

Interim Summary Report

Minnesota Phase 2 Local Historic Bridge Study

Report prepared for

Minnesota Department of Transportation

Prepared by



and



January 2015

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1. Introduction

The Local Historic Bridge Study is a multi-phase project spearheaded by the Minnesota Department of Transportation (MnDOT) to focus on the state's historic bridges that are not DOT-owned (i.e., those bridges owned by counties, townships, other state agencies, railroads, and private entities) that have been evaluated as historically significant.¹

The primary objective of this project, referred to as Phase 2, was to inform interested owners on the existing physical condition, historic significance, and recommendations for preservation of their bridge. As part of the current study, both historic and engineering assessments were undertaken. Engineering condition documentation for each bridge was prepared with recommendations for maintenance, stabilization, and preservation of the structure. Historic assessments and research included re-evaluation of some bridge's historic significance and the preparation of National Register of Historic Places (National Register) nominations where requested by owners. Information was shared with owners through distribution of draft and final reports and participation in meetings to present the project purpose and goals, address questions, and solicit feedback. Ultimately, this phase of the Local Historic Bridge Study provides owners with useful tools to ease the path forward for the continued preservation of their historic bridges if they choose that direction.

¹ Generally, bridges included in the study are those known to MnDOT from previous bridge surveys. These bridges are currently, or were formerly, located on or across public roads. DOT-owned historic bridges were addressed in a previous project.

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2. Project Process

Phase 2 of the Local Historic Bridge Study began in spring 2013 and continued through January 2015. LHB Inc. (LHB) served as the engineering consultant for the project. Mead & Hunt, Inc. (Mead & Hunt) served as the historical consultant, with the 106 Group assisting with historic evaluations, National Register nominations, and website narrative development. Mead & Hunt engineers also assisted with assessment and report preparation. The project was broken into multiple tasks that ran concurrently. Tasks included:

- Field survey, including historic and engineering analysis for select bridges in the study pool
- Preparation of bridge reports, which included historic and engineering information
- Completion of National Register nominations for owner submittal to the State Historic Preservation Office (SHPO)
- Preparing an Engineering Summary – a summary of the bridges, detailing maintenance, stabilization, and preservation costs; estimated engineering costs to implement preservation; funding eligibility; and an opinion for preservation timing based on condition
- Database and website development to collect and share information
- Preparing an update of the General Management Plan
- Conducting research and preparing a summary of best practices in funding and Programmatic Agreements from other states
- Conducting owner outreach meetings

A. Field survey and analysis of data

The largest component of the project was field survey, which took place from May through October 2013 and May through September 2014. As part of the field survey efforts, the project team gathered and reviewed historical and engineering data from the bridge owners and local repositories. This research informed engineering analysis and historical evaluation of the structure. Information collected was stored in project files and made accessible to all team members.

Field survey was a collaborative effort, with an engineer and historian present at each bridge during the field assessment. On-site collaboration facilitated discussion and understanding about the bridge's character-defining features and the current condition of the structure. The collaborative approach ensured that both engineers and historians fully understood the limitations and potential opportunities available to the bridge and how proposed repairs might affect the historic integrity of the structure.

(1) Historical analysis

As part of the study, each bridge's historic significance was reviewed. Generally, the significance of Minnesota bridges was established a number of years ago when documentation standards were more minimal than they are today. Further, certain bridges have been altered since their original evaluation. These two factors resulted in the need to re-evaluate select bridges to fill information gaps and improve understanding of their historic significance. This re-evaluation was undertaken for 74 bridges.² Of these, 17 were found to be not individually eligible due to lack of significance or diminished integrity due to alterations (see Appendix A). Additionally, some bridges were found to be nonextant (see Appendix B). These bridges were removed from the study and SHPO was informed of their status. No further evaluation, analysis, or work was undertaken for nonextant bridges.

For other bridges, clarification of eligibility was undertaken. Often, expansion of the historic significance identified in an original eligibility determination was needed because a new historic context had since been established. For example, Bridge L7075 was re-evaluated under the "Federal Relief Construction in Minnesota, 1933-1945" Multiple Property Document Form (MPDF) because this context was not yet developed when the bridge was first evaluated for significance (see Figure 1). In other instances, a bridge was inadvertently missed while establishing contributing or noncontributing status within a historic district. For example, Bridge 93844 was re-evaluated as a contributing resource within the determined-eligible Grand Rounds Historic District as it was not included in the initial district inventory (see Figure 2). In total, 24 bridges were reviewed under new historic contexts or for contributing status within a newly defined historic district as part of the project.



Figure 1. Bridge L7075 in Todd County. This bridge was re-evaluated for significance under the "Federal Relief Construction in Minnesota, 1933-1945" MPDF.

² In total, 68 Phase II evaluations were completed on 74 bridges. Evaluations for Ore Dock # 5 and #6 each included four bridges.



Figure 2. Bridge 93844 in Minneapolis, Hennepin County. This bridge was re-evaluated to address its contributing status to the National Register-eligible Grand Rounds Historic District.

(2) Engineering analysis

An important goal of this phase of the Local Historic Bridge Study was to evaluate the current condition of select National Register-listed or determined eligible locally owned historic bridges. Engineering analysis work which was performed consisted of review of previous condition inspection reports, construction and rehabilitation plans, past studies, and ratings which were collected from both the bridge owner and MnDOT's database, as well as the field condition review of the bridge with a project historian. Engineering analysis was not performed for every bridge in the study. The bridges that did not receive engineering analysis were those that were owned by non-government entities such as a railroad or private owner or bridges that had an in-depth study performed by others or which were in a stable and preserved condition (see Appendix C for a listing of the type of report prepared for bridges included in this study).

Findings from field survey efforts and a description of the existing conditions of the bridge were included within the bridge report. Maintenance, stabilization, and preservation recommendations along with an opinion of cost to implement them were also prepared based upon the information collected and observed for each bridge. Engineering recommendations were guided by accepted engineering standards, the Secretary of the Interior's *Standards for the Treatment of Historic Properties*, and past experience and knowledge.

B. Bridge reports

The engineer-historian project team collaborated on preparing bridge reports based on the historic and engineering analyses. Each bridge report was broken into five sections, including an introduction, historic data, bridge data, existing conditions/recommendations, and projected costs. The project introduction outlined the purpose of the report and the key players involved. The historic data section summarized the significance of the bridge, as compiled from various inventories, studies, and National Register nomination documents. The last three sections of the report (bridge data, existing

conditions/recommendations, and projected costs) relate directly to engineering analysis, evaluation, and recommendations for future planning and preservation of the bridge.

For reporting, bridges were placed into one of two categories: abridged or full. Of the bridges included in the study, 87 had a full report prepared and 39 had an abridged report prepared (see Appendix C, which identifies report type for each bridge).³ A full bridge report included an engineering assessment and cost estimates. Abridged reports were prepared for those bridges that were recently rehabilitated, are owned by a railroad or other private owner (e.g. skyways), and/or had a previous relevant preservation/engineering study undertaken. The abridged report was limited to a historic assessment of the bridge and did not contain substantial engineering data, assessment, or evaluation. An example of a bridge that had an abridged report prepared is Bridge 2366, also known as the Nymore Bridge. This local bridge owner recently undertook a historic and engineering assessment of the bridge for a proposed rehabilitation; therefore, further engineering condition study was not needed (see Figure 3).



Figure 3. Bridge 2366, or commonly called the Nymore Bridge, in Beltrami County. This bridge received an abridged report as a rehabilitation plan had already been developed.

MnDOT reviewed and provided comment on all bridge reports, acting in its role as delegated agent for the FHWA. Agency reviewers included:

- Kristen Zschomler, Cultural Resources Unit
- Renée Hutter Barnes, Cultural Resources Unit
- Linda Pate, MnDOT Cultural Resources Unit/U.S. Army Corps of Engineers (USACE) Liaison
- Patti Loken, State Aid Programs Engineer
- Dave Conkel, State Aid Bridge Engineer

³ Ore Dock Approach Spans #5 and #6 each are comprised of four individual bridges; however, only two reports were prepared, one for each Ore Dock structure.

After MnDOT review, bridge reports were revised and submitted to the SHPO, FHWA, USACE and the bridge owners for review and comment. Bridge reports were revised again and final versions submitted in January 2015.

C. National Register preparation

At the request of eight owners, National Register nominations were prepared for Bridges L7075, L7069, 90646, 90990, 94246, L6113, L8515, and 5368 (see Figure 4). The project team prepared nomination packets, including all required state supplemental materials, and submitted them for agency review. Following agency review, the project team finalized the nomination packets so MnDOT could provide them to owners. Owners will submit the nomination packets, at their discretion, directly to the SHPO for review by the State Review Board.



Figure 4. Bridge 5368, constructed in 1934, was one of eight bridges to have a National Register nomination prepared as part of this project

D. Engineering summary

The Engineering Summary extracts information from each of the individual bridge reports and presents it within a spreadsheet as an efficient means for display, sorting, and analysis. In addition to bridge owner, year built, bridge type and other static bridge information the summary report includes specific bridge information identified through the course of the project. This information includes such items as bridge element condition codes, individual bridge maintenance, stabilization and preservation costs, estimated engineering costs to implement preservation, funding eligibility, and an opinion for preservation timing based on condition.

E. Database and website narratives

As part of this project, a historic bridge database and website narratives were developed. The database is a repository of available historic and engineering data. All of Minnesota's historic bridges are included in the database, including those that are MnDOT owned. The intention of the database is to allow

MnDOT, including the Cultural Resources Unit and State Aid, and the MnDOT District offices to have a comprehensive list of historic bridges in the state to better manage the population and assist bridge owners.

In addition, the project team prepared historic narratives to incorporate into MnDOT's website. The narratives summarize the history of Minnesota bridges, provide a field guide to identify historic bridges, and discuss the reasons, such as community identity, economic development, and regulations, that historic bridges are preserved. Video and photographs were provided for MnDOT's incorporation into the website update narratives. These materials contribute to a broader effort to update and enhance MnDOT's historic bridge webpages.

F. Management Plan for Historic Bridges in Minnesota

Originally prepared in 2006, the *Management Plan for Historic Bridges in Minnesota* (General Management Plan) provides guidance on resources for the rehabilitation of historic bridges. The project team updated the General Management Plan to reflect current practices, funding sources, and contacts. The updated General Management Plan will be made available to the public on MnDOT's historic bridge website at <http://www.dot.state.mn.us/historicbridges/about.html>.

G. Summary of funding and Programmatic Agreements from other states

The project team investigated how other states fund historic bridge programs and structure Programmatic Agreements (PAs) when non-state entities are owners of historic bridges. The team also conducted a review of PAs that are executed or in draft form to provide additional insight into how certain states have systematically addressed issues related to historic bridges. A total of 24 states were represented in the results, presented in *Historic Bridge Rehabilitation and Approaches to Programmatic Agreements: Summary and Analysis of Current Practices Nationwide* (July 2014).

H. Owner outreach meetings

As part of the project, the project team participated in five owner outreach meetings to discuss the project, answer any questions from bridge owners, and solicit feedback about rehabilitation of their historic bridge. The project team clarified how the bridge reports can provide useful information for the bridge owner and serve as a beginning step in any alternatives analysis for bridge rehabilitation. Additionally, the project team heard owner concerns about funding challenges. The outreach meetings were held with various districts around the state, and included the following:

- County Engineer's Bridge Committee – December 3, 2013
- Metro District Meeting – May 12, 2014
- District 7 Meeting – May 21, 2014
- District 3 Meeting – May 29, 2014
- Metro City Meeting – September 26, 2014

3. Findings and Lessons Learned

A. Bridge population

At the start of Phase 2 of the Local Historic Bridge Study, 140 historic bridges were included in the study.⁴ The original pool of bridges was refined throughout the project to exclude those that were found to be nonextant and some bridges planned to be replaced or had a recent rehabilitation (see Appendix D). For example, Bridge L7969 in Yellow Medicine County was removed from the study after a site visit revealed that the bridge was being replaced. According to County Bridge Engineering, this 1930 through truss was salvaged for future use on a nearby farm (see Figures 5 and 6). Other bridges with recent rehabilitation were included in the study and received abridged reports (see Appendix C).



Figures 5 and 6. Bridge L7969 in Yellow Medicine County, removed from its crossing in summer 2013. This bridge is an example of one that was demolished during the project and removed from the study.

Additionally, those bridges found to be not eligible through historic assessment were removed from the study. An example of a bridge removed from the study due to a not eligible finding is Bridge 27A53 (formerly 6992) in Minneapolis. The bridge has diminished integrity due to alterations and therefore was determined not eligible for listing in the National Register (see Figure 7). All bridges that were removed from the study were inventoried on a Minnesota Architecture-History form and submitted to the SHPO. A separate report was also prepared for those bridges removed from the study for the project file.

⁴ The 27 bridges located within the Chicago, Milwaukee, and St. Paul Railroad Corridor Historic District were studied under another MnDOT contract with the Hennepin County Regional Rail Authority. The study will be completed in the spring of 2015.



Figure 7. Bridge 27A53 (formerly 6992) in Minneapolis, Hennepin County, was determined not eligible through additional evaluation and removed from the study.

Generally, the change to the number of bridges within the population was expected. Locally owned bridges are often not as well documented as state-owned bridges. Additionally, bridge removal is at the discretion of the owner and is not reviewed by MnDOT or SHPO if federal or state funds or permits are not used. However, it was hard to keep track of the bridge population when it continuously shifted. The greatest challenge was how to accommodate changes within the bridge population as field work progressed over the course of the study. Ultimately, the team worked through the removal and addition of bridges through continuous communication internally and with MnDOT.

At the close of the project, 126 extant bridges remained in the study pool.⁵ The majority of the bridges are owned by local governments, including cities (39 percent), counties (21 percent), or townships (15 percent). Figure 8 breaks down the ownership of the bridge survey population. Other local agencies are comprised of the Hennepin County Regional Rail Authority, Minneapolis Board of Parks and Recreation, and other (non-DOT) state agencies. Further statistical data, including a breakdown of Minnesota's historic bridges by type, can be found in the General Management Plan.

⁵ In total, Minnesota is home to 227 known, extant, historic bridges. These include 58 MnDOT-owned bridges and 169 owned by others. Within the population of bridges owned by others, 126 were studied in the Mead & Hunt and LHB project and 27 under contract with the Hennepin County Regional Rail Authority (completion estimated in 2015). The remaining 16 historic bridges were not included in either study for one of the following reasons: previous rehabilitation, being in storage, plans for replacement, or being identified late in the study process. These bridges are recommended for further review and management plan preparation as part of a future Local Historic Bridge Study project (see Appendix D for list).

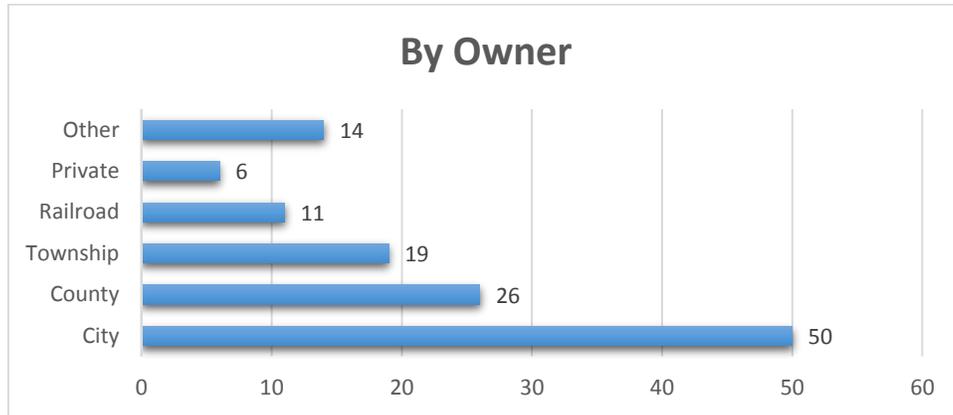


Figure 8. Ownership of bridges included in study.

Included in this number are those bridges that were added to the study. These bridges were thought to be nonextant or were not previously identified in the historic bridge population. For example, the Coffee Street Bridge (Bridge 7965) owned by the City of Lanesboro, a former roadway bridge that now serves to carry pedestrians over the South Branch of the Root River, was identified later in the project (see Figure 9). Because MnDOT does not inspect this bridge, it did not have a record of its existence and therefore the bridge was not originally included in the study. Additionally, three bridges (Bridge 90661, L5728, and 93809) were originally excluded from the scope of work because they had recent rehabilitations but were re-added to the project when it was determined that they had not been individually evaluated for the National Register.



Figure 9. Bridge 7965 in Lanesboro is an example of a bridge added into the study.

Over the course of the study, a handful of late discoveries were made and the potential for other unidentified historic bridges to be found in the future was brought to light. Project time and scope constraints did not allow for survey of additional historic bridges that were previously unknown. Such

examples include vehicular and pedestrian bridges contributing to the determined-eligible Grand Rounds Historic District and Bridge 4667 in Redwood County, which is no longer in vehicular service and therefore not in the MnDOT database. Continued study of these and other bridges is recommended, as detailed in Section 4.

B. Communication and collaboration

Communication and collaboration was an important element to the project. The project team, comprised of representatives from MnDOT State Aid, MnDOT CRU, and a liaison with the USACE, met bi-monthly to discuss project schedule and tasks. On a monthly basis the project team met with MnDOT to discuss findings, provide progress reports, and to work through any outstanding issues or questions. About a third of the meetings were conducted in-person at the MnDOT Central Office. Additionally, the project team met on three occasions with other key players, including the SHPO and Federal Highway Administration (FHWA), to ensure that the various agencies needs and concerns were integrated into the project. Continued conversation with the client and between the different consulting groups ensured that questions were answered in a timely manner, expectations were met, and the project continued to meet goals.

Collaboration between engineering professionals and historians was also a key component to the success of the project. Project historians and engineers were on-site for the condition assessment of each structure. This approach facilitated discussion between the engineer and historian on the current condition of the bridge, character-defining features, and recommendations to maintain, stabilize, and preserve the structure. The collaborative approach was also applied to the bridge report preparation where the historian and engineer reviewed each other's report sections. This allowed for the historian and engineer to collaborate in formulating the final recommendations for each bridge and to understand how each recommendation might impact the historic significance of each structure.

The collaborative approach to field survey, evaluation and report writing was not only more efficient than the conventional approaches, it also makes better use of the skills and experiences of the historian and engineer by allowing ongoing, interactive consultations. As a result, each professional evaluates the bridge with the other's interests, concerns, and regulations in mind. They are interacting regularly with the understanding that any final recommendations must accomplish the purpose of historic bridge management. Additionally, it made an efficient use of the project timetable and project schedule.

C. Lessons from the Programmatic Agreement

The team contacted DOT and consultant cultural resource and engineering representatives via online survey and conducted research into states' best practices for managing and funding historic bridge programs. Survey participants responded to questions about historic bridge rehabilitation projects, state and locally owned bridges, analysis and funding for rehabilitation, challenges, and existing programs for managing and funding historic bridge projects.

Thirteen states include components in their state Programmatic Agreements (PAs) that pertain to historic bridges. Nine states' PAs address a wide range of issues from inventory and evaluation processes to treatment options and management plans. PAs address topics such as the applicability to non-state-

owned bridges, processes for evaluating alternatives and the feasibility of rehabilitation, funding, and public outreach.

Results of research into other states' practices can inform MnDOT policies and procedures going forward, especially as MnDOT looks to assist local bridge owners and update its PA with FHWA and SHPO.

Findings that might inform future practices include:

- The knowledge shortfall that is an ongoing impediment to conducting historic bridge rehabilitation projects should continue to be addressed through outreach and training.
- Exceptions or variances, and acceptance of existing conditions enable preservation outcomes that avoid adverse effect to be achieved. The process for reviewing and approving design exceptions should be clearly communicated.
- MnDOT's current practice of evaluating rehabilitation feasibility through alternatives analysis reports was affirmed.
- Funding for historic bridge rehabilitation projects is a challenge. Most states report having no special historic bridge funding in place; state and federal transportation funds are the primary sources for funding rehabilitation projects.
- Funding for non-vehicular bridges, including those converted to pedestrian use or those that are no longer on the state system, is especially challenging due to certain limitations on federal funds. Finding a qualified recipient that is willing to accept liability and long-term maintenance for the structure once it comes off the statewide bridge inventory is the most common challenge.
- Despite challenges to fund historic bridge rehabilitation projects, survey respondents mentioned a few special state funding programs with some success.
- PAs can include methods to encourage rehabilitation or reuse of locally funded historic bridge projects.
- In evaluating rehabilitation alternatives, some states report that consideration of future maintenance and life-cycle costs is challenging due to lack of agreement on how to use these costs in the evaluation.
- Public outreach and technical guidance for practitioners is helpful to promote both information sharing and stewardship of historic bridges.

D. Local bridge rehabilitation and successful examples

The project team identified the need to find or develop a method to prioritize bridge rehabilitation efforts based upon current condition. Within the study a significant number of bridges are in fair or poor condition and may be in jeopardy of being lost. Approximately 24 percent of the 88 bridges field surveyed by engineers were found to be in poor condition and several are in severely deteriorated condition. Recommendations for methods to prioritize rehabilitations efforts are outlined in Section 4.

Generally, local owners were receptive to the preservation of their historic bridges with few bridge owners indicating they would not be willing or interested in rehabilitation of their historic structure. Rather the majority indicated an interest to receive the report and review the stabilization, preservation, and maintenance recommendations. The largest challenge to bridge rehabilitation, as identified in the study, is the ability to fund rehabilitation efforts, especially for those bridges that are not eligible for state or federal funds.

Through engineering assessment, the project team was able to determine a total and average cost for the maintenance, stabilization, and preservation for 88 of the state's locally owned historic bridges. The cost breakdown for these 88 bridges is as follows:

- Total maintenance, preservation, and stabilization costs for 88 bridges = \$40,485,823

- Average cost for maintenance, stabilization, and preservation per bridge
 - Average annual maintenance cost per bridge = \$3,900
 - Average stabilization cost per bridge = \$14,800
 - Average preservation cost per bridge = \$441,400

These figures provide an opportunity for MnDOT and local owners to know and assess future historic bridge funding needs in the state. Note that they are not inclusive of all locally owned historic bridges as field engineering assessments were only performed for 88 of the bridges. As an example, the Tenth Avenue Bridge (Bridge 2796) was not visited during this project because it had a recent rehabilitation study that concluded a \$16 million to \$42 million project should be considered. This preservation estimate has not been included in the above numbers.

Continued success stories and examples of local owners rehabilitating their bridges impress other owners on the benefits of preserving their historic bridge. For example, the Walnut Street Bridge (Bridge R0412) in Mazeppa was rehabilitated in 2002 (see Figure 10). It continues to serve as an important symbol for the community and the rehabilitation efforts highlight the owner's willingness to preserve the community's heritage. The website narratives discussing the benefits of rehabilitation developed as part of this study will aid in MnDOT's efforts to inform and engage owners.



Figure 10. The Walnut Street Bridge (Bridge R0412) in Mazeppa.

E. Further guidance for local bridge owners

A few bridge owners found the bridge reports stopped short of what they had been hoping for, notably they sought detailed work programming recommendations for their historic bridge with specific guidance on maintenance or stabilization efforts that would not require MnDOT or SHPO review. This was beyond the scope of the project; however, a recommendation to develop a list of maintenance and stabilization activities that would not require agency review is included in Section 4.

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4. Recommendations

The project team recommends that the following items be implemented based on the project activities. The recommendations have been broken into various sub-categories and include:

A. Database and information sharing

- Incorporate additional data not currently in the database. Data gaps exist for certain state-owned bridges and bridges not yet evaluated as historic. Gaps to be filled include: integrity, character-defining features, and the projected engineering costs for maintenance, stabilization, and preservation (after completion of any additional bridge reports).
- Revise existing bridge data in the Structure Information Management System (SIMS) with current historic and engineering inspection information, including bridge name, date constructed, date remodeled, type (including the 3-digit MnDOT code and associated description fields), and eligibility status.
- Provide a way to link SIMS data to the historic bridge database to keep engineering data current while maintaining historic information fields.
- Create a platform for sharing data across MnDOT database systems. This will ensure that current engineering and historic data will be accessible for all.
- Work with the SHPO to obtain all historic district boundary maps for listed, determined-eligible, or potentially-eligible history/architecture and archaeological sites. Boundaries for linear historic districts, such as railroad and highways, are of particular interest.

B. Engineering recommendations

- Using the project findings, a prioritization of bridges based on bridge owners' desires to use the information and evaluate the current condition and their ability to finance rehabilitation activities is recommended. A breakdown of preservation priorities is provided as part of the project; however, specific recommendations and development of a matrix for this work is beyond the scope of the project. Developing a method for and implementing a program around historic bridge preservation and the prioritization of historic bridge rehabilitation is recommended in Phase 3 of the Local Historic Bridge Study.
- Prepare a list of acceptable maintenance activities that would not need CRU or SHPO review and concurrence. Include examples of the type of work and level of effort that can be performed by local owners without CRU/SHPO review and approval based on level/ type of funding and National Register status. Examples that may be acceptable include annual cleaning, deck sealing, and expansion joint work. Further discussion with SHPO and CRU staff to develop the list of acceptable maintenance activities would be necessary. Such a list could be a component

of an updated PA and/or could be used to guide owners undertaking work that does not require MnDOT or USACE review.

- Provide specific relocation recommendations for locally-owned bridges that are good candidates for relocation based on type, potential for adaptive use, and cost. Use the General Management Plan information on relocation to provide these owners with the tools and knowledge to consider relocation of their historic bridge.

Additionally, it is recommended MnDOT keep a list of all bridges with the potential for relocation and continue to monitor their engineering condition. MnDOT may also consider providing a leading role in identifying potential new locations for the bridges, in coordination with the owner. Potential bridges for relocation identified in the study include Bridges L6322, L5537, and L5245.

- Compile a list of bridges that are closed, not in-service, or not inspected by MnDOT. These bridges should continue to be inspected on a regular interval by the bridge owners.

C. Additional historic bridge studies

- Review popular websites, such as Bridgehunter.com, for other open, vehicular historic bridges in the state that were not addressed in Phase 2. Other closed, privately owned, or pedestrian bridges may also be identified at the discretion of CRU.
- Consider re-addressing Warren and Pratt trusses for significance. These bridges were once numerous and therefore excluded in the “Historic Iron and steel Bridges in Minnesota, 1873-1945” MPDF context as significant engineering resources in the state. However, since its preparation the number of Warren and Pratt trusses in Minnesota has reduced dramatically. Additionally, extant small Warren or Pratt trusses may not have been identified in previous bridge survey efforts because they would not have meet MPDF registration requirements for significance, but might now be considered historic due to the limited number of these types in the state.
- If additional efforts result in identification of other historic bridges, conduct historical and engineering analysis for the bridges and prepare a bridge report.
- Prepare Historic American Engineering Record (HAER) documentation for bridges that have little chance for rehabilitation, either due to owner disinterest, inability to be relocated, or deteriorated condition. For example, Bridges 7423 and 90554, both concrete Marsh Arches, are in severe state of deterioration and each owner is not planning on stabilizing or rehabilitating the structure. These bridges are not candidates for relocation due to their type of construction and will likely be lost over time. Additionally, rare, unusual, and first or only known examples should be documented if possible. For example, Bridge L5669 is the only known example of a Bowstring Arch in the state. While the bridge is a good candidate for relocation, documentation of the

bridge in its existing location is recommended. Documentation should be prioritized for bridges in a state of severe deterioration or subject to eminent loss.

D. Funding

- Study findings from this report can be used as valuable information to show and demonstrate the cost and need for funding maintenance, stabilization, and preservation of Minnesota’s historic bridges.
- Consider working with Minnesota stakeholders to create a separate source of funding to non-DOT-owned historic bridges to supplement and, in cases where the bridges are not eligible, substantially fund those not able to receive state or federal funds for rehabilitation efforts. Convey that the funding need will be ongoing (some bridges need preservation work in near-term, others in longer term, rehabilitations will be cyclical, lasting 20 years or more).
- Continue to find funding opportunities for non-DOT owners within the current programs.
- Engage with other agencies, such as the SHPO, to create new grant and funding programs for the state’s historic resources, in particular bridge rehabilitation. While SHPO funding is available for rehabilitation studies for all eligible bridges, it is not available for specific maintenance, stabilization, or preservation work unless the bridge is listed in the National Register.
- Open up state and federal funding eligibility to stabilization and preservation activities that are currently not fundable due to the bridge’s condition/ sufficiency rating being too high to meet eligibility criteria.
- Consider change to process for allocation of federal dollars to local bridge owners; this may include creating a subprogram for historic bridges.
- Consider implementing a program where allocation of funding for bridges is not based on the bridge’s sufficiency rating but rather on the list of accepted eligible or listed historic bridges.
- Update preservation cost estimates and bridge condition status periodically (recommend every five years).

E. Education and outreach:

- Continue to educate the public and engineering professionals on Minnesota’s historic bridges and the management plan process at professional conferences, including the American Society of Civil Engineers (ASCE), the Statewide Historic Preservation Conference, the Transportation Research Conference, and City and County meetings. Additionally, continue to provide training opportunities for engineering and preservation specialists, such as the Historic Bridge Training.

- Further develop programs to reach out to the public through training programs. Support for bridge preservation should be cultivated in the public realm by highlighting the significance of historic bridges and their importance to communities. Too often, a community does not engage in the maintenance and preservation of their bridges until a bridge is designated for replacement or demolition. Raising awareness about the importance of historic bridges may increase local support for bridge preservation. The following items may help in creating public awareness and, in some instances, may be used to mitigate the effects of a salvaged or demolished bridge:
 - Prepare outreach publications to continue to foster interest in historic bridges and raise public awareness of Minnesota’s engineering heritage. Examples of possible outreach publications include information pamphlets, which could be distributed at meetings and in public places such as a library, museum or highway rest stop.
 - Prepare an exhibit that highlights the history and preservation of bridges in Minnesota. The exhibit could be displayed in MnDOT’s Central Office lobby, at local historical societies, or in museums.
 - Install QR codes on historic bridges (with owner approval) that directs viewer to collected information, such as MnDOT web page, so that the public can readily learn the history.
 - Other outreach opportunities include preparation of a poster or calendar.
- Consider working with school boards and/or universities to incorporate a discussion of historic bridges into school programs. Schoolchildren could learn about the history of bridge engineering through Engineers’ Week, an event designed to introduce students to the importance of engineering. Engineers’ Week is sponsored primarily by the ASCE, which chairs the National Engineer’s Week Committee of sponsors. Other supporting sponsors include the FHWA. At a university level, seminars or lectures on historic bridge preservation could be prepared and given to engineering or historic preservation clubs, or within a particular course.

F. Awards and promotion:

- As MnDOT moves forward in its efforts to support local governments that own historic bridges, it might consider establishing an awards program to provide owners and engineers with additional incentives to maintain and rehabilitate historic bridges. While the Preservation Alliance of Minnesota (PAM) currently conducts an annual awards ceremony for statewide preservation activities, and several bridges have received recognition for rehabilitation efforts, an awards ceremony specific to bridges does not yet exist. Creating a separate award for engineering excellence in historic bridge rehabilitation, possibly in cooperation with PAM, would be one method to encourage creative problem solving and recognize those that firms, organizations, and individuals dedicated to Minnesota’s engineering heritage. The names of award winners could be published in professional publications, websites and state and local papers.

Appendix A. Bridges Not Individually Eligible for the National Register of Historic Places

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Appendix A

Bridges Not Individually Eligible for the National Register of Historic Places

Bridge Number	County	Facility Carried	Facility Intersected	Report Type	2015 Status Notes
1816	Pope	E BR CHIPPEWA RIVER	CSAH 21	none	Bridge determined not eligible through Phase II evaluation
27A53	Hennepin	Washington Ave N (CASH 152)	BNSF RR	none	Bridge determined not eligible through Phase II evaluation
6247	Hennepin	BNSF RR & BASSETT CREEK	PLYMOUTH AVE N	none	Bridge determined not eligible through Phase II evaluation
6389	Chippewa	CHIPPEWA RIVER (DAM)	CSAH 13	none	Bridge determined not eligible through Phase II evaluation
6390	Chippewa	WATSON SAG CHANNEL (DAM)	CSAH 9	none	Bridge determined not eligible through Phase II evaluation
6391	Lac qui Parle	MINNESOTA RIVER (DAM)	CSAH 33	none	Bridge determined not eligible through Phase II evaluation
6610	Chippewa	MINNESOTA RIVER	CSAH 15	none	Bridge determined not eligible through Phase II evaluation
6611	Chippewa	MINNESOTA RIVER	CSAH 14	none	Bridge determined not eligible through Phase II evaluation
73030 (Sterns County Great Northern Bridge)	Stearns	Wobegon Trail	US 71	none	Bridge determined not eligible through Phase II evaluation
90202	Lac qui Parle	BR MINNESOTA R	CSAH 18	none	Bridge determined not eligible through Phase II evaluation
90448	Hennepin	CSAH 3(EXCELSIOR)	PEDESTRIAN	none	Bridge determined not eligible through Phase II evaluation
90490	Hennepin	MINNEHAHA CREEK	PENN AVE S	none	Bridge determined not eligible through Phase II evaluation
92643	Hennepin	MINNEHAHA CREEK	BROWDALE AV (488)	none	Bridge determined not eligible through Phase II evaluation
9940	Fillmore	RICEFORD CREEK	CSAH 29	none	Bridge determined not eligible through Phase II evaluation

Bridge Number	County	Facility Carried	Facility Intersected	Report Type	2015 Status Notes
L8796	St. Louis	WEST SWAN RIVER	TWP 883	none	Bridge determined not eligible through Phase II evaluation
L8898	Hennepin	BNSF RR(ABAN)	4 AVE N	none	Bridge determined not eligible through Phase II evaluation
Forest Encampment Association Bridge (LA-SVC-018)	Lake	Ped	Encampment River	none	Bridge determined not eligible through Phase II evaluation

Appendix B. Bridges Found to be Nonextant

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Appendix B
Bridges Found to be Nonextant

Bridge Number	SHPO Number
5837	CR-WAT-002
5882	CR-WAT-010
L2783	CR-CVC-100
L2526	CR-CVC-098
92349	—
90491	—
90664	HE-MPC-9002
4936	—
89182	OL-ROT-017
L8804	—
L5761	HE-MPC-07244
L2197	RK-MND-016
L2198	RK-KAN-007
L2201	RK-MAR-007
L2208	RK-MAR-008
L2210	RK-CLN-001
L8501	—
5704	SC-JRC-053
89451	—
L2215	RK-MAR-010
L2246	RK-MAR-009
L2250	RK-MAR-006
L2258	RK-LVC-031
L2318	RK-BPL-001
L2350	RK-CLN-002
L4100	—
L7969	YM-MNF-012
No MnDOT number	LY-LDT-013
No MnDOT number	SL-DUL-2336

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Appendix C. Bridges Included in Study

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Appendix D

Bridges Included in Study

Bridge Number	County	Feature Intersected	Facility Carried	Report Type	2015 Status Notes	Rehabilitation date
448	Olmsted	MID FK ZUMBRO RIVER	CSAH 18	Full		
661	Martin	ELM CREEK	TWP 38	Full		
1238	Redwood	COTTONWOOD RIVER	MAIN ST (MUN 22)	Full		
1461	Blue Earth	BLUE EARTH RIVER	CR 147	Abridged	Preservation project recently awarded	
1482	Rock	SCHONEMAN PARK PONDS	PEDESTRIAN	Full		
2110	Brown	MINNESOTA RIVER	CSAH 8	Full		
2366	Beltrami	MISSISSIPPI RIVER	OLD MIDWAY DR	Abridged	Recently studied by others	2011
2441	Hennepin	W RIVER RD & MISS RIV	CSAH 5 (FRANKLIN)	Abridged	Preservation project in progress	
2796	Hennepin	MISS R; BNSF & STS	CEDAR (10TH)	Abridged	Preservation project recently awarded	
3130	Faribault	COON CREEK	TWP 232	Full		
3145	Hennepin	LONG MEADOW CREEK	PEDESTRIAN	Abridged	Preservation project recently awarded	
3219	Wabasha	STREAM	CR 68	Full		
3398	Big Stone	MINNESOTA RIVER	PED (OLD HWY 12)	Full		
3481	Goodhue	CANNON RIVER	MUN 11	Full		
3575	Ramsey	MISS R & MISS BL	CSAH 42 (FORD PKY)	Full		
4846	Le Sueur	SHANASKA CREEK	PEDESTRIAN	Full		
5368	Mower	CEDAR RIVER	CSAH 29	Abridged	Recently rehabilitated	2014
5453	Otter Tail	OTV RAILROAD	UNION AVE (MSAS104)	Full		
5744	Pipestone	SPLIT ROCK CREEK	TWP 254	Full		
5756	Hennepin	MINNEHAHA CREEK	SOLDIER'S HOME RD	Full		
6263	Fillmore	S BR ROOT RIVER	CR 118	Full		

Bridge Number	County	Feature Intersected	Facility Carried	Report Type	2015 Status Notes	Rehabilitation date
6527	Watonwan	WATONWAN RIVER	PEDESTRIAN	Full		
6544	St. Louis	ST LOUIS RIVER	MN 39; RR	Abridged	Privately owned railroad bridge	
7097	Polk	RED RIVER OF THE NORTH	CSAH 7	Full		
7423	Itasca	SWAN RIVER	CR 446	Full		
7498	Kittson	S BR TWO RIVERS (DAM)	CSAH 28	Full		
7614	Cook	GRAND PORTAGE CREEK	CSAH 17	Full		
7626	St. Louis	Carlton St (MSAS 194)	DM&IR Ore Dock #5	Abridged	Privately owned railroad bridge	
7627	St. Louis	Carlton St (MSAS 194)	DM&IR Ore Dock #6	Abridged	Privately owned railroad bridge	
7631	St. Louis	3RD ST (MSAS 126)	DM&IR Ore Dock #5	Abridged	Privately owned railroad bridge	
7632	St. Louis	3RD ST (MSAS 126)	DM&IR Ore Dock #6	Abridged	Privately owned railroad bridge	
7771	St. Louis	CHANNEL	CSAH 110	Full		
7965	Fillmore			Full		
7979	Fillmore	STREAM	CSAH 15	Full		
9360	Hennepin	MISS. RIVER & STREETS	CSAH 122 (WASH. AVE)	Full		
9612	Hennepin	MINNEHAHA CREEK	STEVENS AVE S	Full		
25580	Goodhue	N FK ZUMBRO RIVER	WEST AVE (PEDESTRIAN)	Full		
27547	Hennepin	MINNEHAHA CREEK	CHICAGO AVE S	Full		
27552	Hennepin	NINE MILE CREEK	West 106th ST	Full		
27664	Hennepin	E CHAN MISSISSIPPI RIVER	MERRIAM ST	Full		
27956	Hennepin	I 94	CP RAIL	Abridged	Privately owned railroad bridge	

Bridge Number	County	Feature Intersected	Facility Carried	Report Type	2015 Status Notes	Rehabilitation date
62075	Ramsey	TH 51 (MONTREAL)	PED WALKWAY	Full		
69829	St. Louis	I 35	DM&IR ORE DOCK #5	Abridged	Privately owned railroad bridge	
69833	St. Louis	I 35	DM&IR ORE DOCK #6	Abridged	Privately owned railroad bridge	
89188	Olmsted	ZUMBRO RIVER	MSAS 104(7TH ST)	Full		
89850	Redwood	MINNESOTA RIVER	CSAH 17	Full		
89859	Redwood	REDWOOD RIVER	CSAH 31	Abridged	Recently rehabilitated	2014
90386	Ramsey	RCRRA	TH 5 East 7th St	Full		
90401	Ramsey	PICKEREL LAKE OUTLET	CSAH 40 (WATER ST)	Full		
90449	Hennepin	CHANNEL; PED PATH	CSAH 3 (LAKE ST)	Full		
90482	Hennepin	MINNEHAHA CREEK	NOKOMIS AVE S	Full		
90554	Blue Earth	LITTLE COTTONWOOD RIVER	HIGHWAY 101	Full		
90591	Hennepin	MINNEHAHA PKWY & CREEK	NICOLLET AVE S	Full		
90592	Hennepin	MINNEHAHA CREEK	28TH AVE S	Full		
90608	Hennepin	ST ALBANS BAY	56C(MTONKA BLV)	Full		
90646	Hennepin	MINNEHAHA CREEK	WOODDALE AVE	Full		
90661	Hennepin	DEAN BLVD	MIDTOWN GREENWAY	Abridged	Recently rehabilitated	2011
90980	Meeker	N FK CROW RIVER	TWP 362	Full		
90990	Meeker	WASHINGTON CREEK	TWP 161	Full		
92247	Ramsey	RECREATIONAL TRAIL	CSAH 51 (LEXINGTON)	Full		
92321	Hennepin	MINNEHAHA CREEK	BLOOMINGTON AVE S	Full		
92322	Hennepin	MINNEHAHA CREEK	12TH AVE S	Full		
92324	Hennepin	MINNEHAHA CREEK	UPTON AVE S	Full		
92366	Hennepin	CROW RIVER	PED WALKWAY	Full		

Bridge Number	County	Feature Intersected	Facility Carried	Report Type	2015 Status Notes	Rehabilitation date
93809	Hennepin	LAKE ISLES CHANNEL	MIDTOWN GREENWAY	Abridged	Recently rehabilitated	2011
93844	Hennepin	CP RAIL	PED-MAINT	Full		
93861	Hennepin	7th ST	SKYWAY	Abridged	Privately owned skyway	
93863	Hennepin	MARQUETTE AVE S	SKYWAY	Abridged	Privately owned skyway	
93864	Hennepin	NICOLLET MALL	SKYWAY	Abridged	Privately owned skyway	
93866	Hennepin	8 ST S	SKYWAY	Abridged	Privately owned skyway	
94246	Hennepin	MISS RIVER & W RIVER RD	BR#9 PED (ABAN RR)	Abridged	Preservation project under consideration	
1238A	Redwood	STREAM	MAIN ST (MUN 22)	Full		
L0885	Otter Tail	OTTER TAIL RIVER	PED (OLD TWNS RD)	Abridged	Recently rehabilitated	2012
L1393	Winona	CR 120	DM&E RR	Abridged	Privately owned railroad bridge	
L1394	Winona	CR 120	DM&E RR	Abridged	Privately owned railroad bridge	
L2194	Rock	STREAM	TWP 8	Abridged	Removal planned	
L2257	Rock	STREAM	MUN 75	Full		
L2340	Rock	SPRING WATER CREEK	TWP 108	Full		
L3275	Dakota	CANNON RIVER	CANADA AVE	Full		
L3942	Crow Wing	NOKASIPPI RIVER	NORTH KOERING RD	Full		
L4005	Houston	RICEFORD CREEK	TWP 124	Full		
L4013	Houston	DRY RUN	ROOSTER VALLEY RD	Full		
L4646	Rock	SPRING BROOK	MUN 11	Full		
L4885	Fillmore	BEAR CREEK	TWP 354	Abridged	Closure planned	
L5245	Jackson	OKABENA CREEK	TWP 187	Full		
L5391	Goodhue	CANNON RIVER	3RD ST N	Full		
L5573	Steele	STRAIGHT RIVER	TWP 95	Full		

Bridge Number	County	Feature Intersected	Facility Carried	Report Type	2015 Status Notes	Rehabilitation date
L5669	Blue Earth	LE SUEUR RIVER	PED (CLOSED)	Full		
L5722	Hennepin	CHANNEL	LAKE OF ISLES BLVD	Full		
L5728	Hennepin	KNOX AVE S	MIDTOWN GREENWAY	Abridged	Recently rehabilitated	2011
L5729	Hennepin	CHANNEL TO CEDAR LK	W LAKE ISLES PKWY	Full		
L5735	Hennepin	MINNEHAHA CREEK	LAKE NOKOMIS PKWY	Full		
L5736	Hennepin	MINNEHAHA CREEK	MINNEHAHA PARKWAY	Full		
L5852	Ramsey	STREAM	STERK RD PED	Abridged	Past rehabilitation, no vehicular use	1986
L5853	Ramsey	N/A	PED (CLOSED)	Abridged	Preservation project under consideration	
L6007	St. Louis	STEWART CREEK	SKYLINE PKWY	Abridged	Recently rehabilitated	2013
L6113	St. Louis	TISCHERS CREEK	E 4 ST	Abridged	Preservation project under consideration	
L6116	St. Louis	SHIP CANAL	MSAS 140(LAKE AVE)	Abridged	Recently rehabilitated	2009
L6137	St. Louis	SUPERIOR ST (MSAS 109)	DM&IR ORE DOCK #6	Abridged	Privately owned railroad bridge	
L6138	St. Louis	SUPERIOR ST (MSAS 109)	DM&IR ORE DOCK #5	Abridged	Privately owned railroad bridge	
L6322	Olmsted	South Fork Zumbro River	CR 121	Full		
L6393	Hennepin	MINNEHAHA CREEK	PED BRIDGE	Full	Recently rehabilitated	2010
L7069	Todd	TURTLE CREEK	TWP 357	Full		
L7075	Todd	TURTLE CREEK	TWP 411	Full		
L7897	Yellow Medicine	BRANCH SPRING CREEK	TWP 27	Full		
L7898	Yellow Medicine	BRANCH SPRING CREEK	TWP 27	Full		
L8477	St. Louis	Miller Crk & Lincoln Pk	W 10 ST	Full		
L8503	St. Louis	AMITY CREEK	E SKYLINE	Full		
L8505	St. Louis	AMITY CREEK	E SKYLINE	Full		
L8506	St. Louis	AMITY CREEK	E Skyline/MUN 712	Full		

Bridge Number	County	Feature Intersected	Facility Carried	Report Type	2015 Status Notes	Rehabilitation date
L8507	St. Louis	AMITY CREEK	E SKYLINE	Full		
L8515	St. Louis	TISCHERS CREEK	LEWIS ST	Full		
L8560	Ramsey	CHANNEL	PED-PHALEN PARK	Abridged	Recently rehabilitated	2012
L8789	Ramsey	S CHANNEL	PHALEN PK PED	Full		
L8803	Ramsey			Full		
L8849	Chippewa	CHIPPEWA RIVER BYPASS	MUN 99	Full		
L8850	Chippewa	CHIPPEWA RIVER BYPASS	MUN 99	Full		
L9327	Hennepin	BASSETT CREEK	THEO WIRTH PKWY	Full		
L9328	Hennepin	Como-Harriet Streetcar	WILLIAM BERRY PKWY	Full		
L9329	Hennepin	Como-Harriet Streetcar	WEST LAKE HARRIET	Full		
No MnDOT number	Winona	DAM	PED	Full		
No MnDOT number	Winona	WHITEWATER RIVER	PED	Full		
No MnDOT number	Washington	BROWN'S CREEK	MILITARY RD	Abridged	Privately owned bridge	
R0412	Wabasha	N BR ZUMBRO RIVER	PED	Full	Recently rehabilitated	2002
R0437	Pope	E BR CHIPPEWA RIVER	PED	Abridged	Recently rehabilitated	1998
R0657	Yellow Medicine	MINNESOTA RIVER	PED	Abridged	Preservation project under consideration	

Appendix D. Bridges Excluded from Study

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Appendix D

Bridges Excluded from Study

Bridge Number	County	2015 Status Notes	Management Plan or Report Needed?
07566	Blue Earth	Bridge removed and is in storage	No
4667	Redwood	Identified at the end of the project	Yes
L5730	Hennepin	Identified at the end of the project	Yes
L5731	Hennepin	Identified at the end of the project	Yes
L8882	Hennepin	Identified at the end of the project	Yes
L5765	Hennepin	Identified at the end of the project	Yes
L5732	Hennepin	Identified at the end of the project	Yes
93827	Hennepin	Identified at the end of the project	Yes
Shingle Creek Bridge (HE-MPC-1885)	Hennepin	Identified at the end of the project	Yes
4559	Hennepin	Identified at the end of the project	Yes
5584	Hennepin	Identified at the end of the project	Yes
Milwaukee Road Bridge (HE-MPC-1737)	Hennepin	Identified at the end of the project	Yes
93111	Hennepin	Identified at the end of the project	Yes
82524	Washington	Recently rehabilitated; Management Plan prepared in former location	TBD
90437	Hennepin	Midtown Greenway Bridges	No
90494	Hennepin	Midtown Greenway Bridges	No
90590	Hennepin	Midtown Greenway Bridges	No
92347	Hennepin	Midtown Greenway Bridges	No
92350	Hennepin	Midtown Greenway Bridges	No
L5893	Hennepin	Midtown Greenway Bridges	No
L8901	Hennepin	Midtown Greenway Bridges	No
L8902	Hennepin	Midtown Greenway Bridges	No
L8903	Hennepin	Midtown Greenway Bridges	No
L8904	Hennepin	Midtown Greenway Bridges	No
L8906	Hennepin	Midtown Greenway Bridges	No
L8907	Hennepin	Midtown Greenway Bridges	No
L8908	Hennepin	Midtown Greenway Bridges	No
L8909	Hennepin	Midtown Greenway Bridges	No
L8910	Hennepin	Midtown Greenway Bridges	No
L8911	Hennepin	Midtown Greenway Bridges	No
L8913	Hennepin	Midtown Greenway Bridges	No
L8914	Hennepin	Midtown Greenway Bridges	No
L8915	Hennepin	Midtown Greenway Bridges	No
L8916	Hennepin	Midtown Greenway Bridges	No

Bridge Number	County	2015 Status Notes	Management Plan or Report Needed?
L8917	Hennepin	Midtown Greenway Bridges	No
L8918	Hennepin	Midtown Greenway Bridges	No
L8919	Hennepin	Midtown Greenway Bridges	No
L8920	Hennepin	Midtown Greenway Bridges	No
L8921	Hennepin	Midtown Greenway Bridges	No
L8922	Hennepin	Midtown Greenway Bridges	No
L8923	Hennepin	Midtown Greenway Bridges	No
R0529	Mower	Recently rehabilitated; Management Plan prepared in former location	TBD
2628	Jackson	Bridge planned to be demolished (date TBD)	No