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

270.

United States Department of the Interior
National Park Service

National Register of Historic Places Registration Form

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NAT

1. **Name of Property**

Historic name: Old Katy Bridge

Other name/site number: Lyon Creek Pratt Truss Bridge; 31-HT-01

2. **Location** On Otter Creek Road, 0.4 miles south of the intersection with Lyons Creek Road; 0.5 miles southeast of the hamlet of Wreford.

not for publication

city or town Wreford X vicinity

state code KS county Geary county code 061 zip code 66442

3. State/Federal Agency Certification

As the designated authority under the National Historic Preservation Act of 1986, 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 D. Easkertz 3/26/03
Signature of certifying official 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 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. Edson H. Beall
___ 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

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state code KS county Geary county code 061 zip code 66442

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)		
_X_ public-local	___ district	_____	_____ buildings
___ public-State	___ site	_____	_____ sites
___ public-Federal	_X_ structure	1	_____ structures
	___ object	_____	_____ objects
		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: Rail-related

Current Functions
(Enter categories from instructions.)

TRANSPORTATION: Road-related (vehicular)

7. Description

Architectural Classification
(Enter categories from instructions.)

OTHER: Pratt Truss

Materials
(Enter categories from instructions.)

Foundation Concrete, stone

Walls

Roof

Other Metal: Iron, 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	1895-1913	1895
TRANSPORTATION		1908
		1913

Cultural Affiliation

N/A

Significant Person

N/A

Architect/Builder

Pencoyd Bridge & Construction Co. (Pencoyd, Pennsylvania)

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	1/4	6/8/6/6/5/0	4/3/1/3/7/8/0	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 Geary

street & number 139 East 8th Street, P.O. Box 927 telephone 785-229-3612

city or town Junction City state KS zip code 66441

DESCRIPTION

LOCATION AND SETTING

The Old Katy Bridge is located 0.5 miles south of the hamlet of Wreford in the heart of the Flint Hills region of east-central Kansas; in the NW ¼ of Section 2, Township 13S, Range 5E. The region is defined by rolling prairie hills with deep, tree-lined creek valleys and rocky bluffs. The Old Katy Bridge carries Otter Creek Road across Lyon Creek, a wide, deep branch of the Smoky Hill River. The dirt roadway travels southwest out of Wreford on a former railroad bed, flanked by cultivated fields and rocky bluffs. The roadway aligns directly with the Old Katy Bridge.

TRUSS TYPE

The Old Katy Bridge is a railroad truss bridge retrofitted for automobile traffic. It consists of a pin-connected Pratt through truss[1] that measures 129 feet in length and a timber girder northeast approach span that measures 11 feet in length. The deck is 15 feet wide. The abutments and single pier vary in construction techniques and materials. Standard, box-form, poured concrete abutments support the northeast end of the approach span and the southwest bearings of the truss, which rest directly on the abutment seat. The poured concrete abutments have beveled corners, and the date "1913" is stamped into each column.

The wide side walls of the southwest abutment extend approximately 7 feet along the banks. A stout, rough-cut limestone pier with a poured concrete cap stamped "1908" supports the northeast bearing of the truss and the inner end of the approach span.

The inclined end posts rise from the bottom chords and meet the horizontal top chords to form a trapezoidal shape. The top chords and end posts consist of two channels and lacing bars; the bottom chords consist of flat eye bars.

The web members consist of vertical posts that form six equivalent panels and diagonal ties that intersect within the two central panels. Channel stock and lacing bars compose the vertical posts. Flat eye bars and tension rods compose the diagonal ties.

A riveted system of intersecting angle stock and distinctive curved angle bars form the portal and sway struts that connect the top chords at each vertical post, leaving a vertical clearance of 25 feet. Upper lateral bracing bars intersect diagonally between the top chords.

The timber deck is 15 feet wide and rises 24 feet above the creek bed on large, steel, railroad grade I-beam stringers. Floor beams at the base of each vertical post are structurally integrated with the stringers.

Modern metal guardrails are intact along the length of the bridge. A rectangular cast iron plaque on the northeast inclined end post reads "BUILT BY THE / PENCOYD BRIDGE & / CONSTRUCTION CO. / PENCOYD PA / 1895."

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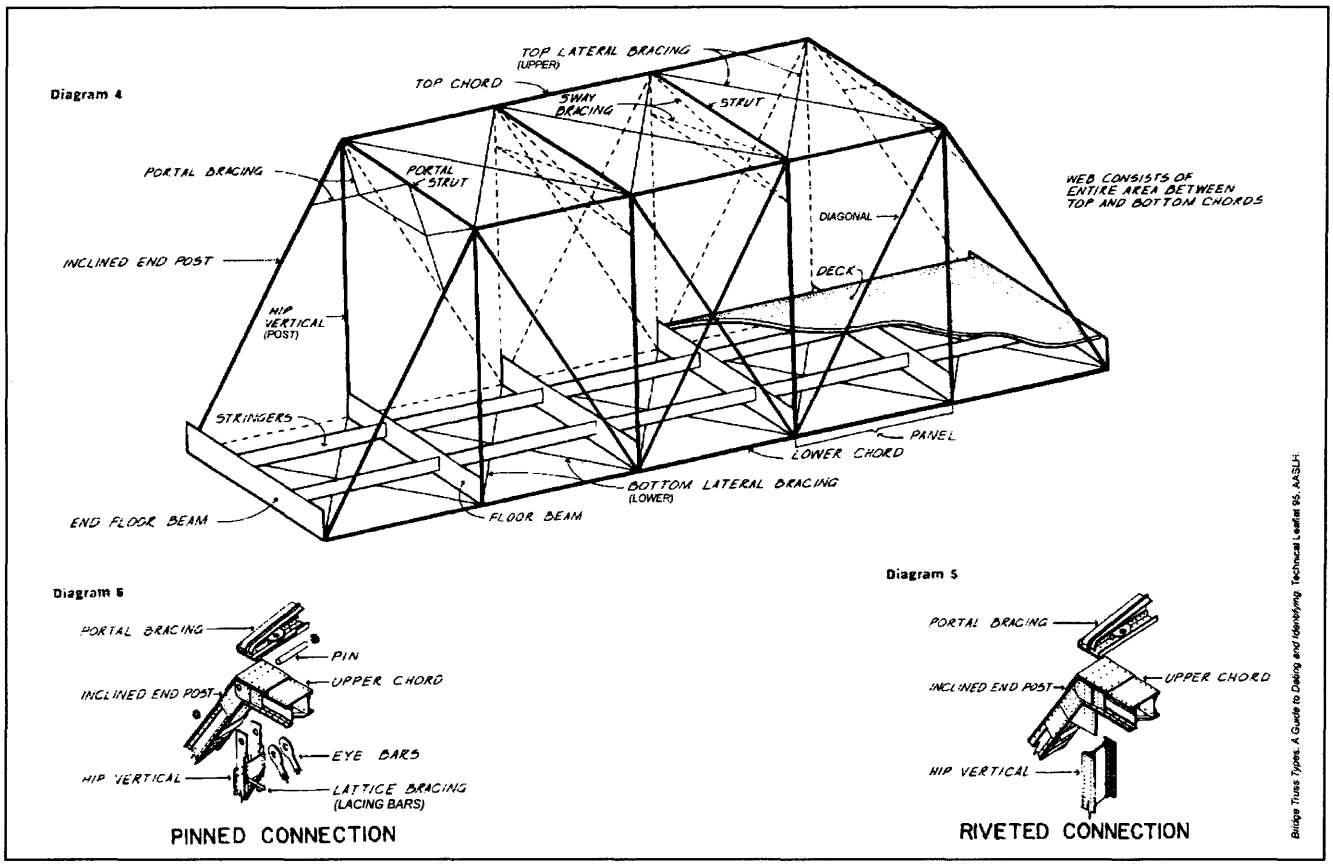
[1] A through truss is also referred to as a high truss.

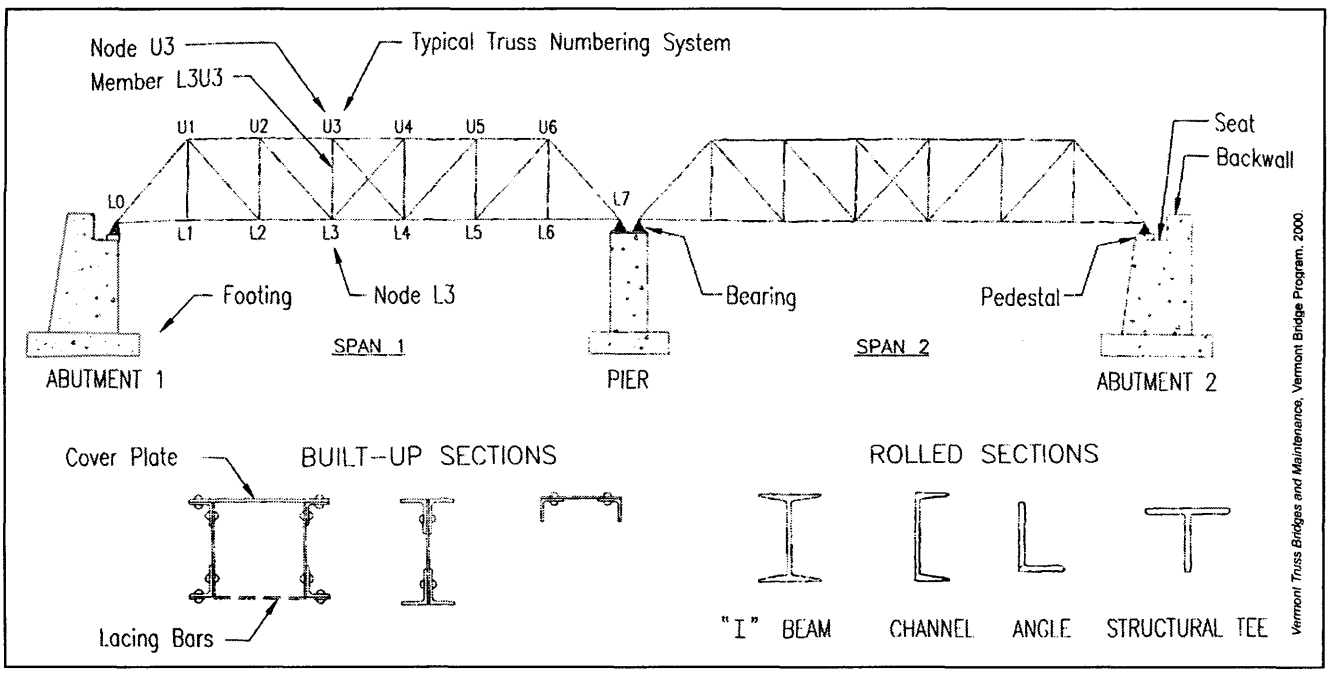
INTEGRITY

The Old Katy Bridge is an excellent example of a Pratt through truss, historically the most popular metal truss bridge built in Kansas.[2] It clearly illustrates an industry standard railroad truss bridge design employed during the period of significance. The 1974 retrofit for automobile use necessitated the replacement of the original timber decking with new planks, as well as the installation of guardrails. These alterations do not substantially impact the overall integrity of the bridge and the Old Katy Bridge retains a good degree of integrity. The historic alterations to the pier in 1908 and to the abutment in 1913 have gained significance in their own right. 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 lightly traveled road, it is unlikely that traffic requirements will necessitate alteration or replacement.

[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), E1. Jochims identified approximately 262 extant Pratt trusses in Kansas. Dale Nimz, *Activity III Review Initial Assessment Metal Truss Bridges.* (Topeka: Kansas State Historical Society, 1998), 6. Nimz identifies approximately 800 extant Pratt trusses in Kansas.

TRUSS TERMINOLOGY





STATEMENT OF SIGNIFICANCE

The Old Katy 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 Pratt truss bridge type and illustrates an industry-standard railroad truss bridge design employed during the period of significance. Built in 1895, the Old Katy Bridge is a common railroad bridge solution applied to a long span. Its pin-connected structure and stone pier, coupled with 1908 and 1913 concrete abutment reinforcements, illustrate the transition in construction techniques and materials that took place during the period of significance.

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 access to markets and could make the difference between growth and stagnation for the many small, young communities across the state.[1] Railroad bridges, in particular, ensured the transportation of goods from small towns to distant processing facilities and larger markets.

Railroad companies maintained engineering divisions that were often responsible for designing the numerous truss bridges required along the ever-expanding rail lines during the mid- to late nineteenth century. This resulted in industry-standard dimensions and widespread commonality among railroad truss bridge forms. If not completed in-house, 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. Railroad companies 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.

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.

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

[1] Jochims, E.
[2] Jochims, F.

of American bridge construction in the nineteenth century.[3] The pin-connected construction of the Old Katy Bridge illustrates the standard use of this technique. 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.

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. At the Old Katy Bridge the 1908 and 1913 concrete reinforcements of the original stone pier and abutments mark the technological transitions that took place during the early twentieth century.

The Old Katy Bridge is a classic example of this truss design. 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.[4] 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.[5]

In Kansas, Pratt truss bridges were constructed well into the twentieth century, suggesting the appeal of the design's strength and economical construction costs.[6] In 1998, approximately 800 Pratt truss bridges, including the Old Katy Bridge, existed throughout the state of Kansas.[7]

STRUCTURE HISTORY

Originally founded in 1869 as the Union Pacific Railway, Southern Branch, the company became known as the Missouri-Kansas-Texas Railroad Company (M-K-T or Katy) in May 1870. Motivated by U. S. Government land grants promised to the first railroad company to reach the southern border of Kansas, the Katy Railroad commenced construction southeast from Junction City, Kansas by 1870.[8] As the company rapidly expanded, Jay Gould acquired it in 1880 and leased the railroad to his Missouri Pacific Railway Company. The Katy Railroad dominated rail transportation in the Middle West through the end of the nineteenth century, reporting combined passenger and freight earnings of $4,200,000 in 1895. Prosperity continued into the twentieth century, reaching

[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.
[5] Ibid, 8.
[6] Jochims, F2.
[7] Nimz, 6.
[8] "A Brief History on Building the Katy Railroad," *Katy Trail Historical Home Page,* [article on-line]; available from http://www.katytexas.com/html/katy_railroad.html; Internet; accessed 31 June 2002.

an all-time peak during World War II.[9] However, by the 1950s, debts, equipment problems, and severe drought drove the Katy Railroad Company to adopt numerous cost-cutting consolidations and pruning measures.[10] Despite these attempts, the company was unable to locate a merging partner and reported a net loss of more than $10 million in 1967.

The Pencoyd Bridge & Construction Company of Pencoyd, Pennsylvania, built the Old Katy Bridge for the Missouri-Kansas-Texas (M-K-T or Katy) Railroad Company in 1895. The Old Katy Bridge is a second-generation span at this location, replacing an earlier structure that carried the original Katy Railroad main line along this route as early as 1870. The Pencoyd Company utilized a widespread railroad truss bridge form. This design incorporated dimensions ideal for railroad traffic, including a comparatively narrow deck width of 15 feet, large railroad-grade stringers and floor beams, and an exceptionally tall vertical clearance of 26 feet. The 1909 Atchison, Topeka & Santa Fe Pratt Truss Bridge in Melvern, Osage County, Kansas, features the same dimensional characteristics and further illustrates this industry-standard design during the period of significance.[11]

Founded in 1852 as the Pencoyd Iron Works by Algernon and Percival Roberts, the company began manufacturing and constructing wrought and cast-iron bridges in 1859.[12] Squire Whipple, inventor of the groundbreaking Whipple truss, subsequently sold the exclusive right to use his patent to Pencoyd Bridge & Construction Company, the only firm engaged in the manufacture of iron bridges at the time. They became a leading bridge construction company during the mid- to late nineteenth century, completing famous spans across the Nile River (1898 - slightly below its confluence with the Atbara River in the Sudan), Niagara Falls (1897 – north of American Falls), and across the Delaware River (1859) at Easton, Pennsylvania. In 1900, steel and railroad financier JP Morgan consolidated 28 of the nation's largest steel fabricators and constructors, including the Pencoyd Bridge & Construction Company, into the American Bridge Company. In 1901, the American Bridge Company became a subsidiary of JP Morgan's newly consolidated steel trust, the U.S. Steel Corporation.

According to Geary County Historical Society records, floodwaters in 1951 washed out the vehicular Edwards Bridge that crossed Lyon Creek less than one-half mile to the east. The Katy Railroad Company abandoned the line carried by the Old Katy Bridge as part of company-wide cutbacks that occurred during the 1950s and 1960s. In an effort to make use of the long-abandoned span, Geary County road and bridge crews retrofitted the Old Katy Bridge and railroad bed to carry vehicular traffic in 1974.[13]

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[9] "Missouri-Kansas-Texas Railroad," *The Handbook of Texas Online,* [article on-line]; available from http://www.tsha.utexas.edu/handbook/online/articles/view/MM/eqm8.html; Internet; accessed 31 June 2002.
[10] Ibid.
[11] The Atchison, Topeka & Santa Fe Pratt Truss Bridge is being nominated concurrently with the Old Katy Bridge.
[12] "Montgomery County: The Second Hundred Years – 1983[:] Business and Industry," *Lower Merion Historical Society,* [article on-line]; available from http://www.lowermerion.org/texts/first200/business_5.html; Internet; accessed 21 March 2002.
[13] "To Replace Edwards Bridge." *Junction City Union,* 4 February 1974. Floodwaters washed out the original auto bridge to the east. The abandoned MK & T railroad bed and bridge were retrofitted to serve automobiles.

BIBLIOGRAPHY

"A Brief History on Building the Katy Railroad," *Katy Trail Historical Home Page,* [article on-line]; available from **http://www.katytexas.com/html/katy_railroad.html;** Internet; accessed 31 June 2002.

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.

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

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"Missouri-Kansas-Texas Railroad," *The Handbook of Texas Online,* [article on-line]; available from **http://www.tsha.utexas.edu/handbook/online/articles/view/MM/eqm8.html;** Internet; accessed 31 June 2002.

"Montgomery County: The Second Hundred Years – 1983[:] Business and Industry," *Lower Merion Historical Society*, [article on-line]; available from **http://www.lowermerion.org/texts/first200/business_5.html;** Internet; accessed 21 March 2002.

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.

"To Replace Edwards Bridge." *Junction City Union*, 4 February 1974.

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

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

GEOGRAPHICAL DATA

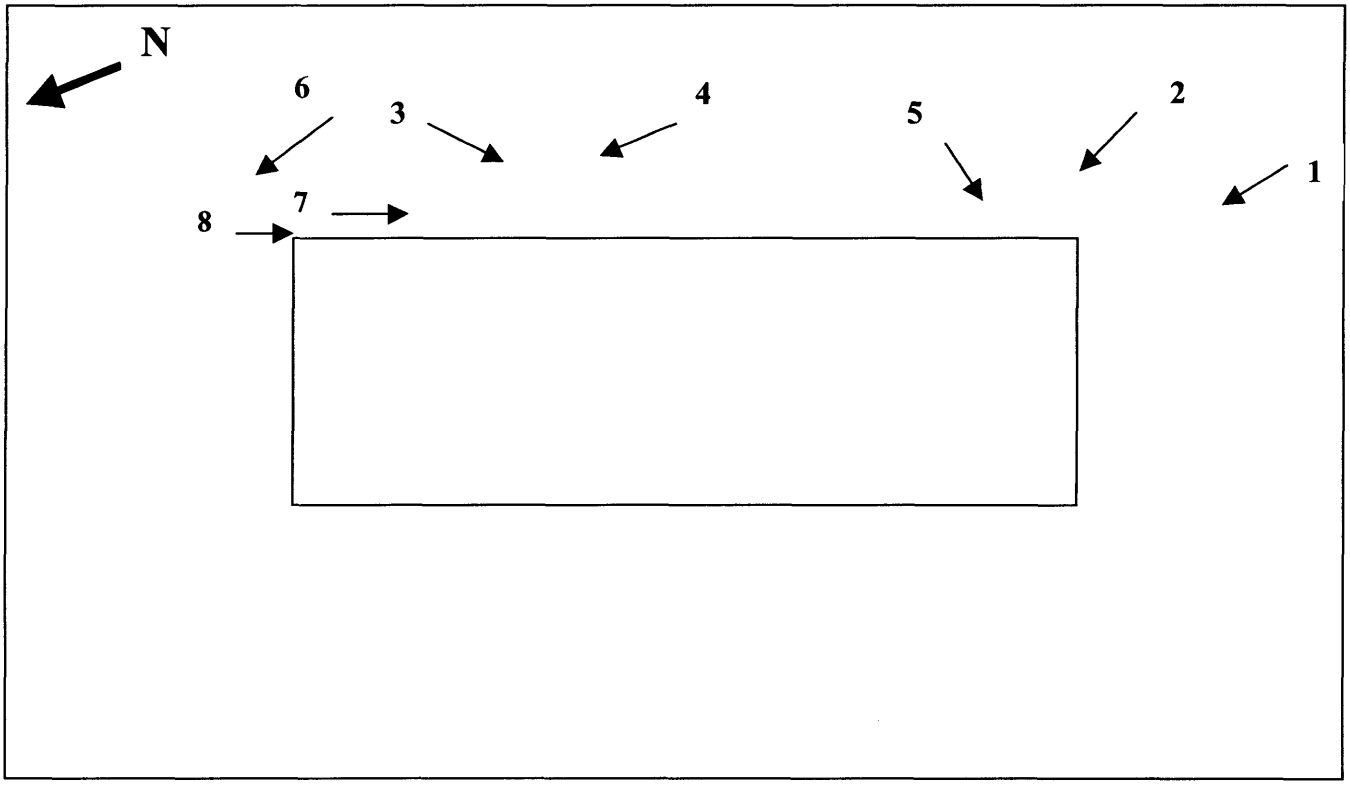
Verbal Boundary Description:
Located on the NW ¼ of Section 2, Township 13S, Range 5E, the Old Katy Bridge encompasses an area measuring approximately 140 feet by 15 feet. The northwest corner of this area corresponds to the northwest corner of the bridge.

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

PHOTO LOG

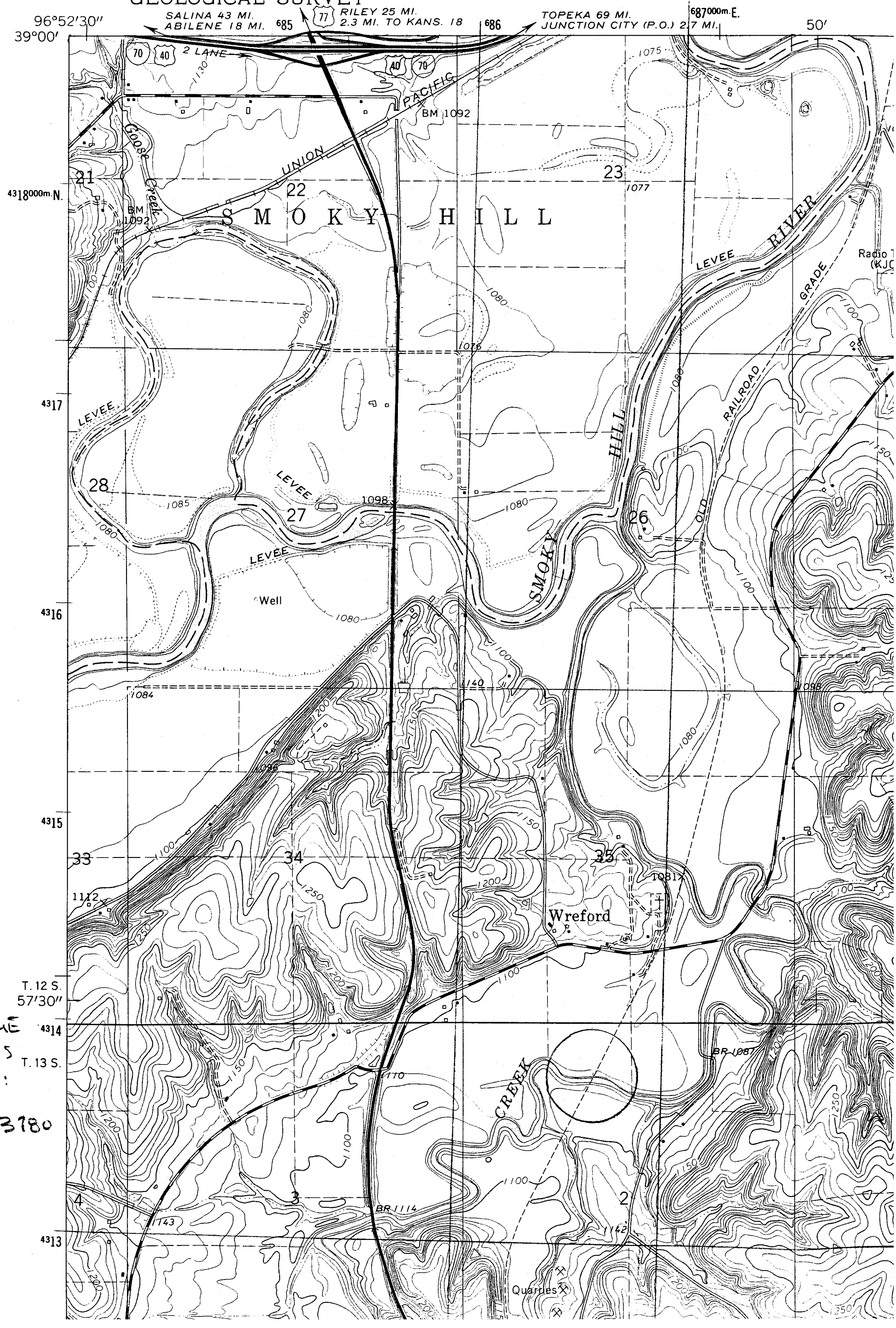
Photographer: Kerry Davis
Date of Photographs: February 2002
Location of Original Negative: Kansas State Historical Society, Topeka, Kansas

Photograph Number	Camera View
1.	View N, bridge truss and roadway
2.	View NW, bridge truss, deck, and lower chord
3.	View SW, bridge understructure and south abutment
4.	View N, bridge understructure and north abutment
5.	View W, south abutment
6.	View N, north approach span and abutment
7.	View SW, bridge understructure and bottom chord
8.	View SW, plaque detail



562 III SW (ALIDA)

UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY



-D KATY BRIDGE
ARY CO., KANSAS
M REFERENCE:
686 650 | 4313780