NPS Form 10-900
(Oct. 1990)

OMB No. 10024-0018

United States Department of the Interior
National Park Service

National Register of Historic Places Registration Form

This form is for use in nominating or requesting determinations for individual properties and districts. See instructions in *How to Complete the National Register of Historic Places Registration Form* (National Register Bulletin 16A). Complete each item by marking "x' in the appropriate box or by entering the information requested. If an item does not apply to the property being documented, enter "N/A" for "not applicable." For functions, architectural classification, materials, and areas of significance, enter only categories and subcategories from the instructions. Place additional entries and narrative items on continuation sheets (NPS Form 10-900a). Use a typewriter, word processor, or computer, to complete all items.

1. Name of Property

historic name Meramec River U.S. 66 Bridge - J421

other name/site number Meramec River Bridge, Times Beach Bridge

2. Location

street & town Historic U. S. Route 66 (1932 alignment) spanning the Meramec River N/A not for publication

city or town Eureka X vicinity

state Missouri code MO county St. Louis code 189 zip code 63025

3. State/Federal Agency Certification

As the designated authority under the National Historic Preservation Act, as amended, I hereby certify that this ☒ nomination ☐ request for determination of eligibility meets the documentation standards for registering properties in the National Register of Historic Places and meets the procedural and professional requirements set forth in 36 CFR Part 60. In my opinion, the property ☒ meets ☐ does not meet the National Register criteria. I recommend that this property be considered significant ☐ nationally ☒ statewide ☐ locally. (☐ See continuation sheet for additional comments.)

Mark A. Miles July 30, 2009

Signature of certifying official/Title Mark A. Miles/Deputy SHPO Date

Missouri Department of Natural Resources
State or Federal agency and bureau

In my opinion, the property ☐ meets ☐ does not meet the National Register criteria. (☐ See continuation sheet for additional comments.)

Signature of certifying official/Title Date

State or Federal agency and bureau

4. National Park Service Certification

I hereby certify that the property is: Signature of the Keeper Date of Action

☐ entered in the National Register.
☐ See continuation sheet.
☐ determined eligible for the National Register
☐ See continuation sheet.
☐ determined not eligible for the National Register.
☐ removed from the National Register.
☐ other, (explain:)

5. Classification

Ownership of Property
(check as many boxes as apply)

- ☐ private
- ☐ public-local
- ☒ public-State
- ☐ public-Federal

Category of Property
(check only one box)

- ☐ building(s)
- ☐ district
- ☐ site
- ☒ structure
- ☐ object

Number of Resources within Property
(Do not include previously listed resources in the count.)

Contributing	Noncontributing	
0	0	buildings
0	0	sites
1	0	structures
0	0	objects
1	0	Total

Name of related multiple property listing
(Enter "N/A" if property is not part of a multiple property listing.)

Route 66 in Missouri

Number of contributing resources previously listed in the National Register

N/A

6. Function or Use

Historic Function
(Enter categories from instructions)

Transportation/road related

Current Function
(Enter categories from instructions)

Transportation/road related

7. Description

Architectural Classification
(Enter categories from instructions)

Other: riveted Warren deck truss

Materials
(Enter categories from instructions)

foundation Concrete
walls N/A
roof N/A
other Steel

Narrative Description
(Describe the historic and current condition of the property on one or more continuation sheets.)

☒ See continuation sheet(s) for Section No. 7

8. Description

Applicable National Register Criteria

(Mark "x" in one or more boxes for the criteria qualifying the property for National Register listing.)

☒ **A** Property is associated with events that have made a significant contribution to the broad patterns of our history.

☐ **B** Property is associated with the lives of persons significant in our past.

☒ **C** Property embodies the distinctive characteristics of a type, period, or method of construction or represents the work of a master, or possesses high artistic values, or represents a significant and distinguishable entity whose components lack individual distinction.

☐ **D** Property has yielded, or is likely to yield, information important in prehistory or history.

Criteria Considerations

(Mark "x" in all the boxes that apply.)

Property is:

☐ **A** owned by a religious institution or used for religious purposes.

☐ **B** removed from its original location.

☐ **C** a birthplace or grave.

☐ **D** a cemetery.

☐ **E** a reconstructed building, object, or structure.

☐ **F** a commemorative property.

☐ **G** less than 50 years of age or achieved significance within the past 50 years.

Areas of Significance

(enter categories from instructions)

ENGINEERING

TRANSPORTATION

Period of Significance

1931 - 1956

Significant Dates

1931

Significant Persons

(Complete if Criterion B is marked above)

N/A

Cultural Affiliation

N/A

Architect/Builder

Frazier-Davis Construction Company

Narrative Statement of Significance

(Explain the significance of the property on one or more continuation sheets.)

☒ See continuation sheet(s) for Section No. 8

9. Major Bibliographical References

Bibliography

(Cite the books, articles, and other sources used in preparing this form on one or more continuation sheets.

Previous documentation on file (NPS):

☐ preliminary determination of individual listing (36 CFR 67) has been requested
☐ previously listed in the National Register
☐ previously determined eligible by the National Register
☐ designated a National Historic Landmark
☐ recorded by Historic American Buildings Survey #
☐ recorded by Historic American Engineering Record #

Primary location of additional data:

☐ State Historic Preservation Office
☒ Other State agency
☐ Federal agency
☐ Local government
☐ University
☐ Other Name of repository:

Missouri Highway & Transportation Department

☒ See continuation sheet(s) for Section No. 9

Meramec River U.S. 66 Bridge - J421
Name of Property

St. Louis County, MO
County and State

10. Geographical Data

Acreage of Property less than one acre

UTM References
(Place additional boundaries of the property on a continuation sheet.)

	Zone	Easting	Northing
1	1/5	7/0/9/9/0/2	4/2/6/4/6/5/5
2	/	/ / / / /	/ / / / / /
3	/	/ / / / /	/ / / / / /
4	/	/ / / / /	/ / / / / /

Verbal Boundary Description
(Describe the boundaries of the property.)

Property Tax No.

Boundary Justification
(Explain why the boundaries were selected.)

☒See continuation sheet(s) for Section No. 10

11. Form Prepared By

name/title Ruth Keenoy & Terri Foley, Historic Preservation Consultants

organization Foley & Keenoy date April 3, 2009

street & number 5229 Oleatha Avenue telephone 314-353-7992

city or town St. Louis state MO zip code 63139

Additional Documentation

Submit the following items with the completed form:

Continuation Sheets
Maps A **USGS map** (7.5 or 15 minute series) indicating the property's location.
A **Sketch map** for historic districts and properties having large acreage or numerous resources.
Photographs: Representative **black and white photographs** of the property.
Additional items: (Check with the SHPO or FPO for any additional items)

Property Owner

name/title Missouri Highway and Transportation Department

street & number 200 Harrison Street telephone

city or town Jefferson City state MO zip code 65102

Paperwork Reduction Act Statement: This information is being collected for applications to the National Register of Historic Places to nominate properties for listing or determine eligibility for listing, to list properties, and to amend existing listings. Response to this request is required to obtain a benefit in accordance with the National Historic Preservation Act, as amended (16 U.S.C. 470 *et seq.).*

Estimated Burden Statement: Public reporting burden for this form is estimated to average 18.1 hours per response including time for reviewing instructions, gathering and maintaining data, and completing and reviewing the form. Direct comments regarding this burden estimate or any aspect of this form to the Chief, Administrative Services Division, National Park Service, P.O. Box 37127, Washington, DC 20013-7127; and the Office of Management and Budget, Paperwork Reductions Projects (1024-0018), Washington, DC 20503.

Summary

The Meramec River U.S. 66 Bridge – J421 is located approximately two miles east of Eureka, St. Louis County, Missouri and is an example of the "Property Type: Road Bridges" as described in the Multiple Property Documentation Form entitled "Route 66 in Missouri." The bridge transports traffic across the Meramec River at a regionally significant river crossing associated with the former U.S. Route 66. Constructed in 1931 – 1932, the bridge is a rigid-connected Warren deck truss structure reinforced by concrete piers and abutments. The Meramec River Bridge features a steel superstructure and a 12-panel, rigid-connected Warren deck truss with steel stringer approach spans. The bridge retains its historic bridge components and its integrity in relation to location, design, setting, materials, workmanship, feeling and association. It is well-preserved and has not experienced any alterations, though it has fallen into disrepair in recent years. This is particularly evident in the concrete deck above the steel stringers, which has suffered significant erosion. The Meramec River Bridge is an excellent example of a rare structural design in Missouri, of which only four examples remain standing. In all, the state constructed ten Warren deck truss bridges. The Meramec River Bridge is the state's solitary three-span rigid deck truss structure.

Elaboration

Setting

The Meramec River U.S. 66 Bridge – J421 is located in St. Louis County, Missouri within Route 66 State Park. The bridge leads to Times Beach and Eureka, a community located approximately two miles southeast of the bridge. Situated immediately south of the Meramec River Bridge is Interstate 44. East of the bridge is the Route 66 State Park Visitor's Center. The bridge is surrounded by a wooded area and recreational setting associated with the State Park.

Description

The Meramec River Bridge is a steel rigid-connected Warren deck truss bridge resting on reinforced concrete abutments and reinforced concrete piers/pilings. The bridge is 1009 feet in length and consists of three 130-foot truss spans. The Warren truss design features vertical web members that create equilateral triangles. The bridge's diagonal truss members create a series of alternating "V" and "A" shapes that extend the length of the truss. The truss design has no crossbar. The bridge is reinforced with concrete abutments, wingwalls, and piers with bullnosed cutwaters. Automobiles travel along the roadbed extending above the deck truss that is additionally supported by the bridge's horizontal chords.

Superstructure

The Meramec River Bridge superstructure is comprised of the components that span the Meramec River. This segment of the bridge carries the traffic load and distributes the load to the substructure. The superstructure of the Meramec River Bridge includes the following components.

1) Bridge deck – roadway section of the Meramec River Bridge is 30 feet wide including shoulders. The bridge deck is constructed of reinforced concrete (concrete with steel bars for increased tensile strength). In addition, the bridge deck conforms to the grade of the approach roadway, thus there is no bump or dip as traffic passes on and off of the bridge.

   The bridge consists of three 130-foot spans. Spans are the horizontal spaces between the bridge's two end supporting structures or abutments. Including the roadway approaches to the bridge, its total length is 1009 feet.

2) Structural members - The bridge deck is supported by steel stringers (beams aligned with the length of the spans that support the deck). In addition, the bridge is supported by steel trusses that brace the spans. A truss is a frame of members that creates tension (pulling force that tends to lengthen a member) and compression (pushing force which tends to shorten a member) that support the bridge load. Used in the same way as a beam, the truss is stronger than a beam, consisting of several smaller members that can be constructed longer and/or deeper than beams or girders. The total weight of the steel trusses, bracing and spans in the Meramec River Bridge is 531,450 lbs. The structural steel girder (large beams) bracing weighs a total of 471,060 lbs. Steel in the floor beams weighs 302,410 lbs.

3) Parapets – These are the steel bridge angle pipe guardrails and pipe handrails. Total footage of handrails and railings for the Meramec River Bridge is 4052 feet

Substructure

The substructure of the Meramec River Bridge includes the abutments, piers, and footings that support the superstructure. The bridge's substructure has concrete bents on piling and concrete piers. The Meramec River Bridge has 74,090 lbs. of reinforcing steel in the substructure.

1) Abutments – This element of the bridge supports the extreme ends of the Meramec River Bridge and restricts the approach embankment, thus permitting the embankment to be

built up to grade with the bridge deck. The Meramec River Bridge features concrete abutments.

2) Piers – The Meramec River Bridge is supported by concrete piers with bullnosed cutwaters (end of pier-base, pointed to cleave the water). The piers are located between abutments to support the ends of the multi-span superstructure.

3) Bent – The concrete bents of the Meramec River Bridge comprise a rigid frame made of reinforced concrete that supports the vertical load and is placed transverse to the length of the bridge structure. The bents are used to carry the load of the beams and girders.

4) Piling or Pile – The bridge has concrete pilings, a long column driven deep into the ground to form a component of the foundation or substructure. The bent is located at the top of the piling.

5) Footing – The Meramec River Bridge has concrete footings that rest directly on the soil and bedrock; usually footings are below grade and not visible.

6) Wingwalls – Concrete wingwalls of the Meramec River Bridge were designed to be an extension of the abutment and are used to contain the fill of the approach embankment.

The Meramec River U.S. 66 Bridge is well preserved and has not experienced any alterations, although it has fallen into disrepair. The bridge is a rare and intact example of the rigid-connected Warren Deck Truss and one of four that remain in Missouri. All of the structural elements and features specific to this design exist in the Meramec River Bridge and are unchanged. The bridge retains its distinctive truss configuration, steel handrails, and bridge rails. The Meramec River Bridge retains all of its vital components of design, workmanship and materials. It appears and functions as it did when it was completed in 1932, when it served as an important Meramec River crossing for Route 66.

Summary

The Meramec River U.S. 66 Bridge – J421 in St. Louis County (also known as Meramec River Bridge and Times Beach Bridge) was constructed in 1931 to support U.S. Route 66, a federally designated highway established in 1926 and re-routed in St. Louis County (to extend across the Meramec River Bridge) in 1932. The bridge is a steel, 12-panel, rigid-connected Warren deck truss structure situated approximately two miles east of Eureka, Missouri. The bridge measures 1,009 feet in length (including approaches), 30 feet in width, and features three 130-foot deck trusses.[1] Warren deck truss bridges are not common in Missouri. Currently four rigid-connected Warren deck truss bridges remain in Missouri, including the Meramec River Bridge on Route 66. The Meramec River Bridge was administrated by Missouri's Bureau of Bridges, a division of the State Highway Department. Construction was completed by Frazier-Davis Construction, a local St. Louis County contractor. The bridge's steel structure was manufactured by the Illinois Steel Company of Chicago. Construction began in 1931 and was completed in 1932; total construction costs were $133,592.99.[2] The Meramec River Bridge is an excellent example of a rigid-connected Warren deck truss bridge located on one of the nation's most prominent historic highways, U.S. Route 66. The Meramec River Bridge is eligible for the National Register of Historic Places under Criterion A: Transportation for its association with Route 66. The bridge is also eligible under Criterion C: Engineering for its unique rigid-connected Warren deck truss design. The property meets the requirements for registration under the Multiple Property Document entitled, "Route 66 in Missouri," under the context of "Automobile Tourism and Roadside Commerce, Route 66 in Missouri, 1926 – 1985." The period of significance relates to the bridge's era of construction and use as the sole Route 66 Meramec River crossing, 1931-1956. The level of significance for the bridge is statewide in relation to its design, which is uncommon in Missouri, as well as its relationship to Route 66 in Missouri.

The Railroad and Nineteenth Century Truss Bridges, 1830 – 1890

The history of the Meramec River Bridge is strongly associated with the development of modern highways and bridges in the State of Missouri. The state's bridge building history roughly parallels what occurred nationally. Historically, bridge builders adapted ancient techniques introduced through early civilizations. Perhaps the best known bridge builders were the Romans, well versed in civil engineering as evidenced by the empire's network of bridges and aqueducts constructed in ca. 200 A.D.[3] Throughout the United States and Europe, modern bridge building was heavily influenced by nineteenth-century railroad companies. Railroads needed bridges to

[1] State Highway Commission of Missouri, *Eighth Biennial Report* ([Jefferson City, MO]: Self-published, 1931), 239.
[2] Clayton B. Fraser, "HAER Inventory: Missouri Bridge Inventory, Meramec River Bridge, MHTD: J421 (4 August 1994).
[3] David J. Brown, *Bridges* (New York: Macmillan Publishing Company, 1993), 18-22.

provide safe passage across swamps, rivers, and treacherous terrain. Materials and design were crucial in developing early railroad bridges. In America, the most common building material for train bridges was wood. It was far less expensive and more available than stone. In fact, even when iron became available, most American railroads continued to use wood. This was particularly true in the nation's central and western states. Consider Illinois that in 1887 held 3,831 bridges – 93% constructed entirely of wood.[4] This pattern illustrates what was also true in Missouri. Not until the late nineteenth century did the state begin to construct bridges using iron and steel. In Missouri's case, this delay came in part from the fact that the Civil War emerged at about the same time that the state began to construct railroads. The conflict caused many projects to be delayed; some were altogether abandoned. Additionally, the state's two primary rivers – the Mississippi and the Missouri – necessitated technological advances for bridges that did not emerge until the mid-to-late nineteenth century.

The world's first railroad bridge – Causey Arch Bridge in County Durham, England – was constructed more than a century before it supported a train. This early structure was constructed of stone in 1720 to support horse-drawn coal wagons. Later, the bridge supported steam locomotives (during the 1810s) and was the example that most subsequent bridge builders followed. In the 1820s, George Stephenson, a British engineer who designed train engines, commissioned his son, Robert, and two other men, Isambar Kingdom Brunel and Joseph Locke, to design bridges. The best known of these bridges is the Royal Border Bridge – a stone viaduct (still standing) across the River Tweed that separates Scotland and England. Completed in 1849, the bridge is a semi-circular arched masonry and wood structure spanning approximately 2,162 feet.[5] Railroad builders continued to utilize brick and stone as primary building materials for railroad bridges in Europe until the mid-nineteenth century when cast-iron became available. This pattern did not emerge in the United States, however, until the late nineteenth century. Timber remained the primary choice for most American bridge builders due to its abundance and affordability.

Cast iron provided tension strength unmatched by timber – a critical factor in planning railroad bridges spanning large bodies of water or vast gorges. Wrought-iron proved even more favorable as its tension resistance surpassed that of cast-iron. Because wrought-iron was nearly twice as expensive as cast-iron; however, it was normally used in conjunction with other materials such

[4] Anthony J. Bionculli, *Trains and Technology: The American Railroad in the Nineteenth Century (Volume 4: Bridges and Tunnels Signals)* (Newark: University of Delaware Press, 2003), 16 and Mark Aldrich, *Death Rode the Rails: American Railroad Accidents and Safety 1823 – 1965* (Baltimore: Johns Hopkins University Press, 2006), 132.
[5] Brown, 62-63 and "Royal Border Bridges," Nationmaster.com – Online encyclopedia (Available at: http://www.nationmaster.com/encyclopedia/Royal-Border-Bridge) Access date: 20 February 2009.

as cast-iron and wood.[6] Iron bridges began to appear in America after 1830 – though they had been successfully introduced by the 1780s. The world's earliest iron bridge was constructed in 1778 by Thomas Farnolls Pritchard across the River Severn in Shropshire County, England. The bridge remains standing today. It spans a distance of 100 feet and is supported by five cast iron ribs and a central iron arch (Figure 1). Another impressive iron bridge was designed by Thomas Paine in the 1780s. Paine relocated to America from England in 1774 and is best remembered for his Revolutionary War era publication, *Common Sense*. His bridge design was one of the first to incorporate both cast- and wrought-iron. The bridge had 13 arched ribs, "one for each state in the new union."[7] Patented in France in 1788, the bridge was constructed as a prototype in London but failed to derive much interest in the United States.[8]

The first iron bridge in the United States was constructed in 1838 on the National Road in Brownsville, Pennsylvania – Dunlap's Creek Bridge, designed by Richard Delafield. Delafield wished to use a permanent building material (i.e., not wood) and knew that stone would be expensive as it had to be shipped to the bridge site. Iron proved most efficient – both in terms of cost and durability.[9] Delafield's iron bridge stands today and is used as a highway bridge, obscured by a modern road that extends above the structure (Figure 2).

Iron bridges relied on the use of pins and trusses, which made the bridges easier to assemble, lighter than their stone and wood counterparts, and able to support heavier loads. In America, the most popular form of iron bridge design was the truss bridge. Truss bridges are supported by triangular placement of beams that make the roadbed "stiffer and stronger."[10] Unlike suspension bridges, which provide support from above and arched bridges, which provide support from below – truss bridges rely on long straight horizontal "chords" at the top and bottom of the bridge. The chords are "connected by a web of vertical posts and diagonals," serving to create the central part of the trusses. Support is also provided by abutments at either end of the bridge and (in some cases) central piers.[11] Iron served extremely well in constructing truss bridges and "several thousand" were constructed in America during the mid-to-late nineteenth century. Today, less than 100 iron bridges remain standing in the United States.[12]

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[6] Eric Dulony, "The Golden Age of the Iron Bridge," *American Heritage.com – Online journal* (Available at: http://www.americanheritage.com/articles/magazine/it/1994/2/1994_2_8.shtml), Access date: 23 February 2009, 1.
[7] Ibid, 3.
[8] Ibid.
[9] Karl B. Raitz and George F. Thompson, *The National Road* (Baltimore: The Johns Hopkins University Press, 1996), 154.
[10] Dulony, 2.
[11] Ibid.
[12] Ibid, 1.

Nineteenth-century advances in bridge designs most often focused on truss patterns. Two truss designs that developed during the nineteenth century and continue to be used even today are the Pratt Truss (patented in 1844) and the Warren Truss (patented in 1848).[13] Both examples proved not only to be innovative but were most durable for railroad (and later automobile) bridges. Truss designs evolved rapidly after metal bridges came into fashion (Figure 3). The first patented American truss design was submitted by Theodor Burr in 1806. Burr designed an "arch-truss combined [with] a parallelchord truss" in which the arch supported the load and the truss stiffened the roadway. This innovation was followed in 1820 by Ithiel Town's lattice truss patent, which became very popular in wooden bridges. Town's design is notable because it was the first to use a truss without an arch – it was also inexpensive and easily adapted for iron bridges.[14] During the 1830s, an Army engineer working for the Baltimore and Ohio Railroad, Colonel Stephen Harriman Long, applied for four truss patents, including one very similar to Town's design. Long's truss created a lattice-type pattern (like Town's) but incorporated post tension vertical supports. Long's design was further enhanced by William Howe, an architect who patented his design in 1840. Unlike Long, who utilized frame post tension members in the truss design, Howe incorporated iron tension rods. Howe's design was very popular in railroad bridges, but future design flaws in a subsequent variation led to the nation's worst nineteenth-century train disaster.[15]

In 1876, a Howe-truss bridge designed by one of Howe's associates, Amasa Stone, collapsed and 89 persons were killed. The incident occurred west of Erie, Pennsylvania when the Ashtabula Ohio Bridge buckled from the weight of a passing train. The event shocked the world.[16] Much of the blame was placed on the railroad company that funded the bridge construction. The company's decisions were poorly made in relation to cutting costs; but they were not unprecedented. Overall, American bridges were far less safe than those in other nations. Builders used substandard and cheap materials and, more often than not, incorporated wood train trestles instead of filling landscape cuts. The Ashtabula disaster was related not so much to Howe's design but to Stone's adaptation of the design. Howe incorporated cast-iron for the bridge's tension members. Stone substituted wrought-iron for the entire truss design which failed to provide adequate compression strength, causing the bridge's eventual collapse.[17]

The first scientifically calculated truss design was patented by Squire Whipple in the 1850s. Whipple's 1847 publication, *A Work on Bridge-Building*, was prompted by a number of bridge disasters that though less tragic, were no less significant than the Ashtabula incident. Whipple's truss design used both upper and lower chords to provide support. The upper chord was designed

[13] Ibid, 3.
[14] Ibid, 2.
[15] Brown, 77-78.
[16] Aldrich, 130-131.
[17] Aldrich, 132; Brown, 78

of cast-iron and provided compression. The lower chord, along with vertical and diagonal connecting members, were wrought-iron to provide tension.[18] "In a highly competitive and fluid field, every builder tried to devise 'the' truss that would be economical, simple to construct, and viable for longer lengths."[19] Two of the most important advances were the Pratt and Warren trusses, developed in 1844 and 1848, respectively.

Caleb Pratt, a railroad engineer and his son, Thomas, patented a truss design in 1844 that switched Howe's pattern by turning it upside down with sloping verticals and diagonals slanting toward the center. Additionally, the Pratt truss utilized cast-iron instead of wrought-iron for the diagonal tension supports, which also differed from Howe's design.[20] The Warren truss was patented by James Warren and Theobald Manzani, British engineers, in 1848.[21] The Warren truss was based on an earlier Belgian design patented in 1838. The truss created a "W" pattern "designed with the chords (to create) equilateral triangles."[22] Warren and Manzani's design alternated "compression and tension as loads passed" but it was not used extensively for bridges until the late nineteenth century.[23] The Warren truss was initially adapted for pony truss bridges and later used in longer span designs when steel became available.[24]

Truss bridges have always been popular in Missouri but until the train arrived in the 1850s, bridge building remained an enigma. "The Civil War and the advent of railroads had a far-reaching effect on the development of roads (and bridges). The railroads became the leading factors in long distance travel," precipitating bridge construction in Missouri.[25] Through the intervention of railroads, bridge builders began to successfully conquer the Mississippi and Missouri waterways that previously restricted overland travel.

Missouri's Nineteenth-Century Railroad Bridges, 1850 - 1890

Missouri's landscape is largely dominated by its rivers. Bordering the state's eastern edge is the nation's second-longest river, the Mississippi, which stretches more than 2,300 miles from

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[18] Brown, 78.
[19] Martha Carver, *Tennessee's Survey Report for Historic Bridges* (Nashville: Tennessee Department of Transportation, 2008), 261.
[20] FRASERdesign. "Missouri Historic Bridge Inventory" (April 1996), Unpublished bridge survey on file with Missouri Department of Transportation and Missouri Department of Natural Resources, Jefferson City, MO, 83; Brown, 78.
[21] FRASERdesign, 117.
[22] Carver, 310.
[23] Ibid.
[24] Frederic L. Quivik and Dale L. Martin, "National Register of Historic Places Multiple Property Documentation Form: Iron and Steel Bridges in Minnesota" (2008; NRL 2009), E:6.
[25] Federal Works Agency, *Narrative Report of the Fiscal Study by the Missouri State-Wide Highway Planning Survey* (Washington, D.C.: Public Roads Administration, 1940), 90.

Minnesota to the Gulf of Mexico. The Mississippi River is widest at its confluence with the Missouri River (just north of St. Louis, Missouri). The Missouri's width closely matches the Mississippi's 2,300 miles, stretching across seven states from Montana to its confluence at the Mississippi (Figure 4).[26] The size, unpredictability, and flooding associated with the state's expansive river system "prevented bridge construction until well into the late 19th century" and few "enduring bridges" were constructed "prior to 1850."[27]

Missouri's territorial laws provided little to no assistance in supporting early bridge construction. Earliest legislation passed in 1814 when territorial laws mandated that men and "slaves from age 16 to 45 years construct bridges over smaller streams."[28] As was true for the state's early roads, bridges were funded by local governments. Congress approved funding for bridges from Missouri land sales in 1820, but the support was capped at 3% and maintenance and improvements fell solely on local sources. After Missouri became a state in 1821, a "public bridge code" was incorporated in 1825, which stipulated that counties provide funding of all bridge construction exceeding $25 and a 50% match for private bridge construction. Toll bridges were allowed by the late 1820s, yet most travelers preferred the ferry as it was less expensive and more reliable.[29] Bridge building in Missouri was not seriously considered by state legislators until the arrival of the railroad in the 1850s.

The nation's earliest Mississippi River railroad bridge was completed in 1854, linking Rock Island, Illinois and Davenport, Iowa. The connection joined the railroad to the Midwest and the east coast. It spurred a number of similar projects up and down the Mississippi River, though most were not completed until after the Civil War.[30] One of Missouri's earliest railroad bridges spanning the Mississippi River was constructed in 1868-71 at Hannibal. The iron bridge, authorized by Congress in 1866, was constructed by the Chicago, Burlington, and Quincy Railroad Company, which also constructed a Mississippi River Bridge (at about the same time) linking the railroad line from Illinois to Burlington, Iowa.[31] A number of iron railroad bridges spanned the upper Mississippi prior to 1870. "By 1868 Mississippi bridges had been completed

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[26] Mississippi River Resource Page website (Available at: http://www.modot.org/interstate/MissouriInterstateHistory.htm), Access date: 1 March 2009 and John W. Smith, "Missouri Conservationist Vantage Point: Rediscovering the Missouri River," *Missouri Conservationist* (October 2001, Volume 62, No. 10, Available at: http://www.mdc.mo.gov/conmag/2001/10/vantage.htm), Access date: 20 February 2009.
[27] FRASERdesign, 8.
[28] Ibid, 9.
[29] Ibid.
[30] David Pfeiffer, "Bridging the Mississippi: The Railroads and Steamboats Clash at the Rock Island Bridges," *Prologue* (Summer 1994, Volume 36, No. 2, Available at: http://www.archives.gov/publications/prologue/2004/summer/bridge.html?template=print), Access date: 24 February 2009.
[31] FRASERdesign, 11-12 and John F. Stover, *American Railroads* (Chicago: University of Chicago Press, 1997), 160.

at Quincy, Illinois and Clinton and Dubuque, Iowa, all of them serving railroads with Chicago connections. Three bridges over the Missouri were also projected or under construction – at Kansas City, Omaha, and St. Charles."[32]

Missouri's best known Mississippi River crossing is the Eads Bridge, constructed in 1867-74. Designed by James Buchanan Eads, the bridge was an engineering marvel. The St. Louis structure was the world's first cast-steel bridge and the first constructed without the use of spandrel supports.[33] The bridge, which has limestone and granite piers, is 6,442 feet in length (including approaches). It is 54-feet wide and features a 530-foot central span, two 502-foot side spans, and chrome-steel tubular arched ribs.[34] The Eads Bridge has two decks – an upper automobile deck (originally used by horse-drawn vehicles and pedestrians) and a lower railroad deck. Today the bridge continues to provide safe passage across the Mississippi River, supporting a four-lane automobile highway on the upper deck and commuter trains along the lower deck (Figure 5).[35]

The nation's first "all-steel bridge" was constructed in 1879 in Glasgow, Missouri. The structure provided railroad access across the Missouri River for the Chicago, Alton, and St. Louis Railroad Company. The bridge had five Whipple trusses, three Pratt trusses, and steel deck trusses.[36] Eight hundred thousand tons of steel were used for the bridge's construction and it measured 3,577 feet in length. "Despite its importance to the proliferation of railroad transportation, and its role in developing the town of Slater, Missouri . . . the Glasgow Bridge lasted less than twenty years (as) increased train weights and speeds necessitated a new bridge in 1899."[37] By the end of the nineteenth century, engineers realized that steel held several important advantages over iron.[38] Steel could be shaped in any way without reducing its strength and it was much lighter than iron, which made it adaptable to nearly every design.[39] By the turn of the twentieth century, "steel emerged over wrought iron as the material of choice for bridge construction."[40]

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[32] James Neal Primm, *Lion of the Valley, St. Louis, Missouri* (Boulder, CO: Pruett Publishing Company, 1981), 295.
[33] Rex T. Jackson, *James B. Eads: The Civil War Ironclads and His Mississippi* (Westminster, MD: Heritage Books, Inc., 2004), 39.
[34] Workers of the Writers' Program of the Works Progress Administration, *Missouri – The WPA Guide to the "Show Me" State* (St. Louis: Missouri Historical Society Press, 1998, reprint; original edition 1941), 306 and FRASERdesign, 12.
[35] Scott Hall, "City Landmark – Eads Bridge – Revitalized Through Tax Credits," *St. Louis Commerce Magazine* (August 2000, Available online at: http://www.stlcommercemagazine.com/archives/august 2000/tax.html), Access date: 24 February 2009.
[36] Bionculli, 18.
[37] FRASERdesign, 12-23.
[38] Ibid, 14.
[39] American Institute of Steel Construction, Inc., *Prize Bridges 1928 – 1936* (New York: Self-published, [1937]), 5.
[40] FRASERdesign, 16.

The next era of bridge building materialized at about this same time that Missouri embraced the nation's most modern method of travel, the automobile. The combined effort of state and federal funds and modern technological advances supplied Missouri with a vast network of good roads and bridges. These changes were in response to one factor – the automobile – which fueled a national transportation agenda. "The period of intensive railroad construction (in Missouri) ended about 1890 and the interest in roads revived . . . which accompanied the advent of the automobile."[41] The age of the automobile shaped Missouri's laws and standards for road construction and heightened statewide bridge construction.

Early Automobile Highway Bridges in Missouri, 1900 - 1926

Until the automobile emerged as the preferred mode of travel in Missouri, few modern improvements were made to the state's highways and bridges, except for those serving the railroad directly. This was primarily due to the shortage of funds for such improvements – highways and bridges were expensive and most of the responsibility for funding their construction and maintenance fell upon local governments. This began to change with the nation's Good Roads Movement, sparked by automobile and bicycle enthusiasts during the late nineteenth century. Missouri supported two early good roads organizations – the Missouri State Roads Improvement Association (established in 1883) and the Missouri Statewide Good Roads Association (organized in 1891).[42] Missouri's good road advocates were important in lobbying (and gaining) political support for several important state laws that improved the state's roads and funded automobile highway bridge construction.

Automobiles were introduced to Missourians at around the turn of the century. St. Louis was one of the nation's few cities that had a network of paved roads, which made the state an early center of automobile development.[43] In Missouri, automobiles became accessible and popular very quickly – even outside of St. Louis where 9,967 automobiles had been registered by 1914.[44] Statewide, Missouri held 346,838 registered automobiles by 1920. Although Missouri's roads were greatly improved after 1900, less than ten percent were paved in 1920.[45] Missouri responded to the automobile craze in 1913 by creating an inter-county network road system and amending earlier legislation passed in 1909 that established the state highway system. Under the 1913 legislation, counties were granted a 50-50 match for funding construction, improvements, and maintenance of state and county roads. This was followed by passage of the Hawes Act in

[41] Federal Works Agency, 90.
[42] Ruth Keenoy and Terri Foley, "National Register of Historic Places Multiple Property Documentation Form, Route 66 in Missouri" (Draft, 2009), E:5.
[43] Ibid.
[44] Norbury Wayman, "St. Louis – Early Automobile Capital," (Norbury Wayman Collection, Mercantile Library, St. Louis), Series 2, Box 2, Folder M109, page 3.
[45] Becky Snider and Debbie Sheals, "Route 66 in Missouri Survey and National Register Project" (January 2003), 19.

1917, which created a state road fund, a bi-partisan State Highway Board, and appointed a State Highway Engineer. The Hawes Act was amended in 1919 by the Morgan-McCullough Act that provided state funding for roads through auto license fees and fuel taxes. The state's most far-reaching road legislation followed in 1921 – the Centennial Road Law. The act placed sole road-building responsibility on the state, created a bi-partisan State Highway Commission, and incorporated a standard highway marking system.[46] It did not, however, provide sufficient funds for maintaining roads.[47]

> From 1908 to 1921, the development of both a highway system and an organ by which to administer it evolved slowly (in Missouri). A combination of local and state organizations as well as legislation brought about gradual changes in the system. What emerged was a series of legislative initiatives that not only improved the administration and quality of the highway system, but also brought about standardization of Missouri's bridge system.[48]

As Missouri slowly pushed ahead with state assistance for constructing roads and bridges, the Federal government began planning a transportation network that would link states to one another via existing and new roads. In short, this was an early step of the nation's interstate highway system. The Federal Highways Act of 1916 was the first action to provide federal assistance for interstate roads. Missouri's Hawes Act of 1917, prompted by the 1916 legislation, assisted the federal funding. Through the dual courses of action, Missouri was able to modernize existing roads, survey new routes, and standardize highways. The state highway board further approved "permanent road and bridge" work, including the implementation of new bridge designs.[49] In 1921, the state created a Bureau of Bridges under the State Highway Commission. The bridge division "worked to implement a more efficient bridge system in Missouri throughout the 1920s."[50] Missouri's Bureau of Bridges prepared "plans for bridge and culvert structures, including railroad grade separations and highway grade separations."[51] Additionally, the division annually inspected bridges; oversaw materials, upgrades, and repairs; and worked with the United States Geological and Weather Services in monitoring rainfall and runoff patterns.[52]

Missouri passed several propositions during the 1920s aimed at stimulating funds for road and bridge projects, which proved successful. In 1918, the state funded only 35 new bridges. In 1922, the state sponsored 293 new bridge designs. This number continued to increase as evidenced by

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[46] Keenoy and Foley, E:6.
[47] Federal Works Agency, 91.
[48] FRASERdesign, 21.
[49] Ibid, 23.
[50] Ibid, 26.
[51] Federal Works Agency, 100.
[52] Ibid.

the statistics for 1924, when the state introduced 555 bridge designs.[53] During the years of 1918 – 1931, the Bureau of Bridges prepared designs for 2,500 bridges "representing a total length of 253,720 lineal feet, or approximately 48 miles."[54] The state's push for new highways and bridges continued after it passed two propositions in 1925 and 1928, Propositions 5 and 3, respectively. Proposition 5 (1925) raised funds for road projects through gasoline taxes, licensing fees, and road bond sales. Three years later, Proposition 3 hastened the success of the earlier funding measure by providing a $75 million road bond issue and preventing use of monies raised under Proposition 5 for anything other than highway-related projects. Missouri was the first state to restrict its road funds, though the measure was overturned in the 1930s.[55]

Through the state and federal funds received for roads during the 1920s, Missouri was able to create a network of state roads and support one of the most important national highways, U.S. Route 66. Designated as a federal highway in 1926, Route 66 in Missouri was possible in large part because of the state's modern bridges that linked the road across the state.

Meramec River U.S. 66 Bridge – J421

The Meramec River U.S. 66 Bridge – J421 was constructed in 1931-32 to serve the needs of Route 66. The road was designated in 1926 as a federal highway and rerouted (in St. Louis County) in 1932. The route re-assignment required a modern bridge to serve the automobile traffic crossing the Meramec River. In 1931, the "U.S. Relief Highway 66" was shifted to extend from downtown St. Louis via Gravois Road as it had done previously. When the road merged with Chippewa at the routes' intersection in south St. Louis City, however, Route 66 followed Chippewa (instead of Gravois Road). From that point, Route 66 continued west along Chippewa, re-assigned as Watson Road when the road extended into St. Louis County. Originally, local planners intended to construct a Mississippi River toll bridge south of downtown, linking Route 66 directly to Chippewa.[56] This did not, however, prove to be the case. The Chain of Rocks Bridge located north of downtown St. Louis was designated as the preferred Route 66 Mississippi River crossing in 1935.[57]

The Meramec River Bridge was funded by the state's 1920s transportation legislation noted earlier (i.e., the Centennial Road Law and subsequent propositions). Though Missouri received New Deal funds for roads and bridges through the National Recovery Act, this allocation was not available until 1933. The Meramec River Bridge was an important contribution to the state's

[53] FRASERdesign , 27.
[54] State Highway Commission, 1931, 257.
[55] Federal Works Agency, 92.
[56] "St. Louis Hills is Turning Building Trend Southward," *The St. Louis Star* (10 September 1931), Copy of newspaper article on file at Route 66 State Park, Eureka, MO.
[57] Keenoy and Foley, E:11.

modern highway bridges. The structure spans a large body of water that although secondary in size to the Mississippi and Missouri Rivers, was no less problematic for bridge builders. Extending a distance of approximately 240 - 250 miles from near Salem, Missouri, northeast to its confluence with the Mississippi River, the Meramec "hosts a restless current" winding through "farm lands, past irregular clumps of giant oak, sycamore, and elm trees, and between bluffs" that range "from sloping hillsides to abrupt gray crags."[58] Earlier bridges had been constructed across the Meramec near Eureka prior to 1931; but the Meramec River Bridge was the first designed to support automobiles (Figure 6).

Route 66's passage across the Meramec River was heavily promoted as a tourist attraction, but it was not the first outlet to do so. The lower Meramec River had become a well-known resort area by the late nineteenth-century, when hotels and commercial accommodations began to spring up along the St. Louis – San Francisco (Frisco) Railroad. The train provided direct passenger service from St. Louis to several smaller communities near the river such as Eureka (St. Louis County), Pacific (St. Louis and Franklin Counties), and Cuba (Crawford County).[59] The area was very much a tourist draw before the automobile made its arrival. Recreational activities continued to increase as the City of St. Louis and railroad companies promoted the 1904 World's Fair. Meramec Highlands, established in 1895, is the area's grandest example of the Meramec's early tourism potential. Situated approximately 10 miles upriver from the Meramec River Bridge, the site catered "to affluent St. Louisans (and) . . . included a 125-room luxury hotel, a dance pavilion called the Sunset Pagoda, a boathouse, and a bath house. The St. Louis-San Francisco (Frisco) Railroad serviced Meramec Highlands, dropping off visitors on the steps of Frisco station" in Kirkwood.[60]

In 1925, just prior to Route 66's designation as a federal highway, a triangular parcel wedged between the Meramec River (northeast) and Frisco Railroad tracks (west) near the present Meramec River Bridge was purchased by the *St. Louis Star-Times* newspaper.[61] In an effort to boost its lagging subscriptions, the newspaper company subdivided the property into 6,000 lots measuring 20 x 100 feet each, and sold single lots with subscriptions for $67.50. The site soon became a "working-class resort" known as Times Beach. For a period of time, the Meramec River Bridge supporting Route 66 was dubbed the "Times Beach Bridge."[62]

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[58] Workers of the Writers Program, 449.
[59] Ibid, 406 and Missouri Department of Natural Resources, Division of State Parks. *Route 66 State Park*. ([Jefferson City, MO]: Self-published, [2005]), 3.
[60] Tim Fox, *Where We Live: A Guide to St. Louis Communities* (St. Louis: Missouri Historical Society Press, 1995), 178.
[61] Joe Holleman, *St. Louis Post-Dispatch* (3 February 1991), Untitled newspaper clipping on file at Missouri Historical Society – vertical files).
[62] Ibid and "A History of Times Beach," *Show Me Route 66* (April 2000, Volume 12:1), pages not numbered.

Times Beach developed as a popular weekend and summer recreational area over the following decade. It began to transition into a permanent community during the Great Depression when many property owners found it necessary to reside year-round in the small homes erected as weekend and vacation cottages. Times Beach's population burgeoned during the 1940s when "improvement of roads and cars made commuting more practical, and a serious shortage of housing in St. Louis" led to its rapid development as an incorporated village, which occurred in 1954.[63] By this time, the area's recreational sector flanking the river was known as Sylvan Beach, which supported picnicking, swimming, and boating.[64] Route 66 and the Meramec River Bridge enhanced the area's growth. In 1956, an auxiliary bridge for eastbound Route 66 was constructed south of the 1931 bridge to accommodate the ever-increasing flow of traffic.[65]

The Meramec River Bridge was erected by the Frazier-Davis Construction Company. Limited information is available about the firm, established in 1917 by Adrian W. Frazier and Edward C. Davis. Research failed to provide information about Edward C. Davis, though Frazier was well known to the area. Adrian Frazier was born in Crescent, Missouri in 1888 – a small resort community near the Meramec River in St. Louis County. Frazier completed a civil engineering degree from Washington University in 1909. He also worked with the Union Pacific Railroad Company and the City of St. Louis prior to forming a partnership with Davis. Though information on the firm is limited, Frazier's 1967 obituary notes that the company specialized "in heavy industrial construction work, with projects in many parts of the United States."[66] Also associated with the Meramec River Bridge construction is Illinois Steel Company of Chicago, which produced the steel components used in assembling the Meramec River Bridge. Illinois Steel was established in 1889 following a merger between the North Chicago Rolling Mill Company, Union Steel Company, and Joliet Steel Company.[67] At that time, the company held the largest and "most modern plant" in Chicago.[68] The enterprise was absorbed by U.S. Steel in 1901 but continued to operate under the nomenclature of Illinois Steel Company.[69]

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[63] Missouri Department of Natural Resources, 6 and Robert Hannon (ed), *St. Louis: Its Neighborhoods and Neighbors, Landmarks and Milestones* (St. Louis: St. Louis Regional Commerce and Growth Association, 1986), 183.
[64] Workers of the Writers' Program, 406.
[65] Missouri Department of Natural Resources, 6.
[66] "Adrian W. Frazier," (obituary) *The Bulletin* (July 1967, Part I, St. Louis: Missouri Historical Society), 374.
[67] Stephen Dale, "EJ & E Railroad History," *The Elgin, Joliet & Eastern Ry Archive.* (Available at: http://www.ejearchive.com/page_rrhistory.html), Access date: 19 February 2009.
[68] Donald Miller, *City of the Century: The Epic of Chicago and the Making of America* (New York: Simon & Schuster, 1997), 242.
[69] David Bensman and Mark R. Wilson, "Iron and Steel," *Online Encyclopedia of Chicago* (Available at: http://www.encyclopedia.chicagohistory.org/pages/653.html), Access date: 28 February 2009.

The Meramec River Bridge incorporates a rigid-connected Warren truss deck design (Figure 7). In Missouri, Warren trusses were most often incorporated in pony truss bridges, a pattern that developed during the 1910s and diminished during the 1930s.[70] Deck trusses like that incorporated in the Meramec River Bridge were infrequently used in Missouri because of the state's waterways which are "flat" and often do not provide sufficient clearance for water traffic below deck truss bridges. In Missouri, most deck truss bridges were constructed during the 1920s and early 1930s. All were designed by the state highway department and constructed "only under special conditions in which under-truss clearance was not a factor."[71]

> Never very common, this (deck) truss type has suffered the same sort of attrition as the other types in recent bridge replacements, until fewer than ten deck trusses are known to remain statewide. Significantly all but one of these are primary system structures built between 1921 and 1936. Of the remaining deck trusses in Missouri, three are simply supported Warrens, two simply supported Pratts, and two are long-span cantilevered trusses."[72]

Four rigid-connected Warren deck truss bridges are extant in Missouri, including the Meramec River Bridge. The state's other three Warren deck truss bridges are the 1921 Auxvasse Creek Bridge in Callaway County; the 1934 Poplar Bluff viaduct (commonly known as Pine Street Bridge) in Butler County; and the 1936 Intercity Viaduct in Jackson County. Of these bridges, the Meramec River Bridge is only three-span deck truss in the state.[73]

In 1956, at about the same time that the eastbound Meramec River bridge addition was constructed for Route 66, the state initiated construction on Interstate-44 (I-44), which currently passes immediately south of the 1931 Meramec River Bridge. Route 66 reached its zenith during the early 1950s, by which time the road had been pinpointed by state and federal agencies as an extremely dangerous highway – limited in width, void of federal safety standards, and rapidly deteriorating from constant heavy truck and automobile traffic.[74] By the late 1960s, I-44 was nearly complete in Missouri, and the state began to decommission sections of Route 66 as the interstate opened. Route 66 was not officially decommissioned until 1985, when the final stretch of I-44 opened; however the road across the Meramec River Bridge was bypassed sometime prior to 1966.[75] For a period of time, the 1956 bridge addition supported the new interstate. The

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[70] FRASERdesign, 117.
[71] FRASERdesign, 116.
[72] Ibid.
[73] Fraser and "Historic Bridges of the United States," website (Available at: http://bridgehunter.com/), Access date: 11 February 2009.
[74] Keenoy and Foley, E:25-28.
[75] Rand-McNally Map Company, *Road Atlas: United States* (1966). Available at Missouri Historical Society, Archives Division, St. Louis and Missouri Department of Transportation, "Missouri's Interstate

south bridge was removed in the 1970s, replaced by a four-lane interstate bridge.[76] The 1931 Meramec River U.S. 66 Bridge remained open and in use for local traffic, accessible via an interchange linking Route 66 with I-44. Today the bridge remains in use and is in the boundaries of Route 66 State Park, which opened in 1999. The Meramec River Bridge is an exemplary component of Route 66 and one of the state's best examples of its unique deck truss design.

System: Yesterday, Today, and Tomorrow," (Available at: http://www.modot.org/interstate/MissouriInterstateHistory.htm), Access date: 1 March 2009.

[76] Hannon, 182.

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Verbal Boundary Description

The boundary for the Meramec River U.S. 66 Bridge is a rectangle that encompasses the bridge and its approaches on both sides of the Meramec River. The length of the boundary is 1,009 feet and consists of three 130-foot spans and the roadway approaches to the bridge. The width of the boundary is 30 feet. The boundary is centered on the bridge (see site maps, Figures 8-9).

Boundary Justification

Boundaries for the Meramec River U.S. 66 Bridge are drawn to encompass the three spans of the bridge, its immediate approaches and that segment of the Meramec River spanned by the bridge. The width is increased beyond the measurements of the structure to include the piers and abutments.

Photo Log *

1-16.	Meramec River U.S. 66 Bridge – J421	East
2-17.	Meramec River Bridge	Detail
3-18.	Meramec River Bridge	Detail
4-19.	Meramec River Bridge	underside of deck
5-20.	West End of Bridge	--
6-21.	Meramec River Bridge	E
7-22.	Meramec River Bridge	SE
8-23.	Meramec River Bridge	SE
9-24.	Meramec River Bridge	SE
10-25.	Bridge approach – west end	--
11-26.	Deck	--
12-27.	Parapet	--
13-28.	Meramec River Bridge	NE
14-29.	Roadbed west end	--

*above numbering includes negative numbers, 16-29.

Figure 1. Iron Bridge designed by Thomas Farnolls Pritchard, constructed in 1778, Shropshire County, England (Source: Nationmaster Online Encyclopedia. Available at : http://www.nationmaster.com/encyclopedia/Image: Ironbridge002.JPG).

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St. Louis County, MO

Figure 2. Dunlap's Creek Bridge, Brownsville, Pennsylvania. HABS/HAER photograph, 1983. Photographer: Jet Lowe. (Online at: http://memory.loc.gov/cgi-bin/query/D?hh:1:./temp/~ammem _NltV::)

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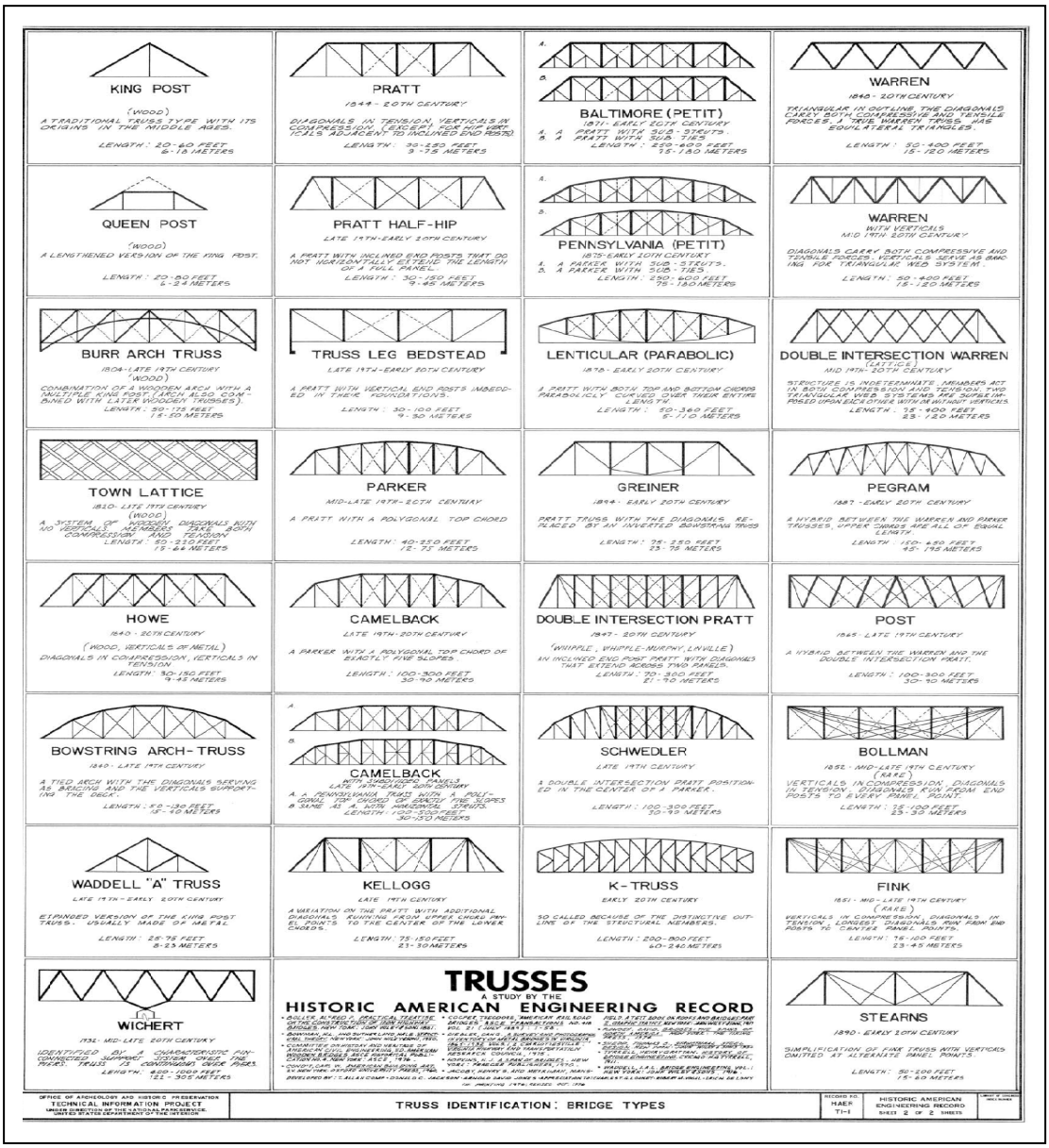

Figure 3. Bridge Trusses, Historic American Engineering Record (Copy available at National Park Service website: http://www.nps.gov/hdp/samples/HAER/truss%20poster.pdf).

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Figure 4. Missouri Highway Planning Watershed Map, 1940 (Federal Works Agency, page 14).

Figure 5. Eads Bridge, HAER photograph, 1983. Photographer, Jet Lowe (Available online at: http://memory.loc.gov/cgi-bin/query/D?hh:1:./temp/~ammem_IZNU::).

Figure 6. Photograph of an early Meramec River crossing, probably the Votaw Bridge, which was constructed ca. 1910 and removed in 1931 when construction began on the Route 66 bridge (Source: Missouri Historical Society Archives. Collection: Bodies of Water, Box #3902, Folder # 5671).

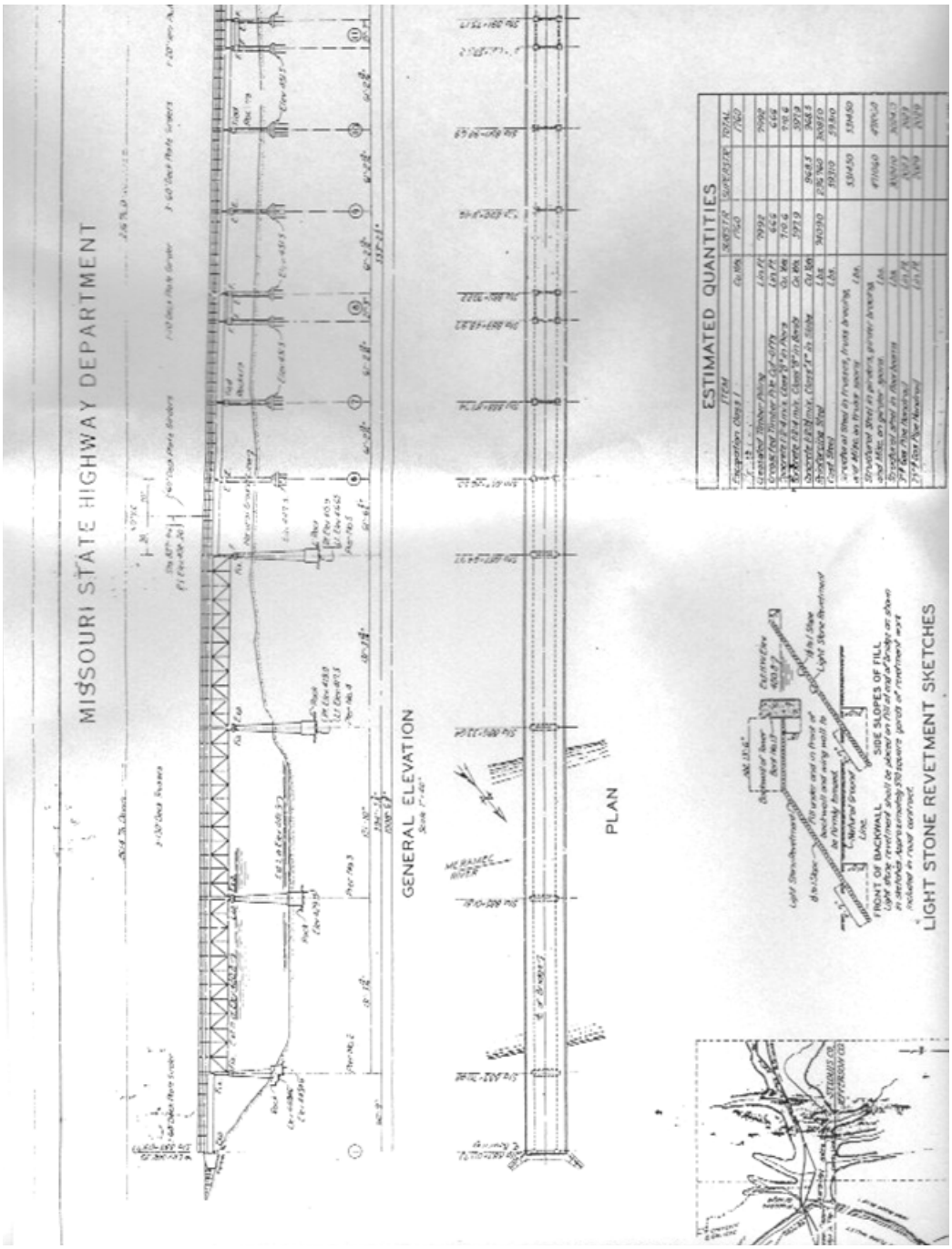

Figure 7. Missouri State Highway Commission, Route 66 Meramec River Bridge plans, 1931 (Courtesy of Route 66 State Park, St. Louis County, Missouri).

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Meramec River U.S. 66 Bridge - J421
Route 66 in Missouri
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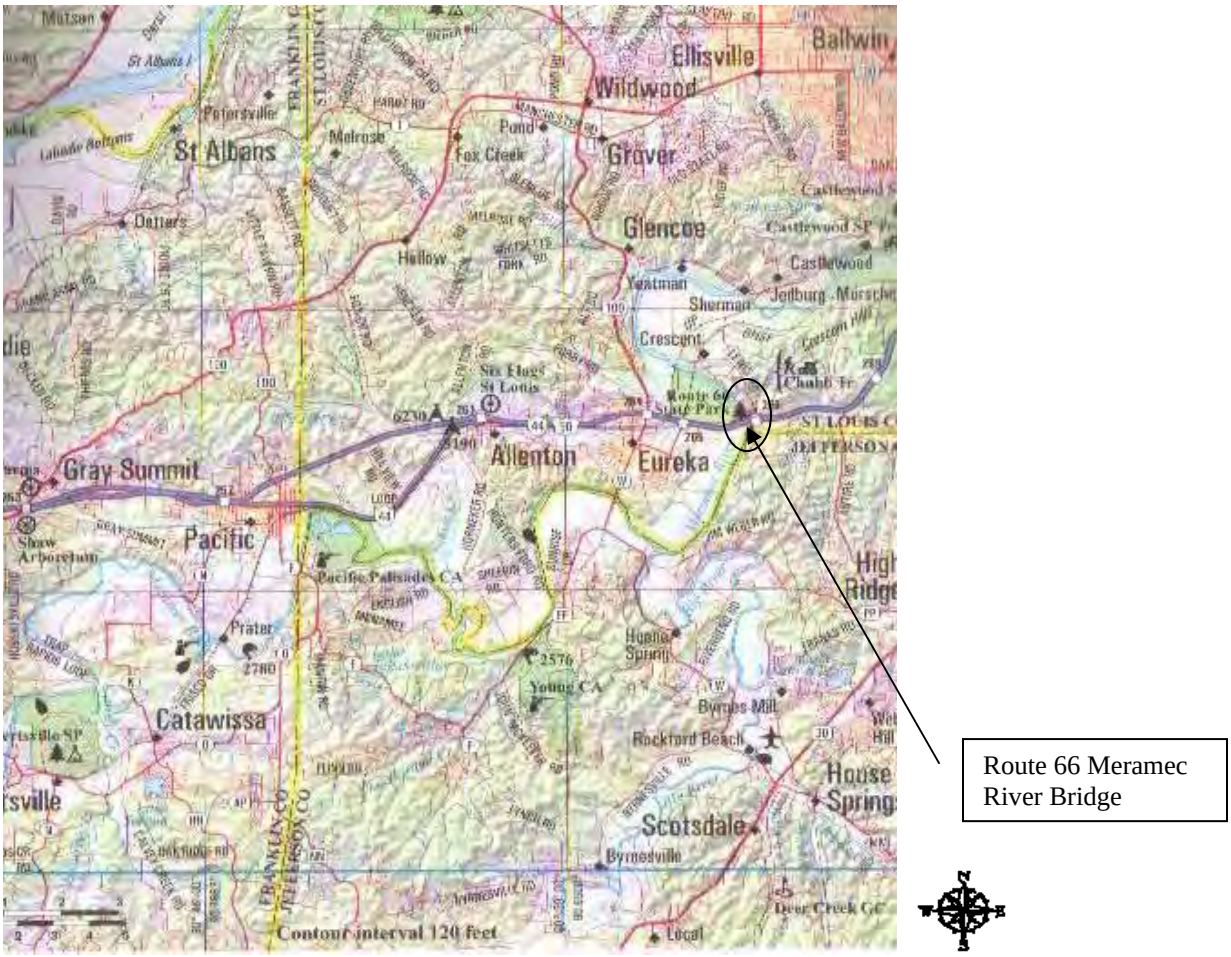
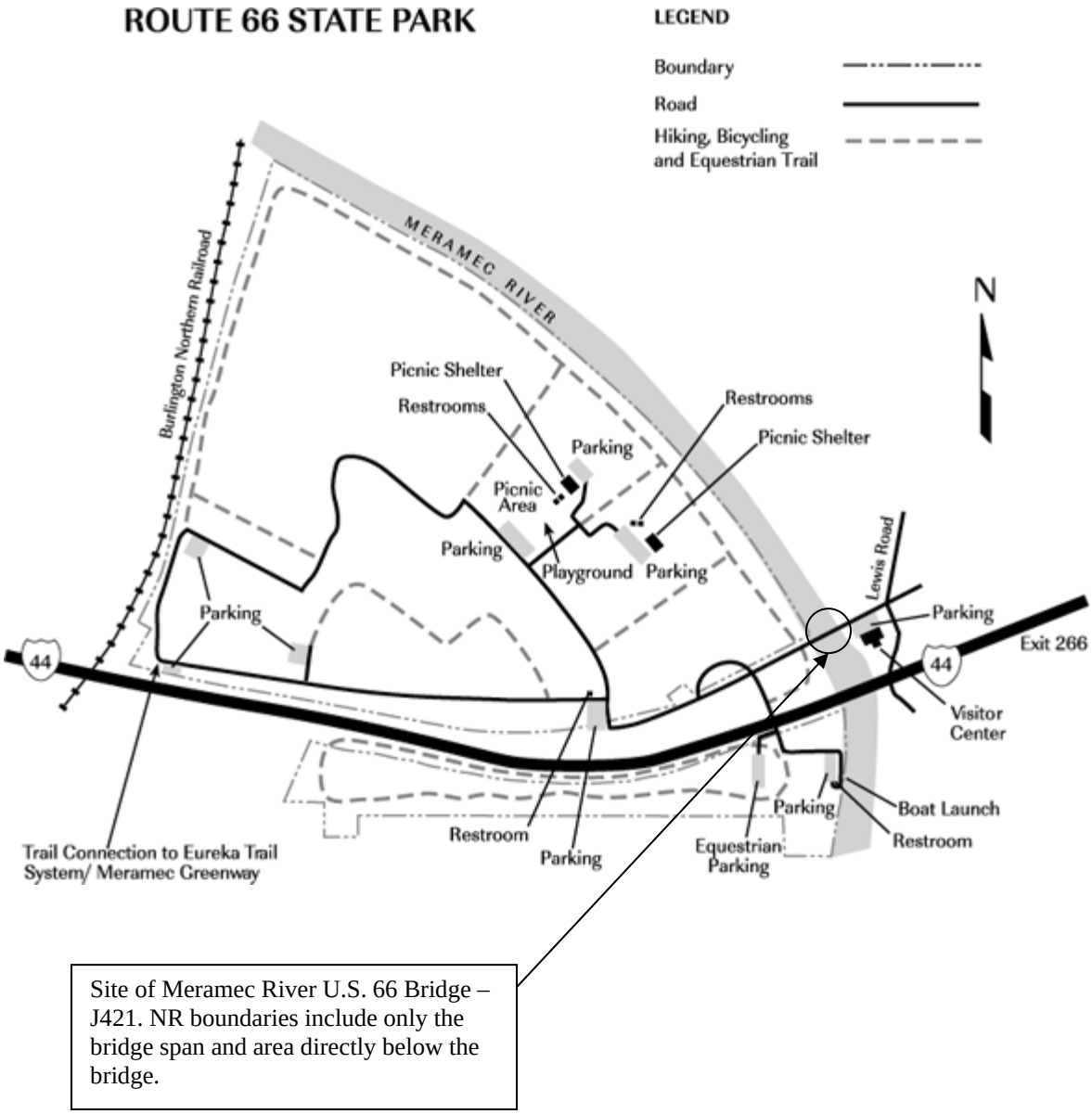


Figure 8. Site Map, Meramec River U.S. 66 Bridge – J421 near Eureka, St. Louis County, Missouri.



Site of Meramec River U.S. 66 Bridge – J421. NR boundaries include only the bridge span and area directly below the bridge.

Figure 9. Location sketch map of Route 66 Park, illustrating additional detail for the bridge location and approximate boundaries of the property.

Meramec River U.S. 66
Bridge - J-421
Eureka
St. Louis County, MO

15709902 (E)
4264655 (N)

(PACIFIC)
7860 I NW

Mapped by the Army Map Service
Published by the Geological Survey

Control by USGS and NOS/NOAA

Topography by photogrammetric methods from aerial photographs taken 1952. Field checked 1954

Projection and 10,000-foot grid ticks: Missouri coordinate system, east zone (transverse Mercator)
1000-meter Universal Transverse Mercator grid ticks, zone 15, shown in blue
1927 North American Datum (NAD 27)

North American Datum of 1983 (NAD 83) is shown by dashed corner ticks
The values of the shift between NAD 27 and NAD 83 for 7.5-minute intersections are given in USGS Bulletin 1875

There may be private inholdings within the boundaries of the National or State reservations shown on this map

UTM GRID AND 1993 MAGNETIC NORTH DECLINATION AT CENTER OF SHEET

FOR S

STOP
WATCH FOR
ONCOMING
TRAFFIC
MERAMEC
RIVER