NPS Form 10-900
OMB No. 1024-0018
(Rev. 10/90)

United States Department of the Interior
National Park Service

National Register of Historic Places Registration Form

1. **Name of Property**

Historic name: _____

Other name/site number: Delaware River Composite Truss Bridge (preferred); 44-HT-03

2. **Location** On Coal Creek Road, 0.1 miles south of the intersection with 170th Road; at the northeast city limits of Valley Falls.

not for publication

city or town Valley Falls X vicinity

state code KS county Jefferson county code 087 zip code 66088

3. State/Federal Agency Certification

As the designated authority under the National Historic Preservation Act of 1986, as amended, I hereby certify that this XX 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 XX meets does not meet the National Register criteria. I recommend that this property be considered significant ___ nationally XX statewide ___ locally. (___ See continuation sheet for additional comments.)

Richard D. Pankratz 4/09/03
Signature of certifying official Date

KANSAS STATE HISTORICAL SOCIETY
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 or other official Date

State or Federal agency and bureau

4. National Park Service Certification

I, hereby, certify that this property is:

___ 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:)

Signature of Keeper Date of Action

5. Classification

Ownership of Property	Category of Property	No. of Resources within Property	
		contributing	noncontributing
___ private	___ building(s)		___ buildings
X public-local	___ district		___ sites
___ public-State	___ site		___ structures
___ public-Federal	X structure	1	___ objects
	___ object		
		1	0 Total

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

Metal Truss Bridges in Kansas

No. of contributing resources previously listed in the National Register

0

6. Functions or Use

Historic Functions
(Enter categories from instructions.)

TRANSPORTATION: Road-related (vehicular)

Current Functions
(Enter categories from instructions.)

TRANSPORTATION: Road-related (vehicular)

7. Description

Architectural Classification
(Enter categories from instructions.)

OTHER: Parker Truss

OTHER: Warren Truss, Polygonal Top Chord

Materials
(Enter categories from instructions.)

Foundation Concrete

Walls

Roof

Other Metal: Steel

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

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.

X 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.)	Period of Significance	Significant Dates
ENGINEERING	1936	1936
TRANSPORTATION		

Cultural Affiliation

N/A

Significant Person

N/A

Architect/Builder

unknown

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

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 Record # _____

Primary location of additional data:

X State Historic Preservation Office

____ Other State agency

____ Federal agency

X Local government

____ University

____ Other

Specify repository:

10. Geographical Data

Acreage of property <1 acre

UTM References

	Zone	Easting	Northing		Zone	Easting	Northing
1	1/5	2/8/8/4/84/0	4/3/5/8/3/7/0	3	/	/ / / / /	/ / / / / /
2	/	/ / / / /	/ / / / / /	4	/	/ / / / /	/ / / / / /

___ 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 Jefferson

street & number 300 Jefferson, P.O. Box 321 telephone 785-863-2211

city or town Oskaloosa state KS zip code 66066

DESCRIPTION

LOCATION AND SETTING

The Delaware River Composite Truss Bridge is located at the northeastern city limits of Valley Falls in northeast Kansas; SW ¼ of Section 18, Township 8S, Range 18E. The region is defined by rounded hills and broad, wooded valleys. The Delaware River Composite Truss Bridge carries Coal Creek Road across the Delaware River, a wide, shallow course that flows into Perry Lake approximately five miles south. The paved roadway, flanked by residential neighborhoods to the south and wooded bottomland to the north, aligns directly with the Delaware River Composite Truss Bridge. Remnant abutments from two demolished railroad bridges stand adjacent to the east side of the Delaware River Composite Truss Bridge.

TRUSS TYPE

The Delaware River Composite Truss Bridge consists of a riveted Parker through truss[1] that measures 152 feet in length, flanked at each end by 103-foot Warren pony trusses.[2] The deck is 25 feet wide. Standard box-form poured concrete abutments with beveled edges support the outer bearings of the pony trusses, which rest directly on the abutment seat pads. Two, unique, monolithic, poured concrete piers with tapered columns connected by a central arched spandrel support the inner truss bearings. The abutment side walls extend approximately 15 feet along the approach grades.

Parker Truss

Seven slopes form the polygonal top chords, creating the arched shape distinctive to a Parker truss.[3] The top chords and inclined end posts consist of two channels, a cover plate, lacing bars, and stay plates; the bottom chords consist of channel stock with stay plates.

The web members include vertical posts that form seven equivalent panels and diagonal ties that intersect within the central panel. The vertical posts and diagonal ties are composed of channel stock.

A system of intersecting, riveted angle stock lacing bars and stay plates form the portal and sway bracing that connects the top chords at each vertical post, leaving a vertical clearance of 14 feet. Upper lateral bracing intersects diagonally between the top chords and is composed of angle stock and lacing bars.

Warren Trusses

Seven slopes form the polygonal top chords, creating an arched shape.[4] 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 channels with stay plates.

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[1] A through truss is also referred to as a high truss.
[2] A pony truss is also referred to as a low truss.
[3] The Parker truss is a Pratt truss with a polygonal top chord of more than five slopes.
[4] A Warren truss with a polygonal top chord is also referred to as a modified Warren truss.

The web members include vertical posts that form twelve equivalent panels and diagonal members that form the system of alternating equilateral triangles distinctive to the Warren truss. The vertical posts and diagonal members are composed of riveted channel stock.

The concrete deck is 25 feet wide with tall, beveled curbs and downspouts. It rises approximately 28 feet above the riverbed on steel I-beam stringers. Floor beams located at the base of each vertical post of the Parker truss and every other vertical post of the Warren trusses, are structurally integrated among the stringers.

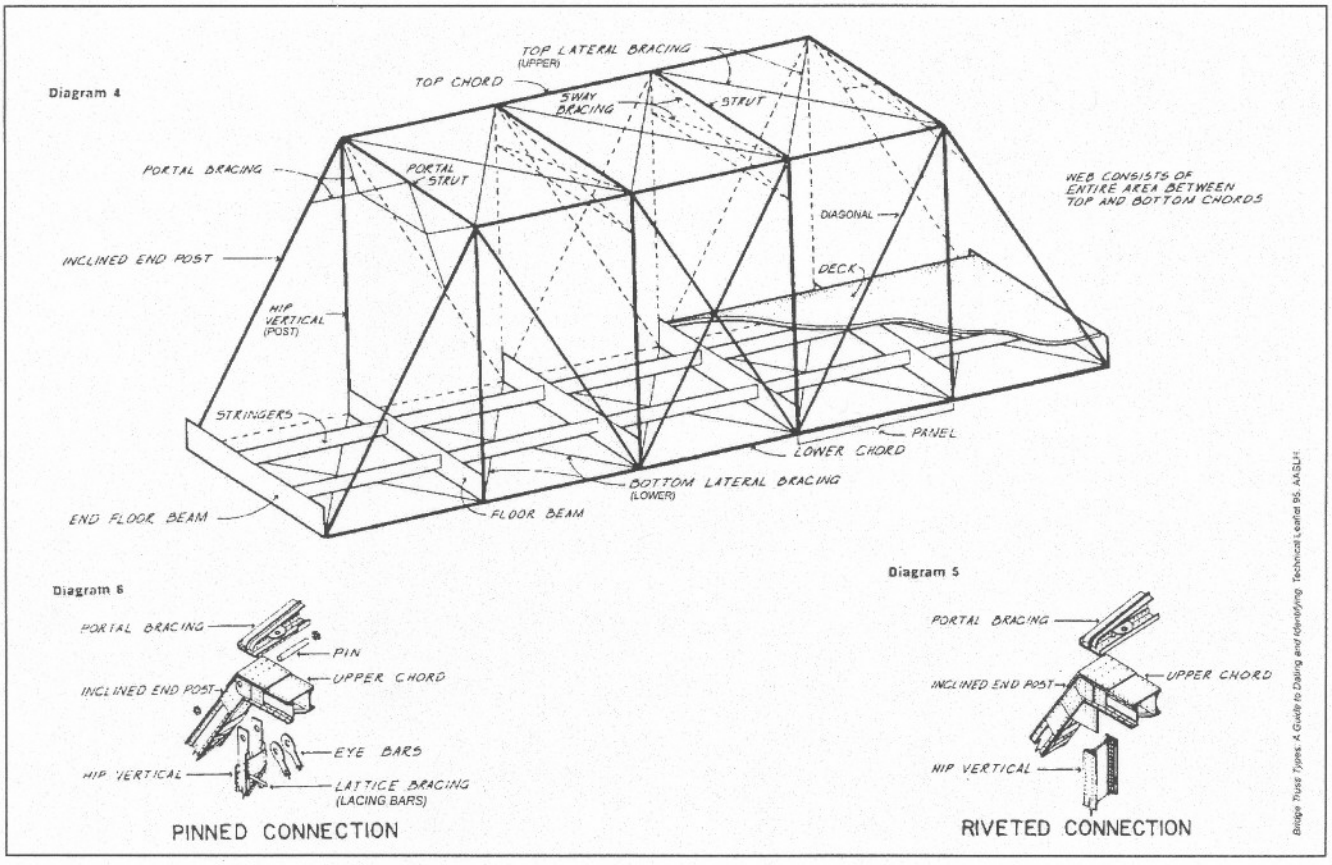
The historic guardrails, composed of parallel channel stock and pipe rail, are intact along the length of the bridge. Letters in relief read "ILLINOIS S USA" and "…HEFF…ELD …SL" on several structural components.

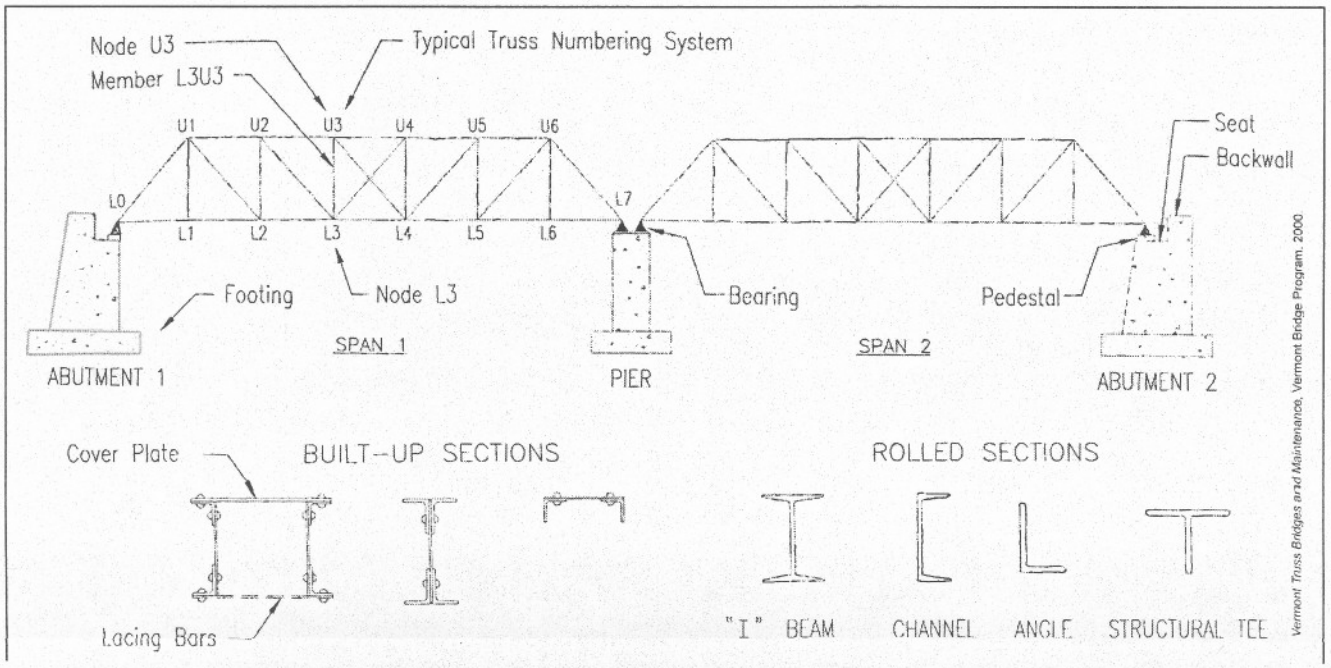
INTEGRITY

The Delaware River Composite Truss Bridge is an excellent, rare Kansas example of a combination bridge that includes both Parker and Warren trusses.[5] The Delaware River Composite Truss Bridge retains a high degree of integrity with no apparent alterations to the original design or materials. The original workmanship, materials, design, setting, and feeling of the property are readily apparent. Furthermore, the potential for preservation of the bridge is good. With ample alternate routes and a modern highway bypass in the vicinity, it is not likely that traffic requirements will necessitate alteration or replacement.

[5] Dale Nimz, *Activity III Review Initial Assessment Metal Truss Bridges.* (Topeka: Kansas State Historical Society, 1998), 6. Nimz stated there were only four candidate Parker truss bridges and approximately 400 extant Warren trusses in Kansas. He makes no mention of extant composite truss bridges.

TRUSS TERMINOLOGY





STATEMENT OF SIGNIFICANCE

The Delaware River Composite 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 both the Parker and Warren truss bridge types. Built in 1936,[1] the Delaware River Composite Truss Bridge represents an uncommon compound bridge solution applied to a long span. Its riveted structure and concrete deck, piers, and abutments 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 Composite 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.[2] 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.[3]

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.

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[1] Jefferson County Engineer's records and Art Strawn, nearby resident, corroborate the construction date.
[2] 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.
[3] Ibid, F.

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.[4] 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 Composite 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 poured concrete deck, piers, and abutments of the Delaware River Composite Truss Bridge are typical of bridges built during this period.

The Delaware River Composite Truss Bridge is a unique compound structure that includes a Parker truss centerpiece flanked by Warren truss approach spans. The Parker truss is a variation of the Pratt truss. Patented in 1844, the Pratt truss incorporates vertical members in compression and diagonal members in tension, a design that reduces the required length of compression members, helping to prevent bending or buckling.[5] The Pratt truss became the most common bridge type of the late nineteenth and early twentieth centuries and spawned numerous variations including Parker, Camelback, Baltimore, Truss Leg Bedstead, Lenticular, and Pennsylvania trusses.[6]

The Parker truss is a Pratt truss with a polygonal top chord. This variation increased truss strength while using the same amount of material, however the lack of uniformity among members often led to increased construction costs.[7] The Parker truss bridge type continued to be constructed into the early twentieth century in Kansas, however it was never widespread. In 1998, approximately four Parker truss bridges, including the Delaware River Composite Truss Bridge, existed throughout the state of Kansas.[8]

The Warren truss approach spans of the Delaware River Composite Truss Bridge are examples of a very popular bridge truss design during the first half of the twentieth century. Patented in 1848, the Warren truss has diagonal members 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 and many, such as the approach spans of the Delaware River Composite Truss Bridge, also include a polygonal top chord for additional structural stability.[9]

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[4] Ibid, F.
[5] 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.
[6] Ibid.
[7] Ibid.
[8] Nimz, 6. Nimz stated there were only 4 candidate Parker truss bridges in Kansas.
[9] 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.

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.[10] 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, not including the approach spans of the Delaware River Composite Truss Bridge, existed throughout the state of Kansas.[11]

STRUCTURE HISTORY

The town of Valley Falls, then known as Grasshopper Falls, was founded in 1855 at the falls of the Grasshopper River, now the Delaware River. The falls were the primary reason for establishing the town and a company was soon organized to build a sawmill and gristmill. The town grew slowly until the arrival of the Atchison, Topeka, and Santa Fe Railroad and the Kansas Central Railroad in 1872. As a result, Valley Falls grew rapidly and became known as the "metropolis of the county."[12] By the early 1880s, the town boasted a population of 1,200 residents, three hotels, two banks, two newspapers, three mills (wool, oil, and grist), an elevator, and a door and window manufacturing company. Valley Falls maintained its steady commercial foundation into the 1930s with little change in population over the previous 50 years. Typical of small cities 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 were critical to the survival of the regional economy.

According to the Jefferson County Engineer's records, the Delaware River Composite Truss Bridge was constructed in 1936. As reported by Art Strawn, a nearby, life-long resident, Works Project Administration crews constructed the bridge in collaboration with Jefferson County.[13] Markings on the structural members indicate that the Illinois Steel Company[14] of Gary, Indiana and possibly the Sheffield Steel Company[15] of Birmingham, Alabama produced the stock metal.

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[10] Jochims, E2.
[11] Nimz, 6.
[12] William G. Cutler. *History of the State of Kansas: Jefferson County.* (Chicago: A. T. Andreas, 1883).
[13] Art Strawn. Telephone conversation with author, 7 June 2002.
[14] Illinois Steel Company was a subsidiary of U. S. Steel at the time.
[15] Markings are only partially legible but appear to read "Sheffield."

BIBLIOGRAPHY

Comp, T. Allan and Donald Jackson. *Bridge Truss Types: A guide to dating and identifying.* Nashville, Tennessee: American Association for State and Local History, Technical Leaflet 95.

Cutler, William G. History of the State of Kansas. Chicago: A. T. Andreas, 1883.

Delaware Historic Bridges, Survey and Evaluation. Historic Architecture and Engineering Series, No. 89. Dover: Delaware Department of Transportation, Division of Highways, 1991.

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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.

Kansas Historic Bridge Rating System. Kansas Department of Transportation, 1980-1983.

Nimz, Dale E. *Activity III Review Initial Assessment Metal Truss Bridges.* Topeka: Kansas State Historical Society, 1998.

The Second Ohio Historic Bridge Inventory: Evaluation and Preservation Plan. Columbus: Ohio Department of Transportation, 1990.

Strawn, Art. Telephone conversation with author, 7 June 2002.

"Valley Falls Town History," *LASR – Valley Falls, Kansas.* [article on-line]; available from **http://www.lasr.net/leisure/kansas/jefferson/valleyfalls/body.html;** Internet; accessed 16 June 2002.

Vermont Truss Bridges and Maintenance. Vermont Bridge Program, 2000.

WPA Guide to 1930s Kansas. Lawrence: University of Kansas Press, 1984.

GEOGRAPHICAL DATA

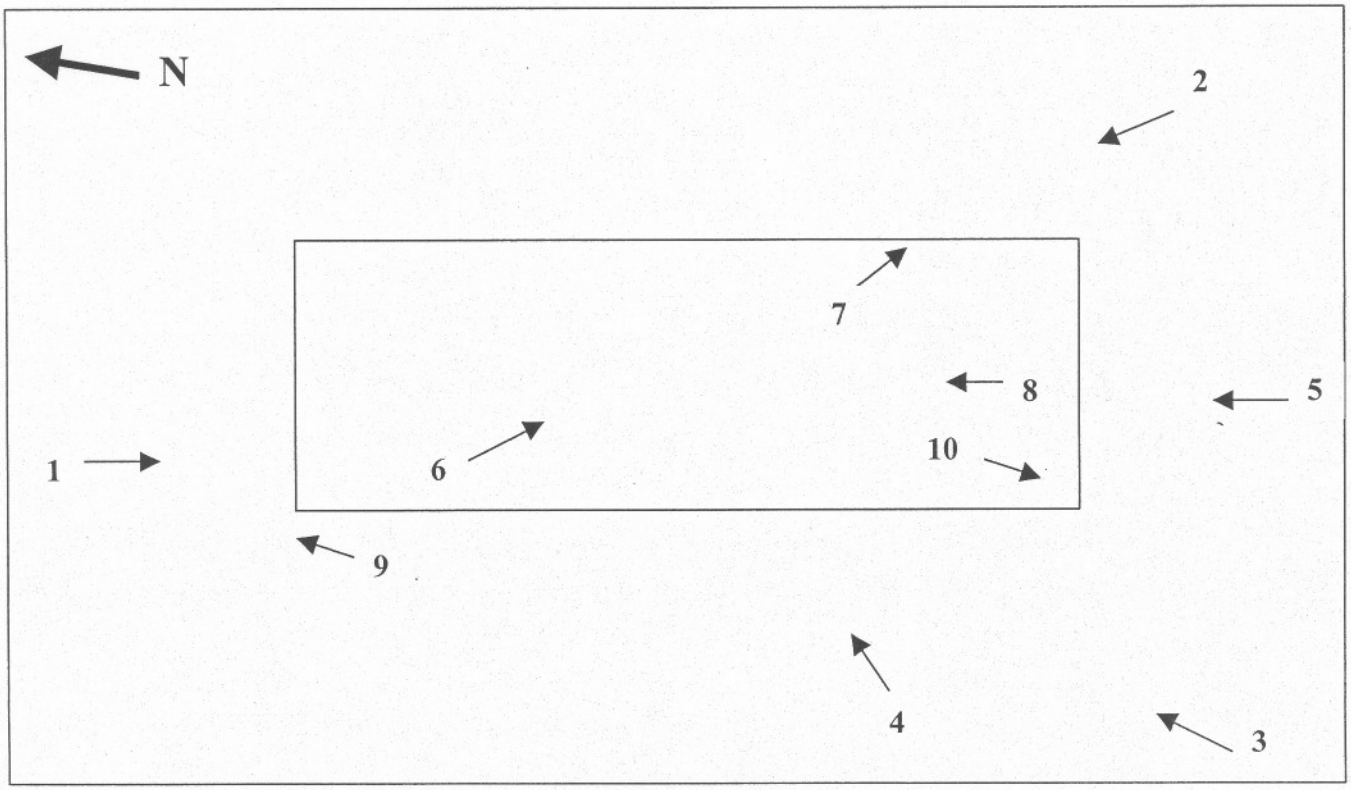
Verbal Boundary Description:
Located on the SW ¼ of Section 18, Township 8S, Range 18E, the Delaware River Composite Truss Bridge encompasses an area measuring approximately 358 feet by 25 feet. The northwest corner of this area corresponds to the northwest corner of the bridge.

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

PHOTO LOG

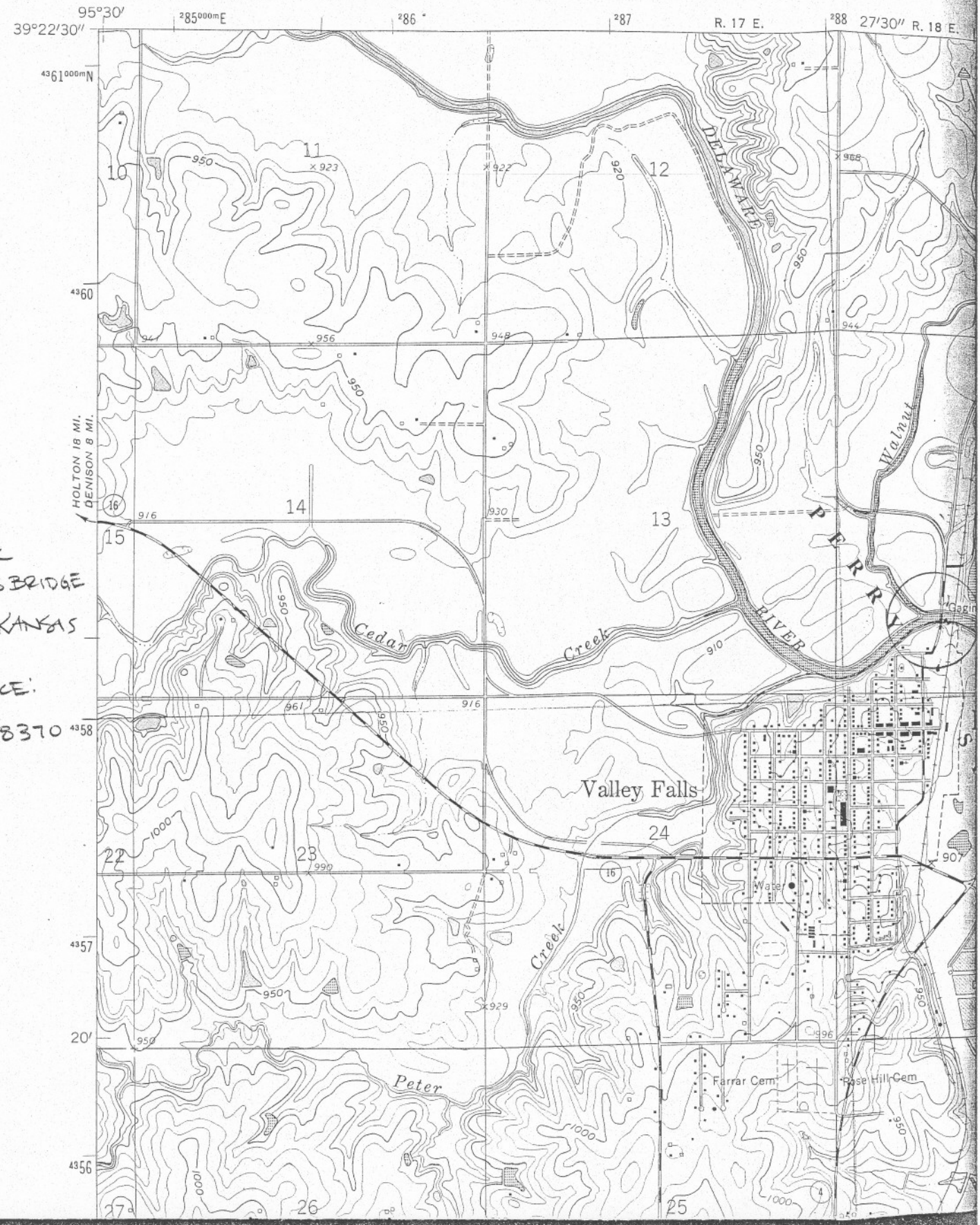
Photographer: Kerry Davis
Date of Photographs: May 2002
Location of Original Negative: Kansas State Historical Society, Topeka, Kansas

Photograph Number	Camera View
1.	View S, bridge trusses and roadway
2.	View NW, bridge trusses and piers
3.	View NE, bridge trusses
4.	View NE, bridge trusses and piers
5.	View N, along roadway
6.	View SE, central span portal
7.	View SE, upper node detail
8.	View N, bridge understructure and south pier
9.	View NE, north abutment and truss bearing
10.	View SW, south abutment and truss bearing



6862 I NE
(ARRINGTON)

UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY



AWARE RIVER
SITE TRUSS BRIDGE
ERSON CO., KANSAS

1 REFERENCE:
88480/4358370