

United States Department of the Interior
National Park Service

National Register of Historic Places
Inventory—Nomination Form

For NPS use only
received
date entered

See instructions in *How to Complete National Register Forms*
Type all entries—complete applicable sections

1. Name

historic Neosho River Bridge

and/or common Neosho River Bridge

2. Location

street & number .2 miles east of Hartford

N/A not for publication

city, town Hartford

vicinity of

~~Congressional Cemetery~~

state Kansas

code 20

county Coffey

code 31

3. Classification

Category	Ownership	Status	Present Use	
<input type="checkbox"/> district	<input checked="" type="checkbox"/> public	<input checked="" type="checkbox"/> occupied	<input type="checkbox"/> agriculture	<input type="checkbox"/> museum
<input type="checkbox"/> building(s)	<input type="checkbox"/> private	<input type="checkbox"/> unoccupied	<input type="checkbox"/> commercial	<input type="checkbox"/> park
<input checked="" type="checkbox"/> structure	<input type="checkbox"/> both	<input type="checkbox"/> work in progress	<input type="checkbox"/> educational	<input type="checkbox"/> private residence
<input type="checkbox"/> site	Public Acquisition	Accessible	<input type="checkbox"/> entertainment	<input type="checkbox"/> religious
<input type="checkbox"/> object	<input type="checkbox"/> in process	<input type="checkbox"/> yes: restricted	<input type="checkbox"/> government	<input type="checkbox"/> scientific
	<input type="checkbox"/> being considered	<input checked="" type="checkbox"/> yes: unrestricted	<input type="checkbox"/> industrial	<input checked="" type="checkbox"/> transportation
	N/A	<input type="checkbox"/> no	<input type="checkbox"/> military	<input type="checkbox"/> other:

4. Owner of Property

name Coffey County

street & number Courthouse

city, town Burlington

N/A vicinity of

state Kansas

5. Location of Legal Description

courthouse, registry of deeds, etc. Register of Deeds

street & number Coffey County Courthouse

city, town Burlington

state Kansas

6. Representation in Existing Surveys

title Inventory of Marsh Arch Bridges --
Kansas Department of Transportation has this property been determined eligible? yes no

date 1980 federal state county local

depository for survey records Kansas State Historical Society

city, town Topeka

state Kansas

7. Description

Condition

excellent
 good
 fair

deteriorated
 ruins
 unexposed

Check one

unaltered
 altered

Check one

original site
 moved date _____

Describe the present and original (if known) physical appearance

The Neosho River bridge is situated .2 miles east of Hartford, Kansas on a county road. It is composed of two reinforced concrete "rainbow arch" (or "Marsh arch") spans each 140 feet in length. The 20 foot wide roadway has been resurfaced periodically since the bridge's construction in 1926 but this has not significantly compromised its integrity. Marsh's plans allowed for whatever filling material, between the bridge deck curbs, that locality might desire. Vandals have painted names and words on the bridge surface. The footing elevation of the abutments and piers lies approximately 31 feet below grade and the stream bed is 29 feet below grade.

The best description of a rainbow arch span is contained in James Marsh's 1911 patent application. The bridge consists of ". . . two abutments (which could be piers), a pair of arches disposed between and springing from the abutments, the floor carried by and between the arches and reaching from one abutment to the other where it alines with the parapets or rails along opposite sides of the floor line." The original patents called for slideable wear plates to be moulded into the concrete where the bridge floor came into contact with the beams and abutments. This is of importance as one of the main benefits of this design was to allow for the expansion and contraction of the reinforced concrete bridge under varying conditions of temperature and moisture.

There were two basic rainbow arch designs, fixed and tied. The original patent application describes the fixed type in which case the arch flowed below the bridge deck and was "fixed" directly into the abutment. This massive abutment (or pier) resisted both the horizontal and the vertical thrust of the arch. In a tied design such as that of the Neosho River bridge, the arch did not flow below the deck line and was not fixed directly into the abutment. It was secured atop the abutment or pier by the use of steel rocker or expansion rocker bearings. Vertical thrust was resisted by the pier and bearing, while horizontal thrust was resisted by the addition of a lower chord.

8. Significance

Period	Areas of Significance—Check and justify below			
<input type="checkbox"/> prehistoric	<input type="checkbox"/> archeology-prehistoric	<input type="checkbox"/> community planning	<input type="checkbox"/> landscape architecture	<input type="checkbox"/> religion
<input type="checkbox"/> 1400-1499	<input type="checkbox"/> archeology-historic	<input type="checkbox"/> conservation	<input type="checkbox"/> law	<input type="checkbox"/> science
<input type="checkbox"/> 1500-1599	<input type="checkbox"/> agriculture	<input type="checkbox"/> economics	<input type="checkbox"/> literature	<input type="checkbox"/> sculpture
<input type="checkbox"/> 1600-1699	<input type="checkbox"/> architecture	<input type="checkbox"/> education	<input type="checkbox"/> military	<input type="checkbox"/> social/ humanitarian
<input type="checkbox"/> 1700-1799	<input type="checkbox"/> art	<input checked="" type="checkbox"/> engineering	<input type="checkbox"/> music	<input type="checkbox"/> theater
<input type="checkbox"/> 1800-1899	<input type="checkbox"/> commerce	<input type="checkbox"/> exploration/settlement	<input type="checkbox"/> philosophy	<input type="checkbox"/> transportation
<input checked="" type="checkbox"/> 1900-	<input type="checkbox"/> communications	<input type="checkbox"/> industry	<input type="checkbox"/> politics/government	<input checked="" type="checkbox"/> other (specify)
		<input type="checkbox"/> invention		

Specific dates 1926

Builder/Architect James B. Marsh, Engineer

Statement of Significance (in one paragraph)

The Neosho River "rainbow arch" (or "Marsh arch") bridge near Hartford, Kansas retains its integrity of location, design, setting, materials, feeling, and association. It is associated with the life of James B. Marsh, pioneer in steel and concrete bridge construction. It embodies the distinctive characteristics of a type and method of construction that is no longer used, and, as such, may yield information important to the history of engineering. Although 72 rainbow arches are known to exist in Kansas the ever-changing needs of modern transportation have made them an endangered species. The Neosho River bridge, however, has a good chance for survival due to its out-of-the-way location.

James Barney Marsh was born in 1856 at North Lake, Wisconsin. He went to Iowa at the age of 18 to enter preparatory school at Fredericksburg. Marsh graduated in 1882 from Iowa State College of Agriculture and Mechanical Arts in Ames, with a B.M.E. degree. In March of 1883 he began his professional career in the Des Moines office of the King Bridge Company of Cleveland, Ohio. With King, Marsh was involved in the design, sales and actual erection of metal bridges. While he continued to work with the King Company, he also became head of the Northern Agency for the Kansas City Bridge and Iron Company. In this capacity, he both designed and superintended the actual construction work done by the company. By March of 1889, Marsh had become general western agent and contracting engineer for the King Bridge Company and was placed in charge of the general western office in Des Moines. In the spring of 1896, he formed his own company, the Marsh Bridge Company, and was its sole proprietor. In private practice as a contracting engineer, Marsh was able to more fully develop his own designs. He also constructed the designs he developed, usually using steel as a medium. At the turn of the century, Marsh initiated the use of both concrete and steel in his bridge design. In April of 1904, the Marsh Bridge Company was incorporated with Marsh as president and chief engineer. In 1909, the company was reorganized as the Marsh Engineering Company.

It was not until the introduction of the "rainbow arch" by Marsh, that Kansas made widespread use of reinforced concrete spans for major stream crossings. Marsh canvassed the midwest, selling his arches in direct competition with the steel trusses at that time.

The Lyon and Coffey county commissioners held a meeting on November 12, 1924 and decided to erect a new bridge across the Neosho River east of Hartford at a point about 100 yards downstream from the existing structure. According to the Hartford Times on November 21, 1924 the bridge to be replaced was one of the oldest in the county and was a wood and steel structure 324 feet long.

UNITED STATES DEPARTMENT OF THE INTERIOR
NATIONAL PARK SERVICE

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NATIONAL REGISTER OF HISTORIC PLACES
INVENTORY -- NOMINATION FORM

CONTINUATION SHEET

ITEM NUMBER 8 PAGE 1

8. Significance

Early in January of 1925 the site for the new bridge was decided upon. It was to be built directly east of Plumb avenue in Hartford so as to avoid the curved approaches that existed on the earlier bridge.

On February 27, 1925 the Hartford Times wrote:

"Bids will be asked for two types of bridges--steel and the Marsh [Marsh] arch (cement). It is hoped a concrete bridge will be built and Hartford people should make every effort to have that type of structure erected."

On October 16, 1925 the people got their wish and the contract for a two span Marsh arch was let to C. A. Clark of Wichita for \$41,045.50. Work on the structure, sponsored by both Lyon and Coffey counties, would begin as soon as federal approval was obtained from Omaha, Nebraska.

By November 27, 1925 a storage building had been erected and the first two loads of sand had been received from Topeka. Work was scheduled to start the following Monday with a gang of 15 men.

The 5th Biennial Report of the Kansas State Highway Commission on June 30, 1926 wrote of an investigation of the bridge construction at Hartford. As a result of a misinterpretation of instructions, the falsework was removed from the completed west span before the east span had been constructed. This placed an unbalanced thrust on the pier between the spans. The purpose of the investigation was to determine how closely actual conditions conformed to those which were assumed for the purpose of designing. Measurements were taken of the pier and abutments under several conditions of loading that occurred during the completion of the structure. The concrete and steel reinforcing were found to have been strained far beyond the safety margin. The stability of the foundations along with the massive proportions of the pier, however, prevented movements great enough to cause a failure in the structure.

The Times reported the bridge as being nearly completed on July 30, 1926 and predicted a late August opening.

9. Bibliography

- "New Bridge to be Built," Hartford Times, November 21, 1924, p. 1, c. 5.
- "New Bridge Site Located," Hartford Times, January 16, 1925, p. 1, c. 2.
- "Bridge Site Approved," Hartford Times, February 27, 1925, p. 1, c. 5.
- "Bids on New Bridge to be Opened October 6th," Hartford Times, September 18, 1925, p. 1, c. 1.
- "Will Receive Bids for New Bridge," Burlington Daily Republican, October 15, 1924, p. 3, c. 1.
- "C. A. Clark gets Contract for New Bridge at Hartford," Burlington Daily Republican, October 17, 1925, p. 1, c. 3.
- "To Have Concrete Bridge," Hartford Times, October 23, 1925, p. 1, c. 1.

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Continuation sheet

Item number 9

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9. Bibliography continued

"Work on Bridge Goes on," Hartford Times, November 27, 1925, p. 1, c. 3.

"New Bridge Finished Soon," Hartford Times, July 16, 1926, p. 1, c. 2.

"Bridge Nearing Completion," Hartford Times, July 30, 1926, p. 1, c. 1.

Kansas State Highway Commission, Fifth Biennial Report, 1926.

Nichols, C.S., Comp. Directory of Graduates of Division of Engineering, Iowa State College of Agriculture and Mechanical Arts, Ames, Iowa.

The Alumnus of Iowa State. Alumni Association of Iowa State College, Ames, Volume XXXII, #1, July 1936.

Marsh, James B., Specification of Letters Patent, Number 1,035,026, patented August 6, 1912, United States Patent Office, Washington, D.C.

Plans and files. Design Department, Kansas Department of Transportation, Topeka, Kansas Microfilm Roll #174, frame 115+.

9. Major Bibliographical References

See Continuation Sheet, Item #9.

10. Geographical Data

Acreage of nominated property .5

Quadrangle name Hartford

Quadrangle scale 1:24,000

UMT References

A

1	5	2	4	2	2	1	6	1	0	4	1	2	4	1	3	9	1	8	1	0
Zone			Easting						Northing											

B

Zone			Easting						Northing											

C

Zone			Easting						Northing											

D

Zone			Easting						Northing											

E

Zone			Easting						Northing											

F

Zone			Easting						Northing											

G

Zone			Easting						Northing											

H

Zone			Easting						Northing											

Verbal boundary description and justification

That property on and over which the bridge is built, east of Hartford, Kansas, S14, T20S, R13E. Includes bridge superstructure plus supporting piers and abutments.

List all states and counties for properties overlapping state or county boundaries

state	N/A	code	county	code
state		code	county	code

state	code	county	code
state		county	code

11. Form Prepared By

name/title Larry Jochims, Research Historian and Michael Snell

organization Kansas State Historical Society date _____

street & number 10th and Jackson Streets telephone (913) 296-2973

city or town Topeka state Kansas

12. State Historic Preservation Officer Certification

The evaluated significance of this property within the state is:

national state local

As the designated State Historic Preservation Officer for the National Historic Preservation Act of 1966 (Public Law 89-665), I hereby nominate this property for inclusion in the National Register and certify that it has been evaluated according to the criteria and procedures set forth by the National Park Service.

State Historic Preservation Officer signature _____

title _____ date _____

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I hereby certify that this property is included in the National Register

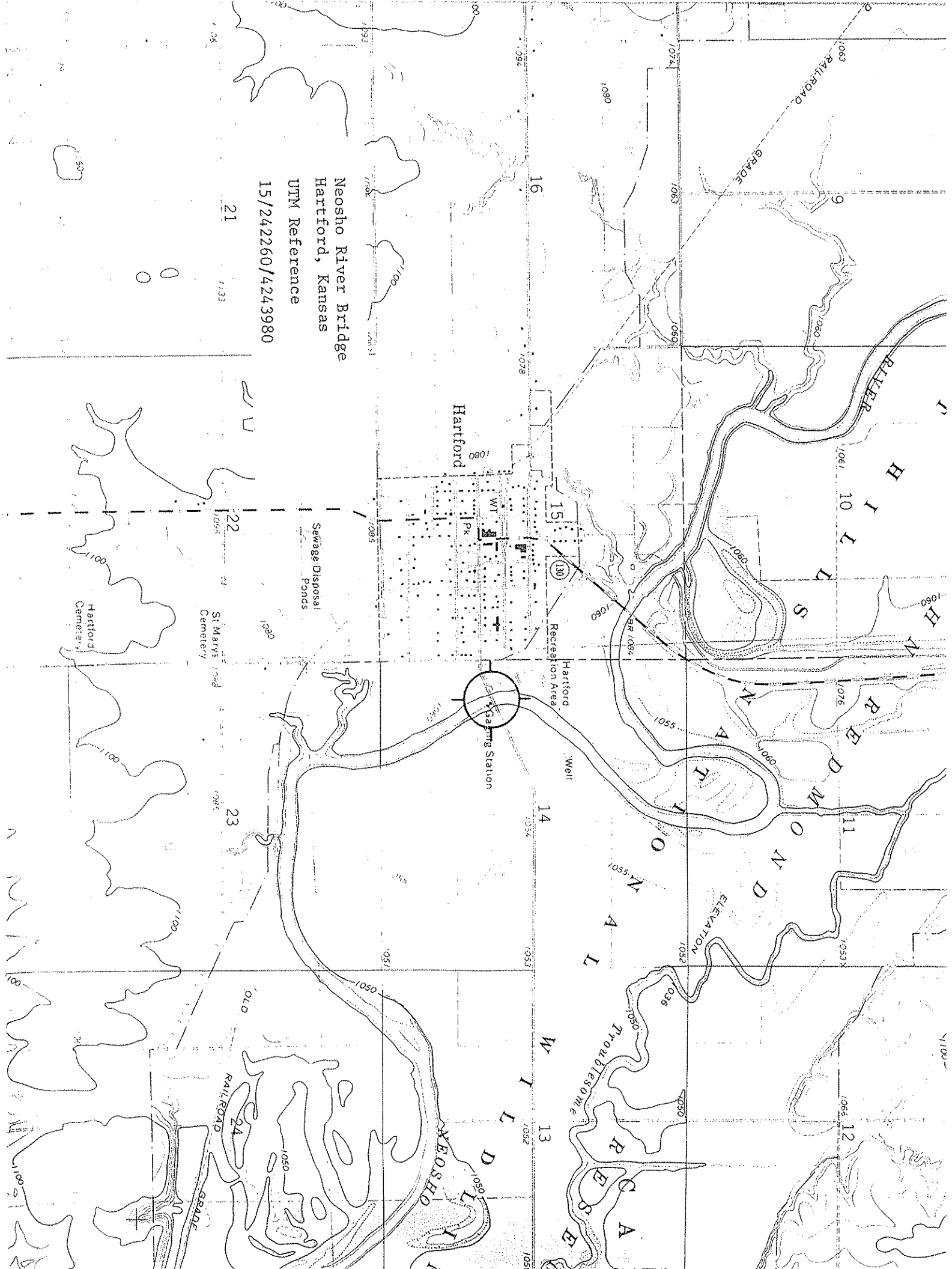
date _____

Keeper of the National Register

Attest:

date _____

Chief of Registration



Neosho River Bridge
Hartford, Kansas
UTM Reference
15/242260/4243980

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