

Brownville Bridge  
Documentation for the Bridge Guardrail

Atchison County, Missouri

Route 136

MoDOT Job Number J1P2161

Report Preparers:  
Jane M. Lee and Randall D. Dawdy

Submitted to:

State Historic Preservation Office  
Missouri Department of Natural Resources

Prepared for:

The Federal Highway Administration  
In Compliance with Section 106 of the National Historic Preservation Act

Pete K. Rahn, Director  
Missouri Department of Transportation

August 2009

## Introduction

The Missouri Department of Transportation has proposed improvements to the Route 136 crossing of the Missouri River at Brownville through aggressive rehabilitation of the historic Brownville Bridge. These improvements include the replacement of the original steel guardrail with a concrete barrier curb, which will improve deck drainage and prolong the service life of the historic bridge. The Brownville Bridge improvements are funded as an American Recovery and Reinvestment Act (ARRA) project. Replacement of the original 1939 guardrail will have an adverse effect on the Brownville Bridge, a property listed on the National Register of Historic Places as part of a multiple property nomination for the Nebraska Historic Bridge Inventory covering *Highway Bridges in Nebraska 1870-1942*.

In consultation with the Missouri State Historic Preservation Office and the Nebraska State Historic Preservation Office, a Memorandum of Agreement (MOA) for the mitigation of the adverse effect was developed and executed on June 18, 2009. The MOA calls for documentation of the historic bridge's guardrail with archival photographs, and historic narrative. This documentation is submitted to fulfill the documentation requirements.

**Brownville Bridge**  
Bridge No. L - 98  
Route 136, Atchison County

Jane M. Lee, Historian  
August 2009

### **Historical Narrative**

The completion of the Missouri River Bridge between Phelps City, Missouri and Brownville, Nebraska in 1939 was the final realization of many years of efforts on both sides of the river. Prior to the bridge, the Missouri River was spanned by a ferry that had allegedly been in place since before the Civil War<sup>1</sup>. The towns of Brownville and Rock Port, Missouri prospered during the heyday of the steamboat era as people and goods were transported up and across the river during the settling of the Western United States<sup>2</sup>. However, the Missouri River was not any easy waterway to cross, and travel across the river via ferry could be unreliable during inclement weather and high water<sup>3</sup>. It is reported that between 1860 and 1880, over 400 riverboats were wrecked on the Missouri River<sup>4</sup>.

When the steamboat trade began to subside, and once Omaha was selected as the crossing point for the Union Pacific Railroad, Brownville suffered a lull in economic development<sup>5</sup>. Furthermore, unreliable travel on the ferry at Brownville also served as an impediment for the development of a transcontinental highway that would have spanned from Quincy, IL to the west coast. The terminus of the Golden Rod Highway (later U.S. Highway 136) was at Auburn—10 miles to the west of Brownville—which left Brownville just short of a direct connection with the fledgling highway.

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<sup>1</sup> Clayton B. Fraser, Missouri Historic Bridge Inventory, 5 Vols., Missouri Department of Transportation, Project No. NBIH(6), Fraserdesign, Inc., Loveland, Colorado, 1996, Atchison County, Brownville Bridge; National Park Service, National Register of Historic Places, Multiple Property Nomination Form, "Highway Bridges in Nebraska, 1870-1942", 1992, Section E, p. 31.; Nebraska Rural Web, "Steamboat Trace History" (Brownville, Nebraska: Brownville Mills, 2002), <http://www.brownvillermills-ne.com/village/trace/history.cfm> (accessed 3 August 2009).

<sup>2</sup> The Lincoln Sunday Star, "A Flourishing Fruit Industry Transforms Brownville, Nebraska's First Chartered Town." Lincoln, Nebraska, 9 November 1924.

<sup>3</sup> For example, the ferry at Brownville was unable to operate for 136 days during the winter of 1881 due to ice, and in 1937, flooding on the Missouri River caused the ferry to cease running. Nebraska State Journal, "Missouri Record Peak at Brownville." Lincoln, Nebraska, 25 June 1937, p1. Nebraska State Journal, "Sixty Years Ago Today." Lincoln, Nebraska, 31 March 1941, p.6.

<sup>4</sup> Nebraska Rural Web, "Steamboat Trace History."

<sup>5</sup> The Lincoln Sunday Star, "A Flourishing Fruit Industry Transforms Brownville, Nebraska's First Chartered Town"

Newspaper accounts from 1924 reported that Brownville was promised a transcontinental highway as long as a good ferry could be maintained at the site<sup>6</sup>. The citizens of Brownville and Auburn, Nebraska allied with the citizens of Rockport and Tarkio, Missouri in order to build landings on each side of the river and raise funds to grade a roadbed in the lowlands on the Missouri side of the crossing<sup>7</sup>. Although the ferry that crossed between Brownville and Rock Port was said to be state of the art, citizens on both sides of the river realized the substantial economic benefit that a bridge would reap for both communities.

As early as 1925, the citizens of Brownville began to boost for a bridge. At an annual meeting of the Southeastern Nebraska Press Club at Brownville in 1925, former Nebraska Governor (1913-1917), John Henry Morehead, publicly promoted local efforts to secure a bridge at Brownville<sup>8</sup>. Two years later, delegations from Auburn and Brownville promoted a bridge at a public meeting held in Rock Port regarding a newly proposed bridge bill. The “free bridge” bill would have appropriated five percent of the state gas tax for the construction of interstate bridges. Unfortunately for the promoters of the Brownville Bridge, the bridge bill was hotly contested in both the senate and the house, and ultimately underwent a number of transformations before its passage in late March.<sup>9</sup> There would be no funding for the proposed bridge at Brownville as a result of the bill’s passage.

Throughout the early-to-mid 1930s, the Great Depression effectively put a halt to any progress that had been made regarding the proposed bridge at Brownville. However, during the late 1930s, the programs of the New Deal provided a boon in bridge building across the country. The New Deal also provided the catalyst for the building of the Brownville Bridge. In 1938, members of the Atchison County Court submitted a request to the Public Works Administration (PWA) for a grant to help fund the construction of the Brownville Bridge. Included in this request were the plans for the bridge, which were drawn by the prestigious engineering firm of Ash, Howard, Needles and Tammen (AHNT) of Kansas City and New York City<sup>10</sup>. AHNT modeled the Brownville Bridge after a similar two-span, continuous truss bridge that the firm had built over the Missouri River at South Omaha between 1934 and 1935.

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<sup>6</sup> Lincoln State Journal, “New Ferry at Brownville.” Lincoln, Nebraska, 1 November 1924, p. 2.

<sup>7</sup> The Lincoln Sunday Star, “A Flourishing Fruit Industry Transforms Brownville, Nebraska’s First Chartered Town.” Lincoln, Nebraska, 9 November 1924.

<sup>8</sup> “Annual Press Club in Annual Meeting,” *The Lincoln Star* (Lincoln, Nebraska), 6 June 1925.

<sup>9</sup> “Many Attend Public Hearing on Bridge Bill,” *The Lincoln Star* (Lincoln, Nebraska), 21 February 1927; “Bridge Bill Passed 18-15,” *The Lincoln Star* (Lincoln, Nebraska), 30 March 1927; “Resist this Raid,” *The Lincoln Star* (Lincoln, Nebraska), 31 March 1927.

<sup>10</sup> During the 1940s, AHNT became known as HNTB. HNTB is still in operation, and still commonly designs plans for Missouri Department of Transportation projects throughout the state, <http://www.hntb.com/about-us/history>. Ash, Howard, Needles, and Tammen, “Missouri River Bridge, Atchison County, Missouri at Brownville, Nebr.” (bridge plans), Revised as Constructed, May 8, 1940, Missouri Highway and Transportation Department, Jefferson City.

However, the Brownville Bridge employed a number of construction methods and details that differed from the previous design, which were changed in order to improve aesthetics and reduce construction costs. Where AHNT was said to have employed a “hodge podge of deck trusses, girder spans and trestles” for the South Omaha approach spans, the Brownville Bridge design was greatly simplified with the use of only continuous deck girder approaches<sup>11</sup>.

In August of 1938, rumors that a PWA grant had been approved for the construction of a toll bridge between Rock Port and Brownville appeared in Missouri and Nebraska newspapers. Although rumors of the PWA grant were met with optimism and excitement by the citizens of Brownville, the citizens of Rulo, Nebraska were immediately alarmed by the news. Backers of a Missouri River bridge at Rulo feared that the PWA grant might preclude additional funds from being expended at their site. Although the fears of the Rulo Bridge proponents ultimately proved to be unfounded, a sense of competition between Rulo and Brownville persisted throughout the construction of both crossings.<sup>12</sup>

The front page of the August 26, 1938 edition of the Atchison County Mail proclaimed, “TO GET BRIDGE AT BROWNVILLE,” and it was officially announced that Atchison County, Missouri had secured a \$333,000 PWA grant to cover 45% of the construction costs. The remaining 55% of construction costs were the responsibility of the county, which planned a \$407,000 bond issue to cover the expense.<sup>13</sup> Additional funding would also be required for the construction of an embankment and long approach span on the Missouri side of the crossing. The Missouri approach had to be built three times as long as the Nebraska side in order to cross the low land in the Missouri River floodplain. Although the Brownville approach had to cross the Burlington Railroad tracks, the bluffs on the Nebraska side of the river served to make the approach significantly shorter.

On September 21, 1938 a special meeting of the Missouri Highway Commission was called in order to address the issue of funding for the Missouri embankment and approach to the Brownville Bridge. At this meeting, it was resolved that the Missouri Highway Commission would pay 55% of the contract price, not to exceed \$19,349.00, for the embankment and approach highway. The approach was described as being, “3,200 feet long, from the east abutment of said bridge to a connection with Missouri Highway No. 4, (Supplementary Route F) about two miles west of Phelps City, Missouri”<sup>14</sup>. The Commission would also provide an improved, bituminous surface for the gravel-surfaced

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<sup>11</sup> Clayton B. Fraser, Missouri Historic Bridge Inventory; National Park Service, National Register of Historic Places, Multiple Property Nomination Form, “Highway Bridges in Nebraska, 1870-1942”, 1992, Section E, p. 31.

<sup>12</sup> “Seek Missouri Bridge in Nebraska Section,” *Daily Capital News* (Jefferson City, MO), 23 August 1938.

<sup>13</sup> “To Get Bridge at Brownville,” *Atchison County Mail* (Rock Port, MO), 26 August 1938.

<sup>14</sup> “Matter of Construction of a Bridge Across the Missouri River Between Phelps City, Missouri and Brownville, Nebraska,” 21 September 1938, Minutes of Proceedings of the Missouri State Highway Commission, Secretary’s Office, Missouri State Highway Commission, Jefferson City.

Missouri Highway 4 from Highway 275 to its connection with the Brownville Bridge approach.

After the funding for the bridge construction was tentatively arranged, the Atchison County Court prepared to receive bids for the construction of the Brownville Bridge. November 14, 1938 proved to be an historic event for Atchison County since the Brownville Bridge contract was one of two very large contracts that were to be let that very same day. The combination of the Brownville Bridge project and a massive project by the Atchison-Holt Electric Cooperative to construct over 200 miles of rural electric lines were estimated to be worth over a million dollars. The front page of the Atchison County Mail reported:

Seldom, if ever, have there been two propositions of this magnitude let on the same day in Rock Port....Both projects have been attracting attention throughout this part of the country. Their letting will mean the immediate employment of many men, who will be busy for a number of months.<sup>15</sup>

Twelve contractors submitted bids for different aspects of the Brownville Bridge construction job. The letting event attracted so many bidders that the circuit room was reportedly filled to capacity for the reading of the bids. Of the twelve bidders, three were awarded contracts: C.F. Lytle Co. of Sioux City, Iowa bid \$241,997 for the bridge substructure; the Bethlehem Steel Co. of Pennsylvania bid \$287,547 for the bridge superstructure; and the C.W. Atkinson Co. of Saint Joseph, Missouri bid \$61,777.50 for the bridge approaches. The bids totaled \$591,321.50.<sup>16</sup>

The County Clerk, J.J. Wright, and presiding Atchison County Judge, Ray Richards, met no delay with the signing of the contracts, and bonds totaling \$350,000 were immediately lithographed and registered. The bonds were to be delivered to the brokerage firm of Stifel, Nicolaus & Co. of St. Louis (Chicago Branch) by December of 1938, and the brokerage was expected to immediately remit \$333,250 to the Atchison County Court.<sup>17</sup> Since the bond issue did not cover the full \$350,000 that was needed to meet the PWA offer, an Atchison County delegation requested that the Missouri Highway Commission guarantee the balance of the necessary funds, totaling \$32,500. The Commission unanimously approved this request with the condition that the actual payment of the funds could not occur earlier than February 1, 1939.<sup>18</sup> In the meantime, a group of private individuals made donations to the bridge effort, which equaled \$17,000. Once the Highway Commission forwarded the promised amount to Atchison County, the private

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<sup>15</sup> "Let Two Big Jobs Here on Monday" *The Atchison County Mail*, 11 November 1938.

<sup>16</sup> *Ibid.*

<sup>17</sup> *Ibid.*

<sup>18</sup> Minutes of Proceedings of the Missouri State Highway Commission, Secretary's Office, Missouri State Highway Commission, Jefferson City, "Matter of Construction of a Bridge Across the Missouri River Between Phelps City, Missouri and Brownville, Nebraska," 22 October 1938.

contributors were refunded the full amount of their donations.<sup>19</sup> Therefore, the financing for the Brownville Bridge was finally secured in November of 1939. Ultimately, the funding for the bridge was provided by a combination of the Missouri Highway Commission's offer to guarantee \$32,500 and to cover 55% of the bridge embankment and approach costs, plus the PWA grant for \$333,000, and the sale of \$333,250 in bonds by the Atchison County Court.

Construction on the Brownville Bridge began less than a month after the letting of the construction contracts. An engineer from the PWA, Elsvon A. Lotz, arrived in Rockport to oversee the building of the new bridge during early December, 1938. In an interview with the Atchison County Mail, Lotz stated:

It will be my duty...to see that the new bridge is built in accordance with the high standard embodied in the plans and specifications. I will see to it that the quantity and quality of materials being used meet requirements, that workmen are paid in accordance with established wage scales and that they are adequately protected against accident as prescribed by PWA regulations.<sup>20</sup>

The weather was ideal for the start of bridge construction operations, with temperatures that averaged above normal for the early winter season. C.F. Lytle and Co. moved their construction equipment to the site and began sinking the steel casons for the pier at the Missouri bank of the river during early January.<sup>21</sup> The general outlook for the construction timetable was optimistic until mid-January, when temperatures began to sink and the snow began to fall. On Tuesday, January 17, 1939, an ice jam backed up the waters of the Missouri River just below Brownville. Construction equipment on the bank of the river was submerged, a road leading from the high bank of the river to the water's edge was submerged, electrical equipment was damaged and work on the bridge piers was forced to halt.<sup>22</sup> Although the river was still high the following week, workers began to build a new road to the river's edge in order to begin working again. The schedule for the completion of the bridge piers was forced back from early April to late spring, but hopes were still high that the completion of the bridge could be achieved by the PWA's January, 1940 deadline.<sup>23</sup>

The construction of the bridge did not resume until mid-February on account of the ice jam on the Missouri River. Once construction activity began again, low temperatures posed complications for mixing and pouring the concrete for the first bridge pier and heavy tarps were used to protect the freshly poured concrete from freezing. Regardless of

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<sup>19</sup> "Contributors to Brownville Bridge Being Repaid Donations of \$17,000" The Atchison County Mail, 9 June 1939.

<sup>20</sup> "PWA Engineer is Here for Bridge" Atchison County Mail, 2 December 1938.

<sup>21</sup> "Pay Roll of \$1,500 a Week," Atchison County Mail, 20 January 1939.

<sup>22</sup> *Ibid.*, "Threat to Bridge Equipment," 20 January 1939.

<sup>23</sup> *Ibid.*, "River is Still High," 27 January 1939.

the frigid weather, crews worked day and night to drive steel pilings for the bridge piers.<sup>24</sup> Unfortunately, the weather would not be the only problem that would be encountered during construction.

On February 24, 1939, the Atchison County Mail reported the news of four men that had been seriously injured in two separate incidents at the bridge site. Two men were badly burned during a gasoline explosion, while two other men were partially buried when a sand pile collapsed as they were shoveling. One of the men that were badly injured during the sand pile collapse died nearly eight months later as a result of his injuries.<sup>25</sup> Additionally, the two men who were burned during the gas explosion incident each filed lawsuits against the construction contractor, C.W. Lytle and Co. The lawsuit claimed that the contractor had negligently operated a stove concealed from view, which ignited the gasoline that burned the men.<sup>26</sup>

Notwithstanding the rocky events during the winter of 1938-39, momentum was regained on the bridge project the following spring. A short delay in the construction of the bridge substructure due to high water in mid-June was the only obstacle in the way of the preparations for the steel work on the bridge. Later that month, the Bethlehem Steel Co. was able to commence their work on the Nebraska side of the river.<sup>27</sup> Once the steel work began, large crowds of spectators would regularly gather at Rock Port to watch as the girders creep closer and closer toward the Missouri side of the river.<sup>28</sup> Articles relaying the construction progress ran in nearly every edition of Rockport's newspaper, which also regularly featured photos of the bridge as the piers and superstructure were being built. One such article detailed the innovative design of the Brownville Bridge piers:

These piers are sunk about 80 feet to bedrock. They are constructed by the driving of sheet piling, which creates the forms for the concrete structure of these big supports of the steel. Placing the piers was done by a method never before used on a Missouri river bridge, as no air-chambers were used in which sand-hogs work under high pressure. Instead, after the sheet piling was driven to bedrock, the concrete was lowered to the bottom of the piling in a closed bucket, which dumped each load, slowly bringing the concrete to the top of the steel piling.<sup>29</sup>

Rock Port reaped enormous economic benefit from the flurry of construction activity on the Missouri side of the Brownville Bridge. The scale of wages for the bridge laborers

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<sup>24</sup> Ibid., "Pour Concrete for Pier," 24 February 1939.

<sup>25</sup> Ibid., "Bridge Worker Dies," 6 October 1939.

<sup>26</sup> Ibid., "Two Suits Filed for \$25,000 Each," 28 April, 1939.

<sup>27</sup> Ibid., "Speed Bridge Operations," 2 June 1939; "Prepare for Steel Work," 30 June 1939.

<sup>28</sup> Ibid., "Crowds Watch Bridge Work," 30 June 1939.

<sup>29</sup> Ibid., "Style of Pier Construction on Brownville Bridge," 21 July 1939.

was reported to be “liberal” and the weekly bridge payroll was estimated to amount to \$6,000.<sup>30</sup> The influx of laborers to the town brought about an extraordinary demand for housing, which was further intensified when the Highway Department solicited for bids for improvements to Highway 4 from its junction with Highway 275 to the Brownville bridge approach. Smaller contracts for additional work on the bridge, including lighting and the construction of the bridge tollhouse, brought even more workers to the Rock Port area.<sup>31</sup>

The October 20, 1938 edition of the Atchison County Mail reported that the last piece of steel had been hoisted into place earlier that week at nearly the same time that the paving was finished on the Missouri approach to the bridge. The following week, Jack Voline, publisher of the Auburn Herald in Nebraska, sent a note to the Atchison County Mail that read simply, “I just walked across the bridge at Brownville. Come over and see me.”<sup>32</sup> By November, speculation on the date of the bridge dedication ceremony spread throughout Atchison and Nemaha Counties. Both sides were eager to hold the ceremony in advance of the festivities that were planned for the opening of the nearby Rulo Bridge on December 15, 1939. At a meeting between representatives of both Missouri and Nebraska on November 24, 1939, it was decided that the dedication of the bridge should be scheduled for the 11<sup>th</sup> of December, just days before the Rulo Bridge opening. It was planned that the bridge would be operated toll-free between the time of the dedication and 6:00 that evening in order to let residents from both sides of the Missouri to cross the bridge.<sup>33</sup>

Thousands of people gathered on both sides of the river to view the dedication of the Brownville Bridge. A festival-like atmosphere marked the occasion, which included local band performances, numerous speeches by local officials, the firing of Brownville’s historic Civil War cannon and the introduction of “queens” from both states.<sup>34</sup> After the close of the dedication ceremony, it was reported that 162 tolls were paid during the first 24 hours of the bridge’s operation.<sup>35</sup> Initially, the toll charge was 50 cents per car and 60 cents per round-trip toll ticket.

Paying for the Brownville Bridge proved to be much more troublesome than had originally been anticipated.<sup>36</sup> The tolls for the bridge proved insufficient to cover the cost

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<sup>30</sup> Ibid., “Big Returns to Local Merchants From Weekly Bridge Pay Roll of \$6,000,” 16 June 1939.

<sup>31</sup> Ibid., “5.883-Mile All Weather Road,” 25 August 1939; “To Let Bridge Lighting Job,” 15 September 1939; “Start Bridge Toll House,” 10 November 1939; “More Bridge Contracts” 17 November 1939.

<sup>32</sup> Ibid., “He Crossed New Bridge” 27 October 1939.

<sup>33</sup> Ibid., “Bridge Dedication Monday, Dec. 11<sup>th</sup>,” 24 November 1939; “Dedication Plans Proceed,” 1 December 1939; “Brownville Bridge,” 8 December 1939.

<sup>34</sup> Ibid., “Huge Throng at Bridge Dedication,”

<sup>35</sup> Ibid., “162 Tolls Are Paid During the First 24 Hours,” 15 December 1939.

<sup>36</sup> “Brownville Bridge Had Precarious Past,” The Hamburg Reporter (Hamburg, Iowa), 1 May 1969.

of both maintenance and the repayment of the bridge bonds. Unfortunately, a number of factors worked against the toll bridge. First, the volume of traffic across the bridge was not particularly high, which was decreased further with the economic stresses that were brought about during World War II. Also, the condition of Highway 4 leading from Rock Port to the bridge was frequently problematic, which often discouraged bridge traffic.<sup>37</sup> Finally, the flood of 1952 cut away part of the highway and levy on the Missouri side of the bridge, which forced the bridge to close until the route could be repaired.<sup>38</sup> The financial problems surrounding the bridge resulted in a lack of general maintenance as well. In 1945, an inspection of the Brownville Bridge by the Nebraska Department of Roads and Irrigation reported that the bridge was in "excellent" condition. However, the same inspection reported that concrete in the piers was cracking and in need of immediate repair.<sup>39</sup>

As the economy began to rebound and repairs were made to Highway 136 (formerly Highway 4), traffic on the bridge began to steadily increase. Despite nearly 30 years of financial difficulty, the Brownville Bridge finally became toll-free on April 28, 1969.<sup>40</sup> As a condition of the contract that would transfer the bridge from Atchison County to the hands of the Missouri State Highway Commission, a number of remedial repairs to the bridge were required. Once the Atchison County Court let contracts for the requested repairs, the Missouri Highway Commission assumed responsibility for the bridge's future maintenance. In an agreement with the State of Nebraska, the Missouri State Highway Commission assumed the maintenance responsibility for the full length of the bridge, of which Nebraska would reimburse 40% of the cost to cover the expense of the portion of the bridge that is located in the state of Nebraska.<sup>41</sup> The Brownville Bridge is still in operation today.

## Physical Description

**General:** Bridge No. L0098 carries two lanes of US Route 136 over the Missouri River and the Steamboat Trace Trail at Brownville, Nebraska. The Brownville Bridge is a two-span steel rigid-connected continuous through truss with two steel plate girder approach spans at the east end and six of the same at the west end. The superstructure is carried on concrete abutments and wingwalls, and nine reinforced concrete spill-through piers. The

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<sup>37</sup> Minutes of Proceedings of the Missouri State Highway Commission, "Improvement of Route 4 to the Brownville Bridge" 8-9 June 1951; "Delegation from Atchison County Requesting a Higher Type Road from Rock Port, Missouri, to the Brownville Bridge, on Route 4," 9-10 July 1956.

<sup>38</sup> Minutes of Proceedings of the Missouri State Highway Commission, "Route 4, Section 1, Atchison County - 0.7 miles, 20' P.C.C.," 11-12 August 1952.

<sup>39</sup> Henry G. Schlitt, "Missouri River Bridges, Report #2," 7 November 1945, located in Bridge Department Files, Nebraska Department of Roads

<sup>40</sup> "Brownville Bridge Had Precarious Past," The Hamburg Reporter, 1 May 1969.

<sup>41</sup> Minutes of Proceedings of the Missouri State Highway Commission, "Authorization for Execution of Agreements, Brownville Bridge, U.S. Route 136, Atchison County," 9-10 April 1969; "Status of Contracts for Taking Over Brownville and Rulo Bridges by the State of Missouri and Nebraska," 15-16 May 1969.

total length of the structure is 1,904 feet from center-to-center of abutment bearings, and the roadway width is 22 feet 7 inches curb to curb. Original construction was completed in 1939 at a cost of \$708, 878.54 and based on design plans by Ash, Howard, Needles, and Tammen of Kansas City, Missouri.<sup>42</sup>

The top chord of the main span is composed of two channels with a solid top cover plate and a vented bottom cover plate. The bottom chord is similar to the top chord, except the bottom chord contains vented cover plates on both the top and bottom. The vertical web members are rolled, wide flange I-beams, and the diagonal members consist of vented channels on the top and bottom with solid cover plates on the sides. The central vertical member consists of two channels with continuous cover plates, and the adjacent central diagonals are reinforced with small angles and wide cover plates riveted to the tops and bottoms of each member. Polygonal gusset plates reinforce the connection of the vertical and diagonal members along the bottom chord. Top lateral bracing and struts consist of wide flange I-beams, and sway bracing and portal bracing are composed of I-beams with cover plates at the connections. Bottom laterals are cross-braced back-to-back angles, and floor beams are massive wide flange I-beams.

The approach spans are composed of massive steel plate girders on the outside, with two lines of steel I-beam deck stringers on the inside. Steel I-beams, double angle struts, and cross-braced angles provide strength and rigidity under the deck. The plate girders are flat vertical plates with flanges, which are comprised of built up angles and cover plates on both the top and bottom edges. Vertical angles riveted along the outside provide additional stability.

**Guardrails:** Each edge of the concrete deck has a raised steel curb and steel rail, which are supported by steel posts attached directly to the steel superstructure. On the main through truss span, the railing is attached by means of rectangular steel curb support brackets, which are riveted directly to the ends of the steel I-beams that support the concrete deck slab. On the steel plate girder approach spans, the steel curb support brackets are riveted to triangular knee braces that are cantilevered outward from the outsides of the outer plate (fascia) girders. At the ends of the bridge, the guardrails terminate within three inches of four massive concrete end posts. The guardrails are not attached to the end posts.

The railing is a steel balustrade and curb with vertical I-beam posts. The horizontal handrails, traffic rails, and curbs are comprised of steel channel, angle, and tee stock. Rows of vertical steel spindle bars are spaced evenly between the traffic rails. The railing on both the north and south side extends the complete length of the bridge, which is 1,904 feet, and will be replaced with concrete safety barriers by the current highway project.

The top horizontal handrail is 6" x 3½" steel angle riveted to 6" steel I-beam vertical posts spaced at intervals of 9'6" along the bridge. Two horizontal courses of traffic railing are spaced 21' apart and consist of 4" x 2½" steel tee. Vertical ½" steel spindle

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<sup>42</sup> Ash, Howard, Needles, and Tammen, "Missouri River Bridge, Atchison County, Missouri at Brownville, Nebr."

bars are welded between the traffic rails at intervals of approximately 11". The bases of the vertical posts are riveted to 22" rectangular steel curb support brackets, which also support the 18" steel channel that comprises the brush curb and walkway.

**Pier 7:** One of six similar land-based piers, Pier 7 is the third pier from the western end of the bridge, and will be replaced in kind by the current highway project. It is a steel reinforced concrete spill-through pier with an arched spill opening and battered outer faces. It measures approximately 43 feet from the base of the buried concrete footing to the top of the pier cap at the bearing plate. The batter ratio is 1:24 from the top of the buried footing to the bearing plate, where the pier cap measures 24 feet in width. The footing is supported by two rows of ten battered steel piles that are driven to bedrock.

**Brownville Bridge over the Missouri River (Bridge No. L0098)  
Route 136, Atchison County, Missouri**

Photographer: Shaun Schmitz, Missouri Department of Transportation

Date: July 27, 2009

Location of Negatives: Digital Images Provided to  
Missouri State Historic Preservation Office

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- #34 of 34. Bridge L0098. East approach. View to west.

### **Photographic Methods and Processing:**

The archival photographs were taken and processed according to the standards for photographs accompanying NRHP documentation. (NPS 2008). Shaun Schmitz, a MoDOT photographer, took the photographs on July 27, 2009 using a digital single lens reflex camera. Images were captured in a raw (nef) format, which was manipulated for light contrast before being converted to a tagged image file format (.tiff) and printed. Images were numbered according to the NRHP Photographic Imaging Policy (NPS 2008) and burned onto a compact disc, which was provided to the SHPO along with this report.

Prints were made on Epson Premium Glossy Photo Paper and used Epson Matte Black UltraChrome K3 Ink, both identified as “best” practices by the NRHP photo policy, and which Epson identifies as having an 85-year permanence under glass. (NHRP 2009, Epson 2009). Kept

in archival conditions the materials will exceed the 75 year permanence standard for the NRHP, which is the standard being used for this project. A copy of the Epson rating is attached.

The .tiff images were burned onto a Delkin Archival Gold compact disc, and provided to the SHPO in that format as well. In addition, a copy of the .tiff file will be maintained by MoDOT in the historic preservation section.

Permanence rating for Epson prints framed under glass

MEDIA	6-Color Photo Dye Inks		DURABrite® Ink	PictureMate™ Ink	UltraChrome™ Ink	UltraChrome Hi-Gloss™ Inks
	Epson Stylus Photo 825/925/960/1280	Epson Stylus Photo R200/R300/R320/RX500/RX600	Epson Stylus C64/C66/C84/C86/CX4600/CX6400/CX6600	PictureMate Personal Photo Lab	Epson Stylus Photo 2200	Epson Stylus Photo R1800/R800
<b>EPSON PREMIUM PHOTO PAPERS</b>						
Premium Glossy Photo Paper		23 years			85 years	104 years
Premium Luster Photo Paper – Cut Sheet		22 years			71 years	64 years
Premium Semigloss Photo Paper		22 years			77 years	In progress
<b>EPSON MATTE PAPERS</b>						
Double-Sided Matte Paper	15 years					
Enhanced Matte Paper			71 years		76 years	110 years
Matte Paper Heavyweight	18 years	30 years	105 years			Over 150 years
Photo Quality Ink Jet Paper		8 years				In progress
PremierArt™ Matte Scrapbook Photo Paper for Epson			94 years		108 years	In progress
Premium Bright White Paper		5 years	74 years			In progress
<b>EPSON FINE ART PAPERS</b>						
UltraSmooth Fine Art Paper					108 years	
Epson Velvet Fine Art Paper					61 years	
Watercolor Paper Radiant White					92 years	
PremierArt Water-Resistant Canvas for Epson					75 years	
<b>EPSON GLOSSY PAPERS</b>						
ColorLife™ Photo Paper	27 years	36 years				
DURABrite Ink Glossy Photo Paper			55 years			
PictureMate Photo Paper				104 years		
Semigloss Scrapbook Photo Paper	27 years	36 years				

\* Lightfastness ratings are based on accelerated testing of prints on specialty media displayed indoors, under glass. Actual print stability will vary according to media, printed image, display conditions, light intensity and atmospheric conditions. Lightfastness ratings do not measure paper deterioration, such as yellowing. Epson does not guarantee the longevity of prints. For maximum print life display all prints under glass or lamination or properly store them. Ratings based on testing conducted by Epson and Wilhelm Imaging Research [www.wilhelm-research.com](http://www.wilhelm-research.com)

\*\*Testing currently in progress. Projected time estimated on current progress of test.

As with traditional photos, proper care will maximize display life. For indoor display, Epson recommends that prints be framed under glass or in a protective plastic sleeve to protect the prints from atmospheric contaminants like humidity, cigarette smoke, and high levels of ozone. And, as with all photographs, the prints should be kept out of direct sunlight. For proper storage, Epson recommends that your prints be stored in a photo album (or plastic photo storage box or museum storage box) in acid free, archival sleeves commonly available from most camera shops and other retailers. By taking these steps to protect prints from direct sunlight and contaminants, you can preserve your photos for many years.



#1 of 34. Bridge L0098. Profile, Spans 3 and 4. View to north.



#2 of 34. Bridge L0098. Profile at Pier 3. View to north.



#3 of 34. Bridge L0098. West approach spans. View to southeast.



#4 of 34. Bridge L0098. Southwest end post. View to east.



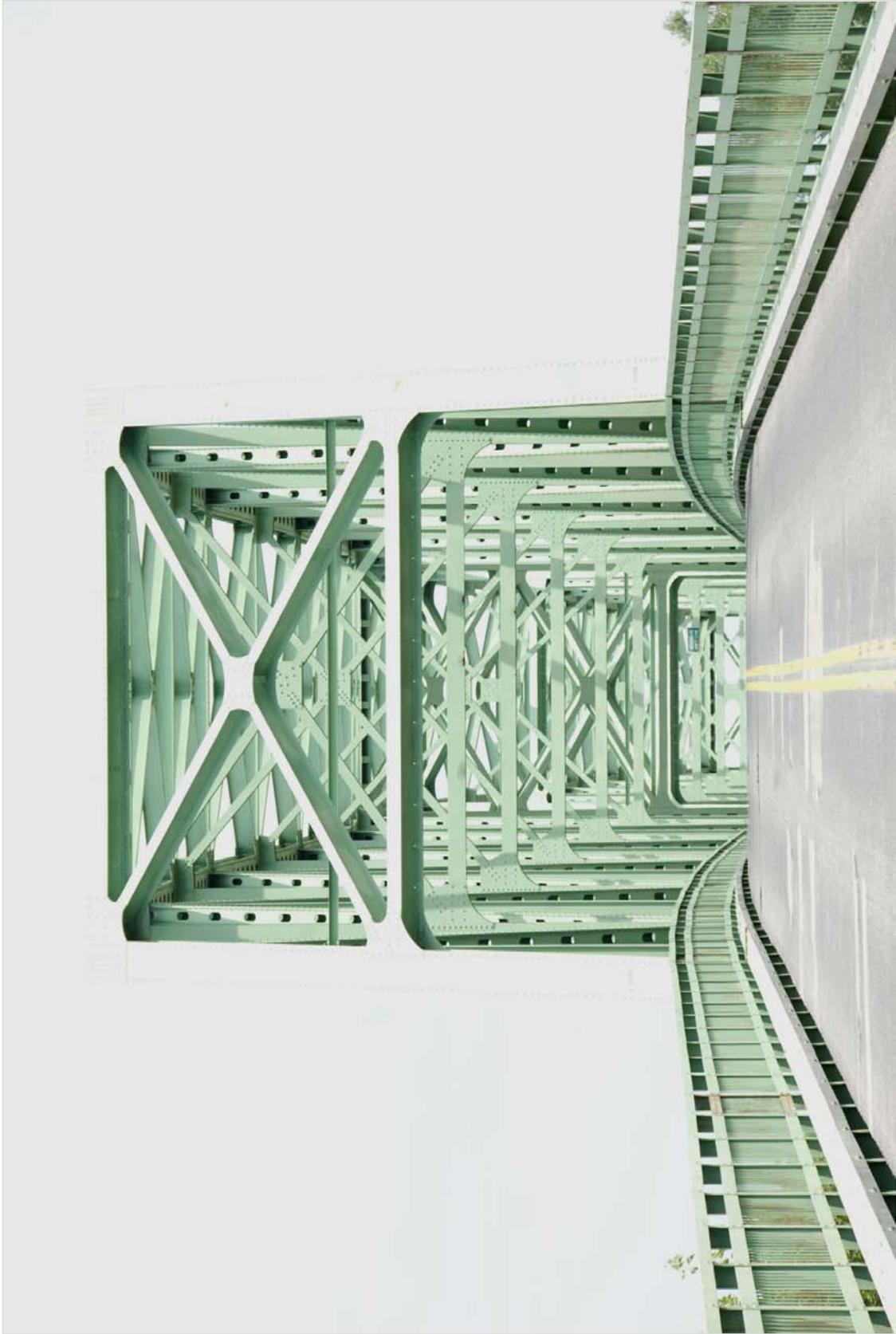
#5 of 34. Bridge L0098. Nameplates, southwest end post. View to east.



#6 of 34. Bridge L0098. Northwest end post. View to northeast.



#7 of 34. Bridge L0098. West approach. View to east.



#8 of 34. Bridge L0098. West portal. View to east.



#9 of 34. Bridge L0098. North guardrail over Pier 2. View to north.



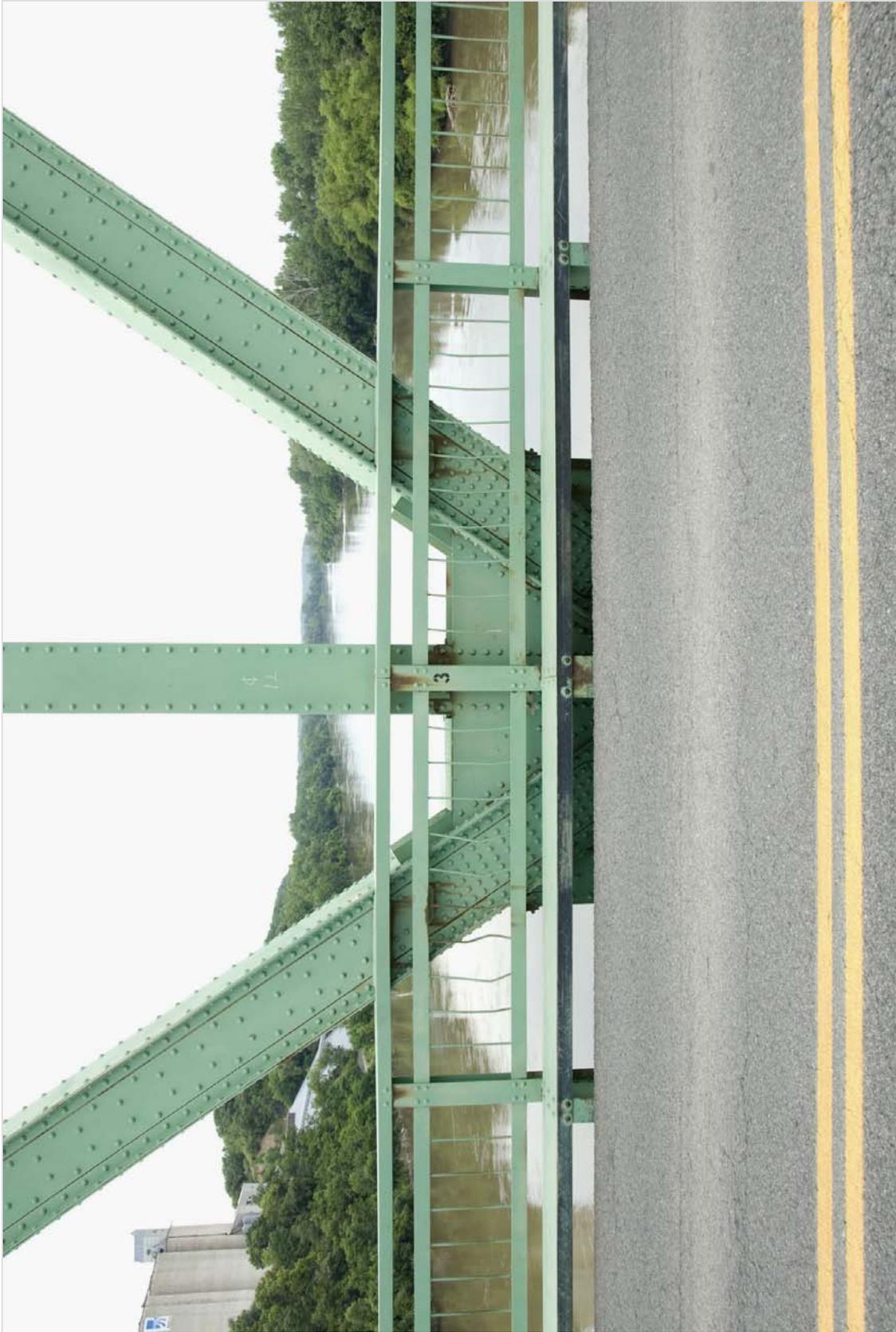
#10 of 34. Bridge L0098. North guardrail, Span 3 center. View to north.



#11 of 34. Bridge L0098. Detail, Span 3 center. View to north.



#12 of 34. Bridge L0098. Detail at vertical member. View to north.



#13 of 34. Bridge L0098. North guardrail, bridge center. View to north.



#14 of 34. Bridge L0098. North guardrail over Pier 3. View to north.



#15 of 34. Bridge L0098. Missouri State Line. View to east.



#16 of 34. Bridge L0098. North guardrail. View to northwest.



#17 of 34. Bridge L0098. Nebraska State Line. View to west.



#18 of 34. Bridge L0098. South guardrail. View to south.



#19 of 34. Bridge L0098. Typical section, north guardrail. View to north.



#20 of 34. Bridge L0098. North guardrail over Pier 4. View to north.



#21 of 34. Bridge L0098. Subdeck, Spans 6 and 7. View to west.



#22 of 34. Bridge L0098. Spans 4, 5, and 6. View to southwest.



#23 of 34. Bridge L0098. Pier 7. View to east.



#24 of 34. Bridge L0098. Pier 7. View to southeast.



#25 of 34. Bridge L0098. East approach spans. View to northwest.



#26 of 34. Bridge L0098. South guardrail, Span 10. View to northwest.



#27 of 34. Bridge L0098. South guardrail at east abutment. View to northeast.



#28 of 34. Bridge L0098. Span 10 at east abutment. View to north.



#29 of 34. Bridge L0098. Guardrail at northeast end post. View to southeast.



#30 of 34. Bridge L0098. Northeast end post. View to north.



#31 of 34. Bridge L0098. Bridge number, east portal. View to west.



#32 of 34. Bridge L0098. East portal. View to west.



#33 of 34. Bridge L0098. East approach. View to west.



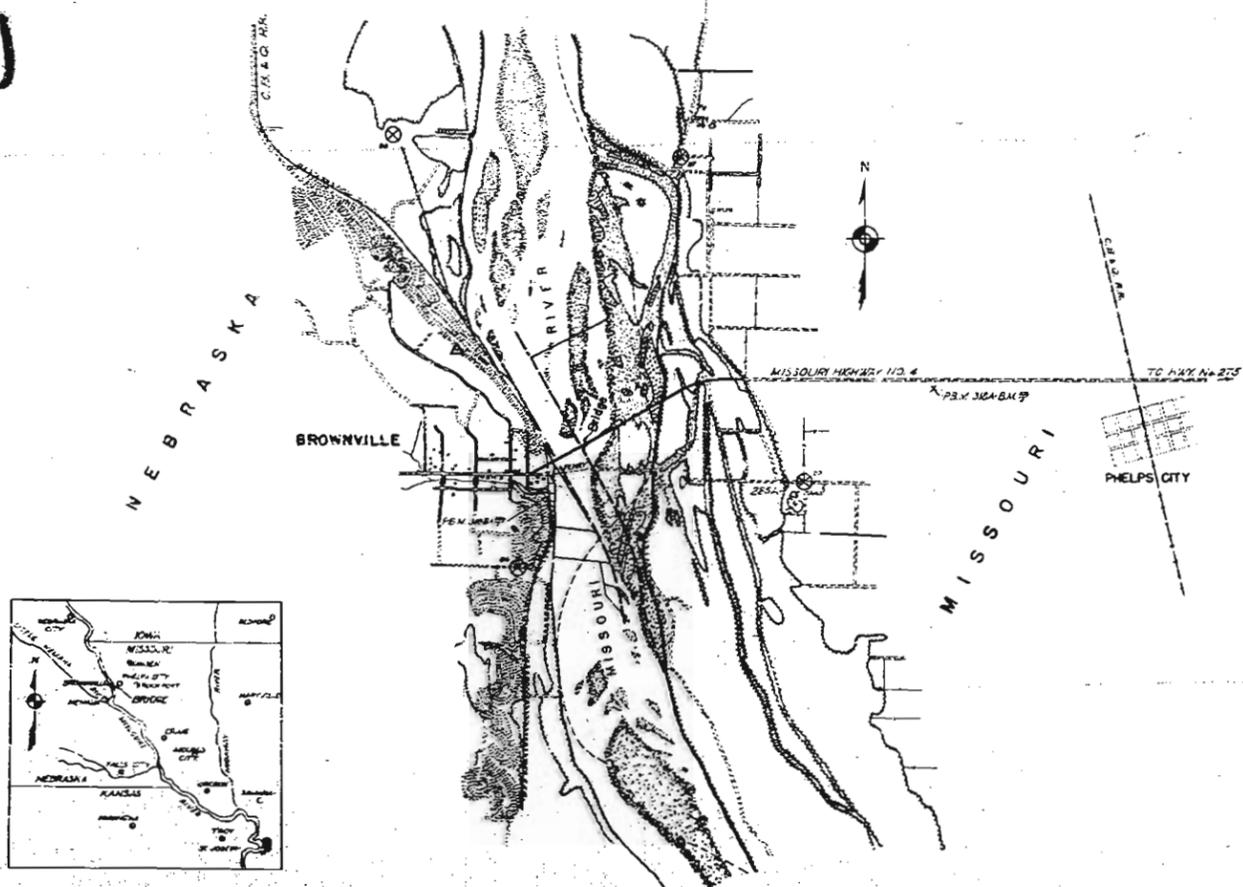
#34 of 34. Bridge L0098. East approach. View to west.

P.W.A. DOCKET, MO.NO.1099-F

# MISSOURI RIVER BRIDGE ATCHISON COUNTY, MISSOURI AT BROWNVILLE, NEBR.

ROLL # 620  
7702

ROLL # 620  
7702

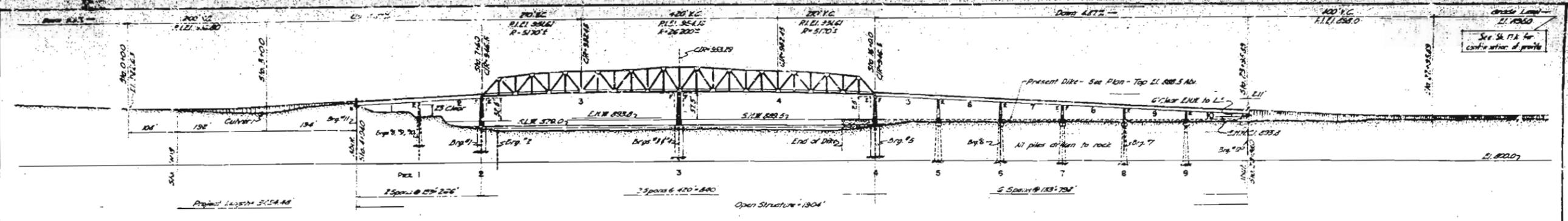


### LIST OF DRAWINGS

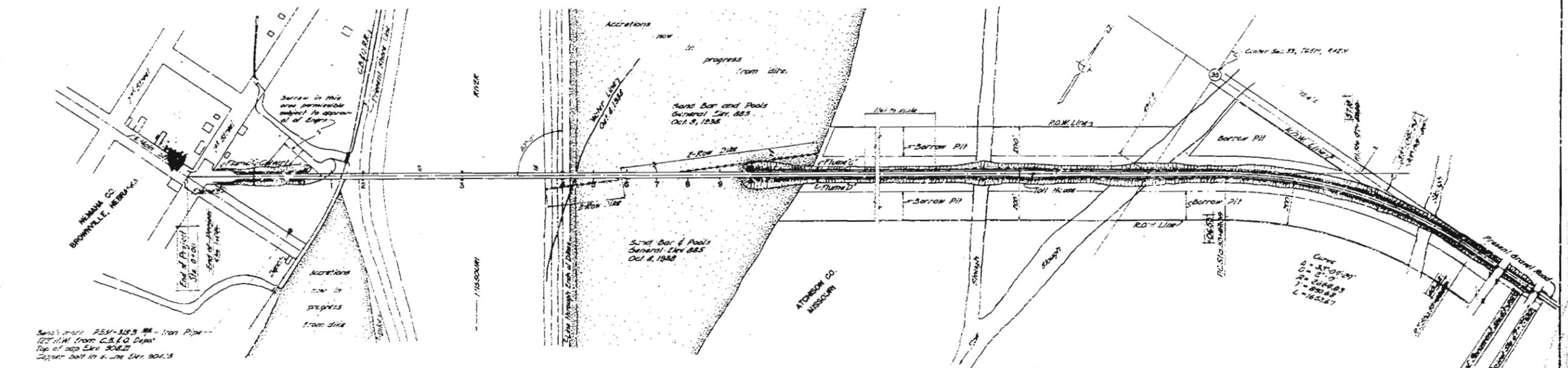
- 1 & 1A GENERAL PLAN AND ELEVATION *\*(1A includes Lighting)*
- 2, 4, 4A, 5, 5A TRUSS SPAN PIERS
- 3, 5A, 5B GIRDER SPAN PIERS
- 6 ABUTMENTS
- 7 SHOES
- 8 TO 12 TRUSS SPANS, SUPERSTRUCTURE
- 14, 15 GIRDER SPANS, SUPERSTRUCTURE
- 16 EXPANSION JOINTS, HANDRAILS, ETC.
- 17, 17A, 18, 18A APPROACH HIGHWAYS
- 19 TOLL HOUSE
- 20 EMBANKMENT PROTECTION
- 21, 22 NAME PLATES
- 23 FENDER DETAILS
- 24 ROADWAY LIGHTS ETC. AT TOLL HOUSE
- 25 PLAN AT BROWNVILLE BRIDGE PLAZA
- 26 PROFILE AT BROWNVILLE BRIDGE PLAZA
- 27 MISC. DETAILS AT BROWNVILLE PLAZA
- 28 TYPICAL LIGHTING DETAILS
- 29 BRIDGE CLEARANCE GAGE
- 30, 31 MAINTENANCE, STORAGE AND GARAGE BLDG.
- 32 RIPRAP NEAR EAST ABUTMENT
- 33 RIVER STAGES

ASH-HOJARD-NEEDLES & TAMMEN  
CONSULTING ENGINEERS  
KANSAS CITY NEW YORK

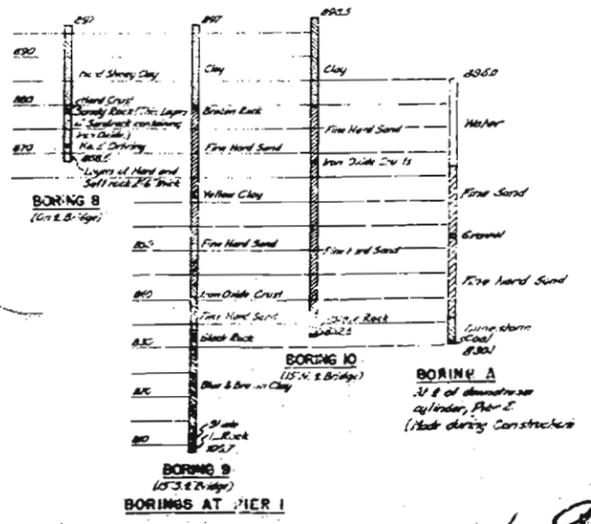
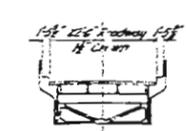
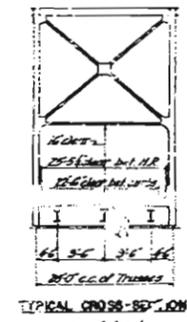
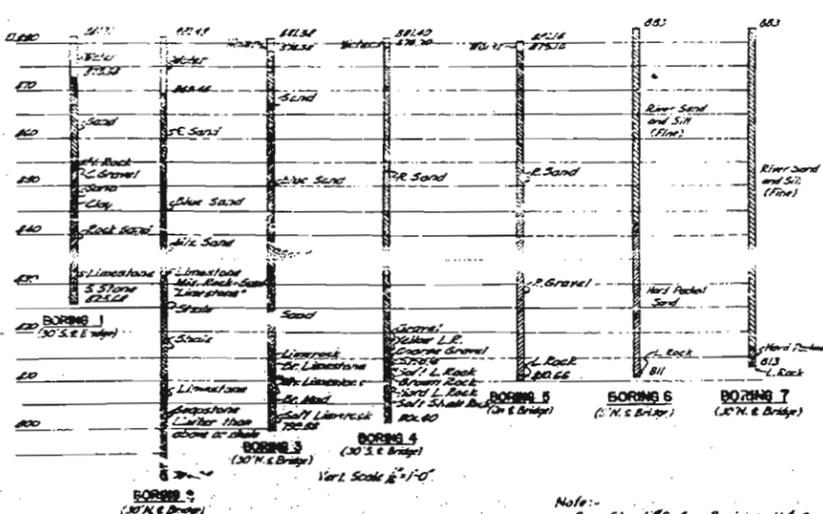
L-98



ELEVATION  
1"=100'



PLAN  
1"=200'



Terminated Sand Starts are established on Sh. 3.

Note: Notes, dimensions, etc. enclosed here are as finally constructed.

MISSOURI RIVER BRIDGE  
ATCHISON COUNTY, MISSOURI  
AT BROWNVILLE, NEBR.  
GENERAL PLAN AND ELEVATION

Note: This Structure is designed for H20 Truck Loading. See Sheet 10.

Note: See Sheet 45 for Borings 11 & 12.

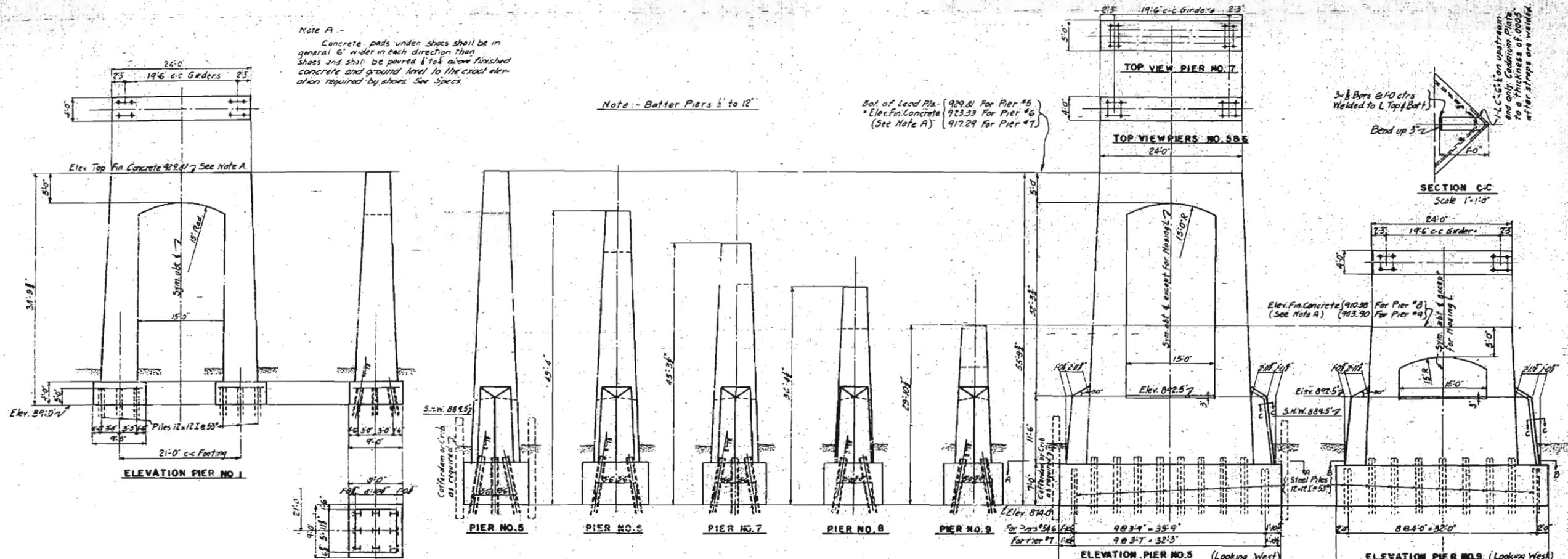
L-98

Note A -

Concrete pads under shoes shall be in general 6' wider in each direction than shoes and shall be poured to & above finished concrete and ground level to the exact elevation required by shoes. See Specs.

Note - Batter Piers 5 to 12

Vol. of Lead Pls. (929.81 For Pier #5  
Elev. Fin. Concrete 923.33 For Pier #6  
(See Note A) 917.29 For Pier #7)



DATA FOR PILES AS CONSTRUCTED

Pier	PIER 1				PIER 5				PIER 6				PIER 7				PIER 8				PIER 9			
	Depth	Location	Cap Elev.	Bottom Elev.	Depth	Location	Cap Elev.	Bottom Elev.	Depth	Location	Cap Elev.	Bottom Elev.	Depth	Location	Cap Elev.	Bottom Elev.	Depth	Location	Cap Elev.	Bottom Elev.	Depth	Location	Cap Elev.	Bottom Elev.
1	10.0	11.0	11.0	11.0	10.0	11.0	11.0	11.0	10.0	11.0	11.0	11.0	10.0	11.0	11.0	11.0	10.0	11.0	11.0	11.0	10.0	11.0	11.0	11.0
2	10.0	11.0	11.0	11.0	10.0	11.0	11.0	11.0	10.0	11.0	11.0	11.0	10.0	11.0	11.0	11.0	10.0	11.0	11.0	11.0	10.0	11.0	11.0	11.0
3	10.0	11.0	11.0	11.0	10.0	11.0	11.0	11.0	10.0	11.0	11.0	11.0	10.0	11.0	11.0	11.0	10.0	11.0	11.0	11.0	10.0	11.0	11.0	11.0
4	10.0	11.0	11.0	11.0	10.0	11.0	11.0	11.0	10.0	11.0	11.0	11.0	10.0	11.0	11.0	11.0	10.0	11.0	11.0	11.0	10.0	11.0	11.0	11.0
5	10.0	11.0	11.0	11.0	10.0	11.0	11.0	11.0	10.0	11.0	11.0	11.0	10.0	11.0	11.0	11.0	10.0	11.0	11.0	11.0	10.0	11.0	11.0	11.0
6	10.0	11.0	11.0	11.0	10.0	11.0	11.0	11.0	10.0	11.0	11.0	11.0	10.0	11.0	11.0	11.0	10.0	11.0	11.0	11.0	10.0	11.0	11.0	11.0
7	10.0	11.0	11.0	11.0	10.0	11.0	11.0	11.0	10.0	11.0	11.0	11.0	10.0	11.0	11.0	11.0	10.0	11.0	11.0	11.0	10.0	11.0	11.0	11.0
8	10.0	11.0	11.0	11.0	10.0	11.0	11.0	11.0	10.0	11.0	11.0	11.0	10.0	11.0	11.0	11.0	10.0	11.0	11.0	11.0	10.0	11.0	11.0	11.0
9	10.0	11.0	11.0	11.0	10.0	11.0	11.0	11.0	10.0	11.0	11.0	11.0	10.0	11.0	11.0	11.0	10.0	11.0	11.0	11.0	10.0	11.0	11.0	11.0
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19	10.0	11.0	11.0	11.0	10.0	11.0	11.0	11.0	10.0	11.0	11.0	11.0	10.0	11.0	11.0	11.0	10.0	11.0	11.0	11.0	10.0	11.0	11.0	11.0
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21	10.0	11.0	11.0	11.0	10.0	11.0	11.0	11.0	10.0	11.0	11.0	11.0	10.0	11.0	11.0	11.0	10.0	11.0	11.0	11.0	10.0	11.0	11.0	11.0
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27	10.0	11.0	11.0	11.0	10.0	11.0	11.0	11.0	10.0	11.0	11.0	11.0	10.0	11.0	11.0	11.0	10.0	11.0	11.0	11.0	10.0	11.0	11.0	11.0
28	10.0	11.0	11.0	11.0	10.0	11.0	11.0	11.0	10.0	11.0	11.0	11.0	10.0	11.0	11.0	11.0	10.0	11.0	11.0	11.0	10.0	11.0	11.0	11.0
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30	10.0	11.0	11.0	11.0	10.0	11.0	11.0	11.0	10.0	11.0	11.0	11.0	10.0	11.0	11.0	11.0	10.0	11.0	11.0	11.0	10.0	11.0	11.0	11.0

Note: The load capacity of vertically driven piles was determined by the formula:  
 $P = 20 \sqrt{W} \sqrt{H}$  where  
 $W =$  Weight of hammer in # - 8000  
 $H =$  Height of fall in feet  
 $S =$  Average penetration in inches per blow for the last 10 blows.  
 $P =$  Load capacity for pile driven with steam hammer.

PERMANENT BENCH MARKS FOR BROWNVILLE BRIDGE

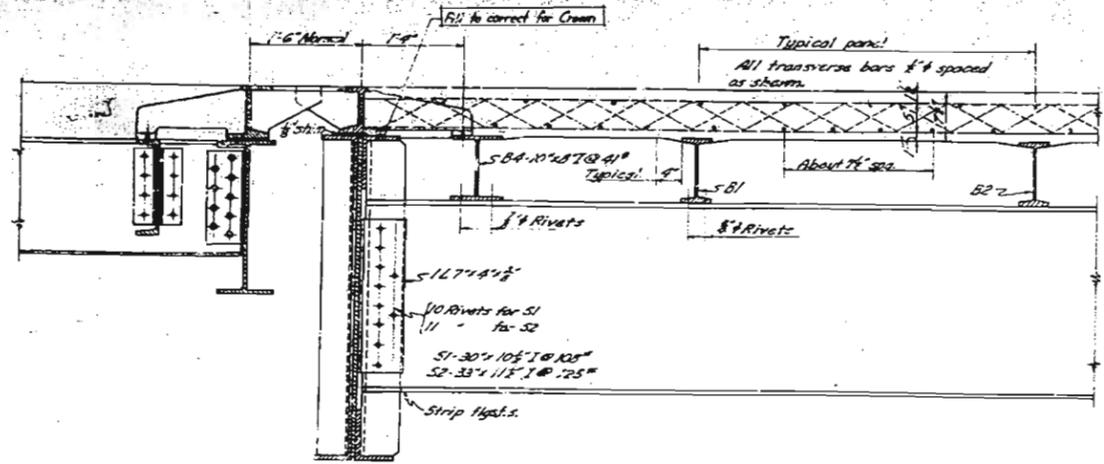
LOCATION	DESCRIPTION	ELEV.
West Abut. N.W. Cor. Downstream Curt.	Nail in lead plug	359.33
Pier 1 N.E. Cor. Top of Pier	Nail in lead plug	363.828
Pier 2 N.E. Cor. Top of Pier	Nail in lead plug	363.489
Pier 3 N.E. Cor. Top of Pier	Nail in lead plug	364.759
Pier 4 N.E. Cor. Top of Pier	Nail in lead plug	369.510
Pier 5 N.E. Cor. Top of Pier	Nail in lead plug	370.890
Pier 6 N.E. Cor. Top of Pier	Nail in lead plug	373.31
Pier 7 N.E. Cor. Top of Pier	Nail in lead plug	377.244
Pier 8 N.E. Cor. Top of Pier	Nail in lead plug	370.206
Pier 9 N.E. Cor. Top of Pier	Nail in lead plug	363.32
East Abut. S.E. Cor. Upstream Curt.	Nail in lead plug	363.373
Sta. 64+47.4 Bridge & Railroad Track	Rock in lead plug	363.01
60' South from Railroad Trestle	Concrete No. 1000	362.01
Sta. 62+73. 30' North Concrete Rft. station	Top of Concrete	362.01

Note: For General Notes for Concrete, see Sp. 2. Pile Splice Details and Pile Cap Details to be same as shown on Sk. 6. All Concrete Class 30.

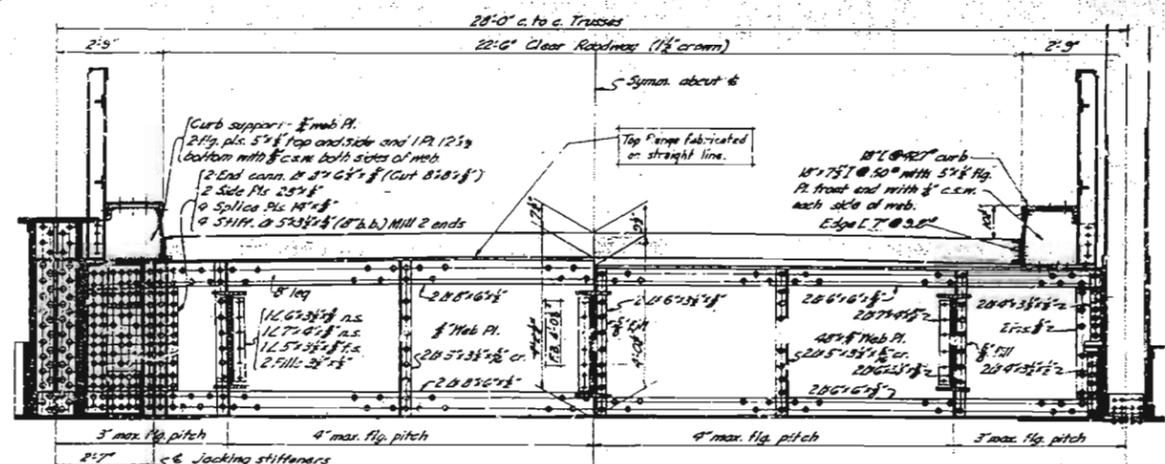
MISSOURI RIVER BRIDGE ATCHISON COUNTY, MISSOURI AT BROWNVILLE, NEBR.

L-98



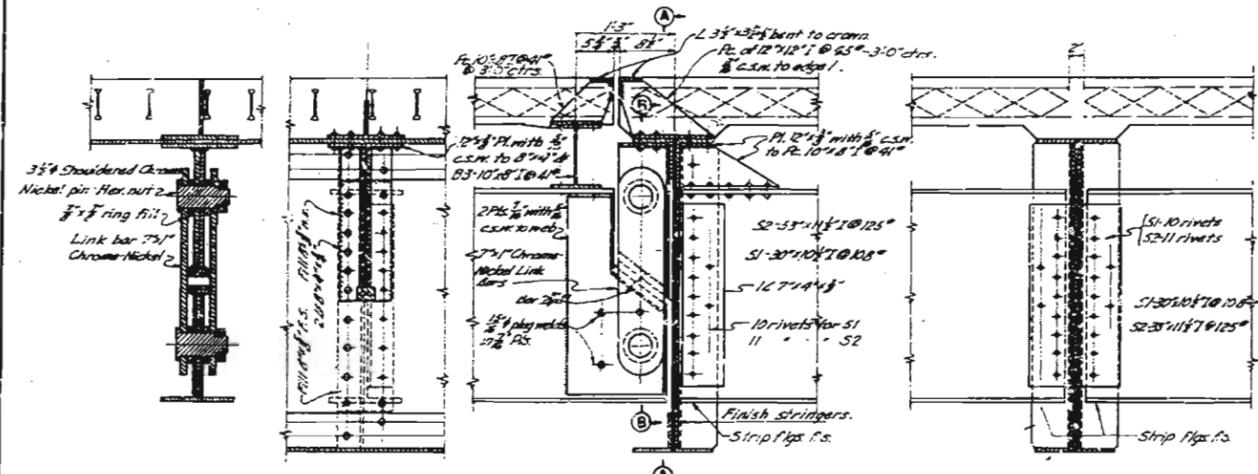


STRINGER CONNECTION AT FB  
1'-0"



HALF SECTION AT END FLOORBEAM FB1

HALF SECTION AT INTERIOR FLOORBEAM FB2  
FLOORBEAM FB3 SIMILAR (For Str. conn. see detail this sheet)  
FLOORBEAM FB2A SAME (Except for End Connection - see detail 1A)



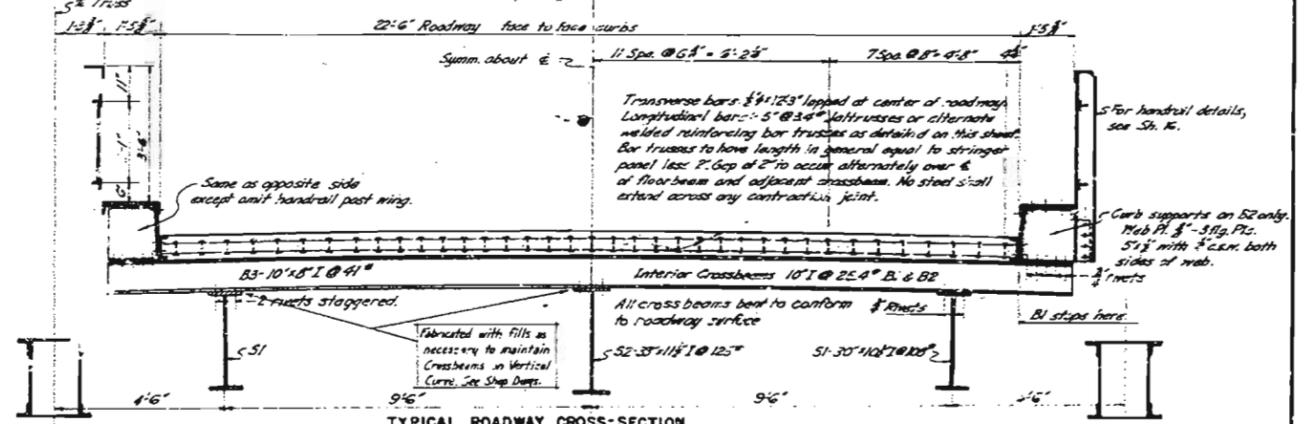
SECTION B-B

SECTION A-A

STRINGER CONN. TO FB3

STRINGER CONN. TO FB2

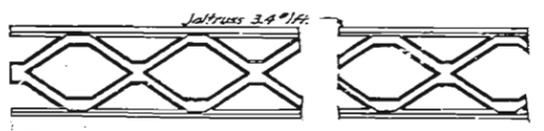
1'-1-0"



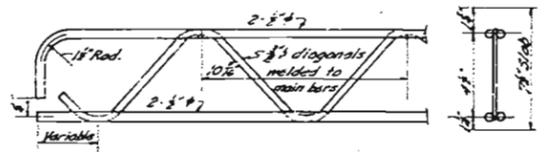
TYPICAL ROADWAY CROSS SECTION

1/2'-1-0"

Note: For General Notes on Steelwork and Welding see sheet B. For Concrete, Sh. 2



JALTRUSS REINFORCING BAR



REINFORCING BAR TRUSS

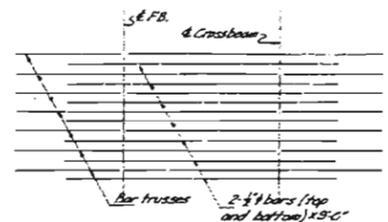
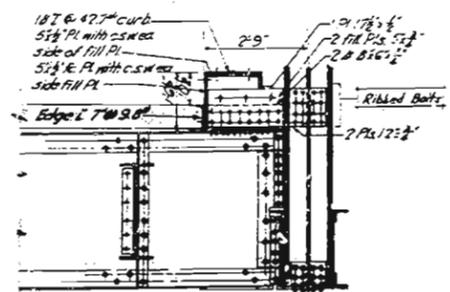
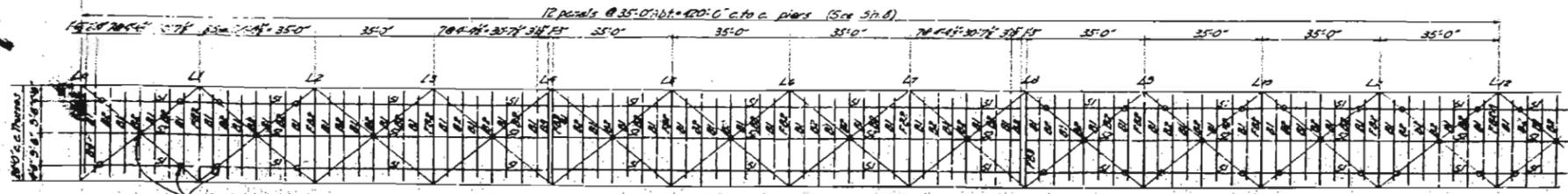


DIAGRAM OF SPLICES FOR JALTRUSSES IN ROADWAY SLABS  
No Scale



DETAIL 1A  
1/2'-1-0"



MARKING DIAGRAM 1'-20"

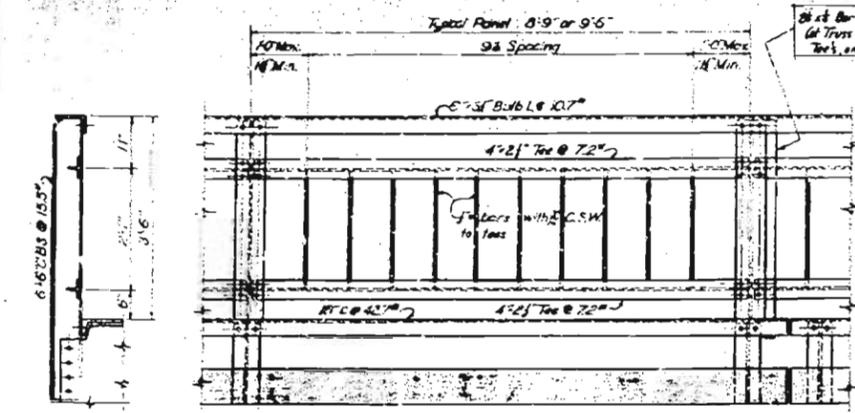
L-98

MISSOURI RIVER BRIDGE  
ATCHISON COUNTY, MISSOURI  
AT BROWNVILLE, NEBR.

TRUSS SPAN-FLOOR SYSTEM

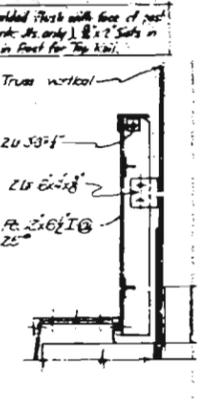
DESIGNED BY: L. G. M. ENGINEERS & ARCHITECTS  
CONSTRUCTION: MISSOURI BRIDGE CO.  
DRAWN BY: L. G. M.  
CHECKED BY: L. G. M.  
DATE: 1910



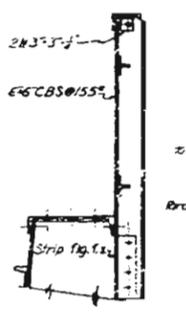


TYPICAL INTERIOR POST

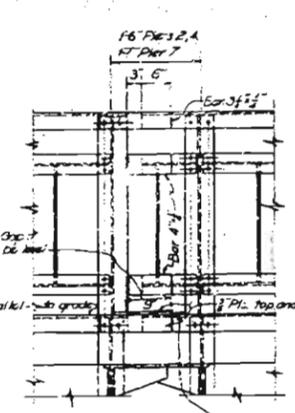
TYPICAL PANEL



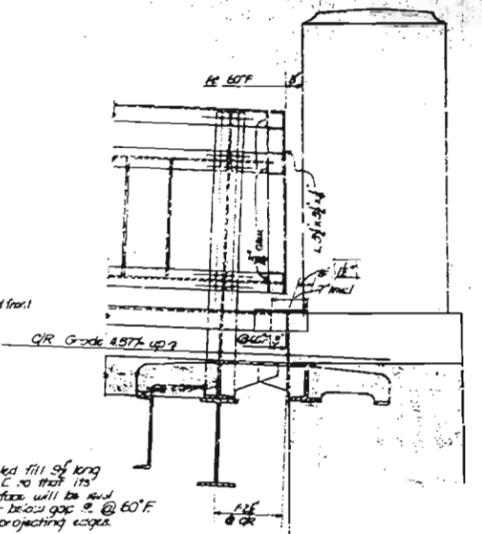
POST AT FB2, L12 TRUSS SPAN



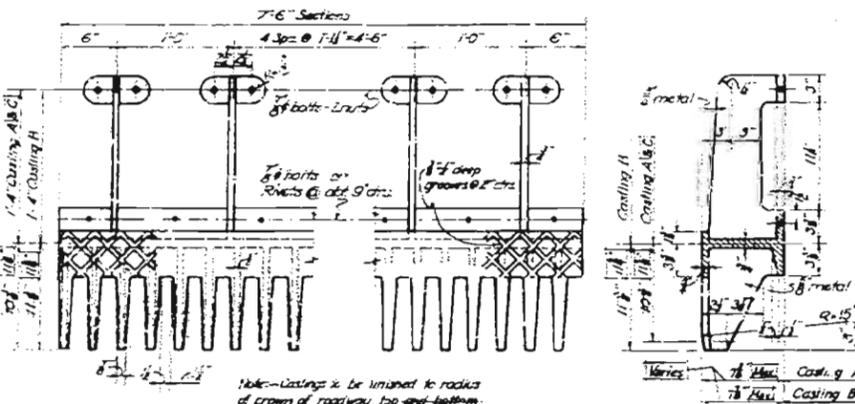
POST AT RAIL SPLICE



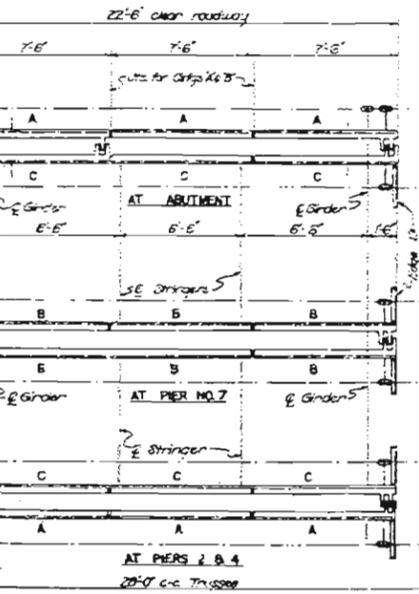
EXPAN. IN DETAIL



TYPICAL RAILING DETAILS  
2'-10"

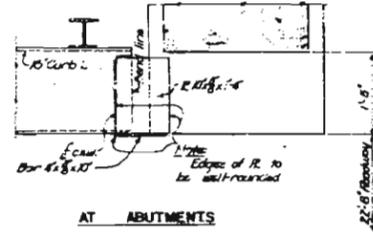


12 EXPANSION CASTINGS AS NOTED-MARK A  
 6 EXPANSION CASTINGS AS NOTED-MARK B  
 (CAST STEEL)  
 (Galvanized)  
 1'-10"



ARRANGEMENT OF EXP. JT. CASTINGS  
 2'-10" Revised as Constructed

**Notes on Railing:**  
 All posts to be set nearest to grade.  
 Bolt angle top rail to be specified as follows: On three truss spans, or panel posts, On Abutment deck spans, or every fourth handrail post (28'-0"). On Missouri deck spans, or every third handrail post (28'-0").  
 All sections to be cut straight. Cut and finish ends of bolt angles to leave normal gap at ends, and to insure neat joints. Remove sharp corners of joints in top rail.  
 Rivets of posts to curbs and curb brackets to be 3/4". Attach railing to posts with 1/2" bottom head bolts with washers on top and toward roadway. Provide 1/2" nut and 1/2" lock nut for each bolt. Holes for bolts to be 1/8" in bolt longitudinal line. 1/2" in posts. Leave holes so that bolts are centered under normal conditions. Lateral adjustment shall be obtained in field by raming holes for attaching post to curb support.  
 Final adjustment of handrail to be made with roadway slab in place.



AT ABUTMENTS

MISSOURI RIVER BRIDGE  
 ATONSON COUNTY, MISSOURI  
 AT BROWNVILLE, NEBR.  
 E. H. HARRISON, ENGINEER  
 HARRISBURG, ILL.

L-98