

Winona Bridge (Bridge 5900)

Rehabilitation Study Memorandum

Draft– September 25, 2009

Section 3. Bridge Significance and Character-Defining Features

a. Background¹

Completed in 1942, the Winona Highway Crossing carries Trunk Highway 43 over the Mississippi River between the City of Winona in Winona County, Minnesota and the Town of Buffalo, Buffalo County, Wisconsin. The 1.5 mile crossing includes a number of components: Main Channel Bridge (Bridge 5900); North Channel Bridge (Bridge 5930); Chicago, Burlington, and Quincy Railroad Overhead Bridge (Bridge B754); and three earthen dikes. The Main Channel Bridge (Bridge 5900) is the focus of this study. Bridge 5900 was designed by the Minnesota Department of Highways (MHD) and the Wisconsin State Highway Commission. Industrial Contracting Company of Minneapolis served as the contractor for the bridge which was constructed between 1940 and 1942.

Bridge 5900 is a 933-foot, three span, steel, riveted cantilever thru truss with 17 deck-type approach spans on the south end and 4 deck-type approach spans on the north end. The approach spans on the south end originally included 14 concrete-girder spans, one plate-girder span, and two steel Warren truss spans. The approach spans on the north consisted of four steel Warren truss spans. Alterations to Bridge 5900 include:

- Removal of ornamental light standards and replacement with utilitarian fixtures in 1975.
- Replacement of the deck and widening of the roadway from 27 feet to 30 feet by removing the interior sidewalk and relocating it to the outside of the truss in 1985. The new sidewalk consists of laminated wood panels carried on welded brackets.
- Replacement of the ornamental metal railings with chain-link fence along the sidewalk in 1985.
- Replacement of concrete girder approach spans 1 and 2 in with steel-stringer spans in 1985.
- Repairs to concrete piers in 1992 and 1998.

The removal of ornamental features and the replacement of the approach spans was not found to significantly affect the structure's integrity because the original design of the cantilever through-truss span remains intact.

b. Significance

A portion of the Winona Highway Crossing, including Bridge 5900, was determined to be eligible for the National Register of Historic Places (National Register) under Criterion A – Transportation History and C

¹ The background is adapted from Hess Roise and Company's *Evaluation of National Register Eligibility: Winona Highway Crossing (Bridge Nos. 5900 and 5930) Summary of Findings* (September 1996) and *Historic American Building Survey Documentation for Bridge 5930 (Winona Highway Crossing) HAER No. MN-91*, prepared by Jeffrey A. Hess, Hess Roise and Company, September 1996.

– Bridge Design and Engineering.² The eligible portion extends for 7,335 feet and includes the Main Channel Bridge (Bridge 5900), the North Channel Bridge (Bridge 5930), the earthen dike that links the two channel bridges, and the earthen dike that links the North Channel Bridge to the overhead railroad grade-separation bridge (Bridge B754) to the north. The overhead railroad grade separation bridge and the earthen dike north of the railroad grade-separation bridge have lost integrity and do not contribute to the crossing's eligibility.

As outlined in the *Evaluation of National Register Eligibility: Winona Highway Crossing (Bridge Nos. 5900 and 5930)*, the Winona Highway Crossing is eligible under Criterion A in the area of transportation history for the role it played as a main arterial route over a major river crossing. In addition, the crossing was vital to the economic life of Winona and the movement of defense materials during World War II.³ The Winona Highway Crossing is eligible under Criterion C in the area of engineering for its contribution to design and construction in Minnesota. The project was the largest single undertaking by MHD and was important for the design of both Bridge 5900 and 5930. Bridge 5900 is significant as the state's only surviving example of a cantilever thru-truss dating from before 1946. The cantilever design, used for long spans over navigable water, requires significant engineering.⁴

The period of significance for the Winona Highway Crossing was defined to be 1942 to 1946. The beginning date corresponds to the structure's completion and the ending date was assigned in 1996 as the 50-year cutoff for National Register evaluation. Due to the continued significance under Criterion A, it is recommended that the ending date for the period of significance be extended to 1950, the current 50-year cutoff date.

c. Character-Defining Features

Character-defining features are prominent or distinctive aspects, qualities, or characteristics of a historic property that contribute significantly to its physical character. Such features may include materials, engineering design, and structural and decorative details. From a preservation perspective, character-defining-features are the most important components of the bridge to consider during rehabilitation activities. While the historic fabric, including all historic period materials and physical features, of a bridge should be considered for preservation, character-defining features have the highest priority in preservation planning. The rehabilitation of the bridge, including character-defining features and historic fabric, should be in compliance with the Secretary of the Interior's *Standards for the Treatment of Historic Properties*. The character-defining-features of Bridge 5900 are:

Feature 1. Steel, riveted, cantilever through-truss, design and construction (spans 18-19-20). Special consideration was given to the overall appearance of the main spans, which were adapted from a similar bridge erected at LaCrosse, Wisconsin. This feature includes the overall cantilever through-truss

² The Winona Highway Crossing was recommended eligible for the National Register in a September 1996 report by Hess Roise and Company. No official eligibility concurrence date was identified. However, correspondence by the SHPO in 1998 acknowledged that Bridge 5900 met the criteria of the National Register.

³ Hess Roise and Company, *Evaluation of National Register Eligibility: Winona Highway Crossing (Bridge Nos. 5900 and 5930) Summary of Findings* (September 1996), 11.

⁴ Hess Roise and Company, 12.

engineering design with the pin-connected suspended span; the rolled and built-up members; the extensive use of rivets throughout, for both member fabrication and for connections of members; and the use of a then-new design for the top chord consisting of a bottom plate with oval holes instead of the conventional lacing. This feature does not include the deck and floor system.

Feature 2. Deck-truss design and construction for approach spans 16-17, 21-22-23-24. The use of deck trusses for bridges was rare in Minnesota. The use of deck-truss approach spans provides continuity of steel design and construction with the adjacent main spans.

Feature 3. Architectural stylistic elements used in design of concrete bridge piers for the cantilever spans and the deck-truss approach spans (piers 15 through 23). The pier columns feature an integrated design of Moderne stylistic elements that blend with the carefully designed form of the cantilever truss above. Pier details include columns that are slightly battered on the outside only, and raised outside panels with pointed tops that reflect the angled bottom of the pier caps.

Additional notable features of the historic fabric include:

- The plate-girder approach span (span 15) adjacent to the southernmost deck-truss approach span. This is the only plate-girder span in the bridge and is comprised of three girder lines placed asymmetrically to accommodate the original deck configuration of a single sidewalk on the east side.
- Stonework at north end of the bridge. This includes original flagstone steps just north of the north abutment that provide access from the east side of the roadway to the bottom of the earthen dike, and the stone slope protection adjacent to the north abutment and beneath the north approach span. The slope protection is designed to include wide stone gutters on each side.
- Remnants of the original Moderne style ornamental railing. These remnants include a single stepped original concrete endpost at the west side of the north abutment, which contains an original bridge plate, and a segment of concrete endpost at the northwest corner of the south filled approach ramp.

d. Secretary of the Interior's Standards for Rehabilitation as related to the bridge

Bridge 5900 may be rehabilitated applying federal funds, in part. Because the bridge is eligible for the National Register and federal funding applies, this project is required to comply with Section 106 regulations implementing the National Historic Preservation Act. Therefore, rehabilitation plans should follow the Secretary of the Interior's *Standards for the Treatment of Historic Properties* (Standards) and comply with the National Park Service's (NPS) *Preservation Brief 15, Preservation of Historic Concrete*.

Within the Standards, the treatment approach of Rehabilitation would apply. The Standards for Rehabilitation recommend the repair or replacement of historic materials while preserving features that convey historical or architectural importance. See Appendix A for the Secretary of the Interior's *Standards for Treatment of Historic Properties, as Adapted for Historic Bridges*.

The Mn/DOT Cultural Resources Unit (CRU) will review and approve the plans and specifications for compliance with the Standards for Rehabilitation, and then submit them to SHPO for their review and concurrence that they comply with the Standard for Rehabilitation.

Appendix A

Secretary of the Interior's Standards for the Treatment of Historic Properties, as Adapted for Historic Bridges

Adapted from:

Clark, Kenneth M., Grimes, Mathew C., and Ann B. Miller, *Final Report, A Management Plan for Historic Bridges in Virginia*, Virginia Transportation Research Council, 2001.

The Secretary of the Interior's *Standards for the Treatment of Historic Properties*, first codified in 1979 and revised in 1992, have been interpreted and applied largely to buildings rather than engineering structures. In this document, the differences between buildings and structures are recognized and the language of the Standards has been adapted to the special requirements of historic bridges.

1. Every reasonable effort shall be made to continue an historic bridge in useful transportation service. Primary consideration shall be given to rehabilitation of the bridge on site. Only when this option has been fully exhausted shall other alternatives be explored.
2. The original character-defining qualities or elements of a bridge, its site, and its environment should be respected. The removal, concealment, or alteration of any historic material or distinctive engineering or architectural feature should be avoided.
3. All bridges shall be recognized as products of their own time. Alterations that have no historical basis and that seek to create a false historical appearance shall not be undertaken.
4. Most properties change over time; those changes that have acquired historic significance in their own right shall be retained and preserved.
5. Distinctive engineering and stylistic features, finishes, and construction techniques or examples of craftsmanship that characterize an historic property shall be preserved.
6. Deteriorated structural members and architectural features shall be retained and repaired, rather than replaced. Where the severity of deterioration requires replacement of a distinctive element, the new element should match the old in design, texture, and other visual qualities and where possible, materials. Replacement of missing features shall be substantiated by documentary, physical, or pictorial evidence.
7. Chemical and physical treatments that cause damage to historic materials shall not be used. The surface cleaning of structures, if appropriate, shall be undertaken using the most environmentally sensitive means possible.
8. Significant archaeological and cultural resources affected by a project shall be protected and preserved. If such resources must be disturbed, mitigation measures shall be undertaken.
9. New additions, exterior alterations, structural reinforcements, or related new construction shall not destroy historic materials that characterize the property. The new work shall be differentiated from the old and shall be compatible with the massing, size, scale, and architectural features to protect the historic integrity of the property and its environment.
10. New additions and adjacent or related new construction shall be undertaken in such a manner that if removed in the future, the essential form and integrity of the historic property and its environment would be unimpaired.