Bridge NRHP Eligibility Report

Structure ID:	231410027205023	Disposition:	In Service	Year Built:	1940	Year Rcnst:	0000

District:	Brownwood	***Span Type:***	Continous
County:	Lampasas	***Roadway Type:***	Through
Location:	0.00 MI E OF SAN SABA C/L	***Member Type:***	Continuous Truss
Facility Carried:	US 190	***Main Span Length:***	0240
Feature Crossed:	COLORADO RIVER	***Structure Length:***	001295
NRHP Det. Date:		***Evaluator:***	

Historical Significance: 1 NR Listed

NRHP Eligibility Determination Statement:

This bridge is currently listed on the National Register of Historic Places.
This bridge is listed in the On-System Historic Metal Truss Bridge Task Force Report. Please see the Task Force Report for a discussion of recommended options regarding this bridge.
The US 190 Bridge at the Colorado River consists of one three-span continuous truss unit 600 feet long and three three-span continuous I-beam units serving as approach spans on the bridge's west end. The bridge serves on US 190 at the Lampasas and San Saba county line, linking Lampasas and San Saba, the county seats. These two counties are on the boundary between the Western Cross Timbers region of North Central Texas and the Edward's Plateau of southwest Texas. The region's economy relies primarily on diversified agriculture, emphasizing cattle, cotton and corn. Pecans are also an important resource to the region, with the town of San Saba claimed as "The Pecan Capital of the World."
Texas Highway Department (THD) engineers custom-designed the bridge's truss spans. These spans form a continuous Warren truss with top chords resembling the curve seen in suspension bridges. Both the truss spans and the concrete approach spans rest on reinforced concrete dumbbell piers, some with square battered columns and others with cylindrical battered columns. Both spread footing and precast concrete pile foundations are employed. The bridge provides a 24-foot roadway with 1½-foot curbs serving as refuge walks for stranded pedestrians. THD Type P approach railing consists of steel channel rails and reinforced concrete posts. Truss railing employs 12-inch deep steel channels. At each end of the bridge, a bronze plaque affixed to a concrete monument identifies the bridge contractor, as well as the governmental agencies responsible for the project. The plaque reads:

COLORADO RIVER BRIDGE

BUILT IN 1940 BY THE

TEXAS HIGHWAY DEPARTMENT

— * —

FEDERAL WORKS AGENCY

PUBLIC ROADS ADMINISTRATION

— * —

STATE HIGHWAY COMMISSION

BRADY GENTRY CHAIRMAN

HARRY HINES MEMBER

ROBERT LEE BOBBITT MEMBER

JULIAN MONTGOMERY

HIGHWAY ENGINEER

CAGE BROTHERS & L.A. TURNER

CONTRACTORS

A water level gaging station operated by the United States Geological Survey (USGS) is attached to the bridge's south side.
From 1939 through 1940, Cage Brothers & L.A. Turner built the Colorado River bridge under contract to THD. No major repairs or alterations have been performed on this bridge. As such, it retains substantial integrity of design, materials and workmanship. The bridge and its surroundings appear relatively unchanged since 1940, maintaining integrity of location, setting, feeling and association. Although no projects are currently planned for the Colorado River bridge, its BRINSAP sufficiency rating as of May 1996 is 56.7, making it eligible for rehabilitation, but not replacement, under the federal Highway Bridge Replacement and Rehabilitation Program (HBRRP)
The US 190 Bridge at the Colorado River was constructed from 1939 to 1940. This custom-designed continuous truss bridge with its combination of typifying features is significant for embodying the defining characteristics of a THD truss bridge. As such, the bridge meets National Register Criterion C in the area of Engineering at a state level of significance.
The Colorado bridge was built on US 190, which linked Central Texas with East Texas. It originated in Brady, the McCulloch County seat, and extended east through San Saba and Lampasas counties on to Temple, Bryan, Huntsville, Livingston, Woodville, Jasper and Newton. The portion of US 190 through the Central Texas counties of McCulloch, San Saba and Lampasas followed the route of former State Highway (SH) 74. About 1937, SH 74 was improved and upgraded to US highway status, holding the shared designation US 190/SH 74. By the early 1950s the SH 74 designation had been completely dropped.
The Colorado River bridge was constructed to replace the former bridge, known as the Red Bluff Bridge, damaged in a severe flood in July 1938. The Red Bluff Bridge consisted of a single Pennsylvania (also known as Petit) through truss span and a Pratt pony truss span flanked by timber trestle approach spans. The flood washed out the timber approach spans, leaving the two truss spans intact. THD initially intended to maintain a detour around the bridge. According to his July 26, 1938, teletype to Herbert Eldridge, Acting State Bridge Engineer, the district engineer believed that the damaged bridge "would be too costly to rebuild" and that the crossing should "be closed indefinitely or until a new bridge can be built on relocation." The teletype continued with a layout of a rather long detour route. J.B. Early, State Maintenance Engineer, stated in his memorandum of the same date, that if there were "no immediate plans for a new structure. . . we wish to consider a temporary bridge rather than maintaining such long detours." In November 1938, THD maintenance forces implemented repairs to the bridge. As detailed in a February 24, 1939, memorandum from the district engineer, "the repairs consisted of replacing the entire wooden floor system on the west approach, the construction of three steel pile trestles out of salvaged steel H-beams from the low water Montopolis Bridge at Austin, the I-beam stringers from the salvaged Castell Bridge in Llano and the replacement of the wooden floor system on the east approach."
In the meantime, THD engineers had applied for federal emergency relief funds from the Bureau of Public Roads (BPR) to cover the cost of constructing a new bridge. The application covered two additional

bridges destroyed by the July 1938 flood, including the Colorado River Bridge in Fayette County (refer to nomination of State Highway 71 Bridge at the Colorado River, FT0265-14-038, NRHP 1995). On November 28, 1938, BPR approved the use of emergency relief highway funds provided for under Section 3 of the Hayden-Cartwright Act of 1934. In addition to extending federal relief funding established under the National Industrial Recovery Act, the Hayden-Cartwright Act provided emergency funds for the repair or reconstruction of highways and bridges on the federal aid system "which have been damaged or destroyed by floods, hurricanes, earthquakes or landslides. . . ." The approval granted $367,500 to cover 50 percent of the estimated construction cost for these three bridges. The cost of constructing a new bridge over the Colorado at Red Bluff was estimated at $275,000, with $137,500 to be covered by the federal funds.

THD engineers prepared the plans for the new bridge and BPR engineers reviewed and approved them. Rather than use a standard design, THD bridge engineers developed a special design for the bridge, employing a continuous truss span for improved economy and appearance. The bridge's top chord curves between two high points, similar to the cable configuration used on suspension bridges. The truss' high points lie over the piers, reflecting the need to resist larger stresses at these locations.

The US 190 Bridge at the Colorado River is one of only seven continuous through truss bridges surviving in Texas and one of only five built before World War II. The Brazos River bridge in Palo Pinto County (refer to nomination of US 281 Bridge at the Brazos River, PP0250-02-018, NRHP 1995) is the only other historic truss bridge in Texas with a curved and peaked top chord.

BPR's January 6, 1939 inspection report, written by W.C. Peterson, Associate Highway Bridge Engineer of the BPR, addressed the improved economy of employing a continuous design: "I was informed by the State's representative that the three-span continuous truss unit had been compared with simple spans at this site and that there was a considerable saving in the use of the continuous unit." He cautioned, however:

Due to the fact that extreme high waters exist on the Colorado River and that any structure placed in this stream should be adequately designed to resist this extreme high water, it was my thought that serious consideration should be given to future flood damage and that the piers be designed to resist the tremendous thrust set up during high water stages. It was also my thought that in using a three-span unit, if one pier was lost the entire structure would be destroyed, whereas this condition would not exist in a series of simple spans.

Sub-surface investigation revealed underlying layers of blue shale, sandy shale and sandstone. The BPR's inspection report dated January 6, 1939, delineated the configuration for the bridge's foundation reflected in the preliminary layout sketch.

The main piers of [the] continuous truss span were to be founded in . . . sandstone. . . . The continuous I-beam approach spans were to be carried on concrete piers. For the first unit footings were to be placed in the sandstone. The next two units, however, were shown supported on concrete piers with concrete piling driven to the sandstone. . . . It was the intention where the sandstone was a considerable distance below the ground to use spread footings supported on precast concrete foundation piling with the piling placed well into the sandstone by means of pilot holes.

THD responded to these suggestions in a three-page letter dated March 24, 1939, analyzing "the probability of pier loss and . . . the relative economic losses for the two types of superstructure."

We have made a careful analysis of the problem presented by the loss of a pier supporting a continuous unit as compared with the loss of one supporting simple spans. In the first case, the entire continuous unit would obviously be destroyed upon the loss of a pier while, in the second case, only two spans or approximately two-thirds as much superstructure would be lost. Of course, the amount of superstructure lost would be equal for both cases in the event two piers were lost. . . . The possibility of the loss of a pier is very remote. The hard sandstone in which the piers will be founded will manifestly insure against the possibility of failure through undermining. The bases and shafts of the piers will be proportioned to resist the forces of the highest known flood. The piers will be many times more substantial than those

supporting the main span of the existing bridge which successfully withstood the highest flood of record. Since the loss of a pier is thus seen to be very improbable, it does not seem economically justifiable to add [unreadable]. Furthermore, if the loss of a pier is to be further guarded against, it would appear more logical to use the added cost in making the piers more substantial.

The letter continues with an cost analysis of construction and repair costs of a simple truss versus a continuous truss bridge, with the latter proving more economical overall.

On May 18, 1939, THD submitted plans, specifications and estimate (PS&E) to the BPR for approval. Provisions were made to fund a related project for the construction of the approach roadway through the Regular Federal Aid Program. The new bridge site was ½-mile north (upstream) of the Red Bluff Bridge site, and the new roadway, in addition to providing access to the new bridge, would straighten a curved alignment on the route near the crossing (see Figure 2). BPR approved the PS&E on June 3, 1939, appropriating the requested $117,500 from federal emergency relief funds. The Texas Highway Commission opened bids for the project on June 20, 1939. After reviewing the eight bids submitted, the commission awarded the contract to Cage Brothers & L.A. Turner of Bishop, Texas, which submitted the low bid of nearly $178,000, more than 24 percent under THD's preliminary estimate. The Virginia Bridge Company of Roanoke, Virginia, fabricated the steel spans in its Birmingham, Alabama, plant.

A month after bidding, THD discerned an error in the estimated quantity of excavation used in the bidding process. With this quantity underestimated by nearly 50 percent, all bids had to be adjusted upward. Cage Brothers & L.A. Turner, asking $6.00 per cubic yard of excavation, remained the low bidder after the bid was adjusted to $181,491. Construction began on August 15, 1939. The THD resident engineer in San Saba supervised the construction, which engineers from both THD and BPR inspected.

Convenience of erection was also a major advantage of continuous spans. The span under construction could be cantilevered from previously built spans acting as anchors. This minimized the amount of falsework needed and was especially advantageous for the construction of long spans over deep water. Although THD did not specify the method of erection in the plans, the bridge contractor chose to use the cantilever method. An October 18, 1939, letter to the contractor stated:

It is our understanding that you intend to use the cantilever method of erection. If such is the case, please submit information regarding the position of the trusses at time of closure of the central span, the method of closure, and the amount of movement of the expansion ends due to the closure. Please submit also the weight of erection machinery you will use which will be traveling on the trusses.

The response came not from the contractor, but from the truss fabricator. The Virginia Bridge Company wrote in a letter dated November 9, 1939, "We are glad to furnish the desired information for Mr. Turner, and know further that the general erection procedure which is covered by our computations will be followed by his erector. . . . The contractor will erect, using the cantilever method, beginning at LØ, west end, using approved wood pile bent falsework at points L1 to L6 inclusive on which the anchor span will be erected, and each half of the center span will be erected cantilever without the use of falsework." THD commented on the erection plan in a November 24, 1939, letter to the Virginia Bridge Company. The letter included several suggestions, stating that "We have used procedures similar to this on previous continuous trusses and have found them expedient and practical."

During construction, the contractor had some difficulty in founding pier footings, encountering irregularities in the underlying materials. Minor difficulties were also experienced in connecting the continuous truss, given the difficulty of reproducing the exact camber required for the reamed holes to line up for riveting. The center truss span was connected over the river on March 11, 1940. A March 27 inspection report filed by BPR (which had recently changed to the Public Roads Administration of the Federal Works Agency) reported the following:

The two end spans of the continuous truss unit (180'-240'-180' spans) were erected on falsework and the middle span was cantilevered out from both end spans. Erection has been closed but the top chord has not been completely riveted. The general plans indicate a dead load camber of 1.55" at the middle of the 240' span, this being the ordinate between the finished camber line and the blocking line. The actual

camber is about ½" less than this. This does not appear to be out of line with the truss cantilevered from the piers, whereas the calculations for the blocking line shown on the plans presumably were based upon the use of false work. Mr. Hogan expects to raise the extreme ends of the continuous truss unit to bring the top chord points to full contact prior to riveting, and it is expected that little if any reaming will be necessary.
Despite these minor difficulties, the project was completed on May 8, 1940, 65 days ahead of schedule, at a total cost of $199,039. The cost overrun was attributable to additional structural steel, as well as the excavation not accounted for in the initial estimate.

Bibliography:

Condit, Carl. American Building. Chicago: University of Chicago Press, 1968.

Hool, George A., and W.S. Kinne, eds. Movable and Long-span Steel Bridges. 2d ed. New York: McGraw Hill, 1943.

Texas Highway Department. Plans of Proposed State Highway Improvement. Control-Section-Job No. 0272-05-003, located at TxDOT headquarters in Austin.

Texas Highway Department. Project Correspondence Files. Control-Section-Job No. 0272-05-003, located TxDOT headquarters in Austin.

Texas Highway Department. Project Correspondence Files. Control-Section-Job No. 0272-05-007, located at TxDOT headquarters in Austin.

NPS Form 10-900
(Oct. 1990)

OMB No. 10024-0018

United States Department of the Interior
National Park Service

NATIONAL REGISTER OF HISTORIC PLACES
REGISTRATION FORM

1. NAME OF PROPERTY

HISTORIC NAME: US 190 Bridge at the Colorado River
OTHER NAMES/SITE NUMBER: LM0272-05-023

2. LOCATION

STREET & NUMBER: US 190 at the Lampasas & San Saba county line **NOT FOR PUBLICATION:** N/A
CITY OR TOWN: Lometa **VICINITY:** X
STATE: Texas **CODE:** TX **COUNTY:** Lampasas/San Saba **CODE:** 281/411 **ZIP CODE:** 76853

3. STATE/FEDERAL AGENCY CERTIFICATION

As the designated authority under the National Historic Preservation Act, as amended, I hereby certify that this _x_ 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 _x_ meets __does not meet the National Register criteria. I recommend that this property be considered significant __nationally _x_ statewide __locally. (__See continuation sheet for additional comments.)

Signature of certifying official — Date

State Historic Preservation Officer, Texas Historical Commission

State or Federal agency and bureau

In my opinion, the property _x_ meets __does not meet the National Register criteria.
(__See continuation sheet for additional comments.)

Signature of commenting or other official — Date

Director of Environmental Affairs, Texas Department of Transportation

State or Federal agency and bureau

4. NATIONAL PARK SERVICE CERTIFICATION

I hereby certify that this property is:	Signature of the Keeper	Date of Action
___ entered in the National Register ___ See continuation sheet.		
___ determined eligible for the National Register ___ See continuation sheet.		
___ determined not eligible for the National Register		
___ removed from the National Register		
___ other (explain): _____		

5. CLASSIFICATION

OWNERSHIP OF PROPERTY: public-State

CATEGORY OF PROPERTY: structure

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: 0

NAME OF RELATED MULTIPLE PROPERTY LISTING: Historic Bridges of Texas, 1866-1945

6. FUNCTION OR USE

HISTORIC FUNCTIONS: TRANSPORTATION/road-related (vehicular)

CURRENT FUNCTIONS: TRANSPORTATION/road-related (vehicular)

7. DESCRIPTION

ARCHITECTURAL CLASSIFICATION: Other: continuous through truss bridge

MATERIALS:

FOUNDATION	substructure: concrete piers and abutments
WALLS	N/A
ROOF	N/A
OTHER	superstructure: steel truss

NARRATIVE DESCRIPTION (see continuation sheets 7-1 through 7-3)

8. STATEMENT OF SIGNIFICANCE

APPLICABLE NATIONAL REGISTER CRITERIA

___ **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 VALUE, 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: N/A

AREAS OF SIGNIFICANCE: Engineering

PERIOD OF SIGNIFICANCE: 1939-1940

SIGNIFICANT DATES: 1939-1940

SIGNIFICANT PERSON: N/A

CULTURAL AFFILIATION: N/A

ARCHITECT/BUILDER: Bridge Designer: Texas Highway Department
Truss Fabricator: Virginia Bridge Company of Roanoke, Virginia
Bridge Builder: Cage Bros. & L.A. Turner of Bishop, Texas

NARRATIVE STATEMENT OF SIGNIFICANCE (see continuation sheets 8-4 through 8-7)

9. MAJOR BIBLIOGRAPHIC REFERENCES

BIBLIOGRAPHY (see continuation sheet 9-8)
PREVIOUS DOCUMENTATION ON FILE (NPS): N/A
___ preliminary determination of individual listing (36 CFR 67) has been requested.
___ previously listed in the National Register
___ previously determined eligible by the National Register
___ designated a National Historic Landmark
___ recorded by Historic American Buildings Survey #
___ recorded by Historic American Engineering Record #
PRIMARY LOCATION OF ADDITIONAL DATA:
_x_ State historic preservation office *(Texas Historical Commission)*
_x_ Other state agency *(Texas Department of Transportation)*
___ Federal agency
___ Local government
___ University
___ Other -- Specify Repository:

10. GEOGRAPHICAL DATA

ACREAGE OF PROPERTY: less than one acre

UTM REFERENCES	Zone	Easting	Northing		Zone	Easting	Northing
1	14	541410	3453720	3	_	_____	_____
2	_	_____	_____	4	_	_____	_____

(___see continuation sheet)

VERBAL BOUNDARY DESCRIPTION (see continuation sheet 10-8)

BOUNDARY JUSTIFICATION (see continuation sheet 10-8)

11. FORM PREPARED BY

NAME/TITLE: text by Regina A. Lauderdale
graphics by Pat St.George

ORGANIZATION: Texas Historical Commission/
Texas Department of Transportation **DATE:** April 1995

STREET & NUMBER: Texas Historical Commission **TELEPHONE:** 512/463-6094
P.O. Box 12276

CITY OR TOWN: Austin **STATE:** TX **ZIP CODE:** 78711

ADDITIONAL DOCUMENTATION

CONTINUATION SHEETS

MAPS

PHOTOGRAPHS

ADDITIONAL ITEMS

PROPERTY OWNER

NAME Texas Department of Transportation

STREET & NUMBER 125 East 11th Street **TELEPHONE** 512/416-2606

CITY OR TOWN Austin **STATE** TX **ZIP CODE** 78701

Description:

The US 190 Bridge at the Colorado River consists of one three-span continuous truss unit 600 feet long followed by three three-span continuous I-beam units serving as the east approach. The bridge serves on US 190 at the Lampasas and San Saba county line, linking Lampasas and San Saba, the county seats (see Figure 1). These two counties are on the boundary between the Western Cross Timbers region of North Central Texas and the Edward's Plateau of southwest Texas. The region's economy relies primarily on diversified agriculture, emphasizing cattle, cotton and corn. Pecans are also an important resource to the region, with the town of San Saba claimed as "The Pecan Capital of the World."

Texas Highway Department (THD) engineers developed a special design for the bridge's truss spans. These spans form a continuous Warren truss with top chords resembling the curve seen in suspension bridges (see Photograph 3). Both the truss spans and the concrete approach spans rest on reinforced concrete dumbbell piers, some with square battered columns and others with cylindrical battered columns (see Photograph 2). Both spread footing and precast concrete pile foundations are employed. The bridge provides a 24-foot roadway with 1½-foot curbs serving as refuge walks for stranded pedestrians. THD Type P approach railing consists of steel channel rails and reinforced concrete posts. Truss railing employs 12-inch deep steel channels (see Photograph 1). A bronze plate affixed to a concrete monument at each entrance to the bridge names the contractor and identifies THD and the Bureau of Public Roads (BPR) as the government agencies responsible for the project. A water level gaging station operated by the United States Geological Survey (USGS) is attached to the bridge's south side.

From 1939 through 1940, Cage Bros. & L.A. Turner built the Colorado River bridge under contract to THD. No major repairs or alterations have been performed on this bridge. As such, it retains substantial integrity of design, materials and workmanship. The bridge and its surroundings appear relatively unchanged since 1940, maintaining integrity of location, setting, feeling and association. Although no projects are currently planned for the Colorado River bridge, its BRINSAP sufficiency rating as of October 1993 is 60.7, making it eligible for rehabilitation but not replacement.

GENERAL SPECS

TRUSS TYPE:	continuous Warren through
THD STD. DESIGN:	n/a
NO. TRUSS SPANS:	3 (continuous unit)
TRUSS SPAN LENGTH:	1 - 600'0" 3-span continuous unit
ROADWAY WIDTH:	24'
DECK WIDTH:	27'
APPROACH SPANS:	3 - 3-span continuous I-beam units
OVERALL LENGTH:	1294'7"

SPECIAL FEATURES

BUILDER/DATE PLATE:	yes
APPROACH RAILING:	Type P concrete approach railing
OTHER:	none

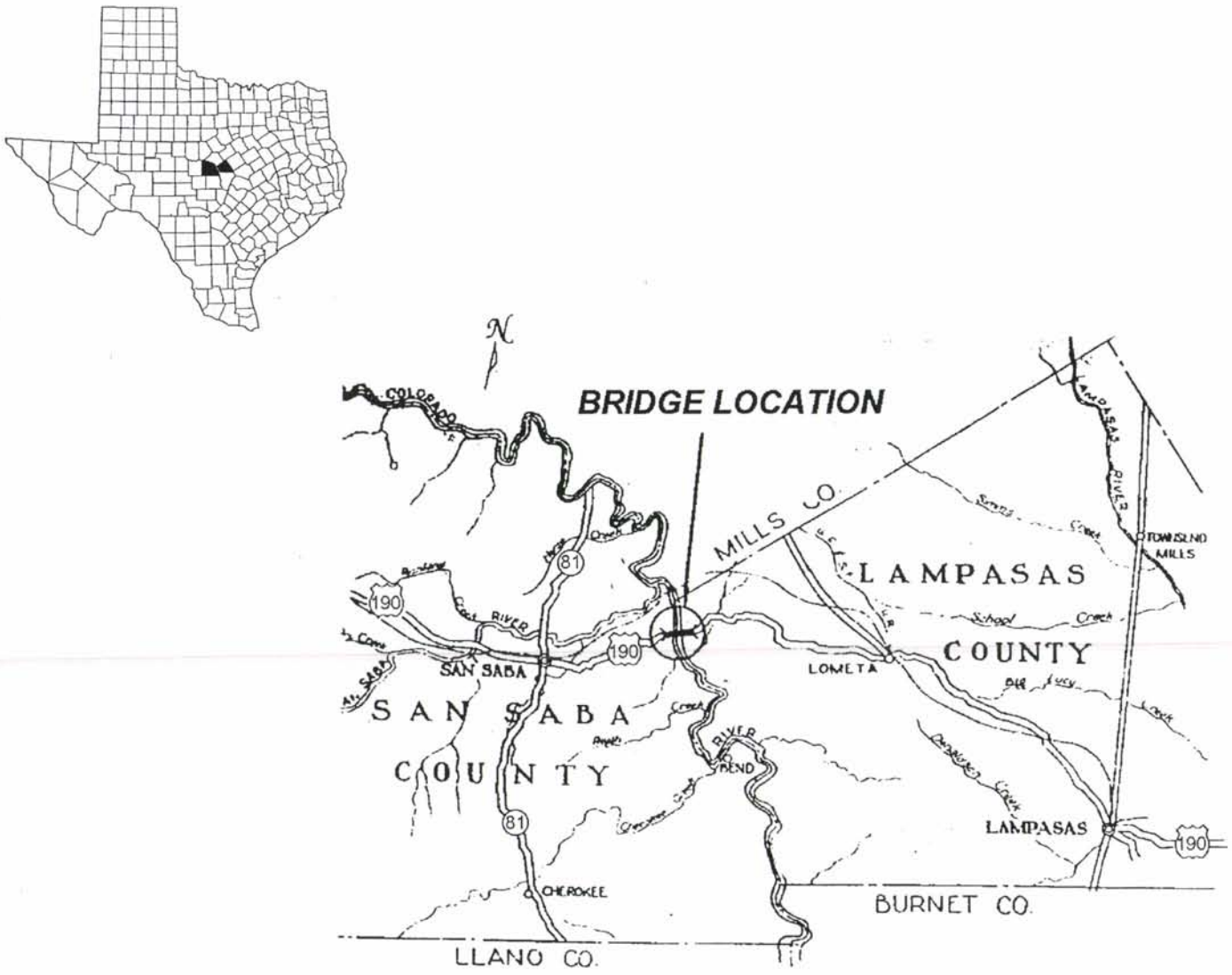
SUPERSTRUCTURE

TRUSS DEPTH:	37'
TRUSS PANELS:	8 - 22'6"; 10 - 24'0"; 8 - 22'6"
TOP CHORD & END POSTS:	2 channels w/ cover plates & lacing
BOTTOM CHORD:	2 channels w/ batten plates & lattice
VERTICAL POSTS:	I-beam; 2 double angles inside channels used over piers
DIAGONAL MEMBERS:	2 channels or I-beam or 2 double angles w/ plate separator
DECK TYPE:	concrete

SUBSTRUCTURE

PIERS/INTERIOR BENTS:	concrete piers
THD STD. DESIGN:	n/a
ABUTMENTS/END BENTS:	concrete abutments
THD STD. DESIGN:	n/a

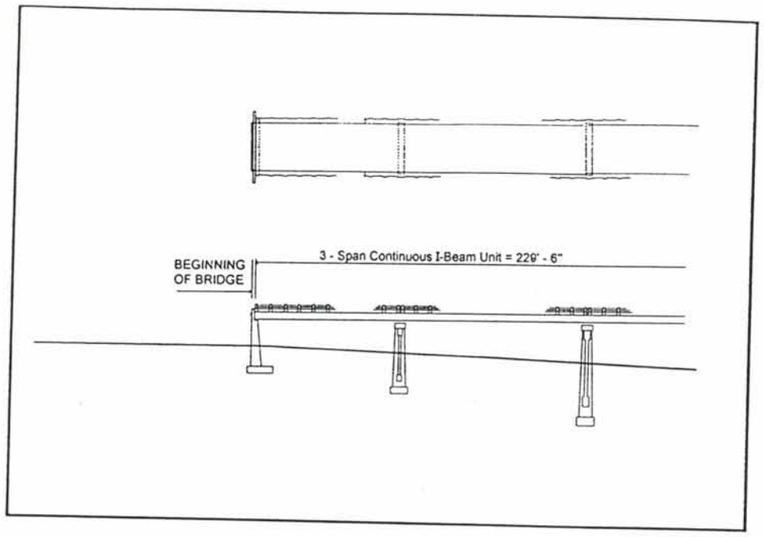
Figure 1. Map of Lampasas and San Saba counties with the location of the Colorado River bridge as shown in the 1940 plans.



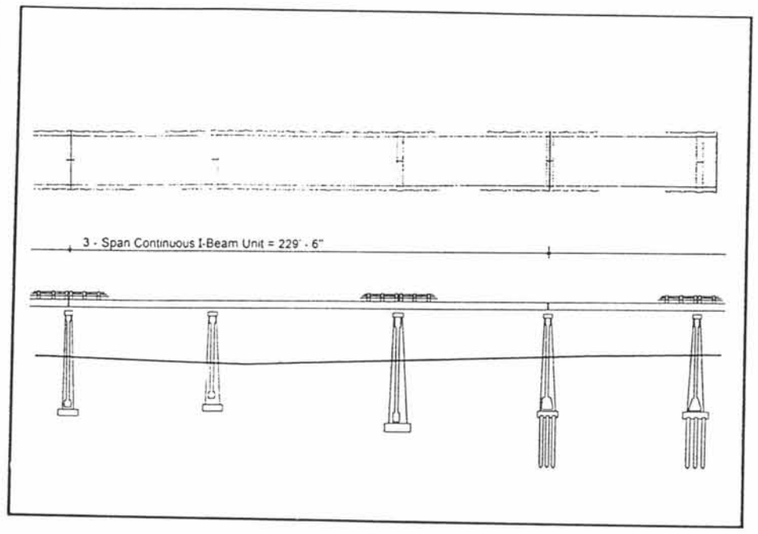
Source: Texas Highway Department, CSJ 0272-05-003, 1940.

Figure 2. Elevation of the Colorado River bridge as shown in the 1940 plans.

Source: Texas Highway Department, CSJ 0272-05-003, 1940.



PLAN SHEET 1 OF 5



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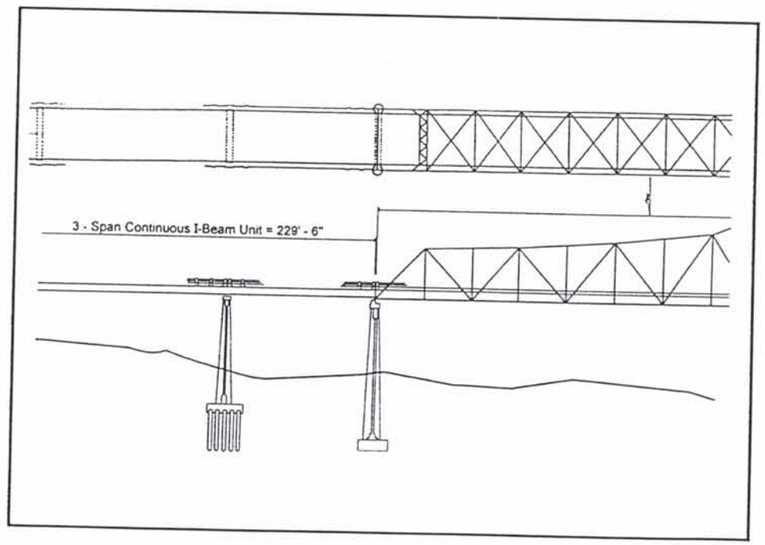
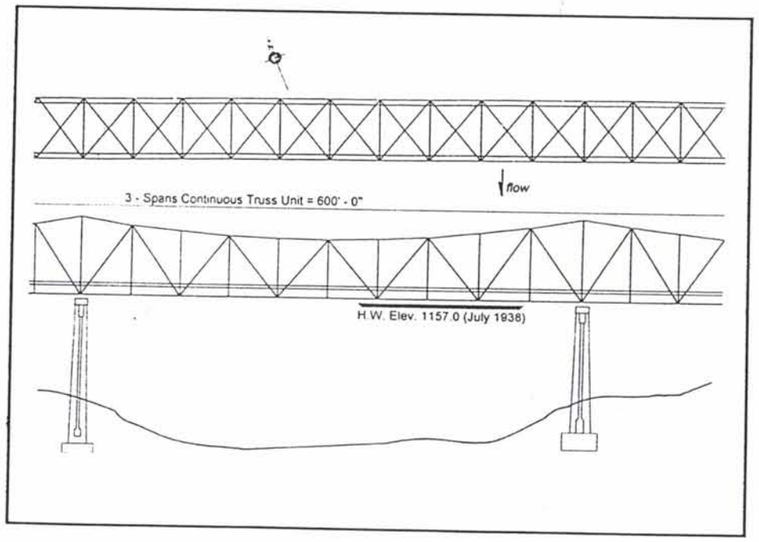
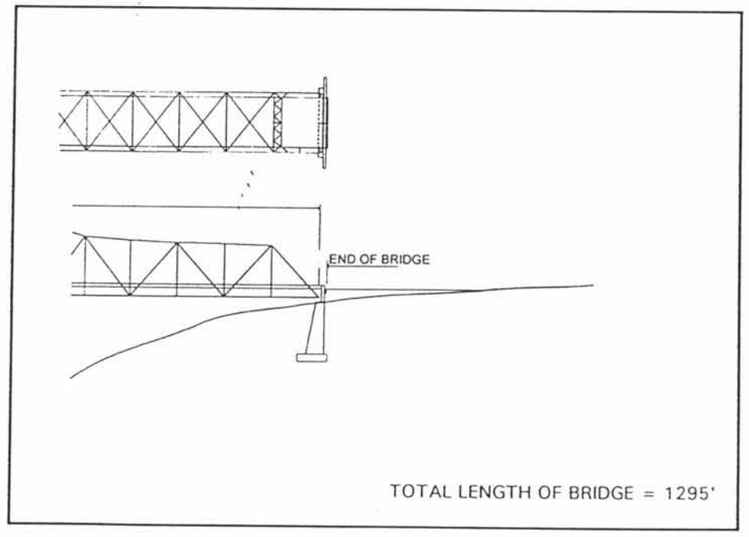


PLAN SHEET 3 OF 5



PLAN SHEET 4 OF 5



PLAN SHEET 5 OF 5

Statement of Significance:

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THD engineers prepared the plans for the new bridge and BPR engineers reviewed and approved them. Rather than use a standard design, THD bridge engineers developed a special design for the bridge, employing a continuous truss span for improved economy and appearance. The bridge's top chord follows a curve between the two high points, similar to the cable configuration used on suspension bridges. The truss' high points lie over the piers, reflecting the need to resist larger stresses at this location.

The US 190 Bridge at the Colorado River is one of only seven continuous through truss bridges surviving in Texas and one of only five built before World War II. The Brazos River bridge in Palo Pinto County (refer to nomination of US 281 Bridge at the Brazos River, PP0250-02-018, NRHP 1995) is the only other historic truss bridge in Texas with a curved and peaked top chord.

BPR's January 6, 1939 inspection report, written by W.C. Peterson, Associate Highway Bridge Engineer of the BPR, addressed the improved economy of employing a continuous design: "I was informed by the State's representative that the three-span continuous truss unit had been compared with simple spans at this site and that there was a considerable saving in the use of the continuous unit." He cautioned, however:

> Due to the fact that extreme high waters exist on the Colorado River and that any structure placed in this stream should be adequately designed to resist this extreme high water, it was my thought that serious consideration should be given to future flood damage and that the piers be designed to resist the tremendous thrust set up during high water stages. It was also my thought that in using a three-span unit, if one pier was lost the entire structure would be destroyed, whereas this condition would not exist in a series of simple spans.
>
> Sub-surface investigation revealed underlying layers of blue shale, sandy shale and sandstone. The BPR's inspection report dated January 6, 1939, delineated the configuration for the bridge's foundation reflected in the preliminary layout sketch.
>
> The main piers of [the] continuous truss span were to be founded in . . . sandstone. . . . The continuous I-beam approach spans were to be carried on concrete piers. For the first unit footings were to be placed in the sandstone. The next two units, however, were shown supported on concrete piers with concrete piling driven to the sandstone. . . . It was the intention where the sandstone was a considerable distance below the ground to use spread footings supported on precast concrete foundation piling with the piling placed well into the sandstone by means of pilot holes.

THD responded to these suggestions in a three-page letter dated March 24, 1939, analyzing "the probability of pier loss and . . . the relative economic losses for the two types of superstructure."

> We have made a careful analysis of the problem presented by the loss of a pier supporting a continuous unit as compared with the loss of one supporting simple spans. In the first case, the entire continuous unit would obviously be destroyed upon the loss of a pier while, in the

> second case, only two spans or approximately two-thirds as much superstructure would be lost. Of course, the amount of superstructure lost would be equal for both cases in the event two piers were lost. . . . The possibility of the loss of a pier is very remote. The hard sandstone in which the piers will be founded will manifestly insure against the possibility of failure through undermining. The bases and shafts of the piers will be proportioned to resist the forces of the highest known flood. The piers will be many times more substantial than those supporting the main span of the existing bridge which successfully withstood the highest flood of record. Since the loss of a pier is thus seen to be very improbable, it does not seem economically justifiable to add [unreadable]. Furthermore, if the loss of a pier is to be further guarded against, it would appear more logical to use the added cost in making the piers more substantial.

The letter continues with an cost analysis of construction and repair costs of a simple truss versus a continuous truss bridge, with the latter proving more economical overall.

On May 18, 1939, THD submitted plans, specifications and estimate (PS&E) to the BPR for approval. Provisions were made to fund a related project for the construction of the approach roadway through the Regular Federal Aid Program. The new bridge site was ½-mile north (upstream) of the Red Bluff Bridge site, and the new roadway, in addition to providing access to the new bridge, would straighten a curved alignment on the route near the crossing (see Figure 2). BPR approved the PS&E on June 3, 1939, appropriating the requested $117,500 from federal emergency relief funds. The Texas Highway Commission opened bids for the project on June 20, 1939. After reviewing the eight bids submitted, the commission awarded the contract to Cage Bros. and L.A. Turner of Bishop, Texas, which submitted the low bid of nearly $178,000, more than 24 percent under THD's preliminary estimate. The Virginia Bridge Company of Roanoke, Virginia, fabricated the steel spans in its Birmingham, Alabama, plant.

A month after bidding, THD discerned an error in the estimated quantity of excavation used in the bidding process. With this quantity underestimated by nearly 50 percent, all bids had to be adjusted upward. Cage Bros. & L.A. Turner, asking $6.00 per cubic yard of excavation, remained the low bidder after the bid was adjusted to $181,491. Construction began on August 15, 1939. The THD resident engineer in San Saba supervised the construction, which engineers from both THD and BPR inspected.

Convenience of erection was also a major advantage of continuous spans. The span under construction could be cantilevered from previously built spans acting as anchors. This minimized the amount of falsework needed and was especially advantageous when used with long spans over deep water. Although THD did not specify the method of erection in the plans, the bridge contractor chose to use the cantilever method. An October 18, 1939, letter to the contractor stated:

> It is our understanding that you intend to use the cantilever method of erection. If such is the case, please submit information regarding the position of the trusses at time of closure of the central span, the method of closure, and the amount of movement of the expansion ends

> due to the closure. Please submit also the weight of erection machinery you will use which will be traveling on the trusses.

The response came not from the contractor, but from the truss fabricator. The Virginia Bridge Company wrote in a letter dated November 9, 1939, "We are glad to furnish the desired information for Mr. Turner, and know further that the general erection procedure which is covered by our computations will be followed by his erector. . . . The contractor will erect, using the cantilever method, beginning at LØ, west end, using approved wood pile bent falsework at points L1 to L6 inclusive on which the anchor span will be erected, and each half of the center span will be erected cantilever without the use of falsework." THD commented on the erection plan in a November 24, 1939, letter to the Virginia Bridge Company. The letter included several suggestions, stating that "We have used procedures similar to this on previous continuous trusses and have found them expedient and practical."

During construction, the contractor had some difficulty in founding pier footings, encountering irregularities in the underlying materials. Minor difficulties were also experienced in connecting the continuous truss, given the difficulty of reproducing the exact camber required for the reamed holes to line up for riveting. The center truss span was connected over the river on March 11, 1940. The BPR's inspection report dated March 27 reported the following:

> The two end spans of the continuous truss unit (180'-240'-180' spans) were erected on falsework and the middle span was cantilevered out from both end spans. Erection has been closed but the top chord has not been completely riveted. The general plans indicate a dead load camber of 1.55" at the middle of the 240' span, this being the ordinate between the finished camber line and the blocking line. The actual camber is about ½" less than this. This does not appear to be out of line with the truss cantilevered from the piers, whereas the calculations for the blocking line shown on the plans presumably were based upon the use of false work. Mr. Hogan expects to raise the extreme ends of the continuous truss unit to bring the top chord points to full contact prior to riveting, and it is expected that little if any reaming will be necessary.

Despite these minor difficulties, the project was completed on May 8, 1940, 65 days ahead of schedule, at a total cost of $199,039. The cost overrun was attributable to additional structural steel, as well as the excavation not accounted for in the initial estimate.

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Texas Highway Department. Project Correspondence Files. Control-Section-Job No. 0272-05-003, located at TxDOT headquarters in Austin.

Texas Highway Department. Project Correspondence Files. Control-Section-Job No. 0272-05-007, located at TxDOT headquarters in Austin.

Verbal Boundary Description:

The nomination encompasses the complete structure, US 190 Bridge at the Colorado River, from the extreme limits of the east abutment to the extreme limits of the west abutment.

Boundary Justification:

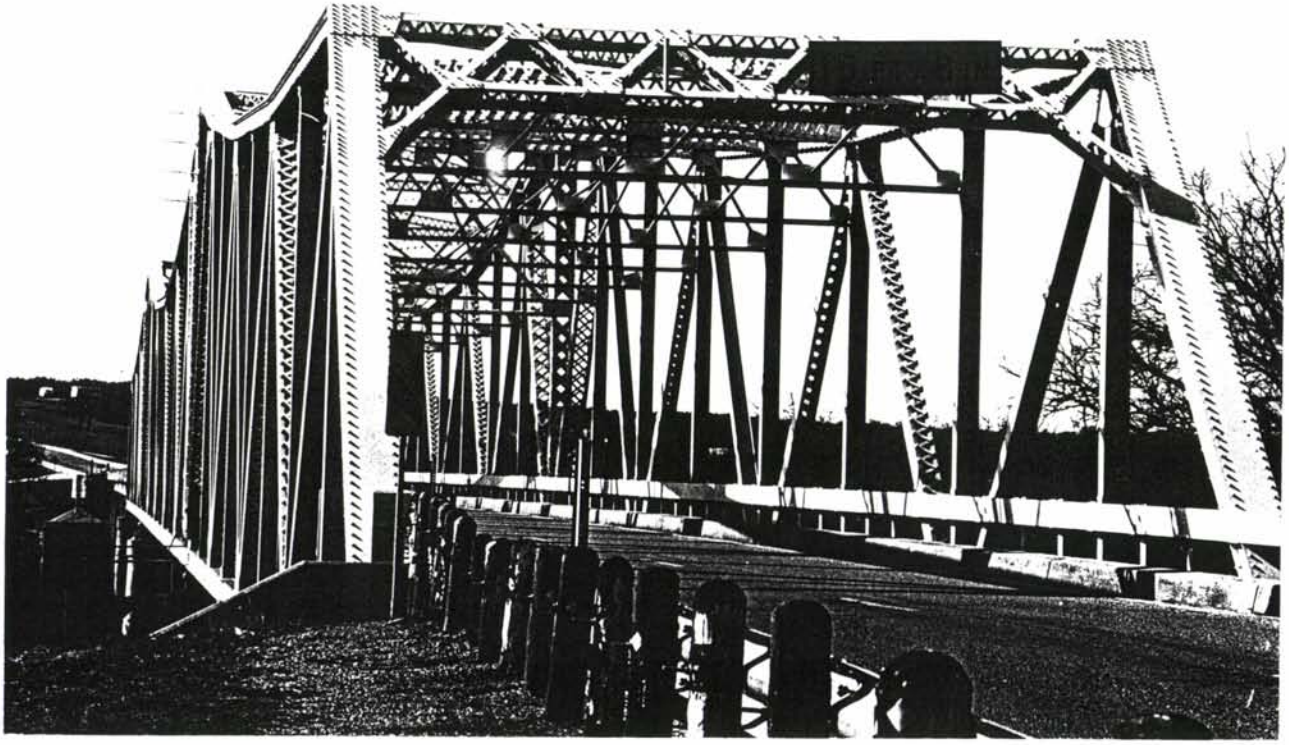
The boundary includes all components of the bridge substructure and superstructure, including the concrete and steel approach railing, historically associated with the property.

Location:

The US 190 Bridge at the Colorado River is located in both Lampasas (281) and San Saba (411) counties.

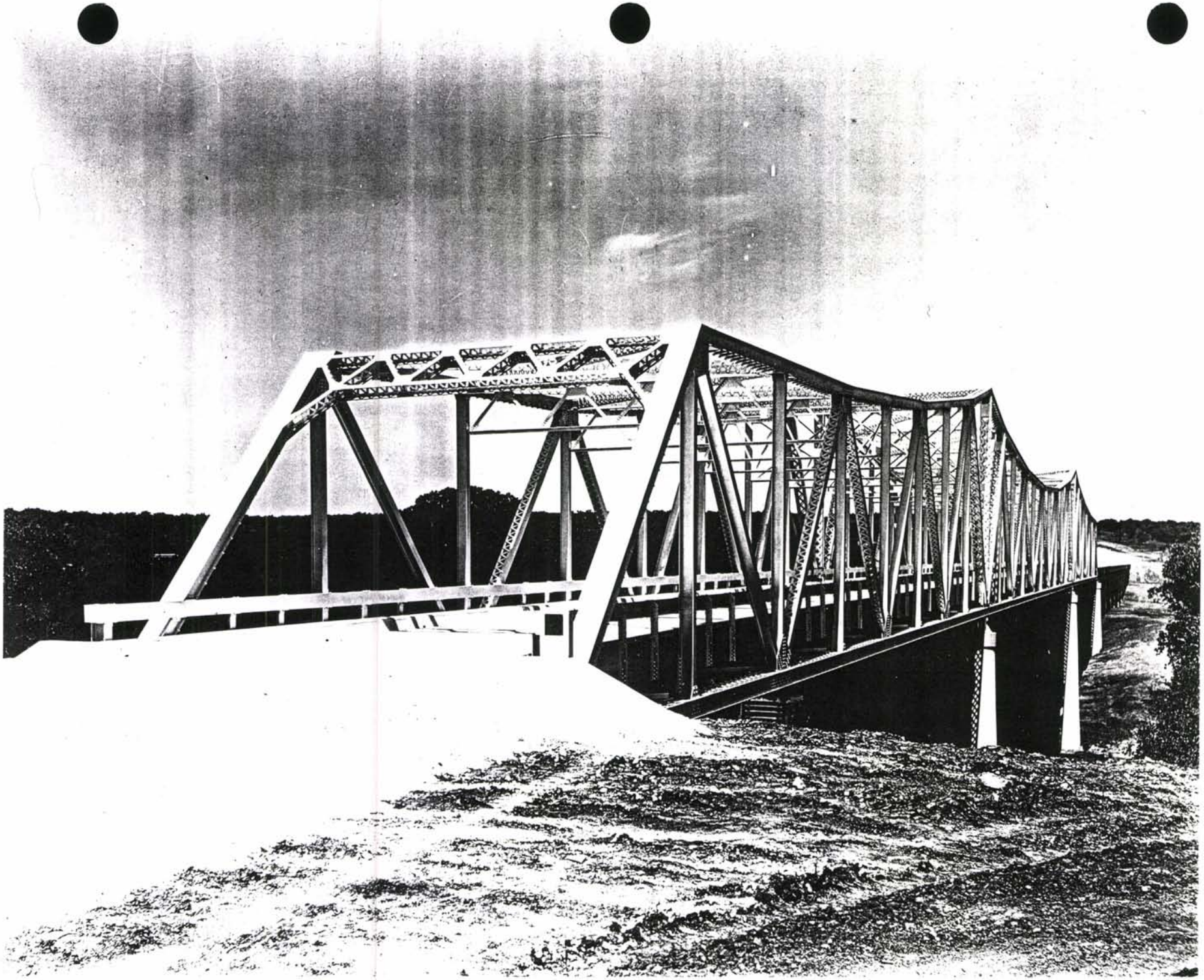
HISTORIC BRIDGES OF TEXAS
US 190 BRIDGE AT COLORADO RIVER
VICINITY OF LOMETA, LAMPASAS CO., TEXAS
UTM REFERENCE: 14/541410/3453720

SITE NO: LM0272-05-023



SITE NO. LM0272-05-023
US 190 BRIDGE AT COLORADO RIVER
HISTORIC BRIDGES OF TEXAS
LAMPASAS CO., TEXAS
PHOTOGRAPH 1 OF 3

SITE NO. LM0272-05-023
US 190 BRIDGE AT COLORADO RIVER
HISTORIC BRIDGES OF TEXAS
LAMPASAS CO., TEXAS
PHOTOGRAPH 2 OF 3




15 FT 9 IN
COLORADO
RIVER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