

BRIDGE NO. 5930
(Winona Highway Crossing)
Spanning the Mississippi River at Trunk Hwy. 43
Winona
Winona County
Minnesota

HAER No. MN-91

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MINN
85-WIN,
2-

PHOTOGRAPHS

WRITTEN HISTORICAL AND DESCRIPTIVE DATA

HISTORIC AMERICAN ENGINEERING RECORD
MIDWEST SUPPORT OFFICE
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HISTORIC AMERICAN ENGINEERING RECORD

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Bridge #5930, (Winona Highway Crossing)

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T.H. 43 spanning Mississippi River between City of Winona, Winona County, Minnesota (south end) and Town of Buffalo, Buffalo County, Wisconsin (north end)

Documentation: 42 photographs of Main Channel Bridge (#5900) (1997)
1 photograph of Latsch Island's hydraulic fill dike and entrance ramp (1997)
9 photographs of North Channel Bridge (#5930) (1997)
5 photographs of grade-separation bridge over the Chicago, Burlington and Quincy Railroad (1997)

Andrew Baugnet, Photographer, April and May, 1997

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HISTORIC AMERICAN ENGINEERING RECORD
WINONA HIGHWAY CROSSING

I. INTRODUCTION

Name of Property: Winona Highway Crossing

Other Names: Main Channel Bridge (Bridge #5900); North Channel Bridge (Bridge #5930); Chicago,
Burlington, and Quincy Railroad Overhead Bridge

Location: Over Mississippi River between City of Winona, Winona County, Minnesota (south end) and
Town of Buffalo, Buffalo County, Wisconsin (north end)

USGS 7.5' Quadrangle Map: Winona West, Minn.-Wis. (1972, revised 1993)

UTM: Winona Highway Crossing:	south end 15/608780/4878440	north end 15/609590/4880680
Main Channel Bridge (#5900):	south end 15/608780/4878440	north end 15/609040/4879170
North Channel Bridge (#5930):	south end 15/609120/4879395	north end 15/609220/4879660
Grade-separation railroad bridge:	south end 15/609540/4880540	north end 15/609550/4880575

Original Use: Vehicular and pedestrian interstate highway crossing

Present Use: Vehicular and pedestrian interstate highway crossing

Description: From south to north, the following four features comprise the eligible portion of the roughly

1.5-mile-long Winona Highway Crossing: (1) the Main Channel Bridge (#5900), a 933-foot-long, 3-span, steel, riveted, cantilever through truss with 17 approach spans on the south and 4 approach spans on the north; (2) a 800-foot-long, hydraulic-fill earthen dike; (3) the North Channel Bridge (#5930), a 1,010-foot-long, 10-span, deck plate-girder bridge; and (4) a 3,100-foot-long hydraulic-fill, earthen dike. These elements all reflect the project as designed in 1940.

Two features of the Winona Highway Crossing do not contribute to the Crossing's eligibility but are part of the 1940 design. From south to north, they are: (1) a 165-foot-long, 3-span, steel-stringer, overhead, railroad grade-separation bridge, and (2) a 500-foot-long earthen dike north of the railroad grade-separation bridge. Both have lost material integrity.

A pair of ramps to and from Latsch Island, still extant, were built in 1943-1944, but are not part of the original Crossing design and were not built by the Minnesota Department of Highways.

Engineers: Minnesota Highway Department and Wisconsin State Highway Commission

Builders: Minneapolis Bridge Company, Minneapolis (south approach to Main Channel Bridge);

Industrial Contracting Company, Minneapolis (Main and North Channel bridges); Ferd J. Robers Company, Burlington, Wisconsin (earthen dike between Main and North Channel bridges, and earthen dike between North Channel Bridge and Wisconsin shore); I.H. Pertasch, Onalaska, Wisconsin (overhead railroad grade-separation bridge).

Dates of Construction: 1940-1942

Ownership: The Minnesota Department of Transportation (MnDOT) has sole ownership of that portion of the crossing extending from the Minnesota shore to the south end of the North Channel Bridge (#5930). MnDOT and the Wisconsin Department of Transportation (WisDOT) have joint ownership of the North Channel Bridge, which is bisected by the boundary line between the two states. WisDOT has sole ownership of the route north of the North Channel Bridge, with the exception of the overhead grade-separation bridge, which is owned by the Chicago, Burlington, and Quincy Railroad.

Period of Significance: 1942-1946

Principal Investigator: Jeffrey A. Hess, Hess Roise and Company, Minneapolis

Date: 26 September 1996

II. HISTORICAL NARRATIVE

In the vicinity of Winona, Minnesota, the Mississippi River is a broad, easterly-flowing stream. By the Wisconsin shore, the river moves sluggishly over snags and sandbars, but its course is swifter and deeper toward the Minnesota side, where the waters encounter a slipper-shaped mass of land known as Latsch Island. The island divides the river into two currents, generally referred to as the "Main Channel" and the "North Channel." Although a railroad bridge connected Winona to the Wisconsin shore as early as 1871, the city had no direct highway access for another two decades. Teamsters made do with a ferry that carried them over the Main Channel to Latsch Island; there they disembarked onto a long wooden trestle that spanned the North Channel and the river's remaining expanse. In 1892, the ferry finally gave way to

a Main Channel highway bridge. Of steel, cantilever, through-truss design, the span was a municipally financed project designed to make Winona the main trade center for its Wisconsin neighbors. To retire the construction debt, the city administered the new "High Wagon Bridge" as a toll crossing.¹

In 1916, Winona further improved its Mississippi River highway crossing by replacing the old and deteriorating wood-trestle Wisconsin approach with a concrete-arch and concrete-girder bridge. Although a modern structure for its time, the new approach joined the High Wagon Bridge at an abrupt angle that would become more and more hazardous as automotive traffic increased in speed and volume over the next few decades.² The crossing saw a marked increase in motorists after 1923, when the highway departments of the two states jointly assumed responsibility for the bridge's maintenance and removed the toll charge. At the same time, the two states agreed that Minnesota would take care of the crossing's eventual reconstruction, while Wisconsin would take the lead in replacing the late nineteenth-century interstate bridge at La Crosse, Wisconsin, located about 20 miles downstream. For the next ten years, the Minnesota portion of the Winona crossing functioned as a state-aid road under the supervision of the Winona County Highway Department, which was reimbursed for repair work by the state. In 1933, however, the Minnesota Legislature designated the state-aid route as State Trunk Highway 43, as part of a general expansion of the state's arterial highway network.³

The Minnesota Highway Department (MHD) had argued against the 1933 enlargement of the state trunk

¹ On the nineteenth-century ferry, railroad, and highway crossings, see "Winona's Winning Way," *Winona Republican Herald*, 2 July 1892; F.B. Maltby, "The Mississippi River Bridges," *Journal of the Western Society of Engineers* 8 (January-December, 1903):447-449; "Ferry Service Grew Irksome," *Winona Republican Herald*, 20 November 1942.

² "Crossing Mississippi Early Problem Here," *Winona Republican Herald*, 20 November 1942; War Department, Corps of Engineers, *The Middle and Upper Mississippi River: Ohio to Minneapolis* (Washington, D.C.: United States Government Printing Office, 1940), 248; *A History of Wisconsin Highway Development, 1835-1945* (Madison, WI: State Highway Commission of Wisconsin and the Public Roads Administration, Federal Works Agency, 1947), 99.

³ "Removal of Toll Made Old Span No Longer City's," *Winona Republican Herald*, 20 November 1942.

highway system, partly because the selection of many of the proposed new routes had been governed by political rather than engineering considerations, and partly because the state had no funds to modernize the many antiquated bridges that would be expected to carry increased loads.⁴ When Minnesota first established its trunk highway system in 1921, the legal minimum roadway width for these main roads was set at 18 feet.⁵ It soon became clear, however, that this specification was unsuitable. As the MHD reported in 1925: "The heavy traffic which has existed on many trunk highways has shown that many of the old bridges having a roadway width of 18 or 20 feet are inadequate and in many cases a positive menace to travel.... The minimum width ordinarily used on trunk highway construction is now 24 feet and the maximum width for larger spans is 28 feet."⁶ The High Wagon Bridge at Winona, with its roadway width of a mere 17 feet, was an obvious case in point. The bridge's dangerous condition was underscored in 1935, when a motorist crashed into the old interstate highway bridge at La Crosse and toppled one of its spans into the Mississippi River. Fearing that a similar fate would soon befall their own interstate crossing, the citizens of Winona immediately formed a committee to petition the MHD to provide their city with a new bridge across the Mississippi.⁷

It was not until the beginning of 1939 that the MHD found the funds to begin preliminary survey work for replacing the interstate bridge at Winona.⁸ By that time, the local citizenry was in a near panic, for Wisconsin was in the process of completing a new bridge over the Mississippi at La Crosse that

⁴ *Biennial Report of the Commissioner of Highways of Minnesota for 1931-1932* (St. Paul: Louis F. Dow Co., 1932), 29-30.

⁵ *Minnesota Highway Department Trunk Highway Standard Specifications* (n.p., 1921), sec. 11, 1.

⁶ *Biennial Report of the Commissioner of Highways of Minnesota for 1923-1924* (Minneapolis: Syndicate Printing Co., 1925), 25, 28.

⁷ See *Winona Republican Herald*: "Salvage Work on La Crosse Bridge Span Being Rushed," 13 August 1935; "Temporary Span of La Crosse Bridge"; "Committee Discusses Course of Action in Getting New Bridge," 23 August 1935.

⁸ O.L. Kipp, Acting Chief Engineer to G.G. Gladman, Engineer of Surveys and Design, 16 February 1939, in Bridge No. 5900 File, MnDOT Records Storage Center (MRSC), St. Paul.

threatened to divert a good deal of Winona's interstate traffic and tourist trade.⁹ The old Winona crossing was also proving an economic liability even without the competition. As the editor of the local newspaper explained at a public meeting:

I have figures on some of the goods that are moved into Winona. For one thing, there is considerable milk from this section. The [present] load limit of 7½ tons [on the Highway Wagon Bridge] requires the use of small instead of large trucks...and that is a handicap. Here is a list of goods that concerns in Winona get from Wisconsin: Canned goods from Blair, Galesville and Onalaska; cranberries, apples, rutabagas, cherries and grapes. We have a large malting company that buys barley, about 75,000 bushels come from Wisconsin. The load ban is a handicap there.... About 50% of the livestock for the Interstate Packing plant comes from Wisconsin. The load ban is a handicap to the trucking of these animals. This gives a small picture of the wholesalers' problems.¹⁰

By June 1940, the MHD had completed its initial hydraulic and geological investigations. On the basis of these studies, it was decided to place the new Winona highway crossing on a straight alignment about one-quarter mile to the west of the old zigzag crossing. Like its predecessor, the new crossing would use Latsch Island as a stepping stone for separate bridges over the Main and North channels.¹¹

⁹ "New Bridge at La Crosse to Be Dedicated in Fall," *Winona Republican Herald*, 16 February 1939. The La Crosse project was built in two stages. The side channel crossing was completed in 1932, and the main channel crossing in 1939; see *A History of Wisconsin Highway Development*, 99.

¹⁰ "Hearing on Winona Bridge Held at Fountain City, Wisconsin," 14 November 1939, typed transcript in Bridge No. 5900 File, MRSC.

¹¹ The MHD had the crossing's general design in hand by mid-October 1939; see H.G. Overholt, "Memorandum," 12 October 1939, in Bridge No. 5900 File, MRSC.

With all of its approaches, the proposed route measured approximately 1.5 miles in length. Besides fixing the alignment and location, the preliminary survey work also yielded valuable information concerning the appropriate design of the individual engineering structures. The most important finding was that the proposed bridge site was extremely similar to the site of the new La Crosse interstate bridge, which also stepped across the river on an island. As the MHD explained in a letter to its Wisconsin counterpart: "The channel conditions and navigation requirements are almost identical.... It therefore appears reasonable that the plans for your bridge at La Crosse will be quite helpful in developing the design for our bridge."¹² The Wisconsin state engineers furnished the plans without cost and agreed to meet with the MHD at the La Crosse bridge to discuss its construction.¹³

During the initial consultations between the two state agencies, the Wisconsin highway officials "expressed their willingness to participate for such portion of the work which would lie within the boundaries of the State of Wisconsin."¹⁴ This collaboration was officially set in motion by a formal request from Wisconsin in January 1940: "We discussed with you some time ago the possibility of our department making the survey and preparing the plans for the North Channel Bridge. We are not exceedingly busy at this time and it would be our desire that you permit us to perform this work."¹⁵ Under the terms of a compact later signed by the two states, Minnesota took responsibility for designing and building all of the crossing from the Winona shore to the North Channel crossing. This task included the project's most complex engineering feature, the Main Channel Bridge, as well as a high earthen dike

¹² E.J. Miller, Bridge Engineer, Minnesota Highway Department to C.H. Kirch, Bridge Engineer, State Highway Commission of Wisconsin, 27 June 1939. On the crossing's design, see Philip B. Fleming, Lt. Col., District Engineer, Corps of Engineers to E.J. Miller, 2 October 1939; in Bridge No. 5900 File, MRSC.

¹³ C.H. Kirch to E.J. Miller, 5 July 1939, in Bridge No. 5900 File, MRSC.

¹⁴ M.J. Hoffman, Commissioner of Highways, Minnesota Highway Department to G.J. Bassingwaite, Winona Association of Commerce, 17 July 1939, in Bridge File No. 5900, MRSC.

¹⁵ C.H. Kirch to State of Minnesota Department of Highways, 15 January 1940, in File 5900, MRSC.

connecting the Main Channel crossing to the North Channel Bridge. On its part, Wisconsin agreed to design and build the North Channel Bridge and the remainder of the route to the Wisconsin shore, which was to consist of two stretches of earthen dike with an intervening grade-separation bridge over the tracks of the Chicago, Burlington, and Quincy Railroad

Half of the project's funding would come from the federal government, with each state covering the balance of the cost for its own construction work, with the exception of the North Channel Bridge. For this structure, the two states split the balance of the cost on an equal basis.¹⁶

The collaborative design effort by the two state highway departments proceeded with an efficiency that would have been remarkable on such a complex undertaking for even a single engineering staff. The tone was set early in the project, when the District Engineer from Minnesota wrote the Resident Engineer from Wisconsin that "we believe it to be desirable that the Bridge Departments of the two States keep in close contact with each other in connection with the design of these bridges so that . . . the entire improvement when completed will be harmonious."¹⁷ In the ensuing months, the two state agencies cordially worked out the details of alignment, loading, and construction to ensure that all parts of the project met the same engineering standards. At the same time, uniformity of design extended to the smallest details, such as ornamental railings and light fixtures, to give the crossing a consistent aesthetic

Although the MHD was responsible for the lion's share of the design work, Wisconsin's contribution was substantial. Indeed, it is doubtful whether the MHD would have gotten the Main Channel Bridge under

¹⁶ "Agreement for Interstate Bridge Project at Winona," 11 June 1940, in Bridge No. 5900 File, MRSC; State Highway Commission of Wisconsin, *Thirteenth Biennial Report of State Highway Activities* (Madison, WI: Published by the State, 1941), 22; "How Bridge Cost Is Split," *Winona Republican Herald*, 20 November 1942; Minnesota Highway Department, "Copy of Preliminary Estimate for Minnesota Federal Aid Project No. F.A.P. 912-A, Winona County," 23 October 1942, in Bridge No. 5900 File, MRSC.

¹⁷ A.E. Palen to E.L. Roettiger, 23 January 1940, in Bridge No. 5900 File, MRSC.

contract as quickly as it did if the agency had not had Wisconsin's experience with the La Crosse interstate bridge at its disposal. At the time the MHD began its preliminary survey work on the Winona Highway Crossing, American highway engineers generally adopted the steel cantilever through truss to span a 400- to 500-foot navigable waterway, such as the Mississippi's Main Channel between the Minnesota shore and Latsch Island. The MHD, however, had no experience with cantilever through-truss design and erection. All previous Minnesota examples had been built in the late nineteenth century as the work of private consulting engineers. But the Wisconsin highway department had erected precisely this type of bridge over the Mississippi's main channel at La Crosse, employing a cantilever through-truss design with end spans of 251 feet each, and a central span of 475 feet.¹⁸ The MHD's final design for its cantilever through truss Main Channel bridge called for a similar three-span configuration with a 240/450/240-foot profile.

The bridge also included a total of 21 approach spans, 17 on the south and four on the north.

All of the approach spans were of deck-type design, with which the MHD had extensive experience. The southern approach, as sequenced from the shore, consisted of 14 concrete-girder spans, one plate-girder span, and two steel Warren truss spans, while the northern approach consisted of four steel Warren trusses.

In the most traditional American practice for cantilever through-truss design, the main, or central, span consisted of two "cantilever arms" — one extending from each main pier — that were attached by pins to an intervening section known as the "suspended span." As the MHD noted in a design memo, there were two conventional methods of erecting the suspended span so as not to obstruct the navigational channel

¹⁸ State Highway Commission of Wisconsin, "[Plan and Elevation of] Proposed Highway Bridge at City of La Crosse, La Crosse County, over Main Channel Mississippi River," July 1936, in Bridge Department, WisDOT, Madison, Wisconsin.

with falsework: "First the cantilever method, working out from the main piers and closing at center of suspended span. Second, hoisting the completely assembled suspended span into place after floating it into line on barges on the river." The contractors on the La Crosse project had used the first method, and the MHD decided to follow their example.

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Despite similarities, the Winona crossing was not a slavish imitation of La Crosse. The Winona project, for example, had unique requirements for hydraulic fill in order to create roadway dikes at either end of the North Channel Bridge

Reaching a maximum height of 40 feet on 3-on-1 slopes, the material for these structures was pumped into place by hydraulic dredges.²⁰ In addition, the North Channel Bridge at Winona differed from the side channel crossing at La Crosse, employing 10 101-foot, deck, plate-girder spans instead of the five through trusses used at the downstream site. In its combination of span number and individual span length, this bridge surpassed any previous plate-girder highway project in the state.

The MHD also refined Wisconsin's cantilever through-truss design by means of two significant modifications. First, the MHD lightened the bridge's dead load by using perforated steel web plates in the boxed upper chord, a type of detailing that had only recently been introduced into American engineering (see HAER Photograph MN-91-20). Second, it shortened vertical members in the cantilever truss's main span to give the curvature of the upper chord a sleeker, more streamlined appearance. As the Winona

¹⁹H.G. Overholt, "Memorandum," 12 October 1939, in Bridge No. 5900 File, MRSC. For the design of the pinned joints, see Minnesota Department of Highways, Bridge No. 5900, Detail of Joints L15 and L5," 7 November 1940, in Bridge Division, MnDOT, St. Paul.

²⁰ The construction of the dikes is discussed in "Description of Wisconsin Bridge Approach Given," *Winona Republican Herald*, 20 November 1920. On the design, see E.J. Miller to C.H. Kirch, 22 January 1940, in Bridge No. 5900 File, MRSC.

press would later note with approval, "the graceful and impressive lines of its cantilever design make it a striking piece of architecture."²¹

The MHD and the Wisconsin highway department agreed to construct the Winona Highway Crossing under a coordinated series of individual contracts, phased to facilitate project administration and minimize congestion at the bridge site. The following major items of work were awarded to the following low bidders: Main Channel Bridge (#5900) and North Channel Bridge (#5930) to Industrial Contracting Company of Minneapolis; hydraulic fill for all dikes to Fred J. Robers Company of Burlington, Wisconsin; south approach for Main Channel Bridge (#5900) to Minneapolis Bridge Company of Minneapolis; and railroad overhead grade-separation bridge on Wisconsin shore to I.H. Pertasch of Onalaska, Wisconsin. The total cost of all the government contracts was approximately \$1.3 million, which was considerably lower than the MHD's original \$2 million-plus estimate.²² The construction schedule, however, went over the allotted time. Although work began according to plan in September 1940, the outbreak of World War II created shortages in labor and materials that extended the construction project almost five months beyond its anticipated completion date.²³

Nevertheless, when the bridge finally opened to traffic on 21 November 1942, all parties concerned had considerable cause for celebration. For the construction workers, the project had not been marred by any serious accidents. For the MHD, it was the "single largest bridge project ever undertaken" by the agency

²¹ "Million Crossings a Year Estimated for New Winona Span," *Winona Republican Herald*, 20 November 1942. On the modifications to the Wisconsin design, see H.G. Overholt, "Memorandum," 12 October 1939; E.J. Miller to Henry Penn, American Institute of Steel Construction, Chicago, 24 November 1939; Henry Penn to E.J. Miller, 27 November 1939; all in Bridge No. 5900 File, MRSC.

²² See "14 Firms Had Part in Construction of Span," *Winona Republican Herald*, 20 November 1942; E. J. Miller, Memo, 1 July 1940, in Bridge No. 5900 File, MRSC.

²³ "'Horse and Buggy' Bridge Goes into Discard after Saturday," *Winona Republican Herald*, 20 November 1942.

in its 37 years of service. For the Wisconsin highway department, it was a confirmation of the excellent design work that had gone into the earlier La Crosse crossing, which had been that agency's single largest project. And finally, for the federal government, the new Winona Highway Crossing was a vital link in the interstate transportation network that would speed the nation's war production to the battlefields.²⁴ As Minnesota Governor Harold Stassen declared upon the crossing's completion:

The new bridge marks a milestone in the history of our North Star state, as well as in the growth of our great transportation system of America. Over it will roll the materials of war, the materials that will bring to our fighting men victory in this war. We shall look forward to the day when it will carry exclusively the traffic of peace, but until the day of victory we hope it serves well as a link in the road to world freedom.²⁵

III. MAJOR ALTERATIONS AND ADDITIONS

Given its size, complexity, and function, the "link in the road to world freedom" has experienced few alterations since its completion. The major modifications are discussed below in chronological order.

Latsch Island Ramps

In 1943-1944, the City of Winona altered the hydraulic fill dike at the south approach to the North

²⁴ See *Biennial Report of the Commissioner of Highways of Minnesota, 1940-1942* (n.p., 1942), 27; State Highway Commission of Wisconsin, *Thirteenth Biennial Report of State Highway Activities* (Madison, WI: Published by the State, 1941), 22. Also, see the following articles in *Winona Republican Herald* of 20 November 1942: "Only Two Time Lost Accidents on Bridge Job," "Million Crossings a Year Estimated for New Winona Span."

²⁵ "Stassen Says," *Winona Republican Herald*, 20 November 1942.

Channel Bridge (#5930) by building two paved roadway ramps to and from the bridge crossing and Latsch Island (see HAER Photographs MN-91-41 and MN-91-42). When the MHD was in the process of designing the Winona Highway Crossing, "the matter of an access road to the island was discussed at a joint meeting" and "at that time the city stated very definitely that they were not interest[ed] in access to this island." In January 1942, however, the city reconsidered the matter and requested the MHD to make "a connection from the new bridge or road to the island in the Mississippi." The MHD refused, explaining that the city's original position had prompted the agency to have "a non-access clause placed in the [right-of-way] agreement." The City of Winona, however, proceeded to construct the access ramps on its own, completing the project in 1944.²⁶

Although the access ramps are contiguous to the Winona Highway Crossing, this contiguity alone does not necessarily make them a structural "addition" in the National Register sense of the term. It is necessary to consider the intent of the crossing's original design, which clearly did not include the addition of the Latsch Island ramps. The ramps, then, are separate non-contributing features.

Alterations to Main Channel Bridge (#5900) and North Channel Bridge (#5930)

In 1975, MnDOT removed the original ornamental light standards from both the Main and North channel bridges, and replaced them with fixtures of utilitarian design.²⁷ In 1985, MnDOT widened the roadway of the Main Channel Bridge (#5900) from 27 feet to 30 feet by removing the structure's sole sidewalk, located on the east side. Pedestrian access was maintained by providing a new sidewalk on the outside of

²⁶ Chief Engineer, Minnesota Highway Department to H.W. Breitlow, 14 January 1942, A.E. Palen to M. J. Hoffman, 23 September 1943; E.J. Miller to C.H. Kirch, 17 January, 1944; all in Bridge No. 5900 File, MRSC.

²⁷ See drawings and contract documents for State Project No. 5503-50900/3520-5910 (T.H. 43 = 75), 21 February 1975, in Bridge Division, MnDOT, St. Paul.

the truss, also on the east side (see HAER Photograph MN-91-17). As part of this project, the bridge's original ornamental metal railing were replaced with railings of utilitarian metal design. Apparently during this same period, MnDOT also replaced the bridge's first two southern approach spans, originally of concrete-girder design, with two steel-stringer spans (see HAER Photographs MN-91-8 and MN-91-9).²⁸ Although the removal of ornamental features somewhat impaired the crossing's aesthetic statement, it does not significantly detract from the totality of the original design, especially since the North Channel Bridge (#5930) retains its original railings. Nor did the alterations to the two approach spans of the Main Channel Bridge (#5900) significantly affect that structure's integrity, which is firmly maintained by the original design of the massive cantilever through-truss spans.

²⁸ For information on these alterations, see Bridge No. 5900 File, in MnDOT District 6 Office, Rochester.