

Appendix C

Analysis of Mainline Widening, North vs. South, Environmental and Engineering Review

Appendix C

**Analysis of Mainline Widening
North vs. South
Environmental and Engineering Review
Technical Memorandum
Interstate 70 SIU 3 – J4I1341F**



**Prepared for:
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List of Abbreviations and Acronyms

CRP	Conservation Reserve Program
EA	Environmental Assessment
EIS	Environmental Impact Statement
FEMA	Federal Emergency Management Agency
MDC	Missouri Department of Conservation
MoDOT	Missouri Department of Transportation
NRCS	Natural Resources Conservation Service
NRHP	National Register of Historic Places
NWI	National Wetland Inventory
SIU	Section of Independent Utility
USACE	U.S. Army Corps of Engineers
USDA	U.S. Department of Agriculture
USGS	U.S. Geological Survey
WRP	Wetland Reserve Program

CHAPTER 1

Introduction

All data represented within this analysis are based on the review of information of record including topographical, aerial, and Interstate I-70 (I-70) Section of Independent Utility 3 (SIU 3) First Tier geographical information system data. The purpose of this review is to expand upon the “critical flaw” level of analysis provided in the Tier 1 study regarding the potential improvement of I-70 to either the north or south of the existing facility. This analysis takes into account updated and more detailed environmental and engineering information based on field reconnaissance but does not include a detailed consideration of potential interchange improvements (including access management) as these impacts are likely to be common to either a north or a south mainline alternative. Additionally, it does not entail a detailed impact analysis that incorporates the results of more intensive environmental investigation (i.e. wetland delineation, Phase I cultural studies, noise modeling, etc.) as would be appropriate for the analysis of final study alternatives.

Information has been obtained through agency correspondence, input from the Overton Bottoms Subcommittee meetings, and other sources of previously recorded information. This report summarizes all features, natural and man-made, contained within the I-70 SIU 3 study area defined as follows: 300 feet (91.4 meters) north and south of the existing highway beginning from the opposite right of way line, extending across the existing roadway for a distance of 300 feet (91.4 meters) from the western terminus at mile marker 99 [approximately two miles (3.2 kilometers) west of the Route 5 interchange in Cooper County] to the eastern terminus at mile marker 115 (just east of the Route BB interchange in Boone County) for a distance of approximately 16 miles (25.7 kilometers).

CHAPTER 2

Alternatives

2.1 Summary of First Tier EIS Mainline Location

Within SIU 3, the First Tier EIS and its associated Record of Decision resulted in the identification of the Widen I-70 Strategy as the selected alternative. Improvements to I-70 considered in the selection of this strategy included widening the existing alignment to the south from the western terminus to approximately Mile 99. From Mile 99, the proposed improvement remained on the south side until approximately Mile 112 at which point it crossed over to the north. From this location, the Tier I EIS entailed improvements to the north across the Overton Bottoms, the Missouri River, and up the Manitou Bluffs. Just east of the interchange at Route BB (Rocheport), the proposed improvement switched again to the south side of the existing alignment to the eastern terminus of SIU 3 at approximately Mile 116. This Second Tier study presents a reassessment of the specific widening improvements to I-70 using more detailed information as discussed below and in Chapter III. These analyses represent a refinement of the assessment process, using greater detail with regard to natural resources (wetlands, sensitive species, visual resources, etc.) and the human environment (residential and commercial land uses, parks and recreational areas, noise impacts, cultural resources, economic impacts, etc.).

2.2 Overview of Scope and Level of Analysis

A detailed screening level analysis was performed for the mainline alternatives to expand upon the “critical flaw” level of assessment provided in the First Tier EIS. This analysis included an evaluation of updated and more detailed environmental and engineering data based on information obtained from agency correspondence, literature review, traffic data review and periodic input obtained from the Overton Bottoms Subcommittee (see Chapter IV, Coordination of the EA). The analysis also incorporated the findings based upon field reconnaissance of the mainline. However, it did not include a detailed consideration of potential interchange improvements (including access management) as these impacts were likely to be common to either a north or a south mainline alternative. Additionally, it did not incorporate the level of detailed impact analysis that considers the results of more intensive environmental investigation (i.e., wetland delineation, Phase I cultural studies, noise modeling, etc.) as would be appropriate for the analysis of a final study alternative.

A more detailed consideration of potential project impacts was undertaken in the vicinity of Overton Bottoms due to the number and kinds of resources potentially affected by proposed north/south improvements. Results of these studies are presented in detail in Chapter II.B.3 of the EA.

2.3 Description of Alternatives Considered

Alternative development within SIU 3 considered the initial configuration as set forth in the First Tier EIS as well as other variations of north-south mainline and cross-over combinations in an attempt to avoid and minimize potential environmental impacts. However, upon close examination and in consideration of more detailed environmental studies, it was found that alternatives that incorporated cross-overs were not advantageous as they did not result in significant reductions in environmental impact. For example, several cross over options (from north to south and vice versa) were initially considered east of the Route 5 interchange in an effort to avoid and minimize impacts. However, impacts associated with these adjustments persisted, as improvements at the interchanges due to ramp relocations and access management related improvements still resulted in displacements, and impacts to businesses on both the north and south side of the mainline. At the same time, however, the cross overs increased the complexity of constructability of the project due to construction phase staging and traffic management issues. Additionally, the constraint that necessitated a north location near the western terminus in the First Tier study, was no longer an issue. Specifically, as discussed in Chapter III.A.2.a of the EA, the Cooper County Fairgrounds, originally considered in the First Tier as a potential 4(f) property, was determined to be privately owned and, therefore, did not represent a 4(f) issue. Avoidance of these lands, therefore, was not necessary, and a southern mainline improvement became feasible.

Two primary alternatives were therefore developed for consideration in this analysis. One alternative was established entirely along the south side of the existing mainline, whereas a second alternative was established along the north side of the mainline. This approach (i.e., consideration of complete north or south alternatives) was used as these alternatives represented a full range of potential engineering and environmental issues and impacts.

For each alternative, an assessment of potential impacts was made by establishing a generalized “footprint” of the proposed improvement to a distance of approximately 300 feet (91.4 meters) north and south of the existing roadway [Note: this footprint was developed from the opposite right of way line across the existing facility to a distance of 300 feet (91.4 meters)]. Typical sections of the proposed roadway are provided in Figure 1. Potential impacts within this generalized footprint were then assessed for each alternative.

CHAPTER 3

Engineering and Traffic Issues

3.1 Traffic Operations and Efficiency

Both a northern or southern alternative have similar, or identical, characteristics in this area. Differences in traffic operations only occur at the interchanges, and are not affected by the location of a northern or southern alternative. The effects on traffic operations are largely governed by how the access is managed at the interchange.

3.2 Traffic Safety

Either a northern or southern alternative can be engineered to provide for safe and efficient travel through the study area. A northern alternative results in two median cross-overs as the tie-ins to the adjacent SIUs are both on the south. A southern alternative does not result in any median cross-overs. If a northern alignment is selected, it would complicate staging and maintenance of traffic during construction. Median cross-overs add complexity to construction staging and potentially reduce construction-time traffic safety. The absence of median cross-overs provides a safer construction zone for both traffic and construction operations.

Again, as with traffic operations, the biggest issue is how access management is implemented at the interchanges and its effect on access to commercial properties. The location of a northern or southern alternative has no bearing on the traffic safety as it relates to access management.

3.3 Length and Constructability

The length of a northern or southern alternative is essentially the same; therefore, this has no bearing on selecting a mainline alternative.

In terms of constructability, as with traffic safety, a northern alignment would require two cross-overs which would increase the cost and complexity of the construction phase of the project.

A southern alternative impacts Manitou Bluffs on the Boone County side of the Missouri River. These bluffs are higher on the south side of I-70 and result in more rock excavation for a southern alternative.

A northern alternative through Overton Bottoms results in a longer bridge over the Missouri River floodway. Beginning at the existing bridge and proceeding upstream, the floodway widens. Given the Federal Emergency Management Agency (FEMA)'s "no-rise" condition, any new bridge over the river would likely be required to span the floodway (in this case, as identified by the study and not by FEMA) and a northern alternative is required to span approximately an additional 400 to 500 feet (121.9 to 152.4 meters) of floodway compared to the southern alternative in order to meet the "no-rise" condition.

3.4 Rest Areas

There are two rest areas located in the study area between Route B and Route 87. The westbound rest area is located approximately 0.75 mile (1.2 kilometers) east of the Route B interchange and the eastbound rest area is located approximately 0.90 mile (1.4 kilometers) east of the same interchange. Regardless of a northern or southern mainline alternative, a widened I-70 displaces one rest area (the westbound rest area or the eastbound rest area, respectively).

CHAPTER 4

Environmental Issues

4.1 Surface Water Resources

4.1.1 Perennial Streams

Based on U.S. Geological Survey (USGS) topographical information, there are three perennial streams that are crossed by Interstate 70. The primary resource is the Missouri River located just west of Route BB (Exit 115). The second perennial stream is located approximately 0.8 mile (1.3 kilometers) west of Route 87 (Exit 106). This unnamed perennial stream is a tributary of the Petite Saline Creek located to the south of the study area. Neither a northern or southern mainline alternative results in a relocation of this stream. Potential expansion of I-70 to the north in the vicinity of Rocheport will result in additional impacts to a perennial stream and associated springs just west of Route BB.

4.1.2 Intermittent Streams

Based on the information of record, there are 15 intermittent stream crossings in the study area. There are 11 streams that would be affected by expansion of the roadway to the north, as compared to 13 that would be affected by improvements to the south. It is likely that improvements to the south would necessitate relocation of at least three (3) intermittent streams [based on USGS topographical data] as compared to two relocations for a northern mainline alternative. Neither a northern nor southern mainline alternative results in a notable impact to the intermittent streams in the study area. There are nine crossings between Route 87 and Route 179. All intermittent streams are unnamed tributaries to Petite Saline Creek.

4.1.3 Water Bodies

West of the Missouri River there are four open water bodies located within the study area and all are impacted by a southern mainline alternative. There are no water bodies impacted by a northern mainline alternative. Three water bodies are located between the western terminus and the Route 5 interchange. These water bodies consist of an unnamed water body on the Cooper County Fairground property, Glenwood Lake, and an adjacent unnamed water body directly west of Glenwood Lake. The fourth impacted water body is located approximately 300 feet (91.4 meters) west of the Route B interchange and is adjacent to a residential property that will be displaced.

The Overton Bottoms area also contains a waterbody that was formed as a result of scour activities during the flood of 1993. This open water area is located immediately east of the existing bridge abutment and would be affected similarly by either a north or south alignment of an improved I-70.

Several water bodies also exist east of the Missouri River within a karst region of the Rocheport bluffs. These water bodies are typically isolated depressional areas located north and south of

the interchange at Route BB (Exit 115) that are associated with sinkhole formations. This is a sensitive area as there is a high potential for surface water/ground water interaction. Impacts to these open water systems (and to groundwater resources) are likely to be similar with both a north and south improvement as the primary effects are associated with the reconstruction of the interchange.

4.2 Wetlands

Between the western terminus and the western bluff at Overton Bottoms, there is one National Wetland Inventory (NWI)-mapped wetland impacted by a northern mainline alternative approximately 1 mile (1.6 kilometers) west of the Route 87 interchange. The wetland is adjacent to the floodplain associated with the unnamed perennial stream tributary to Petite Saline Creek. Within the Overton Bottoms, the distribution of wetlands appears to be similar to the north and the south of I-70 (based on preliminary field reconnaissance). Consequently, wetland impacts are roughly the same regardless of the location of the mainline alternative.

From the eastern bluff at the Missouri River to the eastern terminus, there are several small wetlands potentially impacted by the proposed improvements. Improvements on the north may affect a small forested wetland associated with a stream valley on the property owned by Patrick Cronan. Additionally, several small wetland areas have been noted to occur in the vicinity of the Route BB interchange and are likely to be affected similarly by either alternative. Based upon an office determination (utilizing NWI mapped wetlands), there would be no notable difference between the north versus the south alternative.

4.3 Floodways and Floodplains

4.3.1 Floodways

The floodway of the Missouri River lies in Overton Bottoms. This floodway, as mapped by FEMA, incorporated an erroneously lower elevation of the existing roadway and therefore does not correctly indicate “real-world” conditions. Neither the northern or southern alternative will result in a notable impact on the floodway as both alternatives would entail the crossing of the floodway on structure. There are no other FEMA-mapped floodways west of Overton Bottoms.

4.3.2 Floodplains

The Missouri River floodplain is a dominant feature in the study area. Floodplain encroachment would occur with both the north and south alternative as each improvement would require the placement of fill material within the 100-year floodplain. However, the potential impacts to this floodplain are expected to be similar with each alternative. There are no floodplains east of the Missouri River in the study area.

West of Overton Bottoms, there are four floodplain crossings, all of which are between Route B and Route 179. From the west, the first floodplain is associated with the unnamed perennial tributary to Petite Saline Creek. The floodplain associated with this perennial stream branches into two reaches on the north side of I-70. The next is located between Route B and Route 87 just east of the rest areas. This floodplain is associated with an unnamed intermittent stream. The next two floodplains are located between Route 87 and Route 179. The first is located approximately 1.95 miles (3.1 kilometers) east of Route 87. The last floodplain west of Overton Bottoms is approximately 1.5 miles (2.4 kilometers) west of Route 179 and approximately 750

feet (228.6 meters) west of the intersection of Woodland School Road and Gooches Mill Road. This floodplain is only impacted by a southern mainline alternative.

4.4 Threatened and Endangered Species

According to the Missouri Department of Conservation (MDC) correspondence, federally listed threatened and endangered species potentially occurring within the corridor include the pallid sturgeon (threatened), Indiana bat (endangered) and gray bat (endangered). These species are either directly found within the Missouri River (pallid sturgeon) or the surrounding bluffs. Other state-listed species noted by MDC as occurring within the Missouri River include the sicklefin chub, sturgeon chub, ghost shiner and plains killifish. Detailed assessments of potential impacts to these species are addressed in the body of the EA (Chapter III) for both the north and the south alternatives across the Missouri River.

The information of record (First Tier EIS, MDC Natural Heritage Database) identified buffalo grass (*Buchloe dactyloides*) as being potentially present within the general area of the rest area along eastbound I-70 between Route B and Route 87. Buffalo grass has a S1/G4G5 ranking, which indicates that it is critically imperiled in the state because of extreme rarity or because of factors making it especially vulnerable to extirpation from the state (typically five or fewer occurrences or very few remaining individuals). A southern alternative impacts the eastbound rest area. Preliminary field studies indicate that the population at the eastbound rest area has been extirpated.

4.5 Forest Land

There are two relatively large tracts of forested land in the study area. Both are affected to a greater extent by a northern mainline alternative and are between Route B and Route 179. These forested areas are bound by Woodland School Road to the west, Route 98 to the north, Route 179 to the east, and I-70 to the south.

4.6 CRP/WRP Land

Based upon data supplied by the Natural Resources Conservation Service/U.S. Department of Agriculture (NRCS/USDA) office in Columbia, Missouri, there are no Conservation Reserve Program (CRP) or Wetland Reserve Program (WRP) lands located within Boone County. Coordination with NRCS offices in Boonville however, resulted in the identification of several CRP parcels within Cooper County. The distribution of these lands, however, is similar along both the north and south sides of existing I-70. Consequently, no notable difference in impact would occur with widening of I-70 to either the north or south. No WRP lands were identified from Cooper County.

4.7 Prime and Unique Farmland

The USDA defines prime farmland as soils that have the best combination of physical and chemical characteristics for producing food, feed, forage, fiber, and oilseed crops, and is available for these uses. A preliminary review of the distribution of prime and unique farmland soils indicates that it is distributed relatively evenly on both the north and south sides of existing I-70. Consequently, there is no notable difference in impact to prime and unique farmland with either the north or south mainline alternatives.

4.8 Public Lands

4.8.1 Parks

Katy Trail State Park is a linear recreational facility that crosses I-70 in two places in the study area: approximately 1.4 miles (2.6 kilometers) west of Route 5 in Cooper County (the Katy Trail crosses I-70), and along the Missouri River in Boone County (I-70 crosses the Katy Trail). At the Cooper County crossing, improvements to either the north or south will have an effect on the Katy Trail as the existing bridge over I-70 will need to be reconstructed. The Katy Trail crossing at the Missouri River in Boone County is equally crossed by either a north or south mainline I-70 alternative.

4.8.2 Conservation Areas/Wildlife Refuges

The Overton Bottoms Conservation Area is located in the Missouri River floodplain south of I-70. Immediately opposite this conservation area, also in the floodplain, on the north side of I-70 is the Big Muddy National Wildlife Refuge. A 300-foot (91.4-meter) wide space has been reserved both north and south of existing I-70 to accommodate future roadway improvements. Since there are large tracts of public land on each side of I-70 through Overton Bottoms, impacts would occur with both the northern and southern mainline alternatives.

Taylor's Landing is a public access facility located within the Big Muddy Refuge. It is owned and operated by the MDC and is located upstream of the existing I-70 bridge. No impact to the landing is expected with either a north or south alignment of future improvements to I-70.

Based on the information of record, there are no other conservation areas or wildlife refuges west of Overton Bottoms.

4.8.3 Schools and Fairgrounds

Boonville High School is located north and east of the interchange at Route 5. No impacts to the school result from a mainline I-70 improvement to the north. However, some changes in school access may be considered in order to maintain access management requirements. There are no other schools in the study area.

Another area periodically used for recreational purposes is the Cooper County Fairground located approximately 1.5 miles (2.4 kilometers) west of Route 5 south of I-70 at the western terminus. However, as a result of additional review of this property, it has been determined that it is not 4(f) applicable.

4.9 Social and Economic Factors

4.9.1 Land Use

The consistency of the proposed improvement with existing land uses was evaluated. With the exception of developed areas at each of the interchanges, the primary land use within the study corridor consists of open space, and agricultural lands. A transportation facility such as I-70 is a developed land use that is most consistent when aligned with other transportation land uses. Either a north or a south alignment would result in a high degree of consistency and compatibility with the existing land use as it aligns along an existing transportation facility. No

significant difference in sensitive land uses (recreational areas, public facilities, institutional lands, etc.) was observed with either a north or south mainline alternative

4.9.2 Displacements

The preferred alternative for I-70 would require widening the existing highway. Additional right of way needed for this improvement would necessitate the relocation of some existing households, businesses and other facilities along the corridor. Impacts resulting from displacements of residences were greater for a north alignment than displacements resulting from a south alignment (10 to 15 residential displacements versus <5, respectively). There was no notable difference in displacements to businesses and commercial facilities for a north alignment as compared to a south alignment. Impacts to public utilities were greater with a north alignment, as a water tower would need to be relocated. No impacts to public utilities resulted from a south alignment.

4.9.3 Residential Properties/Access Impacts

There are two types of impacts to residential properties along I-70: the acquisition of residential dwellings and associated support structures, and the changing of access to the intact residential properties adjacent to the study area. Several residential properties in a subdivision near the western terminus north of I-70 are impacted by a northern mainline alternative. Throughout the remainder of the study area, the residential property impacts are similar for both a northern and southern alternative. Several access changes result from both a northern and southern alternative and there is no appreciable difference in the magnitude of these changes for each alternative.

4.9.4 Commercial/Industrial Properties

Based on information of record, there appears to be no impact to industrial properties outside of the interchanges in the study area. All of the commercial property impacts occur at the interchanges. Generally, a northern alternative impacts more commercial properties than a southern alternative. This is true primarily at Routes 5 and 87. The impacts include gas stations, hotels, and restaurants. The impacts at Route B in Cooper County and Route BB in Boone County are similar for both a northern and southern alternative. At Route 179, one business is impacted by a southern alternative and none are impacted by a northern alternative.

4.9.5 Farmland Impacts

Potential impacts to farm operations may include the creation of severances, displacement of on-farm investments, creation of non-farmable remnant parcels, and alterations in field access. Each of the widening alternatives being considered will abut the existing I-70 corridor and will therefore, not result in the creation of unusable remnants, severances, or result in changes in access. No notable impacts to farm operations is therefore anticipated with either alternative.

4.10 Noise

Potential noise impacts to residences differ somewhat for each mainline widening alternative. A northern alignment could impact between 10 and 15 residences (particularly near the western terminus) as compared to approximately five residential receptors southern alignment, which could impact approximately five residences. Additionally, there is a platted residential community north of existing I-70 at the western terminus of the study area which may result in

additional noise impacts accounts for the potential for greater noise impacts from both the construction and operational phases of the project with the northern alignment.

4.11 Air Quality

Potential impact to air quality as a result of a north versus south alignment was evaluated with consideration given to possible non-attainment areas. The study area for SIU 3 is considered to be an attainment area for all primary pollutants. While projected traffic volumes in the year 2030 are anticipated to exceed 72,000 AADT, there would be no difference in impacts to air quality between a north and a south mainline widening alternative.

4.12 Cultural Resources

4.12.1 Archaeological Sites

The data in the information of record does not identify National Register of Historic Places (NRHP) listed archaeological sites within the study area. The U.S. Army Corps of Engineers (USACE) has indicated, through personal communication, that the bluff areas along the Missouri River are rich with archaeological sites as they had previously encountered such sites while constructing a maintenance facility. Any archaeological impacts resulting from a northern or southern alternative are likely to be similar in overall magnitude although locations may vary.

4.12.2 Historic Buildings

The First Tier Study indicated the presence of a potentially historic building in the study area. This structure is a log cabin located northwest of the interchange at Route BB in Boone County. As a result of a preliminary architectural assessment of the structure, it has been shown to be composed of a variety of building materials from different locations and therefore lacks integrity. Consequently, it is likely that it is not NRHP eligible. Regardless of a northern or southern alternative, this structure is likely to be impacted. No other NRHP listed or eligible sites are known along the mainline of SIU 3 that would be impacted by either the north or south widening alternative.

4.12.3 Cemeteries

A cemetery is located approximately 1,000 feet (304.8 meters) west of the western Missouri River bluff north of I-70. Neither a northern or southern alternative impacts the cemetery.

CHAPTER 5

Conclusion

The analysis of the mainline alternatives is based on information of record augmented by field reconnaissance. Based on the known information, there are no known “critical flaws” present in the study area that would preclude either a north or south alignment. A completely north mainline alignment was compared against a completely south mainline alignment as these represented the most reasonable alternatives that reflected a full range of potential engineering and environmental issues and impacts. Other options that included combinations of a north versus south alignment were considered to be less desirable as they would also necessitate cross-overs but would not result in any significant reductions to environmental impact.

The recommendation of this analysis is for mainline I-70 to be widened to the south of the existing highway throughout the entire SIU 3. This allows for connections to the adjacent SIUs without a median crossover. The primary reasons for this recommendation are:

- A north alignment results in two median crossovers (one at each end of the study area necessary to connect with SIU 2 located on the south) that complicate staging and maintenance of traffic during construction. Other variations on the alternatives (i.e., a hybrid of north and south) would also result in one or two median crossovers.
- West of the Missouri River, a north alignment results in somewhat fewer impacts to surface water resources, as it crosses two fewer intermittent streams and would result in one less stream relocation. Additionally, a north alignment would not directly impact water bodies (potentially “isolated”) whereas four open water bodies would be impacted with a south alignment. In contrast, however, a north alignment would result in increased disruption of surface waters in the vicinity of Rocheport, as it would impact a perennial stream and several springs.
- A north alignment results in more residential displacements than a south alignment (10 to 15 versus less than five, respectively) (Note: this does not include displacements at interchanges that would be common to both alternatives).
- A north alignment results in greater disruption to utilities as it would require displacement of the water tower at the Route 5 interchange.
- A north alignment affects a greater number of noise receptors than the south alignment.

A summary of this analysis is provided in Table 5-1.

In contrast to the mainline west of Overton Bottoms, the portion of SIU 3 in the vicinity of Overton Bottoms was perceived as having a greater potential for environmental impact. As a result, two alternatives are retained for analysis that extend from the western bluffs across the Missouri River and its floodplain, to a common tie-in point east of Route BB. Figure 2 presents these two alternatives.

Table 5-1. North Versus South Mainline Evaluation

Evaluation Factor	Definition/Clarification	Indicators And Effects	
		North Alignment	South Alignment
1.0 Engineering and Traffic Issues			
1.1 Traffic Operations/ Efficiency	Evaluate alternatives with respect to accessibility due to differences in access management, changes in travel time, and capacity to meet future demand	Ranking: 4 No significant difference as compared to the S. alignment,	Ranking: 4 No significant difference as compared to the N. alignment
1.2 Traffic Safety/Accident Potential	Evaluate alternatives with respect to reduction in accident rates and capacity to enhance incident management	Ranking: 3 <ul style="list-style-type: none">Results in two median cross-overs, which would complicate staging and traffic maintenance during constructionAssumes improvements to I-70 would also correct East-bound rest area merge problem	Ranking: 4 <ul style="list-style-type: none">No significant difference as compared to the N. alignmentHigher accident rates associated with East-bound rest area would be corrected or eliminated with S. alignment
1.3 Length	Total length of alternative and its resultant impact on acquisition, construction, and operations and maintenance costs.	Ranking: 3 No significant difference in overall length as compared to S. alignment. Somewhat greater bridge length required Costs comparable to S. alignment	Ranking: 3 No significant difference in overall length as compared to N. alignment. Greater need for blasting to remove rock along eastern river bluff. Costs comparable to N. alignment
1.4 Constructability	Evaluate alternatives with respect to staging, maintenance of traffic and constructability. Consideration is given to median crossovers (relative to SIUs 2 and 4).	Ranking: 3 Two crossovers required to connect with SIU 2 on the west, and SIU 4 on the east	Ranking: 4 No crossovers required
1.5 Rest Areas	Evaluate the alternatives with respect to the two rest areas located within the study area.	Ranking: 2 Westbound rest area will be impacted.	Ranking: 2 Eastbound rest area will be impacted
2.0 Environmental Factors			
2.1 Surface Water Resources	Evaluate potential impact on streams/water bodies. Consider extent of alignment on structure, transverse vs. perpendicular crossings, etc., potential impact on public water supplies, potential for water quality degradation	Ranking: 3 No significant difference as compared to the S. alignment <ul style="list-style-type: none">Karst similar to S. side,Missouri River crossingTwo stream relocations10-15 stream crossings Greater impact at Rocheport bluff	Ranking: 3 No significant difference as compared to the N. alignment <ul style="list-style-type: none">Karst similar to N. side,Missouri River crossingThree stream relocations10-15 stream crossings Lesser impact at Rocheport bluff

Table 5-1. North Versus South Mainline Evaluation

Evaluation Factor	Definition/Clarification	Indicators And Effects	
		North Alignment	South Alignment
2.2 Wetlands	Evaluate potential impact on wetlands. Consider extent of alignment on structure, transverse vs. perpendicular crossings, etc.	Ranking: 3 <ul style="list-style-type: none"> No significant difference as compared to the S. alignment Data limited to NWI mapping and some field reconnaissance in Overton Bottoms 	Ranking: 3 <ul style="list-style-type: none"> No significant difference as compared to the N. alignment Data limited to NWI mapping and some field reconnaissance in Overton Bottoms
2.3 Floodways and Floodplains	Evaluate potential impact on floodway and floodplain encroachment. Consider extent of alignment on structure, transverse vs. perpendicular crossings, etc.	Ranking: 3 <ul style="list-style-type: none"> No significant difference in impacts to floodways or floodplains as compared to the S. alignment Significant floodplain encroachment identified along the Missouri River 	Ranking: 3 <ul style="list-style-type: none"> No significant difference in impacts to floodways or floodplains as compared to the N. alignment Significant floodplain encroachment identified along the Missouri River
2.4 Threatened and Endangered Species	Evaluate potential impact on Federal Listed species including pallid sturgeon, Indiana and gray bat, interior tern, bald eagle. Consider potential effects on state listed species (Buffalo grass, etc.)	Ranking: 3 <p>No significant difference as compared to the S. alignment</p> <ul style="list-style-type: none"> Pallid sturgeon in Mo. River Indiana and gray bat potential in bluff area Bald eagle potential along Missouri River Buffalo grass at E. bound rest area may be extirpated 	Ranking: 3 <p>No significant difference as compared to the N. alignment</p> <ul style="list-style-type: none"> Pallid sturgeon in Mo. River Indiana and gray bat potential in bluff area Bald eagle potential along Missouri River Buffalo grass at E. bound rest area may be extirpated
2.4 Forest Land	Evaluate the potential impact of the alternatives on forest land within the study area.	Ranking: 2 <p>Two tracts of forest land are impacted by the N. alignment</p>	Ranking: 3 <p>No significant impact to forest land</p>
2.5 CRP/WRP Land	Evaluate potential impacts to CRP/WRP lands.	Ranking: 3 <p>No significant difference as compared to the S. alignment</p>	Ranking: 3 <p>No significant difference as compared to the N. alignment</p>
2.6 Prime Farmland	Potential conversion of prime and unique farmland and farmland of statewide or local importance	Ranking: 3 <p>No significant difference as compared to the S. alignment</p>	Ranking: 3 <p>No significant difference as compared to the N. alignment</p>
2.7 Public Lands	Evaluate potential impact on potential 4(f)/6(f) lands including Big Muddy Refuge, Overton Bottoms Cons. Area, Katy Trail, Taylor's Landing, and historic properties/sites as well	Ranking: 2 <ul style="list-style-type: none"> <i>Katy Trail</i>: No significant difference as compared to S. alignment 	Ranking: 2 <ul style="list-style-type: none"> <i>Katy Trail</i>: No significant difference as compared to N. alignment

Table 5-1. North Versus South Mainline Evaluation

Evaluation Factor	Definition/Clarification	Indicators And Effects	
		North Alignment	South Alignment
	schools and fairgrounds.	<ul style="list-style-type: none"> <i>Big Muddy National Wildlife Refuge:</i> proposed improvement aligns within previous reserved corridor, no impact to Taylor's Landing. <i>Historic sites:</i> No known effects on historic sites 	<ul style="list-style-type: none"> <i>Cooper County Fairgrounds:</i> determined to be non 4(f). <i>Overton Bottoms:</i> proposed improvement lies within previous reserved corridor, no impact to Taylor's Landing. <i>Historic sites:</i> No known effects on historic sites
3.0 Social and Economic Factors			
3.1 Land Use	<p><i>Consistency.</i> Evaluate the consistency of the proposed improvement with existing land uses (transportation facility is a developed land use that is most consistent when aligned with other transportation land uses and least consistent when aligned with rural, undeveloped land uses (agricultural land, forest land, etc.).</p> <p><i>Compatibility.</i> Evaluate the compatibility of the project with current and proposed land use planning efforts.</p>	<p>Ranking: 4 N. improvement aligned along existing transportation facility, resulting in a high degree of consistency and compatibility</p>	<p>Ranking: 4 S. improvement aligned along existing transportation facility, resulting in a high degree of consistency and compatibility</p>
3.2 Displacements	<p>Residential: Number of residences impacted and potential effects due to parcel takes (may be partial)</p> <p>Commercial/Industrial: Number of commercial and industrial businesses taken.</p> <p>Utilities: Potential need to relocate transmission lines or other major utilities</p>	<p>Ranking: 2</p> <ul style="list-style-type: none"> <i>Residential:</i> 10-15 displacements <i>Commercial/Industrial:</i> No significant difference as compared with S. alignment primarily at interchanges (gas/service stations, hotels, restaurants, and commercial businesses, etc.) <i>Utilities:</i> Need to relocate water tower at Route 5 	<p>Ranking: 3</p> <ul style="list-style-type: none"> <i>Residential:</i> <5 displacements <i>Commercial/Industrial:</i> No significant difference as compared with N. alignment. Some impacts to Bobber truck stop, hotel, gas station, and commercial businesses <i>Utilities:</i> No significant relocations
3.3 Farmland Impacts	Identify potential impact to farm operation due to creation of severances, impacts to on-farm investments, creation of non-farmable lands, changes in access	<p>Ranking: 3 No significant difference as compared to the S. alignment</p>	<p>Ranking: 3 No significant difference as compared to the N. alignment</p>
3.4 Noise	Evaluate potential impact on sensitive receptors (residence, church, school, library).	<p>Ranking: 2 Slightly greater potential for noise impacts to residential community at W. terminus</p>	<p>Ranking: 3 Few, isolated noise impacts</p>

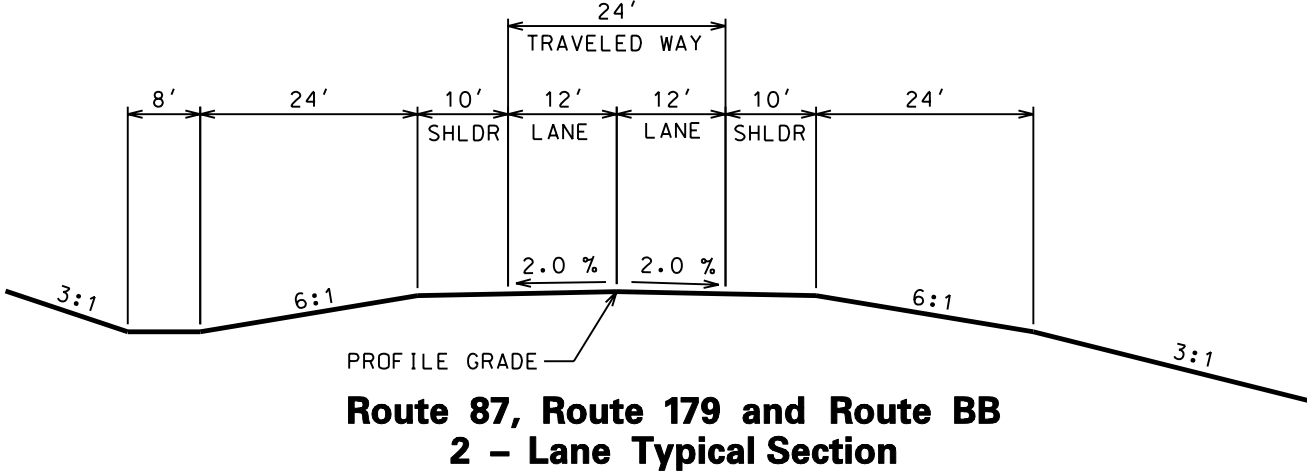
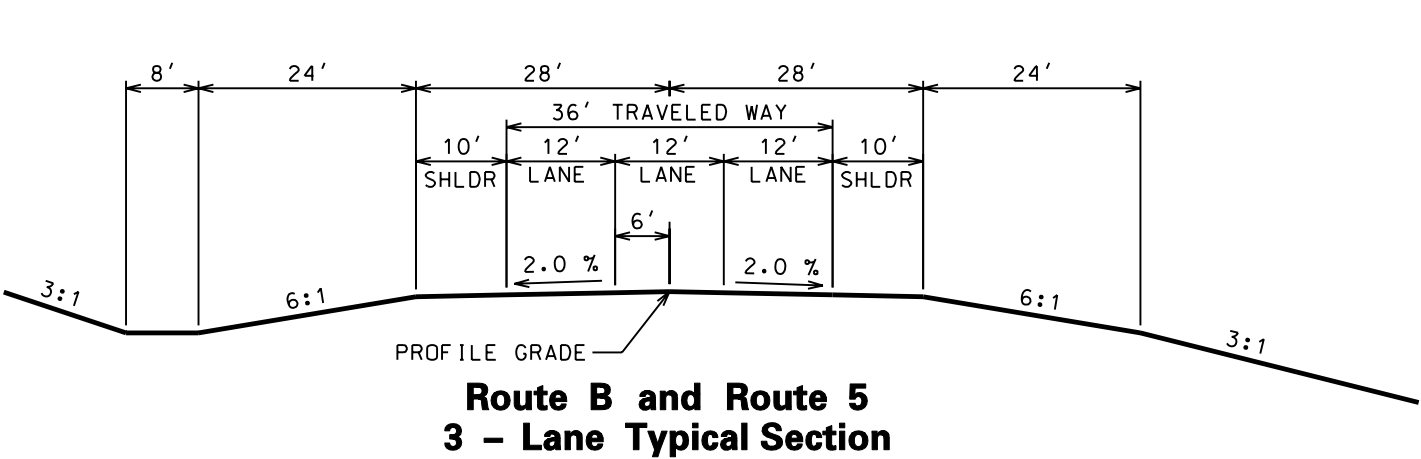
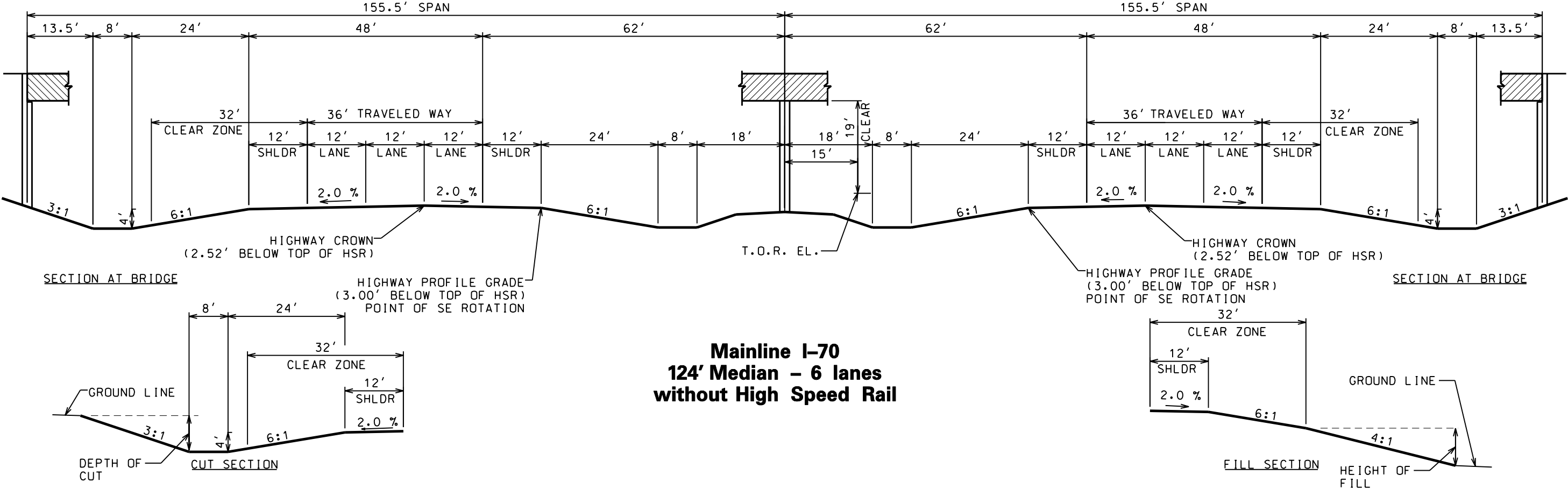
Table 5-1. North Versus South Mainline Evaluation

Evaluation Factor	Definition/Clarification	Indicators And Effects	
		North Alignment	South Alignment
3.5 Air Quality	Evaluate potential impact on air quality. Consideration of non-attainment areas.	Ranking: 3 No significant difference as compared to the S. alignment	Ranking: 3 No significant difference as compared to the N. alignment
3.6 Cultural Resources	Evaluate potential effects on NRHP sites or sites likely to be NRHP eligible.	Ranking: 3 No significant difference as compared to the S. alignment <ul style="list-style-type: none"> No cemetery or NRHP listed sites Log cabin potentially affected at Rocheport interchange not NRHP eligible Potentially eligible I-house located in Route 5 interchange would potentially be affected by either a north or a south alignment 	Ranking: 3 No significant difference as compared to the N. alignment <ul style="list-style-type: none"> No cemeteries or NRHP listed sites affected. Log cabin potentially affected at Rocheport interchange not NRHP eligible Potentially eligible I-house located in Route 5 interchange would potentially be affected by either a north or a south alignment

Scoring:

- 1 Benefits << Adverse Impacts
- 2 Benefits < Adverse Impacts
- 3 Benefits = Adverse Impacts
- 4 Benefits > Adverse Impacts
- 5 Benefits >> Adverse Impacts

CONCEPT ONLY

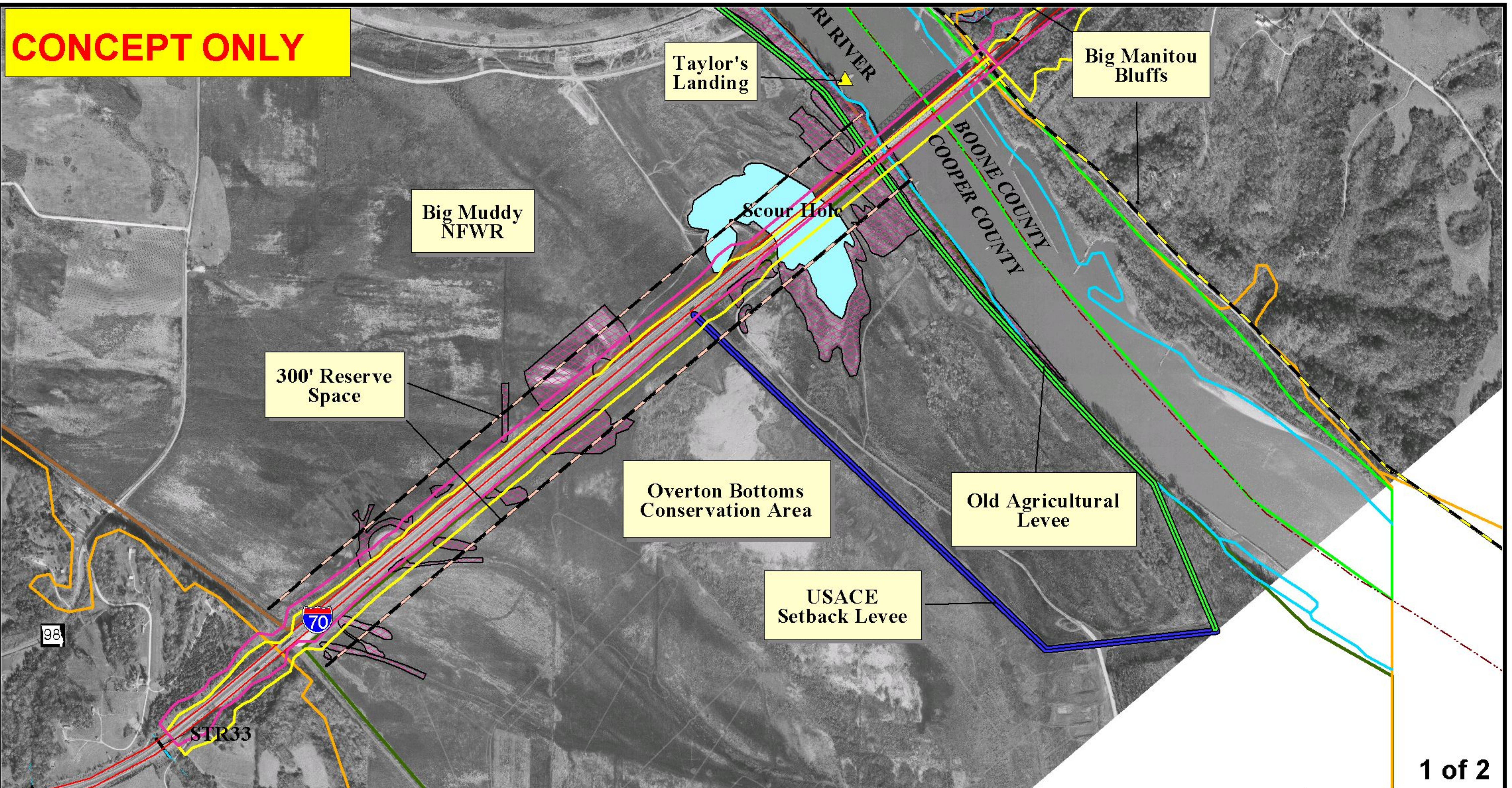


SECTION
3

NOT TO SCALE

FIGURE 1
Typical
Sections

CONCEPT ONLY



1 of 2



SECTION 3
Boonville
to
Rocheport

LEGEND

- | | | |
|-------------------|------------------------|-----------------------------------|
| North Alternative | Katy Trail | FEMA Floodway |
| South Alternative | 300' Reserve Space | Floodplain |
| I-70 Center Line | River/Stream | Overton Bottoms Conservation Area |
| Stream Crossing | County Line | Wetland |
| | Old Agricultural Levee | Sinkhole |
| | USACE Setback Levee | Spring |
| | Big Muddy NFWR | |

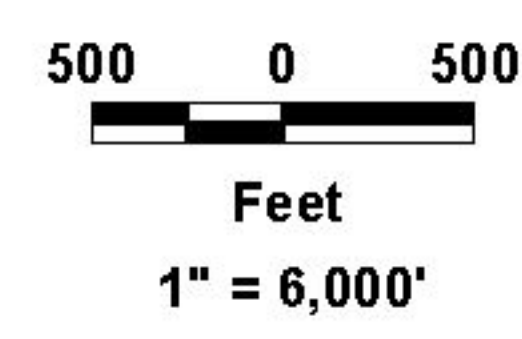
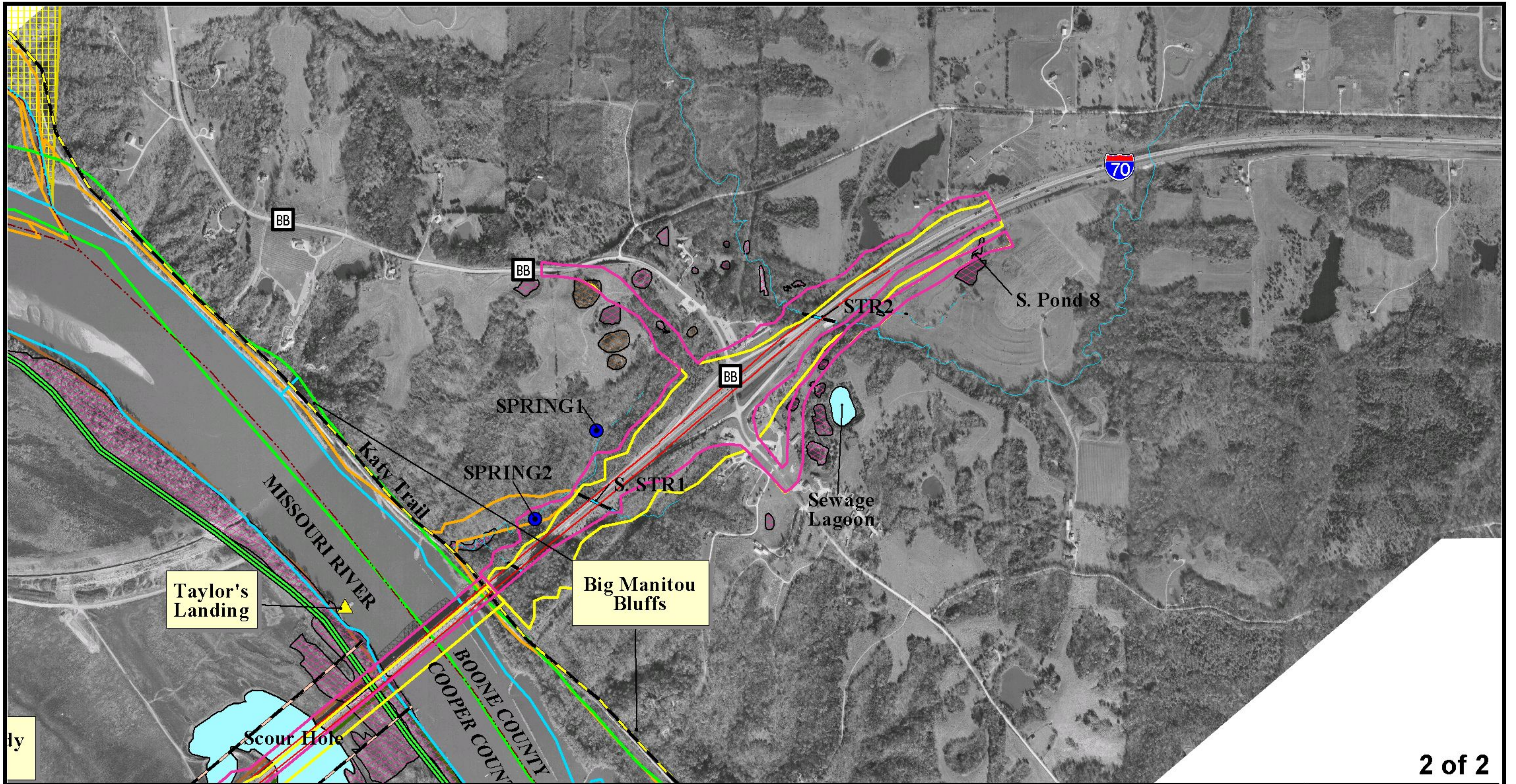


Figure 2
Missouri River
Crossing Alternatives
Cooper & Boone
Counties, Missouri



2 of 2

IMPROVE

i70

SECTION 3

Boonville to Rocheport

LEGEND

<ul style="list-style-type: none"> — North Alternative — South Alternative — I-70 Center Line — Stream Crossing 	<ul style="list-style-type: none"> — Katy Trail — 300' Reserve Space — River/Stream --- County Line — Old Agricultural Levee — USACE Setback Levee 	<ul style="list-style-type: none"> FEMA Floodway Floodplain Big Muddy NRWR Overton Bottoms Conservation Area Wetland Sinkhole ● Spring
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500
500

0

Feet
1" = 6,000'

N

Figure 2

Missouri River Crossing Alternates

Cooper & Boone Counties, Missouri