MILLER'S BLUFF BRIDGE
(Bridge Recall No. 012548)
Carries Louisiana Highway 2 (LA 2) over Red River/Miller's Bluff
between Plain Dealing (Bossier Parish) and Hosston (Caddo Parish)
Plain Dealing vicinity
Bossier Parish
Louisiana

PHOTOGRAPHS

WRITTEN HISTORICAL AND DESCRIPTIVE DATA

FIELD RECORDS

HISTORIC AMERICAN ENGINEERING RECORD
National Park Service
U.S. Department of the Interior
1849 C Street NW
Washington, DC 20240-0001

HISTORIC AMERICAN ENGINEERING RECORD
MILLER'S BLUFF BRIDGE
(Bridge Recall No. 012548)

HAER No. LA-41

Location: Carries Louisiana Highway 2 (LA 2) over Red River/Miller's Bluff between Plain Dealing (Bossier Parish) and Hosston (Caddo Parish).

The Miller's Bluff Bridge is located at latitude 32.892701 north, longitude -93.820155 west.[1] The coordinate represents the center point of the bridge. It was obtained in 2016 by plotting its location in Google Earth. The location has no restriction on its release to the public.

Present Owner: State of Louisiana.

Present Use: Vehicular traffic.

Significance: This Warren through truss bridge has significance for its association with important trends or events that have made a significant contribution to the broad patterns of Louisiana history. Its significance is demonstrated in the area of transportation as a major river crossing that eliminated a former ferry crossing. The bridge was constructed by the Louisiana Department of Highways (LDH) from 1952 to 1955 to provide an uninterrupted east-west highway through the northern portion of Louisiana. Carrying LA 2, this bridge constitutes the only crossing of the Red River in Louisiana north of Shreveport and was the first bridge crossing of the Red River at this location.

This bridge also possesses significance as an example of a distinctive truss bridge subtype. Significance is demonstrated by the presence of distinctive features of the Warren through truss, consisting of five spans characterized by diagonal members to withstand both tensile and compressive forces. This example has added verticals for bracing and polygonal top chords. This bridge exhibits an added concrete guardrail, resulting in a minor loss of integrity, but continues to clearly convey design features that demonstrate its significance as a major river crossing and as a distinctive truss bridge subtype.

The Miller's Bluff Bridge was determined eligible for listing in the National Register of Historic Places (National Register) in 2013 under *Criterion A: Transportation* and *Criterion C: Design/Engineering* at the state level of significance.[2]

Historian: Dianna Litvak, Senior Cultural Resource Specialist; Mead & Hunt, Inc. (Mead & Hunt); 2017.

Project Information: This documentation was prepared as mitigation to fulfill Stipulation IX.5 of the *Programmatic Agreement Among the Federal Highway Administration, the Louisiana Department of*

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[1] The bridge is also known as Structure No. 04080830300001.

[2] Mead & Hunt, Inc., *National Register Eligibility Determination Report: Pre-1971 Louisiana Highway Bridges* (prepared for the Louisiana Department of Transportation and Development, September 2013).

Transportation and Development, the Advisory Council on Historic Preservation, and the Louisiana State Historic Preservation Officer Regarding Management of Historic Bridges in Louisiana, dated August 18, 2015, and executed September 21, 2015. The Louisiana Department of Transportation and Development (LADOTD) retained Mead & Hunt to prepare this document. It was prepared by senior cultural resource specialist Dianna Litvak of Mead & Hunt. Dietrich Floeter completed the photography.

Part I. Historical Information

A. Physical History:

1. Date(s) of construction: 1952-1955.

2. Engineer: Louis Duclos, Louisiana Department of Highways.

3. Builder/Contractor/Supplier: Substructure: Massman Construction Company and Kansas City Bridge Company, both of Kansas City, Missouri (contractor).[3]

Superstructure: Allied Structural Steel Companies, Chicago, Illinois (contractor).[4]

4. Original plans and construction: Photocopies of the original plan sheets for the bank protection, substructure, and superstructure elements of the bridge are available in the General Files room at the Louisiana Department of Transportation and Development, Baton Rouge headquarters. The bridge's main truss spans were built according to the LDH's Standard Plan SHT-35-15 for 360' High Steel Fixed Truss Span With 24' Roadway, designed in 1946 and revised by LDH engineer Louis Duclos in 1950.[5] The LDH project engineers for the superstructure were W.M. Byles and C.C. Lee, and the project engineer for the substructure was Philip P. Angier. The superstructure plans and substructure plans were approved by John Carter, Bridge Design Engineer, and Norman Lant, Chief Engineer, on September 22, 1950.

Bank protection and stabilization of the soils for the bridge site occurred from 1950 to 1953. The substructure was completed in 1952. The superstructure was completed in 1955, and the bridge

[3] Louisiana Department of Highways, "Substructure, State Project No. 83-03-05, F.A. Project No. S-147(1), Red River Bridge at Miller's Bluff, Plain-Dealing Hosston Highway, State Route No. 109, Caddo & Bossier Parishes," September 1950, Final Estimate, available at the Louisiana Department of Transportation and Development, Baton Rouge, Louisiana.

[4] Louisiana Department of Highways, "Superstructure, Red River Bridge at Miller's Bluff, Caddo & Bossier Parishes, State Project No. 83-03-07, F.A.P. No. S-147(3)," September 1950, Final Estimate and As-Built Plans, available at the Louisiana Department of Transportation and Development, Baton Rouge, Louisiana.

[5] Louisiana Department of Highways, "Standard Plan SHT-35-15, 360'-0" High Steel Fixed Truss Span," May 1946, available at the Louisiana Department of Transportation and Development, Baton Rouge, Louisiana.

officially opened June 20, 1955. A concrete end panel atop the end bent has the date "1952" formed in the concrete surface.

5. Alterations and additions: In 1992 and 2013, the bridge was rehabilitated. In 1992, the concrete bridge deck was removed and replaced, and the welded metal guardrails removed and replaced with concrete barriers. Concrete flares at the approach railing ends, shown on the as-built plans, were removed. The bridge was also modified to increase the load requirements of the approach spans. A center beam was inserted between the I-beam stringers of each approach span, and center stringers were added to the floor system of the truss spans. The portals of each truss were also raised and the bottom members replaced to increase the height of the spans to adjust to a new standard height for truck clearances. The structural steel of the trusses was cleaned and painted. Bearing assemblies on the approach spans were retrofitted, replacing the original roller-nest bearings with neoprene pads. The project in 1992 was completed by L&A Contracting Company for $7.5 million.[6] A 2013 project included rehabilitation of a bent portal member on one truss, minor repair of other steel truss and floor members, and patching of concrete spalls. The 2013 project did not result in notable alterations to the bridge.[7]

B. Historical Context:

Historical background

The Miller's Bluff Bridge spans the Red River, a tributary of the Atchafalaya River. The river is named for its reddish color, which originates from red-hued Permian sediments in Oklahoma and Texas. In this part of Louisiana, the Red River alluvial plain is a meandering channel with broad ridges and bluffs on either side that averages about 10 miles in width.[8] This alluvial plain includes a long, sandy expanse known locally as Miller's Bluff. Building a bridge across the river was not technically feasible until well into the twentieth century due to the challenges of poor, sandy conditions and the length and strength of the span that would be required.[9]

Permanent settlement in this area began when white settlers established plantations north of Shreveport in the 1840s. Navigation of the Red River was hampered by massive jams of timber, known as rafts, which accumulated on sand bars and could obstruct the channel for miles. The last major raft was effectively removed by dynamite in 1872-1873 and the river flow has been maintained since that time.[10] A north-south railroad line, the Shreveport and Arkansas Railroad, constructed a line through Plain

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[6] Louisiana Department of Transportation and Development, "Project 083-03-0016," *trns.Port Systems Database,* June 1995, available at the Louisiana Department of Transportation and Development, Baton Rouge, Louisiana.

[7] Louisiana Department of Transportation and Development, "Bridge Inspection Report, Inspection Review, 1992_12_28," FCM_INSP_REVIEW_2013, July 2013, available at the Louisiana Department of Transportation and Development, Baton Rouge, La.

[8] David C. Johnson and Elaine G. Yodis, *Geography of Louisiana* (New York: McGraw-Hill, 1998), 25-26.

[9] Mead & Hunt, Inc. *Historic Context for Louisiana Bridges,* 10.

[10] Johnson and Yodis, *Geography of Louisiana,* 108.

Dealing, Louisiana, east of the future Miller's Bluff Bridge over the Red River, in 1888, and helped to open up the region to settlement.[11] Shortly after the railroad arrived, Plain Dealing established a town charter in 1890.

At the turn of the twentieth century, Louisiana's roads were in poor shape. With the invention and success of the automobile, Louisiana's road network became an increasingly important component of its transportation system. Local residents, merchants, and parishes collectively built roads that were primarily used by farmers bringing their goods to and from market centers. The Good Roads movement began as a coordinated effort of bicyclists and advocates of a Rural Free Delivery mail service, soon joined by growing numbers of automobile owners. In 1910 Louisiana created the State Highway Department and Board of State Engineers to develop a coordinated network of state and parish roads and bridges. The early work concentrated on creating a road system to connect major trade centers and build bridges to span major floodplains and river channels. In the same period, the Good Roads boosters created a network of named auto routes that crisscrossed the country. The Dixie Overland Highway (D-O-H), roughly paralleled by today's U.S. Highway (US) 80, connected communities across the southern part of the U.S. from San Diego, California, to Savannah, Georgia. The D-O-H passed through Shreveport and Monroe in the northern part of Louisiana, bypassing the smaller communities to the north that lacked adequate bridges for river crossings.[12]

In 1921 the newly created Louisiana Highway Commission (LHC, replaced the State Highway Department) was tasked with improving Louisiana's roads but was hampered by inadequate funding until 1928, when increases in the state gas tax and bond issues during the administration of Governor Huey Long provided the revenue for more ambitious bridge projects. With increased funds, the LHC could concentrate on the complex engineering solutions required for major waterways in the state, including the Red River. The 1930-1932 biennial report stated:

> The bridging of the Red, Ouachita, Black and Atchafalaya Rivers presents many difficult foundation problems. All of these streams are large rivers having relatively large variations between low water and high water, and in general the river beds consist of materials unsuitable for heavy bridge foundations, thereby necessitating the employment of various types of subaqueous pier design and various methods of construction.[13]

LHC engineers solved the issue of constructing bridge piers on unstable river banks and soils by designing longer depths for pile bents and piers, which could reach as deep as 200 feet in some cases. New Deal programs in the 1930s also bolstered road and bridge projects and put people to work during the Great Depression. These projects included new bridges over the Red River at Shreveport, and a concerted effort to eliminate all ferry crossings in the state. But despite these improvements, the smaller communities in northwestern Louisiana lagged behind the rest of the state in paved roads and improved river crossings. Residents of Plain Dealing in Bossier Parish had to drive 25 miles south to Shreveport or

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[11] "Clifton D. Cardin, "A Brief History of the City of Bossier City," http://www.bossiercity.org/Bossier-City-History/, (accessed July 14, 2016).

[12] Mead & Hunt, Inc., *Historic Context for Louisiana Bridges*, 11-14,

[13] Mead & Hunt, Inc., *Historic Context for Louisiana Bridges*, 42-43.

39 miles north to Garland City, Arkansas, for a vehicular crossing of the Red River. The ferry boat at Miller's Bluff provided one of only two crossings of the waterway north of Shreveport, but it was small and unreliable.[14]

Construction of the Miller's Bluff Bridge

During World War II, road and bridge work focused only on projects essential to the war effort. After the war, the state reorganized the LHC into the LDH and focused on completing the backlog of projects. Louisiana benefitted from increased federal funding for highways and bridges, a growing population, and interest in tourism. Northern Louisiana was starting to attract more people to work in in natural resource extraction industries such as logging and oil and gas development.[15] In 1948 residents of communities in northern Bossier and Caddo Parishes convinced their state senators and representatives to introduce a bill in the Louisiana legislature to build a new bridge over the Red River north of Shreveport.[16] After the successful passage of the bill in June of that year, the local residents, led by the Plain Dealing Lions Club, celebrated with a barbecue in Plain Dealing on Labor Day 1948, attended by thousands from all over northwest Louisiana and south Arkansas.[17]

The LDH surveyors determined the best location for the new bridge was south of the Miller's Bluff Ferry, and the agency planned to acquire right-of-way for the crossing. However, as the LDH negotiated with landowners between August 1949 and July 1950, the river banks shifted on both sides of the bridge by as much as 200 feet. Engineers developed plans to grade and contour the banks and add pile dikes for stabilization, a project that was completed in 1951 for approximately $230,000. Further erosion problems in 1953 required more protection work, which cost an additional $200,000 to correct.[18]

Between 1951 and 1952 the Massman Construction Company and Kansas City Bridge Company, both of Kansas City, Missouri, completed the substructure for $1.5 million. All that remained was construction of the truss superstructure. The LDH awarded the contract for construction of the superstructure to the Allied Structural Steel Companies of Chicago for $1,287,062.37 in June 1952.[19]

Limited supplies of steel were diverted to projects in New Orleans, which meant local residents anxiously had to wait for enough steel to be found to start the Miller's Bluff Bridge. With the construction stalled, the LDH submitted plans to the Bossier Parish Police Jury in June 1953 to move the alignment of the local

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[14] Clifton D. Cardin, *Bossier Parish* (Arcadia Publishing, 1999), 93.

[15] Johnson and Yodis, *Geography of Louisiana*, 29.

[16] "Senator Boucher for North Bossier Traffic Bridge," *The Bossier Banner,* June 3, 1948, 1a.

[17] "Bridge Will Make Plain Dealing the Cross Roads of North Louisiana," *The Bossier Banner,* June 16, 1955, 4a.

[18] Louisiana Department of Highways, "Bank Protection for Red River Bridge at Miller's Bluff, Plain Dealing-Hosston Highway State Project No. 83-03-08, F.A.P. No. S-147(4), State Route No. 109, Caddo and Bossier parishes," June 1951, Final Estimate and As-Built Plans, available at the Louisiana Department of Transportation and Development, Baton Rouge, Louisiana; "Bridge Will Make Plain Dealing the Cross Roads of North Louisiana, *The Bossier Banner,* June 16, 1955, 4a.

[19] "Contract of Red River Bridge Let," *The New Orleans Time Picayune,* July 22, 1952, 10.

road that connected Plain Dealing and Hosston with the Miller's Bluff Ferry to the south to better connect with other Louisiana communities. Most importantly, the department announced the new bridge and the highway would open at the same time. The road was realigned between Hosston and Plain Dealing and re-numbered LA 2, indicating the importance of the Miller's Bluff Bridge and new highway in improving regional transportation and providing better connections for residents and visitors to these parishes.[20] The Hosston-Plain Dealing highway construction project, with a low bid of more than $480,000, was awarded to Reynolds & Williams, a Shreveport company. The project built the new 20'-0" wide road between Hosston and Plain Dealing, graded and surfaced the road, installed drainage structures, and built two reinforced-concrete bridges.[21]

By November 1953 the necessary quantities of steel had been allocated and the Allied Structural Steel Company began to construct the superstructure.[22] Photographs in the local parish library document the progress and show a partially constructed superstructure in late August 1954, with workers on the bridge deck pouring the deck and rails into wooden forms.[23] In September 1954 the last steel of the bridge had been placed and workers were completing the concrete deck and guardrails of the final span.[24]

On June 20, 1955, the LDH and local communities celebrated the completion of the bridge with a dedication and planned a second celebration later in the fall for other nearby communities. Eugenia Sentell Kennon, wife of Governor Robert F. Kennon, cut the ribbon on the bridge, which a local journalist called the "end to a long-cherished dream made true."[25] The "Ark-La-Tex" region celebrated the new highway and bridge as an alternative transportation corridor to US 80 through Shreveport. The ceremonies included a free chicken barbecue at a local school for all of the visitors, presided over by George S. Covert, director of the LDH.[26] As one example of the benefits the bridge and new highway brought to the area, the *Bossier Banner-Progress* newspaper added four correspondents in the north Caddo communities of Ida, Belcher, Gilliam, and Hosston who would be able to submit more local stories to the paper due to the quicker travel times between the communities.[27] While many of the grander predications did not come true, such as one local politician who promised "thousands more residents in

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[20] "Expect Bridge and Highway to be Completed Within the Next Year," *The Bossier Banner,* June 11, 1953," 1d; Hosston, LA USGS Quad Map, 1932; Vivian, LA USGS Quad Map, 1956.

[21] "Bridge Will Make Plain Dealing the Cross Roads of North Louisiana," op. cit.

[22] "Work has Started on the Final Phase of Miller's Bluff Bridge," *The Bossier Banner,* November 12, 1953, 1g.

[23] "Photographs of Superstructure Red River Bridge at Miller's Bluff, 8-26-54," Available at Bossier Parish Library Historical Center, Photo Records. http://bossier.pastperfectonline.com/photo/3626BA07-32F2-4894-8C7B-338010678417; and http://bossier.pastperfectonline.com/photo/D405D25E-BEF1-4A4E-9E05-362852472252 (accessed October 4, 2016).

[24] "Last Steel on Miller's Bluff Span over Red River Has Been Installed," *The Bossier Banner,* September 2, 1954, 1a.

[25] "Governor's Wife, Mrs. Eugenia Sentell Kennon, Cuts Ribbon," *The Bossier Banner,* June 23, 1955, 1g.

[26] Ibid.

[27] No author, "History: Press that printed Bossier's first newspaper," *BPT Online,* February 4, 2015 http://bossierpress.com/history-press-that-printed%E2%80%88bossiers-first-newspaper/ (accessed July 15, 2016).

Plain Dealing and Hosston," the new bridge and highway did provide an important river crossing for local residents and visitors.

Engineering background

The Miller's Bluff Bridge is a distinctive example of a Warren-with-verticals through truss, with a polygonal top chord. Truss bridges became common in the U.S. in the mid-nineteenth century and were used in Louisiana as fixed-span bridges beginning in the twentieth century. In design, a truss bridge features parallel trusses that use built-up diagonal and vertical members to support deck loads. Steel bridge members are joined with plates and fasteners: pins, rivets, or bolts in early examples and welding in later examples. There are three basic arrangements of trusses—pony, through (or overhead), and deck—and a wide variety of types categorized according to the configuration of the truss members. The choice of truss arrangement (pony, deck, or through) depended on the span length and/or vertical clearance needed below or above the bridge.[28]

The Warren truss was one of the most popular truss designs nationally and in Louisiana. First developed in 1848, the Warren truss design eliminated the vertical members found in most other truss forms by using diagonal members to withstand both tensile and compressive forces. A variation of the design includes the use of vertical members, primarily serving as bracing units rather than load-bearing system, referred to as a "Warren with verticals." The span of the Warren and Warren-with-verticals configuration generally ranged from 50'-0" to 400'-0".[29] Another variation in Warren design includes the use of polygonal top chords that reduce the amount of steel and makes the construction of this variation more economical.[30] The use of polygonal top chords also allowed for greater span lengths.[31] The Miller's Bluff Bridge utilizes a Warren through truss design based on an LDH standard plan with both the verticals, as bracing members, and polygonal top chord variations.

The Warren truss became the most common truss form for bridges beginning in the 1920s, when it supplanted the Pratt truss as the standard American truss. The Warren had the advantage of being more economical in materials and was considered "more refined" than the Pratt truss. The bridge was popular among state highway departments in the 1920s and railroads in the 1930s. This was also true in Louisiana, where the LDH developed at least 16 standard Warren truss plans between 1920 and 1937.[32] The LDH developed Standard Plan SHT-35-15 for a steel Warren through fixed truss span in May 1946 and engineer Louis Duclos revised them for use on the Miller's Bluff Bridge in 1950. The standard plan featured twelve 30'-0" wide by 360'-0" long twin rigid-connected panels, with a 24'-0" wide roadway, and

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[28] Mead & Hunt, *Historic Context for Louisiana Bridges,* 66-67.

[29] Mead & Hunt, *Historic Context for Louisiana's Bridges*, 69.

[30] Mead & Hunt, Inc., *Historic Context for Louisiana Bridges*, 66-67, 69-70.

[31] National Register of Historic Places, Historic Road Infrastructure of Texas, 1866-1965, Multiple Property Submission, National Register #6451240, E-13.

[32] Mead & Hunt, *Historic Context for Louisiana's Bridges*, 70.

two 1'-6" wide walkways. The trusses were designed for a 30'-0" vertical clearance at the portals, which increased to 50'-0" in the middle of the span.[33]

The Miller's Bluff Bridge was designed by LDH civil engineer Louis Duclos. Duclos was an influential LDH engineer in the mid-twentieth century that pioneered the department's use of new technologies. Duclos, a graduate of Tulane University with licenses in electrical, mechanical, and civil engineering, was particularly interested in the technology of movable bridges. Of note, Duclos pioneered the design for hydraulic operation of movable bridges. He also was an early user of high-strength fasteners and promoted the use of high-strength steel in bridge design. According to his Louisiana Highway Hall of Honors induction biography, Duclos was "an engineer's engineer" and was pivotal in improving the science of soil mechanics, thereby reducing costs of bridge foundations for the LDH. Duclos worked at the LDH from 1947 to 1964 before assuming a position with Barnard & Burk Engineers, Inc. He died in 1992.[34]

Part II. Structural/Design Information

A. General Statement:

1. Character: The Miller's Bluff Bridge is a steel through truss with five Warren through truss spans with vertical members and polygonal top chords. The approach spans are steel I-beam stringers/multi-beam girders. The bridge is a distinctive example of the truss subtype.

2. Condition of fabric: Good.

B. Description: The Miller's Bluff Bridge crosses the Red River in an east-west direction but is slightly angled to the northwest/southeast. The Red River flows in a north-south direction at the bridge's location. The bridge also spans an access road for the North Caddo Recreation Area, which consists of a small parking area on the southwest quadrant of the bridge for fishing access and a boat ramp.

The total length of the bridge, including five steel through trusses and 17 steel I-beam approach spans, is 3,100'-3". The five main spans are each 360'-0" long with a 5'-2-1/4" joint between each span. The steel-beam approach spans closest to the trusses are each 75'-11-1/4" long, with a 7-1/4" joint between each approach span and the main span next to it. The 15 remaining steel-beam approach spans are each 75'-0" long, with a 1'-0-1/2" joint between the end approach spans and the slabs on either end of the bridge. The bridge is designed on a vertical curve to achieve a 50'-0" clearance between the extreme high water elevation of the Red River and the lowest steel member on the center main span. Because of the height

[33] Louisiana Department of Highways, "Standard Plan SHT-35-15, 360'-0" High Steel Fixed Truss Span," May 1946, available at the Louisiana Department of Transportation and Development, Baton Rouge, Louisiana.

[34] Mead & Hunt, Inc. *Historic Context for Louisiana Bridges: Louisiana Statewide Historic Bridge Inventory*, prepared for the Louisiana Department of Transportation and Development, December 2013, Section 3, page 101;

of the center spans, the approach spans and outside truss spans are built on a five-percent grade. While not significant in the structural design of the bridge, the vertical curve of the approach spans, particularly on the east end, presents a striking visual appearance as the roadway elevation rises above the surrounding flat terrain.

Main spans

The main spans are five, identical, 360'-0" long, riveted, Warren through trusses with verticals and polygonal top chords. The design is based on a standard plan for Warren through trusses. Each top chord is comprised of back-to-back channels with cover plates on top and bottom. The bottom plates are perforated with oval openings at 3'-6" intervals. Each bottom chord is a built-up box member with full-length plates on each side and batten plates on top and bottom, all riveted together with angles. The truss diagonals and alternate verticals are made up of facing channels with oval-perforated plates, front and back. The other alternate verticals are comprised of paired back-to-back angles riveted with a single plate to form an I-section. The portals are comprised of both built-up and rolled I-section members. Upper diagonal and sway bracing is comprised of angles and batten plates with new lateral struts at the bottom of the sway bracing. All connections are joined with riveted gusset plates. The floor system is comprised of rolled transverse floor beams, four original lines of rolled stringers, and a fifth line of rolled stringers added on the centerline of each span. Fascia channels are located on the outside of the floor system. Diagonal bracing consists of back-to-back angles. The concrete deck is poured on top of the stringers. Original roller-nest expansion bearings have been replaced by neoprene pads.

Approach spans

The bridge has seventeen 75'-0" long steel-beam approach spans, six on the west end and 11 on the east end. Each span has four original 36"-deep rolled beams and a fifth beam added on the span center line. Steel diaphragms are located between all beams. The cast-in-place concrete deck extends in a short cantilever beyond the fascia beams and carries the jersey-style concrete barrier railings. The roadway width between the barriers is 26'-2", while the deck width (edge to edge) is 28'-11", accommodating one lane in each direction and no shoulders or sidewalks.[35] At each end of the bridge a 20'-0" long concrete approach slab transitions from the end span to the adjacent roadway.

Substructure

The substructure for the truss main spans consists of six rectangular-section concrete piers, each constructed on a concrete-filled steel caisson of equal size and depth. Atop each caisson is a 60'-0" high pier shaft with three vertical voids. Atop the shaft is a concrete collar with a single round void. Above the collar is a second pier shaft, which has a rectangular void. The second shaft extends to the necessary height to support span bearings on a pier cap. The elevation of span ends and bearings depends on their point in the vertical curve of the main spans. Pier 3 (numbered from east to west) includes a platform for a gauge station, with an internal access to the pier cap.

[35] "Uglybridges.com National Bridge Inventory Data, LA0002 over Red River-Miller's Bluff", www.uglybridges.com/1224263 (accessed October 24, 2016); information taken from Federal Highway Administration, National Bridge Inventory ASCII Files, 2015 Data, Louisiana www.fhwa.dot.gov/bridge/nbi/2015/LA15.txt (accessed October 24, 2016).

The substructure for the approach spans consists of steel pile bents of varying heights, with concrete caps. Because the original bearings have been replaced, the caps now have raised concrete pedestals to support the shorter neoprene bearings beneath each beam. The caps on the two end bents are extended outward perpendicular to the bents to support short concrete end walls; the southwest wall has the date "1952" formed in the surface.

The bridge underwent rehabilitation/repair projects in 1992 and 2013. In 1992 the historic fabric removed included the original concrete deck, metal guardrails, and bearing assemblies on all spans that were replaced with updated bearings with neoprene pads. The remaining fabric, including the steel trusses, concrete caissons, shafts, steel pile bents, is original. The approach spans and floor system of the trusses were altered in 1992 with the addition of line beams on the centerline of the bridge. The 2013 project included rehabilitation of a bent portal member on one truss, minor repair of other steel truss and floor members, and patching of concrete spalls. The 2013 project did not result in notable alterations to the bridge.[36]

C. Site Information: The Miller's Bluff Bridge is located in the Red River's alluvial plain in the far northwestern corner of the state, approximately 9 miles south of the Arkansas boundary line and 13 miles east of Texas. At this location, the Red River forms the boundary between Caddo Parish on the west and Bossier Parish on the east. The Miller's Bluff Bridge is 3 miles east of the small village of Hosston in Caddo Parish and approximately 20 miles west of Plain Dealing in Bossier Parish. Shreveport and Bossier City are approximately 22 miles to the south of the bridge, accessible from Interstate Highway 49 or LA 3. The North Caddo Recreation Area at the site consists of a small parking area is located on the southwest quadrant of the bridge for fishing access. The bridge is located in a rural, undeveloped area. It carries two lanes of vehicular traffic, one in each direction.

Part III. Sources of Information

A. Primary Sources:

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"Contract of Red River Bridge Let." *The New Orleans Time Picayune,* July 22, 1952

[36] *Bridge Inspection Report*, Recall No. 012548, July 2013, available at the Louisiana Department of Transportation and Development, Baton Rouge, La.

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"Senator Boucher for North Bossier Traffic Bridge." *The Bossier Banner,* June 3, 1948.

"Work has Started on the Final Phase of Miller's Bluff Bridge." *The Bossier Banner,* November 12, 1953.

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