Chester Bridge
Environmental Assessment

FINAL EA / ERRATA

This Final EA is provided in Errata form. Changes have been made, where appropriate, to the EA document issued for public review on April 16, 2021, in lieu of developing a separate final document. Additional information received following publication of the EA, factual corrections or clarifications, and changes to address comments received on the EA are indicated in yellow highlight.

Perry County, Missouri (Route 51) and
Randolph County, Illinois (Route 150)

MoDOT Job No. J9P3239
Federal Aid No. NHPP-0512037

September 2021

CHESTER BRIDGE

Route 51, Perry County, Missouri
Route 150, Randolph County, Illinois
MoDOT Job Number: J9P3239

Environmental Assessment

Submitted Pursuant to 42 USC 4332(2)(c) and 49 USC 303 by the

U.S. Department of Transportation

Federal Highway Administration

and

Missouri Department of Transportation

2021-03-22 | 10:28 AM CDT — DocuSigned by: ABD12EE1F461494...

Date of Approval — *For the Missouri Department of Transportation*

2021-03-22 | 10:56 AM CDT — DocuSigned by: 5720243C86E9457...

Date of Approval — *For the Federal Highway Administration*

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The Missouri Department of Transportation (MoDOT), in cooperation with the Federal Highway Administration (FHWA), is preparing a Location Study and National Environmental Policy Act (NEPA) investigation of the crossing of the Mississippi River near Chester, Illinois. The study will be referred to as the Chester Bridge study. The Chester Bridge study is a transportation study that will investigate and identify improvements to develop a safe and reliable crossing of the Mississippi River at Chester Bridge and adjacent Horse Island Chute Bridge, which connect Route 51 in Perry County, Missouri, with Route 150 in Randolph County, Illinois.

The Federal Highway Administration signature gives approval to distribute this information for public and agency review and comment. Such approval does not commit to approve any future grant requests to fund the preferred alternative.

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Acronyms and Abbreviations

µg/m^3	microgram(s) per cubic meter
AADT	average annual daily traffic
AASHTO	American Association of State Highway and Transportation Officials
ACHP	Advisory Council on Historic Preservation
ACS	American Community Survey
APE	Area of Potential Effects
BA	Biological Assessment
BMP	best management practice
BO	Biological Opinion
CAG	Community Advisory Group
CEQ	Council on Environmental Quality
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	*Code of Federal Regulations*
CFS	cubic feet per second
CO	Carbon Monoxide
EA	Environmental Assessment
EDR	Environmental Data Resources, Inc.
EJ	Environmental Justice
EJSCREEN	Environmental Justice Screen
EO	Executive Order
EPA	U.S. Environmental Protection Agency
ETP	Energy Transfer Partners
FAA	Federal Aviation Administration
FAR	Federal Aviation Regulation
FEMA	Federal Emergency Management Agency
FHWA	Federal Highway Administration
FQI	Floristic Quality Index
HARGIS	Historic Architectural Resources Geographic Information System
HCS	Highway Capacity Software
IAC	Illinois Administrative Code
IDNR	Illinois Department of Natural Resources
IDOT	Illinois Department of Transportation
IEPA	Illinois Environmental Protection Agency

1	IHPA	Illinois Historic Preservation Agency (SHPO)
2	ILCS	Illinois Compiled Statutes
3	INAI	Illinois Natural Area Inventory
4	IPaC	Information for Planning and Consultation
5	ISGS	Illinois State Geological Survey
6	JSP	Job Special Provision
7	LWCF	Land and Water Conservation Fund
8	MDC	Missouri Department of Conservation
9	MDNR	Missouri Department of Natural Resources
10	MOA	Memorandum of Agreement
11	MoDOT	Missouri Department of Transportation
12	MSAT	Mobile Source Air Toxics
13	NAAQS	National Ambient Air Quality Standards
14	NATA	National-Scale Air Toxics Assessment
15	NAVD	North American Vertical Datum
16	NEPA	National Environmental Policy Act
17	NHPA	National Historic Preservation Act
18	NMSZ	New Madrid Seismic Zone
19	NO_2	Nitrogen Dioxide
20	NPDES	National Pollutant Discharge Elimination System
21	NRCS	Natural Resources Conservation Service
22	NRHP	National Register of Historic Places
23	O_3	Ozone
24	P/A	presence/absence
25	PA	Programmatic Agreement
26	PESA	Preliminary Environmental Site Assessment
27	PCR	Perry County Roads
28	PM	Particulate Matter
29	PM_{10}	Particulate matter less than 10 microns in aerodynamic diameter
30	$PM_{2.5}$	Particulate matter less than 2.5 microns in aerodynamic diameter
31	ppb	Part(s) per billion
32	ppm	Part(s) per million
33	PSI	Preliminary Site Investigation
34	REC	Recognized Environmental Condition
35	RFFA	Reasonably Foreseeable Future Action

1	RSMo	Missouri Revised Statutes
2	SEMA	Missouri State Emergency Management Agency
3	SEMO RPC	Southeast Missouri Regional Planning Commission
4	SHPO	State Historic Preservation Office
5	SO_2	Sulfur Dioxide
6	SWPPP	Stormwater Pollution Prevention Plan
7	Uniform Act	Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970
8	USACE	U.S. Army Corps of Engineers
9	USBR-76	U.S. Bicycle Route 76
10	USCG	U.S. Coast Guard
11	USGS	U.S. Geological Survey
12	USFWS	U.S. Fish and Wildlife Service
13	UST	underground storage tank

SECTION 1

Purpose and Need

This section presents the purpose and need for the Chester Bridge Environmental Assessment (EA) study. *Purpose and Need* refers to the transportation-related problems that a study is intended to address. The generation and evaluation of alternatives are conducted to develop the most appropriate solutions to the identified problems. Ultimately, the identification of a preferred alternative will be based, in part, on how well it satisfies the study's purpose and need.

In its very broadest sense, the Chester Bridge EA is intended to develop a safe and reliable crossing of the Mississippi River and adjacent Horse Island Chute Bridge. These two bridges connect Route 51 in Missouri with Route 150 in Illinois. Four specific problems were identified in this study:

- Crossings of the Mississippi River and the Horse Island Chute bridge are too narrow for current design standards.
- Crossings of the Mississippi River and the Horse Island Chute are in poor condition.
- In Missouri, Route 51 is subject to flood-related closures.
- The crossings of the Mississippi River and the Horse Island Chute are important to connectivity locally and within southeast Missouri and southwest Illinois.

The existing Chester Bridge crosses the Mississippi River. To complete the crossing from Illinois to Missouri, users must also cross the adjacent Horse Island Chute Bridge. Between the bridges is a short segment of earthen embankment.

- In general, for simplicity, the discussion will describe the two crossings as a single entity. This is true except where the two bridges need to be distinguished.

This section will examine these themes. **Section 1.1** introduces the study and study area. **Section 1.2** describes the study's purpose statement. **Section 1.3** summarizes the specific elements that comprise the purpose and need. **Section 1.4** presents the study's logical termini and independent utility.

1.1 Study Overview

The Missouri Department of Transportation (MoDOT), in cooperation with the Federal Highway Administration (FHWA) and the Illinois Department of Transportation (IDOT), is preparing a Location Study and EA for proposed improvements to the two Route 51 bridges at Chester, Illinois. The Chester Bridge is a continuous truss bridge across the Mississippi River. The Horse Island Chute Bridge is a steel stringer bridge over the Horse Island Chute. These two bridges connect Route 51 in Missouri with Route 150 in Illinois and form the only Mississippi River roadway crossing between St. Louis (approximately 57 river miles north) and Cape Girardeau (roughly 56 river miles south). The nearest population centers are Chester in Randolph County, Illinois and Perryville in Perry County, Missouri. Chester is located on the bluff immediately adjacent to the bridge. Perryville is located roughly 11 miles south of the bridge along Route 51. The approximate latitude/longitude of the existing bridge is 37°54'09" N, 89°50'13" W (degrees°minutes'seconds"). The Chester Bridge was opened in 1942 as a toll bridge. Tolls were removed in 1989.

Figure 1-1 presents two vicinity maps showing the locations of the Chester and Horse Island Chute bridges.

1.1.1 Overview of Existing Route 51 Crossing

The Chester Bridge is composed of four spans with a total length of the 2,830 feet. The main spans of the Chester Bridge are two-span subdivided Warren cantilevered through trusses. Each of these spans are approximately 670 feet long. The approaches are Warren deck trusses. The Missouri approach connects across Horse Island. The Illinois approach connects to the top of the bluff in Chester. Four piers in the Mississippi River are associated with the bridge; three are associated with the main spans and a fourth smaller pier is located in the center of the Illinois approach span along the edge of the river. The deck width is 22 feet. The vertical clearance above the deck is 20 feet.

Based on an inspection in 2016, the Chester Bridge has been determined to be too narrow for current design standards. The bridge is routinely closed, with police support, to allow for the passage of over-sized loads. While widening the lanes and/or adding shoulders will reduce the number of required bridge closings, these measures may not completely eliminate bridge closings because of oversized loads.

Relative to its condition, the Chester Bridge is on the MoDOT list of poor bridges. The conditions/ratings of the existing bridges are identified in **Section 1.3.2.1**. The Chester Bridge is also eligible for the National Register of Historic Places (NRHP).

An associated bridge, also built in 1942, is the steel stringer bridge over Horse Island Chute on Route 51 in Missouri. There is approximately 800 feet of roadway (on embankment) between the Chester Bridge and the Horse Island Chute Bridge. Total length of the bridge is 462 feet. The deck width is 22 feet. This bridge is in slightly better condition than the Chester Bridge, but is also

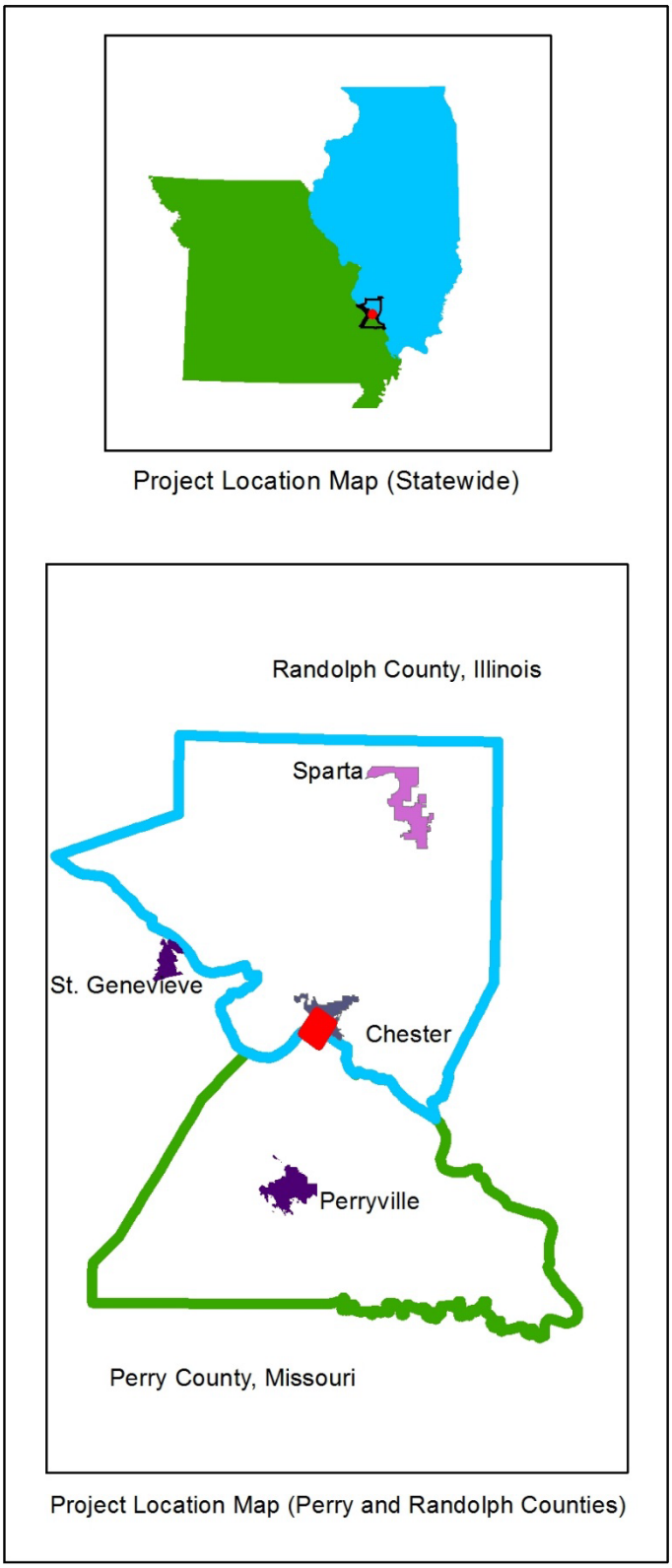


Figure 1-1. Vicinity Maps

considered to be too narrow for current design standards. The Horse Island Chute Bridge is also eligible for the NRHP.

Figure 1-2 presents photographs of the Chester Bridge and the Horse Island Chute Bridge.

1.1.2 Study Area Description

The study area for the Chester Bridge EA includes portions of Missouri and Illinois. The major elements of the study area are shown on **Figure 1-3** and are discussed in this section.

Figure 1-2. Photographs of the Chester Bridge and the Horse Island Chute Bridge

The Chester Bridge is located at river mile 110 of the upper branch of the Mississippi River (110 miles upstream of the confluence with the Ohio River). The Mississippi River is roughly 1,700 feet wide in this area. Over time, the path of the Mississippi River has changed. In 1844, the channel straightened creating Kaskaskia Island; see **Figure 1-3**. The Old River channel still exists and forms the official boundary between Illinois and Missouri. The Old River channel branches near the bridge to create Horse Island. The Route 51 approach to the Chester Bridge traverses the Horse Island with a separate bridge crossing the Horse Island Chute. The road rests on embankment between the bridges.

In Missouri, the earthen Bois Brule levee parallels the river in this area. Gravel roads run along the top of the levee. Behind the levee the land is flat and fertile and is used for agriculture. Within the Chester Bridge Study Area, Route 51 is a two-lane road with minimal shoulders. It is the only paved road in the immediate vicinity of the Chester Bridge; the other roads are narrow gravel farm roads. Two gas stations exist at the intersection of Route 51 and Perry County Roads (PCR) 239 and 944. A few isolated farmsteads are on this side of the river. The largest development is at the Perryville Airport located at 1856 Highway H. This regional airport was originally built by the U.S. Government as a training facility in the early 1940s. The airport was deeded to the City of Perryville in 1947. The airport has a 7,000-foot by 100-foot concrete runway equipped with medium intensity runway lights, which allow for use by numerous kinds of aircraft, including jets. Fixed base operators include Sabreliner Aviation and CertiFLY Aviation Parts, which are engaged in modifications and overhauls to both civilian and military aircraft. The City of Perryville is located approximately 9 miles from the airport. Perryville (population 8,394) is the county seat of Perry County.

In Illinois, a steep bluff rises approximately 100 feet from the river to the City of Chester (population 8,586). Immediately off the bridge is the Chester Welcome Center on IL Route 150. Chester is known as the home of comic book hero Popeye and his statue is a highlight of the Welcome Center. A Union Pacific Railroad line parallels the river below the bluff and passes underneath the bridge. IL Route 6 also parallels the river and railroad. Northwest of the bridge on Route 6 is the Menard Correctional Center, a

maximum-security state penitentiary. Land uses southeast of the existing bridge include a Chester water treatment facility, a riverboat pier, residences, and recreational facilities. Two main routes traverse Chester: IL Route 3 parallel to the river and IL Route 150 perpendicular to the river. To remove heavy truck traffic from downtown Chester, a Truck Bypass was developed. South of the city, the Truck Bypass follows the river front road until arriving at the Chester Bridge. From there, trucks traverse a short spur to IL Route 150, back to IL Route 3, north of the city center.

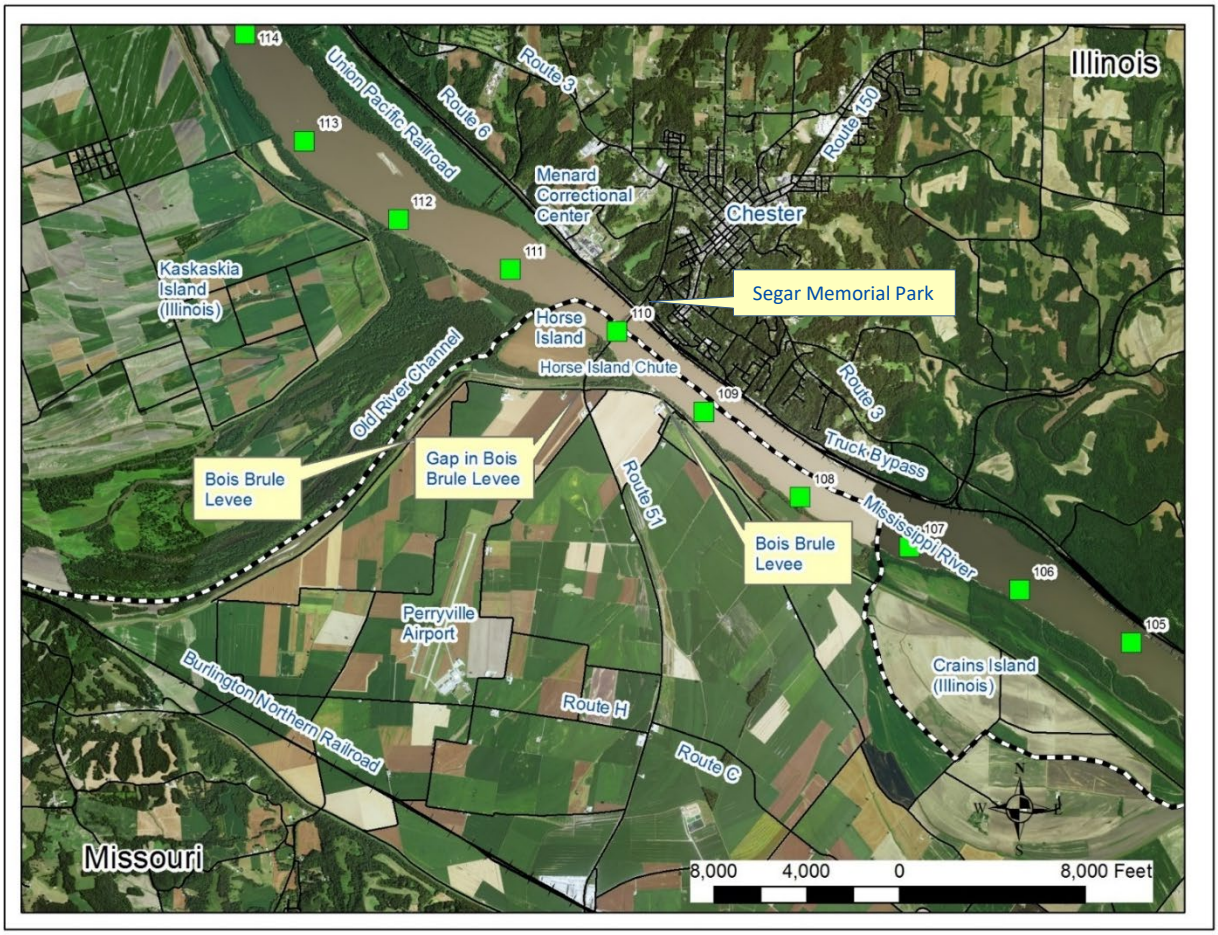


Figure 1-3. Chester Bridge EA Study Area

1.2 Purpose Statement

The Chester Bridge EA is a transportation study that will investigate and identify improvements intended to develop a safe and reliable Route 51 crossing of the Mississippi River. Overall, the purpose of the Chester Bridge EA is to:

- Improve the reliability of the crossing
- Improve the functionality of the crossing

Within the context of this purpose, several specific transportation problems have been identified. The specific transportation problems affecting the Route 51 crossings include, in no particular order:

- **Major Element 1 – The Chester and Horse Island Chute bridges are too narrow for current design standards.** Both bridges are very narrow with no shoulders and modern design standards are not incorporated into the bridges. This creates safety issues and degrades functionality.
- **Major Element 2 – The Route 51 crossing of the Mississippi River is in poor condition.** The condition of the current bridges is such that they require continual maintenance, resulting in substantial expense and periodic closures.
- **Major Element 3 – Route 51 is subject to flood-related closures.** There is a small gap in the Bois Brule Levee where the Horse Island Chute Bridge meets Route 51. To maintain the integrity of the levee, a temporary floodwall is installed over the road. The temporary floodwall closes Route 51 and the river crossing.
- **Major Element 4 – The Route 51 crossing is important to local and regional connectivity.** The existing bridge system provides locally important roadway connections. Some of these are the only available access points. These will need to be accommodated in appropriate ways. The current bridges are also important to connectivity within the area covered by the Southeast Missouri Regional Planning Commission (SEMO RPC).

1.3 Elements of the Purpose and Need

This section examines the context of the transportation problems that affect the Route 51 crossing (Chester Bridge and Horse Island Chute Bridge). As defined here, context refers to the overall nature, scope, and degree of how the transportation problems affect the existing corridor.

These transportation problems are often interrelated but are discussed within the framework of four major elements.

The specific transportation issues that affect the Chester/Horse Island Chute Bridges include:

1. The existing crossing is too narrow for current design standards.
2. The existing river crossing is in poor condition.
3. The existing bridge approach is closed by flood waters along the Bois Brule levee.
4. The existing crossing provides important local access as well as important connectivity within the SEMO RPC Region.

1.3.1 The Route 51 Crossing is Too Narrow for Current Design Standards

The Chester Bridge and the Horse Island Chute Bridge were designed and constructed for narrower vehicles than currently exist. Consequently, several of the existing bridges' physical features are now too narrow for current design standards. These issues contribute to the reduction of traffic efficiency, traffic service levels, and safety conditions on the bridges, resulting in diminished traffic

performance, increased driver safety issues, and heightened operational concerns. Addressing the following substandard design features are important goals of the Chester Bridge EA.

1.3.1.1 Narrow Travel Lanes

The existing bridges have deck widths of 22 feet. The travel lanes on the Chester Bridge are 11 feet wide with no shoulders. The configuration of the Horse Island Chute Bridge is similar. While this configuration was consistent with standard highway design when the bridges were built and for many years after, average vehicle dimensions have continued to increase. As a result, the American Association of State Highway and Transportation Officials (AASHTO) now recommends a standard lane width of 12 feet. Another factor contributing to the adverse effect of narrow lane widths is the increasing number of larger-sized trucks, buses, and farm equipment that now cross the Chester Bridge. Typical truck-trailer and full-size passenger bus widths are now 102 inches (8.5 feet). Almost one-quarter of bridge traffic is made up of trucks.[1] When lane widths are less than 12 feet and lateral clearances (i.e., the distance between the edge of the travel lanes and physical obstructions such as roadway barriers) are less than 6 feet, typical driver reaction is to reduce speed due to uncomfortable driving conditions and to lengthen the distances between vehicles in the same lane. Substandard lane width can affect the efficient flow of traffic and contribute to delays when crashes, vehicle breakdowns, or scheduled road work result in lane closures. Crash data provided by MoDOT and IDOT for the portion of the study area with narrow travel lanes and no shoulders (between Perry County Roads 238/946 in Missouri and the Illinois end of the Chester Bridge) show that over 50 percent of crashes (13 out of 25) between 2011 and 2015 were either head-on or sideswipe, with vehicles traveling in the opposite direction; both crash types can be attributed, in part, to narrow travel lanes. In addition, because of the narrow deck width, oversize loads and large farm equipment often require police assistance to stop traffic to cross the bridges.

Missouri's current standards for new bridges longer than 1,000 feet specify 12-foot lanes and 10-foot shoulders. Missouri's bridge standards meet or exceed AASHTO national standards.[2]

1.3.1.2 Lack of Emergency Shoulder Lanes

The 22-foot-wide deck and 11-foot travel lanes result in a complete lack of shoulders on the bridges. Stalled vehicles, wide load crossings, maintenance, and minor accidents on the bridges can result in significant delays; see **Figure 1-4**. Because of the lack of emergency shoulders, clearing accidents sometimes requires blocking all traffic. The lack of a shoulder breakdown lane on the bridge main span and approaches also reduces safety, as stalled vehicles themselves become safety hazards. While accident data suggest that crashes on the bridge are relatively low, closures to allow oversize loads (primarily agricultural vehicles) are more common.

Figure 1-4. Chester Bridge Lane Closure to Accommodate Over-sized Load
(Source: Google Earth)

[1] According to traffic data provided by MoDOT and IDOT in 2017, MoDOT traffic planning data provides a truck percentage of just under 22 percent. IDOT 2015 traffic classification data show truck percentages of 22 or 23 percent, depending on the direct of traffic flow.

[2] Under AASHTO guidelines, shoulders narrower than 10 feet are allowed.

According to conversations with the Chester Police Department, this happens approximately 400 times a year. Local police facilitate these closures with each taking approximately 15 minutes.

In Missouri, along Route 51 south of the bridge, 8-foot paved shoulders exist. Very narrow shoulders exist between the bridges. In Illinois, narrow turf shoulders exist along Route 150.

1.3.1.3 Approach Span Alignments

The approaches at both ends of the existing crossing have curves, as shown on **Figure 1-5**. To maneuver through these curves, drivers of wider trucks and buses traveling in the right lane often encroach on the left travel lane, making it more difficult for vehicles operating in the left lane. This results in slower travel speeds for all vehicles and reduced bridge capacity because trucks operating on the approach span tend to travel at comparatively slower speeds due to the span's incline, truck weight, and acceleration requirements.

Figure 1-5. Typical View of Truck Crossing Center Line on Curves at the Bridge Approaches
(Source: Google Earth)

1.3.1.4 Bike/Ped Access

Consideration must be given to safely accommodate pedestrians and bicyclists during the development of federally funded highway projects (23 *Code of Federal Regulations* [CFR] 652.5). The bridge's narrow lane width and lack of shoulders discourage pedestrians and bicyclists from crossing.

Important bicycle resources in the area include U.S. Bicycle Route 76 (USBR-76) and Illinois' Mississippi River Trail. In Missouri, USBR-76 is signed and crosses the Mississippi River on the Chester Bridge. The Mississippi River Trail utilizes IL Route 6 and the Truck Bypass to traverse the Chester Bridge.

1.3.2 The Route 51 Crossing is in Poor Condition

As bridges age, conditions deteriorate, generally leading to traffic restrictions as deck repairs and other routine maintenance activities are performed. Traffic also is reduced to one lane for the increasingly needed inspections. A project for deck and structural repairs on the Chester Bridge (Statewide Transportation Improvement Project J9P3104) was conducted in 2018.

Addressing closures due to condition issues is a transportation problem that is addressed in the Chester Bridge EA. This section discusses the condition of the Chester Bridge and the Horse Island Chute Bridge.

1.3.2.1 Chester Bridge Conditions

MoDOT's Bridge Inventory and Inspection System (2016) reports the following conditions for the Chester Bridge (L0135):

- Deck condition: Poor (4/9)
- Superstructure condition: Poor (4/9)
- Substructure condition: Poor (4/9)
- Deck geometry[3] appraisal: Basically intolerable requiring high priority of replacement (2/9)

[3] Deck geometry is calculated using curb-to-curb width and the minimum vertical clearance over the bridge roadway. Deck geometry rating codes vary by traffic level.

- Channel protection: Bank protection is in need of minor repairs
- Pier/abutment protection: None present but re-evaluation suggested
- Scour condition: Bridge is scour critical; bridge foundations determined to be unstable
- Operating/Inventory rating: 42.6 tons/25.7 tons

Overall, from a structural standpoint, the inspection recommendation was considered for the replacement of the bridge due to substandard load carrying capacity. The Chester Bridge has been placed on the MoDOT List of Poor Bridges because of historically documented poor conditions. Barge strikes of piers force the closure of the Chester Bridge periodically to investigate the integrity of the piers and the bridge.

1.3.2.2 Horse Island Chute Bridge Conditions

MoDOT's Bridge Inventory and Inspection System (2016) reports the following conditions for the Horse Island Chute Bridge (L1004):

- Deck condition: Fair (5/9)
- Superstructure condition: Good (7/9)
- Substructure condition: Fair (5/9)
- Deck geometry appraisal: Basically intolerable requiring high priority of replacement (2/9)
- Channel protection: Bank protection is in need of minor repairs
- Scour condition: Bridge is scour critical; bridge foundations determined to be unstable
- Operating/Inventory rating: 67.3 tons/40.6 tons

Overall, from a structural standpoint, the inspection recommendation was for bridge rehabilitation because of general structure deterioration and inadequate strength.

1.3.3 Route 51 is Subject to Flood-Related Closures

On the northeast side of the Mississippi River (Illinois), the topography is defined by steep rocky/wooded bluffs. Flooding is limited to the areas immediately adjacent to the river. There are no substantial flood-related issues on this side of the river that affect the Chester Bridge.

Figure 1-6. Gap in Bois Brule Levee at Route 51

On the southwest side of the Mississippi River (Missouri), the topography is broad and flat. Flooding is a dominant feature affecting this landscape. The Bois Brule Levee and Drainage District covers the portion of Missouri in the vicinity of the Chester Bridge EA study area. There is a small gap in the Bois Brule Levee where the Horse Island Chute Bridge meets Route 51; see **Figure 1-6**. In order to maintain the integrity of the levee, a temporary flood wall is installed over the road, when necessary. This closes Route 51 and the river crossing. The Bois Brule Levee and gap are labeled on **Figure 1-3**. Minimizing

these closures is a transportation problem that this EA is intended to rectify. This section discusses this issue.

1.3.3.1 Bois Brule Levee and Drainage District

The Bois Brule Bottom, located in Missouri, is approximately 6 miles wide and 18 miles long. With rich soil, it is very suited to farming. Bois Brule Bottom is bordered to the north by the Old River channel, which is the old channel of the Mississippi River that shifted course following the flood of 1844 and separates Bois Brule Bottom from Kaskaskia Island. Bois Brule is French for "Burnt Wood". Early French settlers used the term to describe a burnt tract of forest. Flooding has been a constant concern within Bois Brule Bottom since settlement began. The Bois Brule levee system is federally authorized and constructed. It is locally operated and maintained by the nonfederal Sponsor, Bois Brule Levee and Drainage District.

Figure 1-7. Heavy Equipment Used to Install/Remove Route 51 Temporary Flood Wall

The Bois Brule Levee and Drainage District protects approximately 26,000 acres. The District consists of 33.1 miles of earthen levee with miscellaneous relief wells and pump stations. The District's primary risk is under-seepage. This problem affects the entire District. With the existing under-seepage issues, sudden failure of the levee can occur along the levee, placing human life, vehicles, building, industrial equipment, livestock, and agricultural production at risk. The levee failed because of under-seepage prior to the crest of the 1993 Great Flood, flooding the entire levee district to a depth of 20 feet. Failures due to under-seepage can occur very rapidly with little warning.

In the vicinity of the Chester Bridge EA, an earthen levee parallels the Horse Island Chute. At Route 51, the elevation of the road is lower than the top of the levee. This creates a gap in the levee. To cover this gap, a temporary flood wall is placed across the road, as necessary, as shown on **Figure 1-7**. When in place, the temporary flood wall forces the closure of Route 51.

1.3.3.2 Frequency of Flood-Related Closures

Near Chester, flooding of the Mississippi River begins at a river level of 27 feet.

The highest level recorded was during the Great Flood of 1993 (49.74 feet). When the river reaches 40.7 feet, Route 51 will need to be closed (National Weather Service Advanced Hydrologic Prediction Service, 2020). However, MoDOT reports that based on recent experience, Route 51 needs to be closed when the river reaches 44 feet on the Chester gauge.

According to the National Weather Service, only seven of the historically highest river crests met the 40.7-foot level and only four met the 44-foot level. Consequently, closures of Route 51 due to weather are relatively rare. However, all closures have been relatively recent (since 1973) and can be quite lengthy. The 2015 closure lasted roughly a week (December 28 through January 4). The 2017 closure also lasted nearly a week (May 4 through May 10). The most recent closure, occurring in June 2019, lasted 21 days (June 2 through June 22).

Closures result in detours of roughly 100 miles. The increasingly interconnected world makes the crossing important to the cities of both Chester and Perryville, as well as the larger region. With almost 25 percent of bridge traffic composed of trucks, the negative consequences of closures can impact a myriad of interests beyond Perry and Randolph counties.

1.3.4 The Route 51 Crossing is Important to Local and Regional Connectivity

This section discusses the important connectivity issues associated with the Chester Bridge/Horse Island Chute Bridge. These issues are described in terms of important regional connections as well as accommodating existing local pathways.

1.3.4.1 Important Regional Connectivity

The SEMO RPC offers planning and economic development services to a seven-county region of Bollinger, Cape Girardeau, Iron, Madison, Perry, St. Francois, and Ste. Genevieve. SEMO RPC works with governments, economic development organizations, civic groups, businesses, and individual citizens to provide services that help enhance the livability and economic base. They focus on promoting emergency preparedness, community development, healthcare, commerce, social services, public works, and administration.

Relative to transportation planning, SEMO RPC provides input to MoDOT concerning regional transportation issues and projects. SEMO RPC also prioritizes construction and maintenance projects.

This section discusses the important regional connectivity issues. **Figures 1-8 and 1-9** show many of the important elements discussed in this section.

Figure 1-8. I-55 and Adjacent Mississippi River Bridges

1.3.4.2 Access to I-55

Interstate 55 (I-55) is the highest volume roadway in southeast Missouri. Within the region, I-55 traverses the rolling terrain through Cape Girardeau. Exit 95 at Cape Girardeau provides direct access to the Bill Emerson Memorial Bridge). I-55 then passes through rural areas again as it makes a north-northwesterly run through the towns of Perryville and Ste. Genevieve before entering the southern reaches of the St. Louis metro area at the interchange with U.S. Route 67 and the cities of Festus and Crystal City.

Currently, I-55 is roughly 14 miles from the Chester Bridge, as shown on **Figure 1-8**. Close access to I-55 allows the region to be attractive for commerce. It also enhances emergency preparedness. The Chester Bridge is roughly equidistance from the nearest up and downstream crossings. The closure of the existing bridge results in a detour of roughly 100 miles in either direction. Invoking this detour negatively impacts the region.

Maintaining appropriate access to I-55 and to Mississippi River crossings are important goals of SEMO RPC and the Chester Bridge EA.

1.3.4.3 Connection to the Truck Bypass

To reduce the number of trucks going through downtown Chester on IL Route 3, a Truck Bypass has been established. Beginning southeast of Chester, the Truck Bypass starts at Water Street and follows the river to the base of the Chester Bridge. At that point, Randolph Street ascends the bluff to Route 150. From that point, a left turn leads to the Chester Bridge and a right turn returns to IL Route 3. While primarily a benefit to Chester, all truck traffic, including those to and from Missouri, benefit from this expedited route.

The Truck Bypass is shown on **Figure 1-9.** Approximately 1,800 trucks use the Truck Bypass each day. These trips are regionally important because they connect the region's important movements of personnel and materials. Accommodating this movement is an important goal of this project.

1.3.4.4 Access to Chester

The Chester Bridge provides access, from Missouri, to the commercial resources within Chester, Illinois. Among the largest resources are the Menard Correctional Center, Gilster-Mary Lee Company, and Conagra. Accommodating this access is an important goal of this project.

Gilster-Mary Lee is a leading private label food manufacturer with facilities in both Perryville, Missouri and Chester, Illinois. In Perryville, there are four Gilster-Mary Lee facilities. The Perryville Distribution Center is located on Route 51, near US Route 61. In Chester, a 165,000-square-foot Baking Mix Plant produces a variety of retail and food service items.

Conagra operates in the Grain Mill Products industry within the Food and Kindred Products sector. Approximately 31 employees are employed at this location. Onsite resources include grain elevators and milling equipment. The facility is located on the Truck Bypass.

Menard Correctional Center is an Illinois state prison. It houses maximum-security and high medium-security adult males. It is the state's largest prison with an average population of 3,410. Menard Correctional Center occupies 2,600 acres. The Menard Correctional Center is located on IL Route 6, less than a mile north (upstream) of the Chester Bridge.

Another important resource in Chester is the Chester Docks Port Facility (Southern Illinois Transfer Company). The facility is located on IL Route 3 south of Chester. It receives steel products and dry-bulk commodities. The piers are approximately 350 feet apart with berthing space at shore moorings. An open storage area at the rear of lower pier has capacity for 10,000 tons of bulk materials.

In addition, the Chester Community Unit School District 139 serves students residing on Kaskaskia Island and uses the Chester Bridge daily during the school year to transport students.

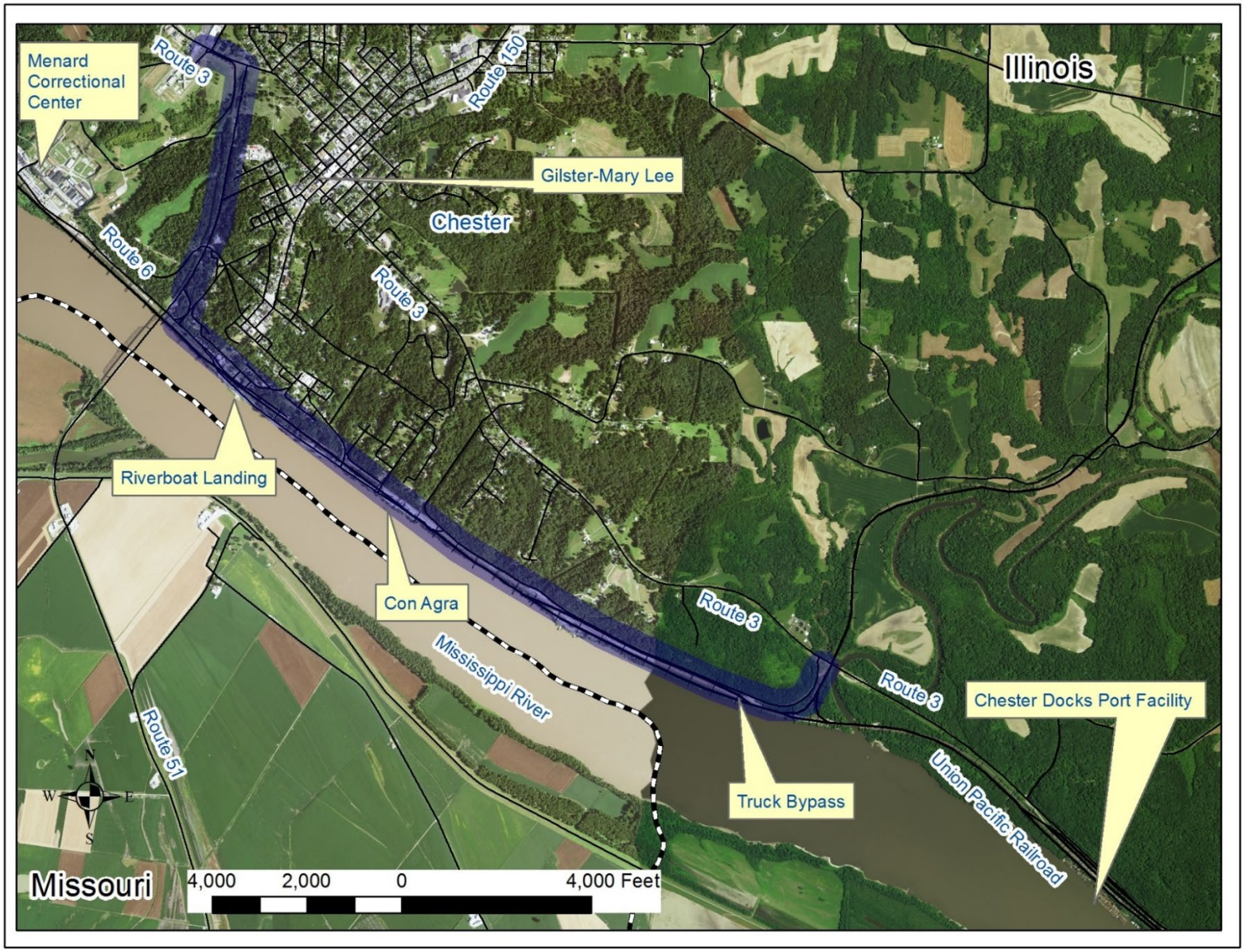


Figure 1-9. Truck Bypass and Other Important Land Uses

1.3.4.5 Farm Access

The Chester Bridge and the Horse Island Chute Bridge provide important farm access from Illinois to Horse Island, Bois Brule Bottom, and Kaskaskia Island. The Missouri approach of the Chester Bridge connects Illinois with Horse Island. The balance of the small island is in cultivation.

Bois Brule Bottom is a productive alluvial floodplain. It is approximately 6 miles wide and 18 miles long. Due to the risk of flooding, the Bois Brule Bottom is sparsely developed. Most supplies, materials, and resources must come from outside the area. Additionally, the closest river port is located on IL Route 3, outside Chester. The existing bridges provide important access to the city.

Kaskaskia Island is part of Illinois. The relocation of the Mississippi River in the 1800s created this isolated portion of the state. The only vehicular access comes from Missouri. The Chester Bridge is the shortest route to Illinois from Kaskaskia Island. Maintaining this access is an important goal of this project.

1.3.4.6 River Access

The Chester Bridge and Horse Island Chute Bridge provide important access to the Mississippi River itself. The levees on the Missouri side of the river tend to limit access. The bridges provide access to both commercial and recreational spaces that are important to the region.

The Chester waterfront provides relatively easy access to the Mississippi River. Paddlewheel tour boats use the area and other recreational users gain access to Chester. The Chester Boat Club is located at 51 Water Street.

A Union Pacific Railroad line also parallels the river and goes under the Chester Bridge. Bulk terminal transfers are important uses. The Chester Docks Port Facility is the nearest public dry-bulk terminal.

Two navigation channels are located along the Mississippi River under the Chester Bridge. Barge traffic is heavy and maintaining safe access for barges under the Chester Bridge is important on regional, statewide, and national levels.

Maintaining this access is a goal of this project.

1.3.4.7 Accommodation of the Existing Local Pathways

The Chester Bridge EA includes several roadway connections within the logical termini of the project. **Section 1.4** discusses the logical termini. These connections will need to be accommodated appropriately.

Within Missouri, the important local connections to maintain are:

- Driveways to Horse Island – Currently, much of Horse Island is under cultivation. Farm equipment access is provided via driveways on either side of Route 51. Equipment can pass under the Chester Bridge approach from one side of Route 51 to the other. Providing adequate farm equipment access to Horse Island is a goal of this project; see **Figure 1-10**.

Figure 1-10. View of Route 51 Driveways to Horse Island
(photo source: Google Earth)

- Levee Roads – East of Route 51, PCR 238 runs along the top of the earthen levee. West of Route 51, PCR 946 runs along the top of the levee. Maintaining connectivity to these roads is a goal of this project; see **Figure 1-11**. Other roads in the vicinity are PCR 944 and PCR 239, which intersect at Route 51. The intersection of PCR 239/944 houses a small cluster of commercial land uses, principally gas and convenience stores. These roads are narrow/low speed gravel roads, used primarily by farm equipment. The access the roads provide to the agricultural fields is an important function; less important is the location of the intersections with Route 51 and the exact configuration of the roads.

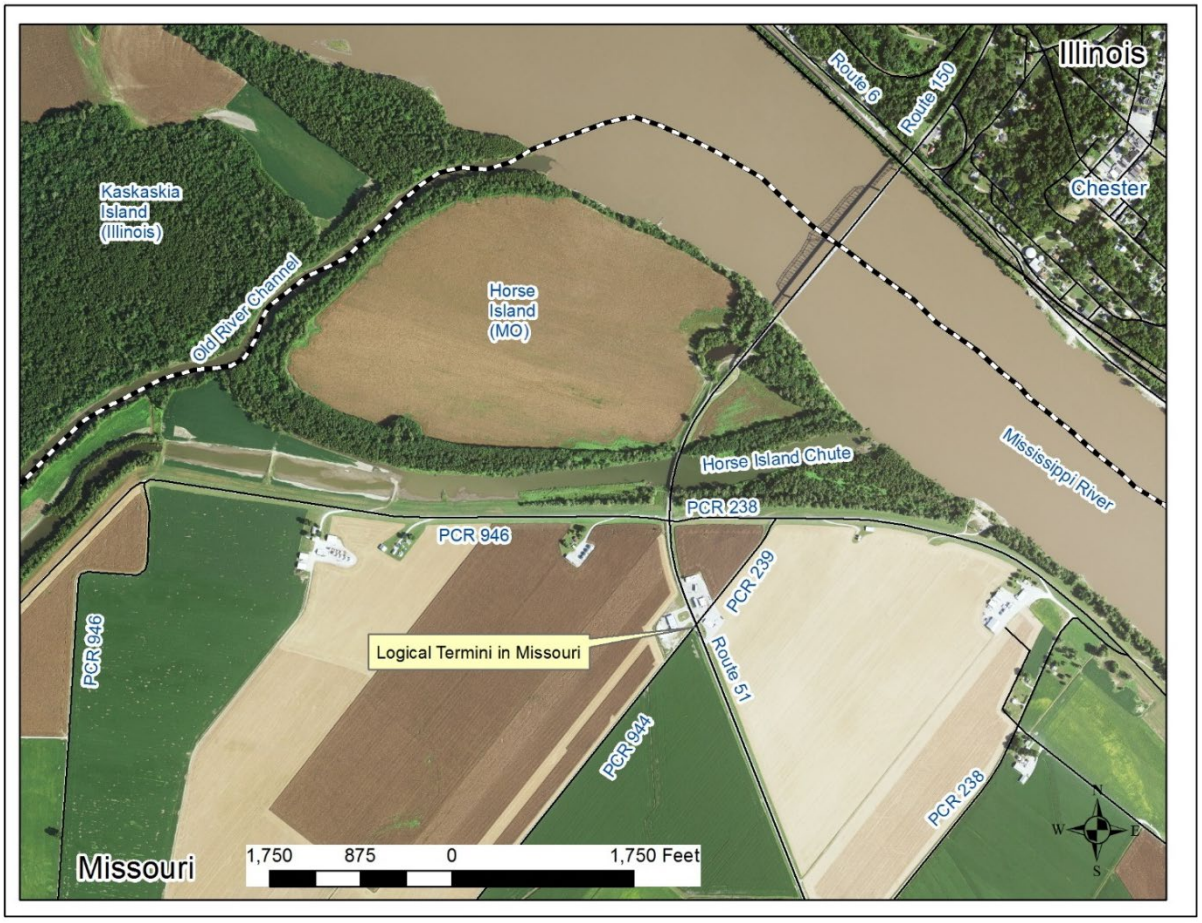


Figure 1-11. Local Roads in Missouri

Within Illinois, the important local connections to maintain are:

- IL Route 6 Bridge Underpass – IL Route 6 provides the principal access to the Menard Correctional Center; see **Figure 1-12**. Route 6 is a narrow, two-lane road with minimal unpaved shoulders. The speed limit is 40 miles per hour.
- Truck Bypass – Randolph Street intersects with Route 150 roughly 800 feet from the Chester Bridge. Randolph Street descends to IL Route 6/Kaskaskia Road/Water Street. It is also part of the Truck Bypass; see **Figure 1-12**.

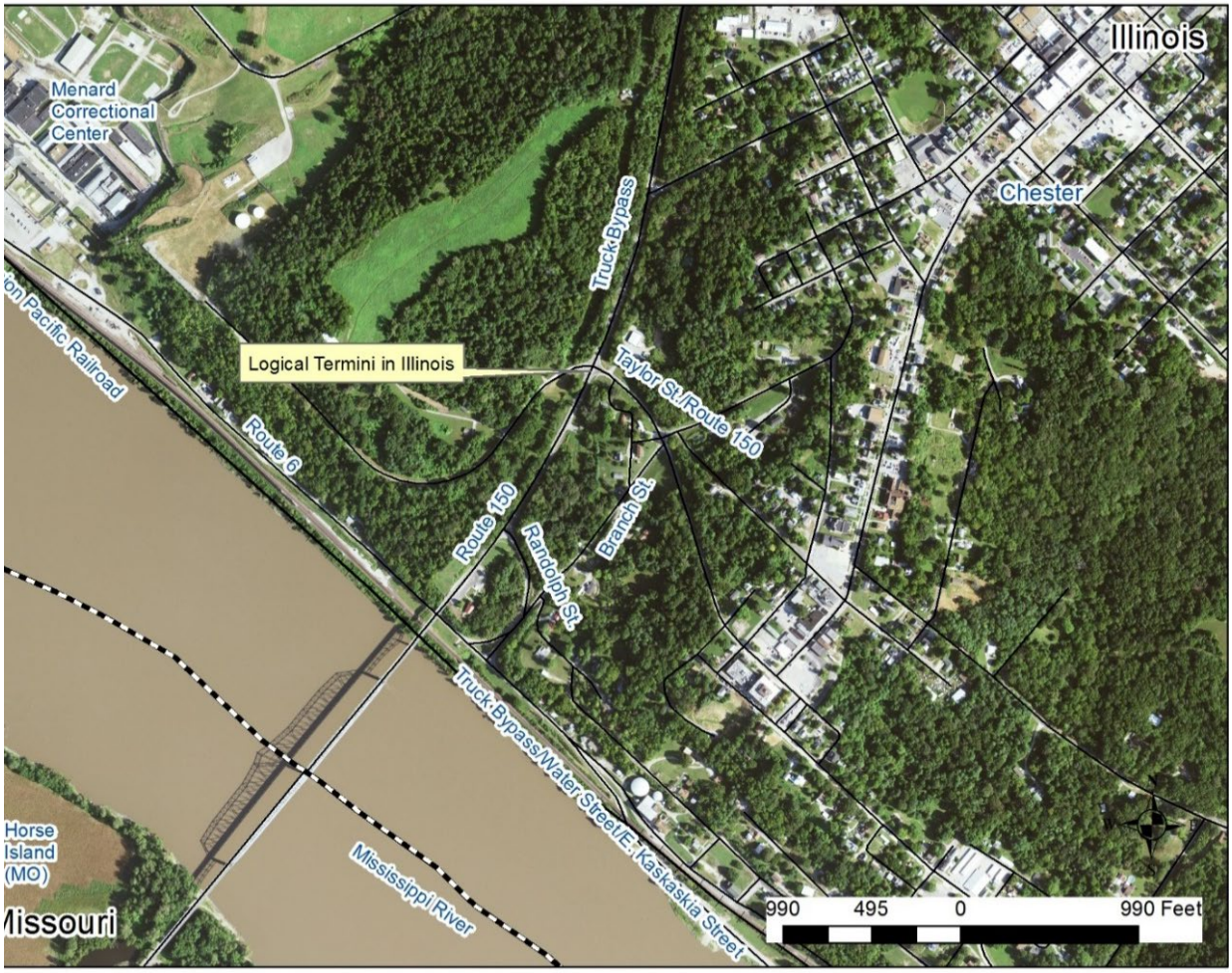


Figure 1-12. Local Roads in Illinois

1.4 Logical Termini and Independent Utility

FHWA issues guidelines to assist transportation planners in designating logical termini for a study. In addition to being the rational end points for a transportation improvement, logical termini also serve as general geographical boundaries for a review of any environmental impacts triggered by the study. Logical termini are located within the study area and frequently are points of major traffic generation, especially intersecting roadways. This is because in most cases traffic generators determine the size and type of facility being proposed.

Based on these criteria, the logical termini for the Chester Bridge EA are:

- **In Missouri, Intersection of Route 51 and PCR 239/944** – This intersection forms the nexus of the local roadway system on the Missouri side of the river. Specifically, it provides connectivity with PCR 946/238 (the gravel roadway atop of the Bois Brule Levee). This will allow for incorporating any needed local roadway alterations within the context of the Chester Bridge EA. Beyond this point, the next intersection with Route 51 is PCR 238. This is another gravel road that provides access to agricultural fields and connects to PCR 946/238. No alterations to PCR 238 will yield results that could not be accomplished by work at PCR 946/238. This also applies to the other intersections with Route 51. The Route 51 roadway configuration (narrow, two-lane paved roadway on minimal embankment with limited shoulders) extends virtually the entire 12 miles to the City of Perryville.

- **In Illinois, Intersection of Route 150 and Taylor Street** – This is the second intersection with Route 150, north of the Chester Bridge. This is also a portion of the Truck Bypass (see **Figure 1-9**). The first intersection with Route 150 is Randolph Street. This is the point where the Truck Bypass connects with Route 150. Randolph Street was not chosen as the logical termini, because it was reasonable/foreseeable that alternations north of this point might be necessary. There is a southbound left turn lane at Taylor Street. As Route 150 moves north, it narrows and enters an area of cut bank; see **Figure 1-13**. Between Taylor Street and the retaining walls shown in **Figure 1-13**, there is an intersection with Valley Street. This intersection is a residential access road that is lightly trafficked and serves the residences along the hillside that ends at the summit of Chester. Because of these conditions, using Taylor Street as the logical termini allows for incorporating any needed local roadway alterations within the context of the Chester Bridge EA, while avoiding the complete restoration of the Truck Bypass.

Figure 1-13. View of Route 150/Truck Bypass, North of Valley Street

These limits connect the essential movements associated with the purpose and need for the project; see **Figures 1-11 and 1-12**.

In addition to being the rational end points for a transportation improvement, the logical termini also incorporate the general geographical boundaries needed for the review of environmental impacts triggered by the study. Finally, because traffic generators affect the appropriate size and type of a facility, these limits include all points of major traffic generation.

The Chester Bridge EA project also has independent utility. It will be able to function on its own, without further construction of an adjoining segment. It also does not preclude any current or future projects within the total study area from advancing once the study's findings have been approved by FHWA.

Multiple transportation improvements within the study area will almost certainly be identified, allowing projects of independent utility that improve the overall system to be built, but whose construction does not restrict or otherwise alter planning and construction of adjacent projects.

Finally, the Chester Bridge EA does not restrict consideration of other reasonably foreseeable transportation improvements. The transportation problems and solutions are being evaluated in consideration of existing long-range transportation plans in order to minimize conflicts with the goals and improvements detailed in those plans. Solutions will be developed to allow for complementary improvements of connecting roadways, as needed, in the future.

SECTION 2

Alternatives

This section examines the development and evaluation of the study's alternatives.

The alternative development process begins with identifying a wide range of initial alternatives that could potentially address the transportation needs established by the study. These initial alternatives are called Conceptual Alternatives. The Conceptual Alternatives were developed in accordance with principles of appropriate design standards with consideration of existing planning goals, public involvement, potential environmental impacts, and engineering judgment. **Section 2.1** presents the Conceptual Alternatives.

The primary screening tool used to evaluate the Conceptual Alternatives is an analysis of how well they satisfy the study's Purpose and Need. **Section 2.2** presents the Purpose and Need screening of the Conceptual Alternatives. Those alternatives that are determined to satisfy the study's Purpose and Need are referred to as Reasonable Alternatives/Alternatives to be Carried Forward. The identification of the Reasonable Alternatives is presented in **Section 2.3**.

The Reasonable Alternatives are further developed and refined based on more detailed engineering analysis and known constraints. This allows for the establishment of preliminary study footprints and, in turn, for detailed impact assessments, cost estimates, and traffic evaluations.

The Reasonable Alternative that best accomplishes the Purpose and Need for the proposed action while avoiding, minimizing, or mitigating the impacts to the social and natural environment is referred to as the Preferred Alternative.

Figure 2-1 depicts the overall process of alternative development and evaluation.

Figure 2-1. Process of Alternative Development and Evaluation

2.1 Conceptual Alternatives

This section of the EA describes the following:

- How and why Conceptual Alternatives were selected for detailed study
- How MoDOT, IDOT, and FHWA evaluated Conceptual Alternatives
- Why alternatives were eliminated from further consideration

Each of the Conceptual Alternatives has been developed to a comparable level of detail to enable a reasonable comparison. Decisions were made based on the ability of an alternative to satisfy the study's Purpose and Need.

2.1.1 No New Build Conceptual Alternatives

The Conceptual Alternatives that do not include a new bridge structure are limited and are presented in this section.

2.1.1.1 No-Build Alternative

The No-Build Alternative for the Chester Bridge EA would consist of maintaining the current roadways and structures in essentially their current conditions. Routine maintenance would continue, and occasional minor safety upgrades would be implemented. No capacity additions or major improvements would be made. Overall, the No-Build Alternative does not meet the study's Purpose and Need. It is described in this EA to provide a baseline condition against which the changes associated with the other alternatives may be evaluated.

The No-Build Alternative assumes that capacity additions on major improvements would not be constructed; thus, many impacts—positive and negative—associated with new construction, would not occur. These impacts include expenditure of funds, land use changes that include converting existing development or public lands into highway right-of-way, potential increased economic development, improved multi-modal accessibility, and improved safety. The No-Build Alternative is not a no-cost concept because maintenance and repair of the existing roadway infrastructure would be needed to ensure the continued use of the corridor. Given the age of the bridges, maintenance costs are an increasing concern.

2.1.1.2 Rehabilitate Existing Bridges

Rehabilitation of the Chester and Horse Island Chute bridges would involve major structural steel repairs, deck replacement, cap replacement, and/or rail replacement at both bridges. While this would improve the crossings at the existing locations, it would not return the bridges to their original structural condition. It is assumed that this alternative would best represent a configuration that could maintain the historic integrity of the existing bridges. As discussed in **Section 2.2.3,** preliminary structural investigations concluded that the rehabilitation would be quite expensive and result in bridges with a shorter operational life. During the evaluations of possible rehabilitations, 15- and 50-year rehabilitations were studied. The 50-year rehabilitation seems unlikely to result in a bridge that would retain the bridge's historic integrity. While the 15-year rehabilitation is more likely to retain the bridge's historic integrity, it is not considered a reasonable or cost-effective alternative. In either case, a standard 75-year design life for the existing bridge is not practically obtainable.

A situation where one bridge is rehabilitated, and one bridge is replaced was not considered because it clearly could not eliminate the need to close the crossing during Route 51 flooding. Additionally, it would require the closure of the crossing, while the connection between two bridges is built. Alternately, a one-way couplet configuration, discussed in **Section 2.3**, was investigated. This configuration provides an opportunity to use the rehabilitated existing bridges and maintain historic integrity to the maximum extent possible.

2.1.2 New Build Conceptual Alternatives

Based on the study's Purpose and Need, logical termini, and study area, a series of new build Conceptual Alternatives was developed. The Conceptual Alternatives represent the wide range of initial alternatives that could potentially address the transportation needs established by the study. Those that are determined to satisfy the study's Purpose and Need are advanced for further consideration.

The bridge sections were assumed to be 40 to 44 feet wide with two 12-foot travel lanes and 8- to 10-foot shoulders. The study also assumes a 16.5-foot minimum vertical clearance design standard. This would allow most oversized loads and large farm equipment to cross the river without stopping traffic and provide room to maneuver during emergencies or to remove disabled vehicles from the travel lanes. The expanded shoulders would allow bicyclists and pedestrians to cross the bridge without using the vehicular travel lanes. The shoulders would also allow bridge inspections to occur without restricting traffic.

The roadway typical sections are specified to match the bridge section (40 to 44 feet wide, with two 12-foot travel lanes and 8- to 10-foot shoulders). Recently, the functional classification of Route 51 was changed from minor arterial to principal arterial, from Perryville to the Missouri/Illinois state line. The design speed and posted speed will be 45 miles per hour. Existing intersections and turns will be maintained in their current configurations. Direct access to the roadways for individual driveways will be maintained, to the extent possible.

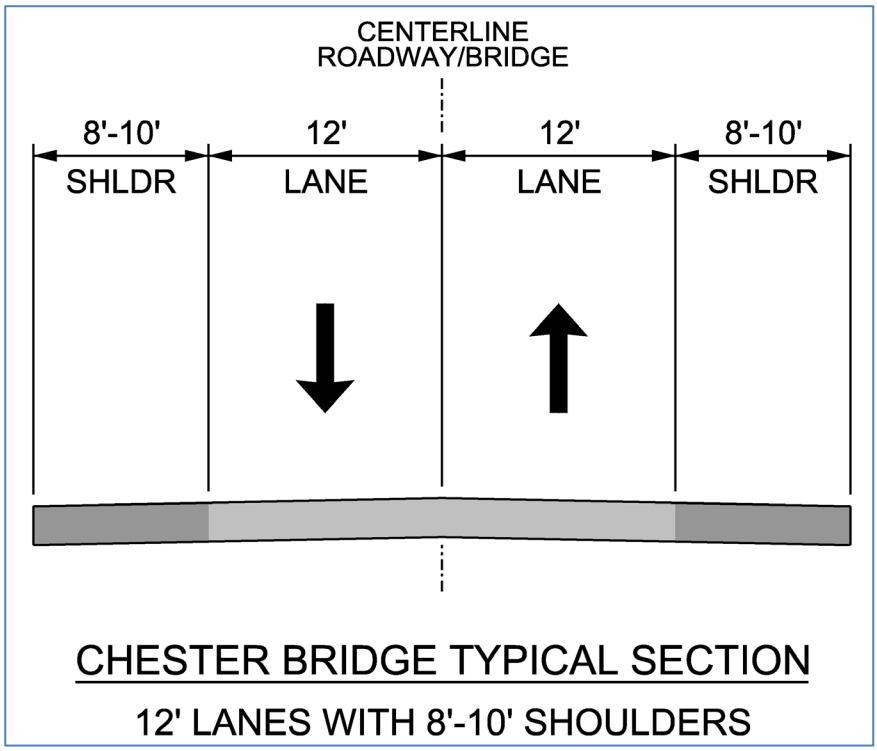


Figure 2-2. Chester Bridge Typical Section

Figure 2-2 shows a typical section.

These Conceptual Alternatives do not preclude the use of more than one of these corridors for hybrid configurations. For example, one-way couplets using a new build alternative in combination with rehabilitating the existing bridge. The possibility of these pairings will be considered in the recommendation of alternatives for further consideration. This configuration also maximizes the possibility of reusing the existing bridge through rehabilitation. The Chester Bridge and the Horse Island Chute Bridge are listed as eligible for the NRHP.

2.1.2.1 Near Upstream Conceptual Alternative (U-1)

Connecting at the logical termini, this alternative moves the alignment approximately 75 feet upstream of the existing corridor. The new bridge would be parallel to the existing bridge. For most stakeholders, once completed, this alignment is expected to be nearly indistinguishable from the existing crossing.

2.1.2.2 Far Upstream Conceptual Alternative (U-2)

Connecting at the logical termini, this alternative moves the alignment a maximum of approximately 375 feet upstream of the existing corridor. The bridge would not parallel the existing bridge; rather, it is roughly 6 degrees askew; this would make a new bridge more perpendicular to the river, potentially shortening the length of the bridge. However, the overall length of the crossing/corridor would be longer, as the alignment curves back to the logical termini.

2.1.2.3 Replace along Existing Conceptual Alternative (E-1)

This alternative will construct a new bridge on the existing alignment. This alternative would be unique in that it would require the closure of the crossing during construction.

2.1.2.4 Near Downstream Conceptual Alternative (D-1)

Connecting at the logical termini, this alternative moves the alignment approximately 75 feet downstream of the existing corridor. The bridge would be parallel to the existing bridge. For most stakeholders, once completed, this alignment is expected to be nearly indistinguishable from the existing crossing.

2.1.2.5 Far Downstream Conceptual Alternative (D-2)

Connecting at the logical termini, this alternative moves the alignment a maximum of approximately 675 feet downstream of the existing corridor. The bridge would not parallel the existing bridge; rather, it is roughly 11 degrees askew. This would be the longest alternative. The alternative would miss most of Horse Island. It would also affect the land uses and roadways at the termini.

Figures 2-3 and **2-4** show and describe the new build Conceptual Alternatives.

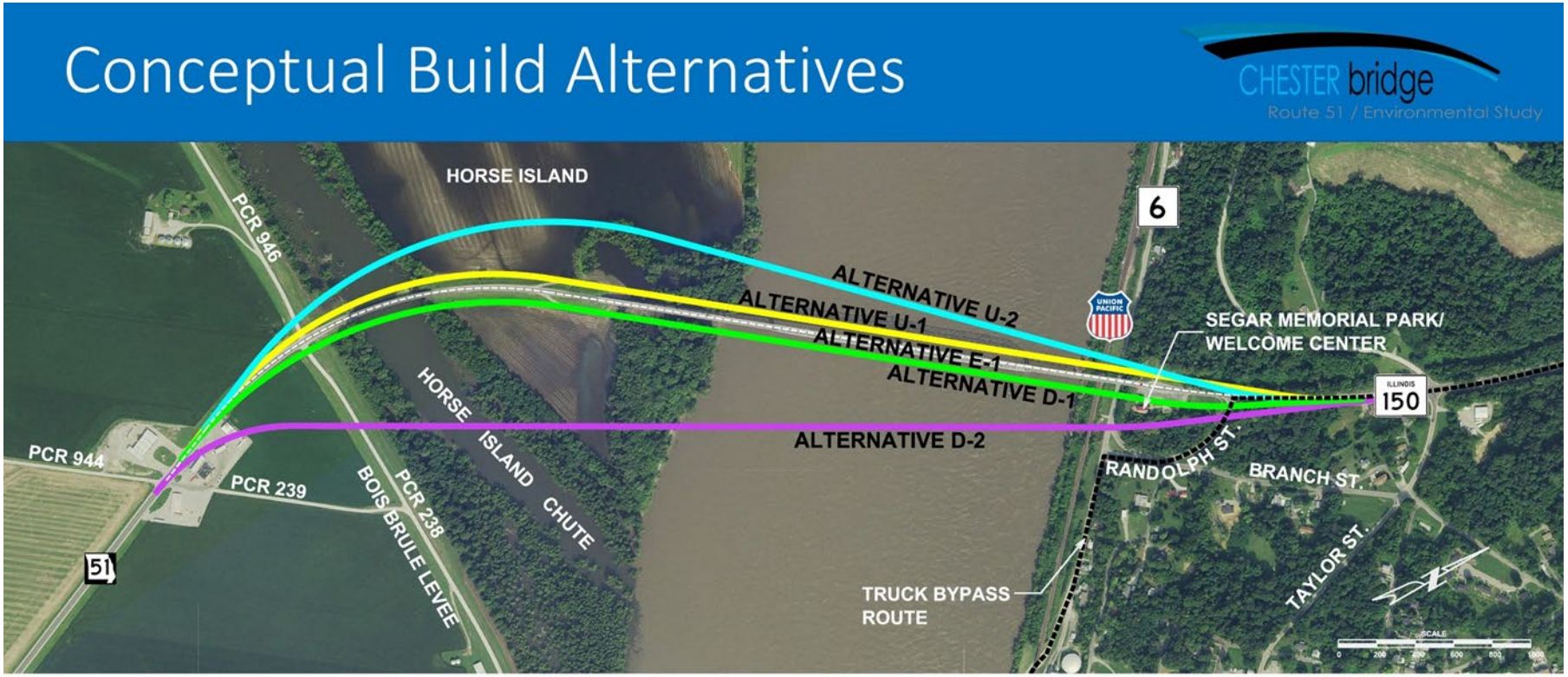


Figure 2-3. Conceptual Build Alternatives

1

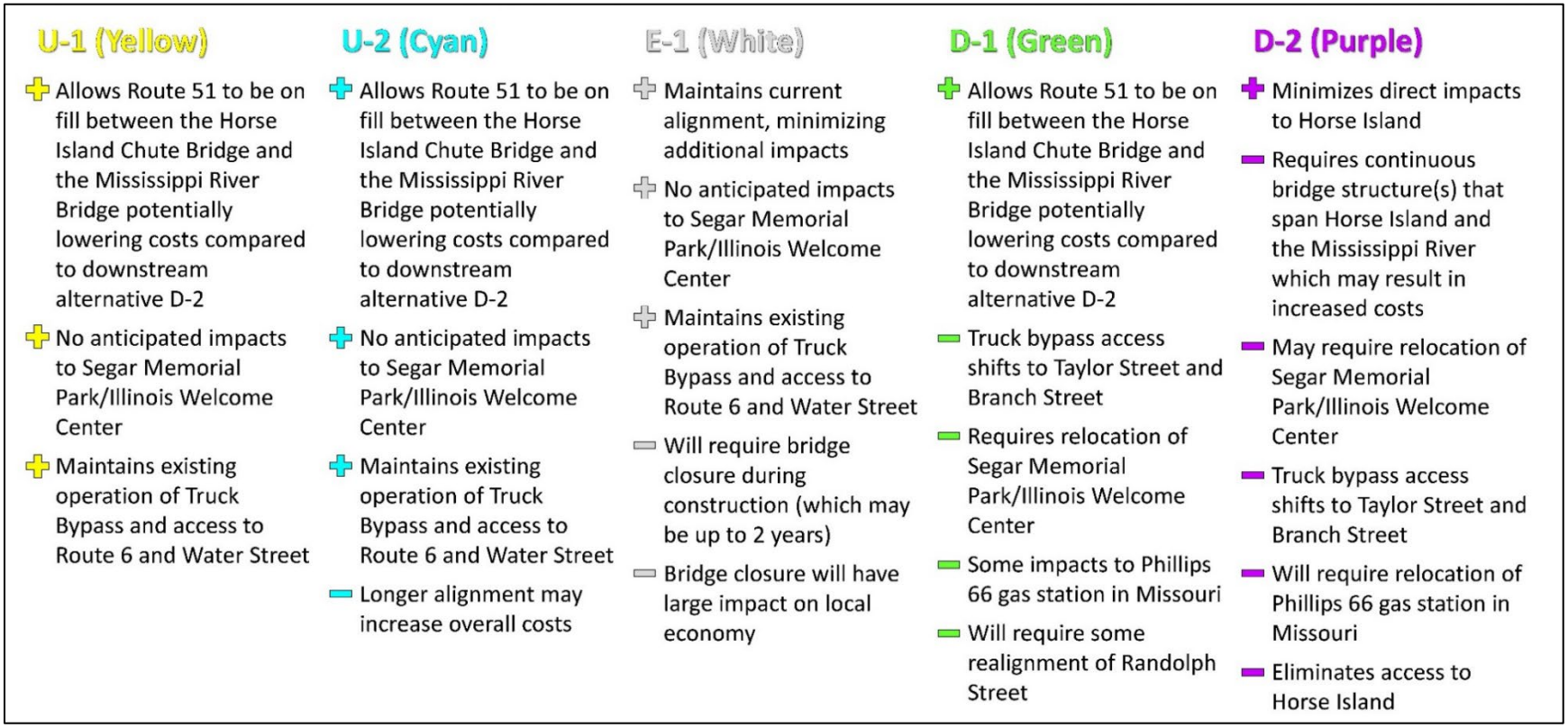


Figure 2-4. Legend of Conceptual Build Alternatives Presented at Public Involvement Meeting (August 24, 2017)

2.2 Screening of the Conceptual Alternatives

To determine the Conceptual Alternatives to advance for further study, a screening, based on the Purpose and Need, was conducted.

This screening determines how well a Conceptual Alternative satisfies the Purpose and Need. Only those Conceptual Alternatives that satisfy each element of the Purpose and Need can be considered a Reasonable Alternative. To determine the potential for each alternative to meet the project Purpose and Need, screening criteria and performance measures are developed. Screening criteria are specific topics that define the Purpose and Need elements. Performance measures define how well an alternative succeeds at accomplishing the evaluation criteria.

Section 2.2.1 summarizes the screening criteria and performance measures. **Section 2.2.2** summarizes the results of the screening. **Table 2-5** presents a graphic representation of the screening. **Section 2.2.4** presents the design life impacts. **Section 2.2.4** provides supplemental data used in the evaluation of the Conceptual Alternatives. Finally, **Section 2.2.5** identifies Reasonable Alternatives/Alternatives to be Carried Forward.

2.2.1 Screening Criteria and Performance Measures

To determine the potential for each alternative to meet the project Purpose and Need, screening criteria and performance measures were developed.

2.2.1.1 Criteria for Evaluating Design Standards

The current bridges are very narrow with no shoulders. Many modern design standards are not incorporated into the bridges. This condition creates safety issues and degrades the functionality of the bridges.

To determine if an alternative can satisfy this Purpose and Need element, two screening criteria and three performance measures were used (**Table 2-1**). These performance measures examined whether important design standards, such as lane width, shoulders, and bicycle/pedestrian facilities, could be provided.

Any New Build Alternative can be designed to accomplish these measures. However, the No-Build Alternative and the Rehabilitate the Existing Bridge Alternative will accomplish none of these measures.

2.2.1.2 Criteria for Evaluating Condition

The poor condition of the current bridges is such that both bridges require continual maintenance, resulting in substantial expense and periodic closures.

To determine if an alternative can satisfy this Purpose and Need element, two screening criteria and five performance measures were used (**Table 2-1**). These performance measures examined whether important standards, such as deck/superstructure/foundation condition, life span, and seismic/carrying capacity limits could be provided.

Any new build alternative can be designed to accomplish these measures. The No-Build Alternative can accomplish few of these measures. The Rehabilitate the Existing Bridge Alternative can theoretically accomplish most of these measures, although it might require a near complete reconstruction to accomplish some of these measures.

Table 2-1. Conceptual Alternative Screening Criteria Matrix

Purpose	Screening Criteria	Performance Measures	No-Build	Rehabilitate Existing Bridges	Upstream Alternatives		E-1: New Bridge at Existing Location	Downstream Alternatives		Screening Summary
					U-2: Far North	U-1: Near North		D-1: Near South	D-2: Far South	
The Route 51 Bridges are too narrow for current design standards	Is the river crossing improved? Does it comply with current MoDOT Design Standards?	Are 12-foot lanes provided? (y/n)	N	N	Y	Y	Y	Y	Y	**All New Build Alternatives can be designed to satisfy current design standards**
		Are 8-10-foot shoulders provided? (y/n)	N	N	Y	Y	Y	Y	Y	
		Can bike/ped facilities be provided? (y/n)	N	N	Y	Y	Y	Y	Y	
The Route 51 crossing of the Mississippi River is in poor condition	Is the bridge condition improved? Does it comply with current MoDOT Design Standards?	Are the deck and superstructure improved to a good condition - 7 of 9? (y/n)	N	Y	Y	Y	Y	Y	Y	**All New Build Alternatives can be designed to satisfy current design standards. Rehabilitation of the existing structure is possible but may result in a virtual reconstruction.**
		Are the bridge foundations stable? (y/n)	Y	Y	Y	Y	Y	Y	Y	
		Is the anticipated lifespan of the proposed improvements greater than 25 years? (y/n)	N	N	Y	Y	Y	Y	Y	
		Is the load carrying capacity adequate? (y/n)	N	Y	Y	Y	Y	Y	Y	
		Are current Seismic Design Criteria met? (y/n)	N	Y	Y	Y	Y	Y	Y	
Route 51 is subject to flood-related closures	Is the gap in the Bois Brule Levee corrected?	Is the need for the existing temporary flood wall eliminated? (y/n)	N	N	Y	Y	Y	Y	Y	**Raising the height of the existing Route 51 is necessary to eliminate the need for the temporary flood wall.**
The Route 51 crossing is important to local and regional connectivity	Are important regional connections maintained?	Is the distance and spacing in relation to I-55 adequate? (y/n)	Y	Y	Y	Y	Y	Y	Y	**These performance measures are primarily regional, they require uninterrupted access to the river crossing and to the Route 3 Truck Bypass. The existing and downstream alternatives have difficulties satisfying these criteria.**
		Is the existing Truck Bypass route maintained? (y/n)	Y	Y	Y	Y	Y	N	N	
		Is access to Chester maintained? (y/n)	Y	Y	Y	Y	Y	Y	Y	
		Can construction be completed without closing the existing crossing for an extended period of time? (y/n)	Y	N	Y	Y	N	Y	Y	
	Are important local connections maintained?	Is access to Bois Brule Bottoms and Kaskaskia Island maintained? (y/n)	Y	Y	Y	Y	Y	Y	Y	**These performance measures are primarily local. Most of alternatives can provide/maintain access to these local resources.**
		Is access to the Mississippi River maintained? (y/n)	Y	Y	Y	Y	Y	Y	Y	
		Can farm equipment access to Horse Island be provided from Route 51? (y/n)	Y	Y	Y	Y	Y	Y	N	
		Is farm equipment access to Bois Brule maintained? (y/n)	Y	Y	Y	Y	Y	Y	Y	
		Is access to Menard Correctional Center maintained? (y/n)	Y	Y	Y	Y	Y	Y	Y	

2.2.1.3 Criteria for Evaluating Flood-Related Closures

There is a small gap in the Bois Brule Levee where the Horse Island Chute Bridge meets Route 51. To maintain the integrity of the levee, a temporary flood wall is installed over the road. The temporary flood wall closes Route 51 and the river crossings. To determine whether an alternative can satisfy this Purpose and Need element, a single screening criterion was used—whether the gap in the Bois Brule Levee will be corrected.

The performance measure is simply whether the need for the existing temporary flood wall is eliminated.

Any new build alternative can be designed to accomplish this measure. However, neither the No-Build Alternative nor the Rehabilitate the Existing Bridge Alternative will satisfy this criterion.

2.2.1.4 Criteria for Evaluating Local and Regional Connectivity

The existing bridge system provides locally important roadway connections. Because of the distance to other river crossings, for all practical purposes, the Chester and Horse island Chute bridges provide the only available access to these connections. These connections will need to be accommodated in appropriate ways. To determine if an alternative can satisfy the needs of local connectivity, five performance measures were used (**Table 2-1**). These performance measures examined whether access to important local resources (Mississippi River, Horse Island, Bois Brule, Menard Correctional Center, and the Route 3 Truck Bypass) could be maintained or accommodated.

The current bridges are also important to regional connectivity within southeast Missouri and southwest Illinois. To determine if an alternative can satisfy the needs of regional connectivity, three performance measures were used (**Table 2-1**). These performance measures examined whether access to important regional resources (I-55/Chester/Bois Brule Bottom and Kaskaskia Island) could be maintained/ accommodated. The ability to maintain the crossing during construction was also considered.

The No-Build and the two Upstream Alternatives (U-1 and U-2) can satisfy all of these performance measures. The Rehabilitate Existing and New Bridge at Existing Location alternatives (No-Build and E-1) cannot construct a new bridge without closing the existing crossing for an extended period. The two Downstream Alternatives (D-1 and D-2) cannot maintain the existing Truck Bypass. Additionally, Alternative D-2 cannot provide farm access to Horse Island.

2.2.2 Summary of the Purpose and Need Screening

The Conceptual Alternatives are remarkably successful at addressing the transportation problems associated with the Chester Bridge crossing. As shown on **Table 2-1**, even the poorest operating Conceptual Alternatives—those that retain the existing structure (No-Build and Rehabilitate Existing)—satisfy the majority of the Purpose and Need performance measures:

- The No-Build Alternative satisfies 56 percent of the performance measures (10 of 18). However, it cannot satisfy any of the performance measures associated with addressing the operational issues caused by the bridge's narrow lanes. Further, it does not address the condition issues of the existing bridge. Neither can it eliminate the need for the temporary flood wall along Route 51. Conversely, it does maintain the existing access pattern.
- The Rehabilitate the Existing Bridge Alternative satisfies 63 percent of the performance measures (12 of 19). Compared to the No-Build Alternative, this alternative has the advantage of possibly allowing for the improvement of some of the condition issues of the existing bridges and the disadvantage of requiring the closure of the crossing to do this work. Also, this alternative does not eliminate the need for the temporary flood wall along Route 51.

As part of a hybrid approach, such as one part of a one-way couplet configuration, it may be possible to use the existing bridge, satisfy Purpose and Need, and maintain the historic integrity of the existing bridge.

The Build Alternatives are vastly more successful at satisfying the Purpose and Need performance measures. These alternatives can be designed to satisfy all, or nearly all, of the performance alternatives:

- The Upstream Conceptual Alternatives (U-1 and U-2) satisfy all (100 percent) of the performance measures.
- The Downstream Conceptual Alternatives (D-1 and D-2) satisfy 95 and 89 percent, respectively, of the performance measures. However, the Downstream Alternatives may require substantial revisions to the Truck Bypass. These alternatives run between the Truck Bypass and Segar Memorial Park. In addition to horizontal alignment issues, there is a large increase in elevation between the riverfront and bluff portions of the Truck Bypass (roughly 60 to over 850 feet). While the Truck Bypass is an essential feature of the project, it cannot be maintained in its existing form under these alternatives. Improving the Truck Bypass will require work beyond the logical termini and study area and will result in impacts along an existing residential street. Segar Memorial Park is also an important resource that would be impacted (**Section 2.2.3.1**). Conceptual Alternative D--2 also fails to provide farm equipment access to Horse Island.
- A new bridge along the existing location (**Conceptual Alternative E-1**) can satisfy all the performance measures, but it requires the long-term closure of the crossing. Because of the duration of the closure and length of the detour, this is considered a fatal flaw.

2.2.3 Design Life Impacts

In accordance with AASHTO guidance (2014), the design life for the bridges is 75 years. The new Build Alternatives (U-1 and U-2) can satisfy this requirement. The couplet alternative (R-2) will not be able to satisfy this requirement.

To maintain the historic integrity of the existing bridges, a rehabilitation would need to retain the characteristics of the bridge's original design, materials, and workmanship. Preliminary structural investigations have led to the conclusion that the rehabilitation would be quite expensive and result in a bridge with a shorter operational life. During the evaluations of possible rehabilitations, 15- and 50-year rehabilitations were studied. The 50-year rehabilitation seems unlikely to result in bridges that would retain their historic integrity. While the 15-year rehabilitation is more likely to retain historic integrity, it is not considered a reasonable/cost-effective alternative. In either case, a 75-year design life for the existing bridges is not practically obtainable.

According to the project's traffic analysis, the project is expected to have no meaningful impact on traffic volumes or vehicle mix. This operational analysis used the Highway Capacity Software (HCS). The traffic analysis was performed for the existing condition, for the construction year (2022) and for the design year (2042). The design year traffic analysis included the No-Build Alternative and the Reasonable Range of Build Alternatives:

- **Existing year (2017):** average annual daily traffic (AADT) of 6,768, Peak Hour Percentage of 7.70
- **Construction year (2022):** AADT of 6,974, Peak Hour Percentage of 7.70
- **Design year (2042):** AADT of 7,705, Peak Hour Percentage of 7.70

The HCS Rural Two-Lane analysis used a performance measure of Percent Time Spent Following to determine that the level of service for Route 51/151 is C.

2.2.4 Additional Considerations Regarding the Conceptual Alternatives

Because of the success of the Build Alternatives, it was appropriate to examine other important impacts that are reasonably associated with the Conceptual Alternatives.

Figure 2-5. Popeye Statue at Segar Memorial Park

2.2.4.1 Segar Memorial Park and Section 4(f)

The Segar Memorial Park/Illinois Welcome Center is located on the south side of IL Route 150, immediately after the Chester Bridge. Elzie C. Segar is the creator of Popeye, and Chester is his birthplace and early home. Segar is said to have modeled many of the Popeye characters after real residents of Chester. In 1977, a 6-foot bronze statue of Popeye was dedicated in Segar Memorial Park. The park is owned and administered by the City of Chester. It is included in the City's roster of recreational amenities. Onsite is a scenic overlook, picnic tables, and a tourist center. In addition to its status as a locally important recreational resource, the 3-acre park is also a Section 4(f) resource; see **Figures 2-5, 2-6, 2-7,** and **2-8**.

A Section 4(f) property is any publicly-owned land of a public park, recreational area, or wildlife and waterfowl refuge of national, state, or local significance, or land of a historic site of national, state, or local significance (public or private). A transportation project approved by FHWA **may not** use a Section 4(f) property except as defined in 23 CFR 774.

Figure 2-6. Segar Memorial Park with IL Route 150 in Foreground

The Downstream Alternatives (D-1 and D-2) are very likely to require the use of land from the Segar Memorial Park. **Figures –2-6 through 2-9** depict the important elements of the Segar Memorial Park and proximity of the Conceptual Alternatives. Based on this depiction, it is likely that the Near Downstream Conceptual Alternative(D-1) will displace the park's decorative fencing, picnic areas, parking, Popeye statue, and perhaps the Welcome Center/scenic overlook patio. The Far Downstream Conceptual Alternative (D-2) will nearly bisect the park property. While Alternative D-2 might avoid the displacement of the existing park amenities, the post-project configuration of the park will change dramatically. It is unlikely that the bridge's access to the park will come directly from the bridge. It is more likely that visitors will be routed around to the existing entrance on existing IL Route 150. A further complication is the elevation change that occurs within the Truck Bypass at this location. The Segar Memorial Park sits on a promontory above the river. The Truck Bypass goes from the low elevation of the riverfront (380 feet) to the higher elevation that intersects with IL Route 150 (440 feet) around this promontory.

This short segment (850 feet) of the Truck Bypass is on a 7 percent slope. Given this slope, reconnecting the Truck Bypass, IL Route 150, and the associated local roads (Third Street and Branch Street) will be difficult. These conditions will also be challenges within the context of Section 4(f).

Further, because other alternatives satisfy all, or nearly all, of the Purpose and Need performance criteria, there are other feasible and prudent avoidance alternatives. Consequently, continuing consideration for the Downstream Alternatives (D-1 and D-2) appears unnecessary.

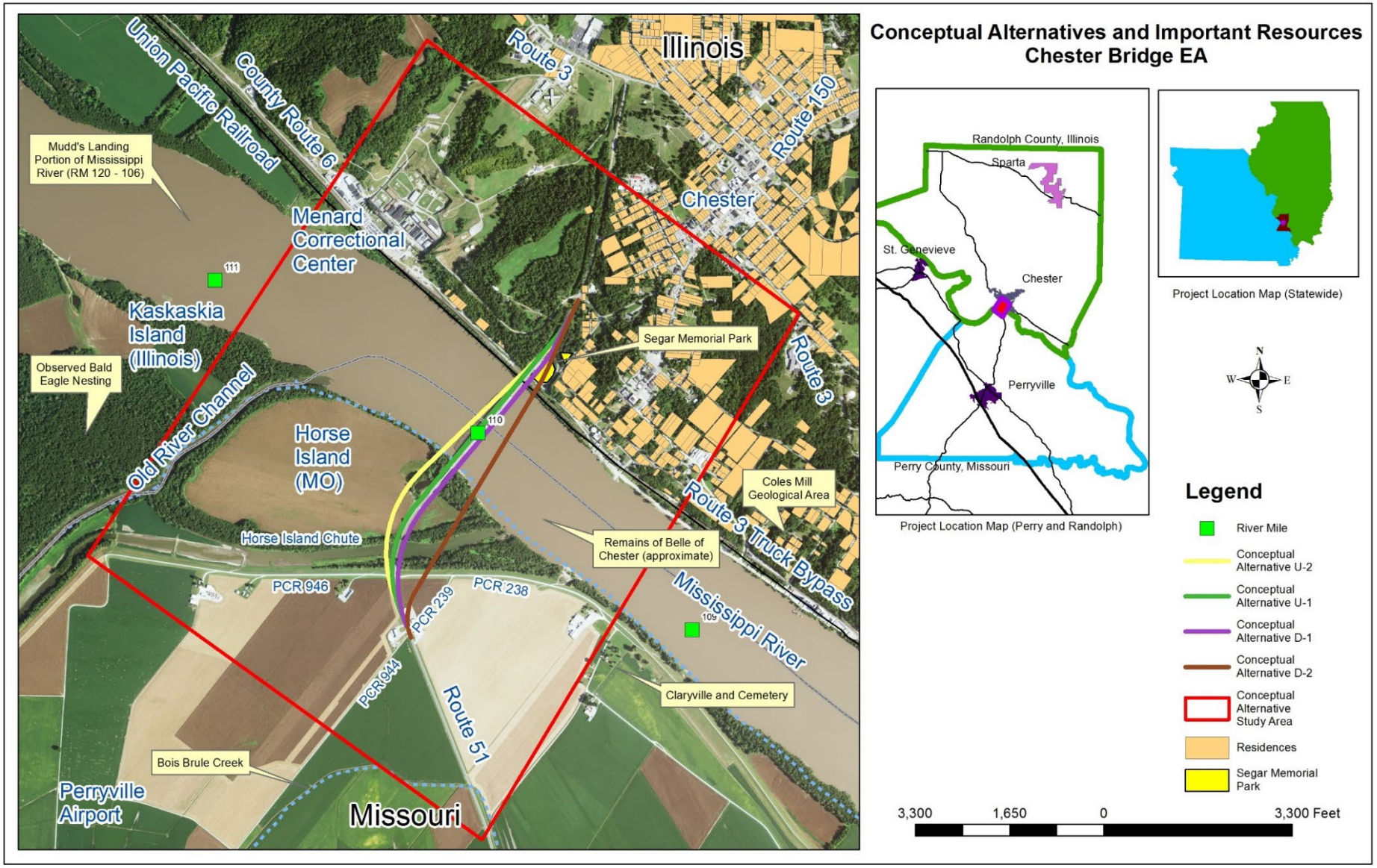


Figure 2-7. Conceptual Alternatives and Important Resources

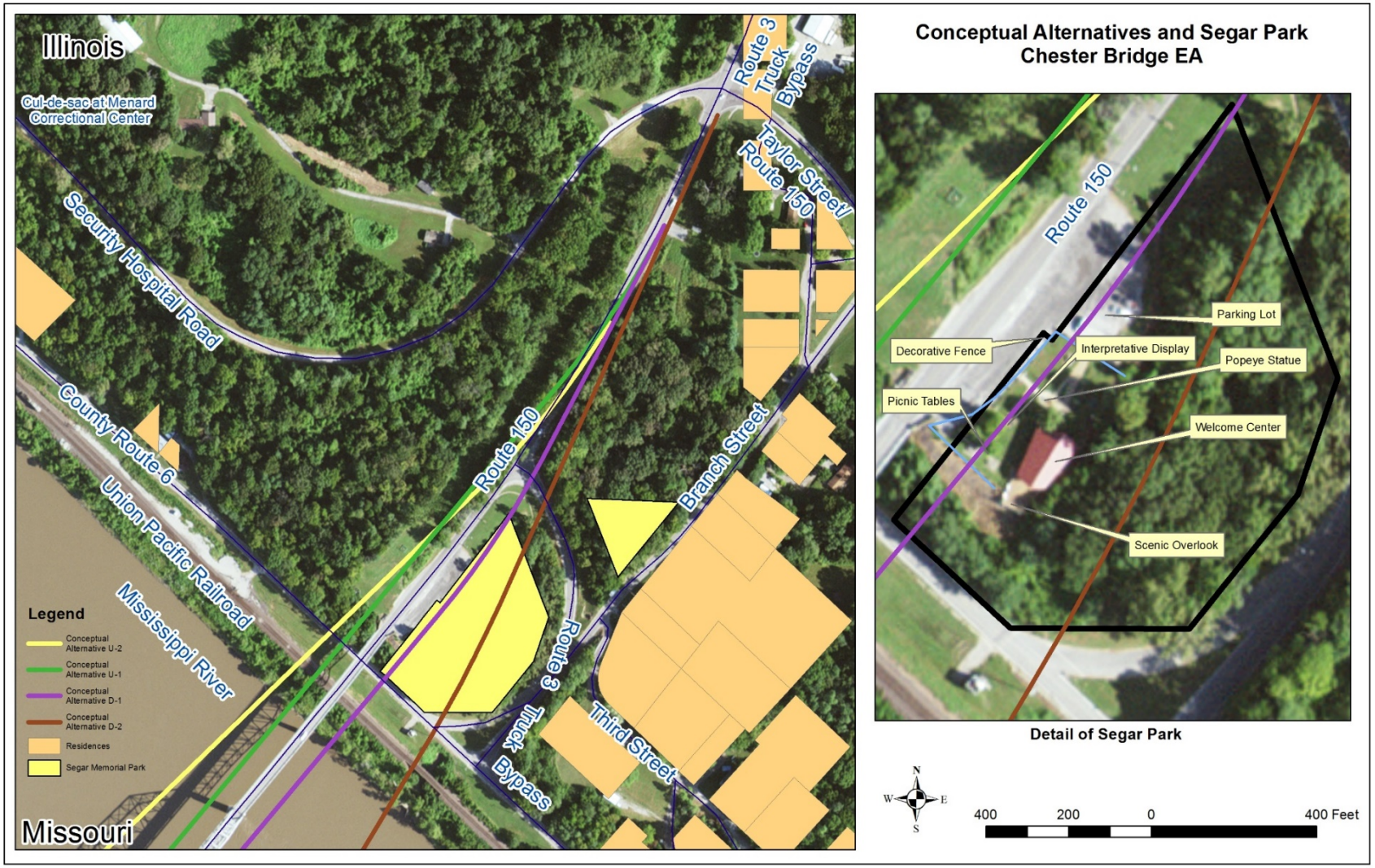


Figure 2-8. Conceptual Alternatives and Segar Memorial Park

2.2.4.2 Reuse of Existing Bridges

Interest in the reuse of the existing bridges for aesthetic, recreational, and bicycle/pedestrian purposes has been expressed during the public involvement process. Pursuant to MoDOT policy, the existing Chester Bridge was made available for donation. Proposals for the reuse of the Chester Bridge were due by December 31, 2018; however, no proposals were submitted by the deadline. The Horse Island Chute Bridge was given an exemption from the marketing requirement. It is a bridge type that is aesthetically not likely to be selected for relocation and its existing location in a notch of the Bois Brule Levee means project's Purpose and Need could not be met while the Horse Island Chute Bridge remains in place. Finally, this bridge is eligible for the National Register of Historic Places under Criterion A for Commerce. Relocation of the bridge would remove the bridge from its association.

Both of the existing bridges are eligible for the NRHP. While the reuse of the bridges, on their own, will not satisfy the Purpose and Need of the project, pairing it with another crossing in a one-way couplet configuration could. As discussed in **Section 2.2.3,** a preliminary structural investigation concluded that the rehabilitation would be quite expensive and result in a bridge with a shorter operational life. During the evaluations of possible rehabilitations, 15- and 50-year rehabilitations were studied. The 50-year rehabilitation seems unlikely to result in a bridge that would retain the bridge's historic integrity. While the 15-year rehabilitation is more likely to retain the bridge's historic integrity, it is not considered a reasonable/cost-effective alternative. In either case, a standard 75-year design life for the existing bridge is not practically obtainable. Other negative aspects of Alternative R-2 include navigation safety, a longer construction schedule, expense, extensive falsework in the river, potential aviation conflicts, and the retention of the roadway gap in the Bois Brule Levee.

These flaws led to the conclusion that the bridges meet all of the applicability criteria set forth in the Nationwide/Programmatic Section 4(f) Evaluation for Projects that Necessitate the Use of Historic Bridges. Principally, the determination was made that the problems associated with Alternative R-2 represent a condition whereby the bridges are seriously deficient geometrically and cannot be widened (horizontally and/or vertically) to meet the minimum required capacity of the highway system on which they are located without affecting the historical integrity of the bridge.

2.2.4.3 Pipeline

A pipeline is attached to the up-stream side of the existing Chester Bridge as shown in **Figure 2-9**. This pipeline is owned by Energy Transfer Partners (ETP). It is currently not being used. Movement of gas from Missouri to Illinois is handled via a different pipeline, downstream of the Chester Bridge. Coordination with ETP determined that there are no plans to replace the Chester Bridge pipeline onto a new bridge; consequently, this issue is deemed to be resolved.

Figure 2-9. Gas Pipeline on Existing Bridge

2.2.4.4 Wetland Impacts

Wetland resources are protected by the Clean Water Act. Nearly all of Horse Island south (downstream) of the existing bridge is wetlands. Upstream, the wetlands form a relatively narrow rim along the periphery of the island. Therefore, the use of the Upstream Alternatives (U-1 and U-2) will minimize wetland impacts.

2.2.4.5 Need to Close Crossing during Construction

Maintenance of traffic across the river during construction is essential. A new bridge along the existing location (Replace along Existing Conceptual Alternative [E-1]) and the Rehabilitate the Existing Bridge Alternative cannot maintain this link. Because the closure would be several years long, this is considered a fatal flaw.

2.2.4.6 Other Emerging Environmental Issues

As the National Environmental Policy Act (NEPA) process continues, more detailed environmental studies were conducted. The results of these studies resulted in the following findings:

- The Mudd's Landing Illinois Natural Area Inventory (INAI) site (INAI Site 1307) occurs within the Mississippi River between river miles 120 and 106. **Figure 2-10** depicts the INAI site within the Chester Bridge study area.
- Records of other endangered species, such as the pallid sturgeon (*Scaphirhynchus albus*), are also known for the Mississippi River.
- The Coles Mill Geological Area is located just outside the study area in Chester.
- Bald eagle nesting was observed on Kaskaskia Island near, but outside, the study area.
- The historic town of Claryville is located south of the current bridge. A cemetery is located near the study area.
- The remains of the ferry *Belle of Chester* are located in the river (downstream of the bridge). Reports note that the remains of the ferry have been seen at low water.

These conditions informed the configuration of alternatives as the study moved forward. These resources validate the use of alternatives in the general vicinity of the existing crossing.

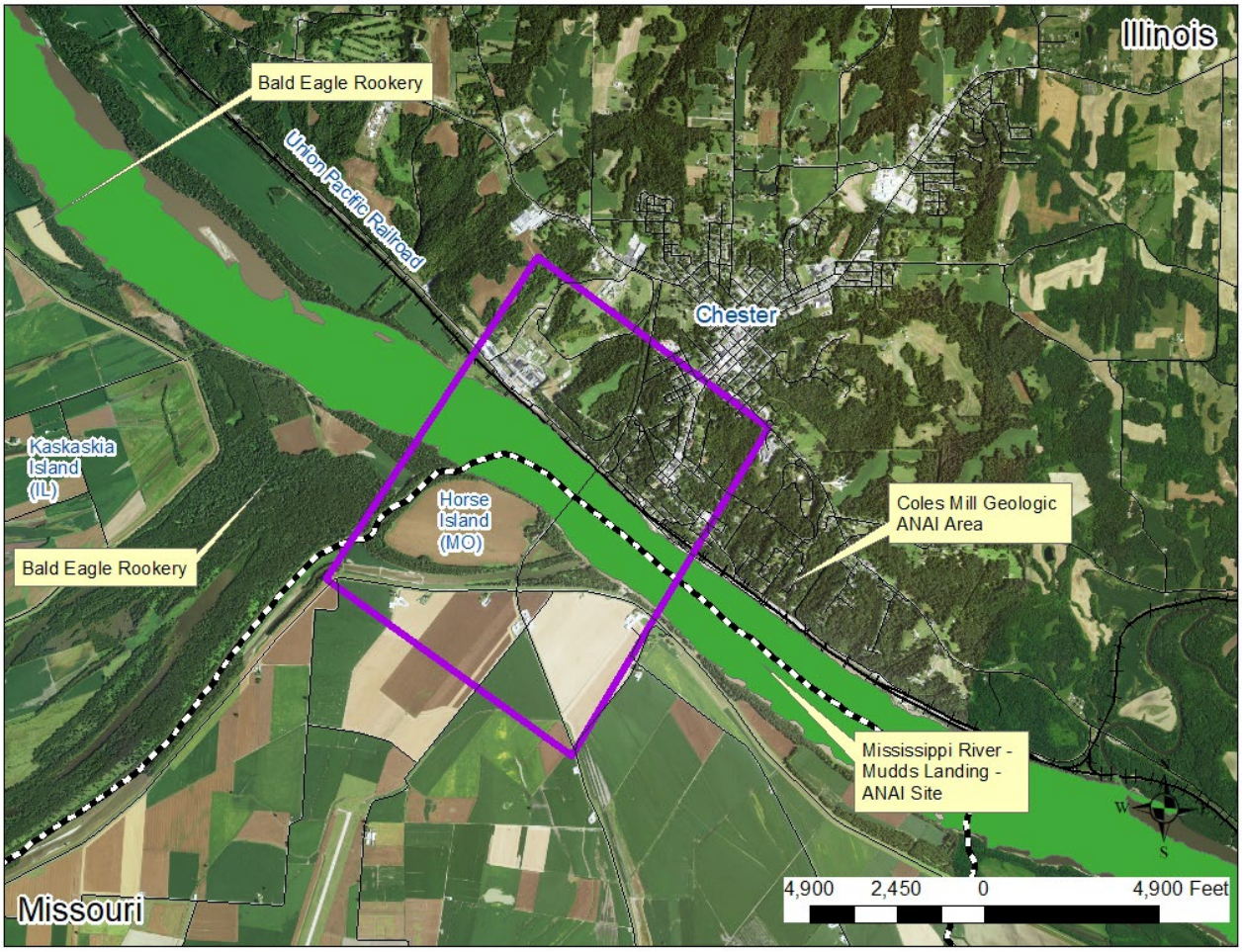


Figure 2-10. INAI Review Map

2.2.5 Reasonable Alternatives/Alternatives to be Carried Forward

Based on the results of the Screening Criteria, the new build Conceptual Alternatives U-1 and U-2 are recommended for further consideration. These alternatives satisfy all 19 of the project's performance measures.

Even though the other new build Conceptual Alternatives satisfy many of the performance measures because there are alternatives that satisfy all, these alternatives are not recommended for further consideration. Additionally, these alternatives have obvious difficulties. The downstream alternatives are likely to negatively impact the Truck Bypass, wetlands, and the Segar Memorial Park. These impacts may force property acquisitions and building displacements during the replacement of those resources. Further, Segar Memorial Park is a Section 4(f) resource, where impacts are generally prohibited when other reasonable and prudent alternatives are available. Because the Upstream Alternatives avoid these issues, it is prudent to narrow the Reasonable Alternatives to U-1 and U-2.

Based on the results of the Screening Criteria, the No-Build Alternative and the Rehabilitate the Existing Alternative are also recommended for further consideration. The rehabilitation of the existing bridges will be considered part of a one-way couplet configuration, using U-1 or U-2 for one direction of travel and rehabilitation of the existing bridges for the other direction of travel. The rehabilitation must be completed in manner that maintains the existing bridge's historic integrity.

2.3 Reasonable Alternatives

This section presents the Reasonable Alternatives emerging from the conceptual alternative evaluation. The configurations discussed in **Section 2.2** were further developed and refined based on more detailed engineering analysis and known constraints. This allowed for the establishment of preliminary study footprints and, in turn, for detailed impact assessments, cost estimates, and traffic evaluations. The Reasonable Alternatives were updated based on more detailed design studies to further avoid and minimize environmental impacts and to optimize engineering design and constructability.

Reasonable Alternative U-1 (Near Upstream Conceptual Alternative) was refined to enhance constructability of the roadway embankment adjacent to the existing roadway approaching the Chester Bridge on the Missouri side of the river. Shifting the alignment approximately 75 feet farther upstream ensures that that the existing roadway could remain operational during construction of the new embankment and roadway while avoiding the need for any temporary shoring. Other minor refinements simplify the proposed roadway curvature as it ties into the existing roadway west of Taylor Street in Illinois and to complete connections for intersecting roadways at PCR 946/238 in Missouri and Randolph Street in Illinois.

Reasonable Alternative U-2 (Far Upstream Conceptual Alternative) was refined minimally to simplify the curvature of the proposed roadway as it ties into the existing Route 150 west of Taylor Street in Illinois and to complete connections to the proposed roadway at PCR 946/238 in Missouri and Randolph Street in Illinois.

The Rehabilitate the Existing Alternative (R-2) uses a one-way couplet configuration (where a modified version of U-1 or U-2 is used along with the existing Mississippi River bridges rehabilitated while maintaining their historic integrity). This alternative can eliminate the need to close the crossing during the rehabilitation work. However, it does not eliminate the need for the temporary flood wall along Route 51.

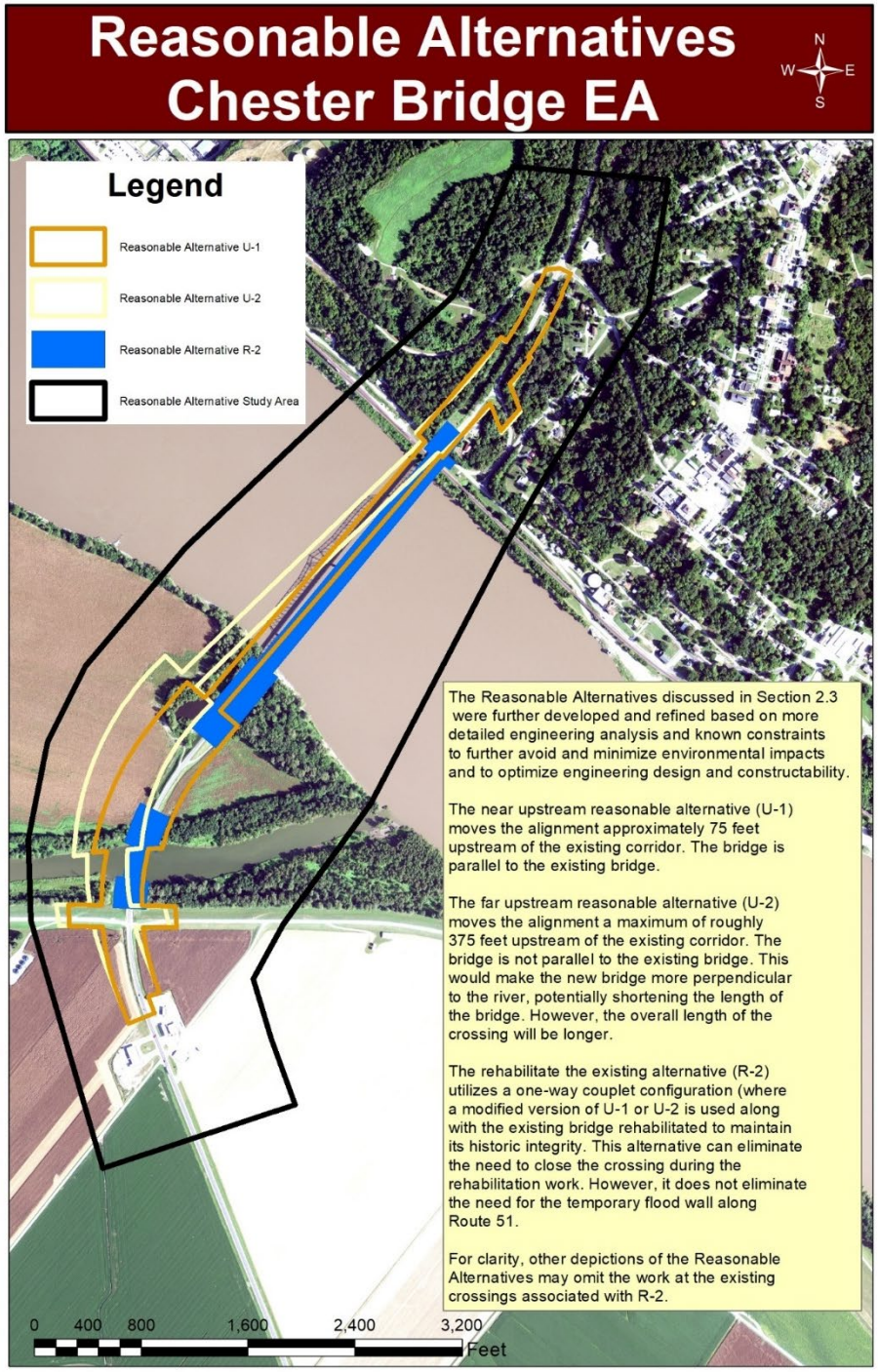
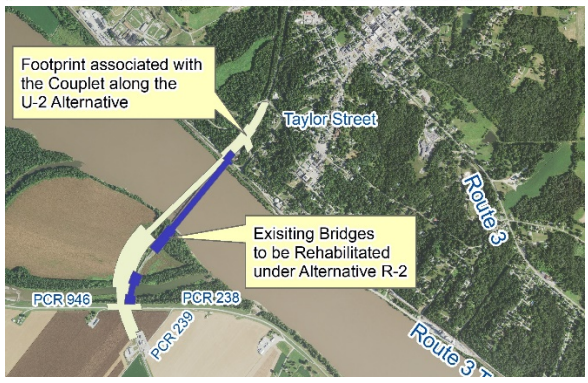


Figure 2-11. Reasonable Alternative Impact Footprints



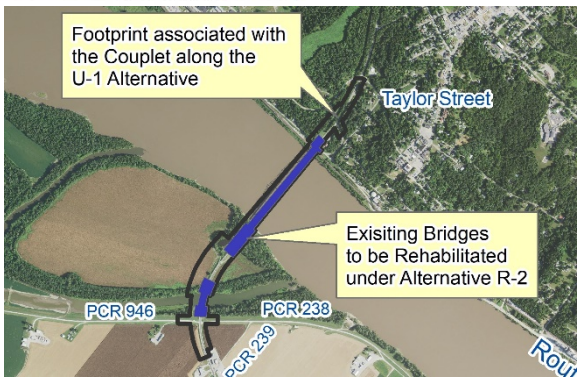


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Figure 2-11 depicts the footprints of the modified configurations. The preliminary footprints were developed to determine the physical area required to construct the Reasonable Alternatives, including anticipated right-of-way and temporary and permanent easements, and accounting for the width of the proposed roadway, embankments, stormwater drainage and conveyance, and roadway connections. Using the alignments of the Reasonable Alternatives and a preliminary profile that is anticipated to meet the clearance requirements for likely bridge structure types, the roadway typical section, embankment slopes, and drainage features were used to define approximate construction limits. Based on these limits and a reasonable buffer width to accommodate further engineering refinements, future design, and eventual construction, a preliminary footprint was developed for each segment of the alternatives.

2.3.1 Bridge-Type Considerations

While this project will not ultimately select a bridge type within the NEPA Preferred Alternative, the span lengths and design criteria do limit the types of bridges that would be broadly suitable at this location. The primary design criterion that affects bridge type is minimum horizontal clearance. According to coordination with the U.S. Coast Guard (USCG), the Mississippi River span width should be a minimum of 800 feet for the main navigation channel (IL side) and a minimum of 500 feet for the axillary navigation channel (Missouri side). The existing main and auxiliary span widths are 650 feet for the both navigation channels. The minimum main span length is quite long and is a limiting factor for bridge-type suitability. **Figure 2-12** depicts the potential bridge types that appear suitable for the project and the existing bridge configuration, which are described as follows:

Because vertical clearances can affect navigation and bridge height can affect aviation, agency coordination with the USCG and the Federal Aviation Administration will be necessary to establish an appropriate Environmental Commitment to balance bridge height and vertical clearance considerations associated with the ultimately selected Preferred Alternative.

- Tied arch – A tied-arch bridge is an arch bridge for which the outward-directed horizontal forces of the arch(es) are borne as tension by a chord tying both arch ends, rather than by the ground or the bridge foundations.
- Continuous through truss – A continuous-truss bridge is a truss bridge that extends without hinges or joints across three or more supports. A continuous-truss bridge may use less material than a series of simple trusses because a continuous truss distributes the weight of vehicles on the bridge across all the spans. Continuous-truss bridges rely on rigid truss connections throughout the structure for stability.
- Cable Stay – A cable-stayed bridge has one or more towers from which cables support the bridge deck. A distinctive feature is the cables that run directly from the tower to the deck, normally forming a fan-like pattern or a series of parallel lines.
- Extradosed – An extradosed bridge employs a structure that combines the main elements of both a prestressed box girder bridge and a cable-stayed bridge. The name refers to how the stay cables are designed. An extradosed bridge uses shorter stay-towers and a shallower deck structure. This results in a look of a fan of low, shallow-angle stay cables.
- Segmental – A segmental bridge is a bridge built in short sections as opposed to traditional methods that build a bridge in very large sections. These bridges are very economical for long spans.
- Girder – A girder bridge uses girders as the means of supporting the deck. A girder bridge is very likely the most commonly built and used bridge in the world. Its basic design, in the most simplified form, can be compared to a log across a creek.

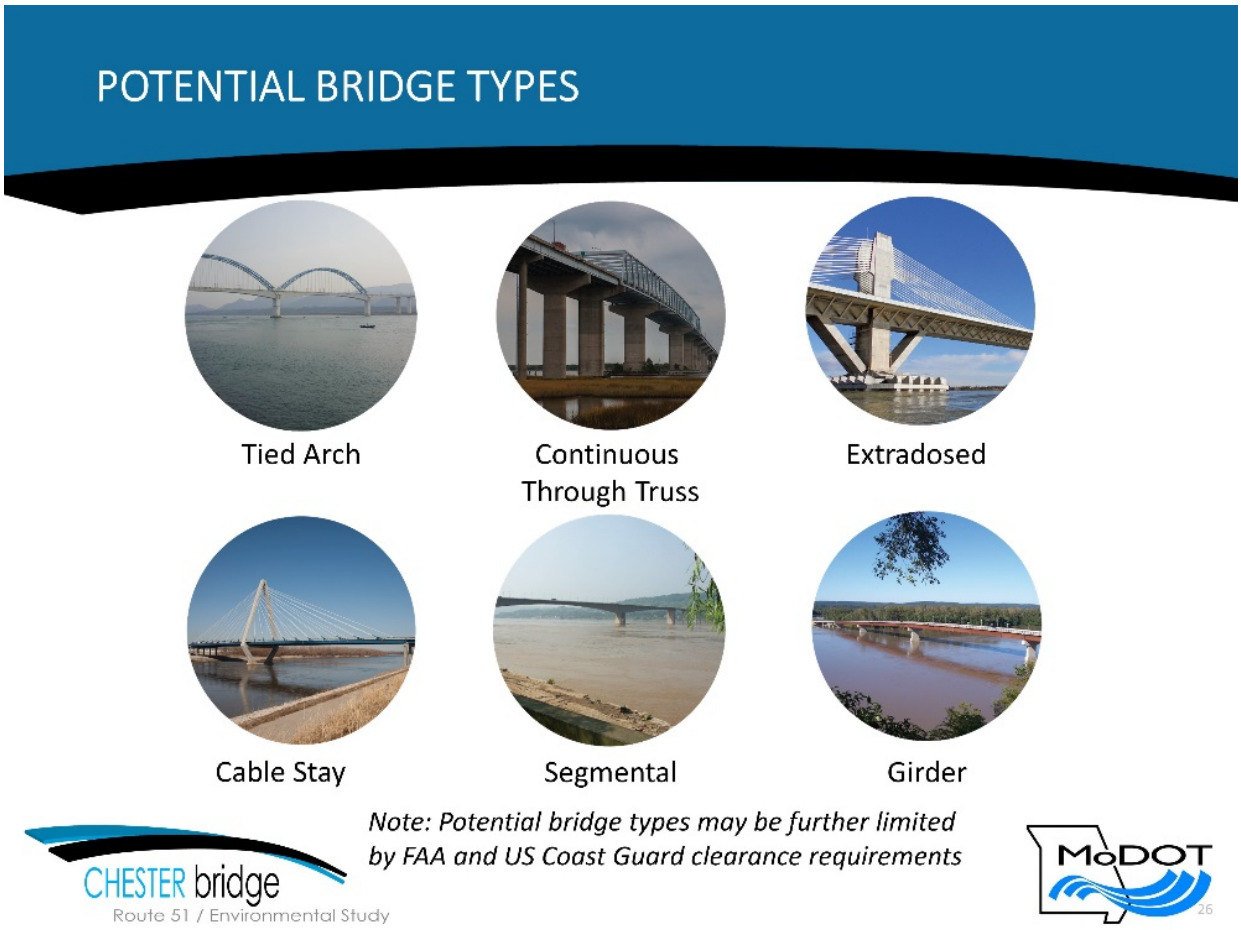

Figure 2-12. Potential Bridge Types

Neither of the Reasonable Alternatives (U-1 and U-2) have obvious shortcomings relative to the bridge types seen as potentially suitable to the conditions. The couplet alternative (R-2) would rehabilitate the existing bridges (while maintaining historic integrity); R-2 would be paired with a modified version of the Reasonable Alternatives (U-1 and U-2).

2.3.2 Tentative Preferred Alternative Recommendation

Based on the project's Purpose and Need, logical termini, study area, and Reasonable Alternatives, a Preferred Alternative emerged. This alternative, the Near Upstream Conceptual Alternative (U-1), best addresses the identified Purpose and Need of the project, connects at the logical termini, and once completed is expected to be nearly indistinguishable in alignment from the existing crossing.

The Tentative Preferred Alternative recommendation for the Chester Bridge project is the Near Upstream Conceptual Alternative (U-1), which connects at the logical termini and moves the crossing approximately 75 feet upstream of the existing corridor.

For both bridges, the bridge typical section is assumed to be 40 to 44 feet wide, with two 12-foot travel lanes and 8- to 10-foot shoulders. A 16.5-foot minimum vertical clearance is assumed to allow for most oversized loads and large farm equipment to cross the river without stopping traffic and provide room to maneuver during emergencies or to remove disabled vehicles from the travel lanes. The shoulders would allow bicyclists and pedestrians to cross the bridge without using the vehicular travel lanes. The shoulders would also allow bridge inspections to occur without restricting traffic.

The roadway typical sections are specified to match the bridge sections (40 to 44 feet wide, with two 12-foot travel lanes and 8- to 10-foot shoulders). Recently, the functional classification of Route 51 was changed from minor arterial to principal arterial, from Perryville to the Missouri/Illinois state line. The design speed and posted speed will be 45 miles per hour. Existing intersections and turns will be maintained in their current configurations. Direct access to the roadways for individual driveways will be maintained, to the extent possible.

Figure 2-13 depicts the Preferred Alternative. The following important elements are being carried forward with the Preferred Alternative:

- The Preferred Alternative satisfies all (100 percent) of the Purpose and Need performance measures.
- Based on the cost estimate conducted on the Conceptual Alternatives, Alternative U-1 (the Preferred Alternative) was the lowest-cost alternative.
- The Preferred Alternative can achieve the USCG's minimum horizontal clearance of 800 feet for the main navigation channel and a minimum of 500 feet for the auxiliary navigation channel.
- Since the demolition of the existing bridge could occur after a new bridge opens, it is possible that demolition could be timed to occur outside the busiest portion of navigation season.
- While the NEPA document will not select a bridge type, there are no obvious shortcomings relative to the bridge types seen as potentially suitable for the site. As a new build solution, a modern design that achieves hydraulic, seismic, traffic safety, and accessibility needs can be designed. The construction is expected to take 2 years.
- The Preferred Alternative would construct a new bridge immediately adjacent to the existing bridge, minimizing potential changes to the existing floodplain configuration. Regardless, an analysis of floodplain impacts, and a no-rise certificate will be required. The gap in the Bois Brule Levee can be eliminated.
- The Preferred Alternative represents a potential for aviation conflicts. Vertical clearances between the river and the bottom of the bridge can affect river navigation and bridge height can affect aviation; therefore, agency coordination with the USCG and the Federal Aviation Administration (FAA) was conducted to establish appropriate environmental commitment(s) to balance bridge height and vertical clearance considerations associated with the ultimately selected Preferred Alternative. Relative to aviation impacts, the alternatives located closest to the existing bridge location were deemed superior. See **Section 3.5.3** for more detailed discussion on aviation impacts. Consequently, Alternative U-1 presents the least potential for aviation conflicts.
- While the environmental impacts between Alternatives U-1 and U-2 are quite similar, the Preferred Alternative (U-1) is superior. Relative to visual impacts, Alternative U-1 will largely swap the existing bridge for a similarly scaled new bridge. Relative to farmland/habitat/land use impacts, Alternative U-1 will use a corridor immediately adjacent to the existing bridge, rather than a less altered new corridor. This corridor is farther downstream from known bald eagle nesting areas in the Mid-Mississippi Wildlife Refuge and mostly closely mimics the crossing on Horse Island. The anticipated wetland impacts under Alternative U-1 are fewer (3.2 versus 4.8 acres). Finally, U-1 impacts a smaller area of known archaeological resources. These are discussed in **Section 2.4**.

Appendix B contains impact matrices for the Reasonable Alternatives.

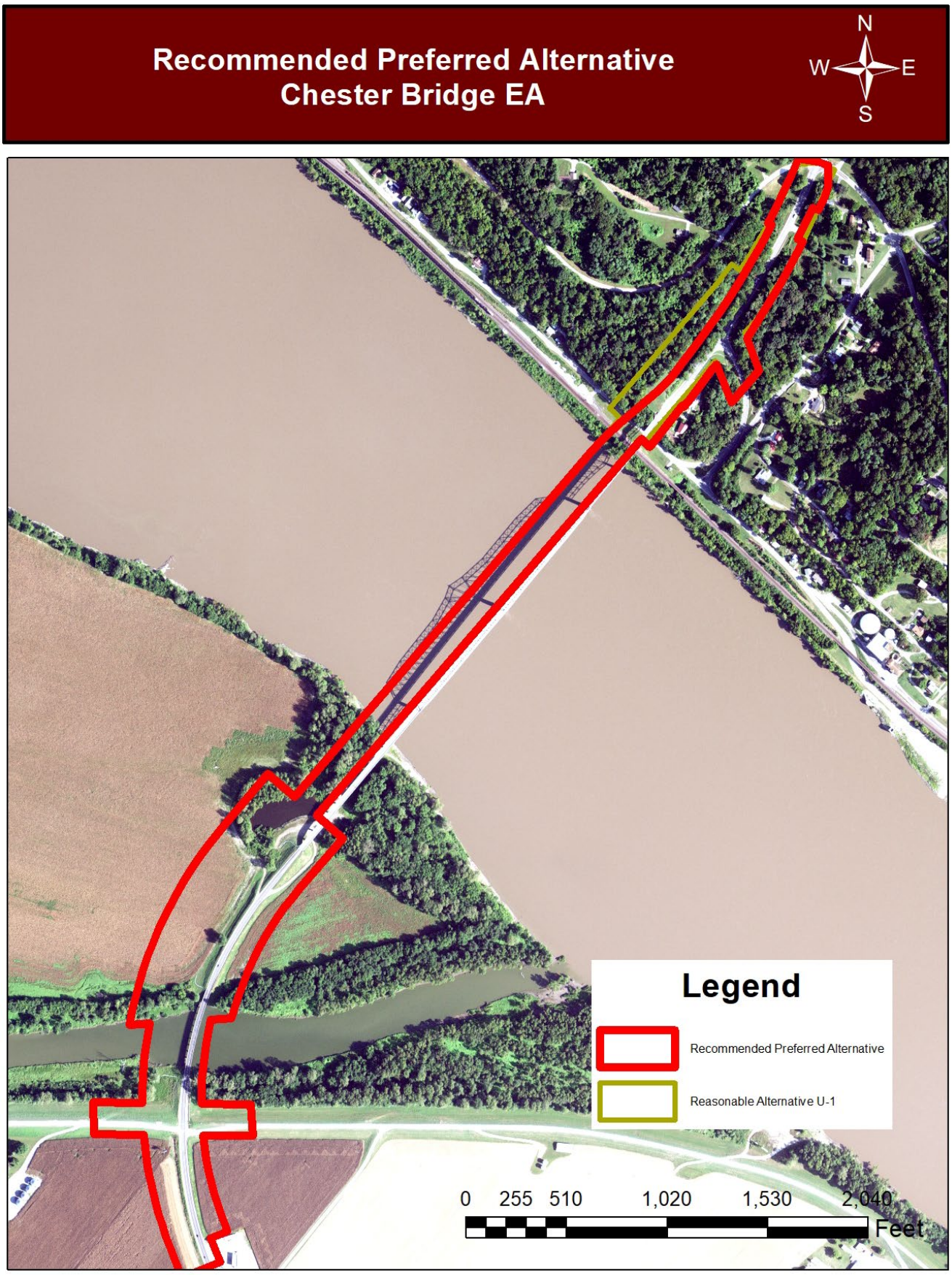

Figure 2-13. Recommended Preferred Alternative

2.4 Updated Preferred Alternative

The responsibility for cultural resource investigations was split between the states of Missouri and Illinois. In June 2018, IDOT produced a report documenting known archaeological resources in Illinois. No archaeological resources were identified in Missouri. **Section 3.6.1** discusses cultural resources.

An evaluation was conducted to investigate avoidance of cultural resources. Ultimately, proposed modifications were developed that would avoid impacts to the archaeological sites, while avoiding impacts to Segar Memorial Park and the Illinois Welcome Center. In order to accomplish this, the following alterations to the Preferred Alternative are proposed:

Based on coordination of the Tentative Preferred Alternative, the configuration was modified to avoid important resources. The changes incorporated into the Preferred Alternative are within the normal design ranges.

- A reverse curve was introduced on the Illinois approach of the Chester Bridge and extending into the end bridge spans. The main spans of the bridge are unaffected by this revision.
- Other engineering treatments were considered to reduce the roadside impact of the roadway section and avoid encroachment into the known archaeological sites. Such treatments may include rock-lining, which maintains stability while allowing construction of steeper slopes, construction of retaining walls, reducing or eliminating roadside drainage ditches, and others.

Figure 2-14 illustrates a combination of rock-lined slope and retaining wall to minimize impacts to known archaeological sites. While the actual constructed solution may vary from what is depicted on the figure, it will be an environmental commitment to minimize impacts to the archaeological sites. **Section 5** lists the project's environmental commitments. These improvements to the Preferred Alternative are reflected in **Figure 2-13**.

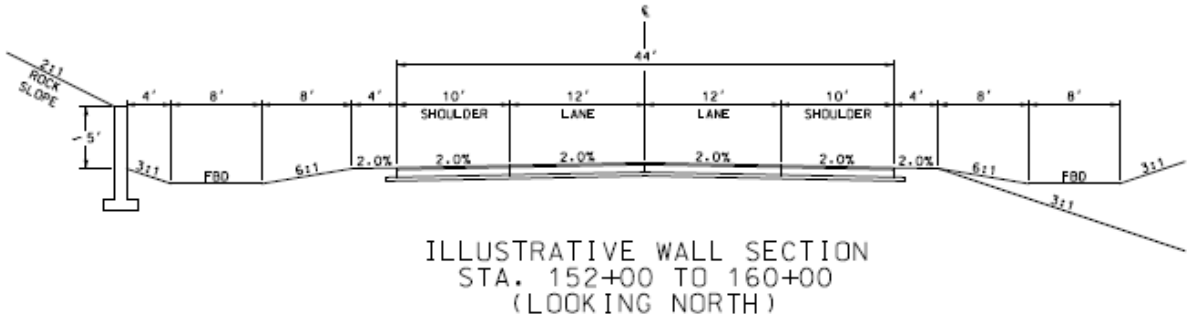

Figure 2-14. Cross-Section Showing Improvements to the Preferred Alternative

These changes also affect bridge costs. Construction costs increased due to the curvature in the end spans on the Illinois side of the river bridge. The total cost estimate for the updated Preferred Alternative is $195,800,000 in 2019 dollars. This is 2 percent higher than the original cost estimate. Every other configuration would also have to avoid impacts to the archaeological sites, while still avoiding the parcel that contains Segar Memorial Park and the Illinois Welcome Center.

SECTION 3

Affected Environment and Impacts

This section describes the regulatory framework, the affected environment, the impacts associated with the Reasonable Alternatives and the Preferred Alternative, and the identification of proposed mitigation/minimization/environmental commitments.

The discussion is organized by each resource of concern within the study area. The specific categories described are consistent with FHWA's Guidance for Preparing and Processing Environmental and Section 4(f) Documents (TA 6660.8A, October 30, 1987). The resources are arranged as follows:

1. Environmental/Pollution Impacts
    - Air Quality
    - Hazardous Materials
    - Noise
    - Visual Resources
2. Natural Habitat Impacts
    - Terrestrial Habitats
    - Geological Resources
    - Endangered and Threatened Species
3. Community/Socioeconomic Impacts
    - Demographics
    - Environmental Justice
    - Land Use
    - Socioeconomics
    - Travel Patterns
4. Aquatic Habitat Impacts
    - Floodplains
    - Hydraulics
    - Streams and Watersheds
    - Wetlands
    - Water Quality
5. Public Land Impacts
    - Section 6(f)
    - Section 4(f)
    - Aviation
    - Navigation during Operation
    - Traffic Safety and Accessibility Impacts
6. Impacts to the Human Environment
    - Cultural Resources
    - Farmlands
    - Construction Considerations
    - Right-of-Way and Relocations

Figures and exhibits are used in this text to help graphically depict the affected environment and impacts. Figures are graphics contained within the text. The figures generally show resources visible at a larger scale. When smaller-scale graphics were necessary, 11-inch-by-17-inch exhibits were used. **Appendix A** contains the exhibits.

MoDOT will implement all project and regulatory commitments, whether or not specifically delineated herein, after construction limits are determined. Federal authorization for construction will not be granted until the necessary regulatory obligations have been satisfactorily completed. Environmental commitments will be depicted as shown below and consolidated in **Section 5**.

- MoDOT will ensure that if revisions to the design or construction result in changes in impacts that were not evaluated in this EA, the document will be reevaluated to ensure the determinations and commitments remain valid.

This section also covers Direct effects, as well as Secondary and Cumulative Effects. **Direct effects** are caused by the project and occur at the same time and place. In other words, they are the impacts caused by the construction of the Preferred Alternative's bridges and roadways. The determination of direct impacts is the comparison of existing and future conditions.

This section will address several types of impacts:

- Direct effects are caused by the project and occur at the same time and place.
- Indirect (secondary) effects are caused by the specific project and are later in time or further removed.
- Cumulative impacts as the impacts on the environment that result from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of who undertakes such other actions.

The individual resource sections will also address the **Indirect effects** caused by the project but that occur later in time or are farther removed in distance than direct effects. These are often referenced to as secondary impacts and are generally the result of changes in land use attributable to the project such as induced growth and impacts on environmental resources that occur as a result of the project's influence on land use. The first step in the process for evaluating secondary impacts is to identify the sensitive resources to be analyzed for effects. Relative to secondary impacts, all of the Build Alternatives will generally replace existing infrastructure. The Preferred Alternative will replace the existing bridges with a similarly configured crossing of two bridges, approximately 75 feet north of the existing bridges. The Preferred Alternative provides the same access as the existing conditions while improving operations and safety. Consequently, secondary impacts are anticipated mostly from construction. Construction impacts are discussed in **Section 3.6.3**.

Further, **Cumulative effects** will also be addressed, as applicable to the project. According to FHWA, a cumulative impact includes the total effect on a natural resource, ecosystem, or human community, and the total of all impacts to a particular resource that have occurred, are occurring, and would likely occur as a result of past, present, and future activities or actions of federal, non-federal, public, and private entities. Relative to cumulative impacts, not all impacts tend to "accumulate;" that is, similar impacts from more than one project do not always add together and create a greater impact. Other resources may experience a minimal impact from each individual action, but when summed cumulatively, impacts from several actions experience greater effects. Important concepts to consider during a cumulative impact analysis is the Area of Influence and Reasonably Foreseeable Future Actions:

- The **Area of Influence** is defined by the National Cooperative Highway Research Program (NCHRP) Report 466, Desk Reference for Estimating Indirect Effects of Proposed Transportation Projects that "development effects are most often found up to one mile around a freeway interchange, up to 2 to 5 miles along major feeder roadways to the interchange." Based on this guidance, the Area of Influence was established as the area encompassing the City of Chester (in Illinois) and the portion of the Bois Brule Levee District westward to the Burlington Northern Railroad (in Missouri); see **Figure 1-3**. This includes the primary routes that provide access to the Chester Bridges.
- **Reasonably Foreseeable Future Actions** (RFFAs) are projects and developments currently anticipated in state, county, and city plans, known private development actions, and planned and funded roadway and other infrastructure projects in or within an Area of Influence. Reviews of planning documents and coordination with important governments, agencies, and businesses uncovered few major projects that would affect cumulative impacts of the project. In Missouri, the Southeast Missouri Regional Planning and Economic Development Commission projects several pavement improvements. The Perryville Airport reports no important improvements (see **Section 4.9** for coordination with the FAA), Glister-Mary Lee operates expanding plants on both

sides of the Mississippi River, and the Bois Brule Flood District proposes a series of maintenance-type improvements. In Illinois, the City of Chester has modest utility improvements, as do Randolph County and the Kaskaskia Regional Port District. None of the RFFAs are the result of the Chester Bridge EA. These actions are reasonably foreseeable in that they are likely to occur by virtue of being funded, approved, or part of an officially adopted planning document or publicly available development plan.

As a result of this analysis, the following sensitive resources were identified using the environmental information collected during the study, as well as public and agency scoping comments received. These impacts are inter-related and will be discussed in the following sections:

- Mississippi River Sediment (see Habitat Impacts; see **Section 3.4.2.4)**
- Flood Protection Impacts (see Hydraulic Impacts; see **Section 3.4.2.7)**
- Negative Riverside Aesthetics (see Visual Resources; see **Section 3.1.4.3)**
- Cross-State Residential/Commercial/Industrial Development (see Land Use/Zoning - **Section 3.3.3)**

3.1 Environmental/Pollution Impacts

3.1.1 Air Quality

Air quality and pollution are general terms that refer to one or more chemical substances that degrade the quality of the atmosphere. Individual air pollutants can degrade the atmosphere by reducing visibility. They can also damage property, reduce the productivity or vigor of crops or natural vegetation, or reduce human or animal health.

3.1.1.1 Regulatory Background and Standards

Transportation can contribute to all of the nation's regulated air pollutants. Transportation Conformity, as required under the Clean Air Act, ensures that federally funded or approved transportation plans, programs, and projects conform to the air quality objectives established in State Implementation Plans. MoDOT implements the conformity regulation in nonattainment and maintenance areas.

The Clean Air Act, as amended by the Clean Air Act Amendments of 1990, and other rules and regulations, such as the Control of Hazardous Air Pollutants from Mobile Sources rule promulgated by the U.S. Environmental Protection Agency (EPA), specifies environmental policies and regulations to promote and ensure acceptable air quality. These policies and regulations were adopted in the Final Conformity Rule (40 CFR Parts 51 and 93). EPA delegates authority to the Missouri Department of Natural Resources (MDNR) for monitoring and enforcing air quality regulations in Missouri. MDNR developed the Missouri State Implementation Plan to ensure conformity with the rule.

The Clean Air Act defines conformity as the following:

> *"Conformity to an implementation plan's purpose of eliminating or reducing the severity and number of violations of the National Ambient Air Quality Standards (NAAQS) and achieving expeditious attainment of such standards; and that such activities* (that is, approved transportation plans, programs, and projects in the state) *will not:*
>
> - *Cause or contribute to any new violation of any NAAQS in any area;*
> - *Increase the frequency or severity of any existing violation of any NAAQS in any area; or*
> - *Delay timely attainment of any NAAQS or any required interim emission reductions or other milestones in any area."*

EPA established the NAAQS for the following major air pollutants, which are known as criteria pollutants: carbon monoxide (CO), nitrogen dioxide (NO_2), ozone (O_3), particulate matter (PM) (PM less

than 10 and 2.5 microns in aerodynamic diameter [PM_{10} and $PM_{2.5}$, respectively]), sulfur dioxide (SO_2), and lead. The primary standards have been established to protect the public health. The secondary standards are intended to protect the nation's welfare and account for air pollutant effects on soil, water, visibility, materials, vegetation, and other aspects of the general welfare. Air quality in Missouri is defined with respect to conformity with the NAAQS. MDNR has adopted the standards for the criteria pollutants listed in **Table 3-1** in its air quality program.

Table 3-1. Criteria Pollutant Emission Standards

Pollutant	Period	Primary Standard	Secondary Standard
O_3	8-hour	0.070 parts per million (ppm)	0.070 ppm
CO	1-hour 8-hour	35 ppm 9 ppm	None None
SO_2	24-hour 1-Year 1-hour	0.14 ppm 0.03 ppm 75 parts per billion (ppb)	None None None
NO_2	Annual 1-hour	53 ppb 100 ppb	53 ppb None
PM_{10}	24-hour	150 micrograms per cubic meter (µg/m^3)	150 µg/m^3
$PM_{2.5}$	Annual 24-hour	12 µg/m^3 35 µg/m^3	12 µg/m^3 35 µg/m^3
Lead	3-month Quarterly	0.15 µg/m^3 1.5 µg/m^3	0.15 µg/m^3 1.5 µg/m^3

Source: MDNR, 2019.

3.1.1.2 Attainment Status

EPA uses the term *attainment area* to describe those areas where air quality meets health standards for particular airborne pollutants. The Chester Bridge EA is located in a non-classified area as defined by the EPA through the Clean Air Act. This means that the study area is in compliance with the NAAQS, and no air quality analysis is required.

3.1.1.3 Mobile Source Air Toxics

In addition to the criteria pollutants, EPA also regulates air toxics. Most air toxics originate from human-made sources, including on-road mobile sources, non-road mobile sources (e.g., airplanes), area sources (e.g., dry cleaners), and stationary sources (e.g., factories or refineries).

Mobile source air toxics (MSATs) are a subset of the 188 air toxics defined by the Clean Air Act. MSATs are compounds emitted from highway vehicles and non-road equipment. Some toxic compounds are present in fuel and are emitted into the air when the fuel evaporates or passes through the engine unburned. Other toxics are emitted from the incomplete combustion of fuels or as secondary combustion products. Metal air toxics also result from engine wear or from impurities in oil or gasoline.

EPA identified the following seven compounds from mobile sources that are among the national and regional-scale cancer risk drivers: benzene, acrolein, formaldehyde, 1,3-butadiene, diesel exhaust, naphthalene, and polycyclic organic matter. While FHWA considers these the priority MSATs, the list is subject to change and may be adjusted in consideration of future EPA rules.

In accordance with the FHWA *Interim Guidance Update on Mobile Source Air Toxic Analysis in NEPA* (2012), an MSAT analysis may be required for projects with sensitive land uses within 500 feet of the study area

and create infrastructure/traffic changes that will negatively impact those land uses. There are no sensitive land uses in proximity to the Chester Bridge EA. Further, according to the project's traffic analysis, the project is expected to have no meaningful impact on traffic volumes or vehicle mix. In 2017, the AADT was calculated as 6,768. The 2042 AADT is predicted to be 7,705 (see **Section 2.2.3**). Thus, the project is not expected to have a meaningful potential for MSAT effects. Consequently, the Chester Bridge EA does not require an MSAT analysis. The traffic analysis is available in the **Project Record**.

3.1.1.4 Project-Level Particulate Matter Hot-Spot Conformity Determination

Within a particulate matter non-attainment or maintenance area, as part of the NEPA process, a transportation project sponsor has to determine if a proposed major transportation project would be considered a project of air quality concern. Since the area is in attainment for particulate matter, a quantitative particulate matter hot-spot analysis is not required for the Chester Bridge EA.

3.1.1.5 Air Quality Impacts – No-Build Alternative Impacts

With the existing facility, traffic volume increases over time are small. Consequently, the No-Build Alternative is not expected to contribute substantially to increased emissions that would lower air quality.

3.1.1.6 Air Quality Impacts – Build Alternatives Impact Summary

The Build Alternatives are not expected to result in substantial new vehicles on the bridge. Consequently, the Build Alternatives are not expected to contribute substantially to increased emissions that would lower air quality. There are no meaningful differences among the Reasonable Alternatives and the Preferred Alternative with respect to air quality.

Construction activities may result in short-term impacts on air quality, including direct emissions from construction equipment and trucks, fugitive dust emissions from site demolition and earthwork, and increased emissions from motor vehicles and haul trucks on local streets. These activities are discussed in **Section 3.6.3**.

3.1.2 Hazardous Materials

Hazardous materials, defined in various ways under a number of regulatory programs, are dangerous or potentially harmful to human health or the environment when not managed properly. Hazardous materials may be generated from specific industrial or manufacturing processes or from commercial businesses. Hazardous materials comprise a broad range of materials that include garbage, refuse, sludge, nonhazardous industrial materials, and municipal and other hazardous materials. Hazardous materials can be solid, liquid, or gas.

3.1.2.1 Hazardous Materials – Regulatory Background and Standards

Hazardous materials fall under the following regulatory programs:

- The Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) governs cleanup of contaminated sites. Pursuant to Section 103 of CERCLA, these sites have been reported to EPA by states, municipalities, private companies, and private persons. Sites evaluated under CERCLA that pose serious threats to human health and the environment are placed on the National Priorities List and are commonly referred to as Superfund sites.
- The Resource Conservation and Recovery Act governs hazardous materials and handlers of hazardous materials subject to reporting requirements (Threshold Planning Quantities) under Sections 311, 312, and 313 of the Superfund Amendment and Reauthorization Act. These sites generate, transport, store, treat, and/or dispose of hazardous materials as defined by Resource Conservation and Recovery Act.

- The Emergency Response Notification System is a national database published by EPA that lists sites where reported releases of hazardous materials and petroleum have occurred.
- Other federal and state programs – MDNR also maintains databases in accordance with federal regulations that provide information on facilities with underground storage tanks (USTs), leaking USTs, spills reported under MDNR's Environmental Emergency Response Section, and dry-cleaning facilities.

3.1.2.2 Hazardous Materials – Affected Environment

To facilitate the hazardous materials assessment, a database and records search report was obtained from Environmental Data Services. The databases searched conform to the ASTM International Standard E 1527-00 and included the appropriate federal and state databases. In addition to the database search, field reconnaissance was conducted within the corridors identified by the Reasonable Alternatives to verify the database information retrieved and to identify any other properties of potential environmental concern. **Appendix C** contains an abridgement of the Regulated Material Summary. The entire Regulated Materials Summary is available in the **Project Record**.

In addition to searches of the databases maintained by state and federal agencies, the Chester Environmental Assessment utilized an Agency Collaboration Plan to communicate with interested federal and non-federal governmental agencies. The Agency Collaboration Plan is discussed in **Section 4.8**. Interested agencies are those federal and non-federal governmental agencies that may have an interest in the study because of their jurisdictional authority, special expertise, local knowledge and/or statewide interest. In all, the study team identified 17 interested agencies. Collaboration with these groups has been coordinated through information packages that coincide with study milestones. Agencies that explicitly acknowledged the collaboration information packages include EPA, MDNR, and the Missouri Department of Conservation (MDC).

The NEPA-404 merger process was also used to coordinate with IDOT and their affiliated resource and regulatory agencies; see **Section 4.11**. The decision-point attendees included agencies responsible for environmental quality, such as the Illinois Environmental Protection Agency (IEPA) and Illinois Department of Natural Resources (IDNR). Data collected include a Site Assessment Letter Report completed by the Illinois Stage Geological Survey (ISGS). Report ISGS No. 3423 is available from IDOT District 8 environmental staff.

Sites of Potential Concern

Based on a review of the Hazardous Material Site Inventory, 10 facilities were identified that pose a potential for environmental concern and possible contamination within, adjacent, or near the study area. **Table 3-2** identifies these facilities and **Appendix C** includes a map of their locations.

Using the available information for these 10 sites, the potential facilities of concern were identified and evaluated. To assess these facilities, the best professional judgment standard was used. Best professional judgment means the highest quality technical opinion developed after consideration of all reasonable available and pertinent data or information that forms the basis for one's recommendation(s). The assessment of potential facilities of concern focused on (1) the contaminants that could be present, (2) the toxicity and mobility of these contaminants, and (3) geological factors that could influence the migration of possible contaminants. The following risk categories emerged:

1. Low Risk – These are sites that appear on either the database search or the field reconnaissance. Upon evaluation, these sites are so unlikely to be a facility of potential concern that they can be noted but do not require further discussion. Many of these sites are very far from the footprints of the Reasonable Alternatives. Five of the 10 sites fall into this category.
2. Moderate Risk – These are sites that the construction inspector should be aware of but do no rise to the level where additional assessment is necessary. Three of the 10 sites fall into this category.

These sites represent resources that are within the boundaries of the High Risk sites or are known and coordinated with the owner.

3. High Risk – These are sites with characteristics that require additional assessment, prior to construction. The two sites identified are associated with the gas stations on the Missouri side of Route 51.

Table 3-2. Sites of Potential Concern

Site #	Site	Address	EDR Map ID	Page	EDR Notes	Codes	Database	Field Notes (Risk Type)
1	Keeton, Phillip	3669 Illinois 150	15	43		None	FINDS, IL BOL	Private residence. **(Low Risk - Distance)**
2	Randolph County Courthouse, IRID-Ellis Grove, Randolph County Board	#1 Taylor Street	16	44	Closed, abandoned in place	None	IL UST, IL BOL, FINDS	Storage facility with two buildings. **(Low Risk - Distance)**
3	Hettesheimer, Nolan	200 Rebecca Ln	19	46		None	IL BOL	Abandoned property, appears to be old entrance to the prison below. **(Low Risk - Distance)**
4	Menard Correctional Center	711 East Kaskaskia St.	22	48	Minor air emissions, small quantity generator	D001, D002, U069	ERNS, FINDS, ECHO, IL AIRS, IL BOL, IL SPILLS, RCRA-CESQG, ICIS, US AIRS	This facility lies completely outside the area of concern. No building is more than 1/8 of a mile from the entrance. **(Low Risk - Distance)**
5	Upper Mississippi River MP 110		25	69	American Commercial Barge Lines	None	IL SPILLS	Nothing to see. This appears to be a spill into the river. **(Low Risk – past event with no residual)**
6	Midwest Petroleum Store No. 1020	12442 State Highway 51	30	71	Active Well	None	MO UIC, MO AST, MO SPILLS	Appears to be active remediation system, which is currently disassembled. **(High Risk)**
7	Midwest Petroleum Store No 1021	12451 N Hwy 51	30	73	Service station	None	MO AST, EDR Hist Auto/ MO UIC	Active filling station with UST and soil vapor extraction system present. Monitoring wells are present at this facility. **(High Risk)**
8	Bolch #21		31	77	Active Well	None	MO UIC	injection and extraction well present at this location. **(Medium Risk – Near Sites 6/7)**
9	FISCA Oil Co, Inc	12442 N HWY 51	30/32	72/78	Service station/ Active Well	None	EDR Hist Auto, MO RGA LUST	Active filling station with UST present. **(Medium Risk – Near Sites 6/7)**
10	Petroleum Pipeline	30 feet north of Highway 150.						Lack of EDR documentation. **(Medium Risk – unused but on bridge; see Section 2.2.3.3)**

EDR = Environmental Data Resources, Inc.

3.1.2.3 Hazardous Materials – No-Build Alternative Impact Summary

The No-Build Alternative would have no additional impacts on these sites. Because no new right-of-way would be required, no new encroachments would occur. Maintenance of existing bridges, culverts, parking areas, and multi-use trails would continue and could potentially affect these sites.

3.1.2.4 Hazardous Materials – Build Alternatives Impact Summary

Two sites in the study area have a High Risk of concern for impacts to soil or groundwater:

- Site 6: Midwest Petroleum Store No. 1020
- Site 7: Midwest Petroleum Store No. 1021

The identified facilities have a potential for soil or groundwater impacts from past or current site activities. These sites are located at the intersection of Route 51 and PCR 239/944; see **Figure 3-1**.

The remainder of sites in the study area that potentially have hazardous materials are believed to constitute a low to moderate risk to be adversely impacted by the Reasonable Alternatives.

There are no meaningful differences among the Reasonable Alternatives and the Preferred Alternative with regard to hazardous materials.

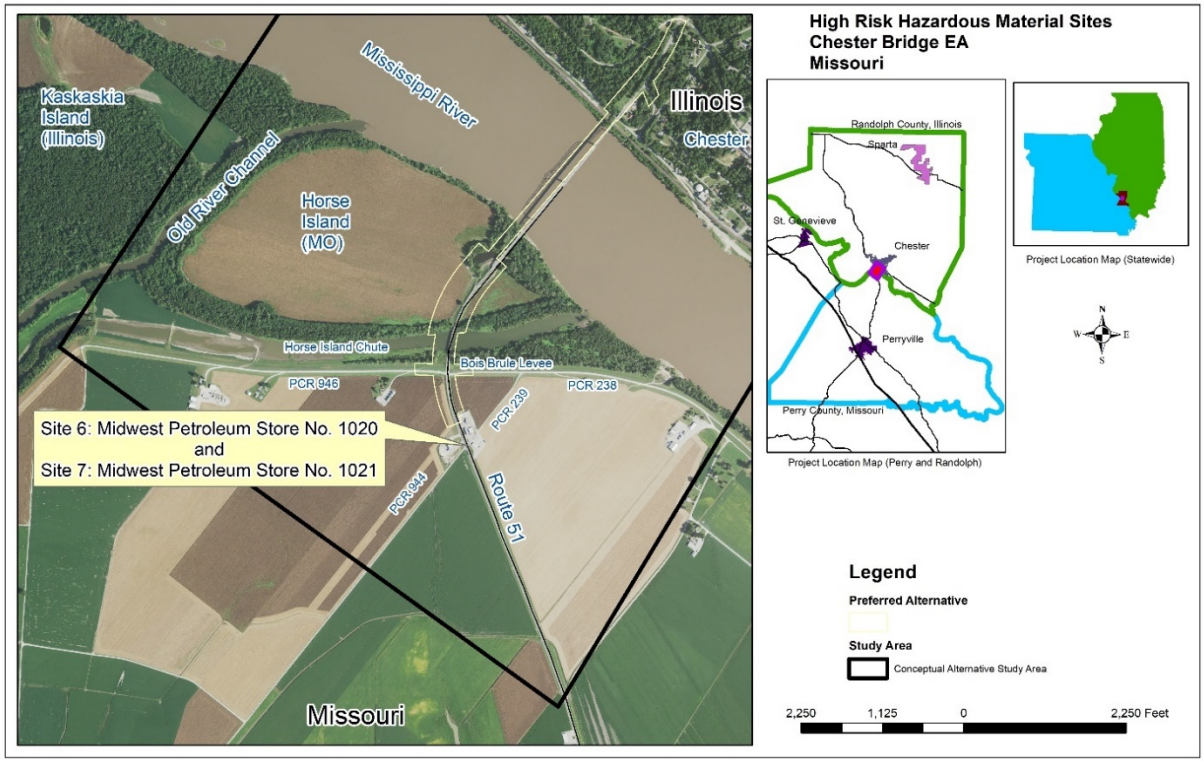

Figure 3-1. High Risk Hazardous Material Sites

3.1.2.5 Hazardous Materials Environmental Commitments

MoDOT will ensure that additional Environmental Site Assessments are conducted prior to construction, as appropriate, at the following locations:

- Site 6: Midwest Petroleum Store No 1020
- Site 7: Midwest Petroleum Store No 1021

Additionally, MoDOT will coordinate with FHWA to determine potential impacts at any high risk sites, if impacted.

MoDOT will ensure that its construction inspector directs the contractor to cease work at the suspect site if regulated solid or hazardous materials are found during construction. The construction inspector will contact the appropriate environmental specialist to discuss options for remediation. The environmental specialist, the construction office, and the contractor will develop a plan for sampling, remediation, and continuation of project construction. Independent consulting, analytical, and remediation services will be contracted if necessary. MDNR/IDNR and EPA will be contacted for coordination and approval of required activities.

MoDOT will ensure that all needed demolition notices, abatements notices, and project notifications to MDNR/IDNR will be submitted, prior to beginning demolition activities. Asbestos-containing material and demolition debris will be disposed of according to state and federal regulations.

MoDOT will ensure that all structures scheduled for demolition are inspected for asbestos-containing material and lead-based paint. MoDOT and the contractor will submit all required demolition notices, abatements notices, and project notifications to MDNR as required by regulation prior to beginning demolition activities. Asbestos-containing material and demolition debris will be disposed of according to state and federal regulations. The reports of these inspections for asbestos and the presence of lead-based paint will be included in the construction bid proposal.

Once the project moves into detailed design, IDOT will complete a preliminary environmental site assessment (PESA) on the portion of the Preferred Alternative that falls within Illinois to identify recognized environmental conditions (RECs). Prior to the purchase of property and prior to construction in study areas located in Illinois, a Preliminary Site Investigation (PSI) will be performed at each affected property containing a REC to determine the nature and extent of the hazardous material present. The PSI will include assessment for lead-based paint and asbestos-containing materials.

3.1.3 Noise

Noise is typically defined as unwanted sound. Noise and sound are physically the same, but the difference is in the opinion of the receiver. A sound is produced by a source that has induced vibrations in the air. The vibration produces alternating bands of relatively dense and sparse particles of air, spreading outward in all directions from the source—much like ripples after a stone is thrown into a pool of water. The result of the air movement is sound waves that radiate in all directions and may be reflected and scattered.

For the purpose of traffic noise analysis, the use of properties adjacent to a planned transportation improvement are classified according to the human activities that occur or are expected to occur within the property boundaries. Noise sensitive areas of qualifying land uses are designated by discrete or representative locations referred to as receptors. No receptors are present within 500 feet of the Reasonable Alternatives in Missouri or Illinois.

Traffic noise analysis requirements are determined based on features of a given project and categorization as a Type I, Type II, or Type III Project. The MoDOT Engineering Policy Guide defines Type III Projects as proposed Federal or Federal-aid projects that do not meet the criteria for Type I or Type II. Examples of Type III projects include rehabilitations, bridge replacements, shoulder additions, and turning lanes.

Pursuant to coordination with MODOT and FHWA, the Chester Bridge EA is a Type III project that does not require a noise analysis. The following features resulted in this determination:

- The project entails bridge replacements (Mississippi River bridge and Horse Island Chute bridge) with the addition of roadway shoulders.

- No additional capacity is being added.
- Horizontal alternations for feasibility of construction are minimal, tie into existing alignments very quickly, and spacing to receptors is not reduced as no receptors are present.
- Vertical alternations to meet design requirements are minimal, tie into existing grades very quickly, and do not substantially alter topography between the highway and adjacent land uses.

There are no meaningful differences among the Reasonable Alternatives and the Preferred Alternative with regard to noise.

3.1.4 Visual Resources

This section describes the existing visual resources and impacts that result from the construction, operation, and maintenance of the project. This section also describes the type and quality of sensitive viewers located near the study area. Visual resource impacts were identified as they relate to potentially sensitive viewpoints.

3.1.4.1 Visual Resources – Regulatory Background and Standards

The methodology for the analysis of visual resources is governed by the Guidelines for the FHWA Visual Impact Assessment of Highway Projects and American Society of Landscape Architects' visual assessment guidelines. Field investigations and photographic analysis were the primary techniques used to assess visual resources. The analysis focused on viewers and the visual resources that appear within their viewshed or angle of view.

The visual analysis of an environment is composed of two sections. First, the project setting is discussed, including an evaluation of the regional landscape, landscape units, and project viewsheds. In addition, the existing visual resources, viewer groups, and viewer responses are examined.

3.1.4.2 Visual Resources – Important Terms

The criteria used to determine visual quality ratings are vividness, intactness, and unity. None of these criteria are individually equal to the visual quality, and all criteria must rate high to indicate high visual quality:

- Vividness is the visual power of the landscape components as they combine to form distinctive visual patterns.
- Intactness is the visual integrity of the landscape, natural or human-made, and its freedom from encroaching elements.
- Unity is the ability of the landscape's individual visual elements to combine in a coherent manner.
- Visual impact is a function of the viewer's response to the visual environment. The two primary groups of viewers for roadway/bridge projects are:
  - Viewers who use the project facility (views from the road/bridge)
  - People who have a view of the project facility from an adjacent viewpoint (views of the road/bridge)

3.1.4.3 Visual Resource Impacts

The visual landscape is a combination of various factors, including landform, land cover, vegetation, and human-made developments. For this study, the landform is generally flat on the Missouri side of the Mississippi River. On the Illinois side, an approximately 80-foot bluff rises from the riverfront. The land cover varies from prime farmland in Missouri to rock bluff and wooded areas in Illinois. The constructed

developments are limited to the Segar Memorial Park and Menard Correctional Center in Illinois, and two convenience stores, with associated out-buildings, in Missouri.

The visual impacts of a project can be varied because the areas are visually distinct. The study area can be divided into several landscape units or outdoor rooms containing similar visual characteristics. The boundaries of these landscape units occur where there is a change in the visual character of the area. The two main determinations of the visual boundaries of these landscape units are topography and landscape components. Topography is the relief or the terrain of an area. Landscape components are anything located above the surface of an area such as vegetation, streams, buildings, and roads.

Overall, the analysis examined five landscape units. These were determined through the review of Digital Elevation Models, recent aerial photography, and onsite surveys. The landscape units and a summary of the analysis are as follows:

Figure 3-2. Typical View from the viewing platform of the Segar Memorial Park

- Segar Memorial Park – Located adjacent to the Chester Bridge in Illinois, the view of the bridge is from a distinct oblique angle; see **Figure 3-2**. The short Illinois span is most clearly visible. The visible details of the main bridge are somewhat limited. The Horse Island Chute Bridge is not visible. Alternatives U-1 and U-2 will move this bridge north (upstream), possibly improving views of the Chester Bridge. The couplet alternative (R-2) will maintain existing views.
- Randolph County Government Center – Located on the top of the river bluff, views of the bridges from this vantage are limited. A viewer needs to navigate to a clear spot to view the bridges. The Horse Island Chute Bridge is the most easily seen of the two bridges. The details are indistinct. The Reasonable Alternatives will have limited impacts on this view. Alternatives U-1 and U-2 will have fewer visible vantage points. The couplet alternative (R-2) will maintain existing views.
- Route 51 Approach – Drivers approaching the river are treated to a clear but short view of the Chester Bridge. It is unlikely that the New Build Alternatives will achieve a similar view.

Figure 3-3. Typical View from Chester Riverfront
(photo source: Google Earth)

- Chester Riverfront – The riverfront is focused on the portion of Chester where there is a riverboat landing, a small riverfront recreation area, and a boat club. Currently, the existing Chester Bridge is a dominant element in the landscape. The view of the bridge is unobstructed, and the trusses and spans are clearly visible (**Figure 3-3**). The Horse Island Chute Bridge is not visible from this vantage point. The

Reasonable Alternatives will affect this view, to some degree. Alternative U-2 will place the crossing in the more distant background. Alternative U-1 will largely swap the existing bridge for a new similarly scaled bridge. The couplet alternative (R-2) will overlay the existing bridge with another bridge, which could be perceived as a confusing landscape or as a unique or interesting overlay.

- Perryville Airport – The bridge is largely not visible at ground-level views from the airport. Coordination with the airport and FAA brought the impact to aviation to the forefront. To clear the existing levee, a new bridge will be somewhat higher and slightly closer to the airport. See **Section 3.5.3** for a discussion on aviation impacts of this project.
- Island Views – Views of the bridge from the islands (Kaskaskia Island and Horse Island) are primarily limited to the levees and isolated clear zones. It is unlikely that the Build Alternatives will affect these sporadic views.

Overall, the impacts to the visual environment are limited and vary by location. The most common and persistent view of bridge comes from the Segar Memorial Park viewing patio and the Chester Riverfront. For these views, Reasonable Alternative U-2 will place the bridge in the more distant background. Reasonable Alternative U-1 will largely swap the existing bridge for a new similarly scaled bridge. Reasonable Alternative R-2, the couplet alternative, will overlay the existing bridge with another bridge. This could be perceived as a confusing landscape or as a unique/interesting overlay.

3.1.4.4 Visual Related Secondary and Cumulative Effects

Regarding secondary and cumulative effects, replacing the Chester and Horse Island Chute bridges may impact the aesthetic nature of the population of bridges along the Mississippi River. Starting around the 1920s, these bridges were largely designed as truss structures to allow for the lengthy spans needed to span the navigational channel. Like the Chester and Horse Island Chute bridges, many of these bridges along the river have been listed for the NRHP. However, many bridges that have been listed may be functionally obsolete or are structurally deficient. Additionally, the aging steel structures may need substantial repairs to prolong function life. Similar to the Chester and Horse Island Chute bridges, most of these truss bridges were built with narrow traffic lanes and do not have shoulders. Widening an existing truss bridge is typically not economically feasible. For these reasons, many of these Mississippi River bridges are being replaced. In addition to the quality of the views of the existing bridges, the bridges are both historic properties. This issue is discussed further in **Sections 3.5.2, 3.6.1,** and **4.12.**

3.2 Natural Habitat Impacts

Habitats are natural environments composed of both living organisms and physical components that function together as an ecological unit.

It is common for habitat considerations to be neglected within environmental analysis because of the difficulties of individual site-specific assessments. To better address the consideration of impacts to habitat in environmental analyses, regional information on the impacts to habitats of concern and their mitigation can be used. Therefore, this section describes general habitats that are threatened with loss or degradation from human activities. The condition of these habitats, the activities that affect them, and potential mitigations for the impacts that degrade them are discussed.

3.2.1 Terrestrial Habitats

Terrestrial habitats are found on land, like forests, grasslands, deserts, shorelines, and wetlands. Terrestrial habitats also include human-made habitats, like farms, towns, and cities. **Section 3.3.3** discusses human-made habitats (land uses) and **Section 3.2.2** discusses habitats that are under the earth, like caves and mines.

Figure 3-4 depicts the terrestrial habitats within the study area. The terrestrial habitat assessment started with the 2010/2011 Land Cover/Land Use Geographic Information System database. The Land Cover/Land Use is a product of USACE's Upper Mississippi River Restoration Program.

An onsite assessment was conducted during the growing season of 2018. The assessment included a wetland determination (see **Section 3.4.4**), the establishment/updating of habitat boundaries, and a Floristic Quality Assessment (see **Section 3.2.1.2**).

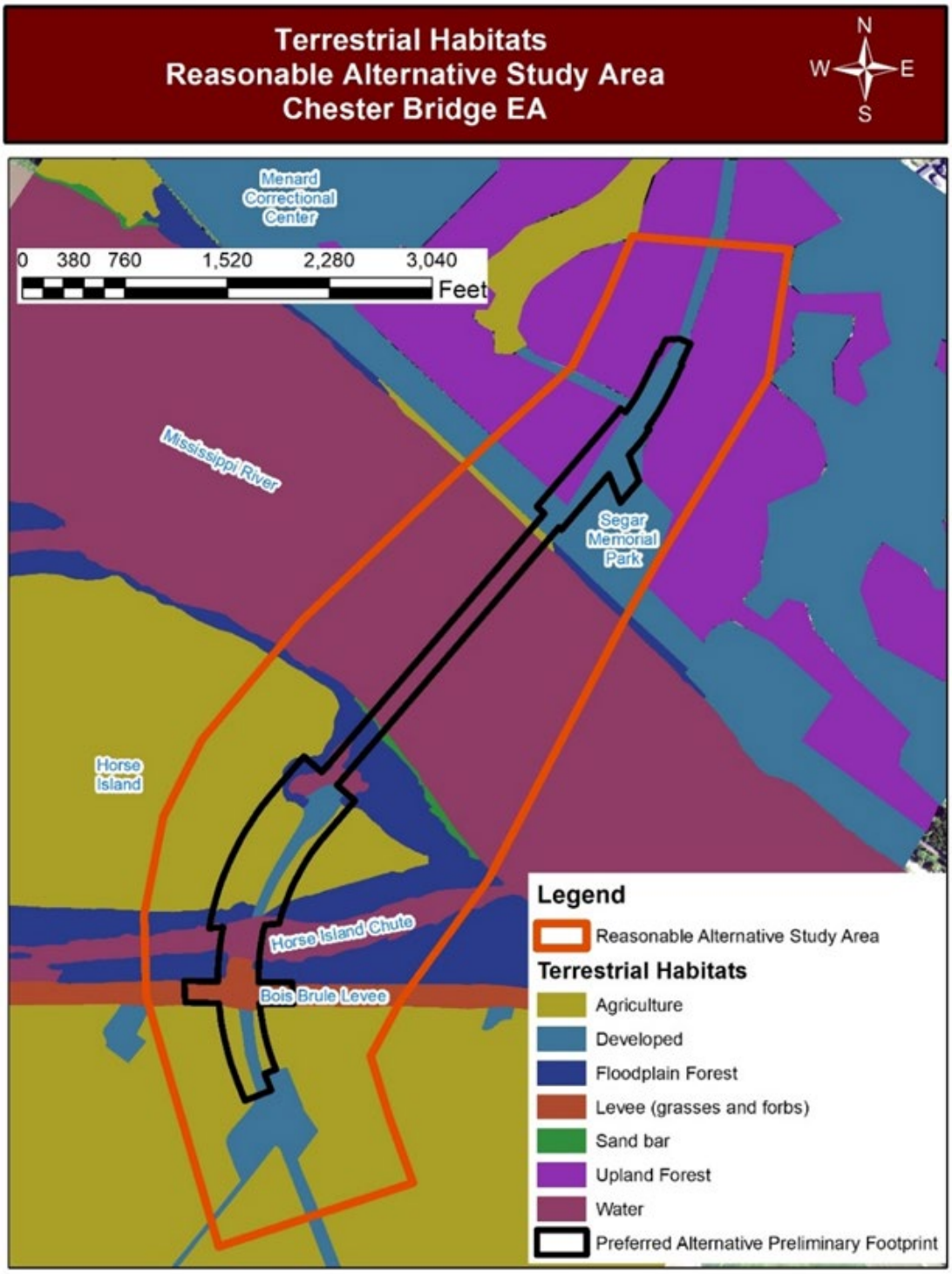

Figure 3-4. Terrestrial Habitat

3.2.1.1 National Vegetation Classifications

The United States Federal Geographic Data Committee's Vegetation Subcommittee created the National Vegetation Classification Standard in 1997. The overall purpose of the National Vegetation Classification Standard is to support the development and use of a consistent national vegetation classification in order to produce uniform statistics about vegetation resources across the nation. Using this framework, the following habitats were established:

- Agriculture – Mostly located in Missouri, this is all cultivated fields, including the transitional or fallow fields on Horse Island. The more fallow areas include moist soil grasses (e.g., reed canary grass, rice cutgrass) with inclusions of mixed emergents and/or forbs (flowering plants).
- Developed – These areas are predominantly artificial in nature (e.g., urban areas, large farmsteads, industrial complexes, and roadways). These areas include common mixed grasses, forbs, and/or shrubs along the roadway and bridge embankments.
- Floodplain Forest – This type of forest consist predominantly of silver maple, ash, cottonwood, black willow, elm, boxelder, and river birch. They are located intermittently along the waterways. Composition varies with areas of dominant areas of willows or cottonwoods.
- Levee Grasses – The Bois Brule levee is covered with common mixed grasses and/or forbs.
- Open Water – This habitat includes non-vegetated river channels, chutes, and ponds.
- Sand Bar – This habitat includes transient assemblages found near the main channel.
- Upland Forest—Located on the steep bluff in Illinois, this assemblage is associated with dry soils and typical upland trees, such as red and white oaks, hickories, and elm.
- In Missouri, the largest single land use in the study area is in active agricultural production. Typical row crops, most recently soybean, are dominant. The farm infrastructure is largely outside of the study area. No displacements of barns or other farm infrastructure is proposed. Access to these areas is via the existing gravel county routes. A narrow band of mature woodlands extends along the Mississippi River and the Horse Island Chute. This band varies in width and is mostly wetlands consisting of a typical assemblage of hardwoods. There are also small amounts emergent wetland (edge areas that cannot be routinely cultivated). The Missouri portion of the study area is located in the Mississippi River floodplain.
- In the Illinois portion of the study area, woodlands are interspersed with residential and commercial developments. A small amount of farmland is also present. The woodlands are located on a steep bluff. These woodlands are mature, unmanaged, and deciduous.
- Within the footprints of the Reasonable and Preferred Alternative, the terrestrial habitat types are roughly equivalent. There are no meaningful differences among the Reasonable Alternatives and the Preferred Alternative with regard to National Vegetation Classifications. **Table 3-3** summarizes the impacts associated with the Reasonable Alternatives and the Preferred Alternative.

Table 3-3. Terrestrial Habitat within the Preferred Alternative

Terrestrial Habitat	Preferred Alternative (acres)	Reasonable Alternative U-1 (acres)	Reasonable Alternative U-2 (acres)	Reasonable Alternative R-2 (acres)
Agricultural	11.1	11.2	17.3	11.2 – 17.9
Developed	12.5	13.1	10.2	13.5 – 12.1
Floodplain Forest	3.6	3.6	4.2	5.0 -6.5

Table 3-3. Terrestrial Habitat within the Preferred Alternative

Levee	4.1	4.1	3.8	4.1 – 4.2
Sand Bar	0.1	0.1	0.1	0.2 – 0.2
Upland Forest	0.6	2.6	2.4	2.5 – 2.4
Water	10.0	10.0	8.7	14.8 – 17.0
Total	**42.0**	**44.5**	**46.7**	**51.4 – 60.2**

The aquatic resources within these habitats are discussed in **Section 3.4**. The developed category includes roadways and the levee. Neither of these categories will be subject to property acquisition. The existing roadways are already owned by the project sponsor. The bridge will go over the levee, allowing for the closure of the existing gap in the levee. This accounts for the difference in the right-of-way acquisition discussed in **Section 3.3.5** and the terrestrial habitat presented here.

3.2.1.2 Floristic Quality Assessment

The Floristic Quality Assessment is a method to assess floristic integrity. A floristic quality index (FQI) and a mean coefficient of conservatism (C) are two of the values derived from floristic inventory data.

The FQI is a measure of the native vegetative quality. It is obtained from a mathematical formula based on the plant inventory conducted for each terrestrial habitat. Areas with FQI values of:

- 0 to 9.9 are highly disturbed
- 10 to 19.9 are moderately disturbed with some native characteristics
- 20 to 35 indicates high vegetative quality and above 35 indicates Natural Area quality
- 20 or greater are considered high-quality aquatic resources

Another measure used to determine the level of disturbance or overall quality of a wetland is with the C value. All plants have a rating between 0 to 10. In general, species that are common to many different conditions are rated with lower numbers, while plants that are more likely to be found in minimally disturbed natural areas are rated higher.

- Species given a C value of 0 to 1 are adapted to severe disturbances, particularly anthropogenic disturbances.
- Species ranked with a C value of 2 to 3 are associated with somewhat more stable, though degraded, environments.
- Those species with a C value of 4 to 6 include many dominant or matrix species for several habitats; they have a high consistency of occurrence within given community types.
- Species with C a value of 7 to 8 are taxa (group of one or more populations) associated mostly with natural areas, but that can be found persisting where the habitat has been degraded somewhat.
- Species with a C value of 9 to 10 are considered to be restricted to high-quality natural areas.

The Mean C value is an overall average of the types of plants in an area. Mean C values over 4 are considered to be higher-quality sites with relatively minimal disturbance. The Native Mean C is also an indication of native vegetative quality. Wetlands with Native Mean C values over 3.5 are considered high-quality aquatic resources. To ensure accuracy using this method, it is important that this list of plant species be generated within the growing season.

During site visits, lists of observed plant species were developed for each of the major terrestrial habitats. Based on these surveys, an FQI and Mean C were derived.

In the Upland Forest areas, the FQI value was determined to be 19.34, the Mean C was 2.56, and the Native Mean C was 4.06. This corresponds to a stable, moderately diverse habitat. This unit is moderately disturbed. Roughly 37 percent of the species are non-native. The largest portion of species (42 percent) had a zero C value; 11 percent had C values greater than 7.

In the Floodplain Forest area, the FQI value was determined to be 17.58, the Mean C was 3.32, and the Native Mean C was 4.43. This corresponds to a stable, moderately diverse habitat. This unit is moderately disturbed. Roughly 0.25 of the species are non-native. The largest portion of species (32 percent) had a zero C value; 21 percent had C values greater than 7.

In the Emergent Wetland area, the FQI value was determined to be 17.83, the Mean C was 2.97, and the Native Mean C was 4.65. This corresponds to a stable, moderately diverse habitat. This unit is moderately disturbed. Roughly 36 percent of the species are non-native. The largest portion of species (42 percent) had a zero C value; 22 percent had C values greater than 7.

There are no meaningful differences among the Reasonable Alternatives and the Preferred Alternative with regard to FQI.

3.2.1.3 Unique Habitats

The IDNR EcoCAT system identified resources in the vicinity of the Chester Bridge EA study area. The EcoCAT system provides data for the Illinois Endangered Species Protection Act, Illinois Natural Areas Preservation Act, and Illinois Interagency Wetland Policy Act. EcoCAT coordination identified several potential unique habitats from the Illinois Natural Area Inventory; see **Figure 2-10**. The following unique habitats were identified:

- The **Mudd's Landing** INAI site 1307 occurs within the Mississippi River between river mile 120 and 106. For reference, the Chester Bridge is located at river mile 110. The existing bridge has three piers in the Mississippi River on the Illinois side, and the navigation channels are 650 feet wide on both the Illinois and Missouri sides. USCG requires an 800-foot navigation channel on the Illinois side and a 500-foot navigation channel on the Missouri side for a new bridge. The 800-foot requirement on the Illinois side pushes a new bridge's third pier into the Missouri side of the river. A new bridge will require two new piers to be built on the Illinois side of the river in the Mississippi River Mudd's Landing INAI site.
- The **Coles Mill Geological Area** is located just outside the study area in Chester. No work will occur in this INAI site. There are no meaningful differences among the Reasonable Alternatives and the Preferred Alternative with regard to unique habitats.

Based on coordination with IDOT/INDR (EcoCAT response dated October 4, 2018), the following commitment will be added to the project:

- IDOT will contact the IDNR Fisheries Lower Mississippi River Biologist at least 60 days prior to blasting (see **Section 5**).
- MoDOT has a history of employing repelling charges and millisecond delays during demolition of the bridge. Repelling charges are used to scare fish from the area before bridge spans are dropped into the water. Seasonal restrictions for demolition and any bathymetric surveys needed for US Army Corps of Engineers or US Coast Guard purposes will also be shared and discussed with US Fish and Wildlife Service for Section 7 consultation.

3.2.2 Geology

The geotechnical data available for the Chester Bridge EA is summarized from an assessment conducted by the ISGS and available data for MDNR and the Natural Resources Conservation Service (NRCS).

There are no meaningful differences among the Reasonable Alternatives and the Preferred Alternative with regard to geology.

3.2.2.1 Surficial Geology

The topmost bedrock unit in the area has been mapped as the Mississippian-age Upper Pope Group, which consists of sandstone, limestone, coal, and shale.

In Illinois, the study area is composed primarily of bluffs 200 to 350 feet above the alluvial valley. These bluffs are composed primarily of limestone of Mississippian geologic age with a thin covering of Pleistocene (Ice Age) loess. The total thickness of surficial deposits has been mapped as 25 to 50 feet of windblown silt of the Peoria and Roxana Silt, and loamy and sandy glacial deposits.

In Missouri, the study area (including the Mississippi River) is resting on glacial drift, which fills the bedrock valley of the river to a depth of 100 to 130 feet. A typical cross section of the valley fills consists of a surface layer of sand, silts, or silty clay, which are recent river deposits; a thick layer of fine to medium sands of glacial age; a bottom layer of boulders, cobbles, and gravels of glacial age; and Mississippian-age bedrock.

3.2.2.2 Surface Soils

In Illinois, the NRCS has classified the Darwin silty clay, 0 to 2 percent slopes; and the Fluvaquents, loamy, 0 to 2 percent slopes, as containing 33 to 100 percent hydric components. None of the other soils in the study area have been classified by NRCS as containing more than 33 percent hydric components. The NRCS has classified the Menfro silt loam, 10 to 35 percent slopes; the Stookey silt loam, 35 to 70 percent slopes; the Brookside silty clay loam, 18 to 60 percent slopes; the Orthents, loamy and undulating; the Darwin silty clay, 0 to 2 percent slopes; and the Fluvaquents, loamy, 0 to 2 percent slopes as non-prime farmland.

In Missouri, the topography of the area of a series of low (5 to 15 feet relative relief) ridges and swales. The ridges, composed of silts and sands, are old natural levees, sand bars, and islands, while the swales are old water courses such as sloughs and chutes that may be filled with water or are marshes or low areas filled with silts and silty clays.

3.2.2.3 Hydrogeology

In Illinois, surficial drainage is toward the southwest, in the direction of the Mississippi River. However, since parts of the study area are urbanized, and storm drains and sewers are present, most surficial runoff is controlled by the storm sewer system; such systems typically follow natural drainage patterns. Groundwater flow is believed to generally mimic local topography.

In Missouri, surficial drainage is also toward the Mississippi River. Groundwater in the study area is generally near the top of the sands and gravels that underlie the modern fine-grained soils. The groundwater surface may be closely correlated with the levels of the river because of the proximity of the river channel.

3.2.2.4 Seismic Hazards

The Chester Bridge EA project is in an area of relatively high potential for seismic ground motions associated with the New Madrid Seismic Zone (NMSZ). The active faults in the NMSZ are poorly understood because they are not visible at the surface. The faults lie beneath at least 100 feet of soft river deposited soils. Seismic hazards introduce risk of structure damage, landslides, settlements, and liquefaction. Because of the relatively high seismic ground motions and site conditions, the floodplain has potential for liquefaction and the bluff slopes have the potential for landslides. Some scientists believe there is about a 10 percent chance of a magnitude 7 to 8 earthquake in the NMSZ in a 50-year time interval.

The Center for Earthquake Research and Information maps earthquakes within the NMSZ. None are recorded in the proximity of the Chester Bridge EA project. The nearest Illinois record is for a small earthquake (2.1 magnitude) that occurred on October 15, 2018, about 3.5 miles north of Sparta (approximately 18 miles northeast of Chester). The nearest Missouri record is for a very small earthquake (1.8 magnitude) that occurred on July 15, 2018, approximately 5 miles east of Leadington (approximately 50 miles west of Chester).

3.2.2.5 Underground Mines, Caves, and Sink Holes

In Illinois, according to the ISGS, the study area is located in a karst region. Karst terrains develop because of the dissolution of carbonate bedrock. Karst features and resulting karst hazards are most common in areas where carbonate rocks either crop out at the surface, or where they are shallowly buried beneath unconsolidated materials generally less than 50 feet in thickness. Hazards common to karst regions include sinkholes, springs, erratic surface water drainage and groundwater flow, and rapid subsurface movement of materials into and through the subsurface. Sinkholes and springs can also back up and cause local flooding during high-volume rain or snowmelt events.

While ISGS mapping indicates that karst features such as caves or sinkholes may be present in the study area, these features were not observed during ISGS field investigations for this project. The ISGS karst maps are published at a scale of 1:500,000 and may reflect conditions present in the area but not specific to the actual project location. Therefore, karst hazards may not be present within the project limits. No other observed or known natural hazards were identified for this project.

In Missouri, MDNR keeps a record of sinkholes reported to the program or shown on U.S. Geological Survey (USGS) topographic maps. There are no records of sinkholes in the Chester Bridge EA study area. Perry County has a high prevalence of sinkholes and the highest concentration of caves in Missouri. Frank Wildman with The University of Missouri Extension has been contacted with regard to sinkholes. No evidence of sinkholes or cover crop barriers was observed during the study. MoDOT provided information from the Missouri Speleological Survey (2019 data) that there are no known caves records within four miles to the west of Horse Island Chute Bridge.

3.2.3 Endangered Species

This section summarizes the laws and programs associated with the conservation of threatened and endangered plants and animals and the habitats in which they are found. These laws and programs seek to assure the continued existence of listed species.

3.2.3.1 Affected Environment

According to coordination with the Information Planning and Consultation package from the U.S. Fish and Wildlife Service (USFWS), there are records for species listed under the Federal Endangered Species Act (ESA). The following species have been identified as those that may occur or could potentially be affected by activities in proximity to the Chester Bridge EA study area:

- Least tern (*Sterna antillarum*) – Least terns are small gulls (9 inches in length). Terns will dive into the water for small fish. Their current habitat follows a wide swath along the Mississippi River. The conservation status of the species found that the species is resilient to existing and potential threats, the amelioration of threats throughout much of its range due to increased population size and range and by the implementation of beneficial management practices, and changes in existing regulatory mechanisms that are more protective of migratory birds.
- Pallid sturgeon (*Scaphirhynchus albus*) – The pallid sturgeon is big river fish that ranges widely in the Mississippi and Missouri River system (including parts of some major tributaries). Their preferred habitat has a diversity of depths and velocities formed by braided channels, sand bars, sand flats and

gravel bars. There has been no substrate survey of the study area yet. Any pallid sturgeon moving through the area could be impacts by both demolition and construction activities.

- Small whorled pogonia (*Isotria medeoloides*) – The small whorled pogonia is an orchid that occurs on upland sites in mixed-deciduous or mixed-deciduous/coniferous forests that are generally in second- or third-growth successional stages. Habitat characteristics are generally sparse to moderate ground cover in the species, a relatively open understory canopy, and proximity to persisting breaks in the forest canopy. Soils are generally acidic and nutrient poor, with moderately high soil moisture values. Light availability could be a limiting factor for this species.

- Gray bat (*Myotis grisescens*), Indiana bat (*Myotis sodalist*) and northern long-eared bat (*Myotis septentrionalis*) – Gray bats are cave obligate species which congregate in maternity or bachelor colonies in the summer utilizing dome cave and mine habitat, and mixed colonies during winter hibernation in vertical or pit-type caves and mines. They utilize mainly stream corridors for foraging spring through fall. Indiana and northern long-eared bats hibernate during winter months in caves and mines. During the summer months, the Indiana and northern long-eared bats roost and raise young under the bark of suitable summer roost trees in wooded areas, often associated with riparian forests and upland forests near perennial streams. These two species could occur anywhere suitable roost trees exists. Removal of suitable summer roost trees at any time of the year may affect both species.

The latest USFWS Information for Planning and Consultation (IPaC) package is included in **Appendix F**. Following a 11/9/2020 coordination call, USFWS issued a technical assistance letter on 12/11/2020. These are also included in **Appendix F**.

The Chester Bridge EA study area is also within the geographic range of nesting bald eagles in Missouri. **Bald Eagles** (*Haliaeetus leucocephalus*) may nest near streams or water bodies in the study area. Nests are large and fairly easy to identify. While no longer listed as endangered, eagles continue to be protected by the federal government under the Bald and Golden Eagle Protection Act. Reports and surveys have identified nesting areas in the northern part of Horse Island and the south part of Kaskaskia Island. The Missouri Department of Conservation Natural Heritage Database information (2020) indicates a nest in this area and one south of the project limits along the Missouri shoreline. These nests are more than 1.0 mile from the existing Horse Island Chute Bridge, well outside the 660-foot disturbance limits for tree clearing and beyond the 0.5-mile buffer for demolition by explosives for the bridges.

Bald eagles are also protected under the Migratory Bird Treaty Act, making it illegal to take, possess, import, export, transport, sell, purchase, barter, or offer for sale, purchase, or barter, any migratory bird, or the parts, nests, or eggs of such a bird, except under the terms of a valid federal permit. Migratory bird species protected by the Act are listed in 50 CFR 10.13. An April 2019 assessment of the Mississippi River Bridge by MoDOT determined there are swallows using the bridge elements as nesting habitat (Evan Hill, for the previous rehabilitation project consideration). MoDOT will also assess the Horse Island Chute Bridge for any nesting birds and apply the MoDOT Migratory Bird Job Special Provision for demolition of both structures, as needed.

Additionally, coordination with the IDNR over the Mudd's Landing INAI site has occurred. Known as INAI site 1307, it occurs within the Mississippi River between river miles 120 and 106. No Illinois listed species occur within the preferred alternative. IDNR concurred that, based on the Illinois Natural Heritage Database, threatened and endangered species are unlikely to be impacted by the project. In accordance with IDNR's EcoCAT response dated October 4, 2018, the following commitment will be added to the project:

- IDOT will contact the IDNR Fisheries Lower Mississippi River Biologist at least 60 days prior to blasting (see **Section 5**).

The State of Missouri also maintains endangered species legislation. MDC is the administrative, regulatory, and enforcement agency for state sensitive species. Coordination with the MDC yielded a Natural Heritage Review (Level Three Report, updated 11/19/2020). The Level Three Report (see **Appendix F**) includes discussion of the following:

- The project occurs near the Middle Mississippi River National Wildlife Refuge (see **Figure 3-11**). Indiana and Northern long-eared bats may occur near the project area.
- The project is within the geographic range of nesting Bald Eagles in Missouri.
- Any project that modifies big river habitat, such as the Mississippi River, should consider the possible impact to pallid sturgeon populations.
- Invasive exotic species are a significant issue for fish, wildlife and agriculture in Missouri. MDC recommends that equipment be cleaned when moving between sites.

A request for additional coordination was also requested during the 11/19/2020 update. This is contained in **Appendix F** and includes the latest coordination.

Missouri also tracks the status of approximately 1,036 plant and animal species that are considered rare in the state. No impacts to state-listed species are expected. The MDC Heritage Report and species list for Perry County are included as **Appendix G**.

No land disturbance or tree removal would occur prior to consultation with the USFWS being complete. Conversations about the project with USFWS began in November 2020 with both Marion, Illinois and Columbia, Missouri USFWS offices. The expected effect determinations were discussed as well as steps required for completing May Affect, but Not Likely to Adversely Affect consultation. MoDOT will submit a Biological Assessment (BA) and initiate informal consultation for the project. Although specific project details are not known at this time, it can be reasonably assumed that project activities could include the following: dredging, tree clearing, bridge demolition, and rock blasting. Conservation measures will be addressed for minimizing the amount of explosives to be used for bridge and/or rock bluff demolition; limiting stream disturbance for pier removal and installation and bridge demolition and construction; seasonal tree clearing of any suitable summer roost habitat; and other appropriate measures as determined by the USFWS. The agreed upon measures to minimize impacts outlined in the BA will be approved through concurrence by USFWS and carried forward as Job Special Provisions (JSPs) in the contract documents. The completed coordination must be provided as part of the USACE Section 408 application package.

3.2.3.2 Endangered Species Impacts

MoDOT is the lead agency for this project and is responsible for completing coordination for compliance with Section 7 of the ESA and with the Missouri Endangered Species Act. In Illinois, the 404 NEPA merger process was used to coordinate endangered species with IDNR. The NEPA-404 merger process is discussed in **Section 4.11**. In summary:

- **No-Build Alternative** – The No-Build Alternative will not impact threatened or endangered species, directly or indirectly.
- **Build Alternatives** – The study area does not contain any known populations of listed species or critical habitat for listed species. There are no meaningful differences among the Reasonable Alternatives and the Preferred Alternative.

A May Affect, but Not Likely to Adversely Affect determination is expected for the Least Tern. It is too early to tell in which season demolition could occur and attempts to minimize blast radius in consideration of this species will be discussed during Section 7 Endangered Species Act consultation.

A No Effect determination is expected for the Small whorled Pogonia**.** The species' historical range includes one site in Randolph County (Illinois) which is not near the study area. In Illinois, property acquisition is limited to a strip take along the existing road, and suitability of habitat is poor. There is no suitable habitat in Missouri within the study area.

A Not Likely to Adversely Affect determination is expected for the Pallid Sturgeon**.** Sturgeons are large and can easily swim away from the types of disturbances expected from this project, such as construction of temporary bulkheads, causeways, dredging, and construction barge activities. However, the demolition of the existing bridge has the potential for effecting fish already in the area of the bridge. To minimize impacts to aquatic species during explosive bridge demolitions, MoDOT has a history of employing repelling charges and millisecond delays during demolition of the bridge. Repelling charges are used to scare fish from the area before bridge spans are dropped into the water. Seasonal restrictions for demolition and any bathymetric surveys needed for US Army Corps of Engineers or US Coast Guard purposes will also be shared and discussed with US Fish and Wildlife Service for Section 7 consultation.

A No Effect determination is expected for the Gray Bat because there are no known nearby caves and no nearby records. The undersides of the Chester Bridge contained no evidence of bat activity and the substructure doesn't appear to provide crevices preferred by roosting bats (MoDOT, Mississippi River Bridge rehabilitation internal surveys, MoDOT Job Number J9P3585, April 2019-Evan Hill). To be thorough, the Horse Island Chute Bridge will be checked for evidence of bat roosting for Section 7 consultation for Indiana and northern long-eared bats.

A Not Likely to Adversely Affect determination is expected for the Indiana and Northern Long-eared Bats. All of the Build Alternatives will result in the removal of trees. There has been no habitat assessment to address suitable summer bat roost trees in the study area. However, removal of suitable summer bat roost habitat, if present, could affect the Indiana bat and the northern long-eared bat. Tree clearing in Illinois will be limited to the woodlands immediately adjacent to IL Route 150. Tree clearing in Missouri will occur adjacent to the Chester Bridge span, next to the embankment between the two bridges and on either side of the Horse Island Chute. All of the Reasonable Alternatives have areas of tree clearing that may be beyond the scope of the Range-wide Programmatic Consultation for Indiana and Northern Long-eared Bat (Programmatic Agreement [PA]). Regardless, MoDOT and USFWS coordinated on November 9, 2020 for consultation purposes. Instead of attempting to consult under the PA for bats and separately for other species, MoDOT will submit one BA consultation for all species and forego using the PA. There will be a complete habitat assessment for suitability of summer bat roost trees prior to future Section 7 consultation. Marion, Illinois US Fish and Wildlife Service will take the lead for Section 7 consultation, while coordinating with the Missouri Ecological Services Office, and has agreed to this consultation plan (**Appendix F** for USFWS Correspondence).

The center line of the Preferred Alternative is 75 feet upstream of the existing bridge with a construction footprint that is 150 feet wide for the Mississippi River bridge span sections and 300 feet wide for the Horse Island Chute Bridge. The construction footprint for the embankment between the two bridges is 500 feet wide. These are conservative limits that may ultimately be narrowed during the detailed design process. The result is a patchwork of wooded areas beyond the 100- and 300-foot offsets:

- The Preferred Alternative is estimated to have 2 acres of woodlands beyond 100 feet of the existing bridge from four woodland fragments. For the area beyond 300 feet, the total area of woodlands in estimated to be less than 1 acre from two fragments.
- The reuse portion of Reasonable Alternative R-2 is estimated to have 2 acres of woodlands beyond 100 feet of the existing bridge from four woodland fragments. Given that the couplet bridge would be either Alternative U-1 or Alternative U-2, this alternative could impact up to 2 acres of woodlands beyond 300 feet.

3.2.3.3 Mitigation Measures and Environmental Commitments

Relative to endangered species, the following environmental commitments have been established:

- FHWA is the lead federal agency for this project. MoDOT is the designated non-federal representative for FHWA for completing coordination for compliance with Section 7 of the ESA and with the Missouri Endangered Species Act. Consultation will include obtaining an updated official species list via IPaC and will be completed prior to construction or before any federal funds or resources (i.e., removal of trees) are obligated.
- Prior to consultation, MoDOT will conduct a complete habitat assessment for suitable summer bat roost trees and any use of the Horse Island Chute Bridge for the Preferred Alternative.
- If necessary, based upon the results of the habitat assessment and consultation with USFWS, MoDOT will incorporate seasonal tree-clearing restrictions of suitable roost trees as a conservation measure/environmental commitment to avoid adversely affecting northern long-eared and Indiana bats. **Tree clearing will not occur prior to consultation being complete.**
- MoDOT will, pursuant to the Migratory Bird Treaty Act, inspect structures for nests prior to construction. If active nests (those with eggs or young) are observed, measures will be taken, including seasonal demolition restrictions, to prevent killing birds and destruction of their eggs and to avoid conflict with the Migratory Bird Treaty Act. The project area will be screened for bald eagle nests prior to construction. If necessary, seasonal restrictions to avoid non-purposeful take will be implemented.
- No known occupied caves exist in the study area. If any are identified, MoDOT will coordinate with the USFWS.
- IDOT will contact the IDNR Fisheries Lower Mississippi River Biologist at least 60 days prior to blasting.
- MoDOT has a history of employing repelling charges and millisecond delays during demolition of the bridge. Repelling charges are used to scare fish from the area before bridge spans are dropped into the water. Seasonal restrictions for demolition and any bathymetric surveys needed for US Army Corps of Engineers or US Coast Guard purposes will also be shared and discussed with US Fish and Wildlife Service for Section 7 consultation.
- MoDOT will submit a BA and initiate informal consultation for the project. Although specific project details are not known at this time, it can be reasonably assumed that project activities could include the following: construction activity, tree clearing, bridge demolition, and rock blasting. The BA currently being prepared further details measures to minimize impacts to bats, such as minimizing the amount of explosives to be used for bridge and/or rock bluff demolition; minimizing pile driving; minimizing tree clearing; completing an acoustic survey; and other appropriate mitigation as determined by the USFWS. The agreed upon measures to minimize impacts will be outlined in the BO rendered by USFWS that will be carried forward as JSPs in the contract documents.
- MoDOT will also assess the Horse Island Chute Bridge for any nesting birds and apply the MoDOT Migratory Bird Job Special Provision for demolition of both structures, as needed.

3.3 Community/Socioeconomic Impacts

The legal definition of community and the human environment has undergone substantial modification as a result of court decisions stemming from NEPA-related litigation. The Council on Environmental Quality's (CEQ) *Regulations for Implementing the Procedural Provisions of the National Environmental Policy Act* point out that the human environment is to be interpreted comprehensively to include the natural and physical environment and the relationship of people with that environment. Agencies need

to assess not only direct effects, but also aesthetic, historic, cultural, economic, social, or health effects—whether direct, indirect, or cumulative. The CEQ Regulations also contain provisions where economic or social and natural or physical environmental effects are interrelated. Consequently, NEPA documents will discuss and disclose all of these effects on the human environment. This section will describe the study area in terms of community and socioeconomic metrics.

3.3.1 Demographics

Demographics are the quantifiable characteristics of a population. This section summarizes population, race, housing, and age data. County, city, and study area demographics are presented.

3.3.1.1 Randolph County, Illinois

As of the 2010 Census, there were 33,476 people, 12,314 households, and 8,188 families residing in 13,707 housing units in Randolph County. The racial makeup of the county was 87.6 percent white and 9.7 percent black. The remaining 2.7 percent is distributed roughly equally among other races. Those of Hispanic or Latino origin made up 2.6 percent of the population.

According to the Population of Counties by Decennial Census, population in Randolph County peaked in the 1980s at 35,652. Each subsequent census reported a population a few percentage points smaller than the previous one.

According to the 2006-2010 American Community Survey 5-Year Estimates, in terms of ancestry, 40.3 percent were German, 11.3 percent were Irish, 9.4 percent were English, and 5.7 percent were American.

Among the County's households, 29 percent had children under the age of 18 living with them, 52 percent were married couples living together, 10 percent had a female householder with no husband present, 34 percent were non-families, and 29 percent of all households were made up of individuals. The average household size was 2.37 and the average family size was 2.90. The median age was 41.0 years.

The median income for a household in Randolph County was $45,020 and the median income for a family was $55,113. Males had a median income of $43,359 versus $28,376 for females. The per capita income for the county was $19,950. About 7.0 percent of families and 10.4 percent of the population were below the poverty line.

3.3.1.2 Chester, Illinois

The most notable feature of the demographics for the City of Chester is its volatility. The Population of Counties by the Decennial Census depicts large swings. For example, it reported a 59.8 percent increase between 1870 and 1880. Between 1970 and 1980, a similarly large increase was reported. Other double-digit increases, and decreases were also reported. The 2010 census reported a peak population of 8,586.

There are 2,018 households in Chester. Of these, 29 percent had children under the age of 18, 49 percent were married couples living together, 10 percent had a female householder with no husband present, 36 percent were non-families. 32 percent of all households were made up of individuals, and 17 percent had someone living alone who was 65 years of age or older. The average household size was 2.32. There are 1,283 families residing in the city. The average family size was 2.92.

The racial makeup of the city was 95 percent white, 4 percent black, and 1 percent other. Hispanic or Latino of any race were 1 percent of the population.

The median income for a household in the city was $39,079, and the median income for a family was $49,426. Males had a median income of $36,103 versus $22,239 for females. The per capita income for the city was $22,190. About 5.4 percent of families and 9.7 percent of the population were below the poverty line, including 11.8 percent of those under age 18 and 13.7 percent of those age 65 or over.

3.3.1.3 Perry County, Missouri

As of the 2010 census, the population of Perry County was 18,971. There are roughly 7,000 households, and 5,000 families residing in the county.

According to the Population of Counties by Decennial Census, population in Perry County is currently at its historical peak. Although, population declined during the 1970s and 1990s, the overall trend is upward. The population of Perry County is roughly one-third higher than it was in 1970.

The racial makeup of the county was 98 percent white and less than 1 percent for all other race categories. Approximately 0.51 percent of the population were Hispanic or Latino of any race.

The average household size was 2.57. Amongst the households 34 percent had children under the age of 18, 60 percent were married couples living together, 8 percent had a female householder with no husband present, 29 percent were non-families, 25 percent were made up of individuals, and 12 percent had someone living alone who was 65 years of age or older.

The average family size was 3.07. The median age was 37 years.

The median income for a household in the county was $44,264, and the median income for a family was $53,034. About 5 percent of families and 9 percent of the population were below the poverty line.

3.3.1.4 Study Area

Within the vicinity of the Chester Bridge in Missouri, there is a single Block Group. In Illinois, there are four different Block Groups. These are depicted on **Figure 3-5**.

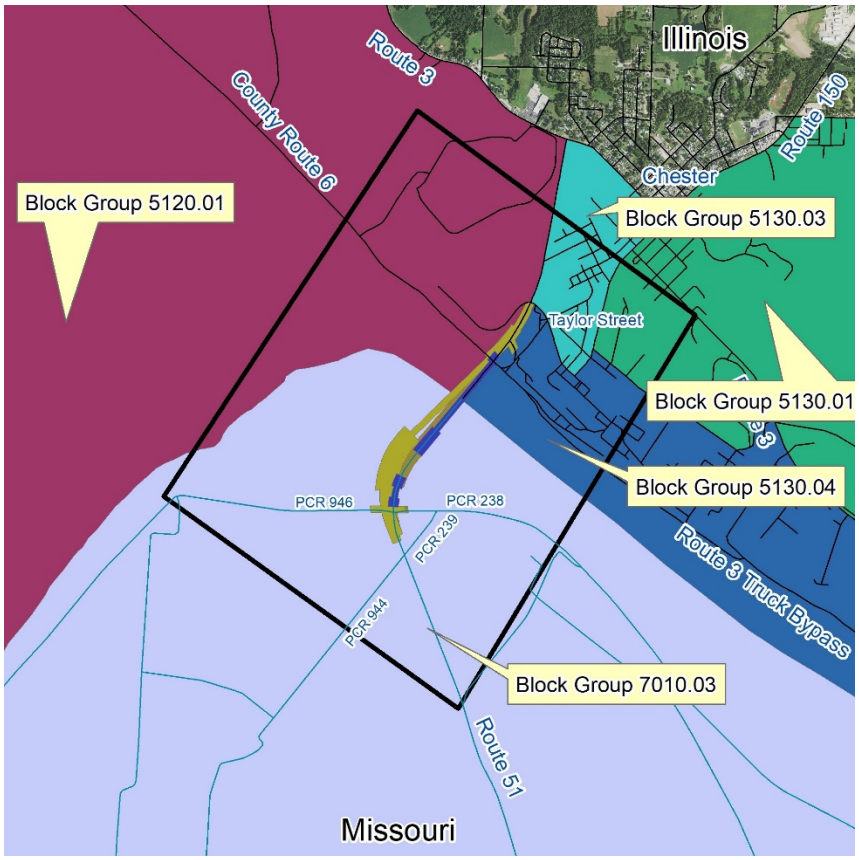

Figure 3-5. Census Block Groups

- **Block Group 5120.01** encompasses the portions of Illinois, northwest of the Chester Bridge. This includes the Kaskaskia island and the Menard Correctional Center. The North II Cell House contains inmates in disciplinary segregation, administrative detention, and the general population. It has an average daily population of around 3,410 inmates. The racial breakdown is 62 percent black, 28 percent white, and 9 percent Hispanic. This breakdown influences the racial distribution of the Block Group. The American Community Survey (ACS-2013-2017 American Community Survey 5-Year Estimates) reports a similar breakdown: 55.7 percent black and 42.8 percent white. The remaining 1.5 percent are largely reported to be multiple races. Census Tract 5120 reportedly has a poverty rate of 16 percent.
- **Block Group 5130.01** encompasses a large portion of the City of Chester, including a portion of the central downtown. The racial breakdown is 95 percent white, 2 percent black, and 3 percent other. Census Tract 5130 reportedly has a poverty rate of 13 percent.

- **Block Group 5130.03** encompasses the portion of the Illinois study area, along IL Route 150. The racial breakdown is 96 percent white and 4 percent black. Census Tract 5130 reportedly has a poverty rate of 13 percent.
- **Block Group 5130.04** encompasses the Illinois riverfront, downstream of the Chester Bridge. The racial breakdown is 99 percent white. Census Tract 5130 reportedly has a poverty rate of 13 percent.
- **Block Group 4701.03** encompasses the Missouri portion of the study area. One-hundred percent of the 761 residents and reported to be white. Census Tract 4701 reportedly has a poverty rate of 9.4 percent.

3.3.1.5 Demographic Impacts

The No-Build Alternative would have no direct impact on the population in the study area. However, the forces tending to cause emigration from the area will remain. Based on historical trends, it is expected that the population may continue to decrease.

There are no meaningful differences among the Reasonable Alternatives and the Preferred Alternative with regard to demographics. The Reasonable Alternatives are not expected to have a direct impact on the local population, except for the acquisition of small amounts of land. Acquisition of affected properties will be in accordance with the relocation procedures established in the Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970 (Uniform Act); see **Section 3.3.5**.

Assuming most residents and businesses will elect to remain in the vicinity, the project will have no appreciable negative impact on the size of the local population. With the improvement of the bridge, it is possible that the project would encourage new residents and businesses to relocate into the study area and have a positive impact on the local population.

3.3.2 Environmental Justice

Executive Order (EO) 12898, Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations, signed by the President on February 11, 1994, directs Federal agencies to take the appropriate and necessary steps to identify and address disproportionately high and adverse effects of Federal projects on the health or environment of minority and low-income populations to the greatest extent practicable and permitted by law. With regard to environmental justice (EJ), EO 12898 seeks to ensure that the proposed transportation activity will do the following:

- Avoid, minimize, or mitigate disproportionately high and adverse human health and environmental effects, including social and economic effects, on minority populations and low-income populations
- Ensure the full and fair participation by all potentially affected communities in the transportation decision-making process
- Prevent the denial of, reduction in, or substantial delay of, the receipt of benefits by minority and low-income populations

Minority Populations are identified in the FHWA Guidance on Environmental Justice and NEPA (December 16, 2011) as Black or African American, Hispanic, Asian American, American Indian/Alaskan Native, and Native Hawaiian or Pacific Islander. Minority populations, according to the CEQ guidelines, should be identified where either (1) the minority population of the affected area exceeds 50 percent, or (2) the minority population percentage of the affected area is meaningfully greater than the minority population percentage in the general population or other appropriate unit of geographic analysis. With the exception of the Menard Correctional Center, the percentage of minorities in the vicinity of the project is very small.

In Illinois as a whole, over 28 percent of the population is constituted of minorities. In Chester, less than 5 percent of the population is a minority. Eighty percent of these residents are African American. The Block Group containing the Menard Correctional Center (9512-1) has a minority population of 55 percent. The balance of the Block Groups in the vicinity of the Chester and Horse Island Chute bridges have virtually no minority populations. The inmates within the Menard Correctional Center will not be negatively affected by the Chester Bridge EA project.

In Perry County, less than 2 percent of the population is a minority. The distribution of the minority races is roughly equal. In Missouri as a whole, over 25 percent of the population is a minority. The population within the study area's Block Group (4701-3) is 100 percent white.

The replacement of the existing bridges will not cause disproportionately high and adverse effects on any **minority populations** in accordance with the provisions of EO 12898 and FHWA Order 6640.23A. No further EJ analysis is required.

No **low-income populations** have been identified that would be adversely impacted by the proposed project as determined above. Therefore, in accordance with the provisions of EO 12898 and FHWA Order 6640.23A, no further EJ analysis is required.

Low-income Populations are identified by FHWA using the Department of Health and Human Services poverty guidelines (HHS, 2020). These guidelines are updated annually and available online. A low-income population is either a group of low-income individuals living in proximity to one another or a set of individuals who share common conditions of environmental exposure or effect. The percentage of people in poverty in the United States is 12.3 percent.

Within Illinois, 12.6 percent of the population is in poverty. In Chester, that number is 13.3 percent. In census tracts 9512 and 9513, the poverty rate is 16 and 13.3 percent, respectively.

Within Missouri, 13.4 percent of the population is in poverty. In Perry County, that number is 10.3 percent. In census tract 4701, the poverty rate is 9.4 percent.

3.3.2.1 EJSCREEN

Environmental Justice Screen (EJSCREEN) is an EJ mapping and screening tool that provides EPA with a nationally consistent dataset and approach for combining environmental and demographic indicators. EJSCREEN users choose a geographic area; the tool then provides demographic and environmental information for that area. EJSCREEN includes:

- **Demographic Indicators** – EJSCREEN uses six demographic factors as an indicator of a community's potential susceptibility to the factors associated with Environmental Justice. EJSCREEN has been designed in the context of EPA's EJ policies, including EPA's Final Guidance on Considering Environmental Justice During the Development of an Action (EPA, 2010). EJSCREEN uses demographic information that is obtained from the U.S. Census Bureau's ACS. The 2018 version of EJSCREEN includes 2012-2016 ACS 5-year summary file data. The demographic indicators include:
  - Percent Low-Income – The percent of a block group's population in households where the household income is less than or equal to twice the federal "poverty level."
  - Percent Minority – The percent of individuals in a block group who list their racial status as a race other than white alone and/or list their ethnicity as Hispanic or Latino, that is, all people other than non-Hispanic white-alone individuals. The word "alone" in this case indicates that the person is of a single race, not multiracial.
  - Less than high school education – Percent of people age 25 or older in a block group whose education is short of a high school diploma.

  - Linguistic isolation – Percent of people in a block group living in linguistically isolated households. A household in which all members age 14 years and older speak a non-English language and also speak English less than very well is linguistically isolated.
  - Individuals under age 5 – Percent of people in a block group under the age of 5.
  - Individuals over age 64 – Percent of people in a block group over the age of 64.

- **Environmental Indicators** – Environmental indicators are reflected in 11 EJ indexes in EJSCREEN. Some of these environmental indicators quantify proximity to environmental pollutants, such as nearby hazardous waste sites. The lead paint indicator indicates the presence of older housing, which often, but not always, indicates the presence of lead paint, and therefore the possibility of exposure. Other indicators are estimates of ambient levels of air pollutants. Still others are actual estimates of air toxics-related cancer risk or a hazard index. The 11 environmental indicators are:
  - National-Scale Air Toxics Assessment (NATA) respiratory hazard index
  - Proximity to National Priority List sites
  - Proximity to Risk Management Plan sites
  - Traffic proximity and volume
  - Proximity to Hazardous Material Facilities
  - NATA diesel PM
  - NATA air toxics cancer risk
  - Ozone
  - Lead paint indicator
  - Particulate matter
  - Wastewater Dischargers Indicator (Stream Proximity and Toxic Concentration)

- **EJSCREEN Output** –The key output from EJSCREEN is a standard printed report that describes a selected location. The analysis can focus on a single Census block group. A block group is an area defined by the Census Bureau that usually has in the range of 600 to 3,000 people living in it. The analysis can also aggregate portions of the block groups, weighted by population, to create a representative set of data for a study area.

Percentiles are a way to see how local residents compare to everyone else in the United States. Instead of just showing numbers out of context, EJSCREEN compares a community to the rest of the state, the EPA region, and the nation, by using percentiles. The national percentile denotes what percent of the U.S. population has an equal or lower value, meaning less potential for exposure/risk/ proximity to certain facilities, or a lower percent minority. Percentiles over 50 are the default setting for further scrutiny.

EJSCREEN uses percentiles – A percentile is a relative term that compares performance in comparison to others. A percentile of 80 means that one scored equivalent to or better than 80 percent of the units in the dataset.

For example, if an EJSCREEN results indicate that an area is 48 percent minority and is at the 69th national percentile, this means that 48 percent of the area's population is minority, and that is an equal or higher percentile of minorities than where 69 percent of the U.S. population lives.

Percentiles over 50 are the default setting for further scrutiny.

Appendix H contains the EJSCREEN reports for the four Illinois Block Groups that intersect the study area, for the polygon that encompasses the Illinois portion study area and for the Block Group that encompasses the Missouri portion of the study area. **Table 3-4** lists the Demographic Indicators for the Block Groups that intersection the Chester Bridge EA study area. Highlighted percentiles exceed 50.

Table 3-4. EJSCREEN Demographic Indicators Results

Demographic Indicators	Missouri			Illinois		
	Project Value	State Average	Percentile in State	Project Value	State Average	Percentile in State
Demographic Index	20%	27%	43	34%	34%	60
Minority Population	7%	20%	37	41%	38%	62
Low Income Population	34%	35%	51	36%	31%	63
Linguistically Isolated Population	4%	1%	90	0%	5%	43
Population with Less than High School Education	10%	11%	54	36%	12%	94
Population under 5 years of age	3%	6%	18	2%	6%	10
Population over 64 years of age	13%	15%	43	11%	14%	40

Based on this analysis, several demographic indicators were above the default percentile (50). In Illinois, this almost certainly the result of the Menard Correction Center. In Missouri, this is the result of the large size of the Block Group. No impacts are expected to the EJ population because no residential relocations and virtually no minority populations are located near the Chester and Horse Island Chute bridges, low-income percentages near the bridges are not meaningfully greater than the low-income population in Chester, low-income populations near the Chester Bridges are lower than the Perry County average in Missouri, and transportation services will be maintained during construction.

Among the 11 EJ indexes, several were above the 50 percentile. In Missouri, indexes above 50 included: Particulate Matter, Ozone, Lead Paint, Risk Management Plan Proximity, and Waste Water Discharge Indicator. In Illinois, the indexes above 50 included: Ozone, National Air Toxics Assessment Cancer Risk, Cancer Risk, and Lead Paint. This result is more a factor of being near industrial and commercial operations. It also depicts limitations of a state-based analysis.

3.3.2.2 Environmental Justice Impact Summary

Environmental Justice requires federal agencies to identify and address disproportionately high impacts on minority and low-income communities. Relative to EJ impacts, the Reasonable Alternatives are indistinguishable.

Aside from the Menard Correctional Center, the percentage of minorities in the vicinity of the project is small. No evidence of minority populations have been uncovered within the study area. Land acquisition is limited to primarily agriculture uses and service will be maintained during construction. The replacement of the existing bridges will not cause disproportionately high and adverse effects on any **minority populations** in accordance with the provisions of EO 12898 and FHWA Order 6640.23A. No further EJ analysis is required.

Relative to low-income populations, aside from the Menard Correctional Center, the population is roughly equivalent to standard benchmarks. As shown in **Table 3-4** the low-income Demographic Indicator is 51, just above the baseline of 50. Additionally, since the overall environment will be improved, a disproportionate impact is not expected. No low-income populations have been identified that would be adversely impacted by the proposed project as determined above. Therefore, in accordance with the provisions of EO 12898 and FHWA Order 6640.23A, no further EJ analysis is required.

3.3.3 Land Use/Zoning

The CEQ's Regulations for Implementing the Procedural Provisions of the National Environmental Policy Act point out that the human environment is to be interpreted comprehensively to include the natural and physical environment and the relationship of people with that environment. The CEQ Regulations also contain provisions where economic or social and natural or physical environmental effects are interrelated. Consequently, NEPA documents will discuss these effects on the human environment. This section discusses/discloses the land uses contained within this large study area.

3.3.3.1 Land Use

This section discusses land use and disclose land use impacts. Using parcel data, recent aerial photography and field surveys, land uses were determined. **Figure 3-6** shows the distribution of existing land uses within the Reasonable Alternative study area (313 acres).

Missouri comprises 195 acres of the Reasonable Alternative study area. About 45 percent of that area is engaged in active agricultural pursuits. Roughly 29 percent is open water. The balance is made up of natural habitat, flood control levees, and two gas stations/convenience stores.

Illinois comprises 118 acres of the Reasonable Alternative study area. Land uses are diverse, including residential properties, forest, and Segar Memorial Park (**Table 3-5**). Roughly one-third of the Reasonable Alternative study area is open water.

Table 3-5. Land Use in the Study Area (acreage within Reasonable Alternative Study Area)

Land Use	Missouri	Illinois	Total
Residential	-	16.5	16.5
Agriculture	86.6	-	86.6
Railroad	-	7.3	7.3
Commercial	5.6	-	5.6
Levee	8.3	-	8.3
Forested	37.8	48.2	86.0
Segar Park	-	3.2	3.2
Open Water	56.6	42.9	99.5

Within the footprints of the Reasonable and Preferred Alternative, the land use breakdown is roughly equivalent. **Table 3-3** summarizes the impacts associated with the Reasonable Alternatives and the Preferred Alternative.

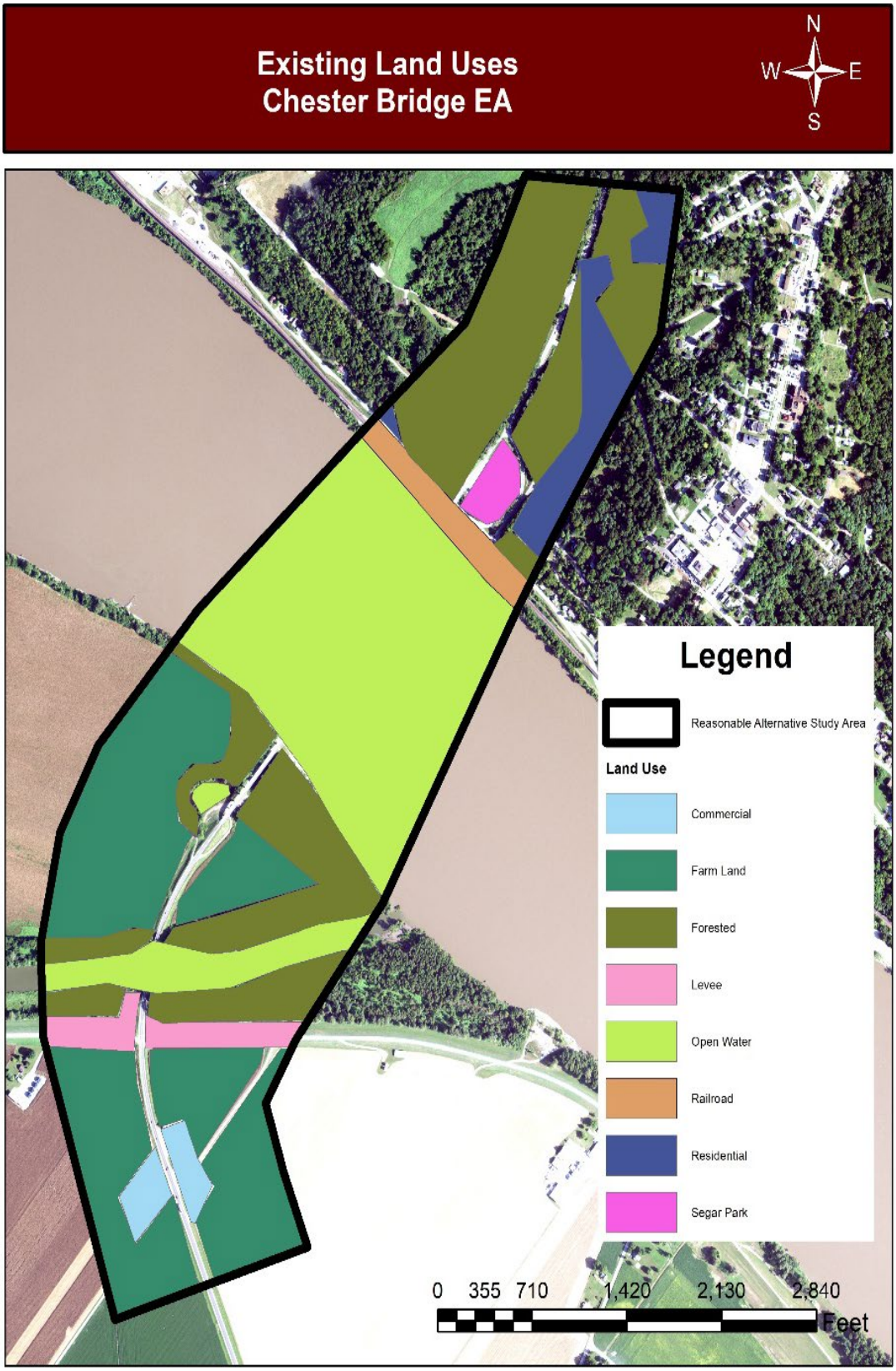

Figure 3-6. Existing Land Uses

3.3.3.2 Zoning

Zoning in the study area is rudimentary. **Figure 3-7** shows the Chester zoning map. The zoning designations are generally consistent with the existing land uses. Several large undeveloped parcels are within the study area.

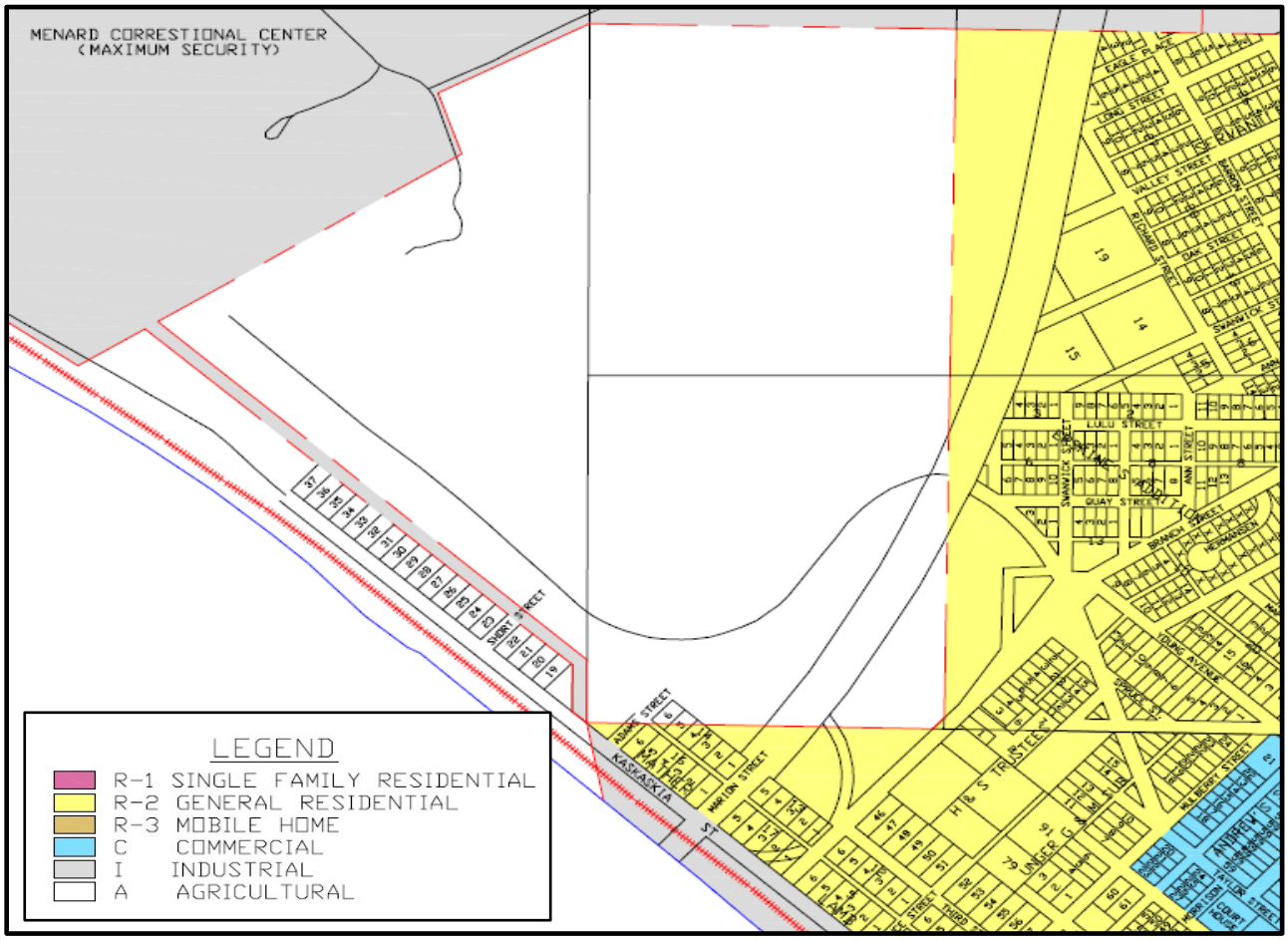

Figure 3-7. Chester Zoning Map

3.3.3.3 Land Use and Zoning Secondary and Cumulative Effects

The proposed project does not introduce a new transportation facility or corridor into the region and will not provide any new access. The proposed project is not intended to serve an explicit economic development purpose. However, there would be both immediate and long-term potential economic impacts around the study area. The bridge replacement and intersection improvements could influence a business's decision to locate or expand within the area. Immediate, positive economic impacts would occur during the time required for property acquisition and design and construction of the bridge. These impacts would be generated by the work and incomes provided by construction. Additionally, jobs supporting construction activities will flow into the economy.

In Missouri, land outside of the levee system is almost exclusively agricultural. Farming is the highest and best use. The replacement or rehabilitation of the existing bridges is not expected to create a large demand for new development. The management of this land would likely remain unchanged regardless of the Reasonable Alternative selected. However, the permanent removal of the gap in the floodwall may increase confidence in the levee and promote investments that might not otherwise have been made.

In Illinois, land within the study area is a mix of residential, forest, and Segar Memorial Park. The proposed project could encourage new or redevelopment as a result of improved access to the area but would be subject to comprehensive plans and future planning and zoning ordinances that would continue to serve as appropriate mechanisms to guide land use and development.

3.3.4 Right-of-Way/Property Acquisition

A new crossing at Chester would require the acquisition of the permanent easements. The Preferred Alternative will require a total of 16.1 acres of new right-of-way. Most of this occurs in Missouri (15.04 acres) and most of the Missouri right-of-way is on Horse Island (12.45 acres); see **Table 3-6**.

Table 3-6. Right-of-Way Summary

Alternative	Total Acquisition
Reasonable Alternative U-1	18.8 acres
Reasonable Alternative U-2	26.6 acres
Preferred Alternative	16.1 acres

The Reasonable Alternatives estimated a somewhat larger footprint. See **Section 2.4** for the refinements applied to the Preferred Alternative. The same types of adjustments would also apply to the Conceptual Alternatives.

Existing right-of-way within slope limits necessary for maintenance purposes or for access to the new roadway and bridge would be retained by IDOT or MoDOT in their respective state.

Most of the needed right-of-way area west of the river is agricultural land within the Bois Brule Levee and Drainage District. MoDOT would acquire all properties needed in Missouri for this project while IDOT would acquire all properties needed in Illinois, including areas needed for maintenance and inspection access. Any right-of-way deemed excess would be offered for sale to adjacent land owners or be transferred to the city or county government.

No existing buildings are expected to be acquired as a result of this project.

- MoDOT and IDOT will ensure that the Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970, as amended be carried out without discrimination based on race, color, national origin, religion, and age and in compliance with Title VI (the Civil Rights Act of 1964), the President's Executive Order on Environmental Justice, and the Americans with Disabilities Act. In accordance with the Uniform Act and the states' relocation programs, fair market compensation will be provided to property owners who are affected by this project.

The Rehabilitate the Existing Alternative (R-2) uses a one-way couplet configuration (where a modified version of U-1 or U-2 is used along with the existing Mississippi River crossing rehabilitated while maintaining its historic integrity). The rehabilitation of the existing bridges is expected to require areas outside the existing right-of-way. This will be for work items such as equipment/supply staging. It is expected that these impacts will be accomplished through temporary construction easements rather than permanent takings. Consequently, the permanent right-of-way impacts of Reasonable Alternative R-2 are expected to be dependent on the new alignment couplet selected (Reasonable Alternatives U-1 or U-2).

3.4 Aquatic Habitat Impacts

This section addresses the various topics associated with water that apply to this study.

3.4.1 Mississippi River Floodplain and Bois Brule Levee District

All current and available Federal Emergency Management Agency (FEMA) products for Perry County, Unincorporated Areas, Randolph County, and the City of Chester are available in the **Project Record**. These materials include the Flood Insurance Studies and the Flood Insurance Rate Map panels for both counties, and Letters of Map Change for Perry County. **Figure 3-8** (dated September 4, 2019) shows the Flood Insurance Rate Map data for Missouri and Illinois. Section 14 of the Rivers and Harbors Act of 1899 and 23 CFR 650 Subpart A are also discussed in this section. In Missouri, the 100-year floodplain of the Mississippi River extends throughout the study area—approximately 2 miles from the river. An important purpose of the Chester Bridge EA is to raise the roadway enough to eliminate the gap in the Bois Brule Levee. The removal of this gap will eliminate the need to close the road and river crossing during flood stage periods—a condition that has become more frequent, last occurring in June 2019. Reasonable Alternatives U-1 and U-2 will be able to close this gap. The regulatory 1 percent Annual Chance Flood water surface elevations at the current Chester Highway Bridge are 388.8 feet North American Vertical Datum (NAVD) for Perry County.

In Illinois, the floodplain of the Mississippi River is constrained by the rocky bluff that parallels the river. The floodplain boundary is approximately located along County Route 6. The regulatory 1 percent Annual Chance Flood water surface elevation at the current Chester Highway Bridge is 388.9 feet NAVD for Randolph County. The Illinois side of the bridge contacts the land in an area of minimal flood hazard, just outside of the 0.2 percent Annual Chance Floodplain Boundary.

- MoDOT will ensure that, should a floodplain encroachment occur, a floodplain permit will be acquired. MoDOT will conduct an engineering analysis for the Preferred Alternative prior to submission of the floodplain development permit application to the Missouri State Emergency Management Agency (SEMA) and IDNR/Office of Water Resources. MoDOT or its contractor will obtain a floodplain development permit and no-rise certification.

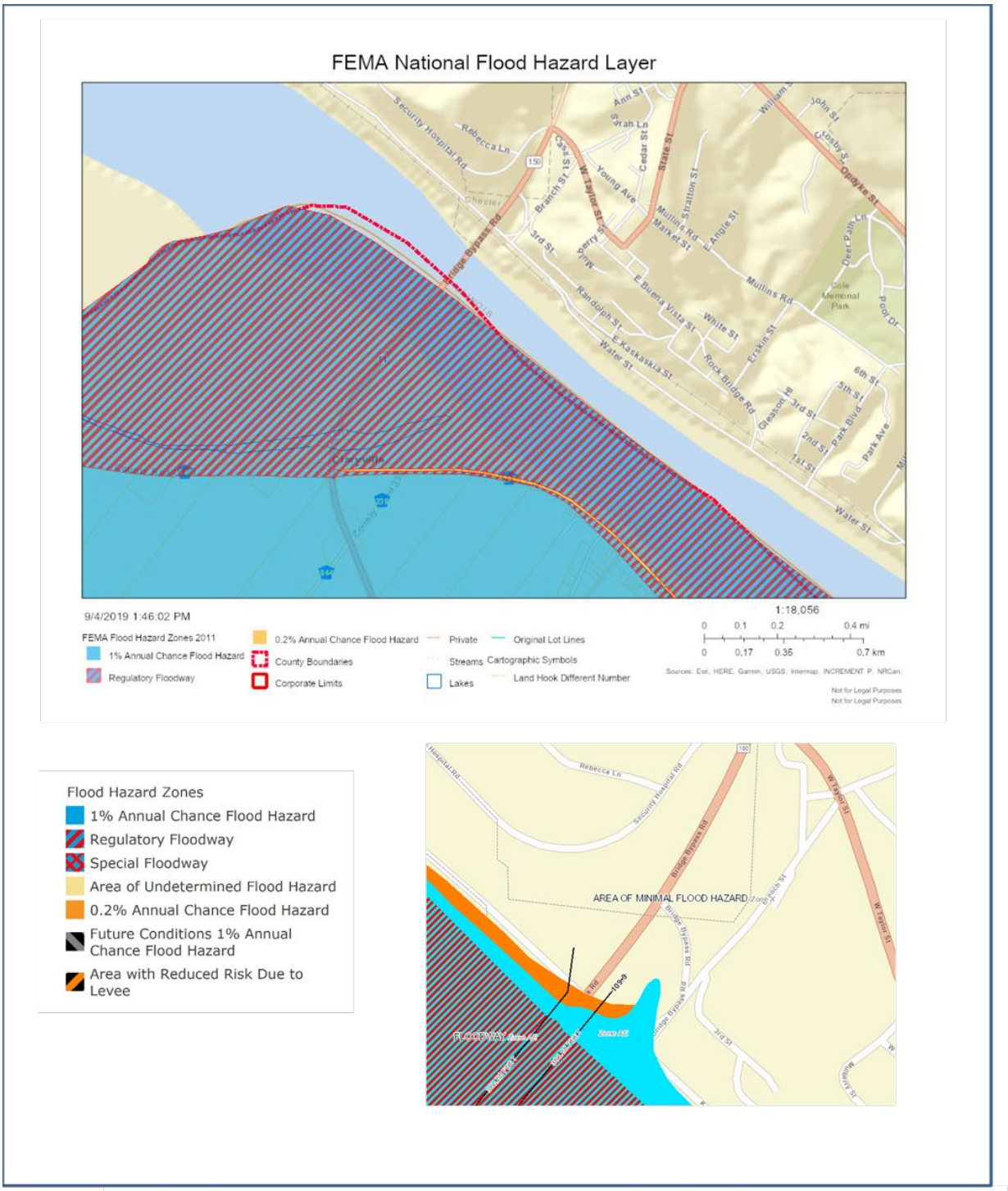

Figure 3-8. Floodplain and Floodway Map - Missouri (Top) and Illinois (Bottom)

The Bois Brule Levee and Drainage District protects approximately 26,000 acres of primarily agricultural land, the Perryville airport and primary roadway connecting Missouri and Illinois. The levee is located on the right descending bank (RDB) of the Mississippi River and consists of 33.1 miles of levee. **Figure 3-9** depicts the levee district map from the USACE Project Fact Sheet (dated September 2016).

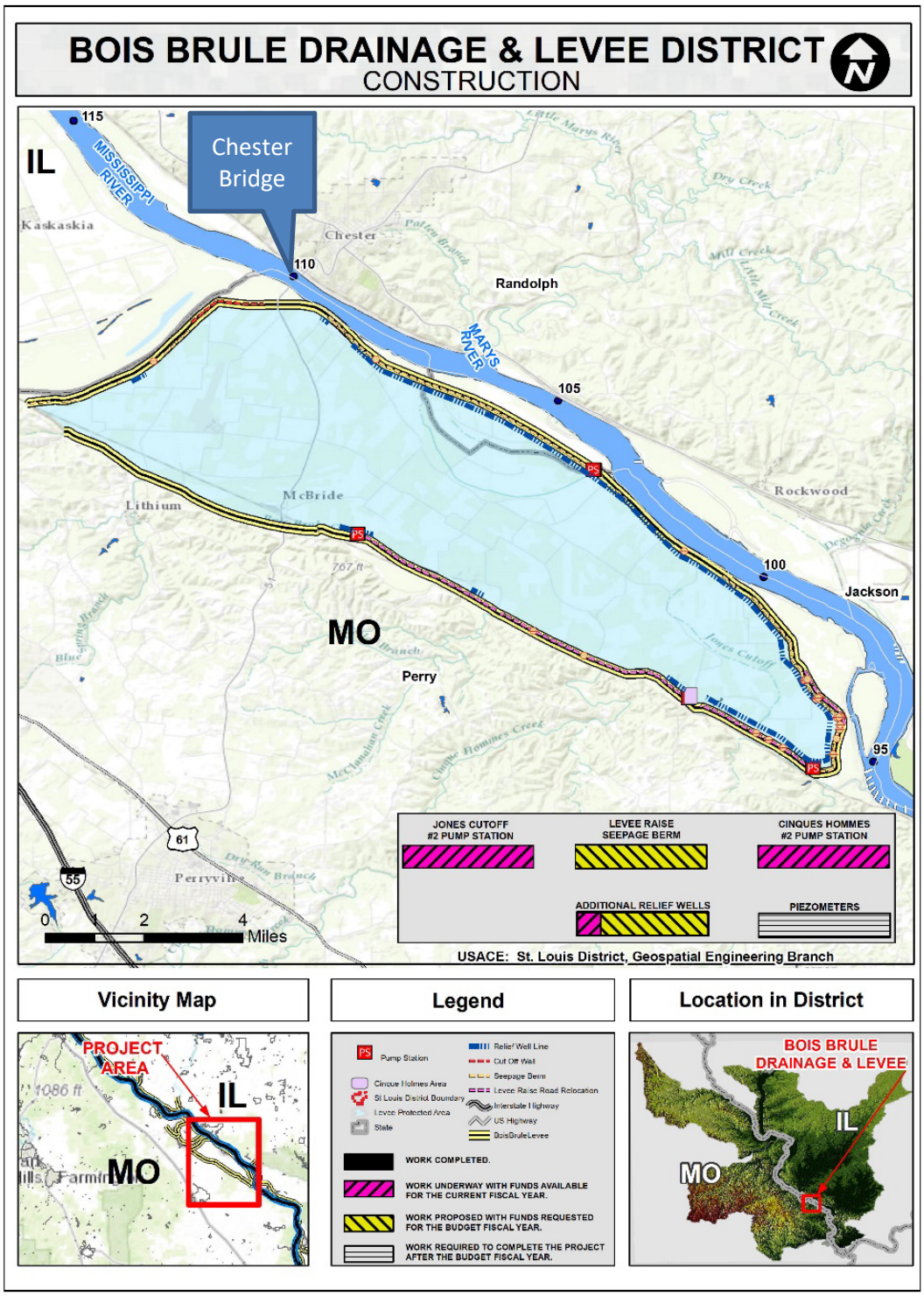

Figure 3-9. Bois Brule Levee District Map
Source: USACE, 2016

The main deficiencies within the levee district is underseepage and inadequate levee grade (2 to 4 feet below net levee grade) along sections of the back levee. Until these are corrected, the levee is at an increased risk of failure. The levee failed due to underseepage prior to the crest of the 1993 flood, flooding the entire levee district with to a depth of 20 feet. Failures due to underseepage can occur very rapidly with little warning.

3.4.1.1 Section 14 of the Rivers and Harbors Act

Section 14 of the Rivers and Harbors Act of 1899, codified at 33 USC 408 (Section 408), provides that USACE may grant permission for another party to alter a civil works project upon a determination that the alteration proposed will not be injurious to the public interest and will not impair the usefulness of the civil works project.

- MoDOT will coordinate (and obtain) a Rivers and Harbors Act Section 408 Permit from USACE for any alterations to USACE structures. Remediation of the existing gap in the levee will be addressed as part of permit coordination with the USACE and Bois Brule Levee District.

3.4.1.2 23CFR Section 650 Subpart A

FEMA and FHWA guidelines at 23 CFR 650 identify the base flood as the flood having a 1 percent probability of being equaled or exceeded in any given year. The base flood is the area of 1 percent flood hazard within a county or community. The regulatory floodway is the channel of a stream in addition to any adjacent floodplain areas that must be kept free of encroachment so the 1 percent flood discharge can be conveyed without increasing the base flood elevation more than a specified amount. FEMA mandates projects cause no rise in the regulatory floodway and a maximum of 1-foot cumulative rise for all projects in the base floodplain.

If an action results in development within a floodplain or floodway, agencies are required to minimize potential harm to persons and property and to natural and beneficial floodplain values. FHWA requirements for compliance are outlined in 23 CFR Section 650, Subpart A. The analysis and findings for this project are summarized in the *23 CFR Section 650 Subpart A Technical Memorandum*. (**Appendix K**).

According to a review of current FEMA flood insurance rate maps, portions of the study area are within Zone AE 100-year floodplain of the Mississippi River. **Figure 3-8** includes the FEMA National Flood Hazard Layer Firmette map (dated September 4, 2019).

Temporary soil disturbance will occur during construction activities. Measures to restore and preserve the natural and beneficial floodplain values will include sediment and erosion control best management practices (BMPs) during construction and disturbed areas will be seeded following construction.

This is not considered significant floodplain encroachment and improvements will not support incompatible floodplain development. The project does not result in a significant potential for interruption or termination of this transportation facility, which is needed for emergency vehicles or a community's only evacuation route. It also does not result in a significant risk or potential for loss of life or property or substantial adverse impact on natural and beneficial floodplain values. This highway improvement project will maintain local and regional access to existing rural and agricultural areas, and surrounding communities throughout construction.

Because construction will occur in the floodway fringe, a floodplain development permit from SEMA is required.

- MoDOT will ensure that, should a floodplain encroachment occur, a floodplain permit will be acquired. MoDOT will conduct an engineering analysis for the Preferred Alternative prior to submission of the floodplain development permit application to SEMA and IDNR/Office of Water Resources. MoDOT's contractor will obtain a floodplain development permit and no-rise certification.
- MoDOT will ensure sediment and erosion control BMPs are implemented. MoDOT will develop and implement two stormwater pollution prevention plans (SWPPPs) to comply with the Missouri State Operating Permit No. MO-R 100007 and the IEPA general National Pollution Discharge Elimination System (NPDES) Permit ILR10. During construction, MoDOT and its contractors would implement the SWPPPs to minimize adverse impacts to the Mississippi River and waters adjacent to the project

corridor. The contractor would implement the current SWPPP held by MoDOT for work in Missouri and would apply for an NPDES permit and develop a SWPPP for work to be completed in Illinois.

3.4.2 Hydraulics

This section examines the resources associated with the hydraulic analysis, summarizes the applicable regulations, and outlines the potential impacts. Sections 9 and 10 Bridge Permitting of the Rivers and Harbors Act of 1899 are also discussed in this section.

3.4.2.1 Regulatory Environment – National Flood Insurance Program

The National Flood Insurance Program and FEMA are tasked with minimizing construction impacts in the floodway and floodplain and reducing disturbances to the Waters of the United States. Engineering analyses of floodplain impacts would be conducted during the project's design to avoid and reduce impacts wherever possible.

The Flood Insurance Studies for both Randolph County and Perry County used the regulatory hydraulic model for the Mississippi River developed by USACE for the Upper Mississippi River System Flow Frequency Study (USACE, 2004). This was created using HEC-RAS software modeled with the UNET unsteady flow hydraulic tool. The Flood Insurance Studies show that regulatory 1 percent Annual Chance Flood water surface elevations at the current Chester Highway Bridge are 388.8 feet NAVD for Perry County and 388.9 feet NAVD for Randolph County. This analysis assumes no improvements to the Bois Brule Levee.

- MoDOT will design the roadway to a 100-year flood level to accommodate the Brule Bois Levee. Remediation of the existing gap in the levee will be addressed as part of permit coordination with the USACE and Bois Brule Levee District.

Except for the No-Build Alternative and the couplet alternative (R-2), the Chester Bridge is designed to span as much of the base floodplain and regulatory floodway as possible, thus serving a dual role by minimizing construction impacts in the floodplain and reducing disturbance to wetlands. All of the reasonable alternatives would be constructed adjacent to the existing bridge, minimizing any additional floodplain impact. Because a new bridge and roadway approaches would replace the existing bridge and roadway approaches, it is not anticipated that the project would support any additional incompatible floodplain development. There would be minimal, if any, additional impact to the base floodplain and regulatory floodway following completion of construction and removal of the existing bridges and roadway approaches.

3.4.2.2 Floodplain Development Permits in Missouri

SEMA issues floodplain development permits for projects undertaken by the State of Missouri. The Missouri side of the Chester and Horse Island Chute Bridges land within the regulatory floodway and will have piers in the floodway. As such, any construction project would need to obtain a No-Rise Certificate.[4] Proof that the construction would have no effect on 100-year flood elevations is required. If the new pier locations are located directly upstream of the existing pier, this would presumably have negligible hydraulic effects on the river and would pass permit requirements.

The bridges and all proposed bridge construction are located in an unincorporated area of Perry County. Perry County does not have a county-wide code of ordinances and therefore no local zoning regulations apply.

[4] https://sema.dps.mo.gov/programs/floodplain/documents/no-rise-certification.pdf

The construction of the Chester and Horse Island Chute Bridges will be primarily constrained by the need to comply with the no-rise requirement. This requirement prohibits any measurable rise in water surface elevations for the 100-year flood condition.

- MoDOT will ensure that, should a floodplain encroachment occur, a floodplain permit will be acquired. MoDOT will conduct an engineering analysis for the Preferred Alternative prior to submission of the floodplain development permit application to SEMA and IDNR/Office of Water Resources. The contractor will obtain a floodplain development permit and no-rise certification.

3.4.2.3 Floodplain Development Permits in Illinois

In Illinois, IDNR/Office of Water Resources issues permits for projects. For projects proposed within regulatory floodways, a no-rise certificate would be required before a permit is issued.

Construction in Illinois could be subject to regulations under 17 Illinois Administrative Code (IAC) Part 3700 (Construction in Floodways of Rivers, Lakes and Streams) and 17 IAC Part 3704 (Regulation of Public Waters). City and county regulations also apply.

17 IAC Part 3700 requires that construction in the floodway of any urban stream with a tributary area of 640 acres or more, or the floodway in a rural stream with a tributary area of 6,400 acres or more, will need to apply for a permit. This is a joint permit application for IDNR/Office of Water Resources, IEPA, and USACE. Additionally, bridge reconstruction (under which one of the options would likely be categorized) requires that reconstruction be no more restrictive to flood flows than the existing structure and must include documentation that the existing structure has not caused demonstrable flood damage.

17 IAC Part 3704 mandates a joint permit from IDNR/Office of Water Resources, IEPA, and USACE. There are no specific impact metrics that must be modeled; rather, the permit focuses on demonstrating that the project will not impair public rights, interests, or uses of the water body, will not affect shoreline stability, and will not interfere with navigability or encroach on public water. If one of these provisions appears not to be met, further analysis may be required at that time.

The City of Chester has a Floodplain Code, and the project will require a development permit from the zoning administrator. Special provisions for bridge replacement and/or bridge widening (applicable to IDNR/Office of Water Resources Statewide Permit Number 12) include demonstrating that the existing structure has not been the cause of flood damage, will not include appreciable raising of approach roads, will not include non-permitted channel profile changes, and has a number of construction phase requirements (14-1-6 (12)).

Because this project will comply with the City of Chester Floodplain Code, the Randolph County Floodplain Code likely will not apply. However, for general knowledge, the County has similar requirements and permitting processes. Zoning is approved through the Land Resources Management Office.[5]

- MoDOT will ensure that, should a floodplain encroachment occur, a floodplain permit will be acquired. MoDOT will conduct an engineering analysis for the Preferred Alternative prior to submission of the floodplain development permit application to SEMA and IDNR/Office of Water Resources. The contractor will obtain a floodplain development permit and no-rise certification.

3.4.2.4 Mississippi River Habitat Related Secondary and Cumulative Effects

Placing new bridge piers in the Mississippi River could contribute to a cumulative negative effect on the habitat of some species of fish that live in the river. Both MoDOT and IDOT will have Pollution Prevention Plans that describe erosion control practices that will be implemented. Given the existing

[5] http://am.randolphco.org/index.php/gov-menu/appointed-officials/2015-12-04-02-46-19

Mississippi River natural sediment load and contributions from agricultural runoff, river dredging, and other developments, the sediment contribution from the construction of the bridges is expected to be minimal. MoDOT and IDOT (and their contractors) will implement BMPs to minimize offsite transport of sediment. The implementation of these practices should afford adequate protection of sensitive aquatic resources in the Mississippi River and minimize this project's contribution to any potentially negative cumulative impacts associated with sedimentation. See **Section 3.4.3** for further discussion of aquatic habitat impacts.

The elimination of the gap in the levee will be a logistical benefit but is not expected to impact future alterations of the flood-protection level that would be allowed by USACE.

3.4.2.5 Section 9 Bridge Permit

This project will also require a Section 9 Bridge Permit from USCG a for maintaining a navigation channel in the Mississippi River. A Section 9 bridge permit is a document approving the location and plans of bridges over a commercially navigable waterway in accordance with all applicable federal laws.

According to coordination with USCG, the existing vertical clearance is adequate. The existing vertical clearance above-pool elevation is roughly 104 feet. The provision of vertical clearance is somewhat in tension with the overall height of the structure. USCG also clarified that the minimum Mississippi River span width should be a minimum of 800 feet for the main navigation channel (east side) and a minimum of 500 feet for the axillary navigation channel (west side). The existing main and auxiliary span widths are 650 feet for both navigation channels. A no-rise certificate will be required before a Section 9 Bridge Permit is issued. Reasonable Alternatives U-1 and U-2 are able to achieve these clearances; therefore, they would satisfy the reasonable needs of navigation.

The couplet alternative (R-2) would rehabilitate the existing Chester and Horse Island Chute Bridges (while maintaining their historic integrity); R-2 would be paired with a modified version of the Reasonable Alternatives (U-1 and U-2). Because the piers of the Mississippi River bridge would need to match those of the existing bridge, the couplet alternative (R-2) would not be able to achieve the USCG's minimum horizontal clearances. In addition, based on past vessel allisions[6] occurring at the existing bridge and reported issues with background lighting creating difficulties for navigation, USCG has expressed reservations about the present bridge remaining. The presence of two, tightly-spaced bridges would further complicate navigation. MoDOT will obtain a Section 9 Bridge Permit from USCG prior to construction, approving the location and plans of bridges over a commercially navigable waterway in accordance with all applicable federal laws, if required. The contractor will submit a work plan to USCG, which will, in turn, issue a permit that includes specific requirements such as displaying lights to alert river traffic of barges and new piers.

- MoDOT (and their contractors) will coordinate with USCG to halt river traffic during demolition activities. The contractor will submit a work plan to the USCG who would in turn issue a permit that includes specific requirements such as displaying lights to alert river traffic of barges and new piers. Temporary lighting and signage will be installed to direct and warn boaters and barges of construction on the bridge.

3.4.2.6 Section 10 Permit

The Bois Brule levee system is federally authorized and constructed, and locally operated and maintained by the nonfederal Sponsor, Bois Brule Levee and Drainage District. USACE has jurisdiction under Section 10 of the Rivers and Harbors Act of 1899. A Section 10 permit is required if a proposed structure or work affects the course, location, or condition of a navigable water of the United States.

[6] "In maritime terms there is a difference between a collision and an allision. When two moving objects strike each other, that is a collision. (When a moving object strikes a stationary object, that is an allision" (MrReid.org, 2020).

The law applies to any dredging or disposal of dredged materials, excavation, filling, rechannelization, or any other modification of a navigable water.

Application for a permit/letter of permission under Section 10 can be made by completing and submitting one application form. An application for a Department of Army Permit will serve as an application for both Section 404 and Section 10 Permits (Engineer Form 4345).

- MoDOT will obtain a Section 10 Rivers and Harbor Act of 1899 Letter of Permission from USACE for fill and excavation within the Mississippi River.

The length of the permitting process will depend on the location of the study area, the material being dredged, and the location of dredge disposal.

3.4.2.7 Hydraulic Impacts

The upstream alternatives (U-1 and U-2) would construct a new bridge and roadway approaches upstream of the existing bridge, replacing the existing bridge and roadway approaches. It is not anticipated that the project would support any additional incompatible floodplain development. There would be only minimal, if any, additional impact to the base floodplain and regulatory floodway following completion of construction, especially if the existing Chester and Horse Island Chute Bridges and roadway approaches are removed. Because Alternative U-1 would construct a new bridge and roadway approaches immediately adjacent to the existing bridge, it would minimize potential changes to the floodplain configuration.

The No-Build Alternative would not involve any improvements in the floodplain or regulatory floodway. Therefore, it would have no adverse impacts. However, Route 51 would still have to be closed during flood events if water levels exceed the roadway gap in the Bois Brule Levee.

The couplet alternative (R-2) would also require an analyses of floodplain impacts. Because this alternative retains much of the existing infrastructure, any necessary mitigation measures will be difficult to incorporate into the construction project. Additionally, the couplet alternative (R-2) would also retain the roadway gap in the Bois Brule Levee.

3.4.3 Streams and Watersheds

The following three waterways are within proximity of the Reasonable Alternatives:

- Mississippi River
- Old River channel (of Mississippi River)
- Horse Island Chute

Horse Island is formed by the boundaries of these three waterways. The Chester Bridge crosses the Mississippi River. The Horse Island Chute Bridge crosses the Horse Island Chute. Between the existing bridges, the roadway is built on soil embankment across Horse Island.

Reasonable Alternatives U-1 and U-2 will continue this configuration and do not have significant differences relative to waterways. In all cases, a finding of no practical alternative will be necessary for waterway permitting purposes. This requirement is also important in the evaluation of alternatives regarding satisfying the project's Purpose and Need.

The couplet alternative (R-2) would create two crossings across these waterways. The degree of stream impacts will depend on the degree to which the existing bridge would be reconstructed.

3.4.3.1 Mississippi River

The Mississippi River near Chester, Illinois, is roughly 1,800 feet wide. The total width of the Mississippi River floodplain throughout this reach can be as much as 5 miles and is dissected by various levee districts. Upstream from the study reach, the Mississippi River is isolated from the Old River channel by

Kaskaskia Island. The Old River channel floodway is confined between the northwestern edge of the Bois Brule Levee and the southeastern edge of the Kaskaskia Levee.

The drainage area for the Mississippi River upstream of the USGS stream gage station 07020500 is approximately 708,600 square miles.

River conditions between 1861 and 2008 have been recorded based on cross sections extracted by USGS in *Scientific Investigations Report 2009–5232* (USGS, 2009). In the 100,000 cubic feet per second (CFS) range, the bed fluctuated substantially (by 26 feet on the left side of the channel and 22 feet on the right side). The thalweg[7] of the channel shifted from the right side of the channel to the left side between September 22, 1943, and August 21, 1947; to the left side again by March 15, 1956; and to the right side again by January 16, 1969. The maximum fluctuation of the average bed elevation is approximately 11.2 feet for this discharge range. The dikes upstream of the Chester gage have a small effect on average velocity and average bed elevation. The maximum fluctuation of the average bed elevation for this time period is 4.7 feet.

At the 400,000 CFS range at the Chester Bridge, the bed fluctuated as much as 20 feet on the left side of the channel and 26 feet on the right side. The maximum average bed elevation fluctuation for this discharge range is approximately 10.3 feet. As with the 100,000 CFS range, the channel thalweg shifted back and forth from the right side of the channel to the left side during the period of record. The maximum fluctuation of the average bed elevation for this time is 4.0 feet. As with the 100,000 CFS range, this stabilization likely is caused by the dike fieldwork upstream of the Chester Bridge.

The 600,000 CFS range had the least fluctuation, but still as much as 21 feet in some locations. The bed configurations for the first and last measurements are similar. Although the cross sections for measurements after the mid-1960s indicate the same fluctuation of 15 feet on the right side of the channel, the fluctuations of the thalweg on the left side of the channel are substantially less after the dike fieldwork upstream of the Chester Bridge. The cross sections for the first and last measurements of this time remain similar. The overall stabilizing effect of the dike field observed in the 100,000 and 400,000 CFS ranges is less for the 600,000 CFS range because the effects of the dike field would tend to wash out with more than 15 feet of water over the dikes.

The amount of flow in Horse Island Chute has a direct effect on values recorded or computed from measurements at the Chester gage because flow in an overflow channel increases the discharge, area, and top width of a measurement. However, if the conditions to initiate flow in the overflow channel change with time, the additional discharge, area, and top width also will change with time, which can have a profound effect on measurements recorded when conditions are near those required to initiate flow in the overflow channel. At the initiation of flow in the overflow channel, the measured area and top width often increases substantially with a relatively small change in stage or discharge, which causes average quantities computed from the measured quantities (such as average velocity computed from measured discharge and area) to be substantially less than that for a similar in-channel discharge. As flow increases through the overflow channel, the discharge, area, and top width become more proportional to flow in the main channel, but often will continue to have an effect on average quantities computed from the measured quantities. Furthermore, quantities derived from measurements at a given stage or discharge will change with time as the conditions to initiate flow on a floodplain or in an overflow channel change. This change with time may contribute to the increase in rated gage height for a given discharge observed at the Chester gage after the completion of the Alto-Gale levee system in the mid-1960s.

[7] Thalweg is defined as the middle of the primary navigable channel of a waterway that defines the boundary line between states.

3.4.3.2 Old River Channel (of the Mississippi River)

Upstream of the Mississippi River (and all of the project's conceptual and reasonable alternatives) is the Old River channel. The Old River channel surrounds Kaskaskia Island. Its floodway is confined between the northwestern edge of the Bois Brule Levee and the southeastern edge of the Kaskaskia Levee.

The village of Kaskaskia is located on the west side of the Mississippi River just upriver of Chester. Kaskaskia was a commercial and transportation hub in the 1800s; in fact, it was the first capital of Illinois until 1820. The Mississippi River shifted course to the east side of Kaskaskia in the middle and late 1800s and as a result, the village is now located on the west side of the Mississippi River. But since the state line follows the historical path of the Mississippi River, Kaskaskia remains a part of the state of Illinois.

3.4.3.3 Horse Island Chute

Horse Island Chute splits from the Old River channel approximately 3,000 feet upstream from the mouth of the Old River channel (approximately 3,000 feet upstream from the Missouri State Highway 51 Bridge over the Mississippi River) and flows into the Mississippi River approximately 1,400 feet downstream from the Chester Bridge. Horse Island is bounded by the Mississippi River on the northeast, the Old River channel on the northwest, and Horse Island Chute on the south. Near the point where Horse Island Chute separates from the Old River channel, the Bois Brule Levee trends toward the east, parallel to Horse Island Chute, and approaches the southern bank of the Mississippi River. The Bois Brule Levee then turns toward the southeast and essentially follows the southern bank of the Mississippi River for several miles. The Bois Brule Levee creates a construction on the floodplain of the Mississippi River that narrows to a minimum width of 2,230 feet approximately 3,500 feet downstream of the Chester Bridge. During the 1993 Great Flood, the Bois Brule Levee was not overtopped in the study reach; thus, the study reach was constrained between the Bois Brule Levee on the Missouri side and the railroad embankment along the toe of the bluffs on the Illinois side.

Missouri State Highway 51 crosses the Mississippi River in a northeast direction between Bois Brule Levee and the Illinois bluffs near river mile 110, approximately 8,400 feet upstream from the downstream boundary of the study reach. Missouri State Highway 51 bears to the northwest inside (south of) the Bois Brule Levee and begins to curve to the northeast as it crosses the levee. The Missouri State Highway 51 curve continues as it crosses Horse Island Chute and terminates just before the Chester Bridge.

The Horse Island Chute Bridge (structure 1004R1) is 464 feet long and was built on a horizontal curve. The Chester Bridge (structure L 135A) is 2,827 feet long and is raised substantially above normal water-surface elevations for barge traffic on the Mississippi River. A short section of raised road embankment exists between the southern end of the Horse Island Chute Bridge and the Bois Brule Levee. Another section of raised and curved road embankment extends northward from the Horse Island Chute Bridge, rising to meet the sloped approach spans of the Chester Bridge.

A change in flow in the Horse Island Chute has occurred over time. In the mid-1940s, flow occurred in the chute at any discharge more than approximately 100,000 CFS. By the 1970s, flow occurred in the chute only for discharges greater than 300,000 CFS. The inlet to Horse Island Chute or to the Old River channel that connects Horse Island Chute with the main channel upstream from the Chester gage appears to be filling in, such that the stage required to initiate flow in Horse Island Chute has been increasing with time.

3.4.3.4 Stormwater Management

Existing surface water conditions would continue under the No-Build Alternative. For the Build Alternatives, sediment generation is the impact of concern for surface water quality. Sediment loads in rivers, streams, and wetlands can have an impact on drinking water quality and on aquatic animals by

limiting oxygen absorption and covering eggs. Thus, erosion and the resulting sediment are regulated and involve BMPs to control adverse impacts.

The Existing Stormwater Management System primarily consists of an open drainage system. Driveway and roadway culverts are located along the entire corridor. The open drainage system is well maintained through the majority of the corridor with open driveway culverts and relief in the roadway.

- MoDOT will ensure sediment and erosion control BMPs are implemented. MoDOT will develop and implement two SWPPPs to comply with the Missouri State Operating Permit No. MO-R 100007 and the IEPA general NPDES Permit ILR10. During construction, MoDOT and its contractor would implement the SWPPPs to minimize adverse impacts to the Mississippi River and waters adjacent to the project corridor. The contractor would implement the current MoDOT SWPPP for work in Missouri, and would apply for an NPDES permit and develop a SWPPP for work to be completed in Illinois.

3.4.3.5 Surface Water Impacts.

The Build Alternatives are likely to involve dewatering during pier construction and may require dredging within the Mississippi River to facilitate contractor access to all bridge spans. Any project that involves discharge of dredge or fill into Waters of the United States requires a Section 404 Permit from USACE.

3.4.4 Wetlands

Wetlands are transitional Waters of the United States between aquatic and terrestrial habitats where water occurs at or near the soil surface during the growing season. They provide diverse and sometimes specialized habitats for aquatic and terrestrial wildlife and plants.

Wetlands are regulated under a number of federal and state laws and policies. Executive Order 11990 requires a finding that there is no practicable alternative to construction in wetlands and that the selected alternative includes all practicable measures to minimize harm to wetlands that may result from project use. Wetlands within the Chester Bridge EA study area are regulated by the USACE St. Louis District and IEPA under the Clean Water Act through permitting activities prior to the start of project construction. Wetlands are also regulated by IDNR through the implementing regulations of the Interagency Wetland Policy Act of 1989, which also requires avoidance, minimization, and mitigation of wetland impacts. These regulations also include mandatory mitigation (replacement) ratios of up to 5.5:1 replacement for impacted wetlands.

Initial wetland investigations began with a review of county soil survey maps and National Wetland Inventory maps to determine the locations of potential wetland sites. The study area was then surveyed to determine the presence of plant species, soil type, and presence of water at or near the surface. Areas that met these conditions are considered wetlands and were mapped on aerial photographs. Methodologies used follow protocols outlined in the *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Midwest Region (Version 2.0)* (USACE, 2010) and the *Corps of Engineers Wetland Delineation Manual* (Environmental Laboratory, 1987). The wetland investigations and related findings are documented in the *Aquatic Resources Delineation Report* (**Appendix L**).

Approximately 40 acres of wetlands were identified within the Reasonable Alternative study area; see **Figure 3-10**. Most of these wetland sites are floodplain wetland associated with the original Mississippi River channel and the Horse Island Chute.

Nearly all of Horse Island south (downstream) of the existing bridge is wetlands. Upstream, the wetlands form a relatively narrow rim along the periphery of the island. Therefore, the use of the Upstream Alternatives (U-1 and U-2) minimizes wetland impacts.

Using the impact footprints for the Reasonable Alternatives, the expected wetland impacts are estimated to be 3.2 acres for U-1 and 4.8 acres for U-2. The couplet alternative (R-2) will have a variable impact depending on the couplet bridge configuration. Because R-2 uses a one-way couplet configuration (where a modified version of Alternative U-1 or U-2 is used, along with the existing Mississippi River crossing being rehabilitated while maintaining its historic integrity), encroachments will depend on the couplet used (U-1/U-2) and the equipment/supply staging areas needed for outside the existing right-of-way. This will be for work items such as equipment/supply staging. It is expected that these impacts will be accomplished through temporary construction easements rather than permanent takings. Consequently, this work may not constitute a permittable activity.

The impacts will also be dependent on the extent of the use of piers versus fill material used in the final design/configuration. The impacts will be primarily to floodplain forested wetlands. All of the alternatives are expected to require the filling of the small open-water pond near the existing bridge.

The Preferred Alternative is estimated to impact 3.2 acres of wetlands.

In all cases, a finding of no practical alternative will be necessary for waterway permitting purposes. USACE must evaluate alternatives that are practicable and reasonable. A permit cannot be issued for a proposed project if a practicable alternative exists that would have less adverse impact on the aquatic ecosystem, provided that the alternative does not have other significant adverse environmental consequences to other natural ecosystem components. The guidelines also include two rebuttable presumptions. First, alternatives that do not affect special aquatic sites are presumed to be available. The second presumption states that practicable alternatives located in non-special aquatic sites have less adverse impact on the aquatic ecosystem. It is the permit applicant's responsibility to clearly demonstrate to USACE that both of these presumptions have been rebutted in order to pass the alternatives portion of the guidelines. This requirement is also important in the evaluation of alternatives regarding satisfying the project’s Purpose and Need.

- MoDOT will obtain authorization by an Individual Clean Water Act Section 404 Permit from USACE, including Section 401 Water Quality Certification from MDNR/IEPA.

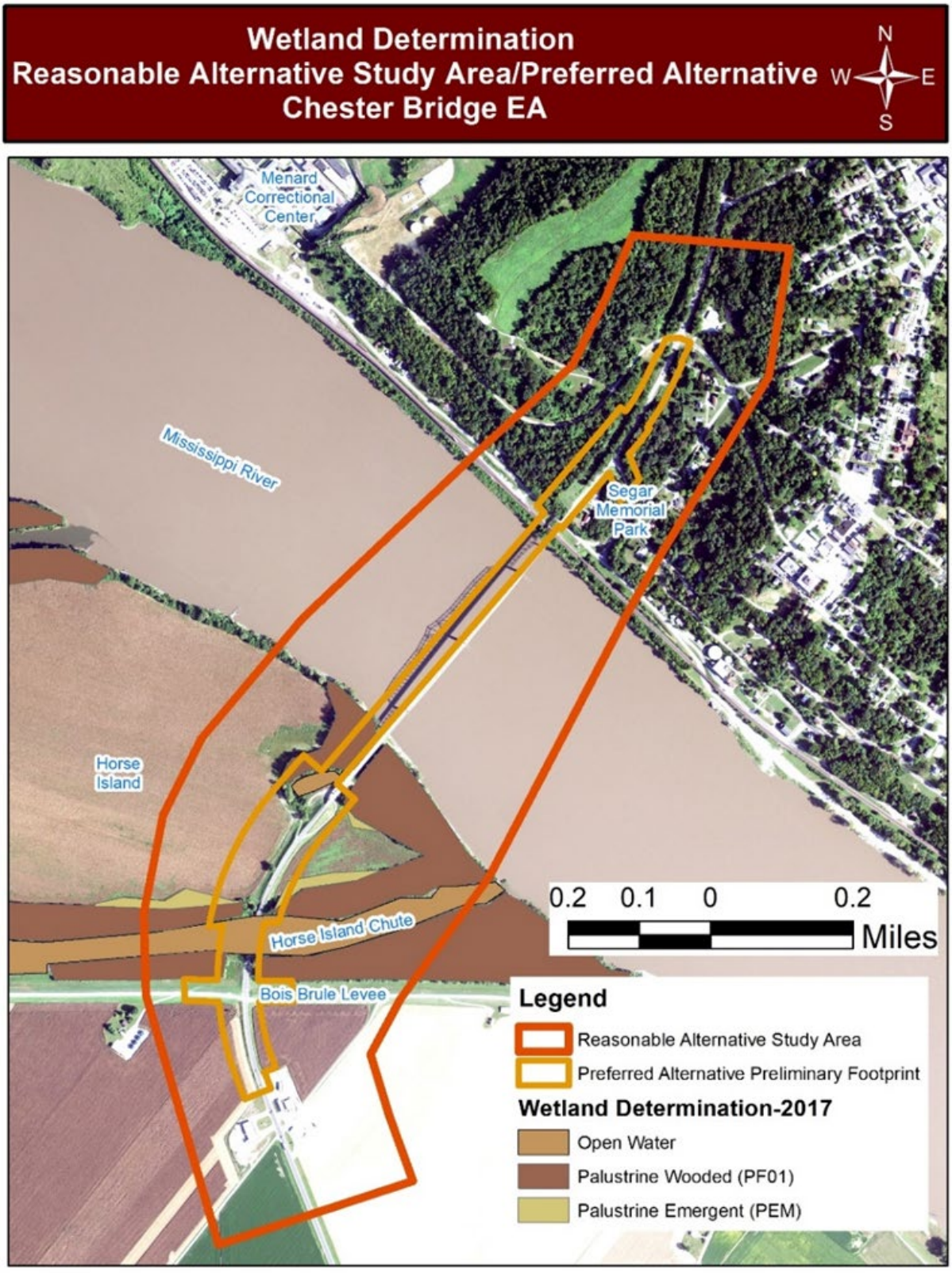

Figure 3-10. Wetland Determination

3.4.5 Groundwater and Drinking Water

The geology and topography of the project location in Illinois consist of limestone and shale outcroppings over dissected valleys. The very narrow floodplain band between the bluffs and the

Mississippi River is occupied primarily by the Union Pacific Railroad and Illinois Route 6. On the Missouri side, deposits of poorly sorted sands, silts, and clays over well-sorted sands and gravel overlay limestone, dolostone, and shales.

There are no meaningful differences among the Reasonable Alternatives and the Preferred Alternative with regard to groundwater and drinking water.

3.4.5.1 Karst Formations

Karst is the term referring to areas with caves and sinkholes that has the potential for groundwater recharge. Although the region within which the project lies has known karst formations, there are no observed cases in the project corridor.

3.4.5.2 Sole-Source Aquifers

There are no sole-source aquifers or public or private water wells within 200 feet of the project corridor. Nor are there any Illinois Class III Groundwater designations within the project corridor. The latter designation has been established in Illinois to protect dedicated nature preserves from groundwater contamination.

3.4.5.3 Public Water Supplies

The Chester Water Plant is located at 194 Kaskaskia Street, near the Chester riverfront overlooking the Mississippi River. The City of Chester draws drinking water from the Mississippi River approximately 0.5 mile downstream of the Chester Bridge (Public Water System ID# - IL 1570100). There is also a Public Water System entry at the Menard Correctional Center (IL-1575550). The Menard Correctional Center is upstream of the Chester Bridge.

- MoDOT will coordinate with the Chester Water Department and the Menard Correctional Center should water quality concerns arise that may negatively affect public drinking water, such as an accidental petroleum or chemical spill from contractor operations. If dredge discharge were to be authorized in the Mississippi River, MoDOT would discharge this material downstream of Chester's public drinking-water intake. The No-Build Alternative would not have impacts on existing groundwater or drinking water.

3.4.5.4 Other Well Information

According to IEPA, there are no known public water wells within 1,000 feet of the project right-of-way, and no IDOT facility work is planned for the proposed project; therefore, no impact on any setback zones as determined by the IEPA Division of Public Water Supplies is expected. According to ISGS, no other types of water wells were identified within 200 feet of the proposed project. An EDR Well Search was also conducted for the project (Inquiry Number: 5167186.5 - January 26, 2018). In Illinois, a very shallow well was dug roughly 0.25 mile upslope of the Mississippi River, approximately 0.5 mile upstream of the Chester Bridge.

In Missouri, an EDR Well Search Report identified three small wells in the vicinity of the Chester Bridge. . Each had pumps rated less than 500 gallons per minute. Two wells are located upstream of the Chester Bridge, on Kaskaskia Island. The third is downstream of the Chester Bridge along PCR 238 (equidistant between the levee and Route 51).

3.4.5.5 Other Groundwater Considerations

In Illinois, the potential for contamination of shallow aquifers is limited. Most of the Chester Bridge EA study area within the uplands is located in Zone A1. Zone A1 is described as permeable bedrock at or within 20 feet of land surface, with variable overlying materials.

In Missouri, soils in the Bois Brule Levee district are clayey alluvium over loamy alluvium on floodplain steps. These are typically not prime farmland. The depth to restrictive features is about 19 inches to a

strongly contrasting textural stratification. The soils are somewhat poorly drained. The capacity of the most limiting layer to transmit water is very low to moderately low (0.00 to 0.06 inch per hour). The depth to water table is about 12 to 24 inches. Flooding is occasional, with no frequency of ponding. The available water storage in the soil profile is very low (about 2.3 inches). The Hydrologic Soil Group is typically D, with many areas of hydric soil rating.

3.5 Public Land Impacts

This section addresses programs that affect public lands and resources.

3.5.1 Section 6(f)

Section 6(f) is intended to protect parks and other recreational resources from conversion to other uses. The Section 6(f) park process applies to those state, county, or local recreational resources that have received funding through the Land and Water Conservation Fund (LWCF) Act.

Section 6(f) of the LWCF Act (codified at 16 United States Code 460l-4 et seq.) states that:

> *"No property acquired or developed with assistance under this section shall, without the approval of the Secretary [of the Interior], be converted to other than public outdoor recreation uses. The Secretary shall approve such conversion only if he finds it to be in accord with the then existing comprehensive statewide outdoor recreation plan and lonely upon such conditions as he deems necessary to assure the substitution of other recreation properties of at least equal fair market value and of reasonably equivalent usefulness and location."*

Section 6(f) is intended to protect parks and other recreational resources from conversion to other uses. The Section 6(f) park conversion process applies only to those state, county, or local recreational resources that have received funding through the LWCF Act. The National Park Service makes the ultimate decision on whether to approve a conversion of land that has received funding under the LWCF Act.

Coordination with the state Section 6(f) coordinators revealed that no LWCF funds were used in the vicinity of the Chester Bridge. No impacts will occur.

3.5.2 Section 4(f)

A Section 4(f) property is any publicly owned land of a public park, recreational area, or wildlife and waterfowl refuge of national, state, or local significance or land of a historic site of national, state, or local significance.

3.5.2.1 Section 4(f) – Regulatory Framework

In general, a transportation project approved by FHWA may not use a Section 4(f) property unless the following are determined:

1. There is no feasible and prudent avoidance alternative, as defined in 23 CFR 774.17, to the use of land from the property.
2. The action includes all possible planning, as defined in 23 CFR 774.17, to minimize harm to the property resulting from such use.

If it is determined that an action would result in the use of a Section 4(f) resource, then the lead federal agency, in this case FHWA, is required to prepare a Section 4(f) evaluation. A variety of evaluations are possible, depending on a project's circumstances.

An **individual Section 4(f) evaluation** is processed in two phases—draft and final—both of which must be submitted to the FHWA Division Office or Federal Lands Division Office for review and approval. The

final Section 4(f) evaluation is subject to a legal sufficiency review by FHWA's Office of Chief Counsel. The review is intended to ensure that Section 4(f) requirements have been met, in case of a legal challenge to Section 4(f) use.

Programmatic Section 4(f) evaluations can be used in place of individual evaluations for projects where uses are considered minor. The primary advantage of a programmatic evaluation is that it saves time. Unlike an individual evaluation, a programmatic evaluation does not require a draft, a comment period, or circulation, because its framework and basic approach has already been circulated and agreed upon by the U.S. Department of the Interior. Project-specific details are then applied to the programmatic evaluation to determine whether it can be used. Programmatic evaluations are usually assessed and approved by the Division Offices much sooner than individual evaluations.

For historic sites, a **de minimis Section 4(f) impact** means that FHWA has determined, in accordance with 36 CFR part 800, that no historic property is affected by the projector that the project will have "no adverse effect" on the historic site in question. For parks, recreation areas, and wildlife and waterfowl refuges, a de minimis impact is one that will not adversely affect the features, attributes, or activities qualifying the property for protection under Section 4(f). A de minimis impact determination does not require analysis of feasible and prudent avoidance alternatives.

3.5.2.2 Section 4(f) – Affected Environment

Parks and Recreation Section 4(f) Resources Identified within Study Area

Based on field investigations and records reviews, two park and recreation Section 4(f) sites exist in the general area of the Chester Bridge EA.

The Segar Memorial Park/Illinois Welcome Center is located on the south side of IL Route 150, immediately after the Chester Bridge. The park is owned and administered by the City of Chester. It is included in the City's roster of recreational amenities. Onsite is a scenic overlook, picnic tables, and a tourist center. In addition to its status as a locally-important recreational resource, the 3-acre park is also a Section 4(f) resource; see **Figures 2-6, 2-7, 2-8,** and **2-9**.

Conceptual Alternatives that were expected to impact Segar Memorial Park were eliminated from further consideration. The reasonable Build Alternatives (including the Preferred Alternative) are not expected to require the acquisition/use of property from the park; neither are they expected to alter the operations of, or access to, the park.

The epic flooding of 1993 gave birth to the Middle Mississippi River National Wildlife Refuge **(Figure 3-11)**. The first parcels were purchased in 1996. The refuge now consists of about 7,000 acres. According to the USFWS, the goal of the refuge is to provide habitat for migratory birds, native river fish, and endangered, threatened, and rare species. The various divisions of the Middle Mississippi River National Wildlife Refuge are not contiguous. The 2,010-acre Horse Island Division is nearest to the Chester Bridge EA.

The management goal of the refuge is to restore the function of the lands as they were prior to human existence. Much of the land in the refuge is bottomland property that had been converted to agricultural use at one time, and this part of the Mississippi River is largely untamed. Although there are wing dams and weirs, no lock-and-dam facilities exist south of Alton.

Figure 3-11. Middle Mississippi River National Wildlife Refuge (Horse Island Division)

Historic Section 4(f) Resources Identified within Study Area

For the purposes of Section 4(f), a historic site is significant only if it is on or eligible for the NRHP. For historic properties, the official with jurisdiction is the State Historic Preservation Office (SHPO). The Advisory Council on Historic Places (ACHP) will also be invited to comment on the project with regard to impacts to historic sites. The ACHP will be an Official with Jurisdiction if they participate in consultation. Historic properties are also subject to review pursuant to Section 106 of the National Historic Preservation Act (NHPA). Section 106 regulations define a consultation process that includes consultation with the SHPO and other consulting parties to identify any historic properties within the project's Area of Potential Effects (APE), determining whether the project will have an adverse effect on any historic properties, and resolving any adverse effects on those resources.

As discussed in **Section 3.6.1** Cultural Resources, six Historic Section 4(f) Resources exist in the vicinity of the Chester Bridge EA study area: the Chester Bridge, the Horse Island Chute Bridge, and four closely-spaced prehistoric lithic artifact sites. These are described below:

On August 10, 1998, the Keeper of the National Register determined the Chester Bridge eligible for the National Register under Criterion C. In 2009, the Missouri SHPO also determined the bridge to be eligible for the National Register under Criteria A and C, with the area of significance being engineering. The Chester Bridge was reevaluated on October 11, 2018, by Archaeological Research Center of St. Louis. The architectural survey has revealed that the bridge has been regularly maintained and it retains its historic integrity; Chester Bridge (L0135) remains eligible to the NRHP under Criterion C, for Engineering.

The economic importance of the bridge to the City of Chester also makes it eligible under Criterion A, for Commerce. Replacement will have an adverse effect on the Chester Bridge.

Its partner bridge, the Horse Island Chute Bridge (L1004), is an example of an extremely common bridge. However, the Horse Island Chute Bridge is eligible for the NRHP under criterion A for significance in commerce, since its construction was necessary for the Chester Bridge to function in its role in improving commerce. Replacement will have an adverse effect on the Horse Island Chute Bridge.

In April and May 2018, the American Bottom Field Station of the Illinois State Archaeological Survey conducted an investigation of archeological sites on the Mississippi River bluff south of Chester. The survey found several closely spaced prehistoric lithic artifact sites. Four of these sites (11R931, 11R932, 11R933, and 11R934) have the potential to provide new information on the prehistory of the region and therefore warrant NRHP consideration under Criterion D. If potential impacts to these sites cannot be avoided, further investigations are recommended.

3.5.2.3 Section 4(f) Impacts

The Reasonable Alternatives and Preferred Alternative are not expected to require the acquisition/use of property from Segar Memorial Park. Neither are they expected to alter the operations of, or access to, the park.

None of the Build Alternatives encroach on the Middle Mississippi River National Wildlife Refuge. However, the USFWS' acquisition boundary for planning purposes, extends to the existing Chester Bridge. None of this land is in the USFWS acquisition process. The acquisition boundary was developed on the basis of USFWS' determination of greatest need and highest potential for restoration. However, the refuge system only purchases land from willing sellers, thus no impacts are expected.

The Preferred Alternative would not reuse the existing Chester and Horse Island Chute Bridges**.** The only Reasonable Alternative that would reuse the existing bridges is the Rehabilitate the Existing Alternative (R-2), which uses a one-way couplet configuration (where a modified version of U-1 or U-2 is used along with the existing Mississippi River bridge rehabilitated to maintain its historic integrity). This alternative can eliminate the need to close the crossing during the rehabilitation work; however, it does not eliminate the need for a temporary flood wall along Route 51. **Section 2.3** includes a discussion of decision-making that resulted in the selection of the Preferred Alternative.

Interest in the reuse of the existing bridges for aesthetic, recreational, and bicycle/pedestrian purposes has been expressed during the public involvement process. Pursuant to MoDOT policy, the existing Chester Bridge was made available for donation. Proposals for the reuse of the Chester Bridge were due by December 31, 2018; however, no proposals were submitted by the deadline. The Horse Island Chute Bridge was given an exemption from the marketing requirement. It is a bridge type that is aesthetically not likely to be selected for relocation and its existing location in a notch of the Bois Brule Levee means project's Purpose and Need could not be met while the Horse Island Chute Bridge remains in place. Finally, this bridge is eligible for the National Register of Historic Places under Criterion A for Commerce. Relocation of the bridge would remove the bridge from its association

MoDOT has determined that the bridges cannot be reused by non-MoDOT entities. Consequently, MoDOT has undertaken the necessary Section 106 review and consultation. This process is discussed in **Sections 3.6.1** and **4.12**. This project meets all of the applicability criteria set forth in the Nationwide/Programmatic Section 4(f) Evaluation for Projects that Necessitate the Use of Historic Bridges. The development and evaluation of alternatives is sufficient to conclude that there are no feasible and prudent alternatives to the use of the historic bridges. The project also includes all possible planning measures to minimize harm. The programmatic worksheet is included as **Appendix G**.

Relative to the archeological sites on Mississippi River bluff south of Chester**,** an evaluation was conducted to investigate avoidance. Ultimately, the Preferred Alternative was modified to avoid impacts to the archaeological sites. See **Section 2.4** for more details.

3.5.3 Aviation

In Missouri, one of the largest study area developments is at the Perryville Airport (1856 Highway H). This regional airport was originally built by the U.S. Government as a training facility in the early 1940s. The airport was deeded to the City of Perryville in 1947. The airport has a 7,000-foot-by-100-foot concrete runway equipped with medium-intensity runway lights that allow for use by numerous kinds of aircraft, including jets. Fixed base operators include Sabreliner Aviation and CertiFLY Aviation Parts, which are engaged in modifications and overhauls to both civilian and military aircraft.

To evaluate how the Chester Bridge EA project might affect aviation at the Perryville Airport, the project team began coordination with FAA and the airport itself. The FAA is responsible for the safety and efficiency of navigable airspace and has requested to be an Interested Agency (see **Section 4.9** for further information about agency coordination and commitments). The primary mechanism that FAA uses to assess airspace considerations is Federal Aviation Regulation (FAR) Part 77, *Objects Affecting Navigable Airspace*. Under this FAR, any plan that proposes construction or alterations that exceeds 200 feet tall or are within 10,000 feet of a runway (with a 50:1 surface from any point on the runway is required to provide a Notification to FAA). Notification allows FAA to identify potential aeronautical hazards in advance, thus preventing or minimizing the adverse impacts to the safe and efficient use of navigable airspace.

The potentially suitable bridge types for this project (see **Section 2.3.4**) may exceed 200 feet in height and the bridge is within 10,000 feet of the airport, prompting coordination with FAA. An initial feasibility study by FHWA of the potential locations and elevations of bridge towers for the Reasonable Alternatives and Preferred Alternative indicated that potential impacts to either the visual landing approach surfaces and/or instrument approach landing surfaces may occur.

- MoDOT will submit an official FAA 7460 evaluation and complete required mitigation prior to construction. The FAA 7460 evaluation provides a more precise explanation on the landing surfaces affected and offers mitigation strategies. The submittal of the FAA 7460 evaluation and completion of required mitigation must occur with FHWA's timeframe(s).

The aviation impacts associated with the couplet alternative (R-2) will depend on the upstream couplet selected as its pair.

3.5.4 Navigation During Operation

Two navigation channels are located along the Mississippi River under the Chester Bridge. Barge traffic is heavy and maintaining safe access for barges under the Chester Bridge is important on regional, statewide, and national levels.

USCG has determined that a replacement bridge with a minimum horizontal clearance of 800 feet will be provided for the main navigation channel (east side) and a minimum of 500 feet will be provided for the auxiliary navigation channel (west side). The existing vertical clearance is sufficient. Reasonable Alternatives U-1 and U-2 are able to achieve these clearances; therefore, they would satisfy the reasonable needs of navigation.

The existing Chester Bridge has the following characteristics:

- Vertical clearance (over the Mississippi River) of roughly 104 feet
- Bridge height roughly 175 feet tall
- Located 10,000 to 12,000 feet from the end of the Perryville airport runway

As described in **Section 3.4.2.5**, the couplet alternative (R-2) would rehabilitate the existing Chester and Horse Island Chute Bridges (while maintaining their historic integrity); R-2 would be paired with a modified version of the Reasonable Alternatives (U-1 and U-2). Because the piers of the Mississippi River bridge would need to match those of the existing bridge, the couplet alternative (R-2) would not be able to provide the USCG's minimum horizontal clearances. In addition, based on past vessel allisions occurring at the existing bridge and reported issues with background lighting creating difficulties for navigation, the USCG has reservations about the present bridge remaining. The presence of two, tightly-spaced bridges would further complicate navigation.

Navigation during construction is discussed in **Section 3.6.3**.

3.5.5 Traffic Safety and Accessibility Impacts

A major driver of this study is safety and accessibility. The narrow, 11-foot lane widths force closures to allow for wide loads and farm equipment to cross the Chester Bridge. While accidents are infrequent, a common stakeholder concern is safety. In addition to roadway traffic, the Chester Bridge affects barge traffic along the Mississippi River. Allisions with the existing bridge piers are also a concern.

Three broad categories of advantages are associated with one-way couplets (like Reasonable Alternative R-2): safety, capacity, and convenience. In general, intersections of one-way couplets have significantly less vehicular and pedestrian conflict points. One of the prime objectives of one-way couplets is to improve the movement of vehicles along the network; in other words, improving capacity. From a convenience perspective, one-way systems usually allow for better pedestrian crossing times and fewer accidents, provided enough time is allocated on the signal crossing. Because of the low traffic volumes and minimal pedestrian presence, this benefit is expected to be minimal. Because of the length of the couplet alternative (R-2), this alternative offers few, if any, of the typical safety and benefits listed. This alternative would result in the one-way roadways converging near the access points (entrances) to the gas stations on the Missouri side of the Mississippi River and Segar Memorial Park, the Welcome Center, and the intersection of IL Route 150 and Randolph Street on the Illinois side. This configuration has the potential to increase driver confusion and may be a detriment to traffic safety.

The new alignment alternatives (U-1 and U-2) are expected to maintain existing traffic patterns. Maintenance of traffic across the river during construction is essential. The new Build Alternatives (U-1 and U-2) can be constructed while the existing bridges are still open. Under the couplet alternative (R-2), rehabilitation of the existing bridges must wait for the completion of a new bridge. At that point, a new bridge can handle both directions of travel while the existing bridges are rehabilitated. This would

essentially double the construction period[8]. Road construction always has inconveniences to the community; Reasonable Alternative R-2 will double that time of inconvenience. Construction crew access, material deliveries, temporary detours, and delays are all expected.

3.6 Impacts to the Human Environment

Just as natural resources are considered in NEPA decisions, community or human resources are also covered by NEPA. This section covers some of the resources associated with human systems.

3.6.1 Cultural Resources

The term cultural resource is not defined in NEPA. However, NEPA does require that agencies consider the effects of their actions on all aspects of the human environment. Humans relate to their environment through their culture. Important elements of the human/cultural environment are preserved to retain a community's sense of history. Thus, the term cultural resources has come to encompass historic properties under NEPA. Historic properties typically encompass districts, sites, buildings, structures, and objects included on or eligible for the NRHP. For ease of discussion, this section focuses on cultural resources in terms of architectural resources and archaeological resources.

3.6.1.1 Cultural Resources – Regulatory Background and Standards

Federal approvals associated with the Chester Bridge EA are subject to compliance with the NHPA and its implementing regulations (36 CFR 800). NHPA Section 106 requires that the federal agency responsible for an undertaking consider the effects of its actions on historic properties. Historic properties are those listed on or determined eligible for listing on the NRHP. The types of resources eligible for listing on the NRHP include buildings, sites, structures, objects, and districts. In addition, registered graves are protected by Missouri Statute 214.131-132, and unmarked human graves and burial mounds are protected by Missouri Revised Statutes (RSMo) 194.400-401 and the Native American Graves Protection and Repatriation Act of 1990. Illinois has similar protections including the Human Skeletal Remains Protection Act (20 Illinois Compiled Statutes [ILCS] 3440) and the Cemetery Protection Act (765 ILCS 835).

[8] The anticipated construction phasing to maintain traffic continuity would be to construct the new crossing (bridges), connect to the existing approach roadways, and then undertake the rehabilitation of the existing bridge. This is estimated to be approximately twice as long as building a new bridge, connecting to the existing approaches, and demolishing the existing bridge.

Section 106 regulations require consultation. Consultation is the process of seeking, discussing and considering the views of other participants, and where feasible, seeking agreement with them regarding matters arising in the section 106 process (36 CFR 800.16(f)). For the Chester Bridge EA project, participants in the Section 106 process include FHWA, SHPO(s), Tribes, the City of Chester, MoDOT/IDOT, and other consulting parties with a legal or economic interest in the project or a demonstrated interest in historic properties. The federal ACHP may choose to participate in consultation if the project meets their criteria. On April 25, 2019, the ACHP responded that their participation in the consultation to resolve adverse effects is not needed. Resolution of adverse effects will be documented in a Memorandum of Agreement (MOA), which will be negotiated among the consulting parties. The details of the consultation meetings are contained in **Section 4.12**.

The Section 106 Process

Step 1: Initiate the process--Includes identifying the Lead SHPO and potential consulting parties

Step 2: Identification of historic properties—archival review and the field surveys for architecture and archaeology

Step 3: Assess effects of the project on historic properties using the criteria of adverse effects

Step 4: Resolve adverse effects—through consultation identify potential mitigation measures, and develop and execute an agreement document for the project

In accordance with current practice, a series of evaluations was conducted to investigate cultural resources in the vicinity of the Chester Bridge EA. The evaluations started with an Archival Review (a review of the existing literature). The archival review covered the broad study area. Based on the results and the Reasonable Alternatives, a Phase I Architectural Study was conducted. Finally, a Phase I Archaeological Survey was conducted for the Preferred Alternative.

3.6.1.2 Resources Identified during the Archival Review

In Missouri, the Archival Review reached the following conclusions:

- There is a moderate chance for intact archaeological resources to be present in the vicinity of the Chester Bridge EA.
- There are no significant architectural resources in the vicinity of the Chester Bridge EA.
- One unique area of concern is the location of the remains of the Belle of Chester, on the Missouri side of the Mississippi River, south of the Chester Bridge. The exact location of these remains is unknown. Work planning on the existing bridge should consider this resource.
- Another unique area of concern is the Osage Mississippi River trail. The Osage Nation indicted that "The proposed undertaking is located one-mile northeast of the Osage Mississippi River Trail. Expedient graves and temporary hunting camps may be located along these trails."
- The Chester Bridge is eligible for the NRHP because of its significance in engineering and commerce.
- The Horse Island Chute Bridge is also eligible for the NRHP under criterion A for significance in commerce, since its construction was necessary for the Chester Bridge to function in its role in improving commerce.

In Illinois, the Illinois Inventory of Archaeological and Paleontological Sites database showed no known archaeological sites intersecting or within the APE. A check of the geographic information system data of previous Archaeological Survey (companion data set to the Illinois Inventory of Archaeological and Paleontological Sites) reveals portions of two previous archaeological surveys within the Illinois portion of the APE. Much of the Illinois portion of the APE (67 percent) falls within the Illinois Archaeological Higher Potential Model. Relative to architectural resources, the Historic Architectural Resources Geographic Information System (HARGIS) database, and the historic files from the Illinois Historic

Preservation Agency (IHPA) were consulted. In Illinois, other than the Chester Bridge itself, no other resources are eligible for listing on the NRHP in the vicinity of the Reasonable Alternatives.

3.6.1.3 Resources Identified during the Architectural Survey

The architectural survey for the Chester Bridge EA APE was conducted on October 11, 2018, by the Archaeological Research Center of St. Louis. The survey evaluated nine properties and two bridges. The properties included: one parcel where access was denied (AD); one parcel with buildings, structures, or objects outside of the APE (P); six parcels with no buildings, structures or objects (V); one parcel with buildings, structures, or objects constructed before 1979; and two bridges, the Chester Bridge (L0135) and the Horse Island Chute Bridge (L1004), both constructed before 1979.

The Chester Bridge and Horse Island Chute Bridge are the only architectural resources affected by the Reasonable Alternatives. The Chester Bridge status as eligible for the NRHP was confirmed. Its partner, the Horse Island Chute Bridge (L1004), is an example of an extremely common bridge. However, it is eligible for the NRHP under criterion A for significance in commerce since its construction was necessary for the Chester Bridge to function in its role in improving commerce. Replacement will have an adverse effect on both bridges.

Consequently, Section 106 regulations require consultation. For the Chester Bridge EA, the consultation resulted in an MOA. The Section 106 consultation is discussed in **Section 4.12** of this document.

- MoDOT and IDOT will ensure that all stipulations outlined in the Section 106 MOA be fulfilled within 5 years of the date of execution of the MOA by FHWA. The MOA will be contained in the **Project Record** and available upon request to the MoDOT Historic Preservation Section.

3.6.1.4 Resources Identified during the Archaeological Survey

In Missouri, an archaeological field survey was completed within 100 feet of the Preferred Alternative footprint. No materials were found. No resources eligible for the NRHP were identified.

In Illinois, an archaeological field survey was completed within a 330-acre APE. This resulted in the identification of new archaeological sites. These sites consist of moderate to high-density scatters of non-diagnostic prehistoric lithic material. These resources have the potential to provide new information on the prehistory of the region. Consequently, they warrant consideration for the NRHP, under Criterion D because of the prehistoric components identified. If potential impacts to these sites cannot be avoided, further investigations are recommended.

As discussed in **Section 2.4**, the use of rock-lined slope and retaining walls allows for the minimization of impacts on the known archaeological sites. In accordance with consultation with the Illinois SHPO, four archaeological sites (11R931 to 11R934) and no architectural resources in Illinois are eligible for National Register consideration.

- Additional archaeological investigations are required if potential impact to the four archaeological sites (11R931 to 11R934) cannot be avoided. Further coordination with the SHPO is required after potential impacts to the four sites have been determined. Plans developed for this area will designate avoidance areas.

3.6.1.5 Evaluation of Efforts to Reutilize the Existing Bridges

Under Section 106, MoDOT, IDOT, and FHWA must consider the effect of their actions on historic properties. To successfully complete a Section 106 review, federal agencies must explore alternatives to avoid or reduce harm to historic properties and reach agreement with the SHPO on measures to deal with any adverse effects.

- As part of this project, MoDOT requested reuse proposals for the Chester and Horse Island Chute Bridges; however, no reuse proposals were received. MoDOT has determined that the bridges cannot be reused by non-MoDOT entities.

As discussed in **Section 2.3**, Reasonable Alternative R-2 was developed and evaluated. This alternative would rehabilitate the existing alternative to serve as a one-way couplet configuration where a modified version of U-1 or U-2 is used along with the existing Mississippi River bridge. Alternative R-2 would need to rehabilitate the existing bridges in a manner that maintains their historic integrity. Alternative R-2 may be able to minimally satisfy the Purpose and Need and maintain the historic integrity of the existing bridges. The use of a new one-way crossing can eliminate a closure of the river crossing; however, it does not eliminate the need for the temporary flood wall along Route 51. Other negative aspects of Alternative R-2 include the following:

- The USCG has reservations about the Chester Bridge remaining, citing navigation safety due to the 650-foot navigation channels and light from the City of Chester partially obscuring the bridge during the night. The presence of two, tightly-spaced bridges would further complicate navigation.
- The construction schedule would be double of the standalone Alternatives U-1 and U-2. The couplet alternative will cause interference both during the new build phase and again during the rehabilitation phase.
- Rehabilitation of the existing bridges may require extensive amounts of falsework, adding to navigation complications.
- The couplet alternative (R-2) would retain the roadway gap in the Bois Brule Levee.
- The second crossing required by Reasonable Alternative R-2 represents another potential for aviation conflict.
- The cost of Reasonable Alternative R-2 could be extensive given the required rehabilitation work. As such, it could be the most expensive alternative.
- To maintain its historic integrity, the rehabilitation of the existing bridges would need to retain the bridges' design, materials, and workmanship. A 15-year rehabilitation could maintain the bridges' historical integrity; however, this is not a practical alternative. A 50-year rehabilitation is not expected to retain the bridges' historic integrity. In addition, it could be quite expensive because of the unknown amount of rehabilitation that would be required and result in bridges with an operational life below the project design life.

These flaws led to the conclusion that the bridges meet all of the applicability criteria set forth in the Nationwide/Programmatic Section 4(f) Evaluation for Projects that Necessitate the Use of Historic Bridges. Principally, the determination was made that the problems listed above represent a condition whereby the bridges are seriously deficient geometrically and cannot be widened (horizontally and/or vertically) to meet the minimum required capacity of the highway system on which it is located without affecting the historic integrity of the bridge. The programmatic worksheet is included as **Appendix G**.

3.6.2 Farmland Impacts

The NRCS classifies farmland that is prime or of statewide importance. Prime farmland is land that has the best combination of physical and chemical characteristics for producing food, feed, forage, fiber, and oilseed crops, and is available for these uses. In general, prime farmland has an adequate and dependable supply of moisture from precipitation or irrigation, a favorable temperature and growing season, acceptable acidity or alkalinity, an acceptable salt and sodium content, and few or no rocks. The water supply is dependable and of adequate quality. Prime farmland is permeable to water and air. It is not excessively erodible or saturated with water for long periods, and it either is not frequently

flooded during the growing season or is protected from flooding. Slope ranges mainly from 0 to 6 percent.

Unique farmland is land other than prime farmland that is used for the production of specific high-value food and fiber crops, such as citrus, tree nuts, olives, cranberries, and other fruits and vegetables. In some areas, land that does not meet the criteria for prime or unique farmland is considered to be farmland of statewide importance for the production of food, feed, fiber, forage, and oilseed crops. The criteria for defining and delineating farmland of statewide importance are determined by the appropriate state agencies. Generally, this land includes areas of soils that nearly meet the requirements for prime farmland and that economically produce high yields of crops when treated and managed according to acceptable farming methods. Some areas may produce as high a yield as prime farmland if conditions are favorable.

The Farmland Protection Policy Act requires federally funded projects to be coordinated with the NRCS. The coordination will determine whether agricultural resources and support services are significantly affected by the project. **Appendix D** contains the Farmland Protection Policy Act coordination package.

Figure 3-12. Farmland in the Mississippi River Floodplain

3.6.2.1 Farmland – Affected Environment

The floodplain portions of the Chester Bridge study area are primarily in agricultural use. Much of the floodplain is identified as prime farmland. Within the study area, all of the farmland outside of the levee is prime farmland (**Figure 3-12**). The conversion of existing important farmland (prime farmland and farmland of statewide importance) associated with the alternatives is limited—approximately 2 acres for the reasonable Build Alternatives.

3.6.2.2 Farmland – Impacts

The Farmland Conversion Impact Rating (under the Farmland Protection Policy Act) was completed for the Reasonable Alternatives and Preferred Alternative. The assessment consists of two parts, with a total 260 points possible. One hundred points are assigned by the NRCS. The remaining 160 points are determined by the project team, based on a series of questions that evaluate the nature of the affected farmland. The Reasonable Alternatives and the Preferred Alternative received a score of 43. **Appendix D** contains the Farmland Protection Policy Act coordination package. There are no meaningful differences among the Reasonable Alternatives and the Preferred Alternative with regard to farmland impacts.

Selection of the Preferred Alternative was based, in part, on the benign affect it will have on the farmland community. Using a new alignment will allow for the existing roadway to be used for farm equipment access purposes. This will minimize impacts. The Preferred Alternative will also use a new alignment that is very near the existing roadway, which will minimize the bisection of farm fields.

It is anticipated that the greatest impact to the farming community will be the potential for construction-related disruptions to farm operations. To mitigate this, MoDOT's project development process is dedicated to maintaining an open dialog with stakeholders, including the farm community, in order to understand their needs and arriving at design solutions that will allow critical farm operations during construction.

3.6.3 Construction Costs and Impacts

3.6.3.1 Construction Costs

A planning-level cost estimate was prepared, in 2019 dollars, for each of the Reasonable Alternatives.

The costs associated with Upstream Alternatives (U-1 and U-2) are roughly equivalent. Based on the current level of design detail, the primary difference is volume of earthen fill required to construct the embankment between Horse Island Chute and the Mississippi River. Alternative U-1 overlaps with the existing Route 51 embankment on the Missouri approach reducing the amount of earthen fill required to construct the embankment for the new roadway in this area of the project.

The cost of the one-way couplet (R-2) is roughly equivalent to the other alternatives. Not only does it require the construction of a new bridge, but it will also require the substantial rehabilitation of the existing bridge which is more susceptible to cost overruns. Maintaining the historic integrity of the existing building will require the disassembly of the bridge. Each piece will be inspected, repaired, or replaced. One of the difficulties with the existing Chester Bridge is that it is severely rusted. The degree of rust, repair, and replacement will be unknown until each piece is removed and inspected. In addition, given that the amount of rust and subsequent rehabilitation will not be known until disassembly, the cost for rehabilitation could be substantially greater than that shown in **Table 3-7**.

Other than cost, the rehabilitation of the existing Chester Bridge will result in a bridge whose service life is substantially lower than a new bridge (assumed maximum of 50 years), meaning that it will require replacement/further rehabilitation before Alternatives U-1 and U-2.

Table 3-7. Cost Estimate Summary (2019 dollars)

Alternative	New Bridge Elements	New Roadway Elements	Existing Bridge Rehabilitation	Total
U-1	$180,000,000	$11,000,000	Not applicable	$191,000,000[a]
U-2	$180,000,000	$15,000,000	Not applicable	$195,000,000
R-2	$93,000,000	$8,000,000	$72,000,000	$173,000,000

[a] As discussed in **Section 2.4**, upon the tentative selection of the Preferred Alternative construction costs were updated. The total cost estimate for the updated Preferred Alternative is $195,800,000 in 2019 dollars. This is 2 percent higher than the original cost estimate. The increase is due to the curvatures needed at the end spans in Illinois to avoid archaeological sites found during the archaeological survey of the Preferred Alternative footprint *(*see **Section 3.6.1.4***)*. The other alternatives would also have to avoid the archaeological sites and incur similar construction cost increases.

3.6.3.2 Construction Impacts

Construction activities may result in short-term impacts on air quality, including direct emissions from construction equipment and trucks, fugitive dust emissions from site demolition and earthwork, and increased emissions from motor vehicles and haul trucks on local streets. The Preferred Alternative is almost entirely contained within the existing right-of-way. These impacts would be temporary and localized to the area of construction and its immediate vicinity. Fugitive dust, suspended particulates, and emissions could occur during ground excavation, material handling and storage, movement of equipment at the site, and transport of material to and from the project corridor. Fugitive dust could be a problem during periods of intense activity and would be aggravated by windy and/or dry weather conditions. The amount of emissions would depend on the type and number of equipment used. Contractors will be required to comply with all applicable local, state, and federal air pollution regulations.

Standard MoDOT operating procedures associated with air quality include steps to minimize emissions from construction. Controlling construction emissions requires the development of a construction

mitigation plan for implementation during construction. This construction mitigation plan will adhere to current MoDOT standards. Environmental Commitments, beyond MoDOT's standard operating procedures include:

- MoDOT will coordinate with the USCG to schedule dates of the closures of the navigation channel, including the duration of these closures.
- MoDOT will negotiate and execute an agreement with the Union Pacific Railroad prior to seeking project federal authorization for construction. To avoid train-traffic interruptions, the contractor will coordinate to schedule girder settings and for handling other materials over the railroad tracks. Railroad flagmen will be retained during construction when potential impacts to the rail system could occur. Construction of nearby bridge piers will require flaggers during construction operations.
- MoDOT will ensure that details of utility disposition are determined during project design. Agreements with utilities will be negotiated and executed prior to seeking project federal authorization for construction. MoDOT and IDOT utility engineers and representatives of the various utilities will plan the details of individual utility adjustments on a case-by-case basis. MoDOT and IDOT will disconnect and reconnect electrical service lines on the bridge responsible for navigating lighting to the new structure. Temporary power or lights will be maintained for navigational lighting during construction.
- MoDOT will ensure that contractors control fugitive dust to prevent it from migrating off the limits of the project corridor.
- MoDOT will include standard specifications in the construction contract requiring all contractors to comply with every applicable local, state, and federal laws and regulations relating to noise levels permissible within and adjacent to the project construction site.
- MoDOT will ensure that careful refueling practices are employed to limit spills of gasoline and diesel fuels. Oil spills will be minimized by frequently evaluating construction equipment.
- MoDOT will ensure that the construction contract includes a Traffic Management Plan to provide response to temporary disruptions in travel patterns and travel time. The Traffic Management Plan will be developed during project design as part of the final design activities.

3.6.3.3 Utility Impacts

During the initial planning stages of the project, one of the potentially difficult engineering issues is the relocation of the gas pipeline on the existing bridge. This pipeline is owned by ETP. It is currently not being used as movement of gas from Missouri to Illinois is handled via a pipeline downstream of the bridge. ETP has no plans to replace the pipeline on a new bridge; consequently; therefore, this issue is deemed to be resolved.

The Union Pacific Railroad line parallels the river below the bluff and goes under the existing Chester Bridge. The Reasonable Alternatives are not expected to impact the railroad. Requests for participation as an Interested Agency were not answered.

3.6.3.4 Construction and Navigation

Construction of either of the new Build Alternatives (U-1 and U-2) would be conducted to reasonably minimize interference with free navigation of the waterway or impair the present navigable depths.

The existing main and auxiliary navigation channel widths are 650 feet; see **Figure 3-13**.

The contractor's erection scheme would provide adequate horizontal clearance within the navigation channel span to allow safe passage of river traffic during construction of the superstructure. If temporary reduction in navigation channel width is allowed, this reduced navigation clearance during construction would be required only for the minimal amount of time needed to erect the girders. The

contractor's falsework would be removed promptly to restore the full width of the navigation channel span. None of the Build Alternatives would affect the location of the navigation channel.

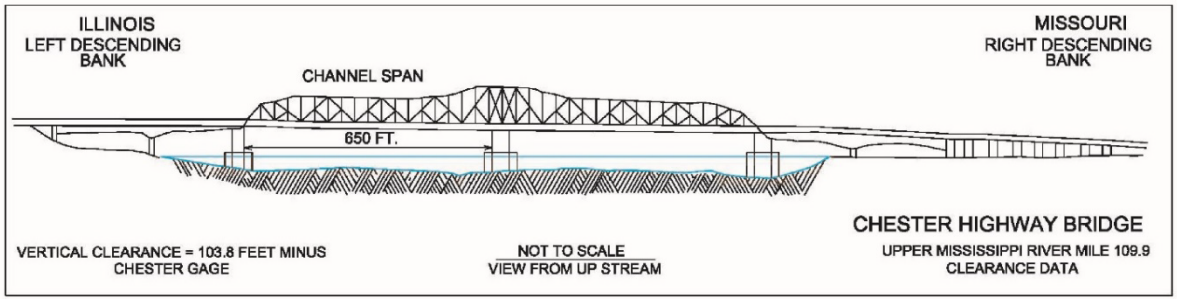

Figure 3-13. Existing Bridge Configuration

According to coordination with USCG, the existing vertical clearance is adequate. The existing vertical clearance above pool elevation is roughly 104 feet. The provision of vertical clearance is somewhat in tension with the overall height of the structure. An alternative that maintains existing bridge height elevations is superior in regard to avoiding aviation encroachments related to Perryville Airport. Agency coordination with the USCG and FAA was conducted to establish an appropriate environmental commitment to balance bridge height and vertical clearance.

The Reasonable Alternatives (U-1 and U-2) would involve demolition of the existing bridges with potential impacts to river users and Mississippi River commerce associated with blocking navigation through the span for a short period of time. The spans would be dropped into the river and then salvaged. Since demolition of the existing bridges would occur after a new bridge opens, it is possible that demolition could be timed to occur outside the busiest portion of navigation season.

If the existing bridge is demolished during the supported navigation season, commercial use of the river in the vicinity of the bridge would be slowed during demolition. However, use of the navigation channel can only be restricted for a 24-hour period while the span is salvaged. Since the USCG monitors the demolition onsite to provide a safe environment during span blasting and salvage, this operation is anticipated to have minimal impact on commercial river traffic.

Recreational use of the river near the bridges may be reduced both during construction and demolition activities. To ensure safety of commercial and recreational river users, MoDOT will coordinate with the USCG to halt river traffic during demolition activities.

The couplet alternative (R-2) would rehabilitate the existing Chester and Horse Island Chute Bridges (while maintaining their historic integrity); R-2 would be paired with a modified version of the Reasonable Alternatives (U-1 and U-2). Since these activities will be done consecutively, substantial impacts are not expected. However, the construction-related disruptions will be twice as long.

SECTION 4

Public Engagement and Agency Collaboration

Recognizing the value that stakeholders bring to the transportation-planning process, the study team employed several tools to ensure a variety of opportunities for public involvement were available throughout the Chester Bridge EA. Additionally, the Stakeholder and Public Involvement Plan was guided by both NEPA's requirements for public involvement and MoDOT's public engagement policies.

The approach to this study helped ensure that the recommended improvement balances costs, safety, traveler needs, environmental impacts, and the study's goals. Stakeholder and public involvement were critical to this approach and helped build awareness and understanding. Ultimately, this involvement played an important role in providing input into an outcome that reflects an interdisciplinary, collaborative process and includes input from anyone with a stake in the study. This section outlines the various techniques and tools that were used to exchange information.

4.1 Stakeholder Interviews/Briefings

The public involvement team scheduled and conducted interviews with key stakeholders at the beginning of the study, including community leaders, emergency responders, and elected officials. These stakeholders were identified in collaboration with MoDOT. A total of 10 one-on-one interviews were conducted. The stakeholder interview guide and a list of the questions asked are available in **Appendix E**.

In addition to the stakeholder interviews, an online survey was posted to the study's website (www. ChesterBridgeStudy. com) to seek input on stakeholders' use of the bridge and the issues they encounter when using the bridge. Over 1,000 stakeholders completed the survey, with the majority citing narrow lanes, deteriorating physical conditions, and flood related closures as their most important concerns.

4.2 Community Advisory Group

A Community Advisory Group (CAG) was established. CAG members represented various study area constituencies, including residents, businesses, chambers of commerce, emergency responders, and other community stakeholders. The CAG was a means of directly engaging stakeholders to gain valuable community input, identify and address local concerns, and build public interest and involvement in the study's decision-making process.

The role of the CAG members was to advise MoDOT. The agency ultimately made the final decision on how best to create a safe and reliable Mississippi River crossing. Four CAG meetings were held:

- Kickoff meeting to present the study, discuss issues affecting the existing bridges, and present the draft Purpose and Need statement
- Meeting to present the Purpose and Need, Conceptual Alternatives, and screening process
- Meeting to discuss the Reasonable Alternatives
- Final meeting to present the Preferred Alternative

CAG Meeting 1 was conducted on July 19, 2017. The primary issues identified by the CAG members were the narrow travel lanes, poor condition of the Chester Bridge, roadway closures due to flooding, bridge closures due to oversized loads, and safely accommodating bicycle and pedestrian traffic.

CAG Meeting 2 was conducted on October 12, 2017. This meeting focused on presenting the approved Purpose and Need and a review of how well the Conceptual Alternatives satisfied the project's Purpose and Need. It presented the results of the Public Involvement Meeting 1. The criteria for selecting the Reasonable Alternatives were discussed and environmental/engineering data were updates were provided.

CAG Meeting 3 was conducted on March 6**,** 2018. This meeting focused on the screening of the Conceptual Alternatives to identify the Reasonable Alternatives.

CAG Meeting 4 was conducted on October 23, 2018. This meeting focused on the screening criteria used to determine the Preferred Alternative from the three Reasonable Alternatives.

The CAG meeting summaries are available in **Appendix E**.

4.3 Elected Officials Briefings

Early coordination and continuous communication with elected officials were accomplished through an introductory letter, followed by elected official briefings. A letter introducing the study was sent to all identified elected officials for Perryville and Perry County in the State of Missouri, and Chester and Randolph County in the State of Illinois. The study team conducted briefings with elected officials prior to each public meeting. The purpose of these briefings was to inform and educate officials about the study at key milestones before presenting to the public.

The first briefing occurred prior to the first Public Involvement Meeting on August 24, 2017, and introduced the study and Purpose and Need. Twenty elected officials, or representatives of elected officials, attended the briefing. The second briefing discussed the Reasonable Alternatives prior to the second public involvement meeting on March 13, 2018. Eleven elected officials, or representatives of elected officials, attended the briefing. A third briefing will present the Preferred Alternative and Chester Bridge EA prior to the Public Hearing.

Briefing summaries are available in the Public Information Meeting Reports in **Appendix E**.

4.4 Public Involvement Meetings

Public meetings are an important opportunity for direct engagement with the larger public. At these meetings, study team members are available to discuss, explain, and help participants understand the information presented.

Two public involvement meetings and one public hearing were planned for the study. The first public meeting was conducted on August 24, 2017 at the Chester High School in Chester, Illinois. The draft Purpose and Need and the initial Conceptual Alternatives were presented for comment. Thirty-three stakeholders attended the first public meeting, citing narrow lanes, flood-related closures, the poor condition of the Chester Bridge, and safely accommodating bicycles and pedestrian as the major issues affecting the bridges. Based on comment forms submitted by attendees, Alternative U-1 (near upstream) received the most positive ratings.

The second public informational meeting for the Chester Bridge Study was held on Tuesday, March 13, 2018, from 4:00 p.m. to 7:00 p.m. at the Perryville Higher Education Center in Perryville, Missouri. More than 50 people attended. The meeting addressed the Purpose and Need for the study, Reasonable Alternatives for replacing or repairing Chester Bridge, and potential impacts to the community, as well as cultural and environmental resources. Alternative U-1 (near upstream) received the most positive ratings based on comment forms submitted by attendees.

The public information meeting reports are available in **Appendix E**.

4.5 Presentations

Presentations to community and civic groups, business groups, and other interested groups or organizations over the course of the study were used to introduce the study, provide study updates, and obtain public input. Such presentations were made upon request.

Three presentations were requested by the Chester Chamber of Commerce. The presentations/updates occurred on September 19, 2017, September 18, 2018, and September 17, 2019. Discussion following the presentations focused on timing and funding for the final design and construction.

No other presentations were requested by other groups.

4.6 Community Events and Festivals

The public involvement consultant stayed informed of local events and festivals where the study team could conduct public outreach throughout the study process. One such event was the Perryville Mayfest (May 10 to 13, 2017). Team members attended these events to distribute study information and to promote public engagement and the study website.

4.7 Outreach and Informational Materials

Informational materials have been developed and updated throughout the project. This outreach is intended to drive the public involvement process. They undergo a continuous series of updates as needed.

- A **fact sheet** was written and designed for distribution at the CAG meetings, elected official's briefings, presentations, community events, and study meetings. It has been uploaded to the study website.
- A list of **frequently asked questions** was written, designed, and distributed at meetings and presentations. This handout has been uploaded to the study website and is updated as needed throughout the study.
- The public involvement team wrote, designed, and distributed study **newsletters**. Three newsletters will be produced in total, one before each of the two public meetings, and the third will be prepared before the public hearing. The newsletters are distributed to stakeholders on the study mailing list via email and regular mail. PDF files of all newsletters are posted to the study website.
- The **study website** is a tool for both public outreach and engagement. The website is online at http://www. ChesterBridgeStudy. com and includes general study information, contact information, technical documents, and information on how residents can be involved. It serves as a centralized information portal for learning about the study, getting updates, and downloading public meeting displays and other study materials.
- The project's **mailing list** includes the identified key stakeholders, CAG members, elected officials, Chester and Perryville Chamber of Commerce members, and coordinating agencies. Anyone who attends a stakeholder meeting or signs up for mailings through the study website is added to the master mailing list.
- MoDOT's phone number, 1-888-ASK-MODOT, is used as the phone number for the study.
- MoDOT's Southeast District office address is used as the mailing address for the project.
- The project's primary media strategy is for the team to produce and distribute press advisories to announce the informational public meetings and the public hearing.

- The project's social media content is posted on MoDOT's Facebook page, tweeted via its Twitter account, and emailed using a mass email service.

4.8 Agency Collaboration Plan

The Agency Collaboration Plan was intended to define the process by which the Project Study Team will communicate information about the Chester Bridge EA project to the interested federal and non-federal governmental agencies.

Because FHWA is expected to provide funding for this project, FHWA (Missouri Division) serves as the Lead Agency for the project. MoDOT, as the direct recipient of federal funds for the project, is a Co-Lead Agency. The Agency Collaboration Plan includes two types of agencies:

- Cooperating agencies are those federal agencies that the lead agency specifically requests to participate in the environmental evaluation process for the project. FHWA's NEPA regulations (23 CFR 771. 111(d)) require that federal agencies with jurisdiction by law, such as permitting or land transfer authority, be invited to be cooperating agencies for an EA. USACE (St. Louis District) and USCG agreed to be Cooperating Agencies for the Chester Bridge EA.
- Interested agencies are those federal and non-federal governmental agencies that may have an interest in the project because of their jurisdictional authority, special expertise, local knowledge, and/or statewide interest. Based on these criteria, the project team identified 22 interested agencies. The definition of governmental was broadened to include an organization with an official mandate (including Missouri and Illinois agencies not covered by the NEPA-404 merger process). Any organization that could not satisfy the criteria as an agency, but is interested in the project, is included in the project as a general stakeholder. Collaboration with these groups has been coordinated through information packages that coincide with the CAG meetings.

In October 2017, the first agency collaboration package was distributed to the cooperating and interested agencies. Among the materials provided to the agencies were the project's Fact Sheet, the Purpose and Need Statement, and an annotated Study Area map. Following the distribution of the package, conversations with several of the agencies were begun. This one-on-one coordination continues.

Following the concurrence of the alternatives to be carried forward, February 15, 2018, the second agency collaboration package was submitted to the cooperating and interested agencies. The materials included in the package were the Alternatives Carried Forward merger package, the public Involvement meeting summary, and the full versions of the Conceptual Alternatives and Reasonable Alternatives.

The interested and cooperating agencies are included in the distribution of the NEPA document, comprising the third and final collaboration point.

The Agency Collaboration materials are available in **Appendix I**.

4.9 Other Direct Agency Coordination

As mentioned, agencies have jurisdiction under the law. Direct coordination with these agencies was conducted beyond the limits of the agency collaboration discussed. Direct coordination was conducted with the FAA, USACE St. Louis District, and USCG.

FAA administers aviation. FAA's primary focus during the preliminary development/obstruction evaluation process is safety and efficiency of navigable airspace. At its closest point, the Chester Bridge is approximately 10,000 feet from the end of the airport's runway. To evaluate how the Chester Bridge project might affect aviation at the Perryville Airport, the study team began direct coordination with FAA and the airport itself.

The primary mechanism that FAA uses to assess airspace considerations is FAR Part 77, *Objects Affecting Navigable Airspace*. Under this FAR, any plan that proposes construction or alterations that exceeds 200 feet tall or are within 10,000 feet of a runway (with a 50:1 surface from any point on the runway is required to provide a Notification to FAA). Notification allows FAA to identify potential aeronautical hazards in advance, thus preventing or minimizing the adverse impacts to the safe and efficient use of navigable airspace. **Section 3.5.3** discusses FAA coordination in greater detail.

The Bois Brule system is federally authorized and constructed, and locally operated and maintained by the nonfederal Sponsor, the Bois Brule Levee and Drainage District. USACE has jurisdiction under:

- The Clean Water Act (Sections 404/401) – Requires USACE permits for discharges of dredged or fill material into Waters of the United States.
- Civil Work Alternations (Section 408) – Addresses alterations to any federally authorized civil works project. Section 408 prohibits alterations that are injurious to the public interest or affect USACE's ability to meet its authorized purpose.
- Dredging (Section 10) – As a navigable river, the Mississippi River is subject to Section 10 jurisdiction. The length of the permitting process will depend on the location of the study area, the material being dredged, and the location of dredge disposal.

Ultimately, it is an environmental commitment of this project to obtain and comply with all USACE permits.

The USCG will also require a Section 9 Bridge Permit for the Chester Bridge. Further, the USCG is responsible for maintaining a navigation channel in the Mississippi River. A Section 9 Bridge Permit is a document approving the location and plans of bridges over a commercially navigable waterway in accordance with all applicable federal laws. MoDOT will obtain a Section 9 Bridge Permit from the USCG prior to construction, approving the location and plans of bridges over a commercially navigable waterway in accordance with all applicable federal laws. According to coordination with the USCG, the existing vertical clearance is adequate. The existing vertical clearance above-pool elevation is roughly 104 feet. The provision of vertical clearance is somewhat in tension with the overall height of the structure.

Finally, coordination with the USCG clarified that the minimum Mississippi River span width should be a minimum of 800 feet for the main navigation channel (east side) and a minimum of 500 feet for the axillary navigation channel (west side). The existing main and auxiliary span widths are 650 feet for the two navigation channels.

4.10 Tribal Coordination

Coordination with Native American Tribes is conducted by FHWA. Requests to be a Section 106 consulting party were sent to 16 tribes that have previously expressed interests in MoDOT projects in this area. Early identification of Tribal concerns allowed FHWA and MoDOT/IDOT to consider ways to avoid and minimize potential impacts to Tribal resources and/or cultural practices as project planning and alternatives are developed and refined. The following replies have been received to date:

- Miami Tribe of Oklahoma accepts invitation to serve as a consulting party and offers no objection to the project. However, if human remains, Native American cultural items, or archaeological evidence are discovered, the Miami Tribe requests immediate consultation.
- Cherokee Nation agreed to serve as a consulting party to this project. Cherokee Nation recommends that a cultural resource survey be conducted on the study area. The Cherokee Nation requires that cultural resource survey personnel and reports follow the Secretary of Interior's standards and

guidelines. The Cherokee Nation also requests that FHWA and MoDOT halt all activities immediately and contact their offices for further consultation if items of cultural significance are discovered.

- Shawnee Tribe does not have any "issues or concerns at this time, but in the event that archaeological materials are encountered during construction, use, or maintenance of this location, please re-notify us at that time as we would like to resume immediate consultation under such a circumstance. "
- Delaware Nation stated they "can concur at present with this proposed plan and request to be a consulting party on this project. "
- The Osage Nation indicted that "The proposed undertaking is located one-mile northeast of the Osage Mississippi River Trail. Expedient graves and temporary hunting camps may be located along these trails." It requests to review the cultural resources survey and final report.
- "The Absentee Shawnee has historic ties within the area referenced in your letter of July 31, 2017. At this time, this office is unaware of properties of significance to inform you of that fall within the APE for this project. There remains the possibility that unrecorded cultural resources, including archaeological artifacts or human remains, may be encountered during construction, demolition or earthmoving activities of this project. Should this occur, we require you contact this office in order that we may offer appropriate comments under 36 CFR 800. 13. Email is the preferred method of communication."
- Ponca Tribe of Nebraska "would like to be a consulting party on this project and will do our best to help with the process of getting this project completed. "

The Tribal coordination materials are available in **Appendix J**.

4.11 404 Merger Process

IDOT uses the NEPA-404 merger process (merger process). The purpose of the merger process is to coordinate the review of complex transportation projects that impact Waters of the United States, requiring an individual Section 404 Permit. Although MoDOT is the lead agency for this project, it agreed to use the merger process to facilitate the IDOT processes.

The merger process coordinates three decision points with resource and regulatory agencies in order to reach agreement (concurrence) before the project advances to the next stage of project development. The three decision points are the Purpose and Need for the project, alternatives to be carried forward (Reasonable Alternatives), and the Preferred Alternative. By obtaining concurrence, it is not necessary to revisit those decisions at later stages of project development (design and construction) and during the permitting process. The decision-point attendees include:

- USACE
- EPA
- USFWS
- USCG
- IDOT
- FHWA
- IEPA
- IHPA
- IDNR
- Illinois Department of Agriculture

Concurrence was requested and received as follows:

- Purpose and Need for the Chester Bridge EA – September 7, 2017
- Alternatives to be carried forward for the Chester Bridge EA – December 12, 2017
- Selection of the tentative Preferred Alternative for the Chester Bridge EA – July 9, 2018

Materials associated with the merger process are available in the **Project Record**.

4.12 Section 106 Consultation

Federal approvals associated with the Chester Bridge EA are subject to compliance with NHPA and its implementing regulations (36 CFR 800). NHPA Section 106 requires that the federal agency responsible for an undertaking consider the effects of its actions on historic properties. Historic properties are those listed on or determined eligible for listing on the NRHP. The types of resources eligible for listing on the NRHP include buildings, sites, structures, objects and districts.

The Chester Bridge and Horse Island Chute Bridge are the only architectural resources affected by the Reasonable Alternatives. Both bridges are eligible for the NRHP. Replacement will have an adverse effect on both bridges.

Section 106 regulations require consultation. Consultation is the process of seeking, discussing and considering the views of other participants, and where feasible, seeking agreement with them regarding matters arising in the Section 106 process (36 CFR 800. 16(f)). For the Chester Bridge study, MoDOT identified participants in the Section 106 process that included FHWA, SHPO(s), Tribes, the City of Chester, MoDOT/IDOT, and other consulting parties with a legal or economic interest in the project or a demonstrated interest in historic properties. Meeting participants for all three consultation meetings were invited via email and a conference call-in number was provided for participants who could not join the meetings in person. Project-related presentation packages were sent to the consulting parties in advance of meetings 1 and 2. No presentation package was required in advance of meeting 3.

Resolution of adverse effects will be documented in a MOA, which will be negotiated among the consulting parties. An important mechanism for 106 Consultation were meetings with the consulting parties.

The initial consultation meeting was held on March 21, 2018. In addition to FHWA, MoDOT, IDOT, and SHPO representatives, the following Consulting Parties participated:

- Brenda Owen, City of Chester
- Kitty Henderson, Historic Bridge Foundation
- Nathan Holth, historicbridge.org
- Michael Hirsch, Society for Commercial Archeology

At this meeting, the following elements were addressed:

1. Project introduction
2. Purpose and Need for the project
3. Conceptual Alternatives
4. Alternatives to be Carried Forward
5. Impact analysis of the Reasonable Alternatives
6. Project Schedule

The discussion of Reasonable Alternative R-2 (a one-way couplet configuration where the existing Mississippi River bridge is rehabilitated while maintaining its historic integrity) was a focus of the meeting. Among the important conclusions were:

- A 15-year rehabilitation of the Chester Bridge is not a reasonable solution (design standard is to provide a 75-year design life).
- A 50-year rehabilitation will most likely not retain the historic integrity of the Chester Bridge.
- Rehabilitation (construction) will adversely affect navigation (temporary).
- The couplet configuration will also adversely affect navigation (permanent).
- 50-year rehabilitation will cost $30 million and will take up to 3 years to complete.

A second Section 106 consultation meeting was held on September 6, 2018. In addition to FHWA, MoDOT, IDOT and SHPO representatives, Brenda Owen from the City of Chester and Michael Hirsch from the Society for Commercial Archeology also participated.

At this meeting, the following elements were addressed:

1. Project Overview
2. Alternatives Carried Forward
3. Alternatives Carried Forward Evaluation
4. Recommended Preferred Alternative
5. Section 106 Consultation
6. Identification of the Preferred Alternative
7. Request Concurrence on the Preferred Alternative

Important discussions included:

- Relative to the rehabilitation of the existing bridge, the need for the disassembly was discussed. Specifically, an example in Michigan was cited. In this example, a way to remove pack rust without disassembly of the bridge was developed.
- MoDOT researched the referenced rehabilitation project and other rehabilitation projects. MoDOT concluded that the conditions of those bridges were better than that of the Chester Bridge and that "…a high percentage of elements would need to be replaced to complete a meaningful rehabilitation" thereby affecting the ability to maintain historic integrity.
- Knowledge of any research that has been conducted on a possible Lewis and Clark encampment on Horse Island was discussed.

A third Section 106 consultation meeting was conducted on May 21, 2019. In addition to FHWA, MoDOT, IDOT, SHPO representatives, and Brenda Owen from the City of Chester participated. Important discussions included:

- Review of the effect determinations for historic properties in Missouri and Illinois
- State Level I documentation on the Chester Bridge and Horse Island Chute Bridge
- Discussion of other potential mitigation measures to resolve adverse effects on the bridges included:
  - Drone footage of the bridges
  - Short film of the bridge with historical information incorporated
  - Funds for Chester Library Archives on the Chester Bridge

A draft of the MOA was circulated to the consulting parties on July 23, 2019, with a request that comments be provided by August 7, 2019. Forty-three comments were received from the Missouri SHPO, Illinois SHPO, and FHWA. The comments concerned technical issues with the drafting of the document. No substantive comments about the substance of the mitigation measures were received.

The views of consulting parties include:

- The Missouri SHPO and Illinois SHPO have concurred that there are no NRHP eligible architectural resources within their respective APE.
- The Missouri SHPO concurred that there are no NRHP eligible archaeological sites within the project APE.
- The Illinois SHPO has concurred that additional testing will need to occur on three sites before NRHP eligibility can be determined and that 11R932 is eligible and the project will have no adverse effect.

- The Missouri SHPO has concurred that the project will have an adverse effect on the Chester Bridge (L0135) and the Horse Island Chute Bridge (L1004).
- Other consulting parties did not comment on project effects or on the draft MOA.
- Tribes that requested copies of correspondence or reports have not provided further comments.

The MOA was signed/implemented between October and December 2019. The MOA is available in the **Project Record**.

4.13 Substantive Public Comments

Throughout the public involvement process, substantive comments were collected and addressed, as appropriate to the nature and format of the comments. This section lists the substantive comments and a summary of the study's responses:

a) Is the project team surprised with the relatively low number of crashes reported for the crossing?
It should be noted that the overall number of daily users is not equivalent to Interstate levels, however there were a relatively high number of opposite direction side-swipe which can be attributed, in part, to the narrow travel lanes and lack of shoulders.

b) Why is this project utilizing the NEPA/404 merger process?
The purpose of the merger process is to coordinate the review of complex transportation projects that impact Waters of the United States, requiring an individual Section 404 Permit. IDOT uses the NEPA-404 merger process. *Although MoDOT is the lead agency for this project, it agreed to use the merger process to facilitate IDOT pro*cesses.

c) Tolls/fees for using new bridge?
The existing crossing used tolls. No plans for tolls are expected at this time.

d) Narrowness of existing bridges
The current bridges are very narrow with no shoulders. Many other modern design standards are not incorporated into the bridges. This creates safety issues and degrades functionality.
The build alternatives utilize bridge sections that 40 to 44 feet wide with two 12-foot travel lanes and 8- to 10-foot shoulders.

e) Road Closures during flood events
The existing bridge approach is closed by flood waters along the Bois Brule levee. Correcting this condition is an element of the project's Purpose and Need.

f) Pedestrian/Bicycle use
The Chester bridge is located along a major national bicycle route. Accommodating this traffic is a component of this project.

g) What is the Design life of the new bridges?
The standard design life for new bridge is 75-years. Alternatives that would retain the bridge's historic integrity (such as Reasonable Alternative R-2) could not achieve this standard. During the evaluations of possible rehabilitations, 15- and 50-year rehabilitations were studied. The 50-year rehabilitation seems unlikely to result in a bridge that would retain the bridge's historic integrity. While the 15-year rehabilitation is more likely to retain the bridge's historic integrity, it is not considered a reasonable/cost-effective alternative. In either case, a standard 75-year design life for the existing bridge is not practically obtainable.

h) Poor condition of bridge decks
Improvement of the physical condition of the crossing is an element of the project's Purpose and Need.

i) Interest in the Historicity of existing Chester Bridge
Interest in the historic nature of the Chester Bridge (not the Horse Island Cute Bridge) was wide spread. Federal approvals associated with the Chester Bridge EA are subject to compliance with the NHPA and its implementing regulations (36 CFR 800). NHPA Section 106 requires that the federal agency responsible for an undertaking consider the effects of its actions on historic properties. See ***sections 3.6.1*** *and* ***4.12****.*

j) Would a new bridge increase traffic?
According to the project's traffic analysis the project is expected to have no meaningful impact on traffic volumes or vehicle mix. See **Section 2.3.2**.

k) *Would construction cranes affect airport operations?*
To evaluate how the Chester Bridge EA project might affect aviation at the Perryville Airport, the project team began coordination with FAA and the airport itself. The primary mechanism that FAA uses to assess airspace considerations is Federal Aviation Regulation (FAR) Part 77, *Objects Affecting Navigable Airspace*. MoDOT will submit an official FAA 7460 evaluation and complete required mitigation prior to construction.

l) If alternative R-2 doesn't take the Coast Guard's width preferences into consideration, is it viable?
R-2 was considered a Feasible Alternative. The Coast Guard ***prefer****s 800-foot and 500-foot clearances but did not mandate them.*

m) The levee has sunk to 48 feet in some places where it should be 50 feet, will this be repaired?
MoDOT will design the roadway to a 500-year flood level to accommodate the Brule Bois Levee. However, the existing gap in the levee (and other improvements) will be the responsibility of the Flood District to rehabilitate.

n) What is the breakdown of funding for the new bridge?
Missouri and Illinois will share the cost of the Chester Bridge project. On 7/1/2021, the Missouri Highways and Transportation Commission approved the FY 2022–2026 Statewide Transportation Improvement Program (STIP). Subsequently, on 9/9/2021, the Commission approved an amendment to the STIP to include funding for construction and right-of-way acquisition for the replacement of the Chester Bridge. Illinois, through IDOT's FY 2022–2027 Rebuild Illinois Highway Improvement Program, has committed funding for its portion of the cost of the Chester Bridge replacement.

o) The cost of 8-foot vs 10-foot shoulders (maybe the shoulders could be restriped into a travel lane)
The build alternatives utilize bridge sections that 40 to 44 feet wide with two 12-foot travel lanes and 8- to 10-foot shoulders. The shoulder width won't be decided until the design phase. The designers are limited with that span as to what kind of bridge can be built.

p) Traffic back-ups occur at Route 150 and Route 3 near the truck bypass
Much of this seems to be timed during shift changes at the Menard Correctional Center. While maintaining the truck bypass is a goal of this project, improvements are not.

q) Congestion/Maintenance of Traffic problems at Route 51 near the existing gas stations.
MoDOT will, prior to construction, develop a Traffic Management Plan to create a set of strategies for managing the work zone of the project during construction. The Traffic Management Plan will balance the mobility and safety needs of the motoring public, construction workers, businesses, and the community. Further, it must be reviewed within the context of this NEPA document and its Environmental Commitments.

SECTION 5

Environmental Commitments

1. MoDOT will implement all project and regulatory commitments, whether or not specifically delineated herein, after construction limits are determined. Federal authorization for construction will not be granted until the necessary regulatory obligations have been satisfactorily completed.
2. MoDOT will ensure that if there are changes in the project scope, project limits, existing conditions, pertinent regulations, or environmental commitments, MoDOT must re-evaluate potential impacts prior to implementation. Environmental commitments are not subject to change without prior written approval from FHWA. (**General – Section 3.0**)
3. MoDOT will ensure that, prior to construction, additional Environmental Site Assessments are conducted, as appropriate, at the following locations:
    - Site 6: Midwest Petroleum Store No 1020
    - Site 7: Midwest Petroleum Store No 1021
4. Additionally, MoDOT will coordinate with FHWA for potential impacts at any high risk sites, if impacted. **(Hazardous Materials – Section 3.1.2)**
5. MoDOT will ensure that its construction inspector has access to the complete Hazardous Material Site Inventory, including the categorization of the risks associated with these sites. The construction inspector will direct the contractor to cease work at the suspect site if regulated solid or hazardous wastes are found during construction. The construction inspector will contact the appropriate environmental specialist to discuss options for remediation. The environmental specialist, the construction office, and the contractor will develop a plan for sampling, remediation, and continuation of project construction. Independent consulting, analytical, and remediation services will be contracted if necessary. MDNR/IDNR and EPA will be contacted for coordination and approval of required activities. **(Hazardous Materials – Section 3.1.2)**
6. MoDOT will ensure that all needed demolition notices, abatements notices, and project notifications to MDNR/IDNR will be submitted, prior to beginning demolition activities. Asbestos-containing material and demolition debris will be disposed of according to state and federal regulations. **(Hazardous Materials – Section 3.1.2)**
7. MoDOT will ensure that all structures scheduled for demolition are inspected for asbestos-containing material and lead-based paint. MoDOT and the contractor will submit all required demolition notices, abatements notices, and project notifications to MDNR as required by regulation prior to beginning demolition activities. Asbestos-containing material and demolition debris will be disposed of according to state and federal regulations. The reports of these inspections for asbestos and the presence of lead-based paint will be included in the construction bid proposal. **(Hazardous Materials – Section 3.1.2)**
8. Once the project moves into detailed design, IDOT will complete a PESA on the portion of the Preferred Alternative that falls within Illinois to identify RECs. Prior to the purchase of property and prior to construction in study areas located in Illinois, a PSI will be performed at each affected property containing a REC to determine the nature and extent of the hazardous material present. The PSI will include assessment for lead-based paint and asbestos containing materials. **(Hazardous Materials – Section 3.1.2)**
9. FHWA is the lead federal agency for this project. MoDOT is the designated non-federal representative for FHWA for completing coordination for compliance with Section 7 of the ESA and with the Missouri Endangered Species Act. Consultation will include obtaining an updated official

species list via IPaC and will be completed prior to construction or before any federal funds or resources (i.e., removal of trees) are obligated. **(Endangered Species – Section 3.2.3)** MoDOT will provide BA and all coordination with USFWS to USACE.

10. Prior to consultation, MoDOT will conduct a complete habitat assessment for suitable summer bat roost trees and any use of the Horse Island Chute Bridge for the Preferred Alternative. **(Endangered Species – Section 3.2.3)** MoDOT will provide results and all coordination with USFWS to USACE.

11. If necessary, based upon the results of habitat assessment and consultation with USFWS, MoDOT will incorporate seasonal tree-clearing restrictions of suitable roost trees as a conservation measure/environmental commitment to avoid adversely affecting northern long-eared and Indiana bats. **Tree clearing will not occur prior to consultation being complete. (Endangered Species – Section 3.2.3)**

12. MoDOT will, pursuant to the Migratory Bird Treaty Act, inspect structures for nests prior to construction. If active nests (those with eggs or young) are observed, measures will be taken, including seasonal demolition restrictions, to prevent killing birds and destruction of their eggs and to avoid conflict with the Migratory Bird Treaty Act. The project area will be screened for bald eagle nests prior to construction. If necessary, seasonal restrictions to avoid non-purposeful take will be implemented. **(Endangered Species – Section 3.2.3)** No known occupied caves exist in the study area. If any are identified, MoDOT will coordinate with the USFWS. **(Endangered Species – Section 3.2.3)** MoDOT will provide results and all coordination with USFWS to USACE.

13. IDOT will contact the IDNR Fisheries Lower Mississippi River Biologist at least 60 days prior to blasting. **(Unique Habitats – Section 3.2.1.3 and Endangered Species – Section 3.2.3)**

14. No known occupied caves exist in the study area. If any are identified, MoDOT will coordinate with the USFWS. **(Endangered Species – Section 3.2.3)**

15. MoDOT has a history of employing repelling charges and millisecond delays during demolition of the bridge. Repelling charges are used to scare fish from the area before bridge spans are dropped into the water. Seasonal restrictions for demolition and any bathymetric surveys needed for US Army Corps of Engineers or US Coast Guard purposes will also be shared and discussed with US Fish and Wildlife Service for Section 7 consultation. MoDOT will provide results and all coordination with USFWS to USACE.

16. MoDOT will submit a BA and initiate informal consultation for the project. Although specific project details are not known at this time, it can be reasonably assumed that project activities could include the following: construction activity, tree clearing, bridge demolition, and rock blasting. The BA currently being prepared further details measures to minimize impacts to bats, such as minimizing the amount of explosives to be used for bridge and/or rock bluff demolition; minimizing pile driving; minimizing tree clearing; completing an acoustic survey; and other appropriate mitigation as determined by the USFWS. The agreed upon measures to minimize impacts will be outlined in the BO rendered by USFWS that will be carried forward as JSPs in the contract documents. **(Endangered Species – Section 3.2.3)** MoDOT will provide BA and all coordination with USFWS to USACE.

17. IDOT will contact the IDNR Fisheries Lower Mississippi River Biologist at least 60 days prior to blasting. (**Unique Habitats – Section 3.2.1.3 and Endangered Species – Section 3.2.3**)

18. MoDOT will also assess the Horse Island Chute Bridge for any nesting birds and apply the MoDOT Migratory Bird Job Special Provision for demolition of both structures, as needed. **(Endangered Species – Section 3.2.3.3)**

19. MoDOT will ensure that the Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970, as amended, be carried out without discrimination based on race, color, national origin, religion, and age and in compliance with Title VI (the Civil Rights Act of 1964), the President's

Executive Order on Environmental Justice, and the Americans with Disabilities Act. In accordance with the Uniform Act and the states' relocation programs, fair market compensation will be provided to property owners who are affected by this project. **(Right-of-Way/Property Acquisition – Section 3.3.4)**

20. MoDOT will ensure that, should a floodplain encroachment occur, a floodplain permit will be acquired. MoDOT will conduct an engineering analysis for the Preferred Alternative prior to submission of the floodplain development permit application to SEMA and IDNR/Office of Water Resources. The contractor will obtain a floodplain development permit and no-rise certification. **(Aquatic Environment – Section 3.4)**
21. MoDOT will design the roadway to a 100-year flood level to accommodate the Brule Bois Levee. Remediation of the existing gap in the levee will be addressed as part of permit coordination with the USACE and Bois Brule Levee District. **(Aquatic Environment – Section 3.4.2.1)**
22. MoDOT will obtain authorization by an Individual Clean Water Act Section 404 Permit from USACE, including Section 401 Water Quality Certification from MDNR/IEPA. **(Aquatic Environment – Section 3.4.4)**
23. MoDOT will ensure sediment and erosion control BMPs are implemented. MoDOT will develop and implement two SWPPPs to comply with the Missouri State Operating Permit No. MO-R 100007 and the IEPA general National Pollution Discharge Elimination System (NPDES) Permit ILR10. During construction, MoDOT and its contractors would implement the SWPPPs to minimize adverse impacts to the Mississippi River and waters adjacent to the project corridor. The contractor would implement the current SWPPP held by MoDOT for work in Missouri and would apply for a NPDES permit and develop a SWPPP for work to be completed in Illinois. **(Aquatic Environment – Section 3.4)**
24. MoDOT will obtain a Section 10 Rivers and Harbor Act of 1899 Letter of Permission from USACE for fill and excavation within the Mississippi River. **(Aquatic Environment – Section 3.4.2.5)**
25. MoDOT will obtain a Section 9 Bridge Permit from USCG prior to construction, approving the location and plans of bridges over a commercially navigable waterway in accordance with all applicable federal laws, if required. The contractor will submit a work plan to USCG, who would in turn issue a permit that includes specific requirements such as displaying lights to alert river traffic of barges and new piers. **(Aquatic Environment – Section 3.4.2.4)**
26. MoDOT will coordinate (and obtain) a Rivers and Harbors Act Section 408 Permit from USACE for any alterations to USACE structures. Remediation of the existing gap in the levee will be addressed as part of permit coordination with the USACE and Bois Brule Levee District. **(Aquatic Environment – Section 3.4.1)**
27. MoDOT will coordinate with USCG to halt river traffic during demolition activities. The contractor will submit a work plan to the USCG who would in turn issue a permit that includes specific requirements such as displaying lights to alert river traffic of barges and new piers. Temporary lighting and signage will be installed to direct and warn boaters and barges of construction on the bridge. **(Aquatic Environment – Section 3.4.2.4)**
28. MoDOT will coordinate with the Chester Water Department and the Menard Correctional Center should water quality concerns arise that may negatively affect public drinking water such as an accidental petroleum or chemical spill from contractor operations. If dredge discharge were to be authorized in the Mississippi River, MoDOT would discharge this material downstream from Chester's public drinking-water intake. The No-Build Alternative would not have impacts on existing ground or drinking water. **(Aquatic Environment – Section 3.4.5.3)**

29. MoDOT will submit an official FAA 7460 evaluation and complete required mitigation prior to construction. The 7460 evaluation provides a more precise explanation on the landing surfaces affected and offers mitigation strategies. The submittal of the 7460 evaluation and completion of required mitigation will occur within FHWA's timeframe(s). **(Aviation – Section 3.5.3)**

30. MoDOT and IDOT will ensure that all stipulations outlined in the Section 106 MOA be fulfilled within 5 years of the date of execution of the MOA by FHWA. The MOA will be contained in the **Project Record** and available upon request to the MoDOT Historic Preservation Section. **(Cultural Resources – Sections 3.6.1.3 and 4.12)**

31. Additional archaeological investigations are required if potential impact to the four sites (11R931 to 11R934) cannot be avoided. Further coordination with the SHPO is required after potential impacts to the four sites have been determined. Plans developed for this area will designate avoidance areas. **(Cultural Resources – Section 3.6.1.4)**

32. MoDOT will coordinate with the USCG to schedule dates of the closures of the navigation channel, including the duration of these closures. **(Construction – Section 3.6.3.2)**

33. MoDOT will negotiate and execute an agreement with the Union Pacific Railroad prior to seeking federal authorization for construction. To avoid train-traffic interruptions, the contractor will coordinate to schedule girder settings and for handling other materials over the railroad tracks. Railroad flagmen will be retained during construction when potential impacts to the rail system could occur. Construction of nearby bridge piers will require flaggers during construction operations. **(Construction – Section 3.6.3.2)**

34. MoDOT will ensure that details of utility disposition are determined during project design. Agreements with utilities will be negotiated and executed prior to seeking project federal authorization for construction. MoDOT's and IDOT's utility engineers and representatives of the various utilities will plan the details of individual utility adjustments on a case-by-case basis. MoDOT and IDOT will disconnect and reconnect electrical service lines on the bridge responsible for navigating lighting to the new structure. Temporary power or lights will be maintained for navigation lighting during construction. **(Construction – Section 3.6.3.2)**

35. MoDOT will ensure that contractors control fugitive dust to prevent it from migrating off the limits of the project corridor. **(Construction – Section 3.6.3.2)**

36. MoDOT will include standard specifications in the construction contract requiring all contractors to comply with all applicable local, state, and federal laws and regulations relating to noise levels permissible within and adjacent to the project construction site. **(Construction – Section 3.6.3.2)**

37. MoDOT will ensure that careful refueling practices are employed to limit spills of gasoline and diesel fuels. Oil spills will be minimized by frequently evaluating construction equipment. **(Construction – Section 3.6.3.2)**

38. MoDOT will, prior to construction, develop a Traffic Management Plan to create a set of strategies for managing the work zone of the project during construction. The Traffic Management Plan will balance the mobility and safety needs of the motoring public, construction workers, businesses, and the community. Further, it must be reviewed within the context of this NEPA document and its Environmental Commitments. As referenced in Environmental Commitment 1, MoDOT will ensure that if there are changes in the construction impacts used in the EA, prior written approval from FHWA will be required. Further, the distribution of appropriate public information will be required. (**Construction – Section 3.6.3.2)**

39. MoDOT will ensure that all tribal requests be addressed punctually. All existing requests have been addressed and are listed in **Section 4.10**.

40. MoDOT will notify the U.S. Environmental Protection Agency (EPA - Region 7) when the final decision has been made on the bridge type and if any deviations in the project plan occur that affect environmental impacts.

SECTION 6

References

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