Form No. 10-300 (Rev. 10-74) PH0691674

UNITED STATES DEPARTMENT OF THE INTERIOR
NATIONAL PARK SERVICE

NATIONAL REGISTER OF HISTORIC PLACES INVENTORY -- NOMINATION FORM

DATA SHEET

FOR NPS USE ONLY
RECEIVED JUN 15 1977
DATE ENTERED DEC 20 1977

SEE INSTRUCTIONS IN *HOW TO COMPLETE NATIONAL REGISTER FORMS*
TYPE ALL ENTRIES -- COMPLETE APPLICABLE SECTIONS

1 NAME

HISTORIC BLUFF DALE SUSPENSION BRIDGE

AND/OR COMMON

2 LOCATION

STREET & NUMBER Berry's Creek Road

__NOT FOR PUBLICATION

CITY, TOWN Bluff Dale __ VICINITY OF

CONGRESSIONAL DISTRICT 17

STATE Texas CODE 048 COUNTY Erath CODE 143

3 CLASSIFICATION

CATEGORY	OWNERSHIP	STATUS	PRESENT USE	
__DISTRICT	X PUBLIC	__OCCUPIED	__AGRICULTURE	__MUSEUM
__BUILDING(S)	__PRIVATE	__UNOCCUPIED	__COMMERCIAL	__PARK
X STRUCTURE	__BOTH	__WORK IN PROGRESS	__EDUCATIONAL	__PRIVATE RESIDENCE
__SITE	PUBLIC ACQUISITION	ACCESSIBLE	__ENTERTAINMENT	__RELIGIOUS
__OBJECT	__IN PROCESS	__YES: RESTRICTED	__GOVERNMENT	__SCIENTIFIC
	__BEING CONSIDERED	X YES: UNRESTRICTED	__INDUSTRIAL	X TRANSPORTATION
		__NO	__MILITARY	__OTHER:

4 OWNER OF PROPERTY

NAME County of Erath

STREET & NUMBER Erath County Courthouse

CITY, TOWN Stephenville __ VICINITY OF STATE Texas

5 LOCATION OF LEGAL DESCRIPTION

COURTHOUSE, REGISTRY OF DEEDS, ETC. Erath County Courthouse

STREET & NUMBER

CITY, TOWN Stephenville STATE Texas

6 REPRESENTATION IN EXISTING SURVEYS

TITLE Texas Historic Engineering Site Inventory

DATE 1974 __FEDERAL X STATE __COUNTY __LOCAL

DEPOSITORY FOR SURVEY RECORDS History of Engineering Program, C.E. Dept., Tx. Tech. Univ.

CITY, TOWN Lubbock STATE Texas

7 DESCRIPTION

CONDITION		CHECK ONE	CHECK ONE
_EXCELLENT	_DETERIORATED	_UNALTERED	_ORIGINAL SITE
X GOOD	_RUINS	X ALTERED	X MOVED DATE 1934
_FAIR	_UNEXPOSED		

DESCRIBE THE PRESENT AND ORIGINAL (IF KNOWN) PHYSICAL APPEARANCE

The Bluff Dale Suspension Bridge crosses the Paluxy River on Berry Creek Road, a dirt, country road, on the outskirts of the little community of Bluff Dale in the northeast section of Erath County. Built ca. 1895, the structure was originally located across the Paluxy River on an old dirt road that later became SH10. When SH10 became US 377, a new and wider bridge was needed and in 1933 a new bridge accommodated the Highway 377 traffic across the River. The precinct moved the unused suspension bridge in 1934 to a point 1½ miles upstream to provide a long-needed crossing for the farmers and ranchers of the area.

Despite the move, the structure's historical integrity remains intact. The bridge was moved because its function at its original location had ceased and a site a mile and a half upstream badly needed a bridge. Rather than tearing down the old narrow suspension bridge, the precinct chose to expand the bridge's length and reuse the old structure on the less traveled country road.

In 1934 Lee Lewis of Bluff Dale contracted to move the structure and 25-feet extensions were added to each end in order to compensate for the difference in the river's width at this location. However, the only alterations to the old bridge have been the occasional replacement of runners by the county.

The Bluff Dale bridge measures approximately 11 by 225 feet. The bridge has seven 1-inch cables running the length of each side. The primary structure of the bridge is composed of 9-inch iron pipes and 4 by 8-inch steel girders. The roadway consists primarily of 2 by 12-inch lengths of lumber. The bridge has two runners, approximately 3 feet wide (each), for automobile tires which run the length of the bridge.

The Bluff Dale Suspension Bridge is presently in a state of deterioration due to lack of maintenance by the county. Portions of the roadway are in need of replacement for adquate safety in crossing the bridge.

8 SIGNIFICANCE

PERIOD	AREAS OF SIGNIFICANCE -- CHECK AND JUSTIFY BELOW				
__PREHISTORIC	__ARCHEOLOGY-PREHISTORIC	__COMMUNITY PLANNING	__LANDSCAPE ARCHITECTURE	__RELIGION
__1400-1499	__ARCHEOLOGY-HISTORIC	__CONSERVATION	__LAW	__SCIENCE
__1500-1599	__AGRICULTURE	__ECONOMICS	__LITERATURE	__SCULPTURE
__1600-1699	__ARCHITECTURE	__EDUCATION	__MILITARY	__SOCIAL/HUMANITARIAN
__1700-1799	__ART	X ENGINEERING	__MUSIC	__THEATER
__1800-1899	__COMMERCE	__EXPLORATION/SETTLEMENT	__PHILOSOPHY	X TRANSPORTATION
X 1900-	__COMMUNICATIONS	__INDUSTRY	__POLITICS/GOVERNMENT	__OTHER (SPECIFY)
		__INVENTION		

SPECIFIC DATES 1895 BUILDER/ARCHITECT

STATEMENT OF SIGNIFICANCE

The Bluff Dale Suspension Bridge is Erath County's earliest recorded bridge and an example of one of Texas' few remaining suspension bridges.

Built ca. 1895 across the Paluxy River on the present US 377, the Bluff Dale Bridge provided a primary crossing for the people of Erath County en route to Fort Worth. Founded in the 1870's, Bluff Dale's population increased with the establishment of the Fort Worth and Rio Grande Railroad line in 1889. The growing community felt an acute need for an all-weather road crossing the Paluxy River. The Bluff Dale Suspension Bridge was the community's first permanent bridge.

When the old SH 10 became US 377, a new and wider bridge was needed and in 1933 a new bridge was constructed across the Paluxy River. The old suspension bridge was left in its original place until 1934. In that year the precinct decided to move the old bridge to a crossing 1½ miles upstream from the original site to provide an all-weather bridge over the well-used ford in the river. The bridge is presently located on Berry Creek Road about 500 yards off US 377 in the west edge of Bluff Dale.

Today, the bridge is still in use. A nearby low-water bridge was erected four years ago for trucks with heavy loads and for people who do not trust the old bridge's construction.

9 MAJOR BIBLIOGRAPHICAL REFERENCES

Correspondence from Cathey Y. Sims, 4237 Southwestern Blvd., Dallas,Tx. 75225 about the Bluff Dale Suspension Bridge. On file with the History of Engineering Program, Tx. Tech. Univ., Lubbock, Tx.

Interview with Garnell A. Baker, Engineering Department, Santa Fe Railway Co., Ft. Worth, Texas

10 GEOGRAPHICAL DATA

ACREAGE OF NOMINATED PROPERTY one acre

UTM REFERENCES

	ZONE	EASTING	NORTHING
A	14	5 9 1 6 8 0	3 5 7 9 9 2 0
B	14	5 9 1 6 8 0	3 5 7 9 8 2 0
C			
D			

VERBAL BOUNDARY DESCRIPTION

Acreage covers only the bridge.

LIST ALL STATES AND COUNTIES FOR PROPERTIES OVERLAPPING STATE OR COUNTY BOUNDARIES

STATE	CODE	COUNTY	CODE
STATE	CODE	COUNTY	CODE

11 FORM PREPARED BY

NAME / TITLE

Paul D. Hutchison, Research Assistant; Marie Landon, Editor

ORGANIZATION: History of Engineering Program

DATE: 12/7/76

STREET & NUMBER: P. O. Box 4089, Texas Tech University

TELEPHONE: (806) 742-3593

CITY OR TOWN

STATE

12 STATE HISTORIC PRESERVATION OFFICER CERTIFICATION

THE EVALUATED SIGNIFICANCE OF THIS PROPERTY WITHIN THE STATE IS:

NATIONAL ___ STATE X 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 State Historic Preservation Officer

DATE 5/31/77

FOR NPS USE ONLY

I HEREBY CERTIFY THAT THIS PROPERTY IS INCLUDED IN THE NATIONAL REGISTER

DIRECTOR, OFFICE OF ARCHEOLOGY AND HISTORIC PRESERVATION

DATE 12/20/77

ATTEST:

KEEPER OF THE NATIONAL REGISTER

DATE 12-16-77

GPO 892-453

Form No. 10-300a
(Rev. 10-74)

UNITED STATES DEPARTMENT OF THE INTERIOR
NATIONAL PARK SERVICE

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Measurements provided by Paul D. Hutchison, Research Assistant, History of Engineering Program, Texas Tech University, Lubbock, Texas.

Telephone interview with Verna Harris, P.O. Box 57, Bluff Dale, Texas by Deborah Nixon about the Bluff Dale Suspension Bridge on December 1, 1976.

GPO 892 455

PROPERTY OF THE NATIONAL REGISTER

Bluff Dale Suspension Bridge
Bluff Dale, Erath Co., Texas

History of Engineering Program, Nov. 1975
C. E. Dept., Texas Tech University
Lubbock, Texas

Looking west to a general view of the
suspension bridge.

JUN 15 1977

DEC 20 1977

#1 of 4

DEC 20 1977

PROPERTY OF THE NATIONAL REGISTER

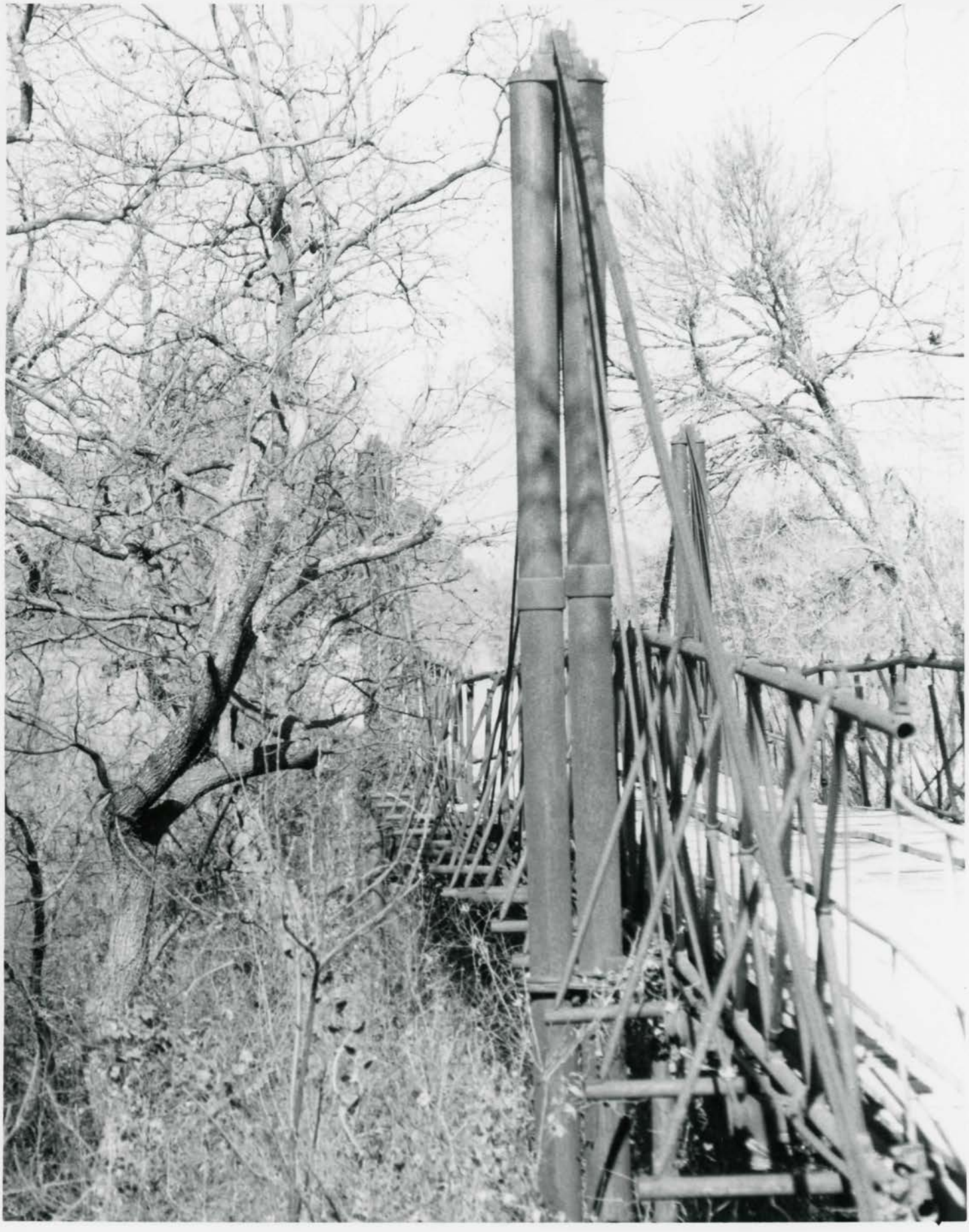
Bluff Dale Suspension Bridge
Bluff Dale, Erath Co., Texas

History of Engineering Program, Nov. 1975
C. E. Dept., Texas Tech University
Lubbock, Tx

Looking north across the top of the bridge.
(Note extensions at left and right of
photograph).

JUN 15 1977

#2 84



PROPERTY OF THE NATIONAL REGISTER DEC 20 1977

Bluff Dale Suspension Bridge
Bluff Dale, Erath Co.

History of Engineering Program, Nov. 1975
C. E. Dept.
Texas Tech Univ.
Lubbock, Tx

JUN 15 1977

A view of one of the cable supports. #34

PROPERTY OF THE NATIONAL REGISTER DEC 20 1977

Bluff Dale Suspension Bridge
Bluff Dale, Erath Co., Texas

History of Engineering Program, Nov. 1975
C. E. Dept.
Texas Tech Univ., Lubbock, Tx

A view showing the bottom portion of the roadbed

JUN 15 1977

#4 of 4

UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY

BLUFF DALE SUSPENSION BRIDGE
BERRY'S CREEK ROAD
BLUFF DALE, TEXAS

U. T. M. REFERENCES:
A-14/591680/3579920
B-14/591680/3579920

BLUFF DALE QUADRANGLE
TEXAS
7.5 MINUTE SERIES (TOPOGRAPHIC)

6348 I NW (MORGAN MILL)
6348 IV NW (TOLAR)
6348 I SW (KNOB HILL)
6348 IV SW (PALUXY)
(STEPHENVILLE) 6348 II NW
(CHALK MOUNTAIN) 6348 II SW
(JOHNSVILLE) 6348 II NE

98°07'30" 32°22'30" 98°00' 32°15'

3.8 MI. TO TEX. 1189
LIPAN (VIA TEX. 1189) 11 MI.
TOLAR 6 MI.
FORT WORTH 52 MI.
DUBLIN 18 MI.
STEPHENVILLE 6 MI.
STEPHENVILLE 10 MI.
PALUXY 6 MI.

1 840 000 FEET
1 810 000 FEET
220 000 FEET
250 000 FEET

Mapped, edited, and published by the Geological Survey

Control by USGS and USC&GS

Topography by photogrammetric methods from aerial photographs taken 1964. Field checked 1965

Polyconic projection. 1927 North American datum
10,000-foot grid based on Texas coordinate system, north central zone
1000-meter Universal Transverse Mercator grid ticks, zone 14, shown in blue

Fine red dashed lines indicate selected fence lines

UTM GRID AND 1965 MAGNETIC NORTH DECLINATION AT CENTER OF SHEET

SCALE 1:24 000

CONTOUR INTERVAL 10 FEET
DATUM IS MEAN SEA LEVEL

ROAD CLASSIFICATION
Heavy-duty
Medium-duty
Light-duty
Unimproved dirt
U.S. Route
State Route

QUADRANGLE LOCATION

RECEIVED
JUN 15 1977
NATIONAL REGISTER

BLUFF DALE, TEX.
N3215—W9800/7.5
1965

DEC 20 1977
AMS 6348 I SE—SERIES V882

THIS MAP COMPLIES WITH NATIONAL MAP ACCURACY STANDARDS
FOR SALE BY U. S. GEOLOGICAL SURVEY, DENVER, COLORADO 80225, OR WASHINGTON, D. C. 20242
A FOLDER DESCRIBING TOPOGRAPHIC MAPS AND SYMBOLS IS AVAILABLE ON REQUEST

INTERIOR—GEOLOGICAL SURVEY, WASHINGTON, D. C.—1967

National Register of Historic Places

Note to the record

Additional Documentation: 2016

RECEIVED 2280
DEC 04 2015
Nat. Register of Historic Places
National Park Service

NPS Form 10-900 OMB No. 1024-0018

United States Department of the Interior
National Park Service
National Register of Historic Places Registration Form

1. Name of Property

Historic Name: Bluff Dale Bridge (Additional Documentation)
Other name: previously listed as Bluff Dale Suspension Bridge (NRIS 77001440)
Name of related multiple property listing:

2. Location

Street & number: County Road 149 (Berry's Creek Road) at the Paluxy River
City or town: Bluff Dale State: Texas County: Erath
Not for publication: ☐ Vicinity: ☐

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 at the following levels of significance:
☐ national ☑ statewide ☐ local

Applicable National Register Criteria: ☑ A ☐ B ☑ C ☐ D

Mark Wolfe State Historic Preservation Officer 12/1/15
Signature of certifying official / Title **Date**

Texas Historical Commission
State or Federal agency / bureau or Tribal Government

In my opinion, the property ☐ meets ☐ does not meet the National Register criteria.

Signature of commenting or other official **Date**

State or Federal agency / bureau or Tribal Government

4. National Park Service Certification

I hereby certify that the property is:

___ entered in the National Register
___ determined eligible for the National Register
___ determined not eligible for the National Register.
___ removed from the National Register
___ other, explain: Additional Documentation Approved

Joe Edson V6. Beall 1.19.16
Signature of the Keeper **Date of Action**

5. Classification

Ownership of Property

	Private
X	Public - Local
	Public - State
	Public - Federal

Category of Property

	building(s)
	district
	site
X	structure
	object

Number of Resources within Property

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

Number of contributing resources previously listed in the National Register: 1

6. Function or Use

Historic Functions: TRANSPORTATION/road-related = bridge

Current Functions: TRANSPORTATION/pedestrian-related = bridge

7. Description

Architectural Classification: Other: cable-stayed bridge

Principal Exterior Materials: metal

Narrative Description (see continuation sheets 7-9 through 7-12)

8. Statement of Significance

Applicable National Register Criteria

X	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: B: Removed from its original location

Areas of Significance: Engineering, Transportation

Period of Significance: 1890 - 1934

Significant Dates: 1890, 1899, 1934

Significant Person (only if criterion b is marked):

Cultural Affiliation (only if criterion d is marked):

Architect/Builder: Edwin Elijah Runyon and William Flinn

Narrative Statement of Significance (see continuation sheets 8-13 through 8-22)

9. Major Bibliographic References

Bibliography (see continuation sheets 9-23 through 9-26)

Previous documentation on file (NPS):
- _ preliminary determination of individual listing (36 CFR 67) has been requested.
- x previously listed in the National Register
- _ previously determined eligible by the National Register
- _ designated a National Historic Landmark
- _ recorded by Historic American Buildings Survey #
- x recorded by Historic American Engineering Record # TX-36 and # TX-104

Primary location of additional data:
- x State historic preservation office (*Texas Historical Commission*, *Austin*)
- _ Other state agency
- x Federal agency
- _ Local government
- _ University
- _ Other -- Specify Repository:

Historic Resources Survey Number (if assigned):

10. Geographical Data

Acreage of Property: less than 1 acre

Coordinates

Latitude/Longitude Coordinates (use decimal degree format)

Datum if other than WGS84: N/A

1. Latitude: 32.353886 Longitude: -98.026001

Note regarding coordinates: The 1977 nomination provided the bridge's location using the Universal Transverse Mercator (UTM) format as follows: Zone 14S, Easting 591680, Northing 3579920. The bridge's physical location has not changed since the 1977 nomination, but the latitude and longitude coordinates provided in this amendment are considered more accurate than the UTM coordinates previously recorded.

Verbal Boundary Description: The boundary is unchanged from the 1977 nomination, which described the boundary by stating "acreage covers only the bridge." The nominated property includes the entire cable-stayed bridge structure at CR 149 (Berry's Creek Road) at the Paluxy River.

Boundary Justification: The boundary includes all components historically associated with the structure.

11. Form Prepared By

Name/title: Mark M. Brown, PhD., Historian
Organization: *for the* Erath County Historical Commission
Address: 3449 CR 149
City or Town: Bluff Dale State: Texas Zip Code: 76433
Email: cat3542@yahoo.com
Telephone: 254.728.3286
Date: November 2015

Additional Documentation

Maps (see continuation sheet Map-27 through Map-29)

Additional items (see continuation sheets Figure-30 through Figure-42)

Photographs (see continuation sheet Photo-49 through Photo-54)

Photographs

Name of Property: Bluff Dale Bridge (formerly listed as the Bluff Dale Suspension Bridge)
City or Vicinity: Bluff Dale
County, State: Erath County, Texas
Photographer: Mark M. Brown
Date Photographed: May 11, 2015
Number of Photo(s): 22

The following digital images were submitted to the National Park Service on disk along with this nomination document. For reference, they also are included at the end of this document, beginning on page 49.

TX_Erath County_Bluff Dale Bridge_0001.tif
Barrel view, looking north

TX_Erath County_Bluff Dale Bridge_0002.tif
South approach spans, looking southwest

TX_Erath County_Bluff Dale Bridge_0003.tif
Oblique view, looking northwest

TX_Erath County_Bluff Dale Bridge_0004.tif
Oblique view of main span, looking northwest

TX_Erath County_Bluff Dale Bridge_0005.tif
Oblique view main span, looking southwest

TX_Erath County_Bluff Dale Bridge_0006.tif
Barrel view, looking south

TX_Erath County_Bluff Dale Bridge_0007.tif
North towers, looking northwest

TX_Erath County_Bluff Dale Bridge_0008.tif
North approach spans, looking southwest

TX_Erath County_Bluff Dale Bridge_0009.tif
Cable stays and deck connections, looking southwest

TX_Erath County_Bluff Dale Bridge_0010.tif
Oblique view of deck and northeast tower, looking northeast

TX_Erath County_Bluff Dale Bridge_0011.tif
Deck connections and truss losses, looking west southwest

TX_Erath County_Bluff Dale Bridge_0012.tif
Castings on top of northwest tower, looking northwest

TX_Erath County_Bluff Dale Bridge_0013.tif
Castings on top of northeast tower, looking north northwest

TX_Erath County_Bluff Dale Bridge_0014.tif
Detail of patented deck connection, looking northwest

TX_Erath County_Bluff Dale Bridge_0015.tif
Truss detail, looking west northwest

TX_Erath County_Bluff Dale Bridge_0016.tif
Patented tower and bent connections, looking northwest

TX_Erath County_Bluff Dale Bridge_0017.tif
Patented tower connection, looking east

TX_Erath County_Bluff Dale Bridge_0018.tif
Patented deck beam castings and cable details, looking northwest

TX_Erath County_Bluff Dale Bridge_0019.tif
Deck beam castings detail, looking southwest

TX_Erath County_Bluff Dale Bridge_0020.tif
Deck beam castings detail, looking northeast

TX_Erath County_Bluff Dale Bridge_0021.tif
Barrel view of deck system, looking north

TX_Erath County_Bluff Dale Bridge_0022.tif
Abutment inscription from 1934 relocation, looking down

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.460 et seq.).

Estimated Burden Statement: Public reporting burden for this form is estimated to average 100 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 Office of Planning and Performance Management. U.S. Dept. of the Interior, 1849 C. Street, NW, Washington, DC.

Summary of Previous Nomination Efforts and the Goal of this Amendment

The Bluff Dale Bridge carried County Road 149 across the Paluxy River in northeastern Erath County on the outskirts of the rural community of Bluff Dale, Texas. It is a seven span, 268 foot overall length, 140 foot clear span, cable-stayed bridge. Constructed in 1890 with metal pipe and castings, it is also notable for using several patents issued to Edwin Elijah Runyon. It retains sufficient integrity to convey its significance as an example of a pre-World War II tradition of wire-supported bridges in Texas, as an extremely early example of a cable-stayed bridge, and as a design by Edwin Elijah Runyon. It was relocated in 1934 to a new location along the same river and continued to provide an important transportation connection for farmers and ranchers in the area.

The bridge was placed on the National Register of Historic Places in 1977 at the state level of significance for its engineering and transportation significance. This amendment does not seek to change the level or areas of significance for this property. However, since the 1977 listing, the Historic American Engineering Record (HAER) program has extensively documented the Bluff Dale Bridge, other pre-1940 wire-supported bridges in Texas, and their statewide context in relationship to their general place in the history of wire-supported bridges. The new research, coupled with that completed for the 2015 *Historic Road Infrastructure of Texas, 1866-1965* Multiple Property Documentation Form, has led to a much greater understanding of the property's construction history and its significance as a very early, pre-1940 wire-supported bridge.

Based on this new information, the current document amends the original nomination in the following ways:

1. Changes the name of the designated property to Bluff Dale Bridge, omitting the term "suspension."
2. Revises the Section 7 physical description of the bridge to more accurately reflect its configuration and construction history. The 1977 nomination insufficiently described the bridge as a suspension bridge instead of a cable-stayed bridge. The revised description provides more precise measurements, a more accurate chronology of original construction and subsequent alterations, and greater detail regarding functionality of the various components than was included in the original submission.
3. Updates the bridge's current condition and integrity status through narrative description and current photographs.
4. Supplements the Section 8 statement of significance to include much greater support for the bridge's state-level engineering significance. The revised narrative includes information about the designer that was not available at the time of original nomination, as well as greater contextual information regarding the history and significance of pre-1940 wire-supported bridges in Texas.
5. Clarifies the property's period of significance. The original nomination, like most early nominations, simply checked the box for twentieth century significance. Section 8 of this amendment defines a more precise period of significance for the Bluff Dale Bridge, 1890 – 1934.
6. Correctly identifies the Bluff Dale Bridge's 1890 construction date, which the 1977 nomination misidentified as c. 1895.

The Bluff Dale Bridge is one of two known surviving examples of a bridge with details patented by Edwin Elijah Runyon.[1] Terms for these distinctive features will follow the usage in the patents wherever feasible.[2]

[1] The other Runyon bridge is the abandoned Barton Creek Bridge, near CR 119 at Barton Creek, Erath County, Texas (see HAER TX-87). Runyon's patents are: Edwin Elijah Runyon, "Suspension-Bridge," U.S. Patent No. 394,940 (December 18, 1888); "Needle-Beam for Bridges," U.S. Patent No. 400,874 (April2, 1889); "Device for Twisting Wire

Large-format photographs taken for the HAER report show the current configuration, while the associated measured drawings show the best possible reconstruction of the original pattern based on site observations and on historical research in 1996. This revised nomination also includes observations made in the summer of 2000 and May 2015, photographs taken May 2015, and additional research conducted since 2000.

Cables of Suspension-Bridges," U.S. Patent No. 404,934 (June 11, 1889); "Bent for Suspension-Bridges," U.S. Patent No. 410,201 (September 3, 1889); "Suspension-Bridge," U.S. Patent No. 446,209 (February 10, 1891); "Side Rail for Suspension Bridges," U.S. Patent No. 493,788 (March 21, 1893); "Cotton-Cultivating Machine," U.S. Patent No. 412,980, (October 15, 1889); and "Lawn-Mower," U.S. Patent No. 445,616 (February 3, 1891).

[2] The patents are analyzed in Historic American Engineering Record (HAER), National Park Service, U.S. Department of the Interior, "Bluff Dale Suspension Bridge," HAER No. TX-36.

Revised Narrative Description (Section 7)

The Bluff Dale Bridge is a cable-stayed bridge with an overall length of 268 feet. It has one suspended approach span and three steel I-beam approach spans on the south and one suspended approach span and one steel I-beam approach span on the north. According to the HAER report, the overall length of the three suspended spans is 200 feet and the main span is 140 feet long. The 1977 nomination confusingly put the overall length at approximately 225 feet and notes that "25-feet extensions were added to each end in order to compensate for the difference in the river's width" when it was relocated in 1934.[3]

Towers
The towers extend approximately 14 feet above the deck surface and consist of two 8 1/2"-diameter wrought-iron pipes arranged along an axis perpendicular to the length of the deck. Two stacked castings on top of the pipes maintain their alignment and also serve as saddles for the suspension cables.[4] Between the castings are two sheets of a soft non-ferrous, non-cuprous metal, such as lead, that likely serve as bearings for longitudinal movement of the upper castings. The top casting supports the main group of wire ropes while the lower casting, referred to in a patent as a cross-piece, is used for the fixed suspension cables attached to two 13'-long deck beams flanking the towers on either side. An additional saddle was cast into the lower casting for a horizontal pipe, now missing, that once provided lateral bracing between the towers.

Deck
Below the deck level, a complicated bent supports the towers against buckling. A series of vertical pipes with special patented castings support horizontal rectangular bars forming a deck beam at the tower. Cast clamps linked to the deck beam are tied together by a loop of twisted heavy wire. Additional twisted-wire strands (as opposed to the replacement wire ropes of the supported spans) form cross-bracing in the vertical plane below the 12'-wide deck.

Wrought-iron pipes, of alternating 13'-0" and 16'-0" lengths, support the bridge deck. The 13'-long deck beams, occurring on 10'-0" centers, are held up by the suspension cables. Runyon's patent describes this configuration as a "needle beam." Though the 16'-long deck beams also occur on 10'-0" centers, they are not exactly centered between the shorter beams. The longer beams are attached to longitudinal stiffening trusses, but are not directly supported by the suspension cables. Special castings cap the ends of the 13'-long deck beam pipes. These terminal caps are used as anchorages for the suspension cables, for the lower lateral cross-bracing, and for a truss system that stiffens the deck beams. The deck beam truss is composed of three additional castings, the middle one being the longest, held in compression by a twisted wire cable stretched between the end castings. Patented rectangular separator blocks, used to twist the cable, are linked by a rod inserted into holes in the blocks. Because the rod keeps the blocks from twisting relative to each other, the cable is prevented from

[3] Bridge inspection records give an overall length of 268 feet. The main suspended span was measured at 140' -6" and the suspended approach spans were measured at 30" -6" and 29' -7". Bridge inspectors recorded steel I-beam approach spans of 16'-4", 14'-7", 15'-2", and 18'-6". Thus while the Bluff Dale Bridge was likely lengthened with approach spans when it was relocated, the dimensions provided in the original nomination were not as carefully measured as they might have been.

[4] Given the general isolation of Bluff Dale and Weatherford at the time of construction, the author suspects that the castings are iron and not steel. A certain determination is not possible, however, without metallurgical testing.

unraveling. Similar separator blocks used to keep the lower lateral bracing in tension are bolted together. Timber stringers present at the time of the 1977 nomination were replaced in 1983 with steel I-beam stringers supporting a deck of embossed steel plates.[5] Combination vertical and diagonal pipe bents with a patented cap-piece mark the original, pre-relocation, end of the deck.

One deck beam is a steel I-beam located near mid span. It is suspended by a wire rope of smaller diameter then the other wire ropes. Its haphazard appearance suggests that it was installed sometime after the 1934 relocation, but no solid information has come to light.

Stiffening truss
The deck is stiffened by a Howe truss railing composed of pipes, rods, and castings. Diagonal compression members leaning toward the center of the span are slightly larger in diameter than those leaning away from the center of the span. Diagonal braces, connecting the ends of the 16'-long deck-beam pipes to the truss's top chord, brace the truss. Many of the truss diagonals are missing, particularly in the middle of the main span, and several braces have been replaced or reinforced with steel angles.

Cables
Stability of suspension bridges depends greatly on the cables. As shown in HAER TX-36 drawing 2 of 5, the Bluff Dale Bridge has five wire subsystems. The main suspension cables consist of a bundle of wire ropes emerging from concrete skirts covering the anchorages located below deck level and rising to the top casting on the towers. From there, individual wire ropes separate and descend under the castings on the ends of the 13'-long deck beams. Except for two cables that go directly to deck beams in the center of the bridge, the ropes rise above the next deck-beam casting and continue along the length of the bridge to a symmetrically located deck beam, where they pass under the casting and ascend to the tower. Given the close similarity of the overall cable pattern to those of the Barton Creek Bridge in northern Erath County (HAER TX 87, photos HAER photographs TX-36-12, TX-36-13) and an unidentified bridge (see HAER TX-36-14), it seems that the cables of the Bluff Dale Bridge did not originally rise above the next deck-beam casting as they continued across the span. The lower tower castings each support two ropes, or fixed suspension cables, the ends of which are looped around the castings of the deck beams nearest the towers.

Three longitudinal cables run the length of the bridge between the deck beams and the deck surface: one in the center, and the other two flanking the deck. The center deck cable rests in the saddle-shaped top of the center casting of each deck beam truss. Based on Runyon's patents, it is almost certain that the saddle-shaped tops of the other two deck beam truss castings were also used as rests for cables. Special patented "bearings" clamp the two outermost deck cables to the deck beams.[6]

[5] T. Lindsay Baker, *Building the Lone Star: An Illustrated Guide to Historic Sites* (College Station: Texas A&M University Press, 1986), pp. 21-22.

[6] While these "longitudinal deck cables," as they are labeled in the measured drawings, do exert a downward force, Alan Matejowsky, PE, Bridge Design Division, TxDOT, has suggested that the force might not be sufficient to improve vertical stability. Rather, he suggests, they might counter-balance the horizontal forces of the main suspension cables (personal conversation, August 1996). Photographs in the Flinn family collections suggest they might have served construction roles.

The two remaining wire subsystems are the previously mentioned twisted wires that brace the towers below the deck and the lower lateral cables. Like the lower lateral bracing on a truss bridge, the lateral bracing cables resist horizontal forces acting on the deck.

Currently, the back-stay cables are built up from loosely wrapped 1" diameter wire ropes. Historic photographs of similar bridges (see HAER TX-87 and photographs TX-36-12 and TX-36-14) and patent descriptions make it clear that the cables were originally hand-twisted strands of heavy-gauge wire. Rectangular castings called separator blocks, now found only underneath the deck and at the ruined Barton Creek Bridge, were placed between the wires and used to twist the strands. The main cables were kept from unraveling by torsion rods, inserted into holes in the castings, and then secured to the timber deck. Based on the description of the bridge in the 1977 nomination, the twisted wire cables were probably replaced with the current wire ropes during the 1934 relocation.

Integrity and Condition[7]

Since its 1977 listing, the condition of the Bluff Dale Bridge has deteriorated to some degree. However, the poor condition of the bridge has not adversely impacted its integrity. Overall, the bridge retains sufficient integrity to convey its significance. It is still readily identifiable as an example of an early cable-stayed bridge designed and modified by non-academically trained engineers at a time when Texas counties owned and financed the majority of the state's bridges with limited resources.

Location and Setting

The location of the Bluff Dale Bridge has not changed since it was listed in the National Register of Historic Places in 1977. It has been in this location since 1934, which is within the period of significance. Its relocation here from about 1 mile downstream facilitated the development of the transportation network in this locality, significantly improving passage from one side of the river to the other.[8] The general relationship of the bridge to the river and the rural character of the landscape remain the same now as it did in 1934 and as it did in its original location. The pre-stressed I-beam bridge by-pass built by the county parallel to the historic bridge in the early 1990s does not adversely impact integrity of setting. The setting of this narrow, rural county bridge remains remarkably intact from the historic period.

Design, Materials, and Workmanship

The bridge retains fair integrity of design and workmanship and good integrity of materials. Enough remains to recognize the gestalt of the bridge as it would have been about 1900. The original wood deck was replaced by a metal plate deck in 1983. However, deck alterations do not represent a significant loss of integrity as they were designed to be replaced due to wear and tear.[9] The replacement of the wood truss with a metal one happened

[7] Based on May 11, 2015, site visit.

[8] Unlike metal trusses during the historic period, relocation of wire-supported bridges was neither common nor a character defining feature. Nevertheless, Runyon's extensive use of modular elements greatly facilitated the relocation.

[9] The metal deck system installed in 1983 might actually have been a beneficial alteration; the increased dead load increased the stress on the cable stays and thus the stability of the bridge.

during the historic period and was most likely completed by Runyon's partner in the original construction. It does not represent a significant impact to integrity. Some of the outriggers bracing the stiffening truss have been repaired or replaced with steel angles. Most noticeable is the loss of at least half of the diagonal pipe elements from 45 of the 80 total truss panels and several missing truss verticals.

Replacing the character-defining twisted wires with wire rope does negatively impact design integrity, as the twisted wire included the majority of Runyon's distinctive block and the rod system. Nevertheless, some of the block and rod system survives on the deck beams, lower-lateral bracing, and the cross-bracing at the tower and approach bents. The twisted wire of the deck beams are likely original. Additionally, physical evidence of the skill, craft, and original manufacturing methods are visible in the original castings, metal pipes, twisting blocks, and rods.

Feeling and Association

The bridge retains high integrity of association despite the relocation and despite the wire rope. Bluff Dale is clearly recognizable as an early and regional cable-stayed bridge constructed using Runyon's patents. Even with the wire rope and the metal deck, the Bluff Dale Bridge retains the sense of untrained empirical engineering through its unusual design and construction. Similarly, its fragility conveys the historic sense of when Texas counties with limited resources owned and financed the majority of the state's bridges.

Amended Statement of Significance

The 1890 Bluff Dale is the second oldest surviving cable-stayed bridge in Texas, and possibly in the United States. The original 1977 National Register nomination established the bridge's transportation and engineering significance. This amendment seeks to enhance the understanding of the bridge's engineering significance. It represents a pre-1940 regional Texas wire-supported bridge tradition practiced by non-academically trained engineers. It further demonstrates the designer's inventiveness and the builder's proficiency as they responded to the engineering challenges of North Central Texas when compared to the designs of professionally trained American engineers. This innovation is demonstrated by the patents and by the fact that that a cable-stayed bridge was built in rural Texas decades before it became a common type elsewhere.

General History of Suspension Bridges through the Nineteenth Century

The history of suspension bridges has been shaped by empirical builders as well as by trained engineers. The Bluff Dale Bridge shows that builders operating on intuition were capable of innovative work even in a period dominated by such engineering giants as John and Washington Roebling. As many scholars have observed, the basic idea underlying the suspension bridge is one that can be, and probably was, independently discovered. There are numerous reports of, and increasing archeological evidence for, extensive experimentation and construction of both fiber rope and iron chain-link bridges in the eastern Himalayas and China as early as 285 B.C. Rumors of Chinese bridges reached Europe by 1667. Chain suspension bridges seem to have been built in the Alps in the early thirteenth century. Information about South American suspension bridges is less precise.

In 1615 Faustus Verantius published three proposals for suspension bridges.[10] One suspended the deck from a rope catenary, while the second used a combination of catenary and inclined iron chains. The inclined chains of this latter proposal anticipate the cable-stayed system employed at Bluff Dale.[11]

Reports vary, but it is generally agreed that Judge James Finley of Uniontown, Pennsylvania, built the first level-deck suspension bridge sometime around 1801.[12] The deck was stiffened with trusses and hung on chain-link suspenders from a chain-link catenary. Truss stiffened decks became standard features of nineteenth-century suspension bridges and such a truss is found at Bluff Dale. About twenty Finley-patent bridges were constructed before 1830. News of these developments reached Europe and apparently influenced British engineers. Before these developments had an impact, however, Josiah White and Erskine Hazard built what could be considered an experimental pedestrian bridge across the Schuylkill River in Philadelphia, using wire cables instead of chains.[13]

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[10] See Tom F. Peters, *Transitions in Engineering: Guillaume Henri duFour and the Early 19th Century Cable Suspension Bridges* (Boston: Birkhäuser Verlag, 1987), pp. 27-28, for illustrations.

[11] This section is based on Peters; Emory L. Kemp, "National Styles in Engineering: The Case of the Nineteenth Century Suspension Bridge," *IA: The Journal of the Society for Industrial Archeology* 19, No.1 (1993): 21-36; and H. J. Hopkins, *A Span of Bridges: An Illustrated History* (Newton Abbot, United Kingdom: David and Charles, 1970).

[12] See Peters, p. 30, for an illustration of Finley's bridge.

[13] Peters, pp. 34-36. See also Donald Sayenga, "A History of Wrought-Iron Wire Suspension Bridge Cables" in *Proceedings of an International Conference on Historic Bridges*. Morgantown, West Virginia: 1999. West Virginia University Press, 63-64.

British engineers experimented with fully or partially cable-stayed bridges, but their greatest achievements were bridges using chain link cables.[14] Thomas Telford's 580-600 foot main-span Menai Straits Bridge of 1826, and I. K. Brunel's posthumously completed Clifton Suspension Bridges were monumental achievements.[15] Telford's work is associated with extensive practical experiments and with material testing.

French engineers took a different approach from their British counterparts. They preferred wire cables over chains, in part because the process of drawing wire through dies reduced internal flaws that would be undetectable in individual chain links. Drawing wire also greatly increased the tensile strength of the iron. In 1823, the first permanent wire-cable suspension bridge was constructed in Geneva with French technology. The engineer Louis Vicat introduced the extremely important idea of spinning the main cables *in situ.* In addition, he and his colleagues, most notably Claude Navier and Albert duFour, developed mathematical models for the behavior of the bridges.

Catenary bridges like Finley's are statically determinate, that is, the forces acting on the various components can be determined using simple mathematical equations or graphical methods. Bridges with cables that directly connect the towers to the deck, as at Bluff Dale, are statically indeterminate and require more complicated calculations, an important difference that enhances the Bluff Dale Bridge's significance. During this period, the general level of American mathematics meant that most American engineers avoided indeterminate designs because of the more difficult calculations.[16]

Another Pennsylvanian's work firmly established wire cables as the standard for American suspension bridges. Charles Ellet, Jr., of Bucks County studied briefly in Paris and became familiar with the work of Navier, Vicat, and other important French suspension bridge engineers such as the Seguin brothers. Ellet's Fairmount (1842) and Wheeling (1849, HAER No. WV-2) bridges showed strong evidence of his European sojourn. The latter's clear span of 1,008'-0" briefly made it the longest bridge in the world.

But while Ellet adapted much French practice, he did not, indeed could not after the Austrian-born John Roebling patented the technology in 1847, employ the so-called method of "air-spinning" cables *in situ.*[17] Roebling's 1845 aqueduct over the Allegheny River at Pittsburgh was the first American suspension bridge to

[14] See, for examples of cable-stayed bridges, Redpath and Brown's Kings Meadows Bridge in Scotland (illustration in Peters, p. 36), or John and William Smith's first Dryburgh Abbey Bridge, 1817 (Peters, p. 37). Both bridges were constructed in 1817. A group of twelve unusual stayed bridges built in Scotland and England by local builders between 1816 and 1834 further illustrates experimentation with suspension forms in the United Kingdom. See Ted Ruddock, "Blacksmith Bridges in Scotland and Ireland, 1816-1834," in *Proceedings of an International Conference on Historic Bridges*. Morgantown, West Virginia: 1999. West Virginia University Press, 133-46.

[15] The main span length of Telford's bridge depends on the source consulted.

[16] Dr. Dario Gasparini, professor of civil engineering at Case Western Reserve University, believes that at least some American engineers could solve the equations for statically indeterminate structures (personal conversation, June 1996). Emory Kemp, professor of civil engineering and history at West Virginia University, however, writes about the combined stayed cable and catenary design of the Brooklyn Bridge: "it would have been impossible at the time for Roebling or anyone else to perform an adequate analysis of this indeterminate structure" (Kemp, "National Styles," p. 34). Special thanks to Norman Friedman, Bridge Design Division, TxDOT, for helping with these concepts.

[17] Peters, p. 166.

employ both cables both spun in place and tightly wrapped in wire. The advantage of this method was to ensure equal tension on all the wires in the cable and reduce slippage between the individual strands. Roebling also patented a method for manufacturing twisted wire rope of the sort that ultimately replaced the Bluff Dale Bridge's original cables. The original cables at Bluff Dale used a very different approach to apply and maintain tension on the cables.

Roebling's numerous other bridges, however, pale in comparison to the international recognition that the Brooklyn Bridge secured for Roebling and for American engineering (HAER No. NY -18). Roebling used a combination of catenary and stay cables on his largest structures. The diagonal cables added stiffness, and resisted the wind-induced vertical and torsional movement of the main spans that destroyed many suspension bridges.

In assessing the Bluff Dale Bridge against this larger international context, it is important to realize that while cable-stayed bridges had been proposed and occasionally constructed, it was not until after World War II that they became a distinctive and regularly constructed bridge type. Indeed, in was not until the 1991 Veterans Memorial Bridge across the Neches River between Jefferson and Orange Counties that a post-Runyon cable stayed bridge was built in Texas.

Statewide Context of Highway Bridges
See "Historic Context: Bridges of Texas 1866-1965," in *Historic Road Infrastructure of Texas, 1866-1965*, Section E, pp. 87-192.

Statewide Context of Suspension Bridges
See "Historic Context: Bridges of Texas 1866-1965," in *Historic Road Infrastructure of Texas, 1866-1965*, Section E, pp. 97-103.

Origins of the Suspension Bridge Tradition in Texas[18]
The success of the 1869 suspension bridge across the Brazos River at Waco (HAER No. TX-13; NR 1970) demonstrated the potential of, and set a strong precedent for, suspension bridges throughout Texas. This influence was particularly strong in the Brazos and adjacent river basins of north-central Texas. Peculiarities of Texas rivers, increasing importance of Waco as a river crossing, and remoteness of Waco from eastern industrial centers shaped the engineering solution represented by the suspension bridge. Texas rivers are subject to flash floods which can suddenly block important fords. Waco became an important stop on the Chisholm Trail after the Civil War, and consequently a reliable crossing became particularly critical. While the ranches and farms surrounding Bluff Dale were not located on a major cattle trail, they did have similar problems bringing livestock across the Paluxy River to the railroad depot at Bluff Dale.[19] In seeking an appropriate solution to Waco's problem, the bridge company selected a suspension bridge instead of a truss bridge. The wire and other construction materials for a suspension bridge were easier than the parts of a pre-fabricated metal truss to transport from coastal ports.

[18] What follows is an expansion of a theory suggested by Barbara Stocklin, Environmental Affairs Division, TxDOT, summer 1996.

[19] Baker, *Building the Lone Star,* pp. 260-62; Verna Harris, "Bluff Dale Suspension Bridge" (typescript, 1977, Bluff Dale Suspension Bridge file, Texas Historical Commission, Austin, Texas), pp. 1-2.

In structural terms, the Waco Bridge shows remarkable similarities to the work of John Roebling. The most important similarities are the hybrid catenary and diagonal cable system and the truss-stiffened deck. This is completely understandable because the Waco company consulted with, and purchased materials from, the Roebling company. Adaptation of the Roebling model to local conditions included the use of crenelated brick towers.[20]

In his history of the Flinn-Moyer company's Beveridge Suspension Bridge (HAER No. TX-46), J. Philip Gruen concluded that suspension bridges were widely used in Texas because they required less material and labor than prefabricated metal trusses. Consequently, they were comparatively inexpensive. In addition, Gruen argued that suspension bridges rarely required the construction of mid-stream piers - a distinct advantage in avoiding unstable soil conditions and providing resistance to Texas's notorious flash floods.[21]

Two examples graphically illustrate how the Waco bridge shaped Texans' concept of "bridge" and of "suspension bridge" in particular. In 1892, the *Texas State Gazetteer and Business Directory* included advertisements for two different bridge companies illustrated with an engraving of the Waco Bridge.[22] That the image is exactly the same in each advertisement, that it was used for two (presumably) competing companies, and that neither company built the Waco Bridge means, at least in the minds of the printer, Waco meant "bridge." Put another way, this use of the Waco bridge engraving was the nineteenth century equivalent of the stock photograph or computer clip art: a widely understood generic image to be used as needed.[23] The second example is an oil painting of Salado College, Bell County, Texas.[24] In the foreground is a small pedestrian suspension bridge with castellated towers. Just as colonnaded plantation houses throughout the south evoke the English country home, and with it Imperial Rome, this private suspension bridge evokes the image of the Waco bridge.

The argument that visual culture impacts technological diffusion is not common in histories of American bridges. Nevertheless, the Western building tradition is replete with examples. From the Holy Sepulcher in Jerusalem to St. Peter's in Rome, architects and their patrons have long taken inspiration from structures vested with special authority by Western society. In the United States, few state capitol buildings are not modeled in some way after the U.S. Capitol.

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[20] Modem photographs reflect two re-buildings of the original bridge, in 1913-1914 and in 1976. For a photograph of the Waco Suspension Bridge close to its 1869 appearance, see Baker, *Building the Lone Star,* p. 260.

[21] In HAER No. TX-46, "Beveridge Bridge," Gruen cites Joseph E. King, *A Historical Overview of Texas Transportation, Emphasizing Roads and Bridges* (Lubbock, Texas: Center for History of Engineering and Technology, Texas Tech University, n.d.), p. 59; and Joseph E. King, *Spans of Time: Oklahoma Historic Highway Bridges* (Lubbock, Texas: Center for History of Engineering and Technology, Texas Tech University, June 1993), p. 6.

[22] The images are admittedly not exact renditions of the Waco Bridge, but well within the range of artistic license used by nineteenth-century graphic artists. See R. L. Polk, *Texas State Gazetteer and Business Directory,* vol. 4, (St. Louis: R. L. Polk and Company, 1892), pp. 256, 276.

[23] The use of such stock images has an ancient lineage: the same woodcut was used by the publisher to illustrate each city in the book popularly known as the Nuremberg Chronicle of 1493 (M. C. Johnsen, Special Collections Librarian, Carnegie Mellon University Libraries, Pittsburgh, Pennsylvania, personal conversation, September 16, 1996).

[24] See also Temple Junior Chamber of Commerce, *Bell County History* (Fort Worth, Texas: University Supply and Equipment Company, 1958), p. 66.

History of the Bluff Dale Cable-Stay Bridge[25]

Bluff Dale, on the Paluxy River, is also on the Stephenville-Granbury road. From Granbury there are connections to Weatherford and Fort Worth. By the mid-1870s Bluff Dale was a stop on a mail route between Fort Worth, Texas, and Yuma, Arizona. More importantly, the Fort Worth and Rio Grande Railroad reached Bluff Dale in 1889. The Paluxy River crossing at Bluff Dale was important to those on the left bank seeking direct rail connections to Fort Worth as well as those traveling by wagon to Granbury and other points.

In 1890, the Erath County Commissioners' Court accepted a $4,200 bid for three bridges from the Runyon Bridge Company.[26] The company, owned by partners E. E. Runyon and William Flinn, was authorized to commence construction of the second and third bridges only when the commissioners had inspected and accepted the first. This makes particular sense because Runyon's patents were issued beginning in 1888 and probably did not have an established track record. On June 12, 1890, the commissioners accepted the first bridge and authorized payment of $1,400. The remaining bridges were accepted and paid for on July 1 of the same year, proving that Runyon Bridge Company could swiftly contract and construct.

Unfortunately, the county records do not seem to indicate when the commissioners authorized construction of the bridge across the Paluxy at Bluff Dale. One surviving county record, however, documents that on January 5, 1891, the Court ordered “that the Bridge across Paluxy Creek near Bluff Dale built by the Runyon Bridge Co. be received and it is further ordered by the Court that the Treasurer pay to the Runyon Bridge Company $3557.50 balance due said Company on the Contract of said Company with Erath County for the building of four bridges in the year 1890.”[27]

The repair history of the Bluff Dale Bridge began at least as early as 1899. In that year the Flinn-Moyer Bridge Company, also of Weatherford, Texas, was paid $815.88 for "repairs of the County Bridge at Bluff Dale, Texas." [28] Flinn-Moyer probably installed the metal pipe stiffening truss as part of this work, based on the following evidence: (1) historic photographs of "Runyon-style" bridges with similar cable stays do not have Howe trusses made of pipe (see HAER photographs TX-36-12 through TX-36-14), (2) railings described or illustrated in Runyon's patents are constructed of cable and pipe using the Pratt pattern, and (3) the truss at Bluff Dale is very close to that which survives on Flinn-Moyer's Clear Fork of the Brazos Suspension Bridge of 1896 (HAER No. TX-64) and the truss once on the Beveridge Bridge (HAER No. TX-46).

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[25] This section based on Harris; Baker, pp. 20-22; Erath County, Texas, *Commissioners' Court Minutes* (hereafter cited as ECCC *Minutes),* vol. E (Dick Smith Library, Tarleton State University, Stephenville, Texas), p. 88 (March 7, 1890), p. 90 (March 27, 1890), pp. 101-102 (June 12, 1890), p. 103 (July 1, 1890), p. 152 (January 5, 1891), p. 203 (November 27, 1891).

[26] The three bridges were to be built across the Bosque River: on the Stephenville-Meridian public road, the Upper Granbury public road, and the Stephenville-Palo Pinto road.

[27] ECCC *Minutes,* vol. E, p. 152 (January 5, 1891). In light of the wording of the Court’s actions on Monday January 5, 1891 and the unlikelihood of any construction taking place the on or after Thursday, January 1, 1891, both the HAER report, and this nomination, use a 1890 date for the completion of the Bluff Dale Bridge.

[28] Erath County, Texas, *Road Records of Erath County 1899-1904* (Dick Smith Library, Tarleton State University, Stephenville, Texas), pp. 48-49 (November 14, 1899).

The Bluff Dale Bridge remained in use until 1934, when it was by-passed with the construction of a new concrete bridge. The following year the bridge was moved upstream to its current location, what is now County Route 149. As detailed in the original 1977 nomination, farmers and ranchers badly needed a reliable river crossing in this location in order to efficiently access the markets at Bluff Dale.

Still in use for vehicular traffic, the bridge was placed on the National Register of Historic Places in 1977. A county road crew replaced the wooden deck with the present metal deck in 1983, but the bridge is otherwise unaltered from the time it was originally listed. It was closed to vehicular traffic in the early 1990s when it was bypassed once again with a new prestressed concrete girder bridge. The Historic American Engineering Record program documented the bridge in 1996 and Lidar documentation was prepared for the Historical Studies Branch of the Texas Department of Transportation in the summer of 2003. The bridge was placed on Preservation Texas' 2009 Most Endangered Sites list.

E. E. Runyon, Bluff Dale Bridge Designer[29]

In 1879, Edwin Elijah Runyon seems to have appeared in the southeast corner of Cooke County just as the first train arrived in Gainesville, the seat county. Indeed, whether known as E. E. Runion, Ed Runyon, E. E. Runyon, or Edwin E. Runyon, the designer of the Bluff Dale Bridge spent his bridge years in a series of communities on the road between Gainesville and Pilot Point, Denton County. While there were Runyons in northern Cooke County as early as 1858, the name seems to be neither especially common in Cooke County, nor source of confusion in the legal documents that survive. In 1879, Runyon was the first school teacher in Bloomfield, a community flooded by Lake Ray Roberts in the 1980s. A couple of years later, he opened a store that soon became the post office for Mountain Springs. Located in the eastern Cross-Timbers, a dense wooded area dominated by post oak, Mountain Springs is a little closer to Gainesville than Bloomfield. In the 1890s, the community grew to have a mill, blacksmith, cotton gin, and about one hundred inhabitants. Perhaps Runyon's 1883 sale of property in Bloomfield marks the move. He remained associated with Mountain Springs until the spring of 1889 when he filed two bridge patents and two agriculture related patents from Mountains Springs and Burns City.[30] While at Mountain Springs, Runyon and his wife Emma acquired ninety acres of land plus horses and cows valued at $125. They also sold two houses; the last was a five room, one-story frame structure with

[29] This section is drawn from HAER TX-87.

[30] Cooke County, *Deed Books*, vol. 5 (County Clerk's Office, Cooke County Courthouse, Gainesville, Tex.; here in after cited as CC *Deeds*), 950-1; A. Morton Smith, *The First 100 Years in Cooke County* (San Antonio, Tex.: The Naylor Company, 1955; second printing 1976), 68, 74; Odessa Morrow Isabel, "Bloomfield, Texas," in *The New Handbook of Texas*, vol. 1 (Austin: The Texas State Historical Association, 1996), 597-8; Delsie Lillard, "Mountain Springs Community," in *Cooke County History: Past and Present*, William F. Powell, project director, (Dallas, Tex.: Cooke County History Book Committee, 1992), 16-17;. CC Deeds, 31: 328; Runyon, "Device for Twisting Wire Cables of Suspension-Bridges," U.S. Patent No. 404,934 (1 Apr. 1889); Runyon, "Bent for Suspension-Bridges," U.S. Patent No. 410, 201 (1 Apr. 1889); Runyon, "Lawn Mower," U.S. Patent No. No. 445,616 (1 Apr. 1889); Runyon, "Cotton-Cultivating Machine," U.S. Patent No. 412,980 (3 May 1889).

stable worth $550.[31] By August 1890, the same year the Bluff Dale and the other Erath County bridges were being built, Runyon filed his fifth and penultimate patent from Pilot Point.[32]

On 29 June 1888, the same day that Runyon filed his first suspension bridge patent, Joseph Mitchell of Montague County, Texas, immediately to the west, was paid $600 for a bridge by Cooke County.[33] While the nature of the bridges Mitchell sold to Cooke County and elsewhere is unknown, in 1887 he patented a bridge using hand-twisted wire cables to support a deck without deck beams.[34] Again on 10 September 1888, when another of Mitchell's bridges was accepted,[35] Runyon received a contract for a bridge across Indian Creek on the Valley View to Collinsville (Grayson County) road. The bridge was "to be built of iron and galvanized wire. Known as Needle Beam Steel wire Bridge" and cost $10 per linear foot. Runyon was paid $820 two months later for what is his first known contract.[36]

With the seeming success of his first contract and possibly resources from the sale of property, Runyon launched into a series of elaborations of his initial wire and pipe suspension bridge concept. Driven by a desire for a simple, light, strong, durable, economic, longer-span bridge, Runyon experimented with a pure cable-stay system when few academically trained engineers would. Evidently, financial success eluded Runyon, but the Erath County contract may have provided useful and ultimately remunerative experiences for his partner, William Flinn.

The primary sources of information about Edwin Elijah Runyon, are the bridge contracts cited above, a business card, and a series of eight patents. In addition, there are photographs in the Weatherford Public Library of bridges that closely resemble the patent illustrations. Six of Runyon's eight patents issued between December 1888 and March 1893 are for suspension bridges. The non-bridge patents are for a cotton-cultivating machine and a lawn mower. Based on the filing dates of the first four patents, it is known that between June 29, 1888, and April1, 1889, Runyon lived in Mountain Spring, Cooke County, Texas. The fifth patent, the cotton cultivator, was filed May 3, 1889, from Burns, Cooke County. Between August 23, 1890, and November 2,

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[31] CC *Deeds* 33: 196-7, 352; CC *Deeds* 34: 138; CC *Deeds* 36: 52; CC *Deeds* 39: 548-9; CC *Deeds* 45: 290-1; CC *Deeds* 46: 138-40; CC *Deeds* 48: 225-6; CC *Deeds* 81: 306-7.

[32] It is interesting to note that the while the Erath County minutes recorded Weatherford, Parker County, Texas, as the place of business for the Runyon Bridge Company, an undated business card found in William Flinn's house places the company in Pilot Point. A copy of the business card, which identifies the Runyon Bridge Company of Pilot Point, Texas, as contractors for "needle-beam combination suspension" bridges, is in the collection of Dr. Timothy L. Flinn, Strawn, Tex.

[33] Cooke County, *Minutes of the Cooke County Commissioners' Court* (hereinafter cited as CCCC *Minutes),* vol. 4 (County Clerk's Office, Cooke County Courthouse, Gainesville, Tex.), 615 (29 June 1888).

[34] Joseph Mitchell, "Bridge," U.S. Patent No. 368,483 (August 16, 1887).

[35] The fact that both Mitchell and Runyon had county business on the same day dramatically emphasizes the issue of mutual influence - especially since Mitchell is documented as having built a bridge reminiscent of Runyon's Erath County bridges. See "Bridges Over the Whitewater River at Richmond, Ind.," *Engineering News* 41, no. 25 (22 June 1899): 390; and Historic American Engineering Record (HAER), National Park Service, U.S. Department of the Interior, "Texas Suspension Bridges," HAER No. TX-98.

[36] CCCC *Minutes,* 5: 67-7 (10 Sept. 1888), 100 (20 Nov. 1888). To no avail, the author searched for obvious remains of Runyon's first bridge at all identifiable Indian Creek crossings not flooded by Lake Ray Roberts with longtime Cooke County resident and historian the Honorable, Margaret Hayes.

1892, Runyon lived in Pilot Point, Denton County, Texas. An undated business card, found in William Flinn's house by a subsequent owner, and now in a family collection, indicates that at one point "Runyon Bridge Company, Pilot Point, Texas," were contractors for a "needle-beam combination suspension bridge."

An analysis of Runyon's patents suggests that he had a clever and inventive mind. It is doubtful that he had any advanced engineering or mathematical training. However, Runyon was apparently aware of the de-stabilizing effect of wind loads, that bridges expand and contract with changing temperature, that it was important to place equal strain on each of the wires of a suspension cable, and that it was necessary to counteract various forces that would deform the bridge towers. On the other hand, Runyon did not seem to be as particularly concerned about stiffening the bridge deck as were Roebling and Ellet. Runyon indicated that many of his bridge components were constructed of gas (lighting) pipe because it was durable, economic, and easily available.[37]

Runyon developed a structural vocabulary based on gas-lighting pipe, hand-twisted cables, and elaborate connection castings, while consistently seeking structural simplicity and economy. While other Texas suspension bridge builders made extensive use of pipe, and while at least one other made use of hand-twisted cables, Runyon's connections are extraordinary accomplishments in design and founder's execution. Runyon's connections have an unusual complexity that suggests a lack of formal engineering training. He seemed to get an idea for a connection only to find he needed another part to keep the first in place, and perhaps a third to keep the second in place.[38]

If Runyon's wonderful and inventive mind developed visually striking and appealing connections, however, it was his use of a pure cable stayed suspension system that was his most striking and telling achievement. The concept of connecting the towers directly to the deck panel-points dates at least to the late Renaissance. Throughout the nineteenth century, bridge designers experimented with a variety of suspension arrangements including pure cable-stayed and hybrid parabolic and cable-stayed systems. Examples of the latter include the Brooklyn and Waco bridges. In a situation closely parallel to north central Texas, blacksmiths in Scotland and Ireland built a series of short-span cable-stayed structures before 1834.[39]

Cable stays lost favor with academically trained engineers in 1823. In that year Navier published his *Memoir sur les ponts suspendus*, arguably the most influential treatise on suspension bridges. His negative assessment of cable-stayed bridges severely limited future development. Runyon likely was unaware of this. Regardless, Texas wire-supported bridge builders perceived a community need, seized an opportunity provided by the legislature, and sought appropriate solutions for their conditions. Despite his inventive work and despite the demand for bridges in north central Texas, Runyon's known output was only between four and six bridges.

Runyon's 1928 death certificate indicates he was a "yard man" and approximately 76 years old.

[37] For an analysis of the patents see HAER TX-36. For a complete engineering analysis of the Bluff Dale Bridge see HAER TX-104.

[38] Justin Spivey, PE, conversation with author, fall 1997.

[39] See Peters, p. 28; Ruddock.

William Flinn[40]

William Flinn of Weatherford, Parker County, Texas, was a partner in both the Flinn-Moyer Bridge Company and the Runyon Bridge Company. Evidence that has emerged from family archives and from patent research suggests that Flinn was primarily a contractor. The level of his involvement in the design of the Bluff Dale Bridge is unclear. William Flinn was born in Iowa Point, Kansas, and arrived in Weatherford, Texas, in the early 1880s. No information has come to light about professional engineering training or how he became involved in bridge building. In late December 1884 he purchased property for a house in Weatherford and married Alice Elizabeth Thompson in the following year. Flinn died without a will on June 16, 1904.[41]

Bluff Dale is one of four known surviving bridges built with the involvement of William Flinn. Complicating our understanding of Flinn's business dealings is evidence that at the same time he was associated with Runyon, he also did bridge business under his own name and with an A. A. Moyer. The 1890-1891 *Texas State Gazetteer and Business Directory* included an advertisement for Flinn which makes no reference to Runyon Bridge or any other company.[42] Interestingly, the advertisement makes it clear that Flinn was seeking other types of construction projects, including buildings, wind mills, cisterns, and tanks- all during the construction of the Bluff Dale Bridge. It is clear that Flinn was a prolific builder, judging by the number of bridges known through county contracts and through family photographs.[43] In 1903 the Weatherford *Daily Herald*, admittedly a source likely to be positively predisposed, reported that Flinn was "reputed to be the most successful bridge builder in the state."[44]

Conclusion

The Bluff Dale Bridge is a rare survivor of the once-common Texas wire-supported bridge. Wire supported bridges were once found in north-central Texas, and along sections of the Red and Rio Grande before 1940.[45] Economy and ease of construction, resistance to flash flooding, and the precedent of the Waco Suspension Bridge made wire supported bridges a popular alternative to the prefabricated metal truss. While cable-stayed bridges were occasionally proposed throughout the history of suspension bridges, they were constructed

[40] The section is a condensed from HAER No. TX-64, "Clear Fork of the Brazos Suspension Bridge (Woodson Bridge)," 1996.

[41] Mrs. Paul Martin Flinn, "Paul Martin Flinn," in Parker County Historical Commission, *History of Parker County* (Dallas: Taylor Publishing Company, 1980), pp. 282-83; Parker County, Texas, *Deed Book,* vol. 15 (Parker County Courthouse Annex, Weatherford, Texas), pp. 354-55 (December 2, 1884); Parker County, Texas, *Probate Minutes,* vol. 8 (Parker County Courthouse Annex, Weatherford, Texas), pp. 581-83 (June 16, 1904).

[42] See R. L. Polk, *Texas State Gazetteer and Business Directory,* vol. 3 (St. Louis: R. L. Polk and Company, 1890-1891), p. 1037.

[43] A preliminary tabulation suggests that more than twenty-five contracts were awarded by Parker County, where Weatherford is located, to William Flinn or to the Flinn-Moyer Bridge Company between 1885 and 1903. In addition to Parker County, Flinn had at least one bridge contract in Bell, Comanche, Denton, Mills, Navarro, Palo Pinto, San Saba, Shackelford, and Wise counties. See County Bridge Files, Environmental Affairs Division, Texas Department of Transportation, Austin, Texas.

[44] "Parker County's Bridge Man," Weatherford *Daily Herald,* June 30, 1903.

[45] HAER TX –98 drawing 1of1 graphically illustrates this.

infrequently prior to 1945.[46] Indeed, noted bridge historian Emory Kemp knows "of no other documented cable stayed bridges of the late nineteenth and early twentieth century."[47] While HAER photographs TX-36-12 through TX-36-14 show that Bluff Dale was not the only cable-stayed suspension bridge ever constructed in north-central Texas, Bluff Dale is the only one of two to survive and is in the best condition of the two. In addition to its rare status as a cable-stayed bridge, Bluff Dale is also important because it preserves the remarkable design details associated with E. E. Runyon's patents. Runyon's striking solutions show that even as late as 1890, empirical engineers were capable of innovative work.

Period of Significance

The original 1977 nomination did not specify a precise period of significance for the Bluff Dale Bridge. It appears that the intent was for the period of significance to begin at the date of the bridge's inception and to span through to at least the year of its relocation. The documentation supports this assumption. Therefore, the period significance begins in 1890, which coincides with the date of its design, and ends in 1934 the date of its relocation. These years encompass the period that the bridge achieved and maintained its important engineering and transportation associations.

[46] See David P. Billington and Aly Nazmy, "History and Aesthetics of Cable-Stayed Bridges," *Journal of Structural Engineering* 117, No. 10 (October 1991): 3103-3134.

[47] Emory Kemp, to author, July 8, 1996.

Bibliography

Baker, T. Lindsay. *Building the Lone Star: An Illustrated Guide to Historic Sites.* College Station, Texas: Texas A&M University Press, 1986.

Billington, David P. and Aly Nazmy, "History and Aesthetics of Cable-Stayed Bridges," *Journal of Structural Engineering* 117, No. 10 (October 1991): 3103-3134.

"Bridges Over the Whitewater River at Richmond, Ind.," *Engineering News* 41, no. 25 (22 June 1899): 390.

Brown, Mark M. "Nineteenth-century Cable-stayed Texas Bridges." In *The Fifth Historic Bridges Conference*. Columbus, Ohio: 1998. Burgess & Niple, 38- 46.

Buonopane, Stephen G. and Mark M. Brown. "History and Engineering Analysis of the 1890 Cable-stayed Bluff Dale Bridge." In *First International Congress on Construction History*, Madrid, Spain, 2003. Instituto Juan de Herrera.

Cooke County, Texas. *Deed Books*. County Clerk's Office, Cooke County Courthouse, Gainesville, Texas.

Cooke County, Texas. *Minutes of the Cooke County Commissioners' Court.* County Clerk's Office, Cooke County Courthouse, Gainesville, Texas.

County Bridge Files. Environmental Affairs Division, TxDOT, Austin, Texas.

DeLony, Eric. *Landmark American Bridges.* New York: American Society of Civil Engineers, 1993.

Erath County, Texas. *Commissioners' Court Minutes.* Dick Smith Library, Tarleton State University, Stephenville, Texas.

___ . *Road Records 1899-1904.* Dick Smith Library, Tarleton State University, Stephenville, Texas.

Flinn, Mrs. Paul Martin. "Paul Martin Flinn," in Parker County Historical Commission, *History of Parker County.* Dallas: Taylor Publishing Company, 1980. Pp. 282-83.

Timothy L. Flinn Collection, Strawn, Texas.

Friedman, Norman. Bridge Design Division, TxDOT, personal conversations, summer 1996.

Gasparini, Dario. Professor of civil engineering, Case Western Reserve University, personal conversation, June 1996.

Harris, Verna. "Bluff Dale Suspension Bridge." Typescript, 1977, 6lvs., Bluff Dale Suspension Bridge file, Texas Historical Commission, Austin, Texas.

Historic American Engineering Record (HAER), National Park Service, U.S. Department of the Interior. "Beveridge Suspension Bridge," HAER No. TX-46. Prints and Photographs Division, Library of Congress, Washington, D.C.

___, HAER No. TX-64, "Clear Fork of the Brazos Suspension Bridge (Woodson Bridge)," 1996.

___, HAER No. TX-36, "Bluff Dale Suspension Bridge," 1996.

___, HAER No. TX-98, "Texas Suspension Bridges," 2000.

___, HAER No. TX-87, "Barton Creek Bridge," 2000.

Hopkins, H. J. *A Span of Bridges: An Illustrated History.* Newton Abbot, United Kingdom: David and Charles, 1970.

Isabel, Odessa Morrow. "Bloomfield, Texas." *The New Handbook of Texas*, vol. 1. Austin, Tex.: The Texas State Historical Association, 1996.

Johnsen, M. C. Special collections librarian, Carnegie Mellon University Libraries, Pittsburgh, Pennsylvania, personal conversation, September 16, 1996.

Kemp, Emory L. "National Styles in Engineering: The Case of the Nineteenth Century Suspension Bridge." *IA: The Journal of the Society for Industrial Archaeology* vol. 19, no. 1 (1993): 21-36.

___ . To author, July 8, 1996.

King, Joseph E. *A Historical Overview of Texas Transportation, Emphasizing Roads and Bridges.* Lubbock, Texas: Center for History of Engineering and Technology, Texas Tech University, n.d.

___ . *Spans of Time: Oklahoma Historic Highway Bridges.* Lubbock, Texas: Center for History of Engineering and Technology, Texas Tech University, June 1993.

Lillard, Delsie. "Mountain Springs Community." *Cooke County History: Past and Present*, William F. Powell, project director. Dallas, Tex.: Cooke County History Book Committee, 1992.

Matejowsky, Alan. Bridge Design Division, TxDOT, personal conversation, August 1996.

Miller, Shannon. *The First 50 Years: 1918-1968.* Dallas: Austin Bridge Company, 1974.

Mitchell, Joseph. "Bridge," U.S. Patent No. 368,483 (August 16, 1887).

Parker County Historical Commission. *History of Parker County.* Dallas: Taylor Publishing Company, 1980.

"Parker County's Bridge Man." [Weatherford] *Daily Herald,* June 30, 1903.

Parker County, Texas. *Deed Book.* Parker County Courthouse Annex, Weatherford, Texas.

___ . *Probate Minutes.* Parker County Courthouse Annex, Weatherford, Texas.

Peters, Tom F. *Transitions in Engineering: Guillaume Henri duFour and the Early 19th Century Cable Suspension Bridges* (Boston: Birkhäuser Verlag, 1987).

Polk, R. L. *Texas State Gazetteer and Business Directory,* vol. 3. St. Louis: R. L. Polk and Company, 1890-1891.

___. *Texas State Gazetteer and Business Directory,* vol. 4. St. Louis: R. L. Polk and Company, 1892.

Ruddock, Ted. "Blacksmith Bridges in Scotland and Ireland, 1816-1834." In *Proceedings of an International Conference on Historic Bridges*. Morgantown, West Virginia: 1999. West Virginia University Press, 133-46.

Runyon, Edwin Elijah. "Suspension-Bridge," U.S. Patent No. 394,940 (December 18, 1888).

___. "Needle-Beam for Bridges," U.S. Patent No. 400,874 (April 2, 1889).

___. "Device for Twisting Wire Cables of Suspension-Bridges," U.S. Patent No. 404,934 (June 11, 1889).

___. "Bent for Suspension-Bridges," U.S. Patent No. 410,201 (September 3, 1889).

___. "Cotton-Cultivating Machine," U.S. Patent No. 412,980 (October 15, 1889).

___. "Lawn-Mower," U.S. Patent No. 445,616 (February 3, 1891).

___. "Suspension-Bridge," U.S. Patent No. 446,209 (February 10, 1891).

___. "Side Rail for Suspension-Bridges," U.S. Patent No. 493,788 (March 21, 1893).

Sayenga, Donald. "A History of Wrought-Iron Wire Suspension Bridge Cables" in *Proceedings of an International Conference on Historic Bridges*. Morgantown, West Virginia: 1999. West Virginia University Press, 59-71.

Smith, A. Morton. *The First 100 Years in Cooke County*. San Antonio, Tex.: The Naylor Company, 1955; second printing 1976).

Stocklin, Barbara. Environmental Affairs Division, TxDOT, personal conversations, summer 1996.

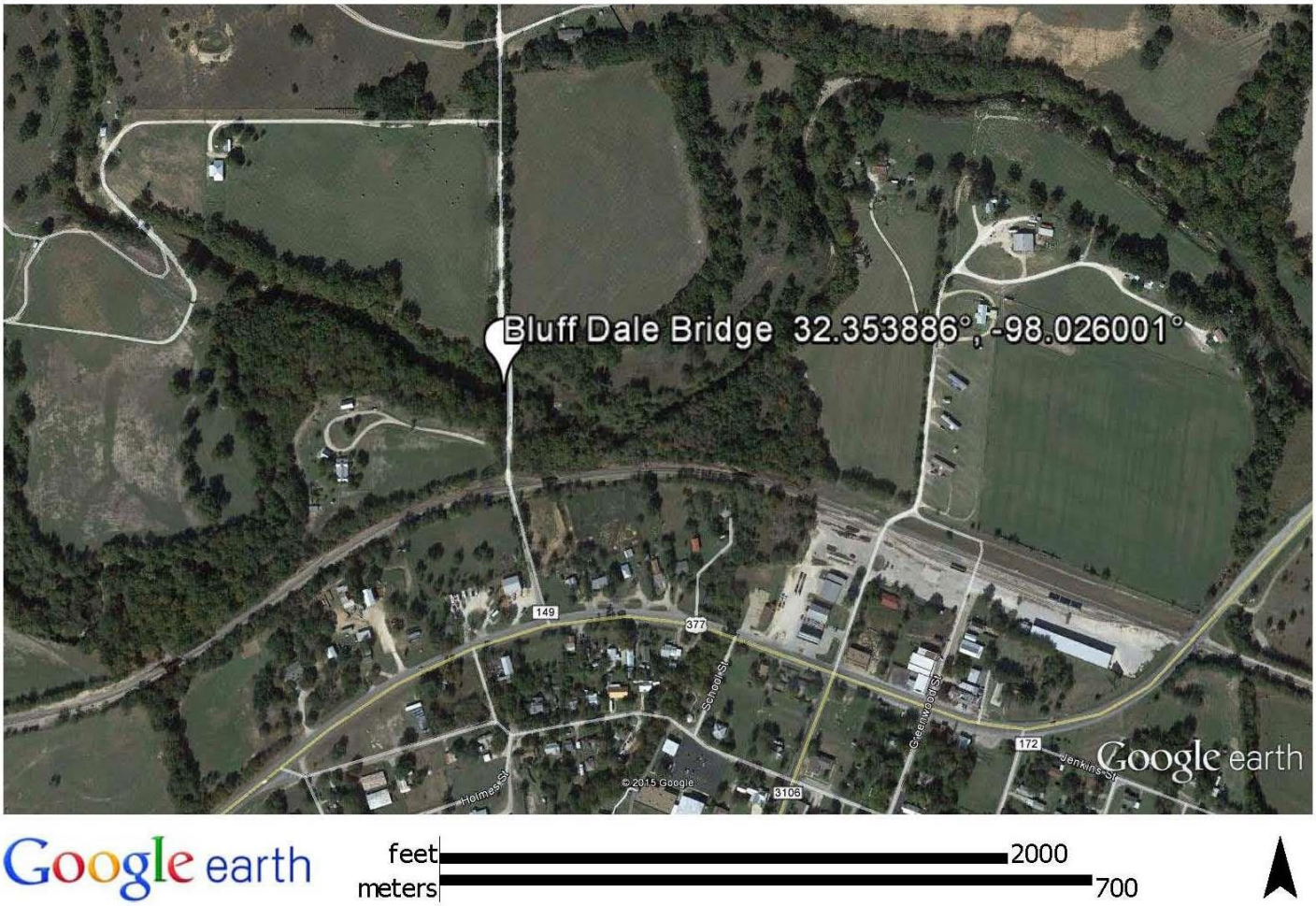
Temple Junior Chamber of Commerce. *Bell County History.* Fort Worth, Texas: University Supply and Equipment Company, 1958.

Texas Department of Transportation. "Historic Road Infrastructure of Texas, 1866-1965." Multiple Property Documentation Form, 2015.

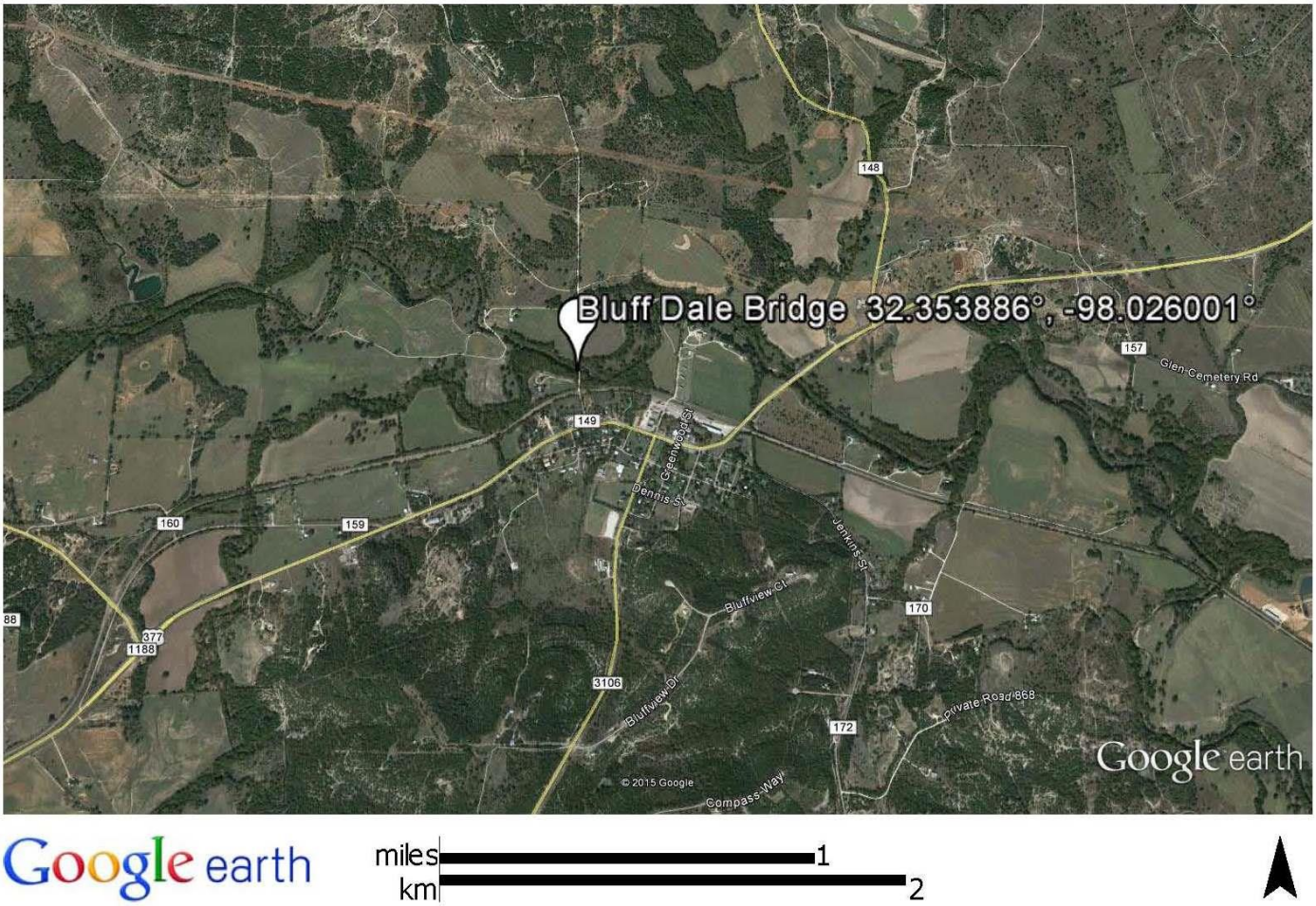
Weatherford Daily Herald, December 4, 1902.

Weatherford Public Library Archives, Weatherford, Texas. List bibliographic sources.

Map 1: Location of bridge. Source: GoogleEarth



Map 2: Location of bridge in wider view. Source: Google Earth



Map 3: Location of Bluff Dale (center) in relation to Stephenville and Granbury. Top edge is north. Source: Google Maps

Figure 1: Historic photograph taken of the Bluff Dale Bridge in 1929 by a Texas Highway Department photographer. Barrel shot looking southwest in the direction of Bluff Dale based on topography in the background. Camera moved during exposure.

Visible in image: pipe towers, the two castings on top of the towers supporting the cables, a single pipe bracing the tops of the nearest towers, stiffening truss, wood deck, and the northeast approach span.

Figure 2: Title Page, HAER Tx-36, 1 of 5 (Zolt Zsanda, 1996)

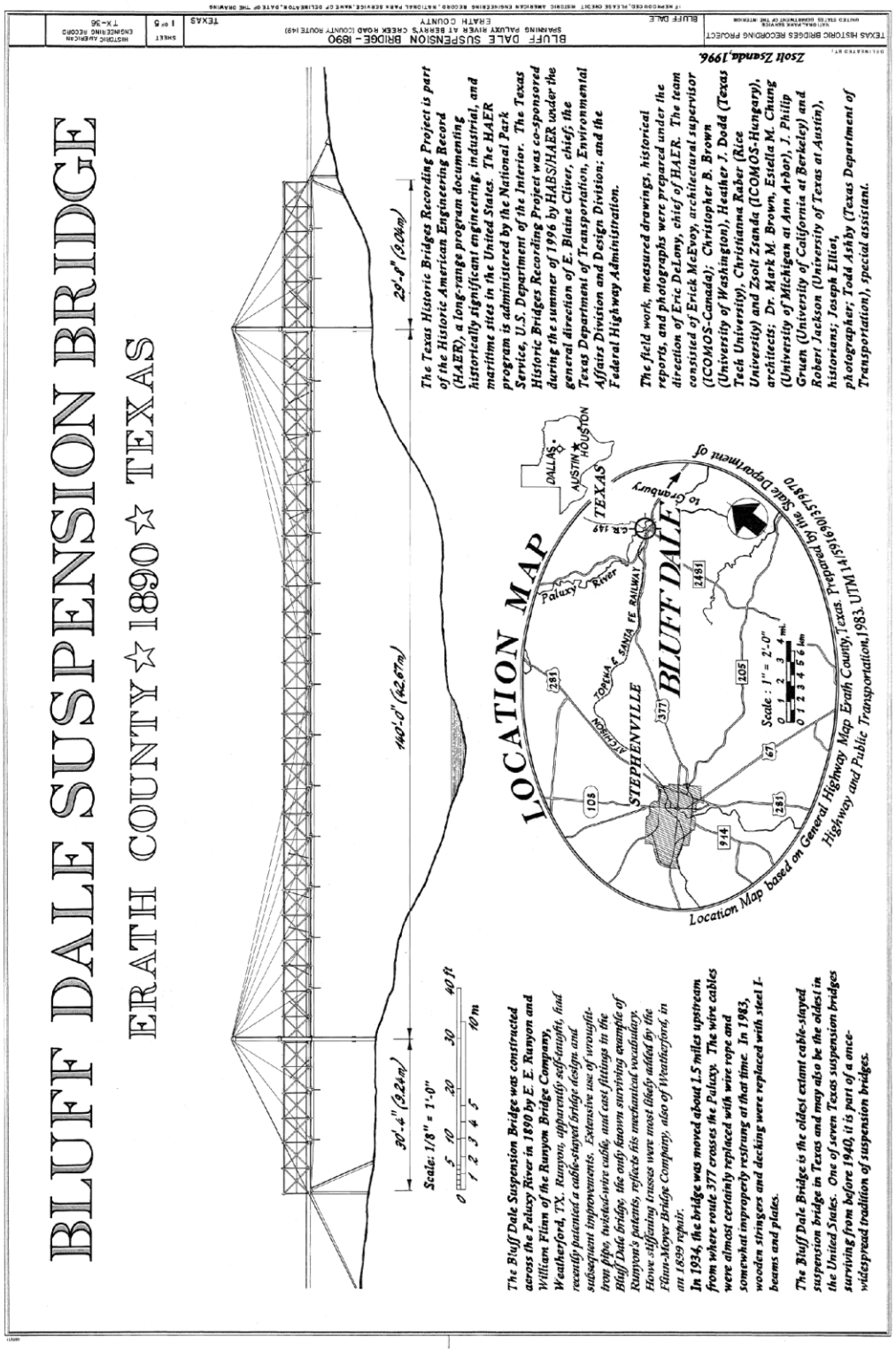


Figure 3: Tension Cable Schematics and Plan, HAER TX-36, 2 of 5 (Erick McEvoy, 1996)

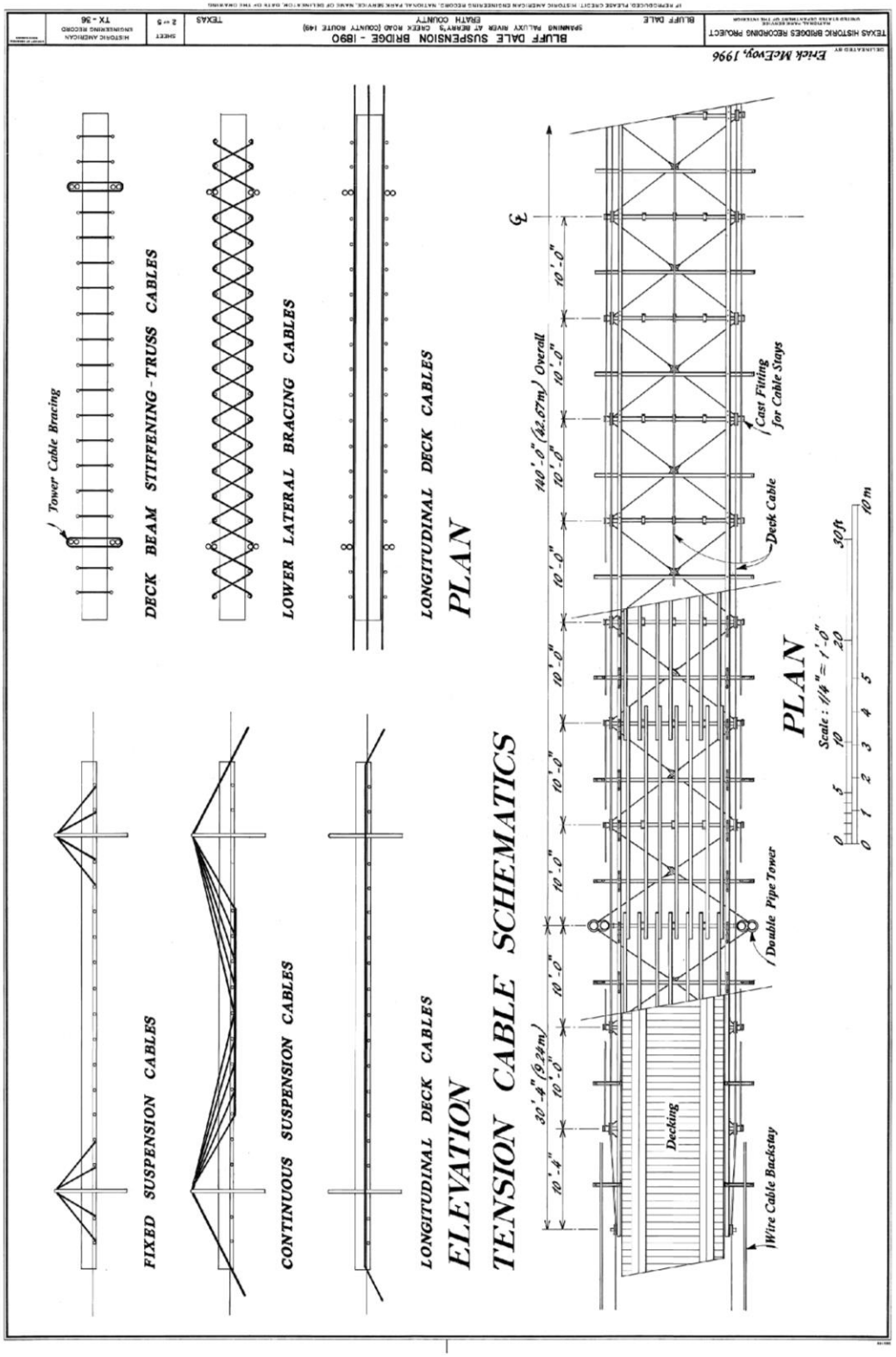


Figure 4: Partial Elevation and Sections, HAER TX-36, 3 of 5 (Erick McEvoy, 1996)

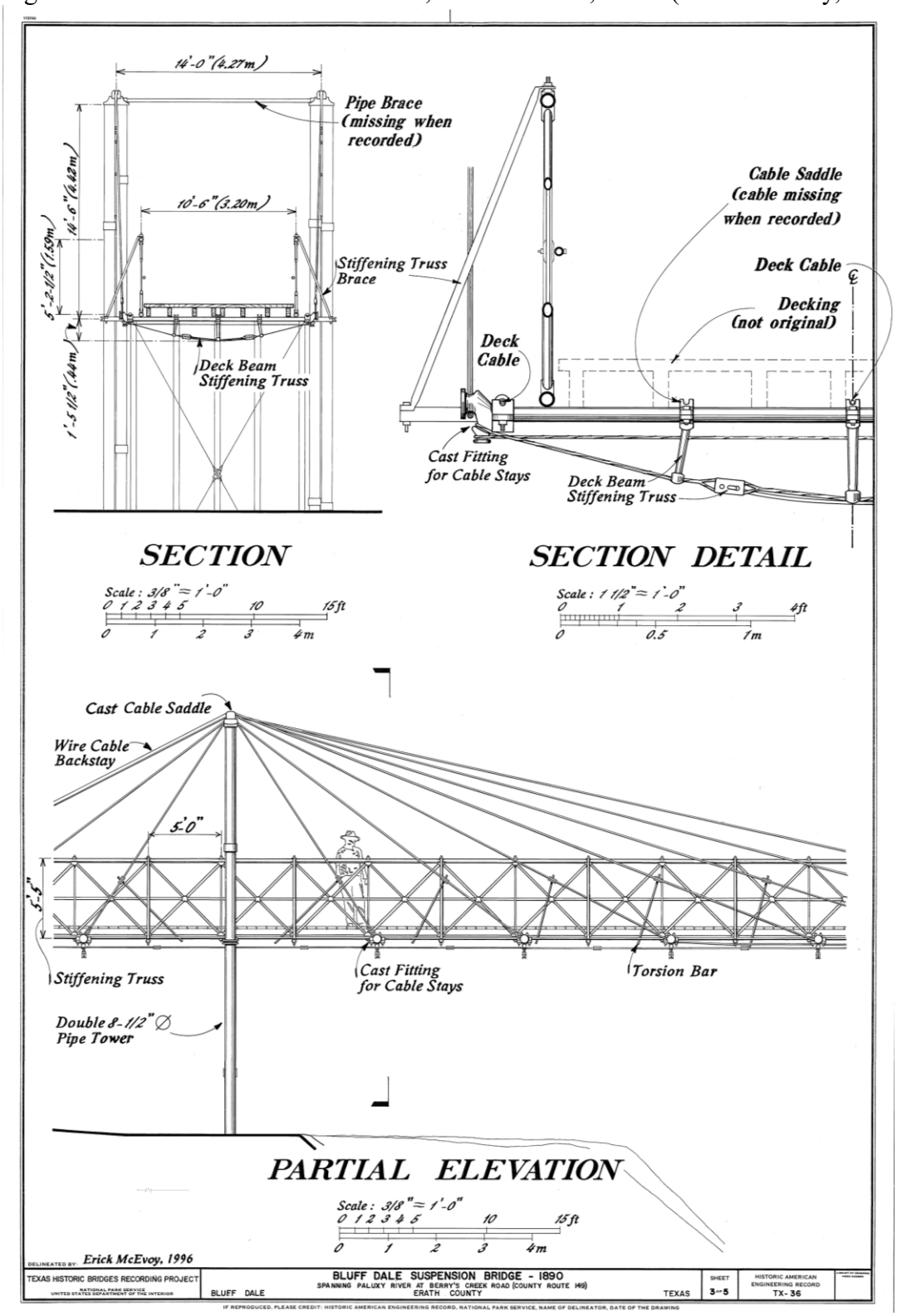


Figure 5: Connections, HAER TX-36, 4 of 5 (Erick McEvoy, 1996)

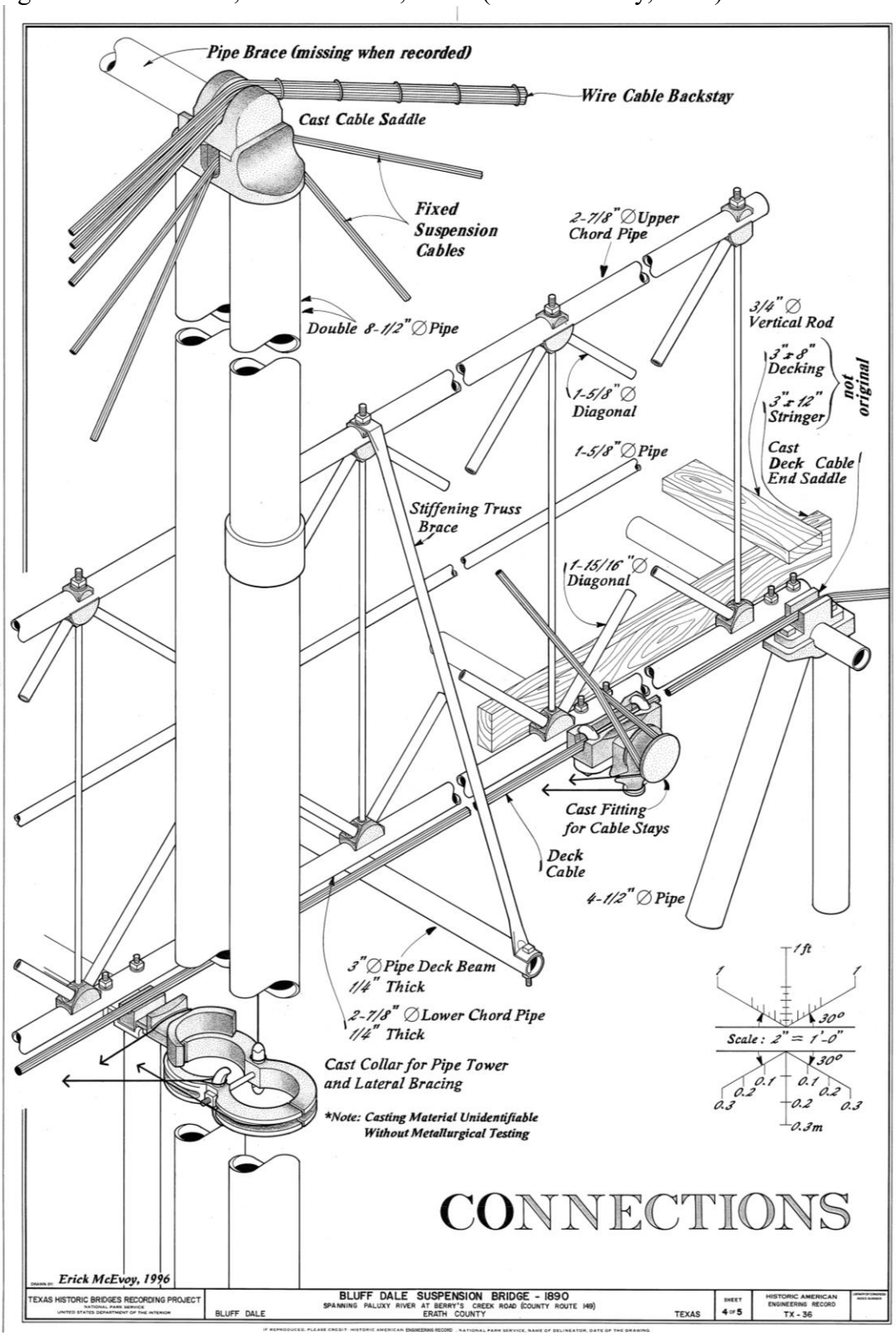


Figure 6: Exploded Connections, HAER TX-36, 5 of 5 (Erick McEvoy, 1996)

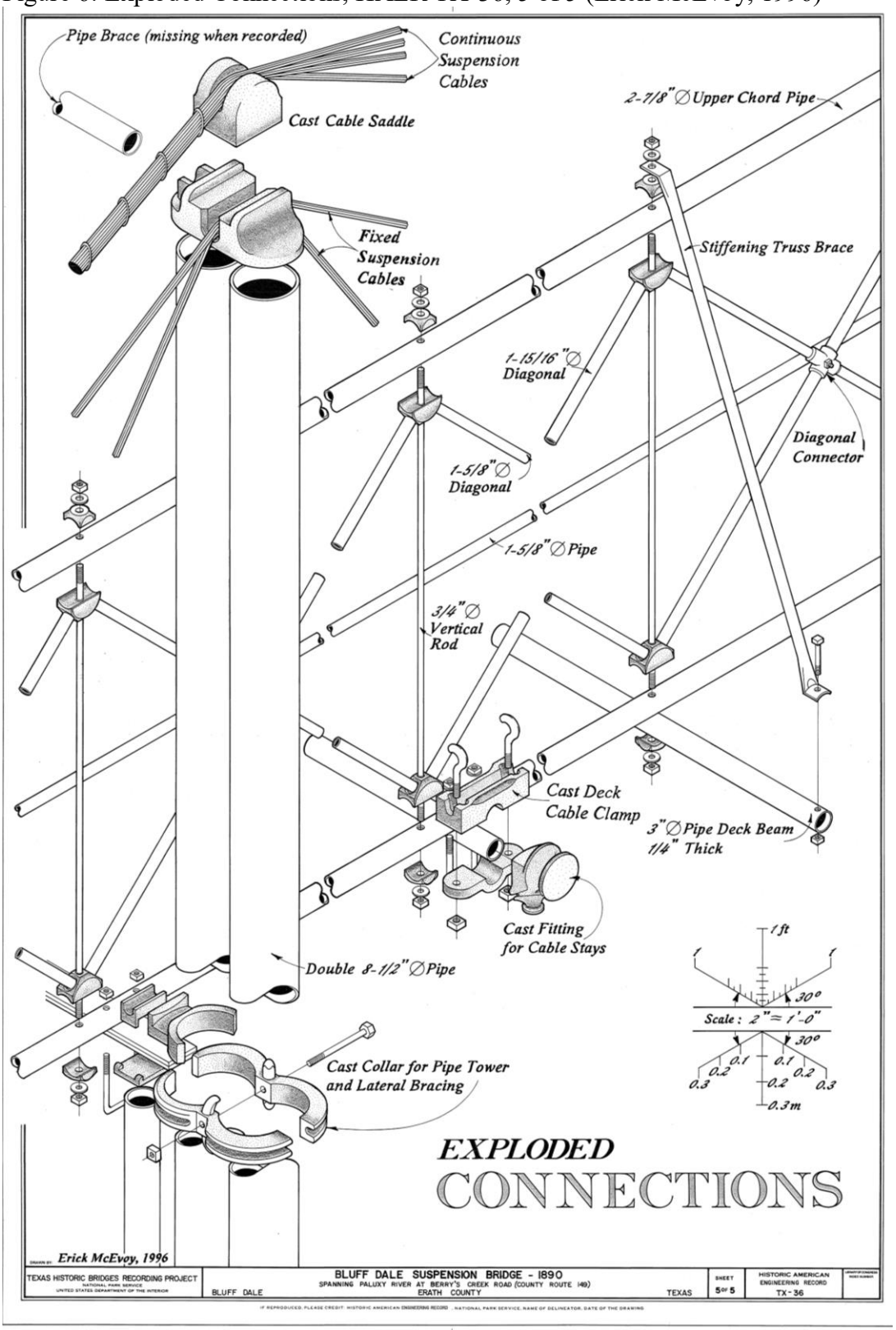


Figure 7: HAER TX-36 Photograph by Joseph E. B. Elliot (1996). Barrel view, from south.

Figure 8: HAER TX-36 Photograph by Joseph E. B. Elliot (1996). 3/4 view, from northeast.

Figure 9: HAER TX-36 Photograph by Joseph E. B. Elliot (1996). 3/4 view, from southeast.

Figure 10: HAER TX-36 Photograph by Joseph E. B. Elliot (1996). 3/4 view from below, from northwest.

Figure 11: HAER TX-36 Photograph by Joseph E. B. Elliot (1996). Underside, from south.

Figure 12: HAER TX-36 Photograph by Joseph E. B. Elliot (1996). 3/4 view floor beam.

Figure 13: HAER TX-36 Photograph by Joseph E. B. Elliot (1996). Detail, cable attachment point, from above.

Figure 14: HAER TX-36 Photograph by Joseph E. B. Elliot (1996). Southeast column.

Figure 15: HAER TX-36 Photograph by Joseph E. B. Elliot (1996). Connection details at southeast column.

Figure 16: HAER TX-36 Photograph by Joseph E. B. Elliot (1996). Detail, cable attachment point, from below.

Figure 17: HAER TX-36 Photograph by Joseph E. B. Elliot (1996). Detail of typical railing support.

CURRENT PHOTOS

The following photos were also submitted to NPS as high quality digital files.

TX_Erath County_Bluff Dale Bridge_0001.tif
Barrel view, looking north

TX_Erath County_Bluff Dale Bridge_0002.tif
South approach spans, looking southwest

TX_Erath County_Bluff Dale Bridge_0003.tif
Oblique view, looking northwest

TX_Erath County_Bluff Dale Bridge_0004.tif
Oblique view of main span, looking northwest

TX_Erath County_Bluff Dale Bridge_0005.tif
Oblique view main span, looking southwest

TX_Erath County_Bluff Dale Bridge_0006.tif
Barrel view, looking south

TX_Erath County_Bluff Dale Bridge_0007.tif
North towers, looking northwest

TX_Erath County_Bluff Dale Bridge_0008.tif
North approach spans, looking southwest

TX_Erath County_Bluff Dale Bridge_0009.tif
Cable stays and deck connections, looking southwest

TX_Erath County_Bluff Dale Bridge_0010.tif
Oblique view of deck and northeast tower, looking northeast

TX_Erath County_Bluff Dale Bridge_0011.tif
Deck connections and truss losses, looking west southwest

TX_Erath County_Bluff Dale Bridge_0012.tif
Castings on top of northwest tower, looking northwest

TX_Erath County_Bluff Dale Bridge_0013.tif
Castings on top of northeast tower, looking north northwest

TX_Erath County_Bluff Dale Bridge_0014.tif
Detail of patented deck connection, looking northwest

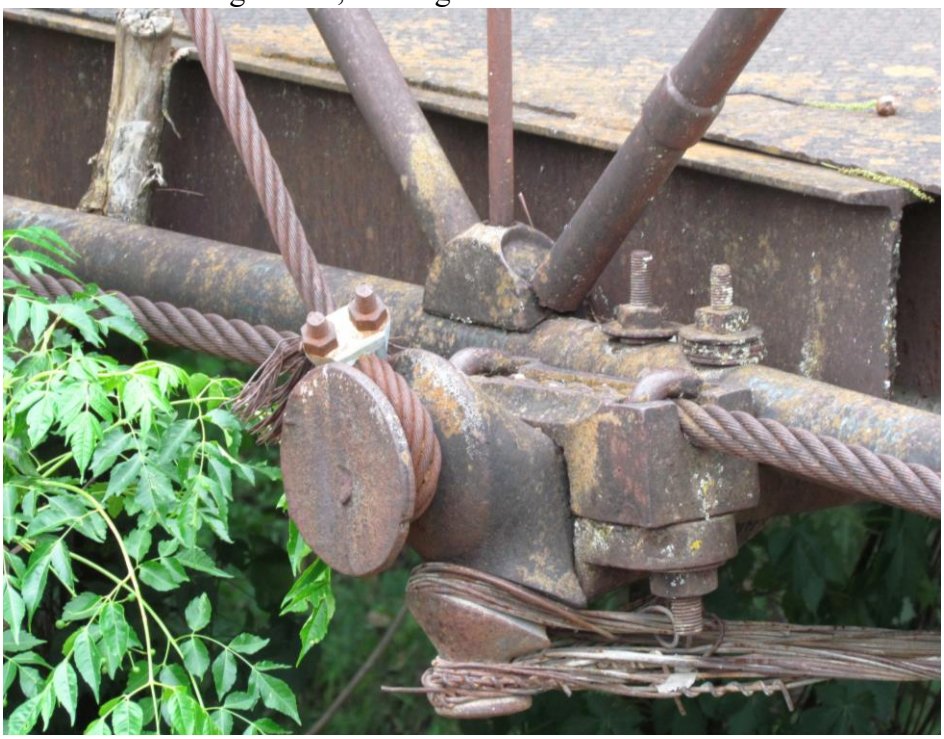
TX_Erath County_Bluff Dale Bridge_0015.tif
Truss detail, looking west northwest

TX_Erath County_Bluff Dale Bridge_0016.tif
Patented tower and bent connections, looking northwest

TX_Erath County_Bluff Dale Bridge_0017.tif
Patented tower connection, looking east

TX_Erath County_Bluff Dale Bridge_0018.tif
Patented deck beam castings and cable details, looking northwest

TX_Erath County_Bluff Dale Bridge_0019.tif
Deck beam castings detail, looking southwest



TX_Erath County_Bluff Dale Bridge_0020.tif
Deck beam castings detail, looking northeast

TX_Erath County_Bluff Dale Bridge_0021.tif
Barrel view of deck system, looking north

TX_Erath County_Bluff Dale Bridge_0022.tif
Abutment inscription from 1934 relocation, looking down


PRESERVATION
TEXAS
BLUFF DALE BRIDGE
1891 Cable-Stayed Bridge
Most Endangered Site – 2009


H.D.A.C.O.M.
R.L.L.C.O.N.
MAR.15.34

National Register of Historic Places
Memo to File

Correspondence

The Correspondence consists of communications from (and possibly to) the nominating authority, notes from the staff of the National Register of Historic Places, and/or other material the National Register of Historic Places received associated with the property.
Correspondence may also include information from other sources, drafts of the nomination, letters of support or objection, memorandums, and ephemera which document the efforts to recognize the property.

ENTRIES IN THE NATIONAL REGISTER

STATE TEXAS

Date Entered DEC 20 1977

Name	Location
Milam County Courthouse and Jail	Cameron Milam County
Bluff Dale Suspension Bridge	Bluff Dale Erath County
Denton County Courthouse	Denton Denton County
Presidio County Courthouse	Marfa Presidio County

Also Notified

Hon. Lloyd M. Bentsen
Hon. John G. Tower
Hon. W. R. Poage
Hon. Omar Burleson
Hon. Ray Roberts
Hon. Richard C. White
Regional Director, Southwest Region

State Historic Preservation Officer
Mr. Truett Latimer
Executive Director
Texas Historical Commission
P.O. Box 12276, Capitol Station
Austin, Texas 78711

Mott/js 12/23/77

880

NATIONAL REGISTER DATA SHEET

(1) NAME as it appears on federal register: Bluff Dale Suspension Bridge

(2) OTHER NAMES:

(3) date of entry: DEC 20 1977

(4) county code: 143

(5) LOCATION street & number: Berry's Creek Rd. | city / town: Bluff Dale | vicinity of | state: TX | county: Erath

(6) NPS REGION: SW

(7) OWNER ☐PRIVATE ☐STATE ☐MUNICIPAL ☒COUNTY ☐MULTIPLE ☐FEDERAL (agency name)

(8) ADMINISTRATOR:

(9) EXISTING SURVEYS ☐HABS ☐HAER ☐NHL

(10) FUNDED? ☐YES ☐NO

(11) CONGRESS. DISTRICT: 17th

(12) SOURCE of NOMINATION: xx STATE ☐FEDERAL

if state who prepared form?

(13) WITHIN NATIONAL REGISTER HISTORIC DISTRICT? ☐YES. NAME ☐NO

(14) WITHIN NATIONAL HISTORIC LANDMARK? ☐YES. NAME ☐NO

(15) ACREAGE

☐LOCAL ☐PRIVATE ORGANIZATION

(16) CONDITION
☐excellent ☐deteriorated ☐altered ☐original site
☐good ☐ruins ☐unaltered ☐moved
☐fair ☐unexposed ☐reconstructed ☐unknown
☐unexcavated ☐excavated

(17) features:
INTERIOR: ☐SUBSTANTIALLY INTACT-1 ☐NOT INTACT-0 ☐UNKNOWN-4 ☐NOT APPLICABLE-7
EXTERIOR: ☐SUBSTANTIALLY INTACT-2 ☐NOT INTACT-0 ☐UNKNOWN-5 ☐NOT APPLICABLE-8
ENVIRONS: ☐SUBSTANTIALLY INTACT-3 ☐NOT INTACT-0 ☐UNKNOWN-6 ☐NOT APPLICABLE-9

(18) ACCESS ☐YES-Restricted ☐YES-Unrestricted ☐No Access ☐Unknown

(19) ADAPTIVE USE ☐YES ☐NO

(20) SAVED? ☐YES

IS PROPERTY A HISTORIC DISTRICT? ☐yes ☐no

(21) AREAS OF SIGNIFICANCE:
☐ARCHEOLOGY-prehistoric-2 ☐COMMERCE-6 ☐ENGINEERING-11 ☐LANDSCAPE ARCH.-15 ☐POLITICS/GOVT.-21 ☐RECREATION-28
☐ARCHEOLOGY-historic-1 ☐COMMUNICATIONS-7 ☐ENTERTAINMENT-26 ☐LAW-16 ☐RELIGION-22 ☐SETTLEMENT-29
☐AGRICULTURE-3 ☐CONSERVATION-8 ☐EXPLORATION-12 ☐LITERATURE-17 ☐SCIENCE-23 ☐URBAN PLANNING-31
☐ARCHITECTURE-4 ☐ECONOMICS-9 ☐HEALTH-27 ☐MILITARY-18 ☐SOCIAL/HUMANITARIAN-24 ☐OTHER (SPECIFY)
☐ART-5 ☐EDUCATION-10 ☐INDUSTRY-13 ☐MUSIC-19 ☐SOCIAL/CULTURAL-30
☐INVENTION-14 ☐PHILOSOPHY-20 ☐TRANSPORTATION-25

(22) CLAIMS: explain
'first' ☐
'oldest' ☐
'only' ☐

(23) functions
WHEN HISTORICALLY SIGNIFICANT:
CURRENTLY:

(24) dates of initial construction:
major alterations:
historic events:

(25) ETHNIC GROUP ASSOCIATION

(26) architectural style(s):

(27) architect:

(28) master builder:

(29) engineer:

(30) landscape architect / garden designer:

(31) interior decorator:

(32) artist:

(33) artisan:

(34) builder/contractor:

(35) NAMES give role & date
PERSONAL:
EVENTS:
INSTITUTIONAL:

(36) NATIONAL REGISTER WRITE-UP

reviewers initials _____ date _____ IF ADDITIONAL SPACE NEEDED, NUMBER & PUT ON REVERSE

Property: Bluff Dale Suspension Bridge

State: Texas

Working Number: 6.15.77.951

Erath
77001440

TECHNICAL

Photos 4

Maps 1

CONTROL

OK 6.16.77

HISTORIAN

ARCHITECTURAL HISTORIAN

If a "moved" structure, I will agree with HAER regarding engineering value.

9/27/77.

ARCHEOLOGIST

~~OTHER~~

accept
Brannam
11.28.77

HAER

What an incredible little structure! This is an unusual example of a ~~rare~~ suspension bridge what I would call a vernacular, stay-suspended bridge.

Inventory _____

Review accept Eng 10/3

Bridge moved in 1934 to new location where it continues to function as originally intended

REVIEW UNIT CHIEF

Accepted
LEBOOREAU
12/15/77

BRANCH CHIEF

12.16.77

KEEPER

12/20/77

National Register Write-up _____ Send-back _____ Entered DEC 20 1977

Federal Register Entry 2.7.78 Re-submit _____

INT:2106-74

TEXAS HISTORICAL COMMISSION
real places telling real stories

RECEIVED 2280
DEC 04 2015
Nat. Register of Historic Places
National Park Service

TO: Edson Beall
National Park Service
National Register of Historic Places
1201 Eye Street, NW (2280)
Washington, DC 20005

FROM: Carlyn Hammons
Texas Historical Commission

RE: Additional Documentation for an Existing National Register Nomination
Bluff Dale [Suspension] Bridge, Erath County, TX (NRIS77001440)

DATE: December 1, 2015

The following materials are submitted:

X	Original National Register of Historic Places form and electronic locational data (in .kmz format) on CD. The enclosed disk contains the true and correct copy of the additional documentation for nomination for the Bluff Dale Bridge, which is already listed in the National Register of Historic Places.
	Resubmitted nomination.
X	Original NRHP signature page signed by the Texas SHPO.
	Multiple Property Documentation form on disk.
	Resubmitted form.
	Original MPDF signature page signed by the Texas SHPO.
X	CD with twenty-two (22) TIFF photograph files.
	Correspondence

COMMENTS:

The Bluff Dale Bridge was listed in the NRHP in 1977 (NRIS 77001440). This packet represents additional documentation intended to supplement the original nomination.

A full explanation of the specific ways in which this document differs from the original is found on pages 6 through 7 of the amended nomination form.

UNITED STATES DEPARTMENT OF THE INTERIOR
NATIONAL PARK SERVICE

NATIONAL REGISTER OF HISTORIC PLACES
EVALUATION/RETURN SHEET

REQUESTED ACTION: ADDITIONAL DOCUMENTATION

PROPERTY NAME: Bluff Dale Bridge

MULTIPLE NAME:

STATE & COUNTY: TEXAS, Erath

DATE RECEIVED: 12/04/15 DATE OF PENDING LIST:
DATE OF 16TH DAY: DATE OF 45TH DAY: 1/19/16
DATE OF WEEKLY LIST:

REFERENCE NUMBER: 77001440

NOMINATOR: STATE

REASONS FOR REVIEW:

APPEAL:	N	DATA PROBLEM:	N	LANDSCAPE:	N	LESS THAN 50 YEARS:	N
OTHER:	N	PDIL:	N	PERIOD:	N	PROGRAM UNAPPROVED:	N
REQUEST:	N	SAMPLE:	N	SLR DRAFT:	N	NATIONAL:	N

COMMENT WAIVER: N

✓ ACCEPT ___RETURN ___REJECT 1.19.16 DATE

ABSTRACT/SUMMARY COMMENTS:

Additional Documentation Approved

RECOM./CRITERIA_____

REVIEWER_____ DISCIPLINE_____

TELEPHONE_____ DATE_____

DOCUMENTATION see attached comments Y/N see attached SLR Y/N

If a nomination is returned to the nominating authority, the nomination is no longer under consideration by the NPS.