IL 18 RIVER BRIDGE PROJECT

Combined Design Report - FINAL Draft

July 2025

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1 Introduction

The Illinois Department of Transportation (IDOT), in cooperation with the Federal Highway Administration (FHWA), is preparing a Combined Design Report (CDR) for the proposed replacement of the IL 18 River Bridge located across the Illinois River between Marshall and Putnam Counties.

1.1 Description and Location

FAP 653/IL Route 18 is an east-west highway facility in central Illinois running from Henry at IL Route 29 to IL Route 17 near Blackstone for a distance of approximately 39 miles. The IL 18 Bridge crossing over the Illinois River between Marshall and Putnam counites, Illinois was constructed in 1934 by the McClintic-Marshall Company connecting Marshall and Putnam Counties. The steel bridge was designed as a Pennsylvania through truss. The bridge was closed and rehabilitated in 1988. Due to the age and condition of the existing IL 18 Bridge over the Illinois River at the city of Henry, the Illinois Department of Transportation (IDOT) District 4, in cooperation with the Federal Highway Administration (FHWA) is evaluating potential improvement options for the bridge. The project study limits extend from the intersection of the IL 18 and 3rd Street in Henry on the west and the intersection of IL 18 and IL 26 on the east (**Figure 1-1**).

The bridge is 1,719 feet long, back-to-back of abutments and consists of two 11-foot lanes with no shoulders. The main navigation span is simply supported 364-feet through truss. To the north are two more simple span through trusses at 202-feet each. Two steel beam spans of 42-feet complete the north approach into the town of Henry. To the south of the navigation span are three simple span through trusses of 202-feet each. Six steel beam spans of 42-feet complete the south approach. Substructures for the truss spans are a reinforced concrete portal frame on an unreinforced concrete plinth.

The nearest adjacent crossings of the Illinois River are approximately 14 miles to the north at Hennepin and eight miles to the south at Lacon. The communities adjacent to the project area include the municipalities of Lacon, Hennepin, Magnolia, Varna, and McNabb **(Figure 1-2**).

This project is funded through construction in IDOT's FY 2025-2030 Proposed Highway Improvement Program.

FIGURE 1-1: PROJECT STUDY AREA

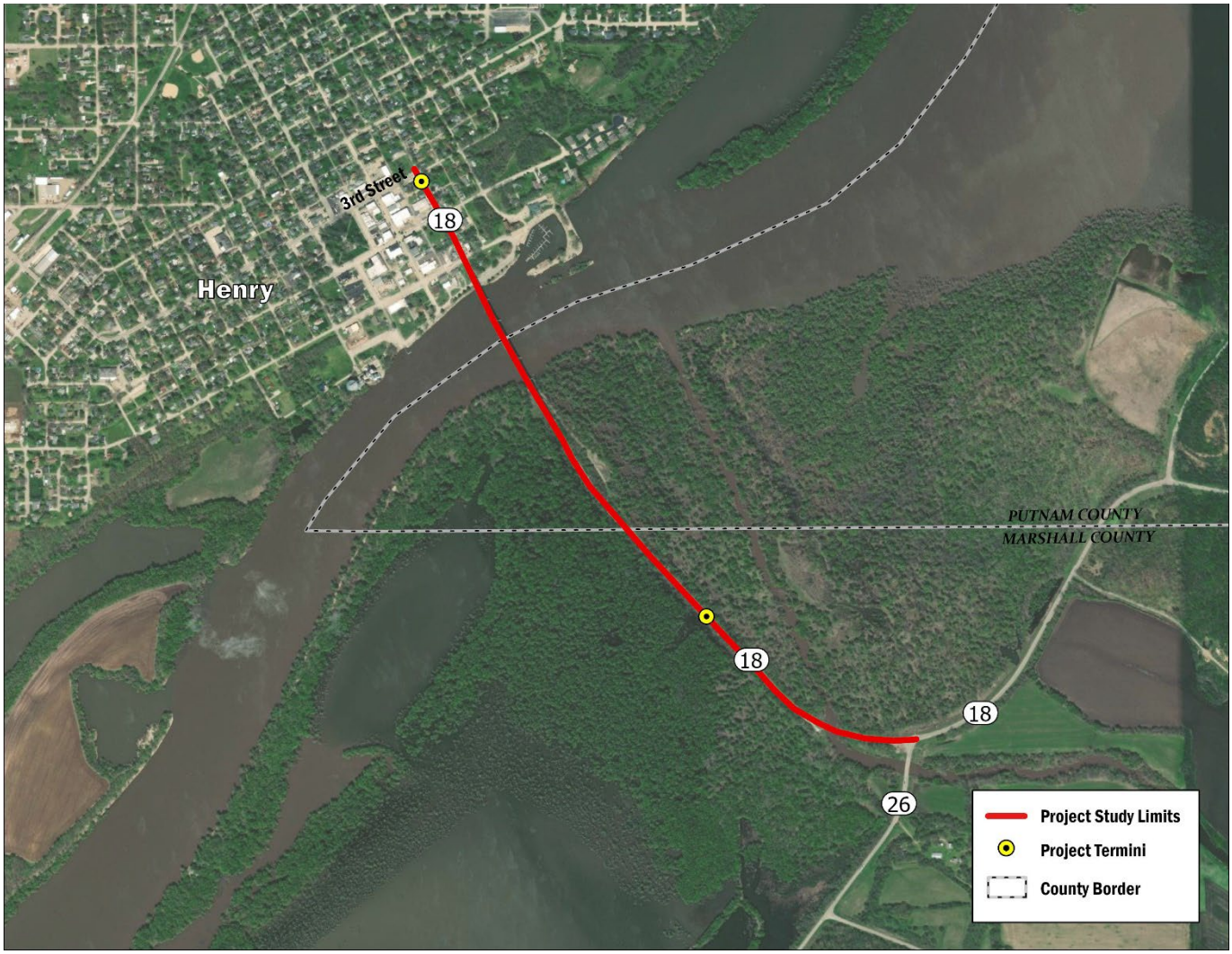
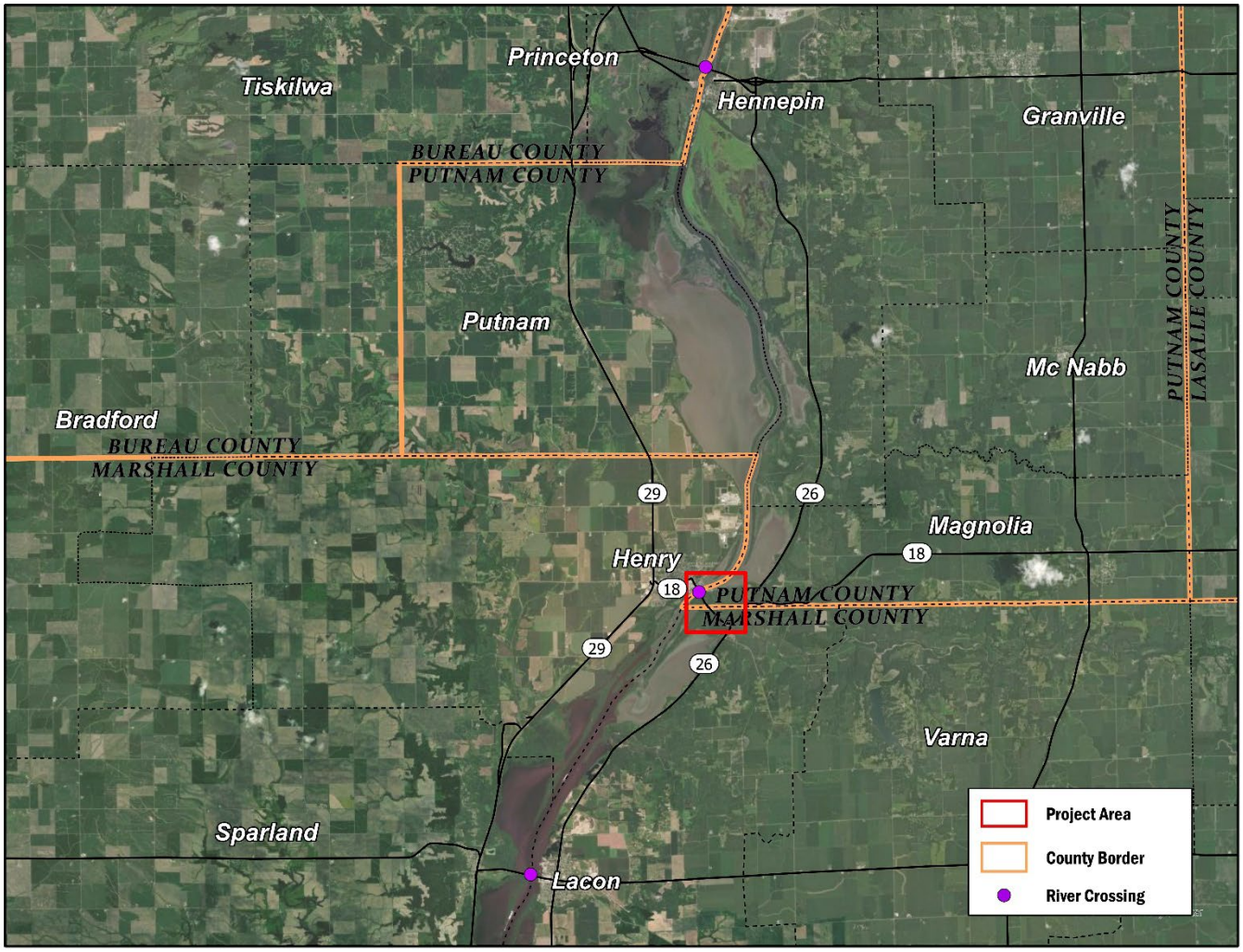


FIGURE 1-2: MUNICIPALITIES SURROUNDING THE PROJECT AREA



1.2 Design Criteria Used

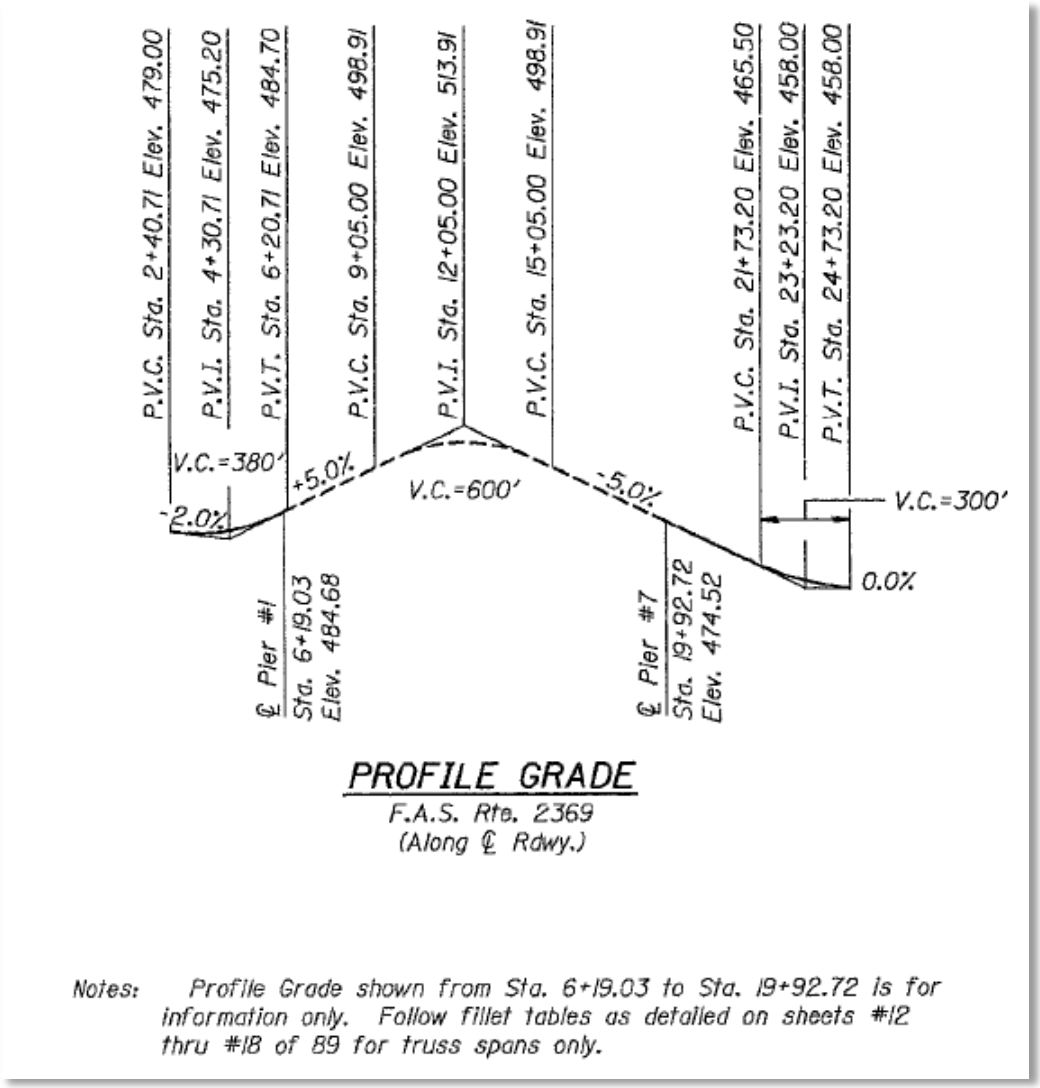
The entire length of IL-18 through the study area is identified as a Minor Arterial as shown on the Illinois Department of Transportation's (IDOT) 5-Year Classification Map for Putnam County, Illinois (See Appendix 1). The classification map also shows that the entire length of the route is outside of any designated Urban Area. In accordance with IDOT Bureau of Design and Environment Manual (BDE) Chapter 43 Highway Systems, small urban areas are defined as between 5,000 and 50,000 population. The population of Henry, Illinois was 2,568 in 2019 and in accordance with Chapter 43-1.01(a), Definitions, all places outside of urbanized and small urban areas are designated as rural areas. Based upon this classification, BDE Manual Chapter 47 Rural Two-Lane/Multilane State Highways (New Construction/Reconstruction) will provide the design guidance for the improvement of IL-18 through the study area.

Although Henry does not meet the IDOT BDE definition of an urban area, the application of rigid rural design standards into and through the City of Henry is likely not desirable due to potential impacts to developed areas. BDE Manual Figure 43-1.A, IDOT Functional Classification Terminology, indicates that rural Minor Arterials can be upgraded to urban Other Principal Arterial (OPA) when these routes enter an urbanized area. Therefore, BDE Manual Chapter 48, Urban Highways and Streets (New Construction/Reconstruction) will also be considered during the analysis of the improvements within the City of Henry.

The existing IL 18 bridge serves as a transition area between the rural and urban environments that exist on either side of the river. The 55 MPH posted speed limit east of the bridge is in conformance with rural standards while west of the bridge, the 30 MPH posted speed limit is indicative of the urban environment. Across the bridge itself, the posted speed is 35 MPH. This posted speed may provide multiple safety benefits as it slows vehicles approaching Henry from the east and reflects the reduced width of the bridge. **Figure 1-3** below shows the profile of the existing bridge from existing plans.

Criteria were selected from applicable IDOT BDE guidance during the development of the Range of Alternatives, Alternatives Carried Forward, and the Preferred Alternative improvement. Illinois Department of Transportation Bureau of Design and Environment (BDE) Manual Chapters 31, 32, 33, 34, 36, 37, 39, 45 and 48. The criteria for Front Street were selected from the IDOT Bureau of Local Roads and Streets Manual (BLRS) Chapters 27, 29, 30, 31, 34 and 35.

FIGURE 1-3: EXISTING BRIDGE PROFILE



2 Purpose and Need

2.1 Purpose of the Project

The purpose of the project is to accommodate IL 18 traffic through the project area and across the Illinois River on a transportation system that is structurally sound, meets current design standards, provides a safe crossing for the public, reduces flooding along IL 18, supports regional connectivity needs, and meets the needs of river traffic.

2.2 Need for the Project

2.2.1 WHAT IS THE STRUCTURAL INTEGRITY OF THE EXISTING IL 18 BRIDGE

The bridge was constructed in 1934. In 1988, 54 years after its construction, Illinois Department of Transportation (IDOT) performed a major rehabilitation project on the structure. The concrete bridge deck was completely replaced. Deteriorated and damaged steel members as well as concrete substructures were repaired. Since this last rehabilitation, vehicular use, weather, and salt usage have caused deterioration to the structural steel and concrete that forms the piers and deck. Although the bridge has undergone extensive repairs, it is approaching the end of its repairable life.

The bridge was last inspected in 2024 and it was assigned a sufficiency rating of 2.0. A bridge sufficiency rating is a numerical value from 0.0 to 100.0 that indicates a bridge's overall ability to remain in service. A lower rating implies a higher priority need for improvement. The bridge was described as being in fair condition with intermittent transverse cracking and scattered areas of delamination and spalling.

The bridge superstructure is the portion of the bridge that supports the bridge deck and connects one substructure element to another. For the IL 18 Bridge the superstructure is the elevated steel truss portions and the concrete roadway. The latest bridge inspection rated the superstructure as "serious" condition with section loss in web bearing areas, truss members, and on floor beam flanges. This limits the greatest weight of a vehicle that the bridge can safely accommodate.

The substructure is the portion of the bridge that supports the superstructure, which are the reinforced concrete piers and abutments for the IL 18 bridge. The substructure was characterized as being in poor condition which indicates advanced deterioration.

Due to its condition, the current structure has limitations in accommodating large loads. The bridge is currently posted to restrict usage to Legal Loads Only. Overweight vehicles should not be using the bridge and permits that allow such loads to travel the roadways cannot be issued for travel across the bridge.

2.2.2 DOES THE CURRENT BRIDGE MEET DESIGN STANDARDS

The existing bridge has a roadway deck that is 22.6 feet wide with no shoulders. The narrow bridge creates issues with wide farm equipment, disabled vehicles, and bicycles. Wide loads require a police escort to cross the IL 18 structure. Passing disabled vehicles or bicycles on the bridge is dangerous due to the need to cross the centerline and the limited sight distance on the crest curve. A minimum deck width of 32 feet is required according to the current standards for vehicular traffic and additional width may be warranted as other design factors are considered. There are also several design standard deficiencies related to the IL 18 vertical profile as some of the rural roadway standards cannot be maintained along the route through Henry.

The existing bridge is considered functionally obsolete because the deck width is deficient and does not meet current standards. Functionally obsolete bridges are those that do not have adequate lane widths, shoulder widths, or vertical clearances to serve current traffic demand, or those that may be occasionally flooded.

Photos from the latest bridge inspection illustrating deterioration and corrosion.

2.2.3 WHAT ARE THE SAFETY CONCERNS WITH THE CURRENT BRIDGE

Existing Average Daily Traffic (ADT) over the bridge is 2,306 vehicles. Truck traffic accounts for five percent of the total traffic.

Historical crash information was obtained from 2014 – 2020 for the purpose of identifying crash causes and trends as part of the existing conditions evaluation. Along IL 18 from Third Street in downtown Henry to the intersection with IL 26, twenty-five crashes occurred over this period with two fatalities, which were not related to bridge deficiencies. The fatalities were both near the intersection of IL 18 / IL 26 and involved impaired drivers. **Table 2-1** and the Crash Report (Appendix 2) provide a summary of the crashes. Of the 25 crashes, three occurred on the bridge. One of the crashes was classified as a sideswipe opposite direction involving a tractor with semi-trailer and a van/mini-van. The second crash was classified as a fixed object involving a tractor with semi-trailer hitting the bridge support. The third was a fixed object crash involving a pickup truck. The narrow and deficient roadway width over the bridge were likely contributing factors to these crashes. Overall, fixed object was the predominant crash type in the project area. Most of the fixed object crashes involved vehicles running off the road and hitting the guardrail along IL 18 east of the bridge. The narrow roadway, traveling at a high rate of speed, and weather conditions were likely contributing factors to these crashes. More recent crash data was reviewed and the overall trend has improved.

TABLE 2-1 – SUMMARY OF CRASH DATA (2014-2020)

Collision Type	Number of Crashes
Angle	5
Animal	2
Fixed Object	9
Head On	1
Other	1
Parked Vehicle	2
Pedestrian	1
Sideswipe Opposite Direction	2
Turning	2
TOTAL	25

2.2.4 WHAT ARE OTHER REGIONAL CONNECTIVITY NEEDS

The IL 18 Bridge at Henry is an essential transportation link for the citizens of Henry, connecting Marshall and Putnam counties. The bridge is a gateway to the city of Henry. It serves as a transportation link for the Henry Fire Protection District, Henry Community Ambulance Service, and Henry-Senachwine Consolidated School District 5, all of which straddle the Illinois River. The farming community also is divided by the river, with several farm owners having to cross the bridge to access their land. The nearest alternative Illinois River crossing is located approximately eight miles to the south in Lacon. When the IL 18 bridge is closed for inspection, maintenance, or construction, the detour route requires approximately 22 minutes of adverse travel time. Since the IL 18 bridge is reaching the end of its repairable life, it can no longer be relied upon to maintain this crucial transportation link for the surrounding community. Additionally, based on flood data for Sandy Creek, the IL 18 roadway east of the bridge has been closed five times in the last 12 years which also affects the reliability of IL 18 through the project area.

The Illinois River is a commercial waterway connecting the Great Lakes and the Mississippi River used to transport bulk commodities. According to U.S. Coast Guard records, the bridge has been hit by commercial river traffic five times in the last 40 years. Vertical and horizontal navigational clearances required to maintain safe and efficient navigation of the river will be coordinated with the U.S. Coast Guard.

2.3 Conditions of the Existing Highway Network

2.3.1 ROADWAY CLASSIFICATIONS

The project area contains one Illinois numbered roadway, IL 18 (FAP 0653), that is not part of the National Highway System (NHS). IL 26 is adjacent to, but just outside of, the eastern project limits where it intersects with IL 18 east of the Illinois River (Figure 1-1). For this report, roadways will be referred to by their primary numbered designation.

Illinois Route 18 is under the jurisdiction and maintenance responsibility of IDOT and is a class II truck route. The local streets, 2nd Street, Front Street, 3rd Street north of School Street and Cromwell Avenue, are under the jurisdiction of the City of Henry, Illinois. IL 18 is not a critical facility, as indicated in IDOT correspondence dated December 16, 2021, and included in Appendix 3.

2.3.2 TYPICAL SECTIONS/EXISTING FACILITIES

See Exhibit 4-A in Appendix 4 for existing typical sections along the referenced roadways.

IL 18 (West of Illinois River) Existing Typical Section

The typical roadway section for IL 18 (School Street), west of the Illinois River, includes two, minimum 12-foot-wide travel lanes in each direction with B-6.24 combination concrete curb and gutter along the edge of pavement. Between Front Street and the IL 18 bridge, there is guardrail on both sides of the roadway.

West of the Illinois River, the posted speed limit for IL 18 is 30 MPH. The posted speed increases to 35 MPH for the eastbound roadway starting at Front Street and extending across the bridge. The existing right-of-way width is 66 feet between Front Street and the west project limit. The right-of-way increases to 80 feet wide on the IL 18 bridge approach. The existing grade varies between approximately -1.0% at 3rd Street and then increases to +5.0% in the vicinity of Front Street and on the west bridge approach. There is no on-street parking.

IL 18 Bridge Existing Typical Section

The existing bridge has a roadway deck that is 22.6 feet wide with no shoulders. Approach grades on both sides of the bridge are 5%. Posted speed limit on the bridge is 35 MPH.

IL 18 (East of the Illinois River) Existing Typical Section

The typical roadway section for IL 18, east of the Illinois River, includes two, 11-foot-wide travel lanes and varies with aggregate shoulders that vary between 2' and 3' wide. There is guardrail at the back of shoulder on both sides of the roadway from the Illinois River bridge to just west of the Sandy Creek Bridge. From west of the Sandy Creek bridge to the IL 26 intersection, there are variable width aggregate shoulders except for the Sandy Creek bridge and approaches where there are 4' wide paved shoulders with guardrail and/or bridge parapet.

The posted speed limit for IL 18 east of the river is 55 MPH. The existing right-of-way is variable; approximately 120 to 130 feet wide and as IL 18 approaches Sandy Creek the right-of-way increases to 160'. Parking is not allowed along any portion of IL 18 east of the river.

2.3.3 EXISTING ACCESS CONTROL

There is no current access control designated along IL 18 within the project limits. In the City of Henry, existing access is provided at 2nd and Front Streets with alley and driveway access in between those cross streets. The Front Street intersection is only 100' from the west abutment of the Illinois River bridge. East of the river, the steep roadway embankments, guardrail, land use, and frequent river floods limit access needs. Only one access location exists. The Duck Ranch Access Road intersects with IL 18 approximately 1000' east of the east river bridge abutment on the north side of the route.

2.4 Existing Traffic and Capacity Deficiencies

There are no capacity deficiencies along IL 18 within the project limits. IL 18 traffic volumes are low (LOS A), and there are no stop signs located along IL 18 within the project limits.

2.5 Existing Safety Performance/Crash Analysis

The IL 18/IL 26 intersection is considered a critical safety tier intersection. The corridor of IL 18 between IL 26 and Front Street is considered a critical safety tier segment. The intersections of IL 18 at Front Street, 2nd Street and 3rd Street are considered low safety tier intersections.

The complete Accident Analysis is included in the Crash Report (Appendix 2). It includes additional information regarding crash locations by type, crash ratios, summary tables and detailed breakdowns of the accident data sorted by type/roadway conditions.

2.6 Alignment, Profile, and Typical Section Deficiencies

The project area contains locations with design features that do not meet current standards. This is consistent with the age of the facility and standards in place at the time of the original design. Features exhibiting substandard design include:

- Mainline design speed – the existing 600' long crest curve over the bridge and the current 5% grades on the bridge approaches are acceptable for a 40-mph design speed in accordance with BDE Figure 33-4.A and 33-4.B. It is lower than the rural minor arterial design standards, which requires a 60 MPH design speed. Therefore, the existing mainline design speed is lower than the required design speed based upon roadway classification.
- According to BDE Figure 47-2.M Alignment Criteria for Rural Two-Lane Highways, new construction for a rural two-lane highway shall have a max grade of 3% for level terrain and 4% for rolling terrain assuming a 60MPH design speed. As previously discussed, it is assumed that the bridge and approach roadways were designed with a 40 MPH design speed and the 5% grades on the bridge and approaches were in accordance with previous standards and discussions. The existing 5% longitudinal slopes do not meet current standards.
- Mainline profile-- the 2 sag curves, 380' on the west side and 300' on the east side, are acceptable for a 35-mph posted speed but do not meet rural minor arterial design standard k-values in BDE Figure 33-4.E In most cases, it is preferable to have the design speed exceed the posted speed. However, on the eastern sag vertical curve, the posted speed and design speed are equal. The posted speed on the west bridge approach roadway is reduced to 30 mph entering Henry and the sag vertical curve design speed of 35 mph exceeds the posted speed by 5 mph.
- The grade at the east end of the bridge approach profile is 0.0%. Section 33-2.03 of the BDE Manual states that while 0.0% could be acceptable with adequate cross slope, a minimum grade of 0.5% is desirable for drainage purposes. The existing grade does not meet current minimum design standards.
- The desirable rural typical section follows the schematic cross section shown in IDOT BDE Figure 47-2A. The tables in Section 47-2.06 are used to determine the minimum widths and other cross section elements used on rural two-lane highways. The design table used for this section of IL 18 is Figure 47-2.K, new construction/reconstruction two-way design hourly volume (DHV): under 1050 column. This design criteria calls for a travel way width of 24' (split into 2 lanes at 12' wide). The bridge typical section is currently 22.6 feet wide with no shoulders and does not meet the requirements for 12' wide lanes. Existing roadway lane widths west of the bridge meet the 24-foot minimum width. East of the bridge the lane width varies and narrows to 11' in some locations.
- Existing shoulders vary from 2'-6' wide and are not paved. This design criteria calls for a travel way width of 24' (split into 2 lanes at 12' wide) with a shoulder width of 10'. A minimum of 4' of the shoulder is to be paved. The existing shoulders do not meet current standards.
- In accordance with current policy, the side slopes in fill sections are 1V:6H to the Clear Zone and then 1V:3H to natural ground. Along IL 18 beyond the shoulders, existing side slopes do not provide recoverable slopes and guardrail is present throughout the project limits from Front Street to west of the Sandy Creek bridge. From the west project limit to Front Street, there is concrete curb and gutter. Both conditions do not meet current standards for rural minor arterials.

The existing horizontal curve that begins west of Sandy Creek and ends at the IL 18/IL 26 intersection has a radius of 1317.49'. Per BDE Figure 32-3.A, a rural two-lane directional road with a design speed of 60 MPH should have a superelevation rate (emax) of 6%. The minimum radius value for a curve at 6% emax and a design speed of 60 MPH is 1330'. Therefore, this existing curve does not meet the minimum radius value.

3 Existing Conditions

3.1 Description of the Project Area

The project includes those areas along and adjacent to IL 18 at the Illinois River crossing between the City of Henry on the west and unincorporated rural areas on the east located within Marshall and Putnam counties (Figure 1-1).

Sidewalks are located along both sides of IL 18 between 3rd Street and Front Street. There are no pedestrian or bicycle facilities on either side of the Illinois River bridge.

3.2 Study/Project Limits

The scope of the project is the replacement of the Illinois River bridge, but the study includes assessing the profile east of the bridge since all of IL 18 between the existing Illinois River bridge and IL 26 is in the floodplain and the Department has records that the highway has been closed at this location several times since 2009 due to high water elevations and water overtopping the pavement. Therefore, the project study limits extend from the intersection of the IL 18 and 3rd Street in Henry on the west and the intersection of IL 18 and IL 26 on the east (**Figure 1-1**).

As this project progressed and the studies continued, it was determined that only a very minor reduction in flooding can be realized along IL 18 east of the new river bridge until the IL 18 and IL 26 bridges over Sandy Creek are raised. Raising the profile of IL 18 between the new river bridge and the Sandy Creek Bridge ahead of raising the Sandy Creek Bridge would relocate the low-profile elevation closer to / or at the bridge which is not preferred. The District proposes a separate study for the entire system (within the floodplain) east of the new IL 18 River Bridge.

Based on this evaluation, it was determined that the logical termini are approximately 130' east of the IL 18 and 3rd Street intersection in Henry on the west and approximately 1,430' west of the Sandy Creek Bridge to the east. (Figure 1-1).

3.3 Land Use

3.3.1 ZONING

The zoning map for the City of Henry shows the area surrounding the project on the west side of the river is zoned as conservation district (C), commercial retail (B-1), single family (R-1) and multi-family residential (R-2). There is no zoning map for the area on the east side of the river.

3.3.2 GOVERNMENTAL DISTRICTS (SCHOOL/FIRE/OTHER)

West of the river, the project is within the municipal limits of the City of Henry, which provides typical city services. The project is located within Marshall and Putnam County.

3.3.3 PUBLIC FACILITIES

Public facilities include schools, places of worship, libraries, hospitals, parks, fire and police facilities, and other public facilities. The following community facilities and community service centers are located within the project study area and are shown on the figures in Appendix B1 in the Environmental Documentation (Appendix 5):

- Waterworks Park
- Riverfront Park
- Central Park
- Duck Ranch
- City Hall

Several facilities are within a half-mile of the project study area and are shown on the figures in Appendix B1 in the Environmental Documentation (Appendix 5):

- Schools: Henry-Senachwine Grade School/Jr. High
- Places of Worship: Henry United Methodist Church, First Christian Church, St. John's Church, First United Presbyterian Church, Henry Baptist Church, St. John XXIII Catholic Church
- Libraries and Museums: Henry Public Library, Charles Perdew Museum
- Parks and recreational facilities: Child Memorial Park, Robert McBride Memorial Park, Stoner Park
- Fire and Police Facilities: Fire Protection District/Ambulance Service/Henry Police Department building

3.3.4 EXISTING BICYCLE/PEDESTRIAN GENERATORS

Generators for bicycles and pedestrians include residential areas, parks, recreation areas, churches, schools, libraries, existing and planned bicycle trails, shopping centers, hospitals, employment centers, government offices, local businesses, industrial plants, and public transportation facilities.

Existing generators include:

- Parks/Recreation Areas: Waterworks Park, Riverfront Park, Central Park, Child Memorial Park, Robert McBride Memorial Park, Stoner Park, Duck Ranch
- Churches: Henry United Methodist Church, First Christian Church, St. John's Church, First United Presbyterian Church, Henry Baptist Church, St. John XXIII Catholic Church
- Schools: Henry-Senachwine Grade School/Jr. High; Henry-Senachwine High School
- Library: Henry Public Library
- Government Office: Henry City Hall
- Local Businesses: Downtown Henry shopping district
- Industrial Plants: Ozinga

3.4 Environmental Resources/Sensitive Environmental Areas

This section provides a summary of environmental resources and sensitive environmental areas located within the project study area. A more detailed discussion of the resources and areas can be found in the Environmental Documentation in Appendix 5.

3.4.1 PARKS AND RECREATIONAL AREAS (SECTION 4(F) PROPERTIES)

Parks and recreational areas located in or near the project study area are Riverfront Park, Water Works Park, Central Park, and Duck Ranch (Appendix B1 in the Environmental Documentation (Appendix 5)). The proposed project would impact Duck Ranch and Riverfront Park. Both of these recreational areas are protected under Section 4(f) of the Department of Transportation Act of 1966. There will be no impacts to Water Works Park or Central Park.

3.4.2 FLOODPLAINS AND WATERWAYS

According to Flood Insurance Rate Maps (FIRMs) prepared by the Federal Emergency Management Agency (FEMA) (FIRM Panels 17123C0176C and 17155C0150E, Effective dates 11/4/2010 and 2/4/2011 respectively), the 100-year floodplain of the Illinois River in the Project study area spans approximately 5,500-feet, with over 5,000-feet of that containing the regulatory floodway (see Appendix B1 in the Environmental Documentation (Appendix 5)).

An hydraulics study was prepared to assess potential floodplain impacts of the new structure. The results of the hydraulics study have demonstrated that the project can achieve the IDNR OWR rise criteria. There are no compensatory storage requirements for the Project, however the piers and some embankment of the existing bridge will likely be excavated and removed, thereby offsetting some of the additional fill placed in the floodplain from the new bridge.

There are no longitudinal encroachments into the floodplain, thereby minimizing the extent of impacts to the floodplain. There are two proposed encroachments into the regulatory floodplain and floodway on the east and west sides of the Illinois River, both being roadway embankment and/or bridge abutments. However, removal of existing embankment/abutment fill will offset some of the proposed encroachment.

3.4.3 WETLANDS

The field survey conducted in 2021 identified three wetlands consisting of wet meadow, wet floodplain forest, and wet shrubland. All three wetlands are considered lower vegetative quality communities (less than 20 Floristic Quality Index). See Appendix B1 in the Environmental Documentation (Appendix 5) for the location of the wetlands within the Project Study Area.

3.4.4 HISTORICAL SITES

The Illinois State Archaeological Survey (ISAS) conducted an archaeological survey of the project study area that resulted in the identification of one potential archaeological site. However, the potential archaeological site is located outside of the proposed construction limits and will not be impacted by the project.

The IL 18 bridge over the Illinois River (Structure No. 062-0036) is listed on the National Register of Historic Places. The Henry lock has been determined eligible for listing on the NRHP but will not be impacted by the project.

Based on a review by IDOT's cultural resources staff, historic buildings within or adjacent to the project study area are:

- Henry City Hall, 514 Front Street
- Bickerman Opera House, 504 Edward Street
- Henry State Bank Building, 495 Edward Street
- 19th Century Commercial Storefront, 509 Edward Street
- City Water Works Building, 547 Cromwell Drive
- M & D Printing Building, 616 2nd Street

IDOT has also determined the following resources eligible for the NRHP:

- IL 18 River Bridge (SN 062-0036) – NRHP eligible, 2020
- Henry Lock – NRHP eligible

3.4.5 SPECIAL WASTE SITES

A Preliminary Environmental Site Assessment (PESA) was conducted to identify sites in or adjacent to the project study area that are potentially impacted with releases of hazardous substances. The presence or likely presence of contamination to soil or water from petroleum or other toxic substance releases is called a Recognized Environmental Condition (REC). Of the sites that the PESA identified as containing RECs, six sites are within the proposed right-of-way and existing right-of-way where work is proposed.

The existing bridge (SN 062-0036) was unconfirmed for asbestos involvement as of October 19, 2001 but has subsequently been determined, on the basis of information available to the District, not to involve asbestos in a bituminous bridge deck wearing surface or waterproofing membrane (Appendix 6).

3.4.6 ENDANGERED SPECIES LOCATIONS

The Federal Endangered Species Act protects species of plants and animals that are threatened or endangered within the U.S. The Illinois Endangered Species Protection Act protects species of plants and animals that are listed under the federal act plus additional plants and animals. Both acts provide for the conservation of threatened and endangered species and the ecosystems upon which they depend.

The federally listed species for Marshall and Putnam counties are: Indiana bat, Northern long-eared bat, decurrent false aster, and Eastern prairie fringed orchid. Illinois Department of Natural Resources' (IDNR) Natural Heritage database shows records of two state listed species as occurring in the project study area: the River Redhorse and an Indiana Bat maternity roost.

3.4.7 NATURAL AREAS

State Designated Lands include Illinois Natural Area (INAI) Sites, Land and Water Reserves, Natural Heritage Landmarks, and Nature Preserves. The Illinois Natural Areas Preservation Act sets the criteria for these land designations to help protect Illinois' sensitive natural resources.

The following State Designated Lands are located within one mile of the project study area:

- Sandy Creek Hill Prairie INAI
- Magnolia Hill Prairies INAI
- Wier Hill Prairie Nature Preserve
- Sandy Creek Bluffs Land and Water Reserve and INAI

3.4.8 BIOLOGICALLY SIGNIFICANT STREAMS

The Illinois River is the only waterway within the project area. Under the Illinois Integrated Water Quality Report and Section 303(d) List, 2022 by the Illinois Environmental Protection Agency (EPA), the Illinois River in the project area is listed as an impaired waterbody. It is not biologically significant.

4 Description of Alternatives Considered

This section describes the alternatives considered for the IL 18 River Bridge over the Illinois River. The alternatives were the result of a lengthy public and agency coordination through the NEPA/404 Merger Process, meeting with local officials and the public, in addition to environmental and technical analyses. Alternatives were evaluated and eliminated from further consideration based on their ability to satisfy the purpose and need for action. Resource agencies participated in the review of alternatives and concurred with the Preferred Alternative. The principal features of each feasible alternative developed prior to this study are summarized in the following paragraphs.

4.1 Reconstruction/Rehabilitation Alternative

Bridge reconstruction includes at a minimum complete replacement of the superstructure and could include work on the substructure and foundation. Bridge rehabilitation includes repairing the damaged or deteriorated portions of the existing bridge (i.e., superstructure, substructure, and/or foundation) to extend the safe working life of the bridge. The Reconstruction/Rehabilitation alternative would not address the narrow lanes and zero-width shoulders. An existing through truss structure type cannot reasonably be widened. The bridge would also need to be closed for several months in connection with any reconstruction/rehabilitation. An existing through truss cannot reasonably be rehabilitated under traffic, even using a single alternating lane of traffic controlled by signals and flaggers. While it would address the structural integrity needs, it does not address the identified design standards, safety, and regional connectivity needs. The bridge reconstruction/rehabilitation alternative does not address the purpose and need for the project; therefore, it was eliminated from further consideration.

4.2 Build a New Bridge and Retain the Existing Bridge Alternative

The existing IL 18 bridge over the Illinois River is considered eligible for the National Register of Historic Places. Given the bridge's historic significance and the fact that a bridge of this type cannot be widened to meet current design standards, consideration was given to retaining the existing bridge and building a new bridge parallel to the existing bridge. The

existing bridge would accommodate one direction of travel, and the new bridge would accommodate the other direction of travel. To use the new bridge for one direction of traffic while also expending resources to rehabilitate and maintain the existing bridge for the opposite direction of traffic is not a reasonable use of funds, since the existing bridge would still be in deteriorated condition and require extensive rehabilitation. In addition, the annual maintenance costs would be above average for that of the new bridge. This is considered a fatal flaw, and therefore, this alternative is eliminated from further consideration.

4.3 No-Build Alternative

No-build means that no improvements to the existing bridge would be made, and the bridge would remain as it is today; however, inspections and maintenance would continue to ensure the safety of the bridge as well as keep it open to traffic. This alternative would not include modifications to address the existing deficiencies (structural integrity, design standards, safety). The costs and disruption to the motoring public associated with repairs would steadily increase. In time, the structural deterioration of the bridge would require weight limits and ultimately closure of the bridge to traffic. This would force local and regional motorists to travel either eight miles south to Lacon or 14 miles north to Hennepin to cross the Illinois River, causing approximately 22 minutes of adverse travel. The No-Build Alternative does not meet the purpose and need since no improvements would be made in the project area to IL 18 or the bridge over the Illinois River.

4.4 Bridge Replacement Alternative

During the project development process, a variety of preliminary bridge replacement alternatives were developed. Alternatives are the possible solutions that may address the purpose and need for the project. The bridge replacement alternatives were developed by the Project Study Team with input from the Community Advisory Group (CAG). The CAG for the IL 18 River Bridge project is a group of key stakeholders formed to gain valuable community input, identify and address local concerns, and build public interest and involvement in the project's decision-making process. CAG members represent various project study area constituencies, including residents, local government officials, school district, emergency service providers, farm bureau, businesses, and other community stakeholders. The Project Study Team obtained input from the CAG to identify potential corridors for a new bridge. The bridge replacement alternative includes a new bridge to meet current design standards, including improved lane and shoulder widths and navigational clearances, and roadway improvements east of the river to address roadway flooding. This alternative meets the purpose and need for the project.

4.4.1 CORRIDORS STUDIED

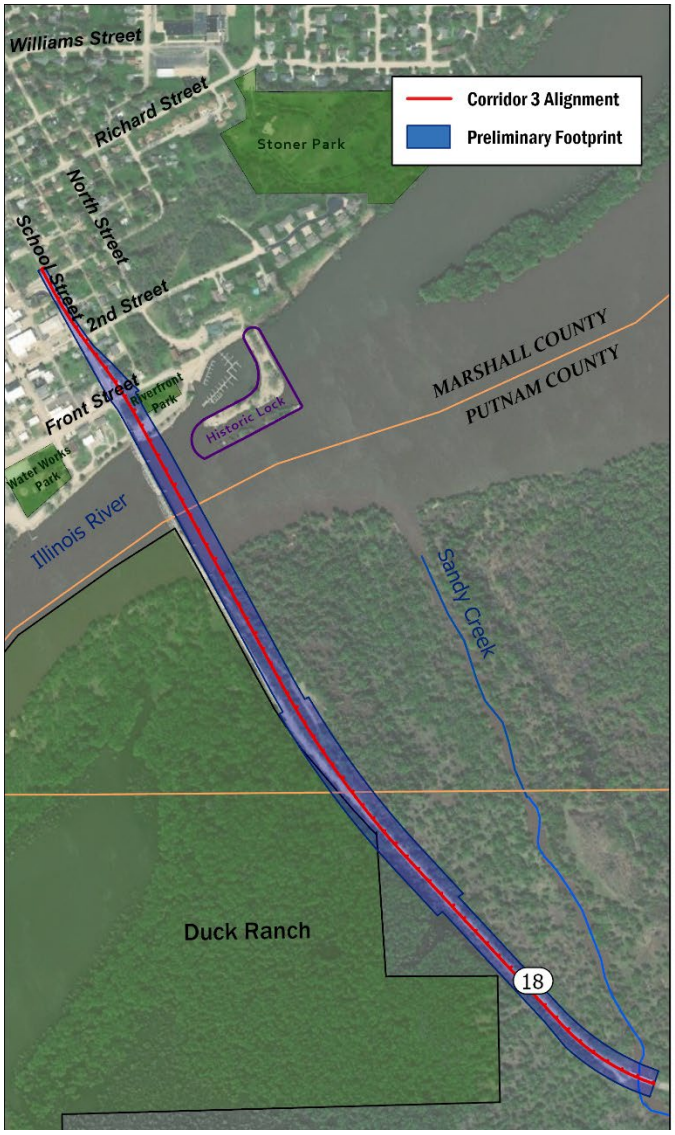
Alignments in two corridors were advanced with the alternatives carried forward. These corridors are summarized below:

- **Corridor 3 Alignment:** Corridor 3 is adjacent to the existing bridge, located just upstream. The new alignment would tie back into School Street at around 2nd Street. Corridor 3 maintains traffic through downtown Henry and would allow the existing bridge to remain open during construction.
- **Corridor 5 Alignment:** Corridor 5 is adjacent to the existing bridge, located just downstream. The new alignment would tie back into School Street at around 2nd Street. Corridor 5 maintains traffic through downtown Henry and would allow the existing bridge to remain open during construction.

These alternatives are denoted as Alignments 3 and 5 and are shown on **Figure 4-1**, **4-2**, and **4-3**.

Subsequent to the identification of the two corridors, roadway/bridge alignments were developed for each taking into account horizontal and vertical design criteria, roadway typical sections, local road connectivity, expected river navigation requirements of the U.S. Coast Guard, and land acquisition constraints. Appendix 4-D shows the roadway geometry developed for each of the corridors. The engineering aspects of each of the alternatives is described in the following sections. Refer to the Environmental Documentation (Appendix 5) for complete documentation regarding corridors studied.

FIGURE 4-1: BRIDGE REPLACEMENT ALTERNATIVE – CORRIDOR 3 ALIGNMENT AND CORRIDOR 5 ALIGNMENT



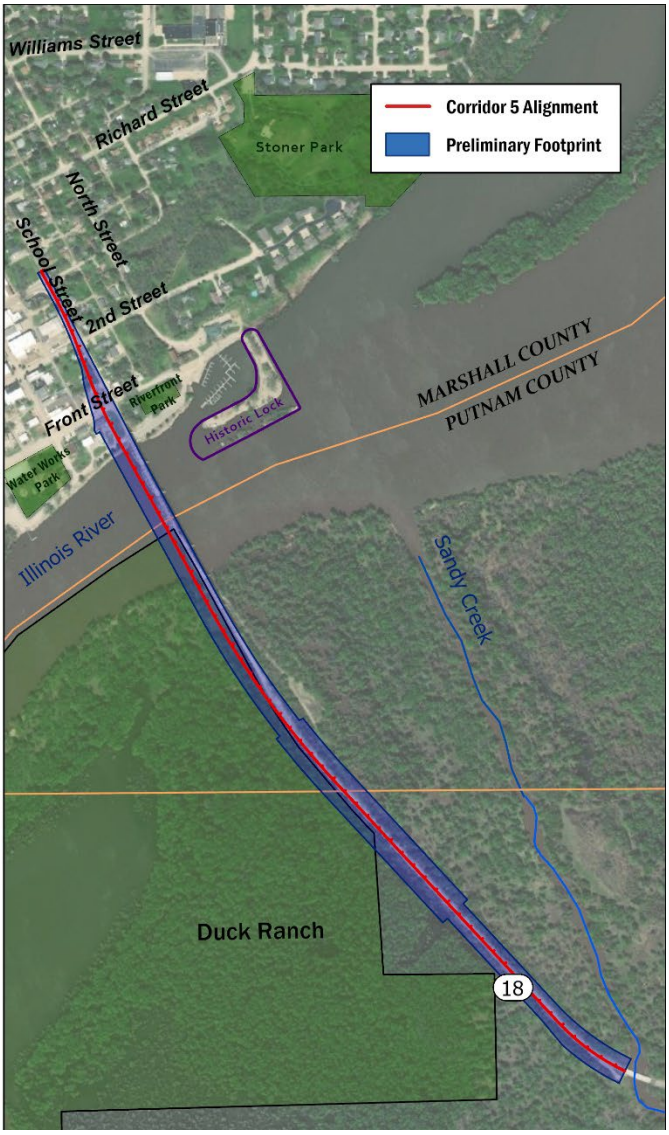


FIGURE 4-2: BRIDGE REPLACEMENT ALTERNATIVE – CORRIDOR 3 ALIGNMENT

FIGURE 4-3: BRIDGE REPLACEMENT ALTERNATIVE – CORRIDOR 5 ALIGNMENT

4.5 Preferred Alternative

4.5.1 ELEMENTS OF THE PREFERRED BUILD ALTERNATIVE

The Preferred Alternative consists of one 12-foot-wide travel lane in each direction on IL 18 throughout the project area. On the east side of the river, the proposed roadway includes 10-foot-wide outside shoulders with 4 feet of the shoulder paved (rural roadway section). On the west side of the river in Henry, the proposed improvement transitions from a rural or bridge typical section to a section with curb and gutter and sidewalks (urban roadway section). Along the new bridge, 8-foot-wide shoulders are provided (bridge section). The use of 8-foot shoulders across the bridge exceeds policy requirements for a rural section but responds to the needs of agricultural users who operate oversize vehicles. The additional width also provides a refuge for stalled vehicles, provides traffic control flexibility for future bridge maintenance, and provides bicycles accommodations (as warranted). The proposed typical sections for the Preferred Alternative are shown on Exhibit 4-B in Appendix 4.

As part of developing the proposed typical sections, an assessment of bicycle and pedestrian needs was conducted to determine what bicycle and pedestrian accommodations are warranted. This assessment was conducted in accordance with Chapter 17 of the IDOT Bureau of Design and Environment (BDE) Manual. Within the project area, sidewalks are present along both sides of IL 18 between 3rd Street and Front Street. East of Front Street, there are no sidewalks on the bridge or IL 18. It is assumed that sidewalks will be provided along both sides of IL 18, regardless of alignment, where IL 18 rejoins the existing street network within Henry (i.e., urban roadway section) so that existing conditions are maintained. However, across the bridge and east of the river, no pedestrian accommodations will be provided because that portion of the project area is rural. There is no evidence of frequent pedestrian activity or pedestrian safety issues,

and there is no existing or known planned development in the project area east of the river that would be expected to generate future pedestrian activity. Although Duck Ranch is located on the east side of the river, this resource is not considered a pedestrian destination.

Since IL 18 crosses the Illinois River (i.e., a natural barrier), a warrant for bicycle accommodations is met. According to the BDE Manual, a 4-foot paved shoulder should be provided as the bicycle accommodation based on roadway type and traffic volumes. A 4-foot shoulder will be provided east of the bridge along the rural roadway section. Across the bridge, a wider (8-foot) shoulder is proposed to provide additional safety and operational benefits as noted above (Appendix 7 Bike/Ped Warrant Analysis).

The navigation channel requirements were a major driver of the design features of any Bridge Replacement Alternative. Based on early coordination with the US Coast Guard and US Army Corps of Engineers (USACE), the following factors governing the navigation span are understood:

- The new navigation span should be centered near the intersection of any proposed alignment with the current sailing line. The current sailing line has been extracted from USACE Waterway Information Charts.
- The new vertical clearance will increase by a small number of feet over the existing.
- The new horizontal clearance within Corridors 3 will be required to increase slightly over the existing 350' value.

The Illinois River navigation channel under the proposed bridge would accommodate the location of the existing channel and the horizontal clearance limits currently in place. A bridge type evaluation was completed that analyzed four bridge types, constant-depth steel plate girder, haunched steel plate girder, through-truss and tied-arch, respectively. The evaluation identified that a haunched steel plate girder bridge is the best bridge type for the main river spans. See the Bridge Type Screening Memo, Appendix 8.

4.5.2 DESCRIPTION OF THE PREFERRED BUILD ALTERNATIVE - ROADWAYS

The proposed alignment connects to School Street between 2nd Street and 3rd Street and merges with existing IL 18 east of the river. The profile of IL 18 is approximately 12 feet higher than Front Street, which does not provide enough room to keep Front Street open under the new roadway at its current grade. The community values local road connectivity so Front Street will be lowered to pass under the relocated IL 18. Cromwell Drive would be spanned and kept open. 2nd Street would remain open with an at-grade intersection. A flatter, 3% IL 18 profile was previously investigated to meet standards that passed over Front Street, but it required the closure of 2nd Street and converged closer to 3rd Street. A significantly higher profile for School Street was not desirable, and it was determined that the 2nd Street intersection should remain open.

Engineering features of Alternative 3:

- Vertical curvature is consistent with 40 MPH west of the river, 50 MPH on the river bridge crest VC, and 60 MPH east of river. The minimum K-value requirement for a sag vertical curve at 40 MPH is 64 per IDOT BDE Figure 33-4.E. The minimum K-value requirement for a sag vertical curve at 60 MPH is 136 per IDOT BDE Figure 33-4.E. The minimum K-value requirement for a crest vertical curve with a 40 MPH design speed is 44 per BDE Figure 33-4.A. The sag vertical curve at the west end of IL 18 falls under the 40 MPH design criteria and the K-value of 69 meets the minimum requirement of 64. The sag vertical curve at the east end of IL 18 falls under the 60 MPH design criteria and the K-value of 164 meets the minimum requirement of 136. The crest vertical curve at the bridge and over the river falls under the 40 MPH design criteria and the K-value is 47, which meets the minimum requirement of 44.
- The vertical grades at the bridge are 4% on the west side and 3% on the east side of the river. The vertical grade to tie down to existing ground on the west side is 1.50%. The vertical grade to tie down to existing ground on the east side is 0.02%. A 0.5% minimum vertical grade is usually desirable for drainage purposes therefore the 0.02% grade could be considered a deficiency. This deficiency has been noted in Section 2.6.
- The typical cross section for rural, bridge and urban areas follow what was outlined in Section 4.4.

West side of the Illinois River.
On the west side of the Illinois River, IL 18 will be re-aligned to provide a smooth transition to the new bridge crossing location. A reverse curve meeting 40 MPH design speed will be utilized to meet the new bridge alignment. The radii of these reverse curves are 2510', which is greater than the minimum radius requirement of 533'. The curve used to tie in the new alignment to existing IL 18 west of the river has a radius of 5250', above the minimum radius requirement of 1330'. The bridge alignment will be skewed at 2° from the parallel street grid to smoothly transition the alignment and reduce ROW impacts on the north side of School Street. As much as possible, horizontal curvature is located off the bridge or limited to the westernmost span.

Superelevation is introduced to both horizontal curves at a rate of 4.0%, developed with the 6% emax standard at a 40 MPH design speed per BDE Figure 48-5.A. The proposed IL 18 alignment crosses 2nd Street on a horizontal curve and creates a slight skew from 90°. Superelevation across 2nd Street affects the 2nd Street profile and profile adjustments are needed along 2nd Street to meet the proposed IL 18 cross-slope.

The proposed IL 18 profile is designed for 40 MPH west of the river and includes a sag curve at the intersection of the proposed 4% western approach grade with the existing School Street profile between 2nd and 3rd Streets.

The roadway typical section transitions from an urban section between 2nd and 3rd Streets to a rural section east of 2nd Street. The urban section is consistent with 30' wide roadway, 5' wide parkway and 5' wide sidewalk on both sides. The rural two-lane minor arterial standard is for a 10' wide shoulder with 4' paved and is accommodated with some adjustment between 2nd Street and the west bridge approach. To accommodate the possibility of bicycles and pedestrians accessing the bridge, 8 feet of the 10-foot-wide shoulder will be paved on the west bridge approach.

Across the Illinois River bridge.
On the bridge over the Illinois River, IL 18 has been designed at a 50 MPH design speed (Level Grade). A portion of the horizontal curve from the west will extend onto the IL 18 bridge but otherwise the horizontal geometry will maintain a tangent section along the bridge.

East side of the Illinois River.
On the East side of the Illinois River, IL 18 will be re-aligned to provide a smooth transition to the new bridge crossing location. A single horizontal curve is designed to merge the proposed roadway alignment with a tangent portion of the existing roadway. The proposed horizontal curvature meets the rural two-lane arterial design speed of 60 MPH. The proposed 2° skewed bridge alignment creates some increased offset between the existing and proposed alignments, but the separation allows for improved constructability at the east abutment. Proposed alignment horizontal curvature is located off the bridge simplifying bridge design.

The horizontal curve east of the bridge will require a superelevation rate of 2.8%. This rate and the associated transitions have been designed with an emax of 6% at a 60 MPH design speed per BDE Figure 32-3A. The proposed vertical curves in this section have also been designed with a 60 MPH design speed.

East side roadway alignment converges on existing IL 18 alignment approximately 1830 feet west from Sandy Creek Bridge.

4.5.3 DESCRIPTION OF THE PREFERRED BUILD ALTERNATIVE – BRIDGE

This project will replace the existing IL 18 bridge over the Illinois River with a new bridge approximately 75 feet upstream of existing (Corridor 3 Alignment). The proposed bridge is approximately 2,200 feet long, spanning over Cromwell and Front St in Henry. The proposed structure will provide a clear roadway width of 40'. The cross-section for the replacement structure includes two 12'-0" travel lanes with 8'-0" shoulders. The superstructure will be an 8" cast-in-place deck on 6 steel girders. The railings will be 39" concrete parapets topped with a 1'-3" tube railing (4'-6" total height). The bridge

west abutment is located to allow Front St to be lowered under the new IL-18 in a cut section. The east abutment is set to limit the height of tall approach embankment and ensure an increase in open hydraulic area. The Type Size and Location plan consists of an 11-span, 3-unit bridge with a total length of 2,206'. The hydraulic opening has been established such that a future project will be able to raise the east approach roadway without creating hydraulic conditions more severe than exist at present (2023).

The new bridge will have a 385' main navigation span, facilitating construction with minimal impact to the existing 350' navigation opening (per US Coast Guard). Vertically, the new bridge is controlled by USCG requirement for 50' clearance above the 2% flowline. In an effort to limit the profile raise and thus minimize the length of structure and the impacts of its approach roadways, the steel girders will be haunched at the navigation span. In conjunction with the clipping of 50' clearance at the corners permitted by USCG, the haunching allows reduction of the required increase in profile by 2 to 3 feet.

The first bridge unit from the west abutment is proposed as a 3-span continuous steel girder with hammer head piers supported on driven piles. The second unit spanning over the river is proposed as a three-span continuous haunched steel plate girder bridge with drilled shaft foundations to carry large vessel collision forces. The third unit to the east of the river is proposed as a four-span continuous steel plate girder with hammerhead piers on driven piles.

The proposed IL 18 bridge and approaches will be constructed while traffic is maintained on the existing bridge. The existing bridge will be removed after the new bridge is completed and open to traffic. Refer to the Bridge Condition Report for more details on the existing structure (Appendix 10). Refer the Bridge Type Screening memo for more details on the selection of the proposed structure (Appendix 8). Refer to the Type Size and Location Plan for final layout of the proposed structure (Appendix 9).

The proposed bridge will be designed using AASHTO LRFD 9th Edition with HL-93 loading.

5 Description and Analysis of Alternative Studied in Detail

5.1 Attainment of Purpose and Need

The Preferred Build Alternative would address the needs identified for the project as summarized below.

- **Structural Integrity** – A new bridge would eliminate the structural deficiencies and concerns associated with the existing bridge.
- **Design Standards** – A new bridge would meet the current design standards for roadway width.
- **Safety** – A new bridge would eliminate the safety concerns related to the narrow roadway width and the potential for bridge closure based on inspection results.
- **Regional Connectivity** – A new bridge would provide the needed regional connectivity for area travelers, agricultural traffic/farm implements, emergency services, and the school district. A new bridge would also provide the required clearances for river navigation.

5.2 Traffic Service to the Region

IL 18

There are no traffic operational deficiencies along existing IL 18. The alternatives studied in detail satisfy the traffic service to the region by:

- Improved roadway and bridge vertical profile meeting a higher design speed.
- Improved bridge horizontal and vertical clearance over the Illinois River.
- Wider roadway and bridge shoulders to meet current shoulders, which will be more accommodating for pedestrians and bicycles.

- Improved roadway side-slopes for increased safety and reduction in guardrail need on east of the bridge.
- Introduction of access control for areas adjacent to the bridge to improve safety.
- Maintaining local road connectivity in Henry by keeping Front Street open on the existing alignment but lowering the street profile to pass under relocated IL 18.

5.3 Proposed Highway Design Guidelines

Criteria were selected from applicable IDOT BDE guidance during the development of the Range of Alternatives, Alternatives Carried Forward, and the Preferred Alternative improvement. The project design will conform to standard design criteria set forth by the Federal Highway Administration as defined in the Illinois Department of Transportation's Bureau of Design and Environment (BDE) Manual. BDE Manual Chapter 47 Rural Two-Lane/Multilane State Highways (New Construction/Reconstruction) will provide the design guidance for the improvement of IL-18 through the study area. Illinois Department of Transportation Bureau of Design and Environment (BDE) Manual Chapters 31, 32, 33, 34, 36, 37, 39, 45 and 48.

Detailed geometric design criteria for IL 18 is provided in BDE Figure 47-2.K Geometric Design Criteria for Rural Two-Lane Minor Arterials shown Appendix 4-C. Front Street was designed in accordance with Illinois Department of Transportation Bureau of Local Roads and Streets (BLRS) Manual Chapters 27, 29, 30, 31, 34 and 35.

Design vehicles for the proposed improvements are:

- School Bus for 2nd Street intersection (no encroachment).Design guidance provided via correspondence with IDOT.
- Passenger automobile with Trailer for Duck Ranch Access Road with no encroachment. Design guidance provided via correspondence with IDOT.

5.4 Proposed Typical Section Standards

Typical sections for the proposed improvements are based upon traffic capacity requirements and BDE Manual design guidance.

Rural Typical Section

The rural typical section follows the schematic cross section shown in IDOT BDE Figure 47-2A. The tables in Section 47-2.06 are used to determine the minimum widths and other cross section elements used on rural two-lane highways. The design table used for this section of IL 18 is Figure 47-2.K, new construction/reconstruction two-way design hourly volume (DHV): under 1050 column.

This design criteria calls for a travel way width of 24' (split into 2 lanes at 12' wide) with a shoulder width of 10'. A minimum of 4' of the shoulder is to be paved. The side slopes at the fill section are 1V:6H to the Clear Zone and then 1V:3H to natural ground. The pavement cross slopes are 3/16"per foot at the travel lanes, 1/2"per foot at the paved shoulder and 3/4" per foot at the aggregate shoulder.

Urban Typical Section

Initially, the urban typical section between 2nd and 3rd Streets was based upon the schematic cross section shown in IDOT BDE Figure 48-2.E with the buffer area between barrier concrete curb and gutter and sidewalk used for both sides. The tables in section 48-6 were used to determine the minimum widths and other cross section elements used on urban two-way arterials. The design table used for this section of IL-18 is Figure 48-6.A under the two-way DHV < 1250 column.

This design criteria calls for a travel way width of 30' from face of curb to face of curb, as this section does not have parking. Concrete curb and gutter are placed at the edge of travel way along with a 5' buffer and a 5' sidewalk. The width

of the buffer is not specified in the standards, but this width is typically around 5'. The cross slope for the travel lanes is 3/16" per foot.

Because the existing typical section width between 2nd and 3rd Streets exceeds the policy requirement, it was determined to match the existing pavement width of 35 feet face to face of curb. This section will be striped with two 12-foot-wide lanes, 3-foot-wide bike accommodation and 2-foot-wide gutter flag. The 3-foot-wide bike accommodations would not be painted to reflect a bike only lane.

Bridge Typical Section

The bridge typical section initially followed the criteria in Figure 47-2.K under the bridges section. The criteria from this figure indicates that a 32' clear roadway width is to be provided. This clear roadway bridge width is measured from the face to face of the parapets and is the sum of the 24-foot-wide traveled way and 4 feet wide paved shoulders carried across from the approach roadway section.

An alternative bridge typical section, reflecting a 40 wide clear roadway width was selected at the bridge reflecting 2-12 foot wide through lanes and 8-foot-wide shoulders in each direction. This increase from the minimum 32-foot width improves both bicycle and wide farm implement accommodation by providing a wider shoulder in each direction. The cross slopes on the bridge deck will follow the IDOT Bridge Manual Figure 2.3.7.4.1-1, which shows the bridge crown policy being 3/16" per foot at the travel lanes and 1/4" per foot at the shoulders.

5.5 Engineering Considerations

5.5.1 HORIZONTAL AND VERTICAL ALIGNMENTS

Proposed plan and profile sheets for IL 18, Front Street, and the Duck Ranch access road are included in Appendix 4-D. The plan and profile sheets show existing and proposed alignments, roadway geometry, proposed right-of-way and/or easement, drainage features, property lines, construction limits, and topo survey.

5.5.2 RIGHT-OF-WAY (ROW) PLANS

Construction limits were developed for the purpose of identifying ROW needs which includes temporary and permanent easements. Right-of-Way plans are provided in Appendix 4-D.

5.5.3 EAST SIDE PROFILE

An assessment of the east roadway approach profile was undertaken to determine if improvements could be made in conjunction with the bridge replacement project, to reduce the flooding along IL 18 between the new river bridge and the intersection of IL 18/IL 26. It was determined that improvements to the east approach roadway beyond the "touchdown" point as part of the bridge replacement project should not be made. Instead, it was recommended that the proposed east bridge approach roadway follow the 3% policy profile grade until it ties into the existing vertical profile. Both the horizontal and vertical alignments will tie into the existing roadway at about the same location (or as close as practical).

These recommendations were made based on the following:

- The study of the east profile showed that only a very minor reduction in flooding can be realized along IL 18 east of the new river bridge until the IL 18 and IL 26 bridges over Sandy Creek are raised.
- The study showed that the two Sandy Creek bridges would need to be raised 5 to 7 feet to meet policy. In addition to raising the roadway between the new touchdown point and the IL 26 Sandy Creek bridge, the IL 18/IL 26 intersection plus approximately 5000 feet approach roadway (E and S legs) would also need to be raised to make this a resilient facility.

- A future study will be conducted for the entire system (within the floodplain) east of the new IL 18 River Bridge to address the flooding and the two Sandy Creek bridges. A detailed memo outlining the east side profile analysis is included in Appendix 11.

5.5.4 INTERSECTION DESIGN STUDIES

Intersection Design Studies (IDS) were completed for 2nd Street and Duck Ranch access road. Traffic data was reviewed to identify intersection level of service (LOS).. Intersection geometry was developed to accommodate S-BUS 40 turning movements on 2nd Street and Passenger Vehicle with Trailer on Duck Ranch. The skew of the intersection at 2nd Street is under the allowable skew angle as stated in the BDE to provide comfortable movement for through traffic. The Intersection Design Studies are provided in Appendix 4-E.

5.5.5 AMERICANS WITH DISABILITIES ACT (ADA) RAMP DETAILS

Details of ADA ramps at the Front Street and 2nd Street intersections are provided in Appendix 4-E.

5.5.6 PAVEMENT DESIGN

Roadway pavement design for the roadway sections on either side of the IL 18 River Bridge were prepared based on the traffic forecasts and geotechnical recommendations. The pavement design is provided in Appendix 12. The pavement design forms were submitted to Central Office and the final pavement design will be determined during Phase II.

5.5.7 GEOTECHNICAL REPORTS

Two geotechnical reports were prepared, a Roadway Geotechnical Report (RGR) and a Structure Geotechnical Report (SGR) (Appendix 13). The RGR presents the results of the geotechnical subsurface investigation, laboratory testing and engineering analyses and evaluations for the roadway reconstruction and realignment of IL 18. The SGR presents the results of the subsurface investigation, laboratory testing, geotechnical evaluations, and recommendations to support the design and reconstruction of the IL 18 River Bridge.

5.5.8 TRAFFIC MANAGEMENT/CONSTRUCTION STAGING

The project will utilize staged construction to complete the proposed improvements. Since the proposed replacement bridge will be constructed parallel to the existing bridge and offset sufficiently to allow for continued use on the existing bridge, traffic can be maintained on the existing bridge until the new bridge is opened to traffic. Some lane closes and one-way operation may be needed at the IL 18 roadway tie-in points at the east and west limits of construction.

A Conceptual Traffic Management Plan has been developed and is included in Appendix 14. In addition, the Location Drainage Study (Appendix 15) provides recommendations for temporary drainage considerations. Detailed maintenance of traffic plans, and temporary drainage plans, will be developed in conjunction with the construction plans during Phase II.

5.5.9 ACCESS/CONTROL MANAGEMENT

It is desirable to employ access control on and or near the bridge abutments to improve safety. This includes the 4% west approach grade where extra stopping distance is needed for westbound vehicles traversing the steeper downgrade. To a certain extent, the proposed IL 18 raised profile and land use impacts/property takes in the City of Henry limit the need to employ access control. The Front Street intersection will be eliminated due to the higher IL 18 profile and will pass beneath the proposed bridge. The residential and commercial properties that currently connect to IL 18 between Front Street and 2nd Street will be purchased by the Department, and no planned driveways or alleys connections are proposed. The one remaining driveway for the parcel on the south side of IL 18 is proposed to be relocated to 2nd Street. On the east side of the river, only one access point is planned. The Duck Ranch Access Road that currently connects to IL 18 on the north side will be relocated to the southside of IL 18 and follow the existing IL 18 alignment. Access to the

Sandy Creek Sportsman Club LLC property will be combined with the Duck Ranch Access Road. The river flood plain limits the likelihood that other access points will be developed in the future.

5.5.10 COST ESTIMATE

Preliminary construction costs were developed based upon roadway quantities and the latest bid prices (see Appendix 16).

5.6 Important Social, Economic and Environmental Effects

The Environmental Document discusses the purpose and need, alternatives considered and evaluation process, assessment of impacts to environmental resources and mitigation. Impacts were identified for the following resources: social and economic, agricultural land and farming operations, air quality, noise, natural resources, water resources and aquatic habitat, groundwater resources, wetlands, special waste, and recreational areas. The Environmental Document provides a detailed discussion of these items and is included in Appendix 5. It summarizes the important social, economic, and environmental effects.

5.7 Utility Involvements/Drainage Considerations

See Location Drainage Study (LDS) in Appendix 15 for drainage considerations for the project. The Hydraulic Report for the River is included as an attachment to the LDS in Appendix 15.

Existing utility data was sent from Ameren Illinois, Frontier Communications, City of Henry and Mediacom. The following table shows the contact information for each utility agency:

Agency	Name	Email	Phone	Address
Ameren Illinois	Sam Kassing	skassing@ameren.com	618-972-1965	300 Liberty St. Peoria, IL 61602
Frontier Communications	Kalin Hinshaw	Kalin.hinshaw@ftr.com	815-895-1515	112 W Elm St. Sycamore, IL 60178
City of Henry	Judd Giffin	office@giffin.com	309-356-5393 309-208-4858	326 Edward St. Henry, IL 61537
Mediacom	Chris Minard	cminard@mediacomcc.com	815-597-5103	6925 Garden Prairie Rd. Garden Prairie, IL 61038

The study found there are water main and storm sewer lines present underground in the City of Henry along with utilities from the companies listed above. A SUE study will be conducted in Phase II and any utility conflicts will be resolved as well.

5.8 Aesthetic Considerations

An Aesthetics Focus Group (AFG) was established with the goal to provide collaborative aesthetics recommendations that will be incorporated into an Aesthetics Master Plan. The AFG is represented by Citizens of Henry, the Illinois Department of Transportation (IDOT), and the Project Team. Two meetings were held with the group where discussions included the goals for the AFG, the potential aesthetic elements that could be incorporated into the project, and the division of costs

for these potential elements between the City of Henry and IDOT. The City of Henry has provided a wish list of aesthetic elements. IDOT created a memo that responded to each item on the wish list including cost estimates (Appendix 17).

5.9 Permits Required

The following permits and certifications will be required from the identified resource/regulatory agencies for this project:

- Section 9 Permit – USCG
- Section 10 Permit, Section 404 Permit (USACE)
- Section 401 Water Quality Certification (IL EPA)
- Section 402 National Pollution Discharge Elimination System (NPDES) Construction Permit (IL EPA)
- Section 404 of the Clean Water Act
- Floodway Construction Permit, Public Waters Permit (INDR OWR)

6 Coordination Activities

This section documents meetings, correspondence, and project comments and responses between the Project Team and members of various Federal, State, and local agencies as well as impacted property owners. During the course of this study, coordination has taken place over many years and has involved both agencies and communities as well as elected officials on both environmental and engineering issues. Copies of correspondence can be found in the various Appendices.

6.1 Local Government and Organizations

At the beginning of the project, interviews were conducted to engage stakeholders, share information, and foster discussion by addressing specific project issues, allowing for more specialized discussions and input, and aiding the general public in developing a better understanding of the project goals and objectives. A context audit was used at each interview to garner and document the public input. The context audit form asked a variety of questions that are intended to be a guide to identify various community characteristics that make each transportation project location unique to its residents, businesses, and the general public. The audit was designed to take into account the community's history or heritage, present conditions and anticipated conditions. Twenty-one completed context audits were received.

Seventeen stakeholder interviews were conducted with the following organizations/groups:

- Local farmers
- Local agricultural businesses
- Marshall-Putnam County engineer
- Marshall-Putnam County soil and water conservation district
- Marshall County Board
- City of Henry
- Henry-Senachwine School District
- Marshall-Putnam County River Conservancy District
- Ozinga
- Local businesses
- Putnam County Board
- Putnam County Emergency Management Office
- Mexichem
- Emergency Services
- Environmental organizations
- Bicycle organizations

6.2 State and Federal Agencies

Coordination with state and federal agencies occurred through the Project Study Group and the PEL and NEPA/404 merger process. The Project Study Group (PSG) is a multidisciplinary team of representatives from the Federal Highway Administration (FHWA), Illinois Department of Transportation (IDOT), and the project consultant team. The PSG met throughout the study process to provide technical oversight and expertise in key areas including study process, agency procedures and standards, and technical approaches. The PSG met in May 2021 and December 2021. District 4 sent the PSG email updates in March 2022 and July 2022.

The project was initiated as a Planning and Environment Linkage (PEL) Study. During the PEL Study, Purpose and Need and Alternatives to be Carried Forward were developed. The Purpose and Need and the Alternatives to be Carried Forward were coordinated through the National Environmental Policy Act (NEPA)-404 merger process. All Illinois highway projects needing action under the NEPA and an individual Section 404 permit under the US Army Corps of Engineers (USACE) are eligible for this concurrent merger processing. This integrated NEPA-404 merger process ensures appropriate consideration of the concerns of the regulatory and resource agencies at key decision points in the project development. The resource agencies involved were the USACE, the US Environmental Protection Agency (USEPA), the US Coast Guard (USCG), the US Fish and Wildlife Service (USFWS), the Illinois Department of Natural Resources (IDNR), the Illinois Department of Agriculture (IDOA), Illinois Environmental Protection Agency (Illinois EPA), and the Illinois State Historic Preservation Office (SHPO).

The IL 18 River Bridge Project was presented at the NEPA-404 merger meetings in September 2021, June 2022, and September 2022. During the PEL Study, NEPA consistency determinations were received at NEPA-404 merger meetings for the Purpose and Need and the Alternatives to be Carried Forward. Prior to selecting the Preferred Alternative, the project transitioned from the PEL Study into NEPA. During NEPA, concurrence was received for the Purpose and Need, the Alternatives to be Carried Forward, and the Preferred Alternative. The following summarizes the actions at each NEPA-404 merger meeting:

- September 2021 – PEL Study: NEPA consistency determination on Purpose and Need
- June 2022 – PEL Study: NEPA consistency determination on Alternatives to be Carried Forward
- September 2022 – NEPA: Concurrence on Purpose and Need, Alternatives to be Carried Forward, and Preferred Alternative

6.3 Property Owner Considerations

A Community Impact Assessment (CIA) was sent to property owners, residents, tenants, and business owners who may be potentially displaced or impacted by the proposed project. The survey was voluntary and confidential. The purpose of the survey was to further evaluate the project's impact on the community and to identify the recipients' issues and concerns. If unexpected impacts to the public are discovered, then those impacts will be mitigated.

40 total surveys were sent out, 33 to residential property owners, and 7 to business owners. Surveys were sent via certified mail. The 33 residential surveys sent represent 19 parcels. Some of the homes or structures on the parcels are rental properties. A survey was sent to both the owner of the parcel and to the occupants of the parcel if it was a rental property.

79% residential and 57% of business surveys were returned. The project will result in five residential displacements and two business displacements. The property owners of all the displaced parcels returned the CIA survey.

7 Public Involvement Activities

This section documents meetings, correspondence, and project comments and responses between the Project Team and concerned members of the business and residential community. During the course of this study, coordination has taken place over many years and has involved community groups as well as elected officials on both environmental and

engineering issues. Copies of correspondence can be found in the various Appendices. A more detailed discussion of Public Involvement Activities can be found in the Environmental Report in Appendix 5.

7.1 Community Advisory Group

A Community Advisory Group (CAG) was formed to directly engage key stakeholders to gain valuable community input, identify and address local concerns, and build public interest and involvement in the project's decision-making process. CAG members represent various project study area constituencies including residents, county and municipal officials, representatives of businesses, agricultural organizations, the local school district, emergency services, and other members of the local community with an interest in the project. They served as liaisons between the communities they represent and IDOT. The responsibilities of the CAG include providing input to the study process and reaching a consensus at key project milestones (e.g., project Purpose and Need, alternatives to be carried forward, and the preferred alternative).

Meetings with the CAG were held in June 2021, July 2021, December 2021, March 2022, July 2022, November 2022, and July 2023. Topics discussed and activities at the CAG meetings included:

- Problem statement
- Purpose and Need
- Brainstorming initial range of alternatives
- Brainstorming issues of community importance
- Environmental resources present
- Alternatives to be carried forward
- Bridge type selection
- Preferred Alternative
- Front Street mitigation options
- Plan and profile views
- East side profile/flooding
- Aesthetics master plan

At each of the meetings, the CAG was asked if they were able to reach consensus on certain topics presented at the meeting. Consensus is defined as a majority of the attendees in agreement, with the minority agreeing that their input was duly considered. The CAG provided consensus on the following topics:

- June 2021 – Consensus that the draft problem statement with added notes identifies and reflects the problems with the existing facility.
- July 2021 – Consensus that the purpose and need reflected and incorporated the issues identified in the problem statement.
- December 2021 – Consensus on the Corridors 1, 4, 6 and 7 will be eliminated from further consideration. Consensus that Corridors 2, 3, and 5 will be retained for further engineering studies.
- March 2022 – Consensus to eliminate Corridor 2.
- July 2022 – Consensus to move forward with Corridor 3 Alignment as the Preferred Alternative.
- November 2022 – Consensus to move forward with an option to mitigate Front Street impacts by maintaining the street on alignment below the new IL 18 roadway.

Valuable feedback has been received from the CAG members and incorporated into the project planning such as issues of community importance, project objectives, development of alternatives, and bridge design features.

7.2 Informational Meetings

Two public meetings were held in August 2021 and June 2022. The meetings were held in an open house format with exhibits, drawings, and aerial photos available for review at the meeting. Attendees had the opportunity to review exhibits, provide comments, and meet with IDOT and study team representatives on a one-on-one basis.

The first meeting was held to introduce the project and solicit feedback on the purpose and need. IDOT provided information regarding the study schedule and process, purpose and need, public involvement activities, and Section 106 and Section 4(f). Seventy-one people attended the public meeting. Four comment forms were received at the meeting, and one additional comment form was mailed in after the meeting.

The second public meeting was held to present the range of alternatives considered for the project and obtain public input on the alternatives identified to be carried forward for detailed evaluation. IDOT provided information regarding the study schedule and process, purpose and need, range of reasonable alternatives, bridge replacement alternative alignments, evaluation of potential alignment corridors, public involvement activities, and Section 106 and Section 4(f). Sixty-eight people attended the meeting. One comment form was returned at the meeting. Four comments were received at the project website during the public meeting comment period.

7.3 Design Public Hearing (Open House Meeting)

A public hearing was held on February 28, 2024 to present the Preferred Alternative. The meeting was held in an open house format with exhibits, drawings, aerial photos, and a 3D animated flyover available for review at the meeting. One hundred and two people attended the public hearing. Six comment forms were returned at the meeting. Four comments were submitted through the project website during the comment period. Two letters were mailed to IDOT.

7.4 Analysis of Correspondence

Public involvement efforts have included correspondence with state and federal agencies, local governments and stakeholders, and local residents and businesses. This correspondence began under the PEL and has continued through NEPA. Potentially impacted residents and businesses were mailed notices of all the Public Meetings and the Public Hearing. A mailing list was maintained throughout the project. A total of three public meetings (two public meetings and one public hearing) were held for this project.

A Community Impact Assessment survey was sent to residents and business owners who would potentially be displaced. Responding to the survey was voluntary. The purpose of the survey was to further evaluate the project's impact on the community, to identify populations with EJ concerns, and to identify the recipients' issues and concerns.

7.5 Commitments

These are the commitments for this project:

- Historic Bridge Mitigation – Mitigation measures to resolve the adverse effect to the historic bridge will be developed through consultation among IDOT, FHWA, and SHPO. A MOA will be executed by these parties to stipulate the measures to mitigate the project's adverse effect on the historic structure.
- Tree Replacement – The non-wetland floodplain forest that would be impacted will be replaced on a 1:1 ratio in accordance with IDOT policy "D&E-18 Preservation and Replacement of Trees". A tree replacement plan will be developed during the design phase of the project.
- Wetland Mitigation – The proposed method of mitigation for the project's impact to 6.0 acres of floodplain forest wetland is wetland banking. Therefore, wetland credits will be purchased for the project's impacts to floodplain forest wetlands. Compensation of wetland impacts will be mitigated at a ratio of 4.0:1.0, in accordance with Section 404 of the Clean Water Act and the Illinois Interagency Wetlands Policy Act of 1989. Impact minimization measures will continue during the design and permitting process.

- Hazardous Materials/Wastes – Accidental spills of hazardous materials and wastes during construction or operation of the transportation system require special response measures. Occurrences will be handled in accordance with local government response procedures. Refueling, storage of fuels, or maintenance of construction equipment should not be allowed within 100 feet of wetlands or water bodies to avoid accidental spills impacting these resources. Additional protection measures for equipment and machinery operating on the river will be investigated and planned during the design phase.
- Special Waste Investigations – A PSI will be conducted during the design phase to determine the nature and extent of contamination for any REC site involving new right-of-way or easement (temporary or permanent) or building demolition/modification. A PSI also will be conducted if excavation or subsurface utility relocation will occur on existing right-of-way adjacent to these sites. IDOT will manage and dispose of any contaminated materials in accordance with applicable federal and state regulations.
- Duck Ranch IDNR Access – A new access road will be provided to maintain access to the Duck Ranch. The road will be located on the south side of IL 18. The location of the new access road to Duck Ranch was coordinated with IDNR. The Contractor will be required to provide reasonable access upon request during construction for IDNR staff and the adjacent private land owner.

8 Conclusions/Recommendations

8.1 Recommended Design Alternative

The Recommended Design Alternative is a bridge replacement project utilizing the Corridor 3 alignment. A new IL 18 Bridge will be constructed to replace the existing bridge. A separate, future study will be undertaken to evaluate the flooding by considering the entire system (within the floodplain) east of the new IL 18 River Bridge. The supporting reasons for alignment recommendation and design features include the following:

- Match existing IL 18 roadway typical section between 2nd and 3rd Streets to provide an additional 3 feet of pavement on each side to accommodate bicycles.
- Alignment of proposed bridge angled at 2 degrees from parallel to reduce impacts. Also, the piers, normal to the bridge alignment, are aligned better with the flow direction of the river. Alignment skew allows for improved convergence on School Street reducing ROW needs and associated impacts at 2nd Street.
- Lower Front Street beneath IL 18 to allow for connectivity between north and south commercial properties.
- Relocate Duck Ranch Access Road to south side of IL 18 to better connect to IDNR Duck Ranch that is located on the south side of IL 18.
- Coordinate east side alignment and profile to tie in the same relative location such that profile is raised throughout project improvement station.

8.2 Discussion of Design Exceptions

Design exceptions have been identified for the project. See Figure 8-1 for a summary of Design Exceptions. See Appendix 18-B for the Level Two Design Criteria Checklist (BDE 3108) and Design Exception Request Project Identification (BDE 3100).

FIGURE 8-1 – SUMMARY OF DESIGN EXCEPTIONS

DE #	Exception Type	BDE Standard	Proposed Design	Location of Exception	JUSTIFICATION
1	Mainline and Ramps; Level Two 3.a	Maximum Grade 3% on Level Terrain per BDE Figure 47-2.M	4%	STA. 3006+75.00 to STA. 3016+40.00	A 3.0% profile grade into the City of Henry would cause the IL 18 and 2nd Street intersection to be raised around 4' to 4.5'. This elevation change would result in more displacements and right of way takes. The intersection being raised by that amount would also create difficult driveway tie ins to the commercial and residential properties in the vicinity of the intersection. Lastly, a 3.0% grade would push the limits of the project to the 3rd Street intersection which this project is attempting to avoid. The existing grade is 5% entering Henry from the east and a 4% grade provides an improvement.
2	Vertical Alignment; Level Two 1.b & 3.c	Stopping Sight Distance application at sag Vertical Curves. Minimum K = 136 per BDE Figure 33-4.E, Adjusted to K = 149 for 4% grades. Figure 33-4.F (60 mph design speed)	K = 70	Sag vertical curve on IL 18 STA. 3004+70.00 to STA. 3008+80.00	The proposed K-value of 70 meets a design speed of 40 MPH at 4% grades. The proposed vertical profile is an improvement from the existing 5% grade on the bridge. The design speed transitions from 60 mph from east of the bridge down to 40 mph to the west as it enters the City of Henry. The intent is to provide a smooth speed transition from the rural to urban as we move from east to west. This vertical curve is within the limits of the City of Henry where the existing posted speed limit is 35 MPH, which would indicate an existing design speed of no more than 40 MPH.
3	Vertical Alignment; Level Two 1.b & 3.b	Stopping Sight Distance application at crest Vertical Curves. Minimum K = 151 per BDE Figure 33-4.A, Adjusted to K = 176 for 4% grades. Figure 33-4.B (60 mph design speed)	K = 84	Crest vertical curve on proposed IL 18 STA. 3013+45.00 to STA. 3019+35.00	The proposed K-value of 84 meets a design speed of 45 MPH at 4% grades. The existing bridge profile meets a 40 MPH design speed and increasing the design speed of the bridge to 45 MPH is a significant improvement and provides a smooth speed transition from rural roadway environment to the east and the urbanized roadway environment in the City of Henry to the west. In addition, the existing bridge is signed for 35 MPH which indicates a 40 MPH design speed.
4	Horizontal Alignment; Level Two 2.c	Superelevation transition lengths from normal crown to e% = 107' per Figure 32-3.E (60 mph design speed)	83'	Horiztonal curve at STA. 3006+98.70 to STA. 3008+78.16	These superelevation runoff lengths were designed with a design speed of 40 MPH which is consistent with the design criteria used for the superelevation and vertical profile design in this section. The current posted speed limit in the City of Henry is 35 MPH.
5	Horizontal Alignment; Level Two 2.i	Superelevation transition length should be located off of bridges and bridge approach pavements, per BDE Section 32-3.07	Superelevated section is within the bridge limits	STA. 3008+44.50 to STA. 3009+64.77	The horizontal curve is located on the bridge structure to reduce right of way take and potential displacement at the northwestern corner of 2nd Street intersection. Shifting the curve off the bridge would also result in a greater skew at the proposed IL 18/2nd Street intersection.
6	Intersections; Level Two 5.a	Accommodation of design vehicle WB-50 and S-BUS for north leg of 2nd Street BDE Figure 31-5.B	S-BUS	East, West, and South legs of 2nd Street intersection	Trucks are discouraged in the downtown area and bus movements are more appropriate for the local street network.
7	Intersections; Level Two 5.m	Does right turn radius accommodate design vehicle without encroachment? (WB-50) BDE Figure 31-5.B	S-BUS	South leg of 2nd Street intersection	Trucks are discouraged in the downtown area and bus movements are more appropriate for the local street network.
8	Horiztonal Alignment; Level Two 2.a	BDE 32-2.03 & Figure 32-2.F, minimum radii for e=4.0% at 30 mph design speed = 250'	60'	STA. 114+68.87 to STA. 115+55.66	Restricted by geometric and ROW constraints, Duck Ranch Entrance is a low speed/low volume access road.
9	Horizontal Alignment BDE 32-2.05	BDE 32-2.G minimum length of curve at 30 mph = 100'.	87'	STA. 114+68.87 to STA. 115+55.66	Restricted by geometric and ROW constraints, Duck Ranch Entrance is a low speed/low volume access road.