

# Minnesota Department of Transportation (MnDOT) Local Historic Bridge Report

## Executive Summary

Bridge Number: 90592

Bridge 90592 is located in the Minnehaha Parkway area of south Minneapolis where it carries 28th Avenue South over Minnehaha Creek. The bridge is owned by the City of Minneapolis. Built c.1904, Bridge 90592 is significant as an example of the early use of reinforced concrete in Minnesota. The bridge is also contributing to the National Register-eligible Grand Rounds Historic District.

Bridge 90592 is a single span, cast-in-place concrete arch bridge spanning 27 feet over Minnehaha Creek. The structural arch and its headwalls, wingwalls and closure walls are comprised of cast-in-place reinforced concrete. The driving surface consists of a 44-foot-wide bituminous roadway with concrete curb and gutter and pedestrian sidewalks with ornamental metal railings on each side.

Bridge 90592 is in fair to poor condition. The ornamental railing has severe paint and section loss and the concrete headwalls, wingwalls and closure walls are deteriorated. However, it still appears to adequately serve its purpose of carrying vehicular and pedestrian traffic. With proper maintenance, and preservation activities it is believed Bridge 90592 could continue to serve in its present capacity for 20 years or longer.

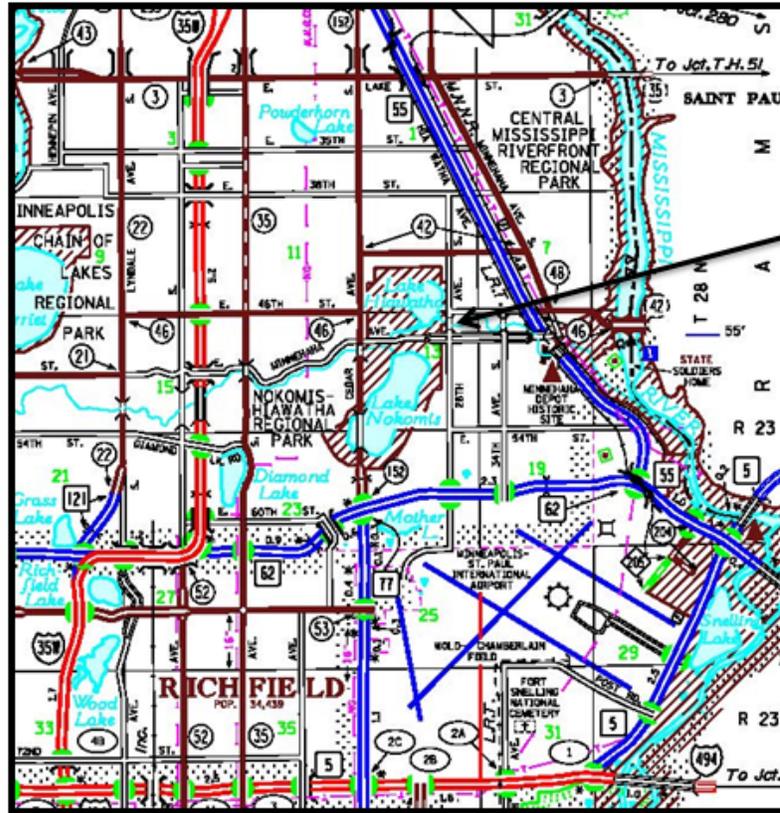
Any work on Bridge 90592 should proceed according to the Secretary of the Interior's Standards for the Treatment of Historic Properties (Standards) [36 CFR part 67] and *The Secretary's Standards with Regard to Repair, Rehabilitation, and Replacement Situations*, as adapted by the Virginia Transportation Research Council (Guidelines).



# Minnesota Department of Transportation (MnDOT) Local Historic Bridge Report

Bridge Location

Bridge Number: 90592



**Bridge 90592 – 28<sup>TH</sup> AVE S over MINNEHAHA CREEK**



**PROJECT LOCATION**

HENNEPIN COUNTY

SEC. 13, TO 028NN, R 24W

UTM ZONE: 15      NAD: 27

USGS QUAD NAME: ST. PAUL WEST

EASTING: 1580306 ft.

NORTHING: 16318518 ft.

# Minnesota Department of Transportation (MnDOT) Local Historic Bridge Report

## Table of Contents

Bridge Number: 90592

---

### Executive Summary

#### Bridge Location

- I. Project Introduction
- II. Historic Data
- III. Bridge Data
- IV. Existing Conditions/Recommendations
- V. Projected Costs

### Appendices

- A. Glossary
- B. Guidelines for Bridge Maintenance and Rehabilitation based on the Secretary of the Interior's Standards
- C. Documents

# Minnesota Department of Transportation (MnDOT) Local Historic Bridge Report

## I – Project Introduction

Bridge Number: 90592

This Bridge Report is a product of a comprehensive study performed for approximately 140 historic bridges owned by county, city, township, private and other state agencies besides MnDOT. The study is the second phase of a multi-phased process developed and executed in partnership with representatives from the Federal Highway Administration (FHWA); State Historic Preservation Office (SHPO); MnDOT State Aid; MnDOT Cultural Resources Unit (CRU); the US Army Corps of Engineers (USACE); local public works and county highway departments; county and township boards and city councils; the preservation community and the general public. To perform the study, MnDOT retained the consultant team of LHB Inc., Mead & Hunt Inc., and The 106 Group.

### The general goals of the study include:

- Gathering and compiling the existing historic and bridge condition data and other relevant information on the bridges in the study group into bridge reports.
- National Register nominations for a select number of bridges within the study group which the bridge owner may request a nomination to be prepared.
- Updating MnDOT's *Management Plan for Historic Bridges in Minnesota* based on the study's findings.
- Producing a narrative for the MnDOT Historic Bridge Website to disseminate information regarding locally owned historic bridges in Minnesota.
- Investigating and preparing a summary regarding how other states have funded historic bridge programs and structured Programmatic Agreements when multiple non-state entities are the owners of historic bridges.

The Bridge Reports compile and summarize the historic and engineering information concerning the structures. It is important to note that this report indicates if a bridge is located within a known historic district, but it does not identify all known or potential historic properties. Potential impacts to adjacent or surrounding historic properties, such as archaeological sites or other structures must be considered. Contact MnDOT CRU early in the project planning process in order to identify other potential historic properties. The reports also document the existing use and condition of the bridges along with assessments of the maintenance, stabilization and preservation needs of each structure, including cost estimates. The maintenance activities, along with regular structural inspections and anticipated bridge component replacement activities are routine practices directed toward continued structure serviceability. Stabilization activities address immediate needs identified as necessary to maintain a bridge's structural and historic integrity and serviceability. Preservation activities are near term or long term steps that need to be taken to preserve and in some cases restore a bridge's structural and historic integrity and serviceability. In assessing preservation activities, a design life of 20 years or longer is typically considered. In addition to general restoration activities and dependent on the severity of deterioration, preservation activities may include spot repair, disassembly and reassembly or replacement of specific bridge components.

Recommendations within the Bridge Reports are consistent with the Secretary of the Interior's Standards for the Treatment of Historic Properties (Standards). The Standards are basic principles created to help preserve the distinct character of a historic property and its site, while allowing for reasonable change to meet new engineering standards and codes. The Standards recommend repairing, rather than replacing

# Minnesota Department of Transportation (MnDOT) Local Historic Bridge Report

## I – Project Introduction

Bridge Number: 90592

---

deteriorated features whenever possible. The Standards apply to historic properties of all periods, styles, types, materials and sizes and encompass the property's location and surrounding environment.

The Standards were developed with historic buildings in mind and cannot be easily applied to historic bridges. The Virginia Transportation Research Council (Council) adapted the Standards to address the special requirements of historic bridges. They were published in the Council's 2001 Final Report: A Management Plan for Historic Bridges in Virginia, *The Secretary's Standards with Regard to Repair, Rehabilitation, and Replacement Situations*, provide useful direction for undertaking maintenance, repair, rehabilitation, and replacement of historic bridges and are included in the Appendix to this plan.

Existing bridge data sources typically available for Minnesota bridges were gathered for the study. These sources include:

- PONTIS, a bridge management system formerly used by MnDOT to manage its inventory of bridges statewide, and its replacement system, SIMS (Structure Information Management System)
- The current MnDOT Structure Inventory Report and MnDOT Bridge Inspection Report. Reports are available for the majority of the bridges (not available for bridges in private ownership)
- Database and inventory forms resulting from the 2012 Minnesota Local Historic Bridge Study and other prior historic bridge studies as incorporated into the database
- Existing Minnesota historic contexts studies for bridges in Minnesota, including *Reinforced-Concrete Highway Bridges in Minnesota, 1900-1945*, *Minnesota Masonry-Arch Highway Bridges, 1870-1945*, *Iron and Steel Bridges in Minnesota, 1873-1945* and *Minnesota Bridges 1955-1970*
- Field investigations documenting the general structural condition and determining character-defining features

Additional data sources researched and gathered for some of the bridges as available also included:

- Files and records at MnDOT offices
- Original bridge construction plans, rehabilitation plans, and maintenance records of local owners
- Files and documents available at the SHPO office, including previous inventory forms, determinations of eligibility, studies, and compliance documents
- Existing historic and documentary material related to the National Register-eligible bridges

The Appendix contains the following: a Glossary explaining structural and historic preservation terms used in the report, the Guidelines for Bridge Maintenance and Rehabilitation based on the Secretary of the Interior's Standards, a list of engineering and historic documents available for this bridge, and copies of the MnDOT Structure Inventory and Bridge Inspection Reports current at the time of the report preparation.

The Bridge Report will provide the bridge owner and other interested parties with a comprehensive summary of the bridge condition and detailed information related to the historic nature of the bridge. This information will enable historic bridge owners to make informed decisions when planning for their historic properties.

# Minnesota Department of Transportation (MnDOT)

## Local Historic Bridge Report

### II – Historic Data

Bridge Number: 90592

*This narrative is drawn from previous documents, as available for the subject bridge, which may include determination of eligibility (also known as Phase II evaluation), Minnesota Architecture/History Inventory Form, National Register nomination, Multiple Property Documentation Form, and/or applicable historic contexts. See Sources for details on which documents were used in compiling this Historic Data section.*

**Contractor**                      Unknown

**Designer/Engineer**        City of Minneapolis

#### Description

Bridge 90592 carries 28th Avenue South over Minnehaha Creek within a linear park, with residential areas north and south of the bridge. Lake Hiawatha is a short distance to the west of the bridge. Aligned on a north-south axis, it is a single-span, reinforced-concrete, filled-spandrel, barrel-vaulted arch bridge, with a main span length of 27 feet, carrying a roadway of 44 feet and two sidewalks of 4 feet 6 inches each.

The bridge has concrete abutments and wingwalls. The remnants of a stepped wall on the east elevation and the drawings of wingwalls on the original 1904 plans indicate that the wingwalls had a stepped top to achieve a gradual reduction in height. Marks from formwork are visible on the spandrel walls; large aggregate is visible in the concrete of the spandrel and the wingwalls. The bridge retains the original ornamental iron railing erected on brackets and mounted in an unusual alignment below the sidewalk elevation, as indicated on the 1904 plans. The 1904 plans include a note that this is the “Railing from Franklin Av. Bridge” in Minneapolis, indicating that the iron railing sections likely date from the 1889 construction of the first Franklin Avenue Bridge.

Work on stormwater drains and catch basins in the 1970s, along with deterioration and erosion, has altered the original stepped wingwalls and removed the stepped top configuration.

#### Significance

The bridge was built around 1904 by the City of Minneapolis. This date of construction indicates this bridge is an example of the early use of reinforced concrete in Minnesota and nationally. The 1904 plans include detailed drawings of the configuration, dimensions, and spacing of the 17 parallel “Reinforcing Rails” that provided the only known reinforcing system. The plans indicate that the “reinforcing rails” were I-beams curved to match the arch curve, and were continuous through the full arch from spring line to spring line. Later cracking and staining on the concrete surface of the arch barrel confirm the locations of the reinforcing rails.

Bridge 90592 is located within Minnehaha Parkway, which is an important component within the Minneapolis park and parkway system. The Minneapolis Park Board was established in 1883 and hired Horace Cleveland to plan and design the city's park system, a portion of which became known as the Grand Rounds. Cleveland was a landscape architect, and an advocate for developing public open space, who lived in Minneapolis for over a decade in the latter half of the 1800's. The Grand Rounds is a series of seven segments of interconnected parks and parkways that encircle the city and connect lakes, river, creeks, and other natural features. Development of the Grand Rounds included the construction of bridges connecting roads and paths between waterways. Minnehaha Parkway, within which Bridge 90592



# Minnesota Department of Transportation (MnDOT)

## Local Historic Bridge Report

### II – Historic Data

Bridge Number: 90592

is located, is part of the Grand Rounds. In 2012 the Grand Rounds Historic District was determined eligible for listing in the National Register; as such the bridge is a contributing resource to the district.

Development of Minnehaha Parkway and creating connections with the lakes to the west began in the late 1880s. "The most natural route," the board's 1889 annual report asserted, "is undoubtedly along the beautiful valley of Minnehaha Creek." In the same year, the Park Board began receiving land donations from property owners along the creek. By 1891 the board had prepared a plat of the proposed parkway, a corridor from two hundred to eight hundred feet in width, and had obtained over eighty percent of the land. The initial period of parkway development was shepherded by William Morse Berry. Berry, the system's first full-time superintendent, was appointed in 1885 after the departure of Rufus Cook. Also, the Park Board started working with landscape architect Warren Manning around the turn of the century. Manning recommended changes and expansions of the Grand Rounds, especially at Minnehaha Park. Bridge 90592 was constructed during this period around 1904, though many of the Manning's recommendations had to wait until after economic depression passed.

The architecture of Bridge 90592 reflects the aesthetic philosophy of the park at the time of its construction. Park Commissioners embraced Fredrick Law Olmsted's philosophy that park architecture should be as simple as possible, allowing nature to be the most prominent decoration. Unlike the majority of reinforced-concrete bridges in the park, built in the Neoclassical style of a later era that celebrated architecture as decoration, Bridge 90592 is simple, with almost no decoration except the metal railing.

Research did not reveal any major repair, modification, or alterations to the arch span. The wingwalls have been altered through deterioration and adjacent stormwater drain work. As such, the 1904 reinforced-concrete arch, as the most significant component of the bridge, retains integrity of workmanship, design, and materials. The bridge continues to carry 28<sup>th</sup> Avenue South over Minnehaha Creek and retains integrity of location, association, feeling and setting. The period of significance for Bridge 90592 is 1904 to correspond with its estimated date of construction.

Bridge 90592 is considered eligible for the National Register under *Criterion C* as an early example of a reinforced-concrete bridge with an unusual early reinforcing system in Minnesota. Its form and architectural style demonstrates the early park philosophy of simplicity and minimal ornamentation applied by the Park Board at the turn of the twentieth century. It is also a contributing resource of the determined-eligible Grand Rounds Historic District,

<b>Historic Context</b>	Reinforced-Concrete Highway Bridges in Minnesota, 1900-1945
<b>National Register Status</b>	Eligible (Individually), Contributing to an Eligible Historic District
<b>Criterion A Significance</b>	N/A
<b>Criterion C Significance</b>	Engineering: Evolution or transition of type
<b>Historic District</b>	Grand Rounds



# Minnesota Department of Transportation (MnDOT) Local Historic Bridge Report

II – Historic Data

Bridge Number: 90592

---

SHPO inventory number      HE-MPC-4813-1

## Sources Used to Compile Section II -- Historical Data

“Bridge 90592.” Structure Inventory Sheet & related documents, MnDOT files, St. Paul.

Frame, Robert M. “Bridge 90592.” Statewide Bridge Survey Inventory Form. 1988.

Roise, Charlene K., "Minnehaha Parkway: An Assessment of Significance," prepared by Hess, Roise and Company for Minneapolis Park and Recreation Board, 1999.

Roise, Charlene and Denis P. Gardner. *Making the City Itself a Work of Art: An Historical Context for the Grand Rounds, Minneapolis*. Hess, Rosie, and Company, Minneapolis: 2000

Field inspection by LHB, Inc. and Mead & Hunt, Inc., 13 August 2013.

# Minnesota Department of Transportation (MnDOT) Local Historic Bridge Report

II – Historic Data

Bridge Number: 90592

---

## 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. Features may include materials, engineering design, and structural and decorative details. Often, the character-defining features include important historic fabric. However, historic fabric can also be found on other elements of a bridge that have not been noted as character-defining. For this reason, it is important to consider both character-defining features and the bridge's historic fabric when planning any work.

**Feature 1: Materials, design, and construction of an early reinforced-concrete arch bridge, representing the early (1900-1905) park design philosophy of simplicity and minimal ornamentation.**



# Minnesota Department of Transportation (MnDOT) Local Historic Bridge Report

II – Historic Data

Bridge Number: 90592

Feature 2: Ornamental metal railing, originally salvaged from the Franklin Avenue Bridge, with metal brackets and knee braces.



Feature 3. Minnehaha Parkway setting. The bridge is located within the Minnehaha Parkway, part of the National Register eligible Grand Rounds Historic District.



# Minnesota Department of Transportation (MnDOT)

## Local Historic Bridge Report

### III – Bridge Data

Bridge Number: 90592

**Date of Construction (remodel)** c.1904

**Common Name (if any)**

#### Location

Feature Carried: 28TH AVE S  
 Feature Crossed: Minnehaha Creek  
 County: Hennepin  
 Ownership: City of Minneapolis

#### MnDOT Structure Data

\*Data Current (as of): June 2014  
 Main Span Type: 112 CONC ARCH  
 Main Span detail: SPANDREL FILLED ARCH  
 Substructure Type - Foundation Type:  
 Abutment: 1-Concrete - 3-Footing/Pile  
 Piers: N-Not Applicable - N-Not Applicable  
 Total Length: 27 ft  
 Main Span Length: 27 ft  
 Total Number of Span(s): 1  
 Skew (degrees): 0  
 Structure Flared: No Flare  
 Roadway Function: Urban, Minor Arterial  
 Custodian/Maintenance Type: City

**Reported Owner Inspection Date** 7/15//2013

**Sufficiency Rating** 81.1

**Operating Rating** HS 18

**Inventory Rating** HS 12

**Structure Status** A - Open

**Posting** VEH: SEMI: DBL:

**Design Load** UNKN

#### Current Condition Code

Deck: N  
 Superstructure: 6  
 Substructure: 6  
 Channel and Protection: 6  
 Culvert: N

#### Roadway Clearances

Roadway Width: 44 ft  
 Vert. Clearance Over Rdwy: N/A  
 Vert. Clearance Under Rdwy: N/A  
 Lat. Clearance Right: 0 ft  
 Lat. Clearance Left: 0 ft

#### Current Appraisal Rating

Structural Evaluation: 4  
 Deck Geometry: 6  
 Underclearances: N  
 Waterway Adequacy: 8  
 Approach Alignment: 8

#### Roadway Data

ADT Total: 10694 (2012)  
 Truck ADT Percentage: Not given  
 Bypass Detour length: 2 miles  
 Number of Lanes: 2

**Fracture Critical** No

**Deficient Status** ADEQ

#### Waterway Data

Scour Code: I-LOW RISK

#### Non-MnDOT Data

##### Approach Roadway Characteristics

Lane Widths: 10 ft  
 Shoulder Width: 10 ft  
 Shoulders Paved or Unpaved: Paved  
 Roadway Surfacing: Bituminous

##### \*\*Number of Crashes reported in MnMCAT within 500 feet of Bridge Site

9

**Location of Plans** City of Minneapolis

**Plans Available** Original 1904 Plans

\* Non-MnDOT data collected during field survey. All other fields of data collected from MnDOT June of 2014. See Appendix C for MnDOT inventory and inspection report data.

\*\* Unless a significant number of crashes are noted on or near a bridge, the accident data is not detailed in this report

# Minnesota Department of Transportation (MnDOT)

## Local Historic Bridge Report

### IV – Existing Conditions/Recommendations

Bridge Number: 90592

#### Existing Conditions

Available information, as detailed in the Project Introduction section, concerning Bridge 90592 was reviewed prior to visiting the bridge site. The site visit was conducted to establish the following:

1. General condition of structure
2. Conformation to available extant plans
3. Current use of structure
4. Roadway/pedestrian trail geometry and alignment (as applicable)
5. Bridge geometry, clearances and notable site issues

#### General Bridge Description

Bridge 90592 is a single span, cast-in-place concrete arch bridge spanning 27 feet over Minnehaha Creek. The structural arch and its headwalls, wingwalls and closure walls are comprised of cast-in-place reinforced concrete. The arch rises from cast-in-place concrete abutments and footings supported by timber piling (per the original construction plans). The underside of the arch reaches a height of approximately 11 feet above the existing grade. The top of the arch is earth filled and the driving surface consists of a bituminous roadway with concrete curb and gutter. The gutter to gutter width is 44 feet. There are 4-foot-6-inch-wide concrete sidewalks on both sides of the bridge with ornamental metal railings measuring to an average height of 35 inches from the top of the sidewalk.

Bridge 90592 is in fair to poor condition. The ornamental railing has severe paint and section loss. The curb and sidewalks are settling. The roadway has no major defects. The concrete headwalls, wingwalls and closure walls are severely deteriorated. The concrete arch and abutments are both in fair condition.

#### Serviceability Observations

The bridge is currently open to vehicular and pedestrian traffic with no apparent load posting restrictions from legal loads.

#### Condition Observations

##### Bridge Railings

The ornamental metal railings are in poor condition. There is an open gap (laterally), where the rail meets the sidewalk, of approximately 2 inches. The lower 6 inches of the railing lattice is completely separated from the lower angle and the majority of this steel has severe section loss. The lower 6 inches of the rail posts also have severe section loss of their webs. The paint system of the rail is completely deteriorated. A concrete infill curb has been placed at the southwest and northeast corners of the bridge, presumably due to deterioration of railing steel.

##### Curb and Sidewalks

The concrete sidewalks and curb are in overall fair condition with some panels in poor condition (approximately 24 feet on each side). These panels have settled and cracked, leaving tripping hazards on the walking surface. Additionally, some curb sections have settled on both the east and west sides of the bridge. There is a steel support beam held by knee bracing under the outside edge of the sidewalk. The beam and bracing has heavy paint peeling and severe pack rust and section loss (especially at the ends where the beam meets the wingwalls). The joint between the sidewalk and curb has vegetation growing

# Minnesota Department of Transportation (MnDOT)

## Local Historic Bridge Report

### IV – Existing Conditions/Recommendations

Bridge Number: 90592

from it. This is an indication that the joint is no longer properly sealed and is allowing water to seep through and approach the top of the arch surface. Settlement of the curb has also created an open joint in some locations between the curb and the sidewalk.

#### Roadway Slab

The bituminous pavement is in fair condition. Previous inspection reports state that the pavement was cored and measured to be 5 and one-half-inches thick. There are small pothole repairs visible. The roadway is cracked throughout both longitudinally and transversely.

#### Concrete Wingwalls and Closure Walls

The wingwalls and closure walls are in overall poor condition. There are large areas of concrete deterioration, spalling and delamination in all four corners of the bridge. The worst deterioration appears to be at the storm sewer outlets, where the wingwall concrete is eroded anywhere from 12 inches to 18 inches deep. According to previous inspection reports, the catch basin drains and slope protection was installed in 1970. In the northeast corner, there is a 4-square-foot area of deteriorated concrete where the closure wall meets the headwall. Beyond this 12-inch-thick cavity in the concrete, there is a void under the sidewalk that measures up to 4 feet deep. The southwest and northwest closure walls appear to be newer and are in good condition. The northwest wingwall, however, is in very poor condition.

#### Concrete Headwalls

The headwalls are in poor condition. The west headwall is 75 to 100 percent deteriorated in the top 3 feet and the lower portion is pitted, but sound. The east headwall is 75 to 100 percent deteriorated over the entire surface.

#### Concrete Arch

The concrete arch is in fair condition. There is a transverse crack through the southern two-thirds of the width and there were minor areas of unsound concrete found. From afar, it appears that there is extensive cracking on the surface of the concrete. However, this is actually a texture/imprint left behind from the original formwork of the cast-in-place arch.

#### Abutments

The abutments are in fair condition. There is some minor scaling of the concrete but no major defects were noted. Past inspection reports note that the abutment footings were repaired in 1987.

#### Approach/Waterway Observations

The approach roadway at each end of the bridge appears to be in good condition. There is a pedestrian trail that crosses the road on the north end of the bridge. There are concrete walls holding the bridge slope at the east end of the bridge and riprap slopes at the west end which appear to be functioning as designed. Past inspection reports indicate that the barrel of the arch is too narrow for high water flow.

#### Date of Engineering Site Visit by LHB

August 13, 2013

# Minnesota Department of Transportation (MnDOT) Local Historic Bridge Report

## IV – Existing Conditions/Recommendations

Bridge Number: 90592



*Condition 1: North approach, looking south*



*Condition 2: Catch basin, curb, sidewalk, and railing, looking southeast*

**Minnesota Department of Transportation (MnDOT)  
Local Historic Bridge Report**

**IV – Existing Conditions/Recommendations**

**Bridge Number: 90592**



*Condition 3: Bridge ornamental railing deterioration (note section loss at sidewalk level)*



*Condition 4: Ornamental bridge railing and sidewalk, looking northeast (note concrete added at bottom of rail at last panel, in the background, presumably due to deterioration)*

# Minnesota Department of Transportation (MnDOT) Local Historic Bridge Report

## IV – Existing Conditions/Recommendations

Bridge Number: 90592



*Condition 5: East elevation, looking north*



*Condition 6: Top of northeast wingwall (note original stepped top and concrete deterioration)*

# Minnesota Department of Transportation (MnDOT) Local Historic Bridge Report

IV – Existing Conditions/Recommendations

Bridge Number: 90592



*Condition 7: Southeast catch basin outlet through wingwall*



*Condition 8: West elevation, looking north (note catch basin structure)*

# Minnesota Department of Transportation (MnDOT) Local Historic Bridge Report



*Condition 9: Sidewalk support beam, northwest (note deterioration of steel and concrete)*



*Condition 10: Arch and abutment, looking southeast*

**Minnesota Department of Transportation (MnDOT)  
Local Historic Bridge Report**



*Condition 11: Arch and abutment, looking northwest*



*Condition 12: Arch underside*

# Minnesota Department of Transportation (MnDOT)

## Local Historic Bridge Report

### IV – Existing Conditions/Recommendations

Bridge Number: 90592

---

#### Overall Recommendations

The bridge is currently open to vehicular and pedestrian traffic. The recommendations that follow assume the structure's use will remain the same.

#### Recommended Stabilization Activities

There are no stabilization activities recommended for Bridge 90592.

#### Recommended Preservation Activities

##### Bridge Railings

Due to the deteriorated condition of the metal railings it is recommended that they be removed, restored and then reinstalled with historic fabric reused to the greatest extent feasible. It is always preferred to retain historic fabric where possible. Prior to a future rehabilitation project, a full study will be required to determine the extent of repair. Since the ornamental rail is a character-defining feature of the bridge, it is recommended that this railing be salvaged and reused. The rail should be removed, repaired, and repainted. It is likely that the lower 6 inches of the lattice and posts will not be salvageable due to their advanced deterioration. The deteriorated portions of the lattice are recommended to be replaced in kind.

The height of the railings does not appear to meet current structural or geometric standards. Future improvements may require a structural and/or geometric design exception from current bridge railing standards. These exceptions have been granted in the past for historic bridges in similar settings. An additional study will be required to determine the appropriate repair solution for the railing that will best satisfy structural, geometric, and historic standards.

##### Curb and Sidewalks

The sidewalk and curb are in fair to poor condition. Due to the settlement observed and the deterioration of the steel support beam and select sidewalk panels, it is recommended that the sidewalk be replaced in the next 5 years. Due to the deteriorated and settled condition, it does not seem feasible to salvage the sidewalks. However, the sidewalk support beam and structure (or portions) may be suitable for repair and repainting in place, depending on their condition at the time of rehabilitation. This work is recommended to be coordinated with the timing of the roadway replacement and arch waterproofing.

##### Roadway Slab

The bituminous pavement is in fair condition. However, in order to facilitate waterproofing of the top of the arch, this pavement will need to be removed and replaced at the time of that repair. Since the surface was historically concrete, it is recommended that it be placed back in kind. This work has been included in the cost summary.

##### Concrete Headwalls, Wingwalls and Closure Walls

There are numerous areas of concrete deterioration in the headwalls, wingwalls and closure walls. Prior to any rehabilitation, it is recommended that a detailed study be conducted to determine the original thickness of the walls and the best repair for their level of deterioration at the time of the study. From the field survey conducted, it is recommended that concrete surface repairs be performed on these walls. It is estimated that 680 square feet of repair will be required. The northwest wingwall condition may be found to be too poor to perform a concrete surface repair. If, during a detailed study, it is determined the

# Minnesota Department of Transportation (MnDOT) Local Historic Bridge Report

## IV – Existing Conditions/Recommendations

Bridge Number: 90592

existing concrete is too deteriorated (full depth) to allow for an effective repair to be made, it may be required to replace this wingwall. For purposes of this estimate, concrete surface repair is assumed, as it is the preferred rehabilitation over replacement. The concrete surface repair will require removal of deteriorated concrete to reach sound concrete, blasting clean and epoxy coating of rusting reinforcing steel, supplementing and doweling with replacement reinforcing where necessary and then replacement with repair concrete of matching color and forming so as to match the existing finished surface. At the time of future rehabilitation, it is recommended to replace all four outlet structures with structures that do not cause damage to the wingwalls.

### Concrete Arch

The lower portion of the concrete arch was accessible and sounded, but the remainder of the arch was only visually assessed. From this assessment, it is estimated that approximately 60 square feet of the concrete surface will require a concrete surface repair. This estimate includes the transverse crack which will require an approximate 6-inch-wide repair. When repairs are programmed the entire underside should be sounded and all deteriorated concrete repaired. These repairs will likely require removal of 3 to 4 inches of deteriorated concrete to reach sound concrete, blasting clean and epoxy coating of rusting reinforcing steel, and then replacement with repair concrete of matching color and forming (including the texture from forming) so as to match the existing finished surface.

The top of the concrete arch is not accessible. There are no records of any rehabilitation or waterproofing performed on this surface in the past. The condition of the arch underside indicates that there is no immediate cause for concern of the condition of the top of the arch. However, during future replacement of the roadway and sidewalk, excavation to the top of the concrete arch and installation of an applied waterproofing system should be strongly considered. This work scope has been included in the preservation cost estimate.

### Abutments

There are no repairs recommended for the abutments at this time.

### Recommended Annual Maintenance Activities

1. Flush bridge roadway, sidewalks, headwalls, closure walls and wingwalls each spring with water to remove salt residue. Low pressure spray, less than 400 psi, should be used to ensure there is no damage to surface finishes. Test flushing method and water pressure to ensure it does not damage or abrade the bridge surfaces.

# Minnesota Department of Transportation (MnDOT) Local Historic Bridge Report

## V – Projected Costs

Bridge Number: 90592

### Summarized Maintenance, Stabilization and Preservation Construction Cost Estimates

It is important to recognize that the work scope and cost estimates presented herein are based on a limited level assessment of the existing structure. In moving forward with future project planning, it will be essential to undertake a detailed structure assessment addressing the proposed work for the structure. It is also important that any future preservation work follow applicable preservation standards with emphasis to rehabilitate and repair in-place structure elements in lieu of replacement. This includes elements which are preliminarily estimated for replacement within the work scope of this report. Only through a thorough review of rehabilitation and repair options and comprehensive structural and historic assessment can a definitive conclusion for replacement of historic fabric be formed.

The opinions of probable construction and administrative costs provided below are presented in 2013 dollars. These costs were developed without benefit of a detailed, thorough bridge inspection, bridge survey or completion of preliminary design for the estimated improvements. The estimated costs represent an opinion based on background knowledge of historic unit prices and comparable work performed on other structures. The opinions of cost are intended to provide a programming level of estimated cost. These costs will require refinement and may require significant adjustments as further analysis is completed in determining the course of action for future structure improvements. A 20 percent contingency and 7 percent mobilization allowance has been included in the construction cost estimates.

Administrative and engineering costs are also presented below. Engineering and administrative costs are also to be interpreted as programming level only. Costs can be highly variable and are dependent on structure condition, intended work scope, project size and level of investigative, testing and documentation work necessary. Additional studies, evaluation, and historic consultation costs not exclusively called out may also be incurred on a case-by-case basis.

Maintenance, Stabilization and Preservation Costs (refer to appendix for work item breakdown)

Opinion of Annual Cost- Maintenance Activities:	\$ 1,800
Opinion of Construction Cost- Stabilization Activities:	\$ 0
Opinion of Construction Cost- Preservation Activities:	\$ 606,390

Estimated Preliminary Design, Final Design, Construction Administration Costs

Preliminary Design and Assessment	\$ 12,000
Final Design and Plans	\$ 60,000
Construction Administration	\$ 73,000



# Minnesota Department of Transportation (MnDOT)

## Local Historic Bridge Report

V – Projected Costs

Bridge Number: 90592

<b>MAINTENANCE, STABILIZATION &amp; PRESERVATION COST ESTIMATE (2013 DOLLARS)</b>					
<b>Bridge No. 90592</b>					
<b>February 3, 2014</b>					
			ESTIMATED QUANTITIES AND COST		
ITEM NO.	ITEM	UNIT	QUANTITY	UNIT COST	TOTAL ESTIMATE
<b>MAINTENANCE COSTS</b>					
1	FLUSH ROAD, SIDEWALKS, RAILS, HEADWALLS & WINGWALLS	LUMP SUM	1	\$1,500.00	\$1,500.00
	20% CONTINGENCY	LUMP SUM	1	\$300.00	\$300.00
<b>ESTIMATED MAINTENANCE COSTS</b>					<b>\$1,800.00</b>
<b>STABILIZATION COSTS</b>					
	NO STABILIZATION ACTIVITIES ARE PROGRAMMED				
<b>ESTIMATED STABILIZATION COSTS</b>					<b>\$0.00</b>
<b>PRESERVATION COSTS</b>					
	MOBILIZATION @ 7%	LUMP SUM	1	\$33,100.00	\$33,100.00
1	REMOVE, REPAINT AND REPAIR METAL RAIL	LIN FT	168	\$200.00	\$33,600.00
2	REMOVE & REPLACE STRUCTURALLY SUPPORTED SIDEWALK	SQ FT	760	\$50.00	\$38,000.00
3	PLACE CONCRETE PARAPET AND RESET METAL RAIL	LIN FT	168	\$80.00	\$13,440.00
4	REPAIR AND REPAINT SIDEWALK SUPPORT STEEL	LIN FT	80	\$200.00	\$16,000.00
5	REMOVE AND REPLACE CONCRETE CURB	LIN FT	168	\$50.00	\$8,400.00
6	REMOVE BITUMINOUS ROADWAY SLAB	SQ FT	7100	\$3.00	\$21,300.00
7	PLACE CONCRTE ROADWAY SLAB	SQ FT	7100	\$12.00	\$85,200.00
8	REPAIR HEADWALL, WINGWALL & CLOSURE WALL CONCRETE	SQ FT	680	\$200.00	\$136,000.00
9	REMOVE AND REPLACE OUTLET STRUCTURES	EACH	4	\$4,500.00	\$18,000.00
10	REPAIR ARCH UNDERSIDE	SQ FT	60	\$150.00	\$9,000.00
11	EXCAVATE AND BACKFILL TOP OF CONCRETE ARCH	LUMP SUM	1	\$40,000.00	\$40,000.00
12	WATERPROOF TOP OF CONCRETE ARCH	SQ FT	3550	\$15.00	\$53,250.00
	20% CONTINGENCY	LUMP SUM	1	\$101,100.00	\$101,100.00
<b>ESTIMATED PRESERVATION COSTS</b>					<b>\$606,390.00</b>

# Minnesota Department of Transportation (MnDOT) Local Historic Bridge Report

Appendices

Bridge Number: 90592

---

## Appendix A. Glossary

## Glossary

**Abutment** – Component of bridge substructure at either end of bridge that transfers load from superstructure to foundation and provides lateral support for the approach roadway embankment.

**Appraisal ratings** – Five National Bridge Inventory (NBI) appraisal ratings (structural evaluation, deck geometry, under-clearances, waterway adequacy, and approach alignment, as defined below), collectively called appraisal ratings, are used to evaluate a bridge's overall structural condition and load-carrying capacity. The evaluated bridge is compared with a new bridge built to current design standards. Ratings range from a low of 0 (closed bridge) to a high of 9 (superior). Any appraisal item not applicable to a specific bridge is coded N.

**Approach alignment** – One of five NBI inspection ratings. This rating appraises a bridge's functionality based on the alignment of its approaches. It incorporates a typical motorist's speed reduction because of the horizontal or vertical alignment of the approach.

**Character-defining features** – Prominent or distinctive aspects, qualities, or characteristics of a historic property that contribute significantly to its physical character. Features may include structural or decorative details and materials.

**Condition, fair** – A bridge or bridge component of which all primary structural elements are sound, but may have minor deterioration, section loss, cracking, spalling, or scour.

**Condition, good** – A bridge or bridge component which may have some minor deficiencies, but all primary structural elements are sound.

**Condition, poor** – A bridge or bridge component that displays advanced section loss, deterioration, cracking, spalling, or scour.

**Condition rating** – Level of deterioration of bridge components and elements expressed on a numerical scale according to the NBI system. Components include the substructure, superstructure, deck, channel, and culvert. Elements are subsets of components, e.g., piers and abutments are elements of the component substructure. The evaluated bridge is compared with a new bridge built to current design standards. Component ratings range from 0 (failure) to 9 (new) or N for (not applicable); elements are rated on a scale of 1-3, 1-4 or 1-5 (depending on the element type and material). In all cases condition state 1 is the best condition with condition state 3, 4 or 5 being the worst condition. In rating a bridge's condition, MnDOT pairs the NBI system with the newer and more sophisticated Pontis element inspection information, which quantifies bridge elements in different condition states and is the basis for subsequent economic analysis.

**Corrosion** – The general disintegration of metal through oxidation.

**Cutwater** – The wedge-shaped end of a bridge pier, designed to divide the current and break up ice.

**Decay** – Deterioration of wood as a result of fungi feeding on its cell walls.

**Delamination** – Surface separation of concrete, steel, glue laminated timber plies etc. into layers.

**Deck geometry** – One of five NBI appraisal ratings. This rating appraises the functionality of a bridge's roadway width and vertical clearance, taking into account the type of roadway, number of lanes, and ADT.

**Deficiency** – The inadequacy of a bridge in terms of structure, serviceability, and/or function. Structural deficiency is determined through periodic inspections and is reflected in the ratings that are assigned to a bridge. Service deficiency is determined by comparing the facilities a bridge provides for vehicular, bicycle, and pedestrian traffic with those that are desired. Functional deficiency is another term for functionally obsolete (see below). Remedial activities may be needed to address any or all of these deficiencies.

**Deficiency rating** – A nonnumeric code indicating a bridge's status as structurally deficient (SD) or functionally obsolete (FO). See below for the definitions of SD and FO. The deficiency rating status may be used as a basis for establishing a bridge's eligibility and priority for replacement or rehabilitation.

**Design exception** – A deviation from federal design and geometric standards that takes into account environmental, scenic, aesthetic, historic, and community factors that may have bearing upon a transportation project. A design exception is used for federally funded projects where federal standards are not met. Approval requires appropriate justification and documentation that concerns for safety, durability, and economy of maintenance have been met.

**Design load** – The usable live-load capacity that a bridge was designed to carry, expressed in tons according to the AASHTO allowable stress, load factor, or load resistance factor rating methods. An additional code was recently added to assess design load by a rating factor instead of tons. This code is used to determine if a bridge has sufficient strength to accommodate traffic load demands. A bridge that is posted for load restrictions is not adequate to accommodate present or expected legal truck traffic.

**Deterioration** – Decline in condition of surfaces or structure over a period of time due to chemical or physical degradation.

**Efflorescence** – A deposit on concrete or brick caused by crystallization of carbonates brought to the surface by moisture in the masonry or concrete.

**Extant** – Currently or actually existing.

**Extrados** – The upper or outer surfaces of the voussoirs which compose the arch ring. Often contrasted with intrados.

**Footing** – The enlarged, lower portion of a substructure which distributes the structure load either to the earth or to supporting piles.

**Fracture Critical Members** – Tension members or tension components of bending members (including those subject to reversal of stress) whose failure would be expected to result in collapse of the bridge.

**Functionally obsolete** – The Federal Highway Administration (FHWA) classification of a bridge that does not meet current or projected traffic needs because of inadequate horizontal or vertical clearance, inadequate load-carrying capacity, and/or insufficient opening to accommodate water flow under the bridge. An appraisal rating of 3 or less for deck geometry, underclearance, approach alignment, structural evaluation or waterway adequacy will designate a bridge as functionally obsolete.

**Gusset plate** – A plate that connects the horizontal and vertical members of a truss structure and holds them in correct position at a joint.

**Helicoidal** – Arranged in or having the approximate shape of a flattened coil or spiral.

**Historic fabric** – The material in a bridge that was part of original construction or a subsequent alteration within the historic period of the bridge (i.e., more than 50 years old). Historic fabric is an important part of the character of the historic bridge and the removal, concealment, or alteration of any historic material or distinctive engineering or architectural feature should be avoided if possible. Often, the character-defining features include important historic fabric. However, historic fabric can also be found on other elements of a bridge that have not been noted as character-defining.

**Historic bridge** – A bridge that is listed in, or eligible for listing in, the National Register of Historic Places.

**Historic integrity** – The authenticity of a bridge's historic identity, evidenced by the survival and/or restoration of physical characteristics that existed during the bridge's historic period. A bridge may have integrity of location, design, setting, materials, workmanship, feeling, and association.

**Inspections** – Periodic field assessments and subsequent consideration of the fitness of a structure and the associated approaches and amenities to continue to function safely.

**Intrados** – The inner or lower surface of an arch. Often contrasted with extrados.

**Inventory rating** – The load level a bridge can safely carry for an indefinite amount of time expressed in tons or by the rating factor described in design load (see above). Inventory rating values typically correspond to the original design load for a bridge without deterioration.

**Keystone** – Wedge-shaped stone, or voussoir, at the crown of an arch.

**Load Rating** – The determination of the live load carrying capacity of a bridge using bridge plans and supplemented by field inspection.

**Maintenance** – Work of a routine nature to prevent or control the process of deterioration of a bridge.

**Minnesota Historical Property Record** – A documentary record of an important architectural, engineering, or industrial site, maintained by the Minnesota Historical Society as part of the state's commitment to historic preservation. MHPR typically includes large-format photographs and written history, and may also include historic photographs, drawings, and/or plans. This state-level documentation program is modeled after a federal program known as the Historic American Buildings Survey/Historic American Engineering Record (HABS/HAER).

**National Bridge Inventory** – Bridge inventory and appraisal data collected by the FHWA to fulfill the requirements of the National Bridge Inspection Standards (NBIS). Each state maintains an inventory of its bridges subject to NBIS and sends an annual update to the FHWA.

**National Bridge Inspection Standards** – Federal requirements for procedures and frequency of inspections, qualifications of personnel, inspection reports, and preparation and maintenance of state bridge inventories. NBIS applies to bridges located on public roads.

**National Register of Historic Places** – The official inventory of districts, sites, buildings, structures, and objects significant in American history, architecture, archaeology, and culture, which is maintained by the Secretary of the Interior under the authority of the National Historic Preservation Act of 1966 (as amended).

**Non-vehicular traffic** – Pedestrians, non-motorized recreational vehicles, and small motorized recreational vehicles moving along a transportation route that does not serve automobiles and trucks. Includes bicycles and snowmobiles.

**Operating rating** – Maximum permissible load level to which a bridge may be subjected based on a specific truck type, expressed in tons or by the rating factor described in design load (see above).

**Pack rust** – Rust forming between adjacent steel surfaces in contact which tends to force the surfaces apart due to the increase in steel volume.

**Pier** – A substructure unit that supports the spans of a multi-span superstructure at an intermediate location between its abutments.

**Pointing** – The compaction of mortar into the outermost portion of a joint and the troweling of its exposed surface to secure water tightness and/ or desired architectural effect (when replacing deteriorated mortar).

**Pony truss** – A through bridge with parallel chords and having no top lateral bracing over the deck between the top chords.

**Posted load** – Legal live-load capacity for a bridge which is associated with the operating rating. A bridge posted for load restrictions is inadequate for legal truck traffic.

**Pontis** – Computer-based bridge management system to store inventory and inspection data and assist in other bridge data management tasks.

**Preservation** – Preservation, as used in this report, refers to historic preservation that is consistent with the Secretary of the Interior's *Standards for the Treatment of Historic Properties*. Historic preservation means saving from destruction or deterioration old and historic buildings, sites, structures, and objects, and providing for their continued use by means of restoration, rehabilitation, or adaptive reuse. It is the act or process of applying measures to sustain the existing form, integrity, and material of a historic building or structure, and its site and setting. MnDOT's *Bridge Preservation, Improvement and Replacement Guidelines* describe preservation differently, focusing on repairing or delaying the deterioration of a bridge without significantly improving its function and without considerations for its historic integrity.

**Preventive maintenance** – The planned strategy of cost-effective treatments that preserve a bridge, slow future deterioration, and maintain or improve its functional condition without increasing structural capacity.

**Reconstruction** – The act or process of depicting, by means of new construction, the form, features, and detailing of a non-surviving site, landscape, building, structure, or object for the purpose of replicating its appearance at a specific period of time and in its historic location. Activities should be consistent with the Secretary of the Interior's *Standards for the Treatment of Historic Properties*.

**Rehabilitation** – The act or process of returning a historic property to a state of utility through repair or alteration which makes possible an efficient contemporary use, while preserving those portions or features of the property that are significant to its historical, architectural, and cultural values. Historic rehabilitation, as used in this report, refers to implementing activities that are consistent with the Secretary of the Interior's *Standards for the Treatment of Historic Properties*. As such, rehabilitation retains historic fabric and is different from replacement. MnDOT's *Bridge Preservation, Improvement and Replacement Guidelines* describe rehabilitation and replacement in similar terms.

**Restoration** – The act or process of accurately depicting the form, features, and character of a property as it appeared at a particular period of time. Activities should be consistent with the Secretary of the Interior's *Standards for the Treatment of Historic Properties*.

**Ring stone** – One of the separate stones of an arch that shows on the face of the headwall, or end of the arch. Also known as a voussoir.

**Scaling** – The gradual distintegration of a concrete surface due to the failure of the cement surface caused by chemical attack or freeze-thaw cycles or rebar too close to the surface and oxidizing from exposure to chlorides.

**Scour** – Removal of material from a river's bed or bank by flowing water, compromising the strength, stability, and serviceability of a bridge.

**Scour critical rating** – A measure of a bridge's vulnerability to scour (see above). MnDOT utilizes letter designations to represent specific descriptions of a bridges susceptibility and/ or present condition in regards to scour. Range in condition and scour susceptibility does not necessarily correlate alpha numerically to the MnDOT scour code letters so it is important to understand the specific scour description for each MnDOT scour code. The scour codes and descriptions can be found in the "MNDOT Bridge Inspection Field Manual".

**Section loss** – Loss of a member's cross sectional area and resulting strength usually by corrosion or decay.

**Serviceability** – Level of facilities a bridge provides for vehicular, bicycle, and pedestrian traffic, compared with current design standards.

**Smart flag** – Special Pontis inspection element used to report the condition assessment of a deficiency that cannot be modeled, such as cracks, section loss, and steel fatigue.

**Spall** – Depression in concrete caused by a separation of a portion of the surface concrete, revealing a fracture parallel with or slightly inclined to the surface.

**Spring line** – The imaginary horizontal line at which an arch or vault begins to curve. As example, the point of transition from the vertical face of an abutment to the start of arch curvature extending from abutment face.

**Stabilization** – The act or process of stopping or slowing further deterioration of a bridge by means of making minor repairs until a more permanent repair or rehabilitation can be completed.

**Stringcourse** – A horizontal band of masonry, generally narrower than other courses and sometimes projecting, that extends across the structure's horizontal face as an architectural accent. Also known as belt course.

**Structural evaluation** – Condition rating of a bridge designed to carry vehicular loads, expressed as a numeric value and based on the condition of the superstructure and substructure, the inventory load rating, and the ADT.

**Structurally deficient** – Classification indicating NBI condition rating of 4 or less for any of the following: deck condition, superstructure condition, substructure condition, or culvert condition. A bridge is also classified as structurally deficient if it has an appraisal rating of 2 or less for its structural evaluation or waterway adequacy.. A structurally deficient bridge is restricted to lightweight vehicles; requires immediate rehabilitation to remain open to traffic; or requires maintenance, rehabilitation, or replacement.

**Sufficiency rating** – Rating of a bridge's structural adequacy and safety for public use, and its serviceability and function, expressed on a numeric scale ranging from a low of 0 to a high of 100. It is a relative measure of a bridge's deterioration, load capacity deficiency, or functional obsolescence. MnDOT may use the rating as a basis for establishing eligibility and priority for replacement or rehabilitation. Typically, bridges which are structurally deficient and have sufficiency ratings between 50 and 80 are eligible for federal rehabilitation funds and those which are structurally deficient with sufficiency ratings of 50 and below are eligible for replacement.

**Through truss** – A bridge with parallel top and bottom chords and top lateral bracing with the deck generally near the bottom chord.

**Under-clearances** – One of five NBI appraisal ratings. This rating appraises the suitability of the horizontal and vertical clearances of a grade-separation structure, taking into account whether traffic beneath the structure is one- or two-way.

**Variance** – A deviation from State Aid Operations Statute Rules that takes into account environmental, scenic, aesthetic, historic, and community factors that may have bearing upon a transportation project. A design variance is used for projects using state aid funds. Approval requires appropriate justification and documentation that concerns for safety, durability and economy of maintenance have been met.

**Vehicular traffic** – The passage of automobiles and trucks along a transportation route.

**Voussoir** – One of the separate stones forming an arch ring; also known as a ring stone.

**Waterway adequacy** – One of five NBI appraisal ratings. This rating appraises a bridge's waterway opening and passage of flow under or through the bridge, frequency of roadway overtopping, and typical duration of an overtopping event.

**Minnesota Department of Transportation (MnDOT)  
Local Historic Bridge Report**

**Appendices**

**Bridge Number: 90592**

---

**Appendix B. Guidelines for Bridge Maintenance and  
Rehabilitation based on the Secretary of the  
Interior's Standards**

## ***The Secretary's Standards with Regard to Repair, Rehabilitation, and Replacement Situations***

**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 historic basis and that seek to create a false historic 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.

# Minnesota Department of Transportation (MnDOT) Local Historic Bridge Report

Appendices

Bridge Number: 90592

---

## Appendix C. Documents

## **Additional Electronic Data Bridge 90592**

### Historic Data

- Research

### Local Data

- 2013\_MN Local Historic Bridge Study

### MnDOT Reports

- Accident Report
- 90592 Condition Sheet 2010
- 90592 Inventory 05-29-13
- 90592 inventory 06-24-14
- 90592 Rating Report 1974
- 90592 Inspection 07-15-13
- 90592 Inspection 08-16-12

### Photos

- 2005
- 90592 LHB 08-13-13
- 90592\_M&H Photos\_8-13-13
- Report Photos
- Photos 90592

### Plans

- 90592 Plans

**Mn/DOT BRIDGE INSPECTION REPORT**

Inspected by: CITY OF MINNEAPOLIS

**BRIDGE 90592 28TH AVE S OVER MINNEHAHA CREEK****INSP. DATE: 07-15-2013**

County: HENNEPIN Location: 0.1 MI S OF JCT E 46TH S Length: 27.0 ft  
 City: MINNEAPOLIS Route: MSAS 431 Ref. Pt.: 001+00.380 Deck Width: 53.3 ft  
 Township: Control Section: Maint. Area: Rdwy. Area / Pct. Unsnd: 1,184 sq ft  
 Section: 13 Township: 028NN Range: 24W Local Agency Bridge Nbr: 4504 Paint Area/ Pct. Unsnd:  
 Span Type: CONC ARCH Culvert N/A

NBI Deck: N Super: 6 Sub: 6 Chan: 6 Culv: N

Open, Posted, Closed: OPEN

Appraisal Ratings - Approach: 8 Waterway: 8

MN Scour Code: I-LOW RISK

Def. Stat: ADEQ Suff. Rate: 81.1

Required Bridge Signs - Load Posting: NOT REQUIRED Traffic: NOT REQUIRED

Horizontal: NOT REQUIRED Vertical: NOT APPLICABLE

**STRUCTURE UNIT: 0**

ELEM NBR	ELEMENT NAME	ENV	INSP. DATE	QUANTITY	QTY CS 1	QTY CS 2	QTY CS 3	QTY CS 4	QTY CS 5
407	BITUMINOUS APPROACH		07-15-2013	2 EA	0	2	0	0	N/A
			08-16-2012	1 EA	0	1	0	0	N/A
Notes:  CRACKS IN THE ASPHALT SURFACE SEALED AND UNSEALED, SEPARATION AT GUTTERLINE, MANY ASPHALT PATCHES.									
334	METAL RAIL-COATED		07-15-2013	171 LF	0	0	0	171	0
			08-16-2012	171 LF	0	0	0	171	0
Notes:  ORNAMENTAL METAL RAILING HAS UNIFORM SEVERE PAINT LOSS, HEAVY PACK RUST, SECTION LOSS AND OUT OF ALIGNMENT, PUSHED OUT BOTH SIDES. WELDS BROKEN AND THE TOP RAIL HAS COME LOOSE FROM THE POST BRACKETS ON THE SE & NW. RAILINGS BELOW MINIMUM HEIGHT REQUIREMENTS AT 34".									
144	CONCRETE ARCH		07-15-2013	26 LF	0	26	0	0	N/A
			08-16-2012	26 LF	0	26	0	0	N/A
Notes:  MANY FINE TO SMALL SIZE LONGITUDINAL AND TRANSVERSE CRACKS, THREE PATCHED SPALLS ON THE S., ONE LARGE CRACK AT CENTER LINE ON THE S. BOTH FASCIAS SHOWING SCALE AND DELAMINATION. OPEN CORE HOLE FORM IN DECK.									
215	CONCRETE ABUTMENT		07-15-2013	98 LF	0	98	0	0	N/A
			08-16-2012	98 LF	0	98	0	0	N/A
Notes:  FASCIAS ARE SCALING AND SPALLING. GRAFFITI.									
387	CONCRETE WINGWALL		07-15-2013	4 EA	0	4	0	0	N/A
			08-16-2012	4 EA	0	4	0	0	N/A
Notes:  WALLS HAVE LARGE AREAS OF SCALING, DELAMINATION, CRACKS AND HOLLOW AREAS. S.W. TOP OF WALL HAS LOOSE DELAMINATED CONCRETE AROUND SURVEY MONUMENT. HEAVY VEGETATION, GRAFFITI.									
361	SCOUR		07-15-2013	1 EA	0	1	0	N/A	N/A
			08-16-2012	1 EA	1	0	0	N/A	N/A
Notes:  THE SLOPE PROTECTION IS FAILING AT ALL FOUR CORNERS CAUSING UNDERMINING, CRACKS AND SEPARATION. BARREL OF ARCH IS TOO NARROW FOR HIGH WATER FLOW.									
964	CRITICAL FINDING		07-15-2013	1 EA	1	0	N/A	N/A	N/A
			08-16-2012	1 EA	1	0	N/A	N/A	N/A
Notes:  NO CRITICAL FINDINGS.									
984	DRAINAGE		07-15-2013	1 EA	0	1	0	N/A	N/A
			08-16-2012	1 EA	0	1	0	N/A	N/A
Notes:  THE CATCH BASINS ARE ALL UNDERMINED, SPALLED WITH REBAR EXPOSED.									
986	CURB & SIDEWALK		07-15-2013	1 EA	0	0	1	N/A	N/A
			08-16-2012	1 EA	0	0	1	N/A	N/A
Notes:  CURB; THERE ARE SPALLS, CRACKS AND LARGE SECTIONS WITH SETTLEMENT ON BOTH SIDES CREATING LARGE GAPS BETWEEN THE CURB AND FRONT OF SIDEWALKS, TWO LARGE SECTIONS SPALLED WITH REBAR EXPOSED. SIDEWALK; SURFACE HAS LARGE OPEN TRANSVERSE CRACKS, PATCHES AND AREAS OF SCALING. SEVERAL PANELS HAVE SETTLED, UNDERMINED, UNEVEN SURFACE, TRIP HAZARDS. THE SUBSURFACE HAS AREAS OF LEACHING, RUST STAINS, TRANSVERSE CRACKS WITH EFFLORESCENCE. STEEL STRINGERS AND KNEE BRACES HAVE PAINT PEELING, SEVERE RUST, PACK RUST AND SECTION LOSS.									

**Mn/DOT BRIDGE INSPECTION REPORT**

Inspected by: CITY OF MINNEAPOLIS

**BRIDGE 90592 28TH AVE S OVER MINNEHAHA CREEK****INSP. DATE: 07-15-2013****STRUCTURE UNIT: 0**

ELEM NBR	ELEMENT NAME	ENV	INSP. DATE	QUANTITY	QTY CS 1	QTY CS 2	QTY CS 3	QTY CS 4	QTY CS 5
987	ROADWAY OVER CULVERT	1	07-15-2013	1 EA	0	0	1	N/A	N/A
			08-16-2012	1 EA	0	0	1	N/A	N/A
Notes:  MANY ASPHALT PATCHES, TRANSVERSE AND LONGITUDINAL CRACKS REFLECTING THROUGH THE ASPHALT.									

General Notes: 2011 DECK ASPHALT THICKNESS CORE MEASURED AT 5 - 1/2".

\_\_\_\_\_  
Inspector's Signature\_\_\_\_\_  
Reviewer's Signature / Date

### Mn/DOT Structure Inventory Report

Bridge ID: 90592      28TH AVE S over MINNEHAHA CREEK

Date: 06/24/2014

+ GENERAL +	+ ROADWAY +	+ INSPECTION +
Agency Br. No. 4504	Bridge Match ID (TIS) 1	Deficient Status ADEQ
District METRO Maint. Area	Roadway O/U Key 1-ON	Sufficiency Rating 81.1
County 27 - HENNEPIN	Route Sys/Nbr MSAS 431	Last Inspection Date 07-15-2013
City MINNEAPOLIS	Roadway Name or Description 28TH AVE S	Inspection Frequency 12
Township	Roadway Function MAINLINE	Inspector Name MINNEAPOLIS
Desc. Loc. 0.1 MI S OF JCT E 46TH S	Roadway Type 2 WAY TRAF	Structure A-OPEN
Sect., Twp., Range 13 - 028NN - 24W	Control Section (TH Only)	+ NEI CONDITION RATINGS +
Latitude 44d 55m 05.68s	Ref. Point (TH Only)	Deck N
Longitude 93d 13m 55.69s	Date Opened to Traffic 10-01-1904	Superstructure 6
Custodian CITY	Detour Length 2 mi.	Substructure 6
Owner CITY	Lanes 2 Lanes ON Bridge	Channel 6
Inspection By CITY OF MINNEAPOLIS	ADT (YEAR) 10,694 (2012)	Culvert N
BMU Agreement	HCADT	+ NEI APPRAISAL RATINGS +
Year Built 1904	Functional Class. URB/MINOR ART	Structure Evaluation 4
Year Fed Rehab	+ RDWY DIMENSIONS +	Deck Geometry 6
Year Remodeled	If Divided    NB-EB    SB-WB	Underclearances N
Temp	Roadway Width 44.0 ft	Waterway Adequacy 8
Plan Avail. MUNICIPAL	Vertical Clearance	Approach Alignment 8
+ STRUCTURE +	Max. Vert. Clear.	+ SAFETY FEATURES +
Service On HWY;PED	Horizontal Clear. 43.9 ft	Bridge Railing 0-SUBSTANDARD
Service Under STREAM	Lateral Clr. - Lt/Rt	GR Transition N-NOT REQUIRED
Main Span Type CONC ARCH	Appr. Surface Width 44.0 ft	Appr. Guardrail N-NOT REQUIRED
Main Span Detail SPANDREL FILLED ARCH	Roadway Width 44.0 ft	GR Termini N-NOT REQUIRED
Appr. Span Type	Median Width	+ IN DEPTH INSP. +
Appr. Span Detail	+ MISC. BRIDGE DATA +	Frac. Critical
Skew	Structure Flared NO	Underwater
Culvert Type	Parallel Structure NONE	Pinned Asbly.
Barrel Length	Field Conn. ID	Spec. Feat.
Number of Spans	Cantilever ID	+ WATERWAY +
MAIN: 1    APPR: 0    TOTAL: 1	Foundations	Drainage Area
Main Span Length 27.0 ft	Abut. CONC - FTG PILE	Waterway Opening 310 sq ft
Structure Length 27.0 ft	Pier	Navigation Control NO PRMT REQD
Deck Width 53.3 ft	Historic Status ELIGIBLE	Pier Protection
Deck Material N/A	On - Off System ON	Nav. Vert./Horz. Clr.
Wear Surf Type BITUMINOUS	+ PAINT +	Nav. Vert. Lift Bridge Clear.
Wear Surf Install Year	Year Painted Pct. Unsound	MN Scour Code I-LOW RISK
Wear Course/Fill Depth 3.60 ft	Painted Area	Scour Evaluation Year 1995
Deck Membrane NONE	Primer Type	+ CAPACITY RATINGS +
Deck Protect. N/A	Finish Type	Design Load UNKN
Deck Install Year	+ BRIDGE SIGNS +	Operating Rating HS 18.00
Structure Area 1,439 sq ft	Posted Load NOT REQUIRED	Inventory Rating HS 12.00
Roadway Area 1,184 sq ft	Traffic NOT REQUIRED	Posting
Sidewalk Width - L/R 4.5 ft 4.8 ft	Horizontal NOT REQUIRED	Rating Date 01-23-2013
Curb Height - L/R 0.50 ft 0.50 ft	Vertical NOT APPLICABLE	Mn/DOT Permit Codes
Rail Codes - L/R 01 01		A: N    B: N    C: N