened out because they either did not meet the identified purpose and need of the project or had substantial community and environmental impacts.

In summary, the practicable alternatives were identified through three levels of screening criteria including, but not limited to meeting project purpose and need, improving mobility and connectivity, environmental impacts, cultural impacts, ROW impacts, community resources impacts, and traffic data analysis. Over 40 alternatives (on-site, off-site, and no-bridge alternatives) were considered during the planning and screening process. Details and results are included in the EIS.

In 2012, MDT recommended Mary Street Option 2 as the Billings Bypass Preferred Alternative. Sufficient funding for construction of the Preferred Alternative has not yet been identified. As such, the Mary Street Option 2 Alternative would be constructed in two phases during a 20-year time frame as funding becomes available. Phase 1 is expected to consist of a two-lane facility following the alignment of the Preferred Alternative with improvements occurring either along the centerline or offset from the centerline as required to develop the phased approach. Although the Phase 1 footprint would be narrower than the Full Buildout footprint, Phase I would still purchase the right-of-way for the final four-lane footprint of the Full Buildout. The secondary corridor would be constructed to accommodate the Full Buildout during Phase 1. The bridge across the Yellowstone River initially would be constructed as a two-lane bridge with sufficient ROW acquired to accommodate the later construction of a second two-lane bridge. The other bridge and all of the culverts that would be required for the project would be wide enough to allow for the eventual expansion to the Full Buildout. This 404(b)(1) evaluation applies only to Phase 1.

2.1.2 ALTERNATIVES

As a result of the planning and screen process, the practicable alternatives advanced to EIS analysis include:

- No Build Alternative
- Mary Street Option 1 Alternative

- Mary Street Option 2 Alternative
- Five Mile Road Alternative

The build alternatives are comprised of one or two typical sections, a primary corridor alignment, intersection/interchange improvements, and secondary corridor improvements. These include 12-foot-wide travel lanes in each direction; paved shoulders; medians; drainage channels, side slopes; and in some cases, a frontage road. Pedestrian elements including sidewalks, multi-use paths, and bicycle lanes are also included as appropriate. Bridge design would optimize the bridge span lengths and reduce the number of piers located in the active channel.

The existing Five Mile Creek Bridge is fairly new and is adequate to carry the projected traffic for the secondary improvements of all build alternatives. However, the current bridge is not wide enough to accommodate the assumed secondary typical pavement width, and the road profile may change. The EIS assumes that the bridge may need to be replaced for the Mary Street Option 1 Alternative and the Five Mile Road Alternative pending final design.

National Highway System (NHS) rural and/or urban standards are proposed for the project primary corridor. Secondary corridor design standards include MDT Rural Local Roads or City of Billings Urban Arterial Roadway standards. Figures depicting the alternatives and typical sections are shown in the EIS. A brief discussion of the alternatives is provided below. Note: some project specific information required for the Section 404(b)(1) evaluation may not be accurately depicted until final design plans are available.

NO BUILD ALTERNATIVE

The No Build Alternative includes the routine maintenance and improvements of the existing roads in the study area and the currently programmed, committed, and funded roadway projects in the study area. The No Build Alternative would perpetuate the existing roadways and intersections. Any improvements to the existing system would be individually considered. The No Build Alternative would not have the construction or operational impacts of the build alternatives. Non-project activities and development in the project area would have continued effects to area ecosystems. Currently programmed roadway projects of the No Build Alternative have the potential to involve discharges to waters of the U.S. including wetlands, with proportionally less adverse effects due to the smaller scale of the projects. The No Build Alternative would not satisfy the purpose and need of the project.

MARY STREET OPTION 1 ALTERNATIVE

This alternative would provide a 6.9 to 7.0 mile long principal arterial alignment across the Yellowstone River between I-90 and Old Hwy 312. The alignment would use portions of Johnson Lane and Coulson Road through commercial and industrialized areas. A grade separated bridge structure would cross over Coulson Road and the Montana Rail Link. North of the bridge, the alignment traverses agricultural land and Yellowstone River floodplain. The Yellowstone River is crossed with two structures: a main channel structure and the side channel structure. Both structures would have a skew to the channel. North of the Yellowstone River, the alignment proceeds west toward the Mary Street corridor. The alignment would parallel the north side of Mary Street for approximately 1.6 miles traversing land with residential and agricultural uses. The alignment would terminate at Old Hwy 312. Secondary corridor improvement includes connection and improvements to the Five Mile Road corridor to Old Hwy 312. The Mary Street Option 1 Alternative would involve discharges that would have adverse effects to waters of the U.S. similar to the Five Mile Road Alternative.

MARY STREET OPTION 2 ALTERNATIVE

This alternative would provide a 6.7 to 6.8 mile long principal arterial alignment across the Yellowstone River between I-90 and Old Hwy 312. The segment of this alternative south of the Yellowstone River would be very similar to Mary Street Option 1. However, the Yellowstone River is crossed with one main channel structure with no skew. North of the Yellowstone River, the alignment proceeds northwest through undeveloped land that is master planned as a regional park. The alignment intersects Five Mile Road and arcs to the southwest over Five Mile Creek toward the Mary Street corridor. A new Five Mile Creek Bridge would be constructed. The alignment would parallel the north side of Mary Street for approximately 1.6 miles traversing land with residential and agricultural uses. The alignment would terminate at Old Hwy 312. Secondary corridor improvement includes improvements to the Five Mile Road corridor to Old Hwy 312. The Mary Street Option 2 Alternative would involve discharges that would have adverse effects to waters of the U.S. greater than the Mary Street Option 1 Alternative and the Five Mile Road Alternative because of the new Five Mile Creek Bridge.

FIVE MILE ROAD ALTERNATIVE

This alternative would provide a 6.7 to 6.8 mile long principal arterial alignment across the Yellowstone River between I-90 and Old Hwy 312. The segment of this alternative south of the Yellowstone River and the Yellowstone River Bridge proposed under this alternative is the same as described for Mary Street Option 2. The alignment intersects Five Mile Road further north than the Mary Street Option 2 Alternative and would follow the existing Five Mile Road alignment north through agricultural areas. The alignment would terminate at Old Hwy 312. Secondary corridor improvement includes connection and improvements to the Mary Street corridor to Old Hwy 312. The Five Mile Road Alternative would involve discharges that would have adverse effects to waters of the U.S. similar to the Mary Street Option 1 Alternative.

2.2 AUTHORITY AND PURPOSE

MDT, in cooperation with FHWA, has prepared an EIS evaluating impacts of a project to improve access and connectivity between I-90 and Old Hwy 312. The build alternatives would:

- Reduce barrier impact to the transportation system,
- Improve connectivity between Lockwood and Billings,
- Improve mobility to and from Billings Heights, and
- Improve truck/commercial vehicle access to and through Billings.

Design objectives included:

- Improving roadway functionality,
- Addressing Yellowstone River crossing concerns,
- Improving safety,
- Consideration of environmental and community resources, and
- Cost considerations.

2.3 DREDGED OR FILL MATERIAL

2.3.1 GENERAL CHARACTERISTICS

Dredge and fill materials would be used for roadway construction and bridge construction. Fill material would be excavated locally and would be similar in physical and chemical characteristics to substrate in areas that are filled. The fill materials for all purposes would be granular material meeting MDT standard specifications for gravel or common borrow. Some typical fill material may be concrete, steel, or similar materials that could be used for culvert or bridge construction. Rock riprap may be used to resist erosion around flowing water.

The Billings Bypass *Hydraulics Report* (DOWL HKM 2011) indicated that Quaternary Age alluvium is the predominant geologic component that consists mostly of very coarse-grained cobbles, gravel, and sand. Sandstone of the Judith River Formation is exposed bedrock in the Yellowstone River channel immediately below Five Mile Creek. Natural Resources Conservation Service (NRCS) has identified over 40 soils series underlying the project corridor. The most abundant were Keiser silty clay loam, 0 to 1 percent slopes, Fort Collins and Thurlow clay loams, 0 to 1 percent slopes, and Bew silty clay loam, 0 to 1 percent slopes. The predominant series of the Yellowstone River was riverwash (NRCS 2011).

2.3.2 QUANTITY OF MATERIAL

Most dredge and fill encroachments to waters and wetlands would involve approach fills, construction of abutments and piers for bridges, or placement of fill over culverts and other required grading necessary for the project. Hydraulic project features include bridge river crossings, drainage culverts, intersection culverts, and irrigation ditches. The build alternatives each have over 40 hydraulic project features. Mary Street Option 1 Alternative has two new bridge structures crossing the Yellowstone River, Mary Street Option 2 Alternative has a new bridge structure crossing the Yellowstone River and a new bridge crossing Five Mile Creek, and the Five Mile Road Alternative has a new bridge structure crossing the Yellowstone River.

Quantities of fill material would depend on specific topographical features of affected waters and wetlands. The final quantities sufficient to make the proposed improvements would be determined during final design.

2.3.3 SOURCE OF MATERIAL

Fill materials compatible with native soils and similar in physical and chemical characteristics as practicable to the substrate in the waters and wetlands would be used. Fill material used for widening and construction of approaches to bridges and fills over culverts would likely be embankment material generated on-site or from nearby cut areas along the roadway. No specific borrow source locations have been identified to date. Borrow sources that are within close proximity to the project area and therefore would be similar to the on-site soil would likely be chosen. Borrow or excavation sites require archaeological clearances and environmental approval to avoid wetlands, sensitive areas, high salinity or acid generating materials, heavy metals, pesticides, or other potentially harmful elements.

2.4 PROPOSED DISCHARGE SITES

The *Hydraulics Report* included a hydraulic analysis and channel migration study. The hydraulics analysis was conducted (DOWL HKM 2011) for two Yellowstone River Bridge crossings, a new Five Mile Creek Bridge crossing, various drainage and irrigation culverts, and miscellaneous hydraulic

features associated with the potential Billings Bypass alignments. During the course of the project planning effort (2004 to 2012), impacts on the Yellowstone River floodplain were evaluated using both the current regulatory floodplain delineation model (developed in 1981 and revised in 2000) and the newest version of the modified preliminary floodplain delineation model.

The channel migration study identified trends in lateral movement of the Yellowstone River near the proposed bridge options. The Yellowstone River Bridge for all three alternatives has a 50-foot-wide, two-lane bridge, which would require a single 10-foot drilled shaft pier (DOWL HKM 2013). A comprehensive analysis of the hydrologic and hydraulic characteristics of the Preferred Alternative alignment would be conducted during the final design.

A Biological Resources Report (BRR) and Addendum was prepared for this study by David Evans and Associates, Inc. (DEA 2011, DEA 2013). The BRR documented biological and aquatic resources in the study area. It included the methodology used in delineating wetlands and documented the location, size, and type of waters and wetlands identified within the project study area.

The impacts to the aquatic resources in this evaluation were updated from the BRR and were derived from the Phase 1 alternative design provided in 2013 by DOWL HKM. Impact analysis included alternative alignments within the Phase 1 construction limits. This includes ROW acquisition areas where new culverts or culvert extensions are planned and where irrigation or drainage canals would be relocated during Phase 1. Final alignment designs are anticipated to reduce aquatic impacts through avoidance and minimization measures implemented on the basis of policies, procedures, and regulations.

2.4.1 LOCATION OF SITES

The project corridor is located within the Upper Missouri Drainage Basin and the Middle Yellowstone Watershed, Yellowstone Basin identified as U.S. Geological Survey (USGS) Hydrologic Unit Code 10070007, Upper Yellowstone-Pompeys Pillar. The three major surface water bodies in the study area include the Yellowstone River, Five Mile Creek, and Seven Mile Creek. Over 50 wetlands were identified in the project study area.

2.4.2 SIZE OF SITES

Wetland boundaries were determined by using the COE Wetland Delineation Manual (Environmental Laboratory 1987) and subsequent Regional Supplement Great Plains Region, Version 2.0 (COE 2010). Wetland boundaries within the study area were determined using Global Positioning Systems. **Table 1** shows the delineated acreage of each wetland in the project study area and impacts according to the build alternatives. The wetland impacts were analyzed assuming maximum impacts. Actual impacts would be avoided and minimized as practicable during final design.

Table 1. Jurisdictional and Non-jurisdictional Wetland Impacts

Wetland Field ID	Location (decimal degrees)	Wetland Class	MDT rating	Preliminary JD	Justification for Determination	Delineated acres (ha)	Mary 1 Impacted acres (ha)	Mary 2 Impacted acres (ha)	Five Mile Impacted acres (ha)
AA	-108.445427 45.842975	PEM	IV	Yes	Supply/waste ditch for agricultural use, outlet to Five Mile Creek	0.08 (.03)	0.04 (.02)	0.04 (.02)	–

Wetland Field ID	Location (decimal degrees)	Wetland Class	MDT rating	Preliminary JD	Justification for Determination	Delineated acres (ha)	Mary 1 Impacted acres (ha)	Mary 2 Impacted acres (ha)	Five Mile Impacted acres (ha)
AC	-108.422228 45.849495	R2EM	III	Yes	Wetland associated with irrigation canal that discharges to natural drainage to Yellowstone River	0.94 (.38)	–	–	0.12 (.05)
AD	-108.425678 45.862220 to -108.425175 45.867509	PEM	IV	Yes	Wetland associated with two canals that join and flow east for agricultural end use and/or to Seven Mile Creek or the Miller McGirl Ditch	1.15 (.47)	1.07 (.43)	1.00 (.41)	1.07 (.43)
AF	-108.413431 45.842836	PFO	II	Yes	Wetland has a natural drainage to the Yellowstone River	1.82 (.74)	0.19 (.08)	0.19 (.08)	0.19 (.08)
AG	-108.414871 45.844137 and -108.416047 45.844981	R2UB	II	Yes	Wetland located within the Yellowstone River channel	10.32 (4.17)	0.89 (.36)	0.48 (.20)	0.48 (.20)
C	-108.459445 45.842297	R2SBHx	IV	Yes	Wetland abuts the canal which flows north to Five Mile Creek	0.18 (.07)	0.02 (.01)	0.03 (.01)	–
D	-108.458486 45.842550	PEM	IV	No	Wetland abuts lateral supply ditch-agriculture end use	0.09 (.40)	0.03 (.01)	0.03 (.01)	–
D9	-108.403341 45.836236	PEM	IV	No	Wetland abuts lateral supply ditch- agriculture end use	0.83 (.33)	0.13 (.05)	0.15 (.06)	0.15 (.06)
E	-108.433658 45.841864	PEM	III	Yes	Wetland source water is a pipe from Lake Elmo, the wetland pond complex discharges into the Yellowstone River	0.89 (.36)	0.16 (.06)	–	0.12 (.05)
F	-108.430044 45.845449	PEM	III	Yes	Wetland along Five Mile Creek	1.11 (.45)	tr	0.08 (.03)	0.01 (.01)
I	-108.451946 45.842441	PSS	IV	Yes	Wetland along irrigation ditch that discharges into natural drainages to Five Mile Creek	0.39 (.16)	0.09 (.04)	0.09 (.04)	–
J	-108.450651 45.842405	PSS	IV	Yes	Wetland along irrigation ditch that discharges into natural drainages to Five Mile Creek	0.19 (.08)	0.11 (.05)	0.11 (.05)	–
K	-108.435140 45.842759	PFO	III	No	Sub surface flow from gravel pit ponds from SE of Mary Street, end use-cistern domestic landscape irrigation, potential intermittent flow to Five Mile Creek without surface connectivity	0.29 (.12)	0.29 (.12)	tr	–
L2	-108.424862 45.868202	PEM	IV	Yes	Wetland connects to larger canal wetland to the south (Wetland AD), which potentially drains to Seven Mile Creek or the Miller McGirl Ditch	0.30 (.12)	tr	tr	tr

Wetland Field ID	Location (decimal degrees)	Wetland Class	MDT rating	Preliminary JD	Justification for Determination	Delineated acres (ha)	Mary 1 Impacted acres (ha)	Mary 2 Impacted acres (ha)	Five Mile Impacted acres (ha)
L4	-108.426117 45.868176 and -108.428823 45.869278	PEM	III	Yes	Wetland connects to Wetland AD, which potentially drains to Seven Mile Creek or the Miller McGirl Ditch	1.31 (.53)	0.24 (.10)	0.24 (.10)	0.24 (.10)
M	-108.461223 45.841980 to -108.461223 45.841980	PEM	IV	No	Wetland abuts supply ditch-agriculture end use	0.68 (.28)	0.34 (.14)	0.39 (.16)	0.68 (.28)
O	-108.417796 45.846165	R2UB	IV	Yes	Wetland located within the Yellowstone River channel	1.79 (.72)	–	0.25 (.10)	0.25 (.10)
P	-108.404117 45.825121	PEM	III	Yes	Wetland abuts supply/waste ditch that potentially flows to the Yellowstone River	0.94	0.09 (.04)	0.09 (.04)	0.09 (.04)
R	-108.401733 45.828063	PEM	IV	Yes	Wetland abuts irrigation lateral supply/waste ditch that potentially flows into the Yellowstone River	0.02 (.01)	0.02 (.01)	0.02 (.01)	0.02 (.01)
S	-108.412326 45.820343 and -108.401237 45.827320	PEM	IV	Yes	Wetland associated with Coulson Ditch which potentially discharges into the Yellowstone River	1.12 (.45)	0.68 (.27)	0.68 (.27)	0.68 (.27)
T	-108.413493 45.813229 to -108.415760 45.814822	PEM	IV	No	Roadside ditch wetlands with fully infiltrated flow	0.37 (.15)	0.37 (.15)	0.37 (.15)	0.37 (.15)
W	-108.413832 45.819996	PEM	III	Yes	Wetland discharges into a large unnamed drainage to Yellowstone River	12.2 (4.95)	0.06 (.03)	0.06 (.03)	0.06 (.03)
Y	-108.465848 45.843483	PEM	IV	No	Wetland abuts lateral supply ditch-agriculture end use	0.04 (.02)	0.04 (.02)	0.04 (.02)	0.04 (.02)
Z	-108.466628 45.842775	PEM	IV	No	Ditch at intersection, intermittent flow, and small pond. Flow north from culvert to culvert ends in agricultural land roadside ditch	0.04 (.02)	0.02 (.01)	0.02 (.01)	–
Total						37.09 (15.01)	4.87 (1.97)	4.36 (1.76)	4.58 (1.85)
Total JD only							3.65 (1.48)	3.36 (1.36)	3.34 (1.35)

JD = jurisdictional determination
tr = < 0.005 acre, included in totals

Twenty-four wetlands were delineated within or partially within the project corridor totaling about 37 delineated acres. Depending on the build alternative, a maximum of 23 wetlands are affected with resulting impacts of about 4.9 or fewer acres.

2.4.3 TYPE OF SITES

Potential discharge sites include the Yellowstone River, Five Mile Creek, up to 30 drainage ditches, up to 25 irrigation ditches, and one gravel pit pond. New crossings are proposed for the Yellowstone River and Five Mile Creek. The gravel pit pond identified as surface water was a recent excavation and does not have wetlands or high habitat value. It would account about 1.08 acres of potential impacts from the Five Mile Alternative.

Primary influences on wetland hydrology include a high groundwater table and the presence of surface water conveyance channels created during the original construction of the irrigation systems and highway construction. The existing roadways, railroad bed, and irrigation features act as an impoundment in some areas.

Detailed evaluation of the distinction between permanent and temporary impacts has not been completed at this level of design. Irrigation features may account for up to ⅔ of total wetland impacts. Most of these irrigation features would be relocated and the wetlands would likely re-establish at the new location. Impacts would therefore be considered temporary except where an irrigation feature requires a new culvert crossing or culvert extension. Furthermore, six wetlands AF, AG, E, F, K, and P, were identified as high quality wetlands, primarily because of riparian features and wildlife use. Wetlands AF, AG, F, and K are associated with naturally occurring streams or springs. Wetlands E and P are associated with large irrigation canals. Although portions of these high quality wetlands are located in a temporary impact zone, they would not re-establish within 5 to 10 years as would be expected with emergent wetlands or those associated with relocated irrigation features. Impacts to these high quality wetlands would be permanent and account for about 1.6 acres. Permanent and temporary wetland impacts would be differentiated and quantified in final project design and permitting.

The high quality wetland descriptions are summarized as follows:

- Wetlands AF and AG are naturally occurring, Category II wetlands of the Yellowstone River with high ratings in sediment/shoreline stabilization, MT Natural Heritage program species habitat, general wildlife habitat, general fish habitat, and production export/food chain support. Wetland AF has riparian vegetation.
- Wetland E is a Category III wetland south of Mary Street. It is part of a wetland complex that abuts a gravel pit pond that was naturalized in the 1980s. The water source is from a pipe from Lake Elmo. It has high ratings in sediment/shoreline stabilization; and sediment, nutrient, and toxic removal.
- Wetland F is a naturally occurring wetland along Five Mile Creek and its tributaries. It is a Category III wetland with high ratings in sediment/shoreline stabilization; sediment, nutrient, and toxic removal; general fish habitat; and production export/food chain support.
- Wetland K is a naturally occurring, spring fed wetland north of Mary Street. The gravel pit has been landscaped, converted to residential and agricultural use, and somewhat naturalized in low areas. It is a Category III wetland with riparian vegetation, high ratings in sediment, nutrient, and toxic removal; and groundwater discharge/recharge.
- Wetland P is a Category III wetland with riparian components and is associated with an irrigation canal. It has moderate ratings in MT Natural Heritage program species habitat, sediment/shoreline stabilization, production export/food chain support, and general wildlife habitat. Fish species were observed in the canal.

DEA biologists made preliminary determinations that most of the waters and wetlands in the project area were jurisdictional waters of the U.S. Irrigation ditches that convey water to an ultimate agricultural use

were classified as non-jurisdictional. According to published guidance, the COE generally does not consider ditches excavated on dry land with an end agricultural use as jurisdictional "waters of the U.S." (COE 2008). The COE will make the final determination on the jurisdiction of the project's waters and wetlands. Non-jurisdictional wetlands account for 1 to 1.24 acres of total wetland impacts

2.4.4 TYPES OF WETLAND HABITATS

The majority of wetland habitats potentially impacted by the project were disturbed from past or current land uses. These wetlands were classified as palustrine emergent and had reed canarygrass and cattail as dominant plant species. Habitat functional ratings were generally low. However, wetlands associated with the Yellowstone River and Five Mile Creek were naturally occurring wetlands classified as forested or scrub/shrub wetlands with moderate to high habitat functional ratings due to vegetation diversity and wildlife habitat.

2.4.5 TIMING AND DURATION OF DISCHARGE

The timing and duration of construction activities would depend on the alternative chosen and the type of construction (bridge construction, road widening, or new road construction). The project schedule would be determined during final design. The timing and duration would be established to minimize turbidity and other disturbances in the waters and wetlands. Construction discharge schedules would be specified to avoid spawning and migration periods for sensitive species.

2.5 CONSTRUCTION METHOD

The type of construction methods would depend on the type of construction that may be conducted in a specific location. The following sections provide a description of construction methods that would be used to build a new roadway, bridge construction, roadway widening, culvert construction and replacement, and irrigation facilities.

New Roadway Construction: The construction method for new roadway would place fill materials in waters and wetlands within the construction zone. Where necessary, the area where fill is to be placed would first be cleared of vegetation and topsoil. The fill material would be placed in the wetlands by large earth-moving equipment such as excavators and bulldozers and compacted in relatively thin lifts. The fill material would likely be acquired from nearby source pits or excess material from other areas within the project corridor. The fill would be required to construct the necessary side slopes and adjust the elevation of the roadway.

Bridge Construction: Bridge construction requires banks be excavated to construct footings, piers, and embankments for the structure. This would include work below the ordinary high water mark. The bridge designs have not been finalized. The *Hydraulics Report* analysis indicated that the bridge crossings could be developed to meet current standards set by COE for encroachment. The hydraulics of these bridge crossings is mostly governed by the number of piers that need to be located within the active channel. The hydraulic analysis assumed one drilled shaft pier location would be needed for a 50-foot-wide bridge. Four designs were analyzed: concrete girder bridge, a steel girder bridge, combination steel and concrete girder bridge, and a combination segmental and concrete girder bridge. Two bridge crossing sites were evaluated. The pier locations would likely vary from seven to ten for the Yellowstone River crossing and zero to two for the new Five Mile Creek Bridge. The bridge configurations would be determined in final design. Temporary cofferdams and work platforms would be constructed for installation of bridge piers or abutments. This may include work below the ordinary high water mark. Where feasible, bridges may be

built such that footings and abutments are outside of the active channels and floodway, effectively spanning the water body and wetlands.

Roadway Widening: Widening of the highway is expected to be accomplished with methods currently employed for new roadway construction, except it would include placing fill material in waters or wetlands located along existing roadways.

Culvert Construction and Replacement: Methods of culvert construction, replacement, and removal would be determined by the contractor. Culvert construction would require excavation of waters or wetlands to lay the pipe or box culvert. However, for culvert replacement, the new culvert would be placed so the existing concrete culvert would continue to contain flow during construction thereby isolating the construction activities from the stream channel. The existing culverts would be removed and isolated from the active stream channel.

Irrigation Canals and Lateral Ditches: Major irrigation canals and lateral ditches would be relocated and longitudinal impacts would be modified. Methods of construction would be similar to culvert construction and removal when needed to maintain irrigation flow.

3.0 FACTUAL DETERMINATIONS

3.1 PHYSICAL SUBSTRATE DETERMINATIONS

The *Hydraulics Report* involved an independent review of the channel migration and a review of the recently completed *Yellowstone River Channel Migration Zone Mapping* report (DTM and AGI 2009) completed by Applied Geomorphology Inc. (AGI) and DTM Consulting. The 2011 *Hydraulics Report* and the *2013 Hydraulic Report Technical Memorandum* (DOWL HKM 2013) was consistent with the evaluation and results presented in the AGI and DTM report.

3.1.1 SUBSTRATE ELEVATION AND SLOPE

The *Hydraulics Report* evaluated channel migration in the project corridor and concluded that that primary channel location near the proposed bridge crossing locations has been very consistent for over 130 years. Additionally, the bridge options were located on the very stable Judith River Formation bedrock along the northwest side of the river corridor. The elevation and slope of the streambeds would not be adversely impacted by the build alternatives except at localized areas immediately around the new piers. Overall stream flow gradients and regimes in these limited areas are not anticipated to change or create velocity changes sufficient to cause abnormal deposition or scour problems. According to the report, this was demonstrated at the I-90 bridge located upstream of the study area that spans the Yellowstone River that was built in 1962. Scour at the proposed crossing locations is not expected to be a significant issue for design. The existing channel characteristics would be designed to match appropriate natural conditions. General site grading would be determined by the upstream and downstream elevations. Installation of culverts would match existing channel elevation where practicable, but may cause localized changes in substrate elevation and slope.

3.1.2 FILL MATERIAL AND SUBSTRATE COMPARISON

The general fill materials used would be select granular backfill with characteristics very similar or better than those at the discharge site. At the stream crossings, the substrate is expected to consist of smooth cobbles with clean gravels and fine sediments along the embankments and in the streambed. Wetland

substrate usually consists of fine sediments with organic soils. Fill materials would be granular materials similar to those at the discharge site, with the exception of bridge pier or abutment materials.

3.1.3 DREDGED/FILL MATERIAL

The fill materials used in the stream crossings, irrigation features, and culverts would consist of granular materials that are not susceptible to movement by water action. Wetland fill materials would be similar to those at the discharge site. Material movement is not anticipated because water velocity is negligible in the wetland areas. Characteristics of dredged/fill material are described in Section 2.4.

3.1.4 PHYSICAL EFFECTS TO THE AQUATIC ECOSYSTEM

a) Physical Effects on Benthos: Benthic organisms (bottom-dwelling plants and animals) would be impacted within waters and wetland areas where the fill materials would be placed and potentially downstream from fill placement as a result of turbidity and sedimentation. The benthic organisms could relocate and re-establish themselves in the fill material over time if the fill is sufficiently similar to the native material. Therefore, the physical effects on benthos should be short-term and relatively localized at the fill site and immediately downstream.

b) Invertebrates: The impacts to aquatic invertebrates would also primarily be short-term. Fill material placed within waters or wetlands would bury organisms that are present at those locations, but new organisms would be expected to quickly re-establish themselves in these areas if fill is sufficiently similar to the native material. In addition, construction activities could cause localized increases in suspended sediment on a temporary basis, which would adversely affect aquatic insects that rely upon sight to find food. Increased sediment levels may also clog interstitial spaces in the streambed that invertebrates use for habitat, but the habitat would quickly regenerate when turbidity is abated and "flushing" occurs.

c) Vertebrates: Aquatic vertebrates primarily include fish in the project area. Impacts would be long-term and short-term. The permanent structures in the waters and wetlands would remove localized areas of aquatic habitat. There are potential localized impacts areas: spawning areas if located at the structure construction zone and immediately downstream. Sediment from the erosion areas of disturbed soil is the primary source of adverse impacts to aquatic vertebrates. Sediment in streams affects fish by increasing silt in spawning gravel and rearing habitat. This suffocates the eggs or fry of fish species, affects the aquatic organisms that fish rely on for food, and is abrasive to fish gills. The use of Best Management Practices (BMPs) for erosion and sedimentation control should prevent these adverse impacts or reduce them to short-term and tolerable levels. Temporary direct adverse effects to fish species could result from pile-driving noise of shaft drilling during bridge construction. Vertebrates may temporarily disperse from the area due to noise.

Toxic materials can also cause problems for fish. Toxins can be introduced to the streams by runoff or through accidental spills or contact with hazardous materials or through the presence of toxins in fill material. See Section 3.4 for more details about potential contaminants in the project area. Stormwater from the proposed project bridge structures would be treated at stormwater drain collection facilities for the bridge decks.

3.1.5 EROSION AND ACCRETION PATTERNS

The *Hydraulics Report* channel migration results indicated that historically the main channel location near the proposed bridges has been very consistent. The existing flow pattern of the local rivers and streams has not caused undesirable erosion and accretion patterns in the project corridor. There has been historic

variation in island formation, erosion, and migration of islands below and above the proposed bridges. Bank armoring and flow diversions occur along Yellowstone River in the area of review. Areas of bank armoring and man-made structures restrict natural channel migration (DTM and AGI 2009). The proposed Yellowstone River Bridge locations are designed to accommodate flow through the main channel, side channels, and areas prone to flooding. The analysis identified bridge design criteria that minimized backwater. Armoring has been limited to the south bank. Localized scour and impacts to substrate would be anticipated to occur at these pier and armoring locations. However, scour at the proposed crossing locations is not expected to be a significant issue for design. Detailed evaluations of potential bridge scour have not been completed for this planning level analysis. The new piers, armoring, and abutments would affect only a small percentage of the overall Yellowstone River system. The alternatives are not anticipated to alter the processes of erosion or accretion that are naturally associated with the streams in the project area. The project is not anticipated to alter channel migration processes of the Yellowstone River. However, new piers, abutments, and/or armoring would result in new restricted channel migration sites at the locations of those structures.

3.1.6 IMPACTS AVOIDANCE AND MINIMIZATION

The following measures have been or can be incorporated into the proposed action to avoid and minimize the impacts to waters and wetlands:

- Alignment design incorporated a combination of existing roadway corridors, new roadway corridors, existing and new interchange configurations that were advanced to evaluation in the EIS.
- Where practicable, the alignment was shifted away from waters and wetland areas to avoid or minimize impacts.
- Bridge structures were located at a narrow crossing point nearly perpendicular to the Yellowstone River and Five Mile Creek.
- Bridge design would optimize the bridge span lengths and reduce the number of piers located in the active channel.
- Channel characteristics are planned to be preserved or designed to match appropriate natural conditions.
- Detailed scour evaluation would be required during final design.
- Fill areas and amounts would be minimized.
- Fill materials would be very similar to those at the discharge site.
- Minimize clearing of vegetation.
- Schedule the timing and duration of the construction activities to coincide with the lowest flows possible and so that it does not coincide with spring spawning runs of the sauger when migration movements could be disrupted or blocked.
- Incorporate a Stormwater Pollution Prevention Plan (SWPPP) and BMPs into construction to avoid and minimize impacts. The contractor would be required to follow the SWPPP and recommended BMPs. The selection of the BMPs would be done during the final design activities and at the discretion of the highway designer.
- Incorporate stormwater facilities for runoff from the bridge deck.
- Restore areas temporarily impacted from construction.

3.2 WATER CIRCULATION, FLUCTUATION, AND SALINITY DETERMINATIONS

3.2.1 WATER

The following sections discuss the proposed action's impact on various components of water quality in the project area. The Yellowstone River in the project area is currently 303(d) listed with constituents of interest that include natural source arsenic; agriculture and municipal sources, and pipeline breaks. These sources impact benthic-macro invertebrates, dissolved oxygen saturation, excess algal growth, nutrient eutrophication, periphyton indicators, suspended and bedload solids; and oil and grease. Associated impaired uses include drinking water, aquatic life, and primary contact recreation. Total maximum daily loads (TMDL) have not been established. No other water bodies in the project area were 303(d) listed at the time of analysis (MDEQ 2012).

a) Salinity: No site-specific tests for salinity have been performed. Increases in salinity can result from the introduction of an impoundment or by altering the existing hydrologic regime of waters or wetlands. Other causes of increased salinity can be the use of fill materials significantly different from native soils. While the proposed project would decrease wetland area, hydrologic regimes would not be significantly altered and no new impoundments would be created. In addition, fill materials used for the project would resemble native soils.

b) Water Chemistry: No site-specific tests for water chemistry have been performed. However, there is no reason to suspect that the proposed action would significantly alter the alkalinity, hardness, pH level, or mineral concentration in the surface waters.

c) Suspended Sediments: Construction activities would cause temporary, localized, minor increases in suspended sediments during construction activities especially near streams where fines in the new fill material are transported from the discharge sites by water currents. Stable, granular fill material would be used to minimize these impacts.

d) Clarity: There may be temporary, localized increases in turbidity during the placement of fill materials along stream embankments. These increases in turbidity would be minor, compared to the naturally occurring processes during spring runoff conditions or after heavy rainstorms.

e) Color: The placement of fill material in waters or wetlands could disrupt the substrate and increase the suspended sediments and turbidity in the water. This may cause temporary, local changes in the color of water near construction activities, especially immediately following the fill placement. This change in color would be similar to the change in color that results from natural processes during the spring runoff when high concentration of sediments from surrounding drainages give the river a milky color.

f) Odor: The project would not significantly influence the odors in the waters and wetlands.

g) Taste: The project would not significantly alter the taste of the surface water or the groundwater in the project area precluding any unforeseen spills or abnormal conditions.

h) Dissolved Gas Levels: Because improvements are not expected to significantly increase the turbulence of flows, cause stagnation in the waters and wetlands, or cause other changes to hydrologic regimes, it is unlikely that the existing dissolved gas levels would be altered.

i) Nutrients: Nutrient loads such as phosphorus arid nitrogen predominantly come from non-point agricultural sources, point discharges such as wastewater treatment plants, and other naturally occurring high organic loads such as decaying algae. Nitrate residual could occur on rock blasted for removal during construction. If such material is placed in watercourses, it could provide a temporary low level source of nitrogen. If blasting of rock would be necessary at crossing locations and/or if shotrock were used for rip-rap, nitrate residuals would be quickly flushed and diluted to insignificant levels. Impacts to these conditions are not expected to occur from the proposed action. Since water and wetland hydrology within the project corridor would be maintained, no impact from nutrient loading should result.

j) Eutrophication: There would be no significant increase in nutrients or negative affects to the hydraulic regimes by the proposed action that may cause undesirable eutrophication. Rivers and streams, having well mixed waters, are generally not affected. The wetlands are naturally subject to eutrophication.

3.2.2 CURRENT PATTERNS AND CIRCULATION

a) Current Patterns, Drainage Patterns, Normal and Low Flows: All of the existing cross-highway drainage would be maintained or improved. In areas where new fills are to be placed, a foundation blanket of granular material could be constructed for the fills that would allow passage of groundwater through areas not already served by culverts and bridges. Seasonal variations in stream flow and groundwater movement naturally affect flow volumes and hydraulic patterns. However, none of the proposed improvements are expected to significantly change or alter these patterns and the total flow of water should not be modified.

b) Velocity: The intent of the new bridge designs would be to maintain the existing velocities in the streams. However, culverts would be designed to keep velocities low enough to minimize erosion at the outfalls.

c) Stratification: Proposed improvements are not expected to alter the existing stratification of waters in any of the waters or wetlands.

d) Hydrologic Regime: Improvements are not expected to significantly affect the existing hydrologic regime of the Yellowstone River or its tributaries.

e) **Aquifer Recharge:** The quality or extent of aquifer recharge would not be significantly adversely affected by the proposed action. New impervious surface areas would be minimized to the extent practicable.

3.2.3 NORMAL WATER LEVEL FLUCTUATIONS

Wherever possible, the bridges and culverts would be designed to accommodate 50-year and 100-year flows without significantly altering the stream elevation or causing backwater problems.

3.2.4 SALINITY GRADIENTS

Because there are no known locations of salinity within the project area, salinity gradients would not be altered.

3.2.5 IMPACTS AVOIDANCE AND MINIMIZATION

The following measures have been or can be incorporated into the proposed action to avoid and minimize the impacts to water circulation and water level fluctuations:

- Bridges and culverts would be sized to maintain the existing stream water levels and velocities as required.
- Culverts and hydraulic structures would be designed to maintain the existing cross-highway drainage and to allow for fish passage as needed. Additional culverts may be installed to preserve or restore flow between connected or bisected waters and wetlands.
- Roads and structures using culverts, open channels, and diversions would accommodate fluctuating water levels, velocity, and maintain circulation.
- The fill material would be placed to maintain the existing hydraulic properties of the waters and wetlands whenever possible.
- Granular material would be used as a foundation for new embankments to maintain flow through them.
- Disruption of periodic water inundation patterns would be avoided by location and schedule of discharge accordingly.
- Highway improvements would be planned to reduce existing highway runoff and the potential for negative impacts to water quality.

3.3 SUSPENDED PARTICULATE/TURBIDITY DETERMINATIONS

3.3.1 EXPECTED CHANGES IN SUSPENDED PARTICULATE AND TURBIDITY LEVELS

Fill placement at stream crossings may introduce some fine materials to the surface waters, which would cause temporary increases in the level of suspended particulates during construction. The placement of fill may also cause unnatural turbulence, which could suspend bottom sediments. This may result in temporary increases of turbidity levels near water or wetland encroachments. Pier construction would utilize cofferdams and other BMPs to minimize sedimentation. Stormwater runoff from recently graded areas near waters and wetlands can also transport sediments to the waters. This would result in an increase in suspended particulates and turbidity levels. However, a SWPPP would be implemented to minimize particulate and turbidity levels.

3.3.2 EFFECTS ON CHEMICAL AND PHYSICAL PROPERTIES

a) Light Penetration: Increased levels of suspended particulates and turbidity in the surface waters near the construction site can decrease the amount of light penetration. These impacts would be short-term and would occur only temporarily during the construction activities.

b) Dissolved Oxygen: The suspended particulates introduced to the surface waters by the placement of soil would be primarily inorganic. Therefore, no increases in biochemical oxygen demand should occur. In addition, the proposed action should not cause increased turbulence or stagnation of the surface waters that would affect the dissolved oxygen levels.

c) Toxic Metals and Organics: The fill material used for construction would be obtained locally and have similar characteristics to the soils at existing stream crossings. Water quality data for the Yellowstone River indicates that arsenic is naturally occurring. No fill material would be taken from hazardous material sites identified in the Hazardous Materials section of the EIS or other known hazardous materials sites in the region. The primary source of contaminants from transportation systems is runoff from impervious surfaces. Rainfall and snowmelt can carry sediments, animal and agricultural

wastes, pesticides, fertilizers, heavy metals, hydrocarbons, road salts, and debris into creeks, wetlands, and waterways. The potential and magnitude for the impacts to occur would be minimized with implementation of standard BMPs.

d) Pathogens: No known major sources of viruses or pathogenic organisms occur in the project area, although livestock presence was evident in several places throughout the corridor. The use of clean, inorganic fill material for construction activities would not introduce pathogens.

e) Aesthetics: Project construction would affect the visual aesthetics of surface water similar to the spring runoff conditions, but at a much smaller scale. The effects would be temporary, localized, and occur near or just downstream of the actual construction activities. Impacts are limited to the increased suspended particulate levels of the surface waters near locations of fill placement, which would rapidly disperse as distance from the source increases.

3.3.3 EFFECTS ON BIOTA

a) Primary Production, Photosynthesis: The project should not substantially reduce photosynthesis and primary productivity in waters and wetlands. Changes in suspended particulates and turbidity levels would be localized and temporary. Therefore, these conditions should not be significant enough to affect the level of photosynthesis.

b) Suspension/Filter Feeders: Collectors and filter feeders, such as net spinning caddis larvae and burrowing mayfly nymphs, capture and use organic particles suspended in the water current. Due to the increased levels of suspended particulates and turbidity near construction activities, these organisms would be temporarily impacted. Excessive sediment can bury these organisms, abrade their gills, and damage their habitat. However, the impacts would be very localized and short-term. The organisms would be expected to naturally repopulate the disturbed area quickly after the construction activities have been completed.

c) Sight Feeders: Sight feeders, such as stonefly nymphs, rely on clear water to find their food. Therefore, localized increases in suspended particulates and turbidity caused by the placement of fill materials would cause short-term impacts to sight feeders. Similar to filter feeders, excessive sediment can bury these organisms, abrade their gills, and damage their habitat. Suspended particulates and turbidity should rapidly diminish after the placement of fill materials, thereby allowing quick recovery for sight feeders.

3.3.4 IMPACTS AVOIDANCE AND MINIMIZATION

Establishing and implementing effective BMPs for bridge construction and the SWPPP development is key for minimizing impacts that could result from suspended particulates and turbidity in the surface waters. For this purpose, the SWPPP would be implemented during preparation and construction of the proposed project and would be used to acquire a Montana Pollutant Discharge Elimination System (MPDES) permit.

BMPs may include, but are not limited to, slope roughening, temporary seeding, mulching, erosion control blankets, straw bales, gravel filter berms, ditches, silt fences, and settling basins. The SWPPP would be designed to prevent or reduce erosion and release of sediment from construction areas. Temporary, site-specific erosion control structures or practices would be selected based on BMPs for highway construction projects. Goals of the SWPPP include the following:

- Avoid or minimize the extent of exposed soils,
- Stabilize and protect disturbed areas as soon as possible in order to keep runoff velocities low,
- Prevent surface water runoff from reaching disturbed areas,
- Retain sediment within the corridor, and
- Implement a thorough maintenance and follow-up program.

3.4 CONTAMINANT DETERMINATIONS

3.4.1 Evaluation of the Biological Availability of Pollutants in Dredge or Fill Material

a) Physical Characteristics: The physical characteristics of fill or dredge materials would be obtained from local sources and have particle sizes and constituents similar to those occurring in the project area. Fill material would be clean and free of hazardous and toxic pollutants, pathogens, and organics.

b) Hydrography in Relation to Known or Anticipated Sources of Contamination: Existing gravel pits, some with wetlands, may store equipment and petroleum products. Existing irrigation ditches, most with wetlands, receive flow from agricultural areas that contain fertilizers and or pesticides. The proposed project corridor crosses many small streams, drainages, and the Yellowstone River. Contaminants from highway runoff or accidental hazardous material spills could potentially be introduced to waters and wetlands. During construction, stormwater runoff would be controlled by an erosion control plan and a Spill Prevention, Control, and Countermeasure Plan (SPCC) would be implemented. By widening the highway and improving the crossings, the potential for accidents at these crossings would be reduced.

c) Results from Previous Testing of Material or Similar Material in the Vicinity of Project: A detailed hazardous materials assessment performed for the project is summarized in the EIS and the *Hazardous Materials/Substance Initial Site Assessment.* It concludes that no active abandoned hazardous waste sites were identified for priority remedial actions under CERCLA (Superfund) within the study area. Additionally, no Montana Comprehensive Environmental Cleanup and Responsibility Act (CECRA) sites were located in the study area. The likelihood of impacts would be minimized by having knowledge of the sites and potential sites prior to construction and employing appropriate control, clean-up, and disposal measures. Many sites identified in environmental databases are inactive or have been closed following contamination removal.

All build alternatives would create potential effects to hazardous materials sites in the area just south of I-90, between Coulson Road and I-90, and north of Coulson Road (east of the river). Hazardous materials sites with the potential for being impacted include industrial facilities adjacent to Coulson Road that are identified as Resource Conservation and Recovery Act – small quantity generators and non-generator sites. Other hazardous materials sites in this area include former spill sites, and sites identified as having underground storage tanks (USTs), leaking underground storage tanks (LUSTs), and/or above ground storage tanks (ASTs). An electrical substation located at 750 Johnson Lane (south of Old Hardin Road) may include oil-filled equipment and PCBs. Pipeline 4/4b runs parallel with Coulson Road; it would be avoided to the greatest extent possible.

Gravel pits may store diesel and/or asphalt in ASTs and/or USTs and operate equipment that can result in contaminant releases. North of Coulson Road, gravel pit 4 would be traversed. The Reinhold Kembel/Billings MPC Facility, located within gravel pit 4 has reported soil contamination that was subsequently removed and groundwater contamination. Contaminated fill might also have been used in

the reclamation process and could be encountered by construction on-site. Automobile facilities, some with reported past spills of diesel fuel, are located near the intersection of Five Mile Road and Old Hwy 312. It may be necessary to acquire ROW at these locations and contaminated soils could be encountered in the process. Therefore, encounters with contaminated soil may occur.

Mary Street Option 1 Alternative

Mary Street Option 1 would directly impact gravel pits 11, 12, and 14. Gravel pits in proximity to the Mary Street Option 1 Alternative appear to be inactive and partially reclaimed. These sites include two delisted Superfund facilities (gravel pit 11 and 14), where soil contamination has been removed. The Mary Street Option 1 Alternative could impact pipelines 5 and 6. Pipelines 5 and 6 are petroleum pipelines that run north-south on Bitterroot Drive, and east-west along Mary Street, respectively. However, avoidance and standard procedures implemented during construction near fuel pipelines are expected to prevent accidental disruption and unnecessary relocation of this facility.

Mary Street Option 2 Alternative

The Mary Street Option 2 Alternative would create impacts as discussed under all build alternatives and the Mary Street Option 1 Alternative with the exception of impacts to gravel pit 11, which would not be expected to occur. The Mary Street Option 2 Alternative would also impact gravel pits 3, 9, 10, and 12.

Five Mile Road Alternative

The Five Mile Road Alternative would create impacts as discussed under the all build alternatives. In addition, this alternative would directly impact gravel pit 3, as the alignment would traverse the complex. There is a newly excavated gravel pit east of Five Mile Road that would be impacted.

d) Known Significant Sources of Persistent Pesticides from Land Runoff or Percolation: Although there is a fair amount of agricultural activity in the project corridor, no known significant point or non-point sources of pesticides are present.

e) Spill Records for Petroleum Products or Designated Hazardous Substances: There have been several recorded spill sites. There is also potential soil and groundwater contamination associated with leaking underground storage tanks, underground storage tanks and above ground storage tanks as described above. Should excavation be required at these locations, soil testing and/or tank removal would occur to avoid impact to waters or wetlands.

f) Other Public Records of Significant Introduction of Contaminants from Industries, Municipalities, or Other Sources: To complete the hazardous material assessment, public records were closely examined in order to find any evidence of contaminants from these sources. No additional documented evidence of significant contamination within the ROW was observed in the public records.

g) Known Existence of Substantial Material Deposit of Substances that Could Be Released in Harmful Quantities to the Aquatic Environment by Man-Induced Discharged Activities: As shown by the hazardous materials assessment as discussed above, there are substances that have the potential to be released to waters or wetlands by project actions. However, avoidance and standard procedures would be implemented.

h) Other Sources of Contaminants: Other sources of pollutants that may be present in dredged or fill materials include road salts, de-icing chemicals, and dust suppressants. FHWA research has concluded that these sources have minimal impacts to receiving waters providing standard, acceptable construction

practices are followed. Vegetation and soils play an active role in filtering, diluting, and neutralizing the pollutant levels from these sources.

3.4.2 IMPACTS AVOIDANCE AND MINIMIZATION

Avoidance and Protection-in-Place. Existing facilities within proximity of project corridors, including but not limited to substations, transmission lines, fuel pipelines, and active USTs/ASTs would be included in final design plans and avoided to the greatest possible extent through design considerations and protection-in-place methods during construction. Avoidance and standard procedures implemented during construction near fuel pipelines are expected to prevent accidental disruption and unnecessary relocation of this facility. If avoidance is not possible and relocation is required to accommodate the project, coordination with facility owners would be necessary during final design to relocate said facilities. Any construction in proximity to existing utilities, if necessary, would be performed in accordance with state regulations. Active USTs or ASTs impacted by the project would be relocated to outside the proposed ROW, if necessary. Inactive or LUSTs would be closed according to applicable regulations.

Soil/Groundwater Contamination. Soils contaminated by LUSTs or other equipment would be monitored for the presence of contaminants. Likely mitigation for soils contaminated with petroleum or oils includes direct disposal or an on-site application. Disposal of contaminated soils would be handled in compliance with applicable local, state, and federal regulations. Tank removal permits would be obtained from Montana Department of Environmental Quality (MDEQ), and all work would be undertaken in accordance with permit conditions.

All sources of fill material used throughout the project would avoid areas of potential contamination and would have the required environmental clearances. There are 23 groundwater monitor wells located in the project area; six were in close proximity to the project corridor. The purpose and presence of monitor wells may indicate a possible contaminant release to local soil and/or groundwater.

Asbestos and Lead Based Paint. Prior to construction, all buildings that have been or would be acquired for the project and proposed for demolition would be surveyed for asbestos and possibly for lead contamination. Established methods would be implemented to prevent worker and public exposure to lead paint.

3.4.3 CONTAMINANT DETERMINATION

The project is not expected to cause an overall increase in contaminants to the project vicinity. However, there would be the potential for increase in the project corridor. To avoid and minimize impacts, there would be strict adherence to the avoidance and protection-in-place of known facilities and contaminated substances. BMPs would be identified and implemented to avoid and minimize potential impacts. The fill material would be obtained from sources that have obtained the required environmental clearances to avoid fill material with pollutants. Fill material would not be taken from areas identified as having any potential for soil or groundwater contamination. If the general evaluation of the discharge material indicates there is a reasonable probability of chemical contamination, tests would be performed in accordance to the guidance of 40 CFR 230.61 “Chemical, Biological, and Physical Evaluation and Testing.”

3.5 AQUATIC ECOSYSTEM AND ORGANISM DETERMINATIONS

The Montana Natural Heritage program classifies the Yellowstone River as an aquatic ecological system type A0001 and A0002 (Stagliano 2005). As previously discussed, plankton would be primarily affected by changes in suspended sediments, turbidity, and pollutant levels resulting from construction activities. Benthic organisms would be impacted where the fill materials would be placed and immediately downstream; these effects would only be short-term and localized. Plankton and benthic organisms could relocate and re-establish themselves over time. Aquatic organisms such as fish that are able to move independently of water current may be adversely affected by sediment from the erosion of disturbed areas. BMPs for erosion control would alleviate the adverse impacts or reduce them to localized and short-term tolerable levels.

Because the proposed project would not significantly impact aquatic organisms, the overall, long-term cumulative effect on the aquatic ecosystem is expected to be insignificant.

3.5.1 EFFECTS ON SPECIAL AQUATIC SITES

a) Sanctuaries and Refuges: State, federal, or local agencies have not designated any wildlife or waterfowl sanctuaries or refuges within the project area. Therefore, none would be impacted by the project.

b) Wetlands: Up to 23 delineated wetlands have the potential to be impacted because of the proposed project. The majority of the wetlands and the majority of the wetland acres are associated with irrigation features. The existing infrastructure currently bisects or abuts many of these wetlands. Implementation of avoidance and minimization measures along with further design refinements would minimize impacts to the extent practicable. Project design elements would avoid the introduction of wetland impoundment or other changes to wetland hydrology. Impacts to wetlands would be offset through compensatory mitigation as discussed in Section 3.5.6.

c) Mud Flats: There were no mudflats identified in the project area during field investigations. However, due to high water levels and typical river dynamics, the lack of observations does not preclude their existence.

d) Vegetated Shallows: There are no isolated vegetated shallows identified in the project area aside from those included as part of the delineated wetlands.

e) Riffle and Pool Complexes: The gradient, meanders, cobbles, and boulders of the project area streams create dynamic riffle and pool complexes. The project bridges and other hydraulic structures would be engineered to maintain existing hydraulic characteristics and complexes as practicable so that adverse impacts on these complexes are not anticipated.

3.5.2 EFFECTS ON THREATENED AND ENDANGERED SPECIES

A detailed Biological Assessment of the project's impact on threatened and endangered species was included in the BRR and was reviewed by the U.S. Fish and Wildlife Service (USFWS). The assessment concludes no effect to the black-footed ferret. The project may affect, but is not likely to adversely affect, the endangered whooping crane. The assessment further concludes that the project is not likely to significantly impact populations, individuals, or suitable habitat of candidate species greater sage grouse and Sprague's pipit. No fish species occur in the project area that are listed as threatened, endangered, or

candidate species under the Endangered Species Act. The effects do not vary by alternative. In a letter dated July 26, 2012, the USFWS concurred with these effect determinations.

No mitigation measures were determined necessary. However, as a recommended conservation measure, if any whooping cranes are observed in or adjacent to the project area during construction, work would be halted and MDT would contact the USFWS. Migration peaks are in April and October.

3.5.3 EFFECTS ON OTHER ANIMALS

The Biological Assessment included the project's impact on general wildlife species and sensitive species of special concern. This assessment concluded that impacts would be avoided with adherence to conservation measures. It is anticipated that direct impacts to wildlife would be similar among alternatives as the primary and secondary arterials have similar alignments and lengths. Potential impacts to wildlife such as direct mortality, displacement, and habitat fragmentation would be a concern in the higher quality habitat areas such as those associated with the Yellowstone River and in undeveloped areas of the project area. Direct mortality of road-killed wildlife would likely increase over the current conditions because of new roadways, additional pavement, traffic, and higher traffic speeds in the project area.

Typically, during construction small mammals, reptiles, amphibians, and invertebrates, especially those that burrow, may experience direct mortality due to earth moving activities. Birds and larger species of mammals currently using the proposed project footprint and adjacent areas may be displaced into surrounding lands during construction because of construction noise and other disturbances. In particular, the cavity nesting or burrowing mammals that utilize the mature, large diameter trees along the Yellowstone River corridor may experience direct mortality during the winter and spring breeding months if tree removal occurs during these months.

Indirectly, wildlife may be impacted by the presence of a new roadway, increased roadway noise, and increased habitat fragmentation, which could reduce the quality of wildlife habitat in the study area. Movement of wildlife for foraging, dispersion, and migration could be altered. However, connectivity in riparian areas that provide important travel corridors for wildlife would be maintained by the installation of appropriately sized culverts and bridges.

Seventeen species of concern are likely to occur in the project area. The potential impacts include disruption of habitat and potential nest sites/breeding locations for bald eagle, black-billed cuckoo, great blue heron, veery, and hoary bat. During construction, peregrine falcon and spotted bat may experience temporary disruption of foraging and roosting locations. The sauger may experience potential disruption of spawning locations. Potential impacts were considered either negligible or not anticipated for the other species of concern.

3.5.4 EFFECTS ON TERRESTRIAL PLANTS

Generally, the amount and type of direct vegetation impact would be similar among the alternatives because the primary and secondary arterials have similar alignments and lengths. The project corridor is located in existing transportation corridors or traverses primarily agricultural land. To a lesser extent there are four native habitats found within the study area: wetlands, riparian areas, sagebrush steppe, and cliffs. The potential native habitat vegetation removal has been estimated to be a maximum of 4.9 acres of wetlands, 0.1 acre of cliff habitat, and 0.1 acre of sagebrush steppe habitat. There were impacts of about 12 acres of riparian vegetation for the Mary Street Option 1 Alternative and about 6 or fewer acres for the other alternatives (see **Table 2**). The bridge crossings generally avoid habitats associated with the

streams, but the conceptual designs did not establish the clearance area under the bridges, therefore estimated values of impacts include the entire dimensions of the span. Indirectly, the project may increase the degradation of the riparian, sagebrush steppe, and cliff areas through fragmentation or spread of noxious weeds.

3.5.5 IMPACTS AVOIDANCE AND MINIMIZATION

The conceptual design of all alternatives avoided or minimized impacts wherever possible by shifting the alignment, altering grades, and using the minimum safe right-of-way width for each alternative. The following measures have been or could be incorporated into the proposed action to avoid and minimize the impacts to aquatic and terrestrial species and ecosystems:

a) Aligning alternatives with previously developed transportation corridors and altered landscapes.

b) Avoiding and/or minimizing impacts to known ecological resources such as rivers, riparian, sagebrush steppe, cliff, and wetland areas.

c) Avoiding and/or minimizing impacts to habitats to avoid and therefore minimize impacts to the wildlife that occupies them.

d) Establishing BMPs for erosion control to alleviate the adverse impacts to aquatic ecosystems and organisms or reduce them to localized and short-term tolerable levels.

e) Timing restrictions to avoid disturbance to spring spawning activities of the sauger.

f) Preforming a pre-construction nest survey if construction is to occur during the nesting season (generally from April 30 through August 15) to avoid impacts to nesting migratory birds.

g) Performing a pre-construction survey or coordinating with resource agencies or organizations to verify the location of the eagle nests and communal roosting sites. Blasting within ½ mile of active eagle nest nests should be avoided. Blasting within ½ mile of bald eagle communal roosting sites may not be conducted without prior coordination of the USFWS and Montana Fish, Wildlife, and Parks (MFWP).

h) Preforming a pre-construction survey or coordinating with resource agencies or organizations to verify the location of the heron rookery. If it is located within the 900-foot recommended buffer area, consultation with the resource agencies is advised.

i) Implementing BMPs and standard specifications to avoid and minimize impacts to vegetation.

j) Plainly marking limits of clearing and requiring construction plans to specify material staging areas be located outside of wetlands and riparian areas.

k) Using standard specifications and BMPs during and after construction to reduce and minimize noxious weeds. Control of noxious weeds would occur during and after construction. A temporary erosion control plan would include provisions for post-construction revegetation of the disturbed road corridor with desirable species seed mix to minimize colonization by noxious weeds.

l) Additional efforts to minimize impacts to wetlands are as follows:

- Reducing wetland and stream impacts with steeper side slopes and smaller fill volumes at wetlands and at stream crossings.

- Using fill material with particle size and constituents to aquatic substrate.
- Establishing a SWPPP identifying control of erosion and sediment transport.
- Implementing BMPs to protect wetlands i.e., installing silt fencing around the perimeter of the construction site and installing perimeter berms and liners in areas used for storage of chemicals, including petroleum products.

Other measures would be taken to minimize environmental impacts of the proposed project. These measures are further discussed in the EIS.

3.5.6 COMPENSATORY ACTIONS TO MINIMIZE IMPACTS

Although all reasonable avoidance and minimization measures would be taken to limit impacts to surface waters and wetlands, some impacts would occur and compensatory mitigation would be required. The goal of wetland compensatory mitigation is to replace functions and values that may be impacted by the proposed action. MDT has been developing the approach to compensatory mitigation for this project throughout design development and will continue through final design and permitting. MDT policy is to avoid and minimize impacts to waters and wetlands, and if wetlands were impacted as a result of an individual highway project, MDT would mitigate for jurisdictional and non-jurisdictional wetlands. Mitigation for the impacts to jurisdictional wetlands may occur in the form of using credits from one of MDT's wetland mitigation reserves, purchasing credits from a wetland mitigation bank, or developing on-site wetland restoration, enhancement, or creation.

The goal of stream compensatory mitigation is the restoration and maintenance of the chemical, physical, and biological integrity of the nation's waters in relation to a project that would result in more than minimal adverse impacts to a stream. Mitigation may occur in the form of mitigation bank credits, in-lieu fee credits, permittee-responsible mitigation, or a combination of the above (COE 2013).

Additional compensatory actions for vegetation and wildlife are not anticipated with the implementation of project avoidance and minimization measures.

3.5.7 MITIGATION MONITORING

To comply with stream compensatory mitigation, monitoring of the physical, biological, and/or chemical characteristics of the adversely impacted and/or the mitigation site may be included to assess the recovery of resources and functions. Monitoring requirements for projects would be determined on a case-by-case basis, be tailored to the size of the project, and may include both physical and biological elements (COE 2013).

To comply with wetlands policy and increase the chance for successful mitigation efforts, inspections would be made by the Project Manager, MDT's Biologist (DB), and other interested agency representatives during planning and implementation of the mitigation activities. These inspections are likely to occur at the following intervals:

a) Pre-construction meeting with the contractor responsible for implementing mitigation plans.

b) Prior to the final grading for the wetlands.

c) During the installation of plant material.

d) The first full summer after the completion of the wetlands construction to determine the preliminary success of the project.

e) During the next three to four growing seasons (interim inspections).

f) In the fourth or fifth season after establishment of the wetland area to obtain enough data and observation to determine whether or not the mitigation has been successful (final inspection). If not, plans can be formulated for correction or a decision made to abandon the site and try elsewhere if solutions to assure success at the site are not apparent.

g) On a periodic basis to document changes in groundwater hydrology (long-term monitoring).

Implementation of the proposed mitigation may also be reviewed during construction by various agencies including MDT, COE, MDEQ, and MFWP. The on-site wetland mitigation process is complete once the DB determines the on-site measures are successful in meeting the mitigation objectives.

3.6 PROPOSED DISCHARGE SITE DETERMINATION

3.6.1 MIXING ZONE DETERMINATION

a) Depth of Water at the Discharge Site: The depths of water at the discharge sites for this project vary considerably between seasons and individual sites. The depth of the non-riparian wetlands is relatively shallow, between 0 to 2 feet deep. The depth of water at the Five Mile Creek, minor stream, and drainage crossings is generally 1 to 6 feet deep. The Yellowstone River varies from 2 feet to over 14 feet at flood stages.

b) Current Velocity, Direction, and Variability at Discharge Site: The current circulation patterns associated with the discharge sites are discussed in Section 3.3 of this evaluation.

c) Degree of Turbulence: Minor, localized, and temporary turbulent conditions could possibly result from the discharge of fill materials into waters or by the temporary construction of cofferdams or work platforms for bridge piers or abutments.

d) Water Column Stratification: The majority of the surface waters that would be affected by the proposed action are comprised of flowing, well-mixed drainages, streams, and rivers. Therefore, the project's impact to stratification patterns would be insignificant.

e) Discharge Vessel and Speed: This consideration does not apply to this project

f) Rate of Discharge: This information is provided in Section 2.5 of this evaluation.

g) Ambient Concentration of Constituents of Interest: In the Yellowstone River constituents of interest include natural source arsenic, agriculture and municipal sources, and pipeline breaks. These sources impact benthic-macro invertebrates, dissolved oxygen saturation, excess algal growth, nutrient eutrophication, periphyton indicators, suspended and bedload solids; and oil and grease. These have affected drinking water, aquatic life, and primary contact recreation. TMDLs have not been established. No other water bodies in the project area were 303(d) listed (MDEQ 2012).The project is not expected to have an effect on the concentration of constituents of interest from the placement of fill material.

h) Dredged or Fill Material Characteristics: The characteristics of the proposed fill materials are discussed in Section 3.4 of this evaluation.

i) Number of Discharges per Unit of Time: This information is provided in Section 2.5 of this evaluation.

j) Other Factors Affecting Rates and Patterns of Mixing: No other unusual factors or consequences are expected to modify mixing at any discharge sites.

3.6.2 EVALUATION OF THE APPROPRIATE FACTORS

An evaluation of the appropriate factors indicates that the discharge sites and sizes of mixing zones are acceptable.

3.6.3 ACTIONS TO MINIMIZE ADVERSE DISCHARGE EFFECTS

All appropriate and practicable measures would be taken through application of recommendations provided in Sections 3.1 through 3.5 to minimize adverse effects of the proposed discharges. These measures are listed elsewhere in this evaluation and in the EIS.

3.7 POTENTIAL EFFECTS ON HUMAN USE CHARACTERISTICS

a) Municipal, Private, and Potential Water Supply: The Yellowstone River is the source of all drinking water for the City of Billings. The anticipated notable effects of the project on water quality are the temporary and localized increase in the level of suspended sediments and turbidity. However, these increases are expected to be much less than those that naturally occur during spring runoff conditions or major rainfall events. The project is not anticipated to have an effect on the quantity or quality of water available that would be sufficient to affect public water supplies. There are no public wells that appear to be in conflict with any of the proposed alternatives. Between nine and 15 private wells could be affected by the project. These include groundwater monitoring or testing wells. However, due to the conceptual level of design, this conclusion would be reevaluated during final design.

The various alignments would longitudinally affect certain irrigation and drainage ditches throughout the project limits. Impacted irrigation ditches would be relocated outside of the ROW limits.

b) Recreational and Commercial Fisheries: The project waters do not support commercial fisheries of harvestable fish, crustaceans, shellfish, or other aquatic organisms. However, there is opportunity for recreational sport fishing by formal boat access upstream and downstream of the project corridor. Use of the streams and some informal access points for sport fisheries in the project corridor would be temporarily interrupted during construction. Construction activities would be scheduled to avoid sensitive species spawning periods. The project could temporarily and locally disrupt fish habitat, thus causing some short-term displacement of fish. This type of impact is expected to be insignificant and would not have a long-term impact or a cumulative impact on any fisheries. The EIS and the BRR discuss these impacts in more detail.

c) Water-Related Recreation: Sport fishing is addressed above. Other water-related recreations such as boating and float trips take place on the Yellowstone River. During bridge construction, use of the Yellowstone River and some access to these activities may be temporarily disrupted in the project corridor.

d) Aesthetics: Existing visual quality throughout the study area currently ranges from high to low, depending on the view location. In general, the negative visual quality effects of the project would not be a significant change from existing conditions. However, the views and noise levels experienced by visitors near the Yellowstone River and Five Mile Creek toward the proposed project location would include the construction and operation of new bridge/bridges where none previously existed. At the same time, a new facility would provide increased opportunity and access to views of the Yellowstone River and environs from the bridge.

e) Parks and Preserves: The Yellowstone River and its tributaries are not designated as National Wild and Scenic Rivers. There are a few informal public recreation areas and proposed sites within the project corridor. Existing and planned bicycle and pedestrian facilities would be integrated with planned improvements of the proposed alignments. The Lockwood Community Plan identified land along the Yellowstone River as a potential area of acquisition for riverfront parkland, and east of Five Mile Road an active gravel mining operation has been master-planned for the Dover Memorial Park development. There are two Nature Conservancy conservation easements at the mouth of Five Mile Creek and along the north bank of the Yellowstone River. The effects to these sites would be similar among the build alternatives. Informal use of these areas would be temporarily interrupted during construction.

3.8 DETERMINATION OF CUMULATIVE EFFECTS ON THE AQUATIC ECOSYSTEMS

Cumulative impacts on the environment are those that result 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.

Past losses of wetland and aquatic resources in the region have resulted primarily from converting wetlands to agricultural and residential/commercial development. Highway improvement projects have also contributed to a lesser extent to these losses up to the time that regulations protecting wetlands were adopted and became law.

Although the project area is not subject to a high degree of development pressure, any future private development in the project area is anticipated to result in impacts to the aquatic system. Several land development projects are planned in the project area. These include residential and commercial developments. These projects would be developed as demanded by the market, and most likely in response to project phases. However, those future actions that are subject to wetland regulations would likely include measures to minimize impacts. Therefore, cumulative effects from development would not likely result in significant alteration to the aquatic ecosystem.

All federally funded future actions are subject to the requirements of Section 404 of the CWA and would be developed in such a way as to avoid, minimize, or effectively mitigate impacts to waters of the U.S. This includes federally funded highway projects. There are numerous reasonably foreseeable transportation projects in the Middle Yellowstone Watershed. These are generally intersection improvement and existing road widening projects. Additionally, a new 6-mile two-lane rural roadway in west Billings, the Inner Belt Loop, is proposed as part of the Full Buildout of the build alternative. Surface runoff from these projects is expected to either maintain or increase what is currently experienced due to an increase of impermeable surfaces. Additional land development pressure should be anticipated to occur from this project, due to improved access. The induced changes in land use are likely to result in impacts to the surface runoff due to an increase of impermeable surfaces. However, because of the CWA

and state protections, cumulative effects from transportation projects would not likely result in significant alteration to the aquatic ecosystem.

3.9 DETERMINATION OF SECONDARY EFFECTS ON THE AQUATIC ECOSYSTEMS

The secondary effects to aquatic ecosystems are associated with a discharge of dredged or fill materials but do not result from the actual placement of the dredged or fill material. Unquantified indirect impacts to aquatic ecosystems may occur from expedited development of undeveloped areas over time with increased road access from all build alternatives as discussed in cumulative effects.

Preliminary estimates of increased impervious surface do not exceed 40 acres for all proposed alternatives. Surface runoff from these surfaces poses the most significant secondary effect associated with this project. For this reason, a SWPPP would be established to prevent surface runoff from transporting materials that could degrade these ecosystems. For the bridges, storm drain collection systems would be developed.

Another secondary effect is the possibility of accidental hazardous material spills during construction and the subsequent use of the highway. However, any improvements to the existing highway that would improve safety would decrease the chance of these accidental spills resulting from the use of the highway by vehicles transporting hazardous materials.

By increasing the amount of roadway requiring maintenance, more sand and de-icing materials would be required to cover the larger surface area. Therefore, sediment traps with a scheduled maintenance program to clean the traps periodically may be installed. A well-established vegetative cover on the sideslopes would improve soil stabilization to help prevent sedimentation from entering the stream and wetland systems. Other secondary or indirect effects of the project are discussed in more detail in the EIS.

4.0 FINDINGS OF COMPLIANCE

4.1.1 404(b)(1) GUIDELINES ADAPTATION

This evaluation is based on conceptual design of the project alternatives. It identifies and quantifies the environmental impacts associated with the proposed action insofar as present design data allow. Before the project can be advanced to the final design stage, the Preferred Alternative must be chosen and approved, and a formal design for it must be developed and approved.

4.1.2 EVALUATION OF PRACTICABLE ALTERNATIVES AVAILABILITY

Section 230.01(a) of the Guidelines states “except as provided under 404(d)(2), 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.”

The alternative development process involved three levels of screening criteria including, but not limited to, meeting project purpose and need, improving mobility and connectivity, environmental impacts, cultural impacts, ROW impacts, community resources impacts, and traffic data analysis. Over 40 alternatives (on-site, off-site, and no-bridge alternatives) were considered during the planning and

screening process. Details and results are included in the EIS and the No-bridge Alternative Screening Memorandum included in **Appendix A** with the detailed evaluation, maps, and screening matrix of project alternatives. As a result of the alternative development process, the three proposed build alternatives in the EIS were determined to be the practicable and reasonable alternatives that satisfy the purpose and need of the project and avoid, minimize, and mitigate the adverse environmental effects.

During alternative development, particular attention was paid to identifying the optimum river crossing. The crossing and alignment locations were based on four factors: the active channel, the floodway, the floodplain, and historic channel migration of the Yellowstone River. The crossing locations of the build alternatives are located at a geologically stable "pinch point" of the river with a narrow floodway, floodplain, and channel migration zone.

The build alternatives are described in Section 2.1.2. Mary Street Option 2 Alternative has been identified as the Preferred Alternative. It was identified through the final screening process that includes cost, technology, transportation needs, topography, construction techniques, and logistics. The three proposed build alternatives are anticipated to have similar adverse impacts to waters of the U.S. due to secondary road improvements. Generally, they have few easily identifiable differences in impacts with the following exceptions:

Mary Street Option 1 Alternative

The Mary Street Option 1 Alternative has the longer bridge crossings of the Yellowstone River, has the highest anticipated total wetland impacts, and highest impacts to high quality wetlands. It also impacts the most riparian habitat and has the highest amount of new impervious surfaces.

Mary Street Option 2 Alternative

The Mary Street Option 2 Alternative is similar to the Five Mile Road Alternative in regard to the Yellowstone River Bridge crossing and anticipated wetland impacts. It has slightly lower total wetland impacts and slightly lower impacts to high quality wetlands than the Five Mile Road Alternative. Compared to the Five Mile Road Alternative, Mary Street Option 2 has slightly higher amounts of riparian impacts and new impervious surfaces.

Five Mile Road Alternative

The Five Mile Road Alternative is similar to Mary Street Option 2 Alternative with slightly higher total and high quality wetland impacts. It has the lowest amount of new impervious surfaces and riparian impacts.

Least Environmentally Damaging Practicable Alternative

Twenty-four wetlands were delineated within the project corridor totaling about 37 delineated acres. The potential impacts to these and other aquatic resources have been avoided and minimized during preliminary design of the three build alternatives. Depending on the build alternative, resulting wetland impacts are about 4.9 or fewer acres. Total impacts to all wetlands and jurisdictional wetlands vary within ½ acre for all the proposed alternatives.

Detailed evaluation of the distinction between permanent and temporary impacts has not been completed at this level of design. Impacts would be differentiated and quantified in project final design and permitting. Up to ⅔ of the total wetland impacts are wetlands associated with irrigation features that would be relocated, and the wetlands would likely re-establish at the new location except where the

feature requires a new culvert crossing or extension. Up to about 1.6 acres of impacts to the six high quality wetlands would occur from project build alternatives. Impacts to these wetlands would be considered permanent.

Currently, the Mary Street Option 2 and Five Mile Road Alternatives would result in fewer impacts to aquatic resources than the Mary Street Option 1 in regard to the Yellowstone River Bridge lengths, impacts to wetlands, impacts to riparian areas, and new impervious surfaces. The distinction between the Mary Street Option 2 and Five Mile Road Alternatives is minor. Despite a bridge crossing over Five Mile Creek, Mary Street Option 2 has the least total wetland impacts and least permanent impacts to high quality wetlands. The Five Mile Road Alternative has least impacts to jurisdictional wetlands and riparian areas. The difference between these two alternatives in regard to wetland impacts may change through selection of the bridge and intersection configurations, further design refinements, avoidance and minimization measures, and final jurisdictional determination by COE. Therefore, the Mary Street Option 2 and the Five Mile Road Alternatives were recognized as the two least environmentally damaging practicable alternatives as a result of this evaluation. FHWA and MDT identified Mary Street Option 2 as the Preferred Alternative.

Table 2. Summary of Potential Aquatic Impacts

BUILD ALTERNATIVES			
	MARY STREET OPTION 1	**MARY STREET OPTION 2**	**FIVE MILE ROAD**
YELLOWSTONE RIVER BRIDGE LENGTH AND OTHER	2,012 ft. plus 185 ft. over channel Widen existing Five Mile Creek bridge	1,885 ft. plus 215 ft. new bridge over Five Mile Creek	1,885 ft. Widen existing Five Mile Creek bridge
TOTAL WETLAND IMPACTS PERMANENT AND TEMPORARY (JD ONLY)	4.87 ac. (3.65 ac.)	4.36 ac. (3.36 ac.)	4.58 ac. (3.34 ac.)
PERMANENT IMPACTS TO HIGH QUALITY WETLANDS	1.62 ac.	0.85 ac.	0.90 ac.
PERMANENT RIPARIAN IMPACTS	11.9 ac.	6.0 ac.	5.8 ac.
NEW IMPERVIOUS SURFACES	39.3 ac.	38.1 ac.	31.7 ac.

JD = preliminary jurisdictional determination

4.1.3 ALTERNATIVES CONSIDERED BUT ELIMINATED FROM FURTHER REVIEW

The following alternatives potentially could have had less adverse effects to waters and wetlands of the U.S. but were not carried forward for detailed analysis in the EIS because they either (1) did not meet the primary project purpose and need or (2) caused more environmental impacts or had fatal flaws. These alternatives are described in detail in the EIS.

No Build Alternative

The No Build Alternative did not meet the overall project purpose and need. Furthermore, currently programmed roadway projects of the No Build Alternative have the potential to involve discharges to waters of the U.S. including wetlands, but with proportionally less adverse effects due to the smaller scale of the projects.

I-94 to Old Hwy 312 Connection at Huntley Alternative

The I-94 to Old Hwy 312 Connection at Huntley alternative was screened out because it would not meet the purpose and need. The alternative was 12.6 miles longer than the existing route along the Main Street corridor. This alternative would not reduce physical barrier impacts, would not improve connectivity between Lockwood and Billings (12.6 miles longer than the existing route), would not improve mobility to and from Billings Heights, and would not improve truck/commercial vehicle access to and through Billings. Floodplain impacts were 4,250 feet across or adjacent to the floodplain, more than any of the proposed alternatives. This alternative was considered but rejected during the Level 2A screening.

The New I-90 Connection Alternative

The New I-90 Connection was determined to generally meet the project purpose and need. It would provide a low degree of travel time benefit, but would have substantial impacts to commercial properties along Main Street. It is estimated that land would be needed from 112 parcels, more than any of the proposed alternatives. The parcels were mostly commercial along the Main Street corridor. Thirty-nine businesses (including gas stations, restaurants, banks, hotels, auto dealerships, nurseries, and a post office) would need to be relocated. This alternative would not avoid impacts to waters of the U.S. Major improvements are needed at the location where Alkali Creek crosses under Main Street, and construction of the new I-90 interchange would encroach into the Yellowstone River floodplain between I-90 and the railroad.

This alternative was screened out because of the substantial impacts to commercial properties along Main Street. Other potentially significant issues associated with this alternative include the following: conflicts with major utility lines to accommodate the improvements near Airport Road and Lake Elmo Drive along Main Street; operational impact to the Conoco refinery including impact to a 130-foot diameter oil storage unit; a Section 6(f) and potential 4(f) resource conversion at Coulson Park, which received LWCF funds; and conflicts with the Alkali Creek pedestrian underpass. Therefore, this alternative was considered but rejected during the Level 2B screening.

Improved US 87 Connection Alternative

The Improved US 87 River Crossing was determined to generally meet the project purpose and need. It would have the most ROW impacts of any alternative evaluated while providing marginal travel time benefits. It is estimated that land would be needed from 157 parcels (mostly commercial) at the Lockwood Interchange and along the Main Street corridor and 50 businesses (including gas stations, restaurants, banks, hotels, auto dealerships, nurseries, and a post office) would need to be relocated. The Montana Stage at the METRA would also need to be relocated. Major improvements are needed at the location where Alkali Creek crosses under Main Street, which would result in impacts to the waterway and associated floodplain. Although this alternative may have the lowest potential for impacts to waters of the U.S. of any alternative evaluated, it would not avoid impacts to waters of the U.S.

This alternative was screened out because of the substantial impacts to commercial properties at the Lockwood Interchange and along Main Street. Other potentially significant issues associated with this

alternative include the following: conflicts with major utility lines corridors and conflicts with the Alkali Creek pedestrian underpass. Therefore, this alternative was considered but rejected during the Level 2B screening.

Piccolo-Bitterroot Drive and Piccolo-River Edge Alternatives

The Piccolo-Bitterroot Drive and Piccolo-River Edge alternatives required a new bridge crossing, but had similar aquatic impacts as the build alternatives of the EIS. The Yellowstone River Bridge location had a narrow floodway, floodplain, and channel migration zone and met the project purpose.

However, these alternatives were rejected during the Level 2B screening due to substantial residential impacts and other potential issues that could be fatal flaws. The Piccolo-Bitterroot Drive Alternative would impact a side channel of the Yellowstone River, would impact a trailer park, and would impact a cemetery. The Piccolo-River Edge Alternative would impact a refinery, would impact a side channel of the Yellowstone River, would impact a trailer park, and would route a new roadway through residential areas. Therefore, these alternatives were considered but rejected during the Level 2B screening.

4.1.4 STATE WATER QUALITY STANDARDS COMPLIANCE

Provided that the following permits were issued, the project would be in compliance with the State Water Quality Standards:

1) A Montana Stream Protection Act Permit (124 SPA permit) must be issued by the MFWP. The purpose of the permit is to protect and preserve fish and wildlife resources in their natural existing state. MFWP will examine application information including projected impacts and determine if the proposed action can be approved. Issuance of the permit constitutes compliance.

2) A short-term exemption from Montana's Surface or Water Quality Standards (3a authorization) will be required. MDEQ will issue this permit. The purpose of the law is to protect water quality, minimize sedimentation, and provide short-term exemptions from water quality standards to certain activities carried out in accordance with conditions prescribed by MDEQ. Approval of the application (outlines impacts) and issuance of the permit constitutes compliance.

3) The Montana Floodplain and Floodway Management Act will require Floodplain Development permits issued by the Floodplain Administrators for Yellowstone County. The purpose of this law is to restrict floodplain and floodway areas to uses that will not be seriously damaged or present a hazard to life if flooded, thereby limiting the expenditure of public tax dollars for emergency operations and disaster relief. Application for the permit provides specific engineering information to evaluate impacts, and approval of the application and issuance of the permit constitute compliance.

4) The project will require a Section 402 MPDES permit from MDEQ. The purpose of this law is to minimize soil erosion and sedimentation, thereby maintaining water quality and protecting aquatic resources. Specific plans for stormwater pollution prevention are developed and submitted for review by MDEQ, demonstrating how and where BMPs would be used to minimize adverse impacts to aquatic resources. Approval of the plan and establishment of such additional conditions as may be necessary through issuance of the permit constitute compliance.

5) Section 401 of the CWA requires MDEQ certify that any discharges into State waters comply with water quality standards before federal permits or licenses are granted. The purpose of this law is to restore and maintain the chemical, physical, and biological integrity of Montana's surface waters. MDEQ will

review plans for construction of a given project as well as review the status of other permits requested from and issued by other agencies before approving the proposal. Issuance of the permit constitutes compliance.

6) Rivers and Harbors Act, 33 USC, 401, et seq: The Rivers and Harbors Act covers construction, excavation, or deposition of materials in, over, or under such waters, or any work which would affect the course, location, condition, or capacity of those waters. Activities requiring Section 10 permits include structures (e.g., piers, wharfs, breakwaters, bulkheads, jetties, weirs, transmission lines) and work such as dredging or disposal of dredged material, or excavation, filling, or other modifications to the navigable waters of the U. S. COE authorizes permits for structures or work in or affecting navigable waters of the U.S. COE navigable waters of the U.S. include the Yellowstone River from Emigrant, Montana downstream to its confluence with the Missouri River in North Dakota.

7) A Navigable Rivers Land Use License or Easement must be issued by the Department of Natural Resources and Conservation (DNRC), Trust Lands Management Division. The State of Montana holds ownership of the land and minerals located below the low water marks of navigable rivers and lakes as established in the Equal Footing Doctrine. The purpose of the permit is to provide for the beneficial use of state lands for public and private purposes in a manner which will provide revenues without harming the long-term capability of the land or restricting the original commercial navigability. DNRC will examine application information including projected impacts to the water resource (water quality and quantity, fisheries, flora, bank and bed stability, recreational and navigational uses) and determine if the proposed action can be approved. Easements are typically issued for dams, bridges, pipelines, utility lines, and some diversion structures (MDT 1997).

In all cases, review of proposed plans and possible impacts associated with implementation of the proposed action may require agencies to request modification of the design, implement mitigation measures, or meet other specified requirements before compliance is achieved through permit issuance. Strict adherence to the permits and their associated provisions and conditions constitute compliance during construction and after for the life of the improvement. Unapproved deviations or non-adherence to these conditions would constitute non-compliance with the law, requiring the owner to take corrective action or face associated penalties or civil action.

As long as acceptable construction practices and design procedures are followed, the acquisition of these permits should be fairly routine. BMPs would be identified using a SWPPP for compliance with the state of Montana's MPDES regulations.

The project complies with the following federal water quality standards:

a) Clean Water Act, as Amended (Federal Water Pollution Control Act), 33 USC 1251 et seq: The project is in compliance. Although Section 404 permit processing has not been completed, FHWA has been in contact with the COE and the EPA, and early coordination is allowing proper planning to meet all requirements.

b) Fish and Wildlife Coordination Act, as Amended, 16 USC 661, et seq: The project is in compliance. MFWP and USFWS were contacted and their comments will be incorporated into the EIS and BRR.

c) Floodplain Management (Executive Order 11988): The project is in compliance. The project will be designed to not have significant effects on floodplains.

d) Protection of Wetlands (Executive Order 11990): The project is in compliance. The project will involve work below the high water line but appropriate measures to first avoid, then minimize, then provide for compensatory mitigation impacts have been established. An Only Practicable Alternative Finding will be issued in the Final EIS once it is developed.

4.1.5 TOXIC EFFLUENT STANDARDS COMPLIANCE

Section 307 of the CWA imposes effluent limitations or prohibitions on discharge of materials containing toxic pollutants into surface waters, specifically adrin/dieldrin, several DDT compounds, endrin, toxaphene, benzidine, and polychlorinated biphenyis (PCB). The project would not discharge any of these specified toxic pollutants; therefore, it will be in compliance with Section 307 of the CWA.

4.1.6 ENDANGERED SPECIES ACT COMPLIANCE

The project will comply with the Endangered Species Act of 1973, as amended. The BRR concluded that the project would have no effect on the black-footed ferret and is not likely to adversely affect the whopping crane, both federally listed endangered species of Yellowstone County. The project is not likely to jeopardize the continued existence of greater sage grouse and Sprague's pipit, which are federal candidate species in Yellowstone County. See Section 3.5.2.

4.1.7 MARINE PROTECTION, RESEARCH, AND SANCTUARIES ACT COMPLIANCE

Measures for marine sanctuaries are not applicable to this project.

4.1.8 EVALUATION OF THE EXTENT OF DEGRADATION OF THE WATERS OF THE UNITED STATES

Each of the following conclusions is based on individual and collective factual evaluations previously discussed in this evaluation. The following statements represent the conclusions of these discussions.

1) Significant Adverse Effects on Human Health and Welfare: This project would not adversely affect municipal or private water supplies, recreation and commercial fisheries, or water-borne disease rates. Although temporary water quality degradation associated with turbidity and sedimentation would occur, no long-term adverse impacts on water quality or the human environment are anticipated.

2) Significant Adverse Effects on Life Stages of Aquatic Life and Other Wildlife Dependent on Aquatic Ecosystems: Short-term localized disruption to wildlife habitat, benthos, invertebrates and vertebrates, photosynthesis, plankton, and sight feeders is expected to result from the turbidity and sedimentation caused by construction. However, this project would not significantly or adversely produce long-term effects on the life stages of aquatic organisms or other wildlife dependent upon aquatic ecosystems.

3) Significant Adverse Effects on Aquatic Ecosystem, Ecosystem Diversity, Productivity, and Stability: This project would not produce significant adverse effects on the diversity, productivity, or stability of the aquatic ecosystems in the project area.

4) Significant Adverse Effects on Recreational, Aesthetic, and Economic Values: This project would not have a significant adverse effect on the recreational, aesthetic, or economic value of any waters of the

U.S. or aquatic ecosystems in the project area except temporary interruption of recreational fishing access and aesthetics would occur during construction.

4.1.9 POTENTIAL ADVERSE IMPACTS MINIMIZATION

The measures taken to minimize the adverse impacts of the discharge on the aquatic ecosystems have previously been described in this evaluation. To summarize, the most significant impacts of the proposed project to aquatic resources would be the bridge crossings and erosion of disturbed areas producing increased levels of suspended sediments and turbidity in the surface waters. Appropriate and practicable steps to minimize impacts incorporated into project design are organized according to relevancy to the physical, chemical, or biological components of the aquatic ecosystem. Implementation of these steps would serve multiple components.

Physical

- Minimize area and amount of fill.
- Conform project design to the natural existing characteristics of the aquatic ecosystem and surrounding terrain.
- Minimize restriction of the channel migration zone.
- Minimize the size and extent of bridge crossings impacts.
- Minimize skew of bridges.
- Minimize number of piers while satisfying maximum backwater criteria.
- Maximize the width between piers and satisfy freeboard clearances for passage of debris and ice flow.
- Align piers with the flow of the stream.
- Span the active channel, floodway, and floodplain where feasible.
- Optimize culvert size determination by culvert analysis program.
- Emphasize the avoidance and minimization of impacts to wetlands before the mitigation of wetlands.
- Relocate and modify longitudinal impacts to waters and wetlands associated with major irrigation canals and lateral ditches.
- Design roads and structures using culverts, open channels, and diversions to accommodate fluctuating water levels, velocity, and maintain circulation.

Chemical

- Schedule in-water work during the lowest flow levels.
- Route water pumped from inside cofferdams to a settling pond before it is reintroduced to the surface waters.
- Implement a storm drain collection system and water quality treatment facility for bridge decks.
- Develop and implement a Temporary Erosion and Sediment Control plan and Stormwater Site Plan.
- Locate and schedule discharge sites to avoid a disruption of periodic water inundation patterns or irrigation needs.
- Select discharge sites and follow discharge procedures to minimize any potential damage to aquatic sites, particularly with respect to water quality.
- Control storm runoff by reducing velocities, retaining sediments, and properly maintaining erosion control feature.
- Develop and implement SPCC plan and SWPPP for the project so that pollutants and products would be controlled and contained.

- Insure that all introduced fill materials including rootwads and logs are free from toxic materials.
- Prevent oils, fuels, or chemicals from discharging to waters or onto land where there is a potential for reentry into waters. The contractor would regularly check fuel hoses, oil drums, oil or fuel transfer valves, fittings, etc. for leaks and would maintain and store materials properly to prevent spills. Cleaning solvents or chemicals used for tools, equipment, or work areas would be contained for proper treatment and/or disposal.
- Install filter fences during construction and prior to permanent revegetation. Filter fences would be installed, checked periodically, cleaned, and repaired as required to maintain proper function.
- Stabilize and protect exposed soils from water and wind through use of compost berms/blanket, seeding, fertilizing, and mulching.
- Other BMPs may include slope roughening, gravel filter berms, ditches, and settling basins.

Biological

- Minimize clearing of existing vegetation.
- Use machinery and techniques that are designed to reduce damage to wetlands such as specially designed wheels or tracks or the use of mats under heavy machines to reduce wetland compaction or rutting.
- Conduct in-water work as stipulated by the SPA 124 permit from MFWP.
- Time disturbances of the aquatic ecosystem to avoid sensitive periods such as breeding, migration, etc. Use appropriate work windows as determined by USFWS and MFWP.
- Design and install bridges and culverts to accommodate fish passage and faunal movement.
- Install preservation fencing to prevent unnecessary clearing and minimize intrusion into surrounding habitats.
- Conform to the invasive weed plan prior to initiating any construction activity.
- Restore areas temporarily impacted from construction such as sites or temporary fills.

4.1.10 CONCLUSIONS

Based on the above discussion, impacts to the aquatic ecosystem would be avoided and minimized to the greatest extent possible. The project design has been adjusted to the greatest extent possible to minimize impacts to project vicinity stream systems and wetlands. Compensatory mitigation would provide mitigating measures for any unavoidable permanent project impacts to waters of the U.S. Once impacts for final design are identified, a Final Mitigation Plan would be prepared to provide compensation to stream and wetland impacts. Following the inclusion of appropriate and practicable conditions to minimize pollution or adverse effects on the aquatic ecosystem, the proposed disposal sites for the direct discharge of dredged or fill material are specified as complying with the requirements and the guidelines of Section 404 of the CWA. Based on the described efforts to avoid and minimize impacts to aquatic ecosystems, it can be concluded that the selected build alternative is the least environmentally damaging practicable alternative.

5.0 REFERENCES

David Evans and Associates, Inc. (DEA). 2013. Biological Resource Report Addendum, Billings Bypass. DEA, Denver, CO.

_____. 2011. *Biological Resource Report, Billings Bypass.* DEA, Denver, CO.

DOWL HKM. 2013. 2-Lane H& H Changes. Billings Bypass, Hydraulic Report Technical Memorandum. Montana Department of Transportation. Billings, MT.

_____. 2011. *Hydraulics Report.* Billings Bypass NCPD 56(55): CN 4199. Montana Department of Transportation. Billings, MT.

DTM Consulting, Inc. and Applied Geomorphology, Inc. 2009. *Yellowstone River Channel Migration Zone Mapping: Final Report.* Prepared for the Custer County Conservation District and Yellowstone River Conservation District Council.

Environmental Laboratory. 1987. *Corps of Engineers Wetland Delineation Manual*. Technical Report Y-87-1, U.S. Army Corps of Engineers Waterways Experiment Station, Vicksburg, MI.

Montana Department of Environmental Quality (MDEQ). 2012. Clean Water Act Information Center-2012 Water Quality Information, Yellowstone River - MT43F001_010 - Middle Yellowstone Watershed. Available [online]: http://cwaic.mt.gov/query.aspx. Accessed on July 16, 2013.

Montana Department of Transportation (MDT). 1997. *Montana Right of Way Design Manual.* Revised. Appendix L. DNRC–Navigable Rivers and Memo of Understanding. Available [online]: http://www.mdt.mt.gov/other/rw/external/manual/MANLROMANA0L.PDF. Accessed on December 21, 2011.

Natural Resources Conservation Service (NRCS). 2011. Soil Survey Geographic (SSURGO) Database for Survey Area. United States Department of Agriculture. Available [online]: http://soildatamart.nrcs.usda.gov. Accessed on July 2011.

Stagliano, D.M. 2005. *Aquatic Community Classification and Ecosystem Diversity in Montana's Missouri River Watershed.* Report to the Bureau of Land Management. Montana Natural Heritage Program, Helena, Montana. 65 pp. plus appendices.

U.S. Army Corps of Engineers (COE). 2013. *Montana Stream Mitigation Procedure.* Omaha District. Available [online]: http://www.nwo.usace.army.mil/Missions/RegulatoryProgram/Montana/Mitigation.aspx. Accessed on July 16, 2013.

_____2010. *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Great Plains Region. (Version 2.0).* Army Engineer Research and Development Center. ERDC/EL TR-10-1. Vicksburg, MS.

_____2008. Clean Water Act Jurisdiction. December 02, 2008. Available [online]: http://www.usace.army.mil/Missions/CivilWorks/RegulatoryProgramandPermits/RelatedResources/CWAGuidance.aspx. Accessed on July 16, 2013.

APPENDIX A

No-Bridge Alternatives Screening Memorandum

DAVID EVANS
AND ASSOCIATES INC.

MEMORANDUM

DATE: June 1, 2011

TO: Fred Bente
Montana Department of Transportation

FROM: Laura Meyer

SUBJECT: **No-Bridge Alternatives Screening Memorandum**

PROJECT: 4199 - Billings Bypass

COPIES: Tom Gocksch, Carol Strizich, Stefan Streeter, Gary Neville, Alan Woodmansey, Brian Hasselbach

This memorandum documents the alternatives development and screening process for three alternatives that do not involve new structures over the Yellowstone River. These alternatives were developed and screened to address comments from the US Army Corps of Engineers (COE). In a letter dated February 8, 2011, the COE commented that the project purpose and need, as submitted to cooperating and participating agencies for review, precluded a "no-bridge alternative." The COE requested revisions to the purpose and need so that at least one alternative without a new Yellowstone River crossing could be considered and requested a comparison between alternatives requiring and not requiring construction of a new bridge across the Yellowstone River. This request was made to facilitate the COE permit review for the project. On March 25, 2011, the Environmental Protection Agency (EPA) submitted an email in support of this request. After further discussion during an April 1, 2011 cooperating and participating agency meeting and confirmation from Federal Highway Administration (FHWA) legal council that the minor refinements to the purpose and need should be made to allow for consideration of no–bridge alternatives, the project team refined the purpose and need, identified three no-bridge alternatives, and re-screened all of the project alternatives using criteria based on the refined purpose and need.

REVISED PURPOSE AND NEED

Purpose: Improve access and connectivity between Interstate 90 (I-90) and Old Highway 312 (Old Hwy 312) to improve mobility in the eastern area of Billings.

Needs:

Reduce physical barrier impacts to the transportation system. The rimrocks, the Yellowstone River, the railroad, and I-90 create barriers for north-south connections in the Billings area, which affect local traffic and regional traffic. Reduction of physical barrier impacts to transportation is one of the key transportation goals for the region as documented in the Billings Urban Area Long-Range Transportation Plan (2009 Update). Both I-90 and United States Highway 87 (US 87) cross the Yellowstone River near downtown Billings, and the next river crossing is over nine miles north at Huntley. The challenging topography in the Billings area coupled with limited connections across the river, the railroad tracks, and the interstate, result in both local and regional north-south traffic being funneled through the US 87/Main Street corridor in the urban area of Billings.

Improve connectivity between Lockwood and Billings. The segment of US 87 that crosses I-90 and the Yellowstone River serves as the only connection between Billings and Lockwood. The need for improved connectivity to Billings is documented in the Lockwood Community Plan (August 2006) and the Lockwood Transportation Study (November 2008).

Improve mobility to and from Billings Heights. A survey completed for the Billings Heights Neighborhood Plan (2006) identified traffic issues as a key concern of residents, with one of the main traffic concerns being traveling to and from the Billings Heights neighborhood. This is also one of the key transportation issues for the region cited in the Billings Urban Area Long-Range Transportation Plan (2009 Update). The City of Billings Capital Improvement Plan (2006 – 2011) includes 16 projects that would address transportation issues in Billings Heights. Only one of these projects (the Billings Bypass EIS/Location Study) would address transportation system redundancy and mobility between Billings Heights and the interstate, which are limited by a lack of Yellowstone River crossings. Limited mobility to and from Billings Heights is also an issue affecting emergency response. Main Street is currently the only emergency route between downtown Billings and the Billings Heights neighborhood. Incidents affecting traffic operations on Main Street have been an impediment to emergency response, which is a concern expressed by the Yellowstone County Disaster and Emergency Services Department.

Improve truck/commercial vehicle access to and through Billings. In the 1990s, the City of Billings and Yellowstone County began to pursue federal funds to study options for improving conditions on the segment of the Camino Real International Trade Corridor through Billings. After completion of the feasibility study in 2001, federal funds were appropriated for a bypass route connecting between I-90 and Montana State Highway 3 (MT 3) north of Billings. Although funding constraints prompted a reduction in the scope of the project, improved truck/commercial vehicle access to state highways and major facilities serving the Billings area is a need identified in the Billings Urban Area Long-Range Transportation Plan (2009 Update). The Billings Bypass project is intended to address that need, and the segment of this facility that would provide a connection between I-90 and Old Hwy 312 is included in the list of fiscally constrained long-range projects identified in the plan.

NO-BRIDGE ALTERNATIVES

There are three existing Yellowstone River crossings in the vicinity of the study area; the existing I-90 bridge, the existing US 87 bridge (both near downtown Billings) and the existing Old Hwy 312 bridge near Huntley. Alternatives using these three crossings were developed and are described below. A map of each of these alternatives is also attached to this memorandum.

New I-90 Connection Alternative

This alternative would extend Main Street from US 87/1st Avenue North to I-90 with a new interchange west of the existing I-90 Yellowstone River Bridge and a grade-separated intersection at US 87/Main Street/1st Avenue North. This alternative also involves an overpass of the railroad, which will require vertical retaining walls from the railroad to 1st Avenue North. One additional travel lane in each direction would be added to Main Street from 1st Avenue to 4th Avenue. The alternative would also require grade separation structures at Airport Road and Lake Elmo Road to improve traffic flow on Main Street. The Lake Elmo/Airport Road intersections would be served by roundabouts and dual-lane one-way frontage roads connecting the two intersections. This would require

an elevated Main Street section and vertical retaining walls from the Main Street north and south landings. An additional travel lane along Main Street in each direction would be needed between these improvements and Wicks Lane to the north. A brief analysis shows that the new I-90 connection would draw approximately 12,000 Average Daily Traffic (ADT) in 2025, thus reducing traffic on the existing US 87 East to volumes somewhat less than 2010 levels.

Improved US 87 Connection Alternative
This alternative includes reconstruction of the Lockwood Interchange to an urban interchange configuration constructed on an elevated structure above I-90. US 87 would require two additional travel lanes, and there would be multi-lane ramps in some quadrants controlled by a single signal on top of the structure. Realignment of US 87 would be a major feature of the Lockwood Interchange improvements as a part of the Improved US 87 Connection Alternative. Intersections on either side of the interchange would also need to be reconstructed but have not been detailed in the attached figures. This alternative would require a Main Street to 1st Avenue North fly-over connection with a roundabout serving Main Street to US 87 traffic below the overpass structure. The overpass structure would serve approximately 32,000 ADT in 2035 while US 87 to the east would have approximately 35,000 ADT. One lane would need to be added to each side of US 87 from this intersection to the Lockwood Interchange. Removal of the raised median on the river bridge and the railroad overpass may be able to absorb the additional lanes without reconstructing the existing bridge. As with the New I-90 Connection Alternative, this alternative would also require grade separation structures at Airport Road and Lake Elmo Road to improve traffic flow on Main Street. The Lake Elmo/Airport Road intersections would be served by roundabouts and dual-lane one-way frontage roads connecting the two intersections. This would require an elevated Main Street section and vertical retaining walls from the Main Street north and south landings. An additional travel lane along Main Street in each direction would be needed between these improvements and Wicks Lane to the north.

I-94 to Old Hwy 312 Connection at Huntley
This alignment would use the existing Old Hwy 312 Bridge over the Yellowstone River near Huntley (approximately 9 miles north of Billings). The alignment would connect to I-94 at the Huntley Interchange. The alignment would proceed north along the existing Northern Avenue alignment across the railroad and would continue northwest along the existing Nahmis Avenue alignment to Old Hwy 312. From the intersection of Nahmis Avenue and Old Hwy 312, the alignment would veer west and follow the existing Old Hwy 312 alignment across the Yellowstone River. It is not anticipated that this alternative would draw additional traffic; therefore, no improvements to the route are proposed.

ALTERNATIVES SCREENING PROCESS

Because the study area for this project was originally much larger (between I-90 and MT 3), the Level 1 screening was a simple exercise in eliminating the previously considered alternatives that were not consistent with the re-scoped project; i.e., did not provide a connection between I-90 and Old Hwy 312. Because the no-bridge alternatives provide this connection, they were all carried to the next level of screening.

The Level 2 screening focuses on the alignments without consideration of typical sections or the type of connection to existing routes. The alternative alignments (shown on the attached map) were screened to determine how well they meet the identified purpose and needs of the project and evaluated for community and environmental impacts that could be considered a fatal flaw. Due to the large number of conceptual alternatives under consideration, this screening was completed in two steps.

Level 2A Screening

The Level 2A screening was performed based on proposed alignments only. No design was completed for the alternatives at this point in the process. The screening criteria focused on evaluating key benefits related to the purpose and need and cultural and floodplain impacts that could be a fatal flaw.

Key Measures Related to the Purpose and Need Criteria

- Reduce Physical Barrier Impacts – The rimrocks, the Yellowstone River, the railroad, and I-90 create barriers for north-south connections in the Billings area, which affect local traffic and regional traffic. The degree to which each alternative would reduce the impacts of these barriers was assessed. In general, provision of new routes traversing these barriers was assessed as a greater benefit than improvements to existing routes traversing these barriers.
- Improved Connectivity between Lockwood and Billings – To gauge how well the alternatives would improve connectivity between Lockwood and Billings, the project team measured route distances between common points to compare the proposed alternatives to the existing conditions. The two common points used were the Johnson Lane Interchange in Lockwood and the intersection of Wicks Lane and Main Street in Billings Heights (which is a common destination for commercial services). Alternatives with longer route distances were deemed to provide less benefit and received a lower rating.
- Improved Mobility between Billings Heights and the Interstate – There are two primary factors that currently impact mobility for Billings Heights residents: 1) there is only one route in and out of Billings Heights, and when this route is compromised or closed, there are no alternate routes, and 2) the existing route is highly congested. To gauge how well the alternatives would improve mobility to and from the Billings Heights area, the project team assessed how the alternatives would improve the convenience and consistency with which people in Billings Heights could travel to and from their neighborhood.
- Improve Truck/Commercial Vehicle Access to and through Billings – Improved truck/commercial vehicle access to state highways and major facilities serving the Billings area is a need identified in the Billings Urban Area Long-Range Transportation Plan (2009 Update). The alternatives were assessed to determine how well they would support the plan for a future bypass route between I-90 and MT 3 north of Billings.

Environmental and Community Impacts

- Cultural/Historic Sites – The National Register of Historic Places (NRHP) was reviewed to identify resources in the study area. Additionally, cultural surveys were completed in 2007 for areas along the Preliminary Alternatives identified under the original purpose and need for the project. No sites listed on the NRHP were identified in proximity to the conceptual alternatives currently under consideration, but one site identified during the 2007 cultural surveys (a historic battlefield site) was identified as a resource that must be avoided due to the high cultural significance of the site. As such, alternatives crossing through this historic site were screened out.

- Floodplain Impacts – Delineated floodplains within the study area are associated with the Yellowstone River, Five Mile Creek, Alkali Creek, and Dry Creek. The Yellowstone River has a broad floodplain through most of the study area and there are relatively few places in the vicinity of Billings where a cost-effective bridge over the river could be built without substantial impacts to the floodplain. Therefore, the linear feet across or adjacent to the 100-year floodplain was measured for each alternative to identify alignments with a higher potential for impacts to the river and floodplain.

Level 2B Screening

For the alternatives advanced from step A to step B of the Level 2 screening, horizontal design was completed to facilitate development of travel time estimates to measure improved mobility and assessment of impacts to private property to measure community impacts. For the alternatives involving new roadway alignments, two right-of-way widths (130 feet and 200 feet) were screened to provide a range of impacts for each alternative. Because the no-bridge alternatives focus on identifying improvements to the existing transportation network instead of identifying new transportation corridors across the Yellowstone River, right-of-way boundaries were developed to accommodate the improvements needed for each concept to achieve the purpose and need. The screening criteria consisted of travel time benefits, private property impacts, and other potential issues that could be a fatal flaw.

Key Measures Related to the Purpose and Need Criteria

- Improved Connectivity Between Lockwood and Billings - travel times between Lockwood and Billings Heights were estimated to identify the reduction or increase in travel time on the proposed alignment in comparison to existing conditions.

Environmental and Community Impacts

- Right-of-way (ROW) impacts – Analysis was performed to determine the number of parcels and structures that would be impacted by the proposed ROW limits for each alternative.
- Other Potential Issues – The project team also reviewed available data to identify community resources that could be impacted by the alternatives. This included such resources as school, churches, cemeteries, parks and recreational facilities, and neighborhoods.
- Potential Floodplain Impacts - The potential for floodplain impacts was also carried forward as a screening criterion.

SUMMARY OF SCREENING RESULTS FOR NO-BRIDGE ALTERNATIVES

Level 2A

I-94 to Old Hwy 312 Connection at Huntley

This alternative was screened out because it would not meet the purpose and need. The alternative is 12.6 miles longer than the existing route along the Main Street corridor. This alternative would not reduce physical barrier impacts, would not improve connectivity between Lockwood and Billings, would not improve mobility to and from Billings Heights, and would not improve truck/commercial vehicle access to and through Billings.

The New I-90 Connection Alternative and the Improved US 87 Connection Alternative did not perform as well as some other alternatives under consideration, but no fatal flaws were identified and thus these alternatives were advanced to the next step for additional screening.

Level 2B

New I-90 Connection

The New I-90 Connection would provide a moderate degree of travel time benefit, but would have substantial impacts to commercial properties along Main Street. It is estimated that land would be needed from 112 parcels (mostly commercial) along the Main Street corridor and 39 businesses (including gas stations, restaurants, banks, hotels, auto dealerships, nurseries, and a post office) would need to be relocated. This alternative would not avoid impacts to waters of the US. Major improvements are needed at the location where Alkali Creek crosses under Main Street and construction of the new I-90 interchange would encroach into the Yellowstone River floodplain between I-90 and the railroad. This alternative was screened out because of the substantial impacts to commercial properties along Main Street. It is not practicable to relocate 39 businesses when other alternatives would relocate 9 or fewer residences/businesses. Other potentially significant issues associated with this alternative include following:

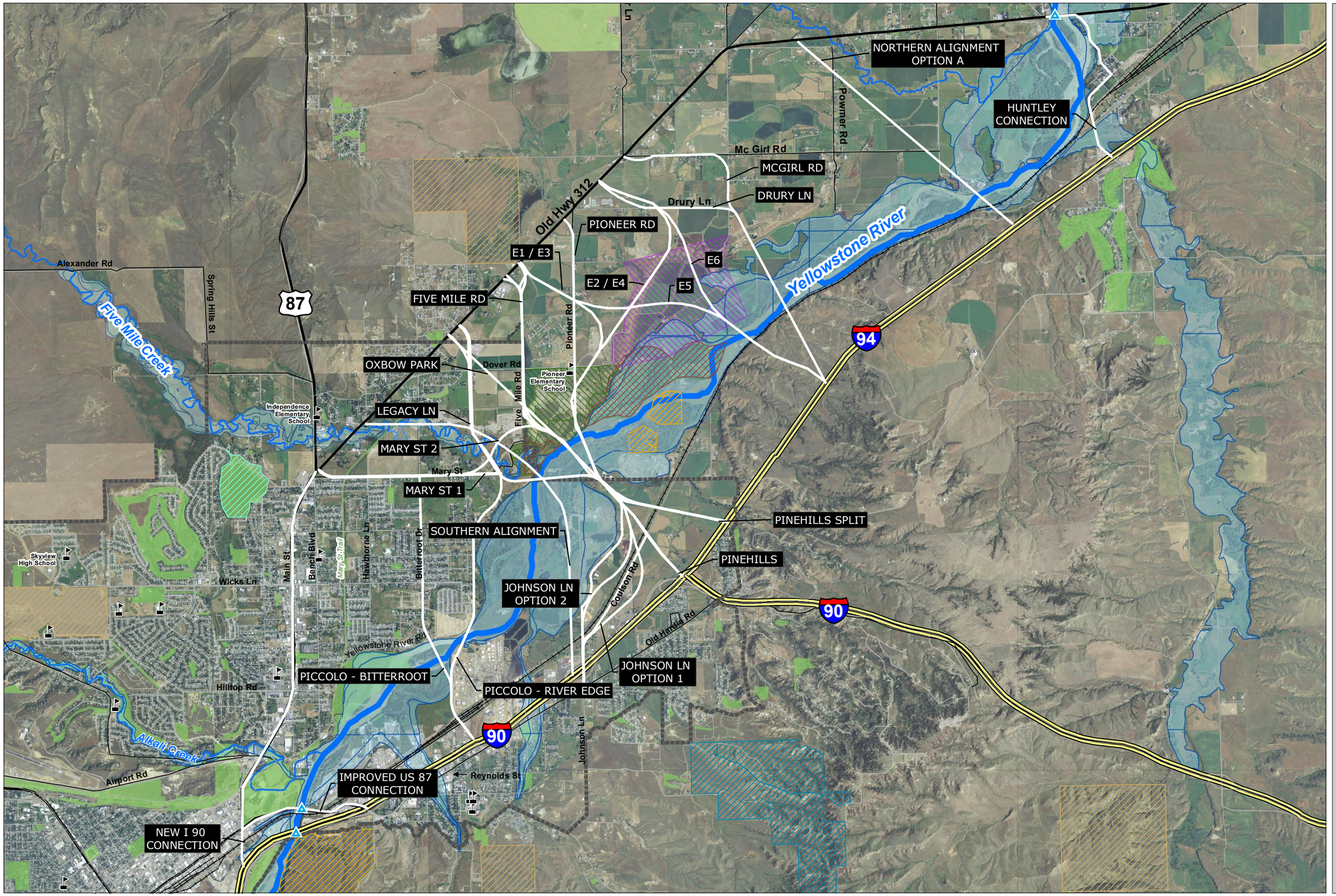
- conflicts with major utility lines to accommodate the improvements near Airport Road and Lake Elmo Drive along Main Street,
- operational impact to the Conoco refinery including impact to a 130-ft diameter oil storage unit, and
- a Section 6(f) conversion at Coulson Park, which received LWCF funds.

Improved US 87 Connection

The Improved US 87 River Crossing would have the most right-of-way impacts of any alternative evaluated while providing marginal travel time benefits. It is estimated that land would be needed from 157 parcels (mostly commercial) at the Lockwood Interchange and along the Main Street corridor and 50 businesses (including gas stations, restaurants, banks, hotels, auto dealerships, nurseries, and a post office) would need to be relocated. The Montana Stage at the Metra would also need to be relocated. Major improvements are needed at the location where Alkali Creek crosses under Main Street, which would result in impacts to the waterway and associated floodplain. Although this alternative may have the lowest potential for impacts to waters of the US of any alternative evaluated, it would not avoid impacts to waters of the US. This alternative was screened out because of the substantial impacts to commercial properties at the Lockwood Interchange and along Main Street. It is not practicable to relocate 50 businesses when other alternatives would require relocation for 9 or fewer residences/businesses. Other potentially significant issues associated with this alternative include following:

- conflicts with major utility lines to accommodate the improvements near Airport Road and Lake Elmo Drive along Main Street, and
- moderate to major operational impacts to all of the fueling stations at the Lockwood Interchange, which is a major fueling hub for the commercial trucking industry.

Attachments/Enclosures: Conceptual Alternatives Map; I-94 to Old Hwy 312 Connection at Huntley Map' New I-90 Connection Map; Improved US 87 Connection Map; Level 2A Screening Table; Level 2B Screening Table



Billings Bypass EIS
Conceptual Alternatives
Level 2 Screening
June 2011

Billings Urban Area

Potential Alternatives

Potential Alignments

Future Development

Planned/Preliminary Platted Development

Conservation Easements

The Nature Conservancy

Montana Land Reliance

Public Lands

Montana State Trust Land

USBR Land

BLM Land

MFWP Land

Community & Natural Resources

School

Park

Master Planned Park

Future Park

Existing Yellowstone River Crossing

Battlefield Site

100-Year Floodplain

Yellowstone River

Stream

Existing Transportation Network

Interstate

Highway

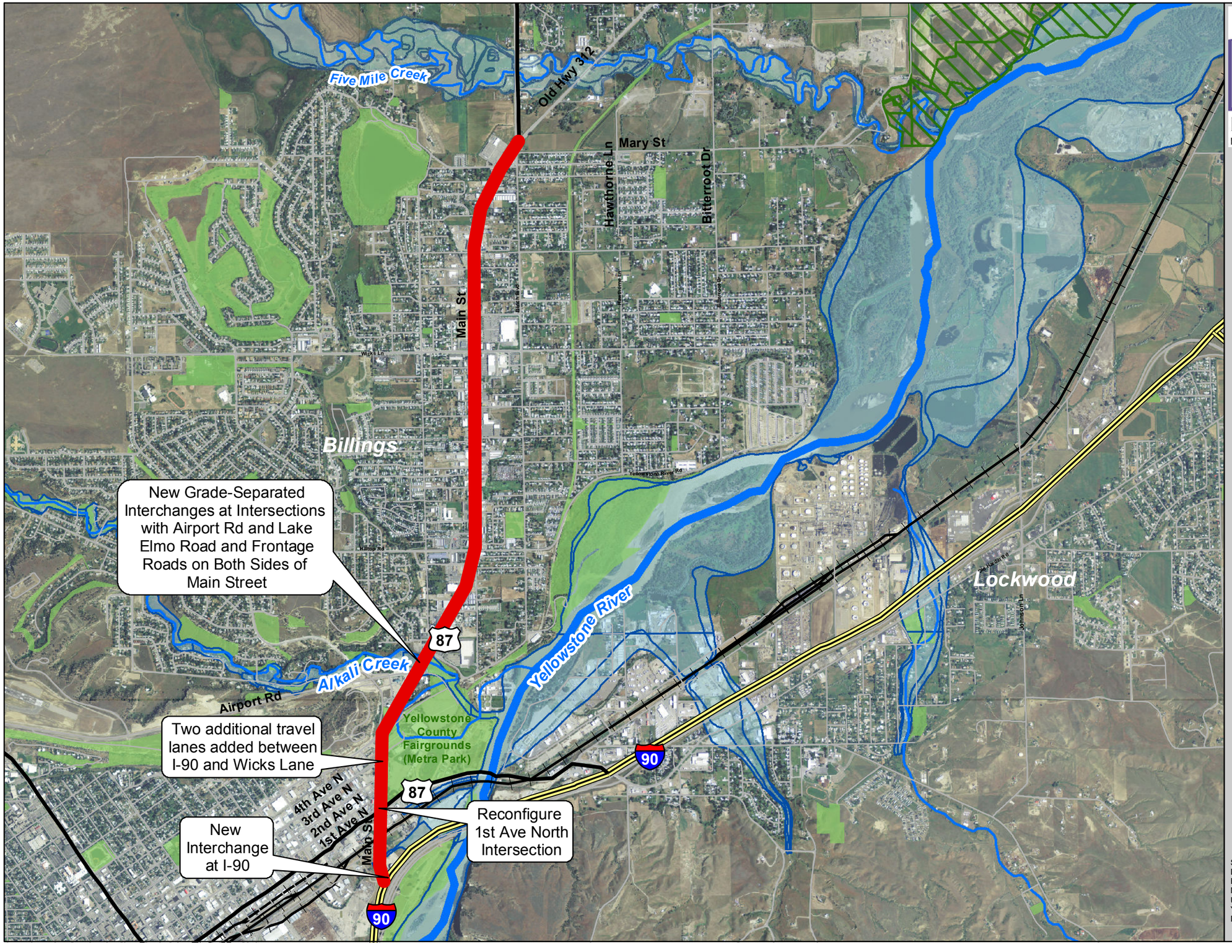
Local Road

Railroads

N

0 0.5 1 Miles

Sources:
HKM/DOWL September 2010
FEMA (floodplain data)
Montana Fish, Wildlife and Parks (streams, public land information)
USDA NationalAgricultural Imagery Program (July 2009 aerial photography)
Yellowstone County (schools, public water supply, parks)
Date Plotted: May 2011



BILLINGS BYPASS EIS

NCPD 56(55)CN 4199

New I-90 Connection Alternative

Alternative Alignment

Transportation Network

- Interstate
- Highway
- Local

Community & Natural Resources

- Park
- 100-Year Floodplain
- Yellowstone River
- Creeks

N

0 0.5 1 Miles

Sources:
DOWL/HKM September 2010
FEMA (floodplain data)
Montana Fish, Wildlife and Parks (streams, public land information)
USDA National Agricultural Imagery Program (July 2009 aerial photography)
Yellowstone County (schools, public water supply, parks) 2010
Date Plotted: May 2011

BILLINGS BYPASS EIS

NCPD 56(55)CN 4199

Improved US 87 Connection Alternative

Alternative Alignment

Transportation Network

- Interstate
- Highway
- Local

Community & Natural Resources

- Park
- 100-Year Floodplain
- Yellowstone River
- Creeks

N

0 0.5 1 Miles

New Grade-Separated Interchanges at Intersections with Airport Rd and Lake Elmo Road and Frontage Roads on Both Sides of Main Street

Reconfigure Existing Bridge for Additional Travel Lanes

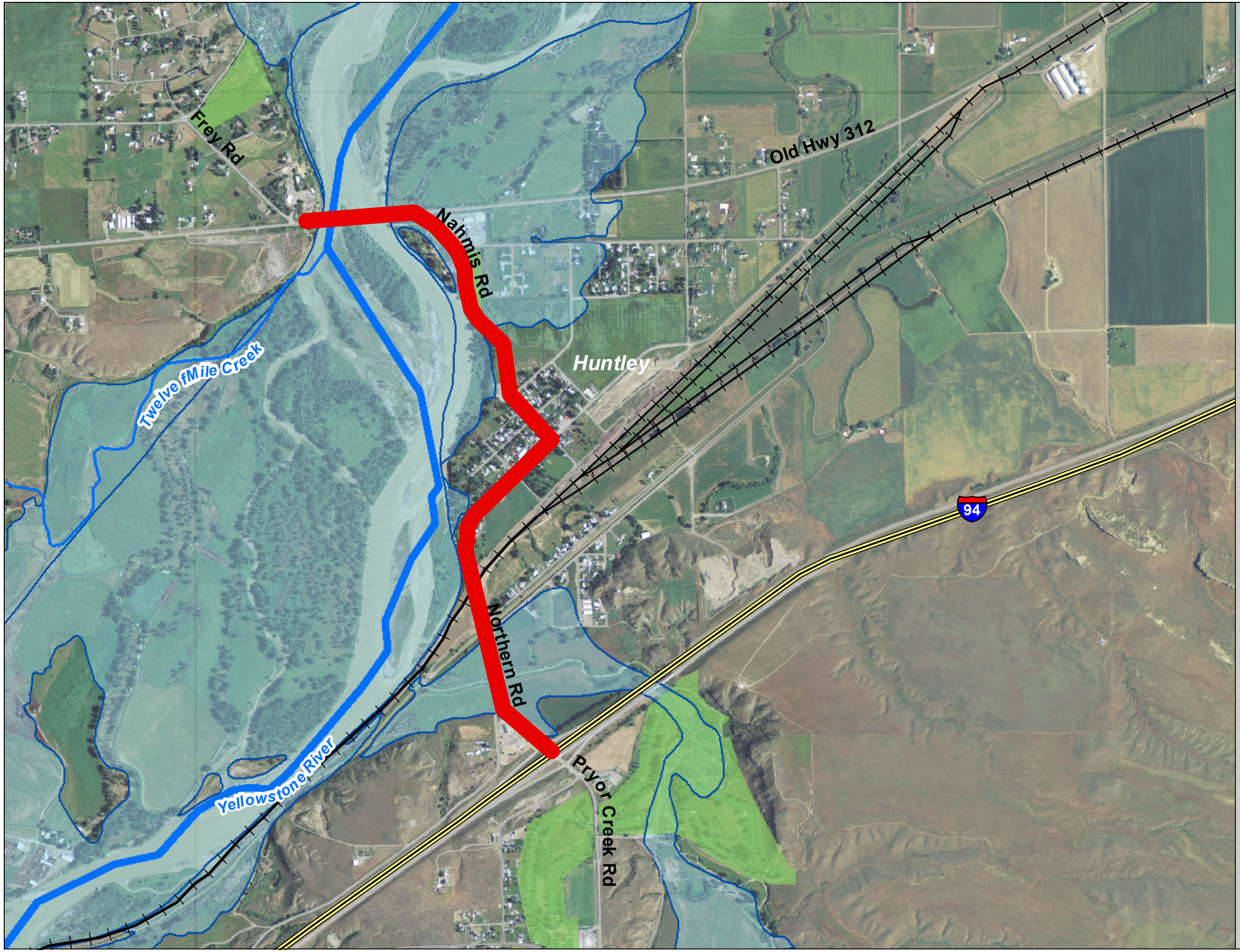
Two additional travel lanes added between I-90 and Wicks Lane

Reconstruct Existing Lockwood Interchange

New Grade-Separated Interchange at 1st Ave North

Five Mile Creek
Old Hwy 312
Mary St
Hawthorne Ln
Bitterroot Dr
Main St
Wicks Ln
Billings
Yellowstone River Rd
Hilltop Rd
Alkali Creek
Airport Rd
Yellowstone County Fairgrounds (Metra Park)
4th Ave N
3rd Ave N
2nd Ave N
1st Ave N
Main St
Lockwood
St Hwy 87
Johnson Ln
87
90

Sources:
DOWL/HKM September 2010
FEMA (floodplain data)
Montana Fish, Wildlife and Parks (streams, public land information)
USDA National Agricultural Imagery Program (July 2009 aerial photography)
Yellowstone County (schools, public water supply, parks) 2010
Date Plotted: May 2011



BILLINGS BYPASS EIS
NCPD 56(55)CN 4199

I-94 to Old Hwy 312 Connection at Huntley

Alternative Alignment

Transportation Network

- Interstate
- Highway
- Local

Community & Natural Resources

- Park
- 100-Year Floodplain
- Yellowstone River
- Creeks

N

0 0.25 0.5 Miles

Sources:
DOWL/HKM September 2010
FEMA (floodplain data)
Montana Fish, Wildlife and Parks (streams, public land information)
USDA National Agricultural Imagery Program (July 2009 aerial photography)
Yellowstone County (schools, public water supply, parks) 2010
Date Plotted: May 2011

Screening Table 2A

Alternative Alignments	Screening Factors						Results
	How well does the alignment meet the project purpose and need? (HIGH, MODERATE, POOR)				Environmental Issues		
	1. Reduce physical barrier impacts (I-90, railroad, Yellowstone River, rimrocks)	2. Improve connectivity between Lockwood and Billings (comparison of existing and proposed route between the Johnson interchange and the intersection of Main Street and Wicks Lane)	3. Improve mobility to and from Billings Heights (improve access to interstate and provide transportation system redundancy)	4. Improve truck/commercial vehicle access to and through Billings (allows for future connection to MT 3 north of Billings)	1. Cultural/Historic Sites	2. Floodplain impacts (linear feet across or adjacent to floodplain)	Preliminary Recommendation
No-Bridge Alternatives							
New I 90 Connection	MODERATE (New connection traversing I-90 and railroad)	HIGH (0.4 miles longer than existing route)	MODERATE (Would provide an alternate connection to I-90 and improvements to the Main Street corridor)	MODERATE (Bypasses a portion of existing route and improves most congested area of existing route)	No data available	600 ft (plus 2-3 acres of encroachment between railroad and I-90)	**ADVANCE TO NEXT LEVEL OF SCREENING**
Improved US 87 Connection	POOR (Does not reduce physical barrier impacts)	HIGH (0 miles longer than existing route)	MODERATE TO POOR (Would not provide an alternate route, but would improve the Main Street corridor)	MODERATE to POOR (Improves most congested area of existing route)	No data available	600 ft (assumes no impacts at existing US 87 crossing of the Yellowstone River)	**ADVANCE TO NEXT LEVEL OF SCREENING**
I-94 to Old Hwy 312 Connection at Huntley	POOR (Does not reduce physical barrier impacts)	POOR (12.6 miles longer than existing route)	POOR (No mobility benefits for Billings Heights)	POOR (Route does not provide access to or through Billings)	No data available	4250 ft	**SCREEN OUT** (Route does not reduce physical barrier impacts because it uses an existing corridor. Connectivity and mobility benefits would be negligible because the interstate and Old Hwy 312 connections are too far north of the urban area and the route does not provide access to or through Billings)
Alternatives Originating from Piccolo Lane							
Piccolo - Bitterroot Drive	HIGH (New connection traversing I-90, railroad, and Yellowstone River)	HIGH (0.3 miles shorter than existing route)	HIGH (Would provide an alternate route with Old Hwy 312 connection in Billings urban limits and new access to I-90)	HIGH (Provides new truck/commercial vehicle access to and through Billings with direct connection to US 87. A future extension west to MT 3 would require that the bypass route follow US 87 north for atleast 1.5 miles due to the Five Mile Creek floodplain and existing residential development)	No data available	2800 feet	**ADVANCE TO NEXT LEVEL OF SCREENING**
Piccolo - River Edge	HIGH (New connection traversing I-90, railroad, and Yellowstone River)	HIGH (0.3 miles shorter than existing route)	HIGH (Would provide an alternate route with Old Hwy 312 connection in Billings urban limits and new access to I-90)	HIGH (Provides new truck/commercial vehicle access to and through Billings with direct connection to US 87. A future extension west to MT 3 would require that the bypass route follow US 87 north for atleast 1.5 miles due to the Five Mile Creek floodplain and existing residential development)	No data available	2000 feet (could result in longitudinal encroachment)	**ADVANCE TO NEXT LEVEL OF SCREENING**
Alternatives Originating from Johnson Lane							
Johnson Ln Option 1 - Mary St 1	HIGH (New connection traversing I-90, railroad, and Yellowstone River)	HIGH (0.2 miles shorter than existing route)	HIGH (Would provide an alternate route with Old Hwy 312 connection in Billings urban limits and new access to I-90)	HIGH (Provides new truck/commercial vehicle access with direct connection to US 87. A future extension west to MT 3 would require that the bypass route follow US 87 north for at least 1.5 miles due to the Five Mile Creek floodplain and existing residential development)	No data available	2400 feet	**ADVANCE TO NEXT LEVEL OF SCREENING**

Screening Table 2A

Alternative Alignments	Screening Factors						Results
	How well does the alignment meet the project purpose and need? (HIGH, MODERATE, POOR)				Environmental Issues		
	1. Reduce physical barrier impacts (I-90, railroad, Yellowstone River, rimrocks)	2. Improve connectivity between Lockwood and Billings (comparison of existing and proposed route between the Johnson interchange and the intersection of Main Street and Wicks Lane)	3. Improve mobility to and from Billings Heights (improve access to interstate and provide transportation system redundancy)	4. Improve truck/commercial vehicle access to and through Billings (allows for future connection to MT 3 north of Billings)	1. Cultural/Historic Sites	2. Floodplain impacts (linear feet across or adjacent to floodplain)	Preliminary Recommendation
Johnson Ln Option 1 - Mary St 2	HIGH (New connection traversing I-90, railroad, and Yellowstone River)	HIGH (0.2 miles longer than existing route)	HIGH (Would provide an alternate route with Old Hwy 312 connection in Billings urban limits and new access to I-90)	HIGH (Provides new truck/commercial vehicle access with direct connection to US 87. A future extension west to MT 3 would require that the bypass route follow US 87 north for at least 1.5 miles due to the Five Mile Creek floodplain and existing residential development)	No data available	2100 feet	**ADVANCE TO NEXT LEVEL OF SCREENING**
Johnson Ln Option 1 - Legacy Ln	HIGH (New connection traversing I-90, railroad, and Yellowstone River)	MODERATE (1.5 miles longer than existing route)	MODERATE (Would provide an alternate route with Old Hwy 312 connection 0 - 0.2 miles outside of Billings urban limits and new access to I-90)	MODERATE (Provides new truck/commercial vehicle access. Future connection to MT 3 would require the bypass route to follow Old Hwy 312 approximately 1 mile northeast (out of direction) due to the Five Mile Creek floodplain and existing residential development)	No data available	2700 ft (could result in longitudinal encroachment)	**ADVANCE TO NEXT LEVEL OF SCREENING**
Johnson Ln Option 1- Oxbow Park	HIGH (New connection traversing I-90, railroad, and Yellowstone River)	MODERATE (1.2 miles longer than existing route)	MODERATE (Would provide an alternate route with Old Hwy 312 connection 0 - 0.2 miles outside of Billings urban limits and new access to I-90)	MODERATE (Provides new truck/commercial vehicle access. Future connection to MT 3 would require the bypass route to follow Old Hwy 312 approximately 1 mile northeast (out of direction) due to the Five Mile Creek floodplain and existing residential development)	No data available	1700 feet	**ADVANCE TO NEXT LEVEL OF SCREENING**
Johnson Ln Option 1 - Five Mile Rd[1]	HIGH (New connection traversing I-90, railroad, and Yellowstone River)	MODERATE (2.1 miles longer than existing route)	MODERATE (Would provide an alternate route with Old Hwy 312 connection 0.8 - 1.0 miles outside of Billings urban limits and new access to I-90)	HIGH (Provides new truck/commercial vehicle access. Future connection to MT 3 is possible through currently undeveloped land west of Old Hwy 312)	No data available	1600 ft	**ADVANCE TO NEXT LEVEL OF SCREENING**
Johnson Ln Option 1 - Pioneer Rd[2]	HIGH (New connection traversing I-90, railroad, and Yellowstone River)	POOR (3.2 miles longer than existing route)	MODERATE (Would provide an alternate route with Old Hwy 312 connection 1.6 miles outside of Billings urban limits and new access to I-90)	HIGH (Provides new truck/commercial vehicle access. Future connection to MT 3 is possible through currently undeveloped land west of Old Hwy 312)	No identified issues (no surveys for west half of route)	1800 ft	**ADVANCE TO NEXT LEVEL OF SCREENING**
Johnson Ln Option 1 - E1/E3	HIGH (New connection traversing I-90, railroad, and Yellowstone River)	MODERATE (2.3 miles longer than existing route)	MODERATE (Would provide an alternate route with Old Hwy 312 connection 0.8 - 1.0 miles outside of Billings urban limits and new access to I-90)	HIGH (Provides new truck/commercial vehicle access. Future connection to MT 3 is possible through currently undeveloped land west of Old Hwy 312)	No identified issues	1800 ft	**ADVANCE TO NEXT LEVEL OF SCREENING**
Johnson Ln Option 1 - E2/E4	HIGH (New connection traversing I-90, railroad, and Yellowstone River)	POOR 4.3 miles longer than existing route)	MODERATE to POOR (Would provide an alternate route with Old Hwy 312 connection 2.0 miles outside of Billings urban limits and new access to I-90)	HIGH (Provides new truck/commercial vehicle access. Future connection to MT 3 is possible through currently undeveloped land west of Old Hwy 312)	Impacts historic Battlefield Site	1800 ft	**SCREEN OUT** (Would impact a historic battlefield site; connectivity and mobility benefits would be negligible because the connection to Old Hwy 312 is too far north of the urban area)

Screening Table 2A

Alternative Alignments	Screening Factors						Results
	How well does the alignment meet the project purpose and need? (HIGH, MODERATE, POOR)				Environmental Issues		
	1. Reduce physical barrier impacts (I-90, railroad, Yellowstone River, rimrocks)	2. Improve connectivity between Lockwood and Billings (comparison of existing and proposed route between the Johnson interchange and the intersection of Main Street and Wicks Lane)	3. Improve mobility to and from Billings Heights (improve access to interstate and provide transportation system redundancy)	4. Improve truck/commercial vehicle access to and through Billings (allows for future connection to MT 3 north of Billings)	1. Cultural/Historic Sites	2. Floodplain impacts (linear feet across or adjacent to floodplain)	Preliminary Recommendation
Johnson Ln Option 2- Mary St 1	HIGH (New connection traversing I-90, railroad, and Yellowstone River)	HIGH (0.1 miles shorter than existing route)	HIGH (Would provide an alternate route with Old Hwy 312 connection in Billings urban limits and new access to I-90)	HIGH (Provides new truck/commercial vehicle access with direct connection to US 87. A future extension west to MT 3 would require that the bypass route follow US 87 north for at least 1.5 miles due to the Five Mile Creek floodplain and existing residential development)	No data available	2400 feet	**ADVANCE TO NEXT LEVEL OF SCREENING**
Johnson Ln Option 2- Mary St 2	HIGH (New connection traversing I-90, railroad, and Yellowstone River)	HIGH (0.3 miles longer than existing route)	HIGH (Would provide an alternate route with Old Hwy 312 connection in Billings urban limits and new access to I-90)	HIGH (Provides new truck/commercial vehicle access with direct connection to US 87. A future extension west to MT 3 would require that the bypass route follow US 87 north for at least 1.5 miles due to the Five Mile Creek floodplain and existing residential development)	No data available	2100 feet	**ADVANCE TO NEXT LEVEL OF SCREENING**
Johnson Ln Option 2 - Legacy Ln	HIGH (New connection traversing I-90, railroad, and Yellowstone River)	MODERATE (1.6 miles longer than existing route)	MODERATE (Would provide an alternate route with Old Hwy 312 connection 0 - 0.2 miles outside of Billings urban limits and new access to I-90)	MODERATE (Provides new truck/commercial vehicle access. Future connection to MT 3 would require the bypass route to follow Old Hwy 312 approximately 1 mile northeast (out of direction) due to the Five Mile Creek floodplain and existing residential development)	No data available	2700 ft (could result in longitudinal encroachment)	**ADVANCE TO NEXT LEVEL OF SCREENING**
Johnson Ln Option 2- Oxbow Park	HIGH (New connection traversing I-90, railroad, and Yellowstone River)	MODERATE (1.3 miles longer than existing route)	MODERATE (Would provide an alternate route with Old Hwy 312 connection 0 - 0.2 miles outside of Billings urban limits and new access to I-90)	MODERATE (Provides new truck/commercial vehicle access. Future connection to MT 3 would require the bypass route to follow Old Hwy 312 approximately 1 mile northeast (out of direction) due to the Five Mile Creek floodplain and existing residential development)	No data available	1700 feet	**ADVANCE TO NEXT LEVEL OF SCREENING**
Johnson Ln Option 2 - Five Mile Rd[2]	HIGH (New connection traversing I-90, railroad, and Yellowstone River)	MODERATE (2.2 miles longer than existing route)	MODERATE (Would provide an alternate route with Old Hwy 312 connection 0.8 - 1.0 miles outside of Billings urban limits and new access to I-90)	HIGH (Provides new truck/commercial vehicle access. Future connection to MT 3 is possible through currently undeveloped land west of Old Hwy 312)	No data available	1600 ft	**ADVANCE TO NEXT LEVEL OF SCREENING**
Johnson Ln Option 2 - Pioneer Rd	HIGH (New connection traversing I-90, railroad, and Yellowstone River)	POOR (3.3 miles longer than existing route)	MODERATE (Would provide an alternate route with Old Hwy 312 connection 1.6 miles outside of Billings urban limits and new access to I-90)	HIGH (Provides new truck/commercial vehicle access. Future connection to MT 3 is possible through currently undeveloped land west of Old Hwy 312)	No identified issues (no surveys for west half of route)	1800 ft	**ADVANCE TO NEXT LEVEL OF SCREENING**
Johnson Ln Option 2 - E1/E3	HIGH (New connection traversing I-90, railroad, and Yellowstone River)	MODERATE (2.5 miles longer than existing route)	MODERATE (Would provide an alternate route with Old Hwy 312 connection 0.8 - 1.0 miles outside of Billings urban limits and new access to I-90)	HIGH (Provides new truck/commercial vehicle access. Future connection to MT 3 is possible through currently undeveloped land west of Old Hwy 312)	No identified issues	1800 ft	**ADVANCE TO NEXT LEVEL OF SCREENING**

Screening Table 2A

Alternative Alignments	Screening Factors						Results
	How well does the alignment meet the project purpose and need? (HIGH, MODERATE, POOR)				Environmental Issues		
	1. Reduce physical barrier impacts (I-90, railroad, Yellowstone River, rimrocks)	2. Improve connectivity between Lockwood and Billings (comparison of existing and proposed route between the Johnson interchange and the intersection of Main Street and Wicks Lane)	3. Improve mobility to and from Billings Heights (improve access to interstate and provide transportation system redundancy)	4. Improve truck/commercial vehicle access to and through Billings (allows for future connection to MT 3 north of Billings)	1. Cultural/Historic Sites	2. Floodplain impacts (linear feet across or adjacent to floodplain)	Preliminary Recommendation
Johnson Ln Option 2 - E2/E4	HIGH (New connection traversing I-90, railroad, and Yellowstone River)	POOR 4.5 miles longer than existing route)	MODERATE to POOR (Would provide an alternate route with Old Hwy 312 connection 2.0 miles outside of Billings urban limits and new access to I-90)	HIGH (Provides new truck/commercial vehicle access. Future connection to MT 3 is possible through currently undeveloped land west of Old Hwy 312)	No identified issues	1800 ft	**SCREEN OUT** (Would impact a historic battlefield site; connectivity and mobility benefits would be negligible because the connection to Old Hwy 312 is too far north of the urban area)
Southern Alignment	HIGH (New connection traversing I-90, railroad, and Yellowstone River)	HIGH (0.5 miles shorter than existing route)	HIGH (Would provide an alternate route with Old Hwy 312 connection in Billings urban limits and new access to I-90)	HIGH (Provides new truck/commercial vehicle access with direct connection to US 87. A future extension west to MT 3 would require that the bypass route follow US 87 north for atleast 1.5 miles due to the Five Mile Creek floodplain and existing residential development)	No identified issues (no surveys for majority of route)	7200 ft (could result in longitudinal encroachment)	**SCREEN OUT** (This alignment is very similar to the Johnson Ln Option 2 - Mary St 1 alignment, but would have more floodplain impacts, potential 4(f) impacts, and would not allow for future connection to US 87.)
Alternatives Originating from Pinehills							
Pinehills - Mary St 1	HIGH (New connection traversing I-90, railroad, and Yellowstone River)	HIGH (0.3 miles longer than existing route)	HIGH (Would provide an alternate route with Old Hwy 312 connection in Billings urban limits and new access to I-90 and I-94)	HIGH (Provides new truck/commercial vehicle access with direct connection to US 87. A future extension west to MT 3 would require that the bypass route follow US 87 north for at least 1.5 miles due to the Five Mile Creek floodplain and existing residential development)	No identified issues (no data for west half of route)	2400 feet	**ADVANCE TO NEXT LEVEL OF SCREENING**
Pinehills - Mary St 2	HIGH (New connection traversing I-90, railroad, and Yellowstone River)	HIGH (0.6 miles longer than existing route)	HIGH (Would provide an alternate route with Old Hwy 312 connection in Billings urban limits and new access to I-90 and I-94)	HIGH (Provides new truck/commercial vehicle access with direct connection to US 87. A future extension west to MT 3 would require that the bypass route follow US 87 north for at least 1.5 miles due to the Five Mile Creek floodplain and existing residential development)	No identified issues (no data for west half of route)	2100 feet	**ADVANCE TO NEXT LEVEL OF SCREENING**
Pinehills - Legacy Ln	HIGH (New connection traversing I-90, railroad, and Yellowstone River)	MODERATE (1.8 miles longer than existing route)	MODERATE (Would provide an alternate route with Old Hwy 312 connection 0 - 0.2 miles outside of Billings urban limits and new access to I-90 and I-94)	MODERATE (Provides new truck/commercial vehicle access. Future connection to MT 3 would require the bypass route to follow Old Hwy 312 approximately 1 mile northeast (out of direction) due to the Five Mile Creek floodplain and existing residential development)	No identified issues (no data for west half of route)	2400 ft (could result in longitudinal encroachment)	**ADVANCE TO NEXT LEVEL OF SCREENING**
Pinehills - Oxbow Park	HIGH (New connection traversing I-90, railroad, and Yellowstone River)	MODERATE (1.3 miles longer than existing route)	MODERATE (Would provide an alternate route with Old Hwy 312 connection 0 - 0.2 miles outside of Billings urban limits and new access to I-90 and I-94)	MODERATE (Provides new truck/commercial vehicle access. Future connection to MT 3 would require the bypass route to follow Old Hwy 312 approximately 1 mile northeast (out of direction) due to the Five Mile Creek floodplain and existing residential development)	No data available	1700 feet	**ADVANCE TO NEXT LEVEL OF SCREENING**
Pinehills - Five Mile Rd[1]	HIGH (New connection traversing I-90, railroad, and Yellowstone River)	MODERATE (2.5 miles longer than existing route)	MODERATE (Would provide an alternate route with Old Hwy 312 connection 0.8 - 1.0 miles outside of Billings urban limits and new access to I-90 and I-94)	HIGH (Provides new truck/commercial vehicle access. Future connection to MT 3 is possible through currently undeveloped land west of Old Hwy 312)	No identified issues (no data for west half of route)	1600 ft	**ADVANCE TO NEXT LEVEL OF SCREENING**

Screening Table 2A

Alternative Alignments	Screening Factors						Results
	How well does the alignment meet the project purpose and need? (HIGH, MODERATE, POOR)				Environmental Issues		
	1. Reduce physical barrier impacts (I-90, railroad, Yellowstone River, rimrocks)	2. Improve connectivity between Lockwood and Billings (comparison of existing and proposed route between the Johnson interchange and the intersection of Main Street and Wicks Lane)	3. Improve mobility to and from Billings Heights (improve access to interstate and provide transportation system redundancy)	4. Improve truck/commercial vehicle access to and through Billings (allows for future connection to MT 3 north of Billings)	1. Cultural/Historic Sites	2. Floodplain impacts (linear feet across or adjacent to floodplain)	Preliminary Recommendation
Pinehills - Pioneer Rd[2]	HIGH (New connection traversing I-90, railroad, and Yellowstone River)	POOR (3.4 miles longer than existing route)	MODERATE (Would provide an alternate route with Old Hwy 312 connection 1.6 miles outside of Billings urban limits and new access to I-90 and I94)	HIGH (Future connection to MT 3 is possible through currently undeveloped land west of Old Hwy 312)	No Data Available	1800 ft	**ADVANCE TO NEXT LEVEL OF SCREENING**
E1[3]	HIGH (New connection traversing I-90, railroad, and Yellowstone River)	MODERATE (2.8 miles longer than existing route)	MODERATE (Would provide an alternate route with Old Hwy 312 connection 0.8 - 1.0 miles outside of Billings urban limits and new access to I-90 and I-94)	HIGH (Provides new truck/commercial vehicle access. Future connection to MT 3 is possible through currently undeveloped land west of Old Hwy 312)	No identified issues	1800 ft	**ADVANCE TO NEXT LEVEL OF SCREENING**
E2[4]	HIGH (New connection traversing I-90, railroad, and Yellowstone River)	POOR (4.9 miles longer than existing route)	MODERATE (Would provide an alternate route with Old Hwy 312 connection 0.8 - 1.0 miles outside of Billings urban limits and new access to I-90 and I-94)	HIGH (Provides new truck/commercial vehicle access. Future connection to MT 3 is possible through currently undeveloped land west of Old Hwy 312)	Impacts historic Battlefield Site	1800 ft	**SCREEN OUT** (Would impact a historic battlefield site; connectivity and mobility benefits would be negligible because the connection to Old Hwy 312 is too far north of the urban area)
Alternatives Originating from Pinehills Split							
Pinehills Split - Mary St 1	HIGH (New connection traversing I-90, railroad, and Yellowstone River)	HIGH (0.9 miles longer than existing route)	HIGH (Would provide an alternate route with Old Hwy 312 connection in Billings urban limits and new access to I-90 and I-94)	HIGH (Provides new truck/commercial vehicle access with direct connection to US 87. A future extension west to MT 3 would require that the bypass route follow US 87 north for at least 1.5 miles due to the Five Mile Creek floodplain and existing residential development)	No identified issues (no data for west half of route)	2400 feet	**ADVANCE TO NEXT LEVEL OF SCREENING**
Pinehills Split - Mary St 2[5]	HIGH (New connection traversing I-90, railroad, and Yellowstone River)	MODERATE (1.2 miles longer than existing route)	HIGH (Would provide an alternate route with Old Hwy 312 connection in Billings urban limits and new access to I-90 and I-94)	HIGH (Provides new truck/commercial vehicle access with direct connection to US 87. A future extension west to MT 3 would require that the bypass route follow US 87 north for at least 1.5 miles due to the Five Mile Creek floodplain and existing residential development)	No identified issues (no data for west half of route)	2100 feet	**ADVANCE TO NEXT LEVEL OF SCREENING**
Pinehills Split - Legacy Ln	HIGH (New connection traversing I-90, railroad, and Yellowstone River)	MODERATE (2.5 miles longer than existing route)	MODERATE (Would provide an alternate route with Old Hwy 312 connection 0 - 0.2 miles outside of Billings urban limits and new access to I-90 and I-94)	MODERATE (Provides new truck/commercial vehicle access. Future connection to MT 3 would require the bypass route to follow Old Hwy 312 approximately 1 mile northeast (out of direction) due to the Five Mile Creek floodplain and existing residential development)	No identified issues (no data for west half of route)	2400 ft (could result in longitudinal encroachment)	**ADVANCE TO NEXT LEVEL OF SCREENING**
Pinehills Split - Oxbow Park	HIGH (New connection traversing I-90, railroad, and Yellowstone River)	MODERATE (1.9 miles longer than existing route)	MODERATE (Would provide an alternate route with Old Hwy 312 connection 0 - 0.2 miles outside of Billings urban limits and new access to I-90 and I-94)	MODERATE (Provides new truck/commercial vehicle access. Future connection to MT 3 would require the bypass route to follow Old Hwy 312 approximately 1 mile northeast (out of direction) due to the Five Mile Creek floodplain and existing residential development)	No identified issues	1700 feet	**ADVANCE TO NEXT LEVEL OF SCREENING**

Screening Table 2A

Alternative Alignments	Screening Factors						Results
	How well does the alignment meet the project purpose and need? (HIGH, MODERATE, POOR)				Environmental Issues		
	1. Reduce physical barrier impacts (I-90, railroad, Yellowstone River, rimrocks)	2. Improve connectivity between Lockwood and Billings (comparison of existing and proposed route between the Johnson interchange and the intersection of Main Street and Wicks Lane)	3. Improve mobility to and from Billings Heights (improve access to interstate and provide transportation system redundancy)	4. Improve truck/commercial vehicle access to and through Billings (allows for future connection to MT 3 north of Billings)	1. Cultural/Historic Sites	2. Floodplain impacts (linear feet across or adjacent to floodplain)	Preliminary Recommendation
Pinehills Split - Five Mile Rd[1]	HIGH (New connection traversing I-90, railroad, and Yellowstone River)	MODERATE (3.1 miles longer than existing route)	MODERATE (Would provide an alternate route with Old Hwy 312 connection 0.8 - 1.0 miles outside of Billings urban limits and new access to I-90 and I-94)	HIGH (Provides new truck/commercial vehicle access. Future connection to MT 3 is possible through currently undeveloped land west of Old Hwy 312)	No identified issues (no data for west half of route)	1600 ft	**ADVANCE TO NEXT LEVEL OF SCREENING**
Pinehills Split - Pioneer Rd[2]	HIGH (New connection traversing I-90, railroad, and Yellowstone River)	POOR (4 miles longer than existing route)	MODERATE (Would provide an alternate route with Old Hwy 312 connection 1.6 miles outside of Billings urban limits and new access to I-90 and I-94)	HIGH (Provides new truck/commercial vehicle access. Future connection to MT 3 is possible through currently undeveloped land west of Old Hwy 312)	No Data Available	3200 ft	**ADVANCE TO NEXT LEVEL OF SCREENING**
E3[6]	HIGH (New connection traversing I-90, railroad, and Yellowstone River)	MODERATE (3.6 miles longer than existing route)	MODERATE (Would provide an alternate route with Old Hwy 312 connection 0.8 - 1.0 miles outside of Billings urban limits and new access to I-90)	HIGH (Provides new truck/commercial vehicle access. Future connection to MT 3 is possible through currently undeveloped land west of Old Hwy 312)	No identified issues	1800 ft	**ADVANCE TO NEXT LEVEL OF SCREENING**
E4[7]	HIGH (New connection traversing I-90, railroad, and Yellowstone River)	POOR (5.6 miles longer than existing route)	MODERATE to POOR (Would provide an alternate route with Old Hwy 312 connection 2 miles outside of Billings urban limits and new access to I-90 and I-94)	HIGH (Provides new truck/commercial vehicle access. Future connection to MT 3 is possible through currently undeveloped land west of Old Hwy 312)	Impacts historic Battlefield Site	1800 ft	**SCREEN OUT** (Would impact a historic battlefield site; connectivity and mobility benefits would be negligible because the connection to Old Hwy 312 is too far north of the urban area)
Alternatives Originating from NE Pinehills							
Drury Ln	HIGH (New connection traversing I-90, railroad, and Yellowstone River)	POOR (5.6 miles longer than existing route)	POOR (Would provide an alternate route with Old Hwy 312 connection 2 miles outside of Billings urban limits and new access to I-94 within vicinity of I-90)	HIGH (Provides new truck/commercial vehicle access. Future connection to MT 3 is possible through currently undeveloped land west of Old Hwy 312)	No identified issues (no surveys for majority of route)	1900 ft	**SCREEN OUT** (Connectivity benefits would be negligible because the interstate and Old Hwy 312 connections are too far north of the urban area)
McGirl Rd	HIGH (New connection traversing I-90, railroad, and Yellowstone River)	POOR (6.1 miles longer than existing route)	POOR (Would provide an alternate route with Old Hwy 312 connection 2.5 miles outside of Billings urban limits and new access to I-94 within vicinity of I-90)	HIGH (Provides new truck/commercial vehicle access. Future connection to MT 3 is possible through currently undeveloped land west of Old Hwy 312)	No identified issues (no surveys for majority of route)	1900 ft	**SCREEN OUT** (Connectivity benefits would be negligible because the interstate and Old Hwy 312 connections are too far north of the urban area)
Northern Alignment Option A[8]	HIGH (New connection traversing I-90, railroad, and Yellowstone River)	POOR (9.8 miles longer than existing route)	POOR (Would provide an alternate route with Old Hwy 312 connection 2.5 miles outside of Billings urban limits and new access to I-94 within vicinity of I-90)	HIGH (Provides new truck/commercial vehicle access. Future connection to MT 3 is possible through currently undeveloped land west of Old Hwy 312)	No data available	2000 ft	**SCREEN OUT** (Connectivity benefits would be negligible because the interstate and Old Hwy 312 connections are too far north of the urban area)

Screening Table 2A

Alternative Alignments	Screening Factors						Results
	How well does the alignment meet the project purpose and need? (HIGH, MODERATE, POOR)				Environmental Issues		
	1. Reduce physical barrier impacts (I-90, railroad, Yellowstone River, rimrocks)	2. Improve connectivity between Lockwood and Billings (comparison of existing and proposed route between the Johnson interchange and the intersection of Main Street and Wicks Lane)	3. Improve mobility to and from Billings Heights (improve access to interstate and provide transportation system redundancy)	4. Improve truck/commercial vehicle access to and through Billings (allows for future connection to MT 3 north of Billings)	1. Cultural/Historic Sites	2. Floodplain impacts (linear feet across or adjacent to floodplain)	**Preliminary Recommendation**
E5[9]	HIGH (New connection traversing I-90, railroad, and Yellowstone River)	POOR (4.5 miles longer than existing route)	MODERATE (Would provide an alternate route with Old Hwy 312 connection 0.8 - 1.0 miles outside of Billings urban limits and new access to I-94 within vicinity of I-90)	HIGH (Provides new truck/commercial vehicle access. Future connection to MT 3 is possible through currently undeveloped land west of Old Hwy 312)	Impacts historic Battlefield Site	2700 ft	**SCREEN OUT** (Would impact a historic battlefield site; connectivity benefits would be negligible because the interstate connection is too far north of the urban area)
E6[10]	HIGH (New connection traversing I-90, railroad, and Yellowstone River)	POOR (7 miles longer than existing route)	POOR (Would provide an alternate route with Old Hwy 312 connection 2 miles outside of Billings urban limits and new access to I-94 within vicinity of I-90)	HIGH (Provides new truck/commercial vehicle access. Future connection to MT 3 is possible through currently undeveloped land west of Old Hwy 312)	Impacts historic Battlefield Site	2700 ft	**SCREEN OUT** (Would impact a historic battlefield site; connectivity benefits would be negligible because the interstate and Old Hwy 312 connections are too far north of the urban area)

[1] Refined version of an alignment using Five Mile Road that was initially suggested by the public. The Red conceptual alternative was a refinement of this suggestion, but was screened out because it did not perform as well as a similar conceptual alignment.
[2] Refined version of an alignment using Pioneer Road that was initially suggested by the public but was screened out because a system interchange could not be constructed at Johnson Lane due to its proximity to the I-90/I-94 interchange.
[3] E1 is a refined version of the following alternatives: conceptual Red and Yellow Alignments, initial Feasability Alignment. Shepherd-Acton Alignment Option 1 used the same alignment in the eastern segment as E1.
[4] E2 is a refined version of the conceptual Purple Alignment.
[5] Pinehills Split - Mary St 2 is a refined version of the Modified Southern Alignment
[6] E3 is a refined version of the conceptual Yellow Alignment. Shepherd-Acton Alignment Option 1A used the same alignment in the eastern segment as E3.
[7] E4 is a refined version of the conceptual Purple Alignment.
[8] Shepherd-Acton Alignment Option 3 used the same alignment in the eastern segment as Northern Alignment Option A.
[9] Refined version of conceptual Orange Alignment.
[10] E6 is a refined version of the following alternatives: conceptual Light Green Alignment, initial Northern Alignment Option B. Shepherd-Acton Alignment Option 2 used the same alignment in the eastern segment as E6.

Screening Table 2B

Alternatives	Screening Factors					Preliminary Recommendation
	Travel Time Benefits	ROW Impacts		Potential Floodplain Impacts	Other Potential Issues	
	Reduction in travel time between Lockwood and Billings Heights	Number of parcels impacted	Number of structures impacted	Linear feet across or adjacent to floodplain		
No-Bridge Alternatives						
New I 90 Connection	4 % - 11%	112	39	600 feet (plus 2 to 3 acres of potential encroachment to the Yellowstone River floodplain between I-90 and railroad)	Could impact Coulson Park (Section 6(f) resource and potential Section 4(f) resource) Could impact 130-ft diameter oil storage unit Could require elevation of 1st Ave North / US 87 / Main St intersection requiring major access reconfigurations for 9th St and 10th St May cause conflicts with major utilities requiring relocations and potentially a separate utility corridor May require reconstruction of Alkali Creek pedestrian underpass	**SCREEN OUT** This alternative does not provide more travel time benefit than other alternatives under consideration and would have substantial impacts to commercial properties along the Main Street corridor.
Improved US 87 River Crossing	6% - 8% for eastern areas of Lockwood (no benefit for western areas of Lockwood)	157	50	600 feet (assumes no impact to the Yellowstone River floodplain along the existing US 87 crossing)	May cause conflicts with major utilities requiring relocations and potentially a separate utility corridor May require reconstruction of Alkali Creek pedestrian underpass	**SCREEN OUT** This alternative provides negligible travel time benefits while causing substantial impacts to commercial properties in Lockwood and along the Main Street corridor.
Alternatives Originating from Piccolo Lane						
Piccolo - Bitterroot Drive	39% - 49%	101/106	29/69	2500 feet	Would impact a side channel of thhe Yellowstone River that parallels the western edge of the refinery Would impact a trailer park (potential EJ issues are unknown) Would impact a cemetary along Bitterroot Drive	**SCREEN OUT** This alternative has substantial impacts to residential properties and the Yellowstone River
Piccolo - River Edge	37% - 41%	68/69	16/29	2000 feet (could result in longitudinal encroachment)	Would impact a portion of refinery Would impact a side channel of thhe Yellowstone River that parallels the western edge of the refinery Would impact a trailer park that is currently under construction (potential EJ issues are unknown) Would route a new roadway through an established residential neighborhood.	**SCREEN OUT** This alternative would impact the refinery and would substantially impact an established neighborhood and the Yellowstone River
Alternatives Originating from Johnson Lane						
Johnson Ln Option 1 - Mary St 1	4% - 29%	52/56	3/6	2400 feet	Would impact existing industrial uses south of Coulson Road	**ADVANCE TO NEXT LEVEL OF SCREENING**
Johnson Ln Option 1 - Mary St 2	1% - 26%	52/56	6/9	2100 feet	Would impact existing industrial uses south of Coulson Road Traverses the area masterplanned for Dover Park (currently in private ownership)	**ADVANCE TO NEXT LEVEL OF SCREENING**
Johnson Ln Option 1 - Legacy Ln	3% - 28%	56/59	5/8	2900 feet	Would impact existing industrial uses south of Coulson Road	**ADVANCE TO NEXT LEVEL OF SCREENING**
Johnson Ln Option 1- Oxbow Park	4% - 29%	44/56	6/9	1700 feet	Would impact existing industrial uses south of Coulson Road Traverses the area masterplanned for Dover Park (currently in private ownership)	**ADVANCE TO NEXT LEVEL OF SCREENING**
Johnson Ln Option 1 - Five Mile Rd	11% - 18% for eastern areas of Lockwood (no benefit for western areas of Lockwood)	47/51	3/4	1700 feet	Would impact existing industrial uses south of Coulson Road Impacts and active gravel mine operation	**ADVANCE TO NEXT LEVEL OF SCREENING**
Johnson Ln Option 1 - Pioneer Rd	14% - 26% for eastern areas of Lockwood (no benefit for western areas of Lockwood)	59/62	14/21	1800 feet	Would impact existing industrial uses south of Coulson Road Impacts and active gravel mine operation Traverses the area masterplanned for Dover Park (currently in private ownership)	**SCREEN OUT** The Johnson Ln Option 1 - Five Mile Rd alignment provides similar travel time benefits with fewer private property impacts
Johnson Ln Option 1 - E1/E3	1% - 11% for eastern areas of Lockwood (no benefit for western areas of Lockwood)	41/44	3/4	1800 feet	Traverses the area masterplanned for Dover Park (currently in private ownership) Would impact an active gravel mine operation	**ADVANCE TO NEXT LEVEL OF SCREENING**
Johnson Ln Option 2- Mary St 1	8% - 33%	45/47	1/5	2400 feet	Traverses a parcel platted for future development and would impact a pond and a composting operation north of the railroad.	**ADVANCE TO NEXT LEVEL OF SCREENING**
Johnson Ln Option 2- Mary St 2	5% - 30%	44/46	3/7	2100 feet	Traverses a parcel platted for future development and would impact a pond and a composting operation north of the railroad. Traverses the area masterplanned for Dover Park (currently in private ownership)	**ADVANCE TO NEXT LEVEL OF SCREENING**
Johnson Ln Option 2 - Legacy Ln	7% - 32%	49/50	3/7	2900 feet	Traverses a parcel platted for future development and would impact a pond and a composting operation north of the railroad.	**ADVANCE TO NEXT LEVEL OF SCREENING**
Johnson Ln Option 2- Oxbow Park	8% - 33%	39/51	6/9	1700 feet	Traverses a parcel platted for future development and would impact a pond and a composting operation north of the railroad. Traverses the area masterplanned for Dover Park (currently in private ownership)	**ADVANCE TO NEXT LEVEL OF SCREENING**
Johnson Ln Option 2 - Five Mile Rd	15% - 22% for eastern areas of Lockwood (no benefit for western areas of Lockwood)	40/41	1 / 3	1700 feet	Traverses a parcel platted for future development and would impact a pond and a composting operation north of the railroad. Would impact an active gravel mine operation Traverses the area masterplanned for Dover Park (currently in private ownership)	**ADVANCE TO NEXT LEVEL OF SCREENING**
Johnson Ln Option 2 - Pioneer Rd	18% - 20% for eastern areas of Lockwood (no benefit for western areas of Lockwood)	52/53	12/19	1800 feet	Traverses a parcel platted for future development and would impact a pond and a composting operation north of the railroad. Would impact an active gravel mine operation Traverses the area masterplanned for Dover Park (currently in private ownership)	**SCREEN OUT** The Johnson Ln Option 2 - Five Mile Rd alignment provides similar travel time benefits with fewer private property impacts
Johnson Ln Option 2 - E1/E3	5% - 15% for eastern areas of Lockwood (no benefit for western areas of Lockwood)	34/35	1 / 3	1800 feet	Traverses a parcel platted for future development and would impact a pond and a composting operation north of the railroad. Would impact an active gravel mine operation Traverses the area masterplanned for Dover Park (currently in private ownership)	**ADVANCE TO NEXT LEVEL OF SCREENING**

Screening Table 2B

Alternatives	Screening Factors					Preliminary Recommendation
	Travel Time Benefits	ROW Impacts		Potential Floodplain Impacts	Other Potential Issues	
	Reduction in travel time between Lockwood and Billings Heights	Number of parcels impacted	Number of structures impacted	Linear feet across or adjacent to floodplain		
Alternatives Originating from Pinehills						
Pinehills - Mary St 1	15% - 23% for eastern areas of Lockwood (no benefit for western areas of Lockwood)	78/79	26/26	2400 feet	Impacts a potential EJ population near the interchange	**SCREEN OUT PENDING FIELD DATA COLLECTION**[2]
Pinehills - Mary St 2[1]	12% - 20% for eastern areas of Lockwood (no benefit for western areas of Lockwood)	77/78	27/27	2100 feet	Impacts a potential EJ population near the interchange Traverses the area masterplanned for Dover Park (currently in private ownership)	**SCREEN OUT PENDING FIELD DATA COLLECTION**[2]
Pinehills - Legacy Ln	14% - 22% for eastern areas of Lockwood (no benefit for western areas of Lockwood)	82/82	26/26	2900 feet	Impacts a potential EJ population near the interchange	**SCREEN OUT PENDING FIELD DATA COLLECTION**[2]
Pinehills - Oxbow Park	15% - 23% for eastern areas of Lockwood (no benefit for western areas of Lockwood)	69/69	26/26	1700 feet	Impacts a potential EJ population near the interchange Traverses the area masterplanned for Dover Park (currently in private ownership)	**SCREEN OUT PENDING FIELD DATA COLLECTION**[2]
Pinehills - Five Mile Rd	2% - 13% for eastern areas of Lockwood (no benefit for western areas of Lockwood)	73/73	23/25	1700 feet	Impacts a potential EJ population near the interchange Impacts and active gravel mine operation Traverses the area masterplanned for Dover Park (currently in private ownership)	**SCREEN OUT PENDING FIELD DATA COLLECTION**[2]
Pinehills - Pioneer Rd	8% for southeastern areas of Lockwood (no benefit for NE or western areas of Lockwood)	105/105	36/42	1800 feet	Impacts a potential EJ population near the interchange Would impact an active gravel mine operation Traverses the area masterplanned for Dover Park (currently in private ownership)	**SCREEN OUT** The Pinehills - Five Mile Rd alignment provides similar travel time benefits with fewer private property impacts
E1	little to no travel time benefit	67/67	25/25	1800 feet	Impacts a potential EJ population near the interchange Would impact an active gravel mine operation Traverses the area masterplanned for Dover Park (currently in private ownership)	**SCREEN OUT PENDING FIELD DATA COLLECTION**[2]
Alternatives Originating from Pinehills Split						
Pinehills Split - Mary St 1	2% - 13% for eastern areas of Lockwood (no benefit for western areas of Lockwood)	103/104	27/27	2400 feet	Impacts a potential EJ population near the interchange	**SCREEN OUT PENDING FIELD DATA COLLECTION**[2]
Pinehills Split - Mary St 2	0% - 10% for eastern areas of Lockwood (no benefit for western areas of Lockwood)	102/103	28/28	2100 feet	Impacts a potential EJ population near the interchange Traverses the area masterplanned for Dover Park (currently in private ownership)	**SCREEN OUT PENDING FIELD DATA COLLECTION**[2]
Pinehills Split - Legacy Ln	1% - 12% for eastern areas of Lockwood (no benefit for western areas of Lockwood)	107/107	27/27	2900 feet	Impacts a potential EJ population near the interchange	**SCREEN OUT PENDING FIELD DATA COLLECTION**[2]
Pinehills Split - Oxbow Park	2% - 13% for eastern areas of Lockwood (no benefit for western areas of Lockwood)	94/94	27/27	1700 feet	Impacts a potential EJ population near the interchange Traverses the area masterplanned for Dover Park (currently in private ownership)	**SCREEN OUT PENDING FIELD DATA COLLECTION**[2]
Pinehills Split - Five Mile Rd	3% for southeastern areas of Lockwood (no benefit for NE or western areas of Lockwood)	98/98	24/26	1700 feet	Impacts a potential EJ population near the interchange Impacts and active gravel mine operation Traverses the area masterplanned for Dover Park (currently in private ownership)	**SCREEN OUT PENDING FIELD DATA COLLECTION**[2]
Pinehills Split - Pioneer Rd	little to no travel time benefit	130/130	37/43	1800 feet	Impacts a potential EJ population near the interchange IWould impact an active gravel mine operation Traverses the area masterplanned for Dover Park (currently in private ownership)	**SCREEN OUT** The Pinehills Split - Five Mile Rd alignment provides similar travel time benefits with fewer private property impacts
E3	little to no travel time benefit	92/92	26/26	1800 feet	Impacts a potential EJ population near the interchange Would impact an active gravel mine operation Traverses the area masterplanned for Dover Park (currently in private ownership)	**SCREEN OUT PENDING FIELD DATA COLLECTION**[2]

[1] Pinehills Split-Mary St 2 is a refined version of the Modified Southern Alignment

[2] Alternatives using these interchange locations would not provide as much travel time benefit as the Johnson Lane or Piccolo Lane alternatives and would have substantially more impacts than the other interchange locations. Additionally, the surrounding neighborhoods are likely comprised of EJ populations and these alternatives could result in a disproportionately high impact. However, these are the only interchange locations that have been designed and field-studied . Without this level of design and data for the other interchange locations under consideration, it could be risky to screen the Pinehills and Pinehills Split out at this point in time.