

United States Department of the Interior
National Park Service

NATIONAL REGISTER
LISTED

JUN 09 2004

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 10-9000a). Use a typewriter, word processor, or computer, to complete all items.

1. Name of Property

Historic name N/A
Other name/site number Delaware River Warren Truss Bridge (preferred); 07-LT-77; Off-system 188; 013-0000-0189

2. Location

Street & number Coyote Rd/190th St; 4.1 miles south, .5 miles east not for publication
Fairview
City or town Fairview vicinity
State Kansas Code KS County Brown Code 013 Zip code 66425

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.)

Richard A. Parkhurst DSHAC

April 21, 2004

Signature of certifying official/Title
Kansas State Historical Society

Date

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 commenting 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:) _____

Property Name Delaware River Warren Truss Bridge

County and State Brown, Kansas

5. Classification

Ownership of Property	Category of Property	No. of Resources within Property	
		contributing	noncontributing
<input type="checkbox"/> private	<input type="checkbox"/> building(s)	<input type="checkbox"/>	<input type="checkbox"/> buildings
<input checked="" type="checkbox"/> public-local	<input type="checkbox"/> district	<input type="checkbox"/>	<input type="checkbox"/> sites
<input type="checkbox"/> public-State	<input type="checkbox"/> site	<input type="checkbox"/>	<input type="checkbox"/> structures
<input type="checkbox"/> public-Federal	<input checked="" type="checkbox"/> structure	<u>1</u>	<input type="checkbox"/> objects
	<input type="checkbox"/> object	<u>1</u>	<u>0</u> Total

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

No. of contributing resources previously
listed in the National Register

Metal Truss Bridges in Kansas

0

6. Functions or Use

Historic Functions
(Enter categories from instructions.)

Current Functions
(Enter categories from instructions.)

TRANSPORTATION: Road-related (vehicular)

TRANSPORTATION: Road-related (vehicular)

7. Description

Architectural Classification
(Enter categories from instructions.)

Materials
(Enter categories from instructions.)

OTHER: Warren Truss

Foundation Concrete

Walls _____

Roof _____

Other Metal: Steel

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

Property Name Delaware River Warren Truss Bridge

County and State Brown, Kansas

8. Statement of Significance

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.)

- A owned by a religious institution or used for religious purposes.
- B removed from its original location.
- C a birthplace or a 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

1913

Significant Dates

1913

Cultural Affiliation

N/A

Significant Person

N/A

Architect/Builder

Missouri Valley Bridge & Iron Co. (Leavenworth, Kansas)

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

Property Name Delaware River Warren Truss Bridge

County and State Brown, Kansas

9. Major Bibliographical References

(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

Primary location of additional data:

- State Historic Preservation Office
- Other State agency
- Federal agency
- Local government
- University
- Other

Specify repository: _____

Record # _____

10. Geographical Data

Acreage of property 1 acre

UTM References

	Zone	Easting	Northing	Zone	Easting	Northing
1	<u>17S</u>	<u>267585</u>	<u>4406995</u>	<u>3</u>	<u>111111</u>	<u>111111</u>
2	<u>17S</u>	<u>111111</u>	<u>111111</u>	<u>4</u>	<u>111111</u>	<u>111111</u>

____ See continuation sheet

Verbal Boundary Description (Describe the boundaries of the property on a continuation sheet.)

Boundary Justification (Explain why the boundaries were selected on a continuation sheet.)

11. Form Prepared By

name/title Kerry Davis, Architectural Historian & Elizabeth Rosin, Partner

organization Historic Preservation Services

date August 5, 2002

street & number 323 West Eighth Street, Suite 112

telephone (816) 221-5133

city or town Kansas City

state Missouri zip code 64105

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 Owners (Complete this item at the request of the SHPO or FPO.)

Name County of Brown

street & number 601 Oregon Street

telephone 785-742-3255

city or town Hiawatha

state KS zip code 66434

United States Department of the Interior
National Park Service

**NATIONAL REGISTER OF HISTORIC PLACES
CONTINUATION SHEET**

Section Number 7 Page 1

Delaware River Warren Truss Bridge
Brown County, Kansas

DESCRIPTION

LOCATION AND SETTING

The Delaware River Warren Truss Bridge is located 0.5 miles east and 4.1 miles south of the town of Fairview in northeast Kansas, on the north-south section line between the NE ¼ of Section 22 and the NW ¼ of Section 23, Township 3S, Range 15E. The region is defined by rounded hills and broad, tree-lined valleys. The Delaware River Warren Truss Bridge carries Coyote Road across the Delaware River, a deep, wide course that joins the Kansas River near Perry. The gravel roadway, flanked by cultivated fields, aligns directly with the Delaware River Warren Truss Bridge.

TRUSS TYPE

The Delaware River Warren Truss Bridge consists of a riveted pony truss¹ that measures 66½ feet in length with a flat girder approach span on each end. The north approach span measures 15 feet in length and the south approach span measures 22 feet in length. The deck is 14 feet wide. A historic, standard, box-form concrete abutment supports the north end of the north approach span; non-historic steel piles, timber planks, and corrugated metal form the south abutment. Concrete-filled sheet metal columns form the piers that support the truss bearings. Sway bracing intersects between the piers on each bank.

The inclined end posts rise from the bottom chords and meet the horizontal top chords to form a trapezoidal shape. The top chords and inclined end posts consist of two channels, a cover plate, lacing bars, and stay plates; the bottom chords consist of two angles with stay plates.

The web members include vertical posts that form five equivalent panels and diagonal members that form the system of alternating equilateral triangles distinctive to a Warren truss. The vertical posts and diagonal members are composed of angle stock and lacing bars; angle buttress posts located at each vertical post consist of angle stock.

The poured concrete deck is 14 feet wide with very shallow curbs. It rises 17½ feet above the riverbed on steel I-beam stringers. Floor beams are located at the base of each vertical post.

The historic, paired, parallel angle bar guardrails are intact along the length of the bridge. A cast-iron plaque affixed to the northwest inclined end post has letters in relief that read "BUILT BY / MISSOURI VALLEY / BRIDGE & IRON CO. / LEAVENWORTH KANSAS / 1913." Letters in relief read "CAMBRIA" and "JONES & LAUGHLINS" on several structural components.

INTEGRITY

The Delaware River Warren Truss Bridge is an excellent example of this bridge type, historically very popular in Kansas.² In spite of the c.1965 reconstruction of the south abutment,³ the Delaware River Warren Truss Bridge retains a good degree of integrity. The original workmanship, materials, design, setting, and feeling of the property are readily apparent. Furthermore, the potential for preservation of the bridge is high. Located on a secondary road, it is unlikely that traffic requirements will necessitate alteration or replacement.

¹ A pony truss is also referred to as a low truss.

² Dale Nimz, *Activity III Review Initial Assessment Metal Truss Bridges*. (Topeka: Kansas State Historical Society, 1998), 6. He identifies approximately 400 extant Warren trusses in Kansas.

³ Ploeger, Warren, Brown County Commissioner, District 3. Telephone interview with author, 14 June 2002.

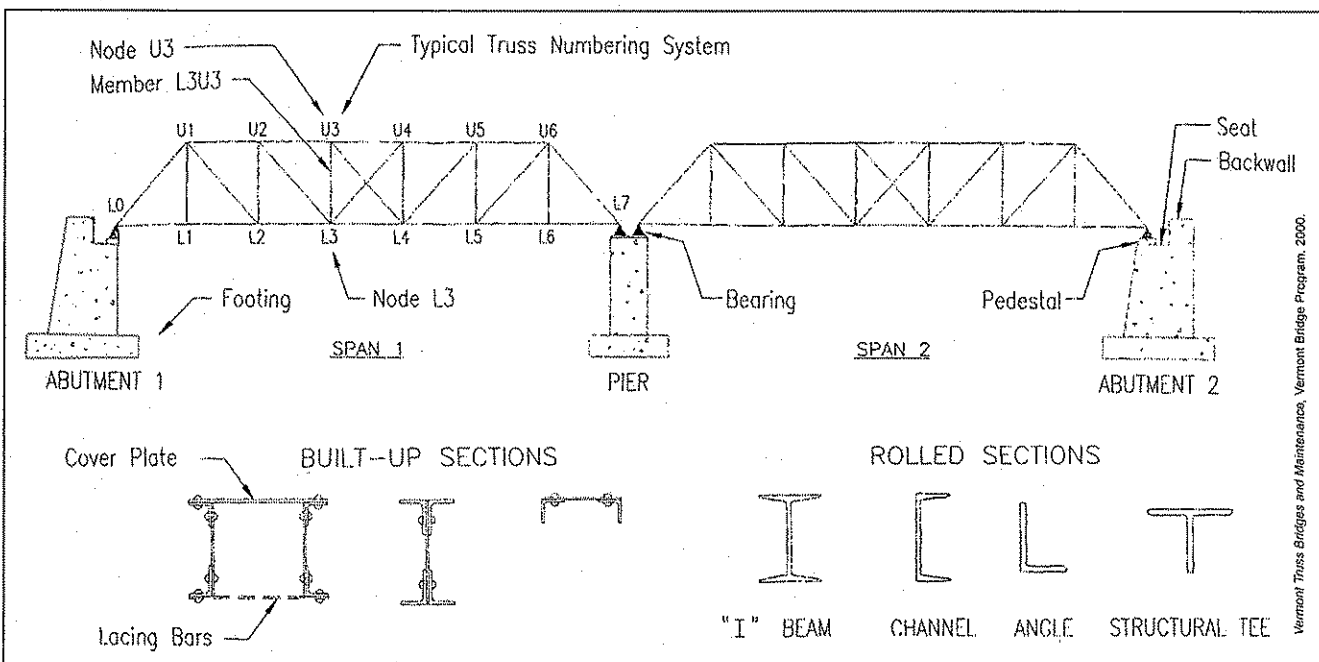
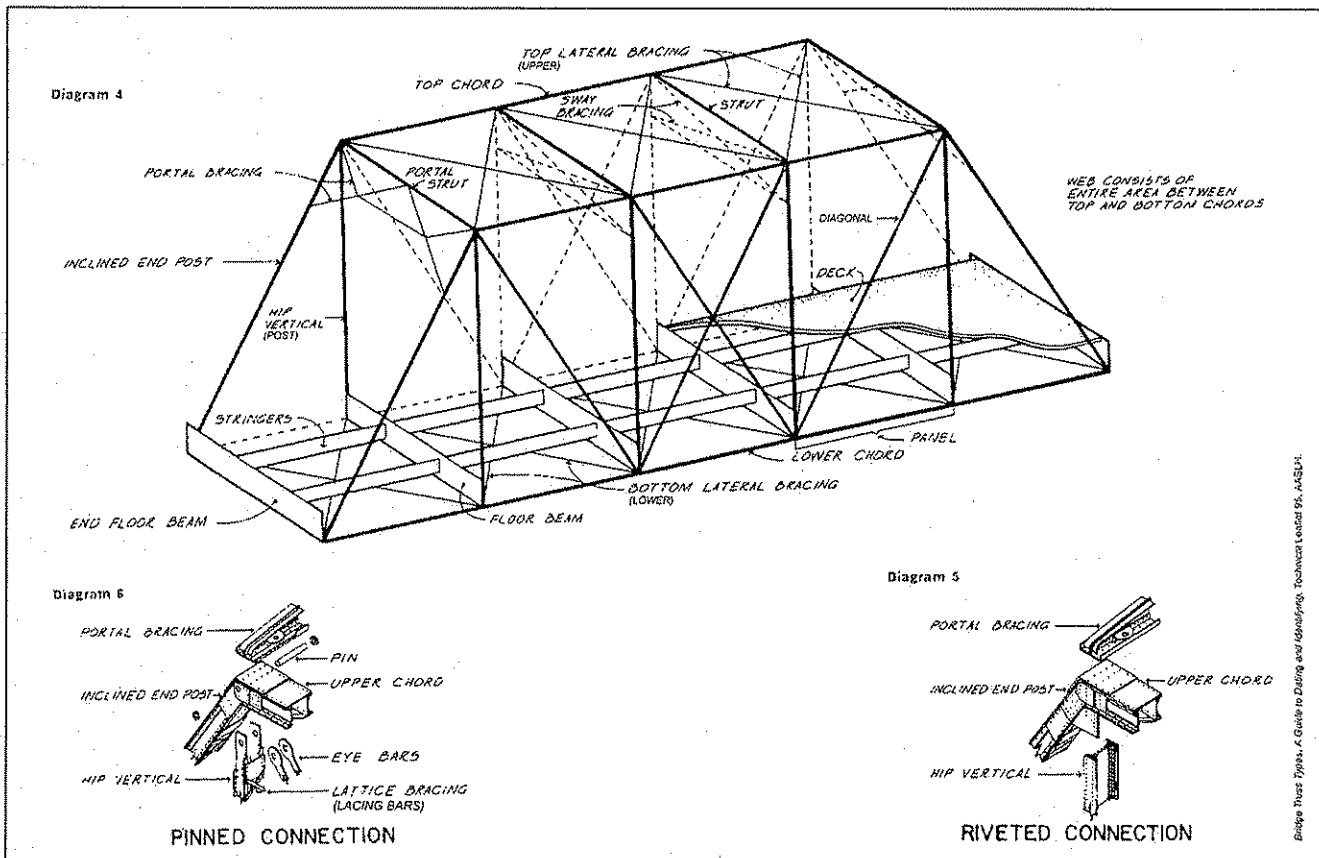
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**NATIONAL REGISTER OF HISTORIC PLACES
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Delaware River Warren Truss Bridge
Brown County, Kansas

TRUSS TERMINOLOGY



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Delaware River Warren Truss Bridge
Brown County, Kansas

STATEMENT OF SIGNIFICANCE

The Delaware River Warren Truss Bridge is significant under National Register Criterion C in the areas of Engineering and Transportation. As defined by the *Multiple Property Documentation Form for Metal Truss Bridges in Kansas*, it is an excellent example of the Warren truss bridge type. Built in 1913, the Delaware River Warren Truss Bridge represents a common, economical bridge solution applied to a relatively long span. Its riveted structure, concrete abutments, and concrete-filled piers illustrate the standardization of these construction techniques and materials during the period of significance. As no historic name identifies this bridge, the preferred name "Delaware River Warren Truss Bridge" has been assigned. This describes the location, design, and function of the structure.

ELABORATION

The need for all-weather crossings of rivers and streams corresponded to the growth of the market economy across Kansas during the late nineteenth and early twentieth centuries. Bridges provided farmers easy access to markets and could make the difference between growth and stagnation for the many small, young communities across the state.¹ Proximity to a bridge often secured a town's economic stability, and it contributed to a local sense of modernity.

Prior to the 1930s, the railroad was the primary means of long-distance travel and there was little need for roads to extend more than a few dozen miles. With little stimulus for improving roads that would cross multiple jurisdictions, road construction and maintenance remained local concerns. County commissioners often carried the burden of selecting bridge locations, over which much contention was common.

The range of choices for bridge designs and companies was vast. Many of the larger bridge companies sold metal truss bridges through mail order catalogues. County commissioners could simply specify the span, clearance needs, and truss type (if there was a preference), then choose the lowest bidder from the numerous competing companies that had salesmen in the field.

By the late nineteenth century, fabrication of iron and steel was widespread. The speed of construction and the relatively low cost of metal truss bridge parts ensured their popularity over labor-intensive masonry bridges and short-lived timber bridges. Toward the end of the nineteenth century, the quality, quantity, and cost of steel improved to such a degree that it virtually replaced wrought iron for bridge construction by 1910.²

Most metal trusses were constructed of built-up members composed of mass-produced, standard-shaped channel, plate, and angle stock purchased from one or more of the numerous steel companies nationwide. The bridge companies preassembled trusses in their factories then simply shipped them to the bridge site for installation. Installation involved grading approaches, constructing abutments and piers, erecting preassembled floor and truss members, and placing deck material.

¹ Larry Jochims, *Metal Truss Bridges in Kansas 1861-1939, National Register of Historic Places Multiple Property Documentation Form*, (Topeka: Kansas State Historical Society, 1989), E.

² Ibid, F.

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Delaware River Warren Truss Bridge
Brown County, Kansas

Before 1900, generally all panel point connections – the locations at which structural bridge elements intersect – were made with the use of a pin. This technique was so widespread that it became one of the distinctive features of American bridge construction in the nineteenth century.³ However, subsequent advancements in pneumatic riveting techniques greatly improved rivet installation quality, enabling more reliable panel point connections. With the increased portability of this construction technology, the more rigid riveting technique rapidly surpassed pin-connected bridge construction during the first years of the twentieth century. The riveted construction of the Delaware River Warren Truss Bridge illustrates the standardization of this technique.

In addition, the contemporary development of economic cement production promoted the widespread combination of steel and concrete in bridge construction. It was not uncommon for older metal truss bridges to receive new reinforced concrete decks or poured concrete reinforcements for older stone abutments. By the 1920s, reinforced concrete was the standard material for abutments, piers, and decks of steel truss bridges. The concrete deck, abutment, and concrete-filled piers of the Delaware River Warren Truss Bridge are typical of bridges built during the period of significance.

The Delaware River Warren Truss Bridge is a classic example of this truss design. Patented in 1848, the Warren truss has diagonal members that are alternately placed in either tension or compression, resulting in a visually distinctive system of alternating equilateral triangles. Vertical members are often incorporated to further strengthen the truss, as in the Delaware River Warren Truss Bridge. Many Warren trusses also include a polygonal top chord for additional structural stability.⁴

While the straightforward design of the Warren truss was desirable, the lack of counters and sometimes verticals subjected the center pins to extensive wear, making it less durable and therefore less popular than the Pratt truss during the nineteenth century. The later standardization of riveted construction techniques eliminated these issues and the Warren truss gained popularity.⁵ In Kansas, Warren trusses were constructed well into the middle of the twentieth century, suggesting the appeal of the design's strength, simplicity, and economical construction costs. In 1998, approximately 400 Warren truss bridges, including the Delaware River Warren Truss Bridge, existed throughout the state of Kansas.⁶

STRUCTURE HISTORY

The nearby town of Fairview, Powhattan Township, developed during the period of rapid settlement along the Delaware River and Spring Creek valleys in the decades after 1854. Despite the lack of railroad access or major towns, Powhattan Township was the third most populous of the ten townships in Brown County in 1880. By 1888, the Chicago, Rock Island, and Pacific Railroad established a station stop in Fairview to serve a branch of its

³ Ibid, F.

⁴ T. Allan Comp and Donald Jackson, *Bridge Truss Types: A guide to dating and identifying*. (Nashville, Tennessee: American Association for State and Local History, Technical Leaflet 95), 8. A Warren truss with a polygonal top chord is also referred to as a modified Warren truss.

⁵ Jochims, E2.

⁶ Nimz, 6.

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Delaware River Warren Truss Bridge
Brown County, Kansas

Chicago, Kansas & Nebraska Railway.⁷ With rail access, Fairview became known as “a comparatively modern and thriving agricultural trade center.”⁸ Typical of small towns throughout Kansas, it served as a trading and shipping point for the surrounding rural community. As a result, fords and bridges that provided area farmers with access to local markets and rail lines were critical to the survival of the regional economy.

The Missouri Valley Bridge & Iron Company of Leavenworth, Kansas, a prolific Kansas bridge builder, built the Delaware River Warren Truss Bridge in 1913. Markings on the structural members indicate that Missouri Valley Bridge & Iron Company purchased the stock metal from both Jones & Laughlins Steel Corporation of Pittsburgh, Pennsylvania and Cambria Steel Company of Johnstown, Pennsylvania.

In 1874, Edwin I. Farnsworth and D. W. Eaves of the Wrought Iron Bridge Company (Canton, Ohio) founded the Missouri Valley Bridge Company in an effort to manufacture and sell bridges locally rather than import them from eastern firms. By 1904, the company incorporated as the Missouri Valley Bridge & Iron Company and built everything from bridges to boats. Their most notable project was the construction of the piers for the San Francisco Bay Bridge in 1936.⁹

According to Warren Ploeger, Brown County Commissioner, District 3, the original south abutment washed out and the existing south abutment was constructed c.1965. No further construction history has presently been located.¹⁰

⁷ *New and Correct Map of the Chicago, Kansas & Nebraska Railway. Rock Island Route.* Buffalo, 1888.

⁸ *WPA Guide to 1930s Kansas.* (Lawrence: University of Kansas Press, 1984), 312.

⁹ Jochims, E3.

¹⁰ Inquiry into the Brown County Road and Bridge records, Kansas Department of Transportation records, Kansas State Historical Society archives, Brown County Historical Society, and *Western Contractor* revealed no further construction history specific to the Delaware River Warren Truss Bridge.

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Delaware River Warren Truss Bridge
Brown County, Kansas

BIBLIOGRAPHY

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- Cutler, William G. *History of the State of Kansas*. Chicago: A. T. Andreas, 1883.
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- Historic Highway Bridges in Pennsylvania*. Harrisburg: Pennsylvania Department of Transportation and Pennsylvania Historical and Museum Commission, 1986.
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- Jochims, Larry. *Riley Creek Bridge, National Register of Historic Places Registration Form*. Topeka: Kansas State Historical Society, 1989.
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- New and Correct Map of the Chicago, Kansas and Nebraska Railway. Rock Island Route*. Buffalo, 1888. [digitized maps on-line]; available from <http://memory.loc.gov/ammem/gmdhtml/rrhtml/rrhome.html>; Internet; accessed 1 June 2002.
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- Vermont Truss Bridges and Maintenance*. Vermont Bridge Program, 2000.
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Delaware River Warren Truss Bridge
Brown County, Kansas

GEOGRAPHICAL DATA

Verbal Boundary Description:

Located on the line between the NE $\frac{1}{4}$ of Section 22 and the NW $\frac{1}{4}$ of Section 23, Township 3S, Range 15E, the Delaware River Warren Truss Bridge encompasses an area measuring approximately 103.5 feet by 14 feet. The northwest corner of this area corresponds to the northwest corner of the bridge.

Boundary Justification:

The boundary includes the truss, deck, abutments, and associated approaches that represent the significant features associated with the bridge structure.

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CONTINUATION SHEET**

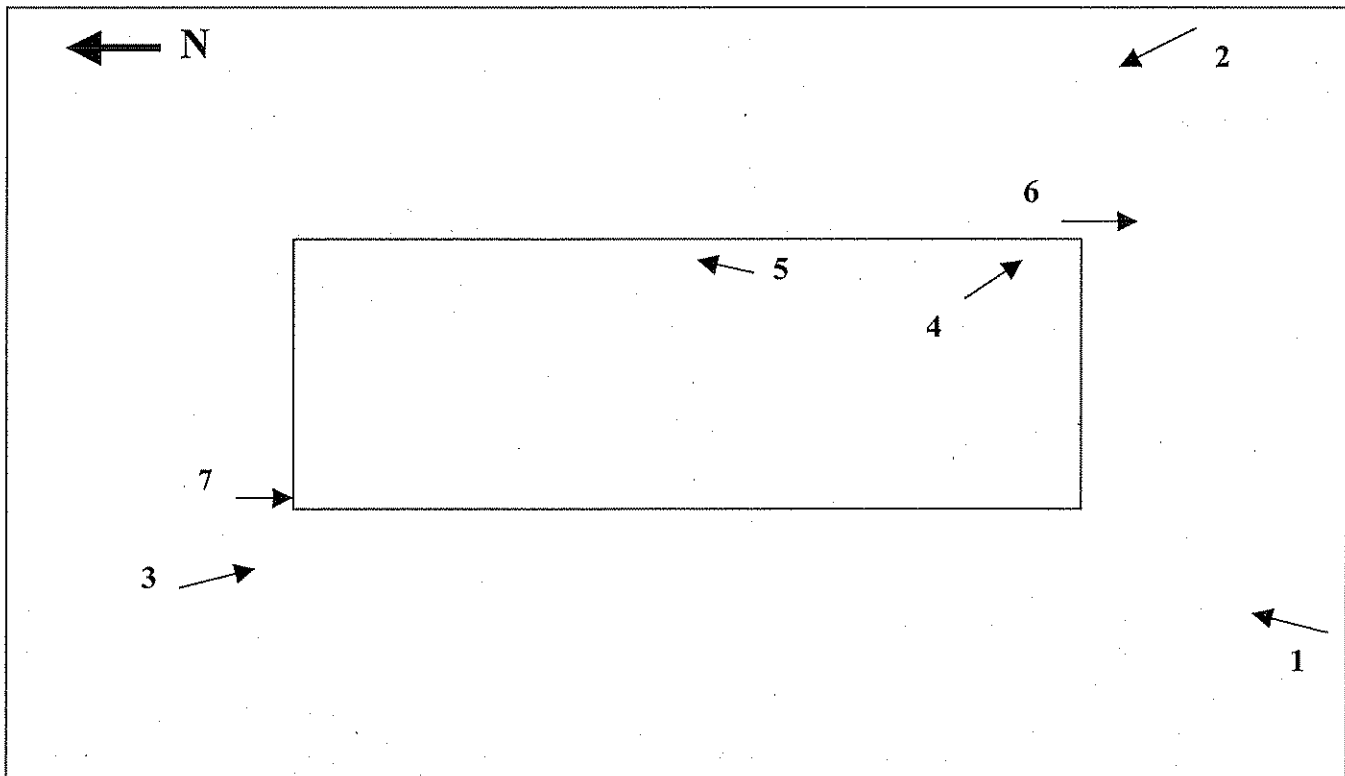
Section - Photographic Documentation Page 8

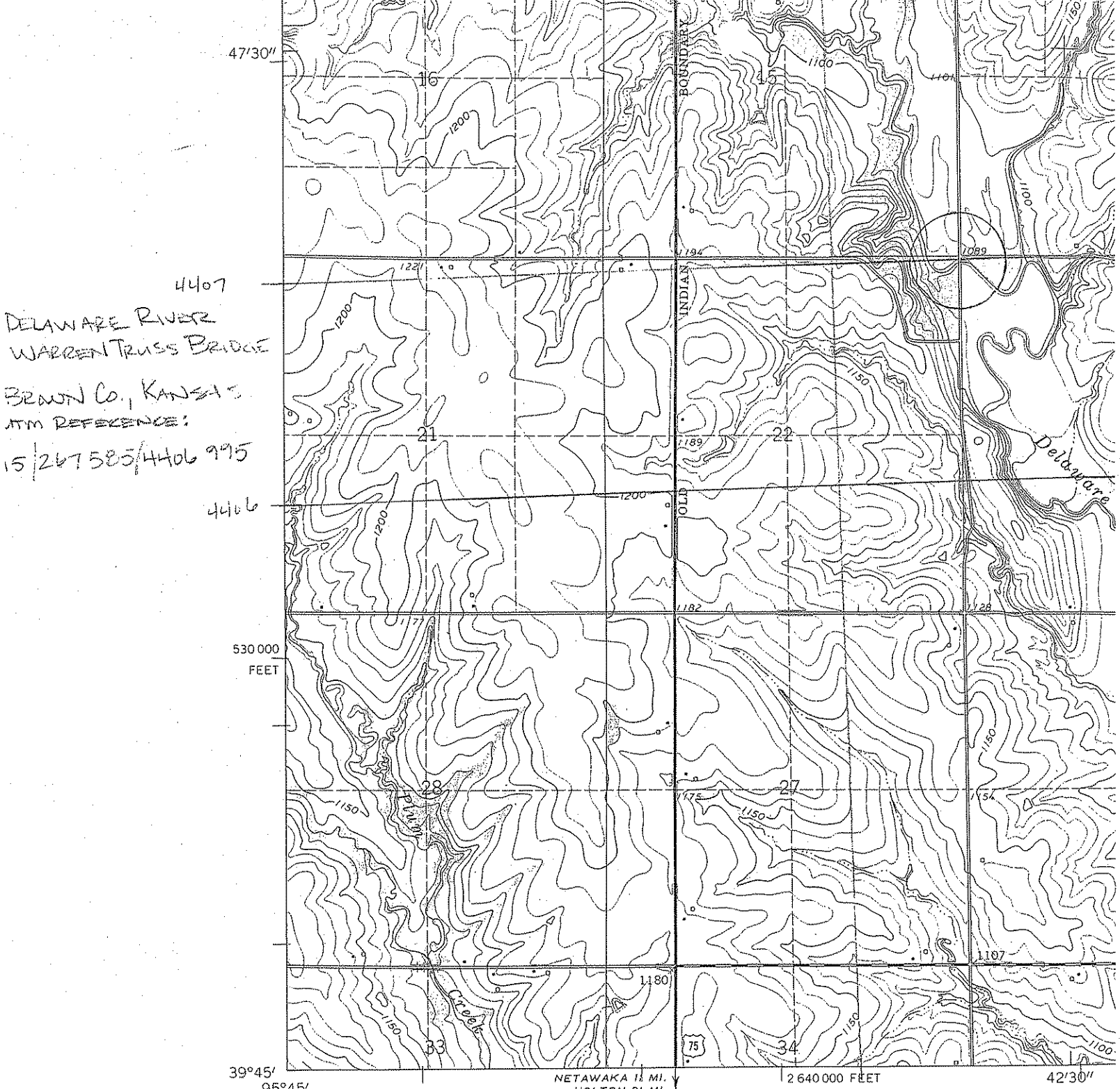
Delaware River Warren Truss Bridge
Brown County, Kansas

PHOTO LOG

Photographer: Kerry Davis
Date of Photographs: May 2002
Location of Original Negative: Kansas State Historical Society, Topeka, Kansas

Photograph Number	Camera View
1.	View NE, bridge truss and piers
2.	View NW, bridge truss, piers, and abutment
3.	View SE, bridge truss and deck
4.	View SE, top chord and inclined end post node detail
5.	View N, deck, guardrail, truss, angle buttresses
6.	View S, south abutment and approach span
7.	View S, plaque detail





4407
 DELAWARE RIVER
 WARREN TRUSS BRIDGE
 BROWN CO., KANSAS
 ATM REFERENCE:
 15/267585/4406995

4406

530 000
 FEET

39°45'
 95°45'

NETAWAKA 11 MI.
 HOLTON 21 MI.

2 640 000 FEET

42'30"

(HIAWATHA 1:125 000)

Mapped, edited, and published by the Geological Survey

Control by USGS and USC&GS

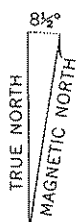
Topography from aerial photographs by photogrammetric methods
 Aerial photographs taken 1957. Field check 1960

Polyconic projection. 1927 North American datum
 10,000-foot grid based on Kansas coordinate system, north zone
 1000-meter Universal Transverse Mercator grid ticks,
 zone 15, shown in blue

Fine red dashed lines indicate selected fence and field lines where
 generally visible on aerial photographs. This information is unchecked

267

263



APPROXIMATE MEAN
 DECLINATION, 1960

1
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FI