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

DATA SHEET

PH0692832

UNITED STATES DEPARTMENT OF THE INTERIOR
NATIONAL PARK SERVICE

NATIONAL REGISTER OF HISTORIC PLACES INVENTORY -- NOMINATION FORM

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

1 NAME

HISTORIC
"Ocean to Ocean" Highway Bridge

AND/OR COMMON
Old Colorado River Highway Bridge

2 LOCATION

STREET & NUMBER
Penitentiary Avenue ~~(former U.S. Business Route 80)~~ at ~~the~~ Colorado River
__NOT FOR PUBLICATION

CITY, TOWN
Yuma
__ VICINITY OF

CONGRESSIONAL DISTRICT
3

STATE	CODE	COUNTY	CODE
Arizona	004	Yuma	027

3 CLASSIFICATION

CATEGORY	OWNERSHIP	STATUS	PRESENT USE	
__DISTRICT	X PUBLIC	__OCCUPIED	__AGRICULTURE	__MUSEUM
__BUILDING(S)	__PRIVATE	X 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

Portion within City of Yuma, owned by City of Yuma; portion outside City of Yuma, owned by County of Yuma.

NAME
City of Yuma, Arizona
County of Yuma, Arizona

STREET & NUMBER
City Hall ✓
Courthouse ✓

CITY, TOWN
Yuma, Arizona
__ VICINITY OF
STATE
Yuma, Arizona

5 LOCATION OF LEGAL DESCRIPTION

COURTHOUSE, REGISTRY OF DEEDS, ETC.
Yuma County Courthouse

STREET & NUMBER
168 South 2nd Avenue

CITY, TOWN
Yuma
STATE
Arizona

6 REPRESENTATION IN EXISTING SURVEYS

TITLE
Yuma Crossing

DATE
National Register of Historic Places
X FEDERAL __STATE __COUNTY __LOCAL

DEPOSITORY FOR SURVEY RECORDS
Heritage Conservation and Recreation Service

CITY, TOWN
Washington
STATE
D.C.

7 DESCRIPTION

CONDITION		CHECK ONE	CHECK ONE
X EXCELLENT	__DETERIORATED	__UNALTERED	X ORIGINAL SITE
__GOOD	__RUINS	X ALTERED	__MOVED DATE_____
__FAIR	__UNEXPOSED		

DESCRIBE THE PRESENT AND ORIGINAL (IF KNOWN) PHYSICAL APPEARANCE

Constructed by the U.S. Office of Indian Affairs, with the assistance of funds provided by the State of Arizona and by Imperial County, California, the 1915 "Ocean to Ocean" Highway Bridge upon its completion constituted the only highway bridge crossing the Colorado River for a distance of 1,200 miles. With only mininal alterations in the years since its erection, the bridge remains in service today carrying vehicular traffic across the river between the Fort Yuma Indian Reservation and the City of Yuma.

The "Ocean to Ocean" Highway Bridge consists of one large modified Pennsylvania pin-connected steel truss span and one smaller deck truss approach span. The two spans are supported on reinforced concrete abutments at each end of the bridge and one 60-foot reinforced concrete pier. The main span of the structure is 336 feet long and consists of fourteen 24-foot panels. The approach span at the south end of the bridge is 105 feet long and consists of six panels, each 17 feet 6 inches long. The total length of the structure is 444 feet 4 inches, including the abutments and roadway on the pier. The roadway is 21 feet 4 inches wide and a walkway is provided on either side of the structure. The minimum overhead clearance on the bridge originally was 15 feet, but roadway renovation in 1943 provided a greater minimum clearance of 16 feet 6 inches.

Concrete used in the construction of the abutments and pier for the bridge consisted of one part Portland Cement, three parts sand, and six parts broken stone. The quality of the materials used is shown by a 1971 report by a consulting engineering firm on the state of the bridge, which noted that the concrete in the footings, piers, and abutments, after about sixty years of weathering, was "very good with practically no evidence of deterioration." The concrete was poured into wooden forms provided by the contractor and allowed to set for 36 hours and all supporting forms were allowed to stand in place under freshly poured concrete for a minimum of seven days.

Steel used in the bridge was described as "medium steel," with rivets made from "rivet steel," all according to the specifications set out by the Office of Indian Affairs. Original specifications called for either a reinforced concrete deck or a wooden timber deck. The contractors chose to use the latter. Supported on 12-inch Bethlehem steel I beams and 12-inch channel steel, the actual roadway consisted of 3-inch X 12-inch southern yellow pine timbers, laid heart face down and fastened to furring strips. The walkway surface was made from lighter 2-inch x 8-inch pine timbers.

Before leaving the contractor's fabricating shop, all steel work was thoroughly cleaned and given one coat of red lead in oil. After erection, the steel surfaces of the bridge were cleaned of mud, grease, and other objectionable materials and given two coats of graphite paint. The 1971 inspectors of the bridge noted, interestingly, that under the present aluminum paint, the "red paints" were "in very good condition."

Soon after the contractors turned the bridge over to U.S. government authorities, the local citizens of Yuma, through the Yuma Commercial Club, erected large electrically lighted signs on either side of the bridge as an effort to publicize their "progressive"

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town "on the American Nile." The sign on either side of the structure read, "Yuma" and "Ocean to Ocean Highway," and was made from 24 gauge galvanized steel sheet attached to angle steel which was securely bolted to the framework of the truss structure. The letters, six and four feet tall, were painted "a beautiful white" and they were outlined in five-watt incandescent light bulbs mounted in "weather-proof" sockets and wired with "double-braided, rubber covered wire." Illuminated on special occasions, such as the dedication of the bridge and times of the passage of important Southern Pacific evening passenger trains, the cost of the sign and its use was funded by local businessmen. All traces of the signs have been removed.

The only significant modifications undertaken to the "Ocean to Ocean" Bridge were in 1943. Most of these changes were to the deck of the structure. At this time the original timber roadway was removed and replaced with one of reinforced concrete. After the removal of the timbers, 30-lb. railroad rails on six-inch centers were made up into units and welded to the steel floor stringers, providing better load distribution. Then metal strips were placed between the flanges of the rails and approximately three inches of concrete was poured between the rails. Over this was poured about 2.75 inches of asphaltic concrete both to level the surface and to provide a wearing course. The design proved to be quite successful, as even today there is only little sign of cracking or spalling. The walkways also received treatment in 1943. The original timber flooring was covered by approximately 2.5 inches of concrete overlay, with blockouts for the structural steel. These concrete coverings, laid in 1943, continue in use at the present time.

The 1914 "Ocean to Ocean" Highway Bridge remains in remarkably good condition today. Although there has been some erosion at the abutments, the pier is well protected from the possibility of erosion by a large flume and dike built several years ago by the Bureau of Reclamation. The concrete in the structure is in good condition, as is both the principal and secondary structural steel. Some eye bars have been bent in the past, undoubtedly through the collision of large loads on vehicles. In all the main structural steel of the bridge, only three or four loose rivets could be located by engineers in 1971. The rivets and pins show practically no wear and are functioning as intended. The lateral bracing of the truss shows some bend, but this probably can be attributed to poor fit at the time of erection. Although regular painting is needed as part of the maintenance of the structure, there is very little if any evidence of oxidation or scaling and consequently there is only minimal rusting. The bridge has withstood many floods in the past years before the construction of large flood-control dams on the Colorado River and now with the control of the river the watercourse presents no danger to the structure. The bridge is adjacent to the Yuma Territorial Prison State Park and provides the most convenient vehicular crossing between the city of Yuma and the Fort Yuma Indian Reservation, thus placing it in a location very appropriate for an interpretive marker.

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 1914-1915 BUILDER/ARCHITECT Design by Office of Indian Affairs
Erected by Omaha Structural Steel Works, Omaha

STATEMENT OF SIGNIFICANCE

Completed in 1915, the construction of the "Ocean to Ocean" Highway Bridge across the Colorado River at Yuma, Arizona, was the result of several years of promotion by business leaders of the Arizona town. It was the most important link in the proposed "Ocean to Ocean" Highway designed to connect Southern California with the remainder of the United States. In engineering terms, the erection of the bridge presents an interesting case study in the problems attending the construction of bridges across streams with frequent and unexpected major rises and falls in water level. The historic structure remains in very good condition at the present time and is an outstanding example of early twentieth-century overhead truss highway bridge construction in Arizona.

Agitation for the construction of "a free wagon bridge" across the Colorado River at Yuma began in the early years of this century. Organizations such as the "Ocean to Ocean" Highway Commission and the Yuma Commercial Club held promotional meetings and issued numerous reports concerning the need for such a link across the river separating Arizona and California. The demands of the local citizens did not fall on deaf ears, as the local Congressional representative, Carl Hayden, on January 2, 1913 introduced a bill to the U.S. Congress for the construction of a steel highway bridge across the Colorado at Yuma. The bridge ostensibly was for the use of the Indians living at the Fort Yuma Indian Reservation, just across the river from Yuma on the California side of the river. In support for the bridge, Arthur P. Davis, the director of the U.S. Reclamation Service, wrote that the only means available for the Indians to cross the river at Yuma was by the railway bridge, "a privilege ... which may properly be revoked at any time," on the ferry, or in privately owned boats. He added that the Yuma Indians would "find use for the proposed bridge for trading purposes in Yuma, for marketing their agricultural products, and for disposing of cordwood which they are cutting from their reservation." All knew, however, that the bridge was not primarily for the Indians, but rather for the citizens of Yuma.

In the fall of 1913 the news spread that funds had been appropriated by Congress for the construction of the bridge at Yuma, but not all the funds. The U.S. government offered to provide $25,000 if the states of Arizona and California would provide similar amounts, making a total of $75,000. The Arizona State Legislature voted such an appropriation, while Imperial County, across the river in California, provided the share for its state. By April 10, 1914 the plans for the bridge, being drawn in Washington, were near complete, but the fact that they were being drawn on the opposite side of the country by engineers who had never seen the conditions at Yuma meant that unforeseen problems later would be met by the actual erectors of

9 MAJOR BIBLIOGRAPHICAL REFERENCES

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Arizona. Department of Transportation. Structures Section. "Bridge Inspection Report Structure No. 1018." MS. 1 lv. 21 December 1976. (See Continuation Sheet.)

10 GEOGRAPHICAL DATA

ACREAGE OF NOMINATED PROPERTY 1 acre

UTM REFERENCES

	ZONE	EASTING	NORTHING
A	11	723540	3623440
B	11	723540	3622440
C			
D			

VERBAL BOUNDARY DESCRIPTION

The area encompassed by this nomination includes the bridge and its approaches.

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

STATE	CODE	COUNTY	CODE
Although originally in both Arizona and and California, an interstate boundary agreement			
between the two states has placed the bridge entirely within the State of Arizona.			

11 FORM PREPARED BY

NAME / TITLE

T. Lindsay Baker, Program Manager

ORGANIZATION — DATE

History of Engineering Program, Texas Tech University — 28 May 1978

STREET & NUMBER — TELEPHONE

P. O. Box 4089 — 806-742-3593

CITY OR TOWN — STATE

Lubbock — Texas

12 STATE HISTORIC PRESERVATION OFFICER CERTIFICATION

THE EVALUATED SIGNIFICANCE OF THIS PROPERTY WITHIN THE STATE IS:

NATIONAL ✓ STATE ____ 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 Dorothy H. Hall

TITLE — DATE 11-29-78

FOR NPS USE ONLY

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

DIRECTOR, OFFICE OF ARCHEOLOGY AND HISTORIC PRESERVATION — KEEPER OF THE NATIONAL REGISTER — DATE 9-11-79

ATTEST:

KEEPER OF THE NATIONAL REGISTER — DATE 9-10-79

GPO 892-453

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the bridge. With the actual site conditions unknown by both the designers and the potential contractors, bids were advertised for the construction of the bridge and were opened in Washington on June 15, 1914. The successful bidder was the Omaha Structural Steel Works of Omaha, Nebraska, with a bid of $72,150. The announcement of the contract was made in Yuma by a telegram from Congressman Hayden to a local newspaper editor.

After the heat of the Yuma summer had passed, in late September 1914 the supervisory staff from the Omaha Structural Steel Works began arriving in Yuma, first among them being superintendent George T. Davis and timekeeper W.H. Larson, who established offices in the Gandalfo Annex Building in downtown Yuma. Already in early October the timber to be used in part of the construction had started arriving and the builders were awaiting the first shipments of steel.

The location chosen for the erection of the bridge was "directly at the end of Prison Hill street," present-day Penitentiary Avenue. This was a site where the river had cut a channel through a hill of "cemented gravel and boulders," but it presented severe foundation problems. The bottom of the river at this point was filled with a fine silt which eroded during high water, scouring out about four feet to every foot of rise in water level.

The most serious problem for the erectors of the "Ocean to Ocean" Bridge was not the foundation, but the design of the bridge itself. The modified Pennsylvania truss with an inclined top chord and subdivided panels, while a beautiful design, was especially dangerous to erect because it required the use of a major wooden falsework to support the structure across the river while it was being assembled. This falsework was subject to damage or destruction from sudden and violent flooding then common on the Colorado. A designer aware of the actual conditions of the Colorado River at Yuma would have instead chosen to build another style of bridge, probably of either cantilever or suspension design.

Work began at the bridge site in mid-October 1914. By the 16th of that month the local press reported to its readers that a force of men was at the bridge site and were occupied in sharpening the timbers to be used as pilings in the wooden falsework. Within a month the number of men at work had risen to sixty and they were busily engaged in excavating the foundations for the two abutments and pier. By this time about one-half of the pilings were in place for the falsework when the first of the winter floods on the Colorado, and its major tributary, the Gila, began, causing a rapid rise in water level and carrying with it large amounts of brush. The pressure of the water and the refuse it carried washed away all but two of the bents of the intended falsework. Thinking that the flood was an unusual occurrence, the contractors returned to work after the high water, replacing the wooden timbers of the falsework across the river. At the same time work continued on the reinforced concrete abutments and pier, with the latter being completed

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before the end of January 1915. At this time, however, a second and more powerful flood came, again washing away almost all of the falsework. The pilings formed a dam in the river at the bridge site, the narrowest point for several miles in either direction, and caught a "raft" of brush and small trees which reached upstream for half a mile. The debris accumulated on the falsework until the pressure became so great that the timbers snapped off "as though they had been pipe stems." It was at this point that the president of the Omaha Structural Steel Works, John W. Towle, came to take personal charge of the bridge erection.

After the flood had subsided the contractors were as far from completion of their project as they had been three months before. They became aware of the fact that they faced the danger of losing the entire steel span if they persisted in the traditional method of erection. They had at the site the steel for the construction of a type of bridge not designed for such a location. Furthermore they were bound by a contract to erect a bridge of this design. The answer had to be found. Company president Towle contacted B. A. McClain, a bridge erector who had experience in the construction of spans on barges and in floating them into position. In the meantime he made arrangements with the U.S. Reclamation Service to borrow one of its barges which had been used in the construction of the Laguna Diversion Dam upstream on the Colorado in 1905-09.

The plan decided upon by Towle and McClain was to put together the steel span partially on land and partially resting on the south abutment, approach span, concrete pier, remaining two bents of the former falsework, and the floating barge in the river. The large truss span was assembled in such a manner that the shoes at the north or outriver end of the trusses rested on the north bent on the barge. In this way the whole weight of that end of the bridge would come on the shoes of the trusses during the assembly process. Special provision had to be made for the span to slide out over the barge two panels more during the "swinging" operation, when the span would be moved across the river, in order for the shoes of the trusses to protrude over the sides of the barge. This was required for them to come to rest on the rollers and bearing plates on the north abutment before the barge came into contact with the north bank of the river.

The requirement that the north end of the truss span protrude a distance of two panels over the barge, however, caused significant new problems in the construction of the outriver end of the trusses. This was because the third and fourth posts of the trusses would become bearing points for the entire load of approximately one-half of the bridge while it was being moved into position. The four end panels in effect had become a cantilever and thus computations were necessary for the reconstruction of the entire north end of the trusses with such materials as were available.

The next problem to be solved was the design of the runways on which the truss

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structure would slide endways across the river to the north abutment. Two sets of tracks were constructed of four rails each upon which to slide the steel shoes mounted under each post of the trusses. It was obvious that as the barge would move farther across the river, loading more and more weight on it, its level in the water would go down. Thus it was necessary to design runways which would conform to the curve caused as the outward end of the truss span sank and the landward end correspondingly rose.

Yet another concern for the bridge erectors was the maintenance of an exact center line in the movement of the truss span across the river, supported on the barge, pier, and approach. This was necessary in order for the outriver end of the bridge to reach the correct point for mounting on the north abutment. Three hoisting engines provided the motive power for moving the truss span, two mounted on the barge and one on the bridge. Cables and ropes were fastened to the drums on the engines and to various anchoring points on the truss span and the riverbanks. In order to keep the bridge moving accurately on its axis, a wooden plank was placed across the end of the span and a nail was driven in its center. A transit was set up at the north abutment and Mr. Towle used this surveying instrument to check the movement of the span in a straight center line as it moved endways across the river toward him.

The day appointed for "swinging" the span into place was Wednesday, 3 March 1915. The schools in Yuma were closed in order for the children to witness the historic "wedding" of Arizona and California and thousands of persons waited on the banks of the river, many doubtful as to the outcome of the effort but hopeful that it would succeed. Mr. Towle recalled several years later that "the situation was indeed tense," as the engineers realized that the least accident or mistake could throw the entire top-heavy span into the river. At two o'clock in the afternoon the drums on the engines began turning and the structure creaked and deliberately moved forward. At the beginning it moved slowly and unsteadily because of the friction between the shoes and the rail runways, but soon they wore smooth and the truss span eased forward more smoothly. The movement of the span became more and more even and the barge, moving sideways, maintained its exact straight course across the river. The crowds, and especially the bridge contractors, endured two hours of tension and suspense as the long truss span slowly moved across the gap. Finally the shoes on the north end of the truss slipped quietly over the roller nests of the north abutment and all realized that the bridge was safe. Engineer Towle recalled, "a mighty cheer went up and whistles blew."

The calculations made for the movement of the truss span across the river proved to be amazingly accurate. The estimates for the displacement of the barge in the river were so close that when the north end of the bridge slipped into place in the north abutment there was but two inches of space between the bottom of the shoes and the top of the bridge seat on the abutment. The measurements of distance across the river were so close that the anchor bolts set in the concrete abutment fit the holes in the shoes of the bridge within a thirty-second of an inch.

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The movement of the truss span into position was the most dramatic time in the construction of the bridge, but it did not complete the structure. Work continued for several weeks until the bridge was finished. One of the important steps was the placing of the timber flooring on the bridge, work which was completed by the second week of April, for on 9 April the first automobile crossed the structure. Finally on 13 April 1915 the bridge was turned over by W. H. Larson, representing the Omaha Structural Steel Works, to Walter Dubree and L. L. Odle, representing the U.S. government. The local press reported hapily: "The bridge is completed . . . and ready for use."

The boosters of Yuma were certain not to allow the opening of the new bridge to go without notice. Its construction, in fact, was to a great extent the result of their efforts at promotion. Plans started as soon as the truss span was in place for festivities to commemorate its dedication. Sponsored by the Yuma Commercial Club, the celebration was scheduled for 22 and 23 May 1915. Numerous dignitaries were invited to the two-day celebration and visitors came from Phoenix, Tucson, and numerous California towns and cities to participate in the speeches, automobile races, sightseeing trips to the Laguna Dam and local land development schemes, exhibitions of military drills, parades of decorated automobiles, concerts, and dancing. The most memorable point in the festivities was the first lighting of the "Yuma" and "Ocean to Ocean Highway" electric signs on the bridge, which "flamed" their message of welcome to "a multitude of people gathered at vantage points along the river . . . [on] the culmination of a great day for Yuma."

The "Ocean to Ocean" Highway Bridge has continued to serve the citizens of Yuma and its region for over six decades. The bridge received its only significant modifications in 1943, when its roadway was reconstructed using reinforced concrete. With this very limited alteration it still carries vehicular traffic across the Colorado River between Yuma and the Fort Yuma Indian Reservation. In 1976 the structure was formally abandoned by the Arizona Department of Transportation, with its title passing to the City of Yuma for that portion within the city limits of Yuma and to the County of Yuma for that portion outside the bounds of the city limits. The structure requires minimal regular maintenance, which both the city and the county have been reluctant to render since they became joint owners of the bridge. Thus, although the bridge remains in remarkably good condition and is used by several hundred vehicles daily, it currently lacks normal maintenance. Within the bounds of the Yuma Crossing in the National Register of Historic Places, the bridge is clearly of sufficient significance to merit recognition in its own right.

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Excise Boundary Justification for Engineering and Transportation

The bridge includes bridge span no. 1 and span no. 2, totalling 444 feet±. The approaches to the bridge include 100 linear feet of highway right-of-way measured inland from the center of the abutments, to include the expansion ends at both ends of the bridge. See construction details (Exhibit "A").

3/5/79

Approx. Loc. RR Br.

Approx. Loc. Hwy Br.

Approx. Loc. Penitentiary Ave.

Arizona Penitentiary

Office

School Hill

Ferry cable

ROAD

Pump House

CALIFORNIA

COLORADO RIVER

Fire

Electric Light & Power Plant

Store

Freight House

S. P. R. R. Bridge

S.P. Station

Southern Pacific Railroad

GILA ST.

FIRST

ARIZONA

MAIN ST.

ST.

N

NOTE:
Elevations above Mean Sea Level
U.S.R.S. Datum.

EXHIBIT "A"

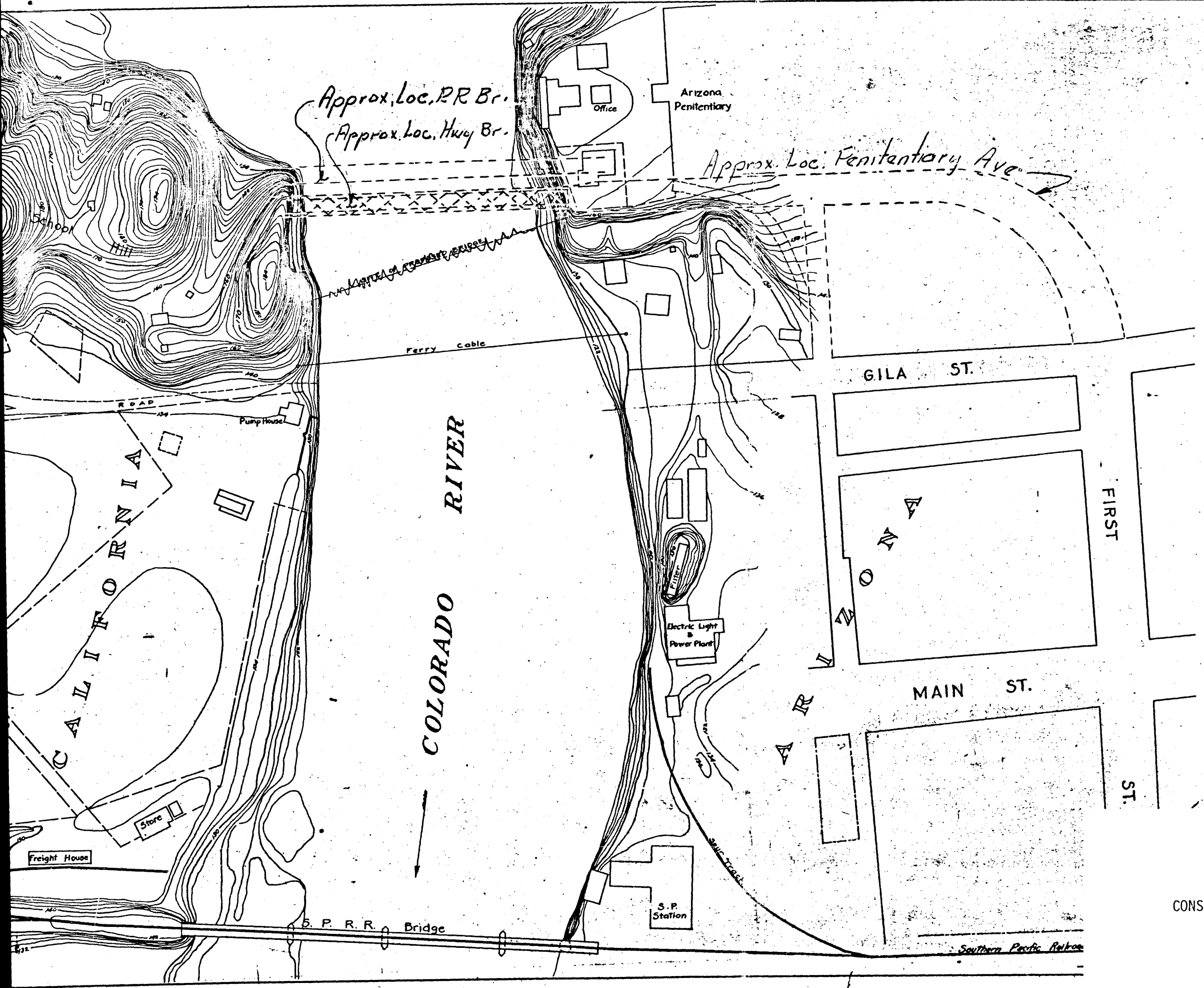
CONSTRUCTION DETAILS

SEP 11 1979

DEPARTMENT OF THE INTERIOR
OFFICE OF INDIAN AFFAIRS

PROPOSED HIGHWAY BRIDGE
OVER COLORADO RIVER
AT
YUMA ARIZ.
FOUR SHEETS SHEET 4
MAP OF SITE
Scale: 1"=100'
F.C.H. April, 1914

3/5/79



NOTE:
Elevations above Mean Sea Level
U.S.R.S. Datum.

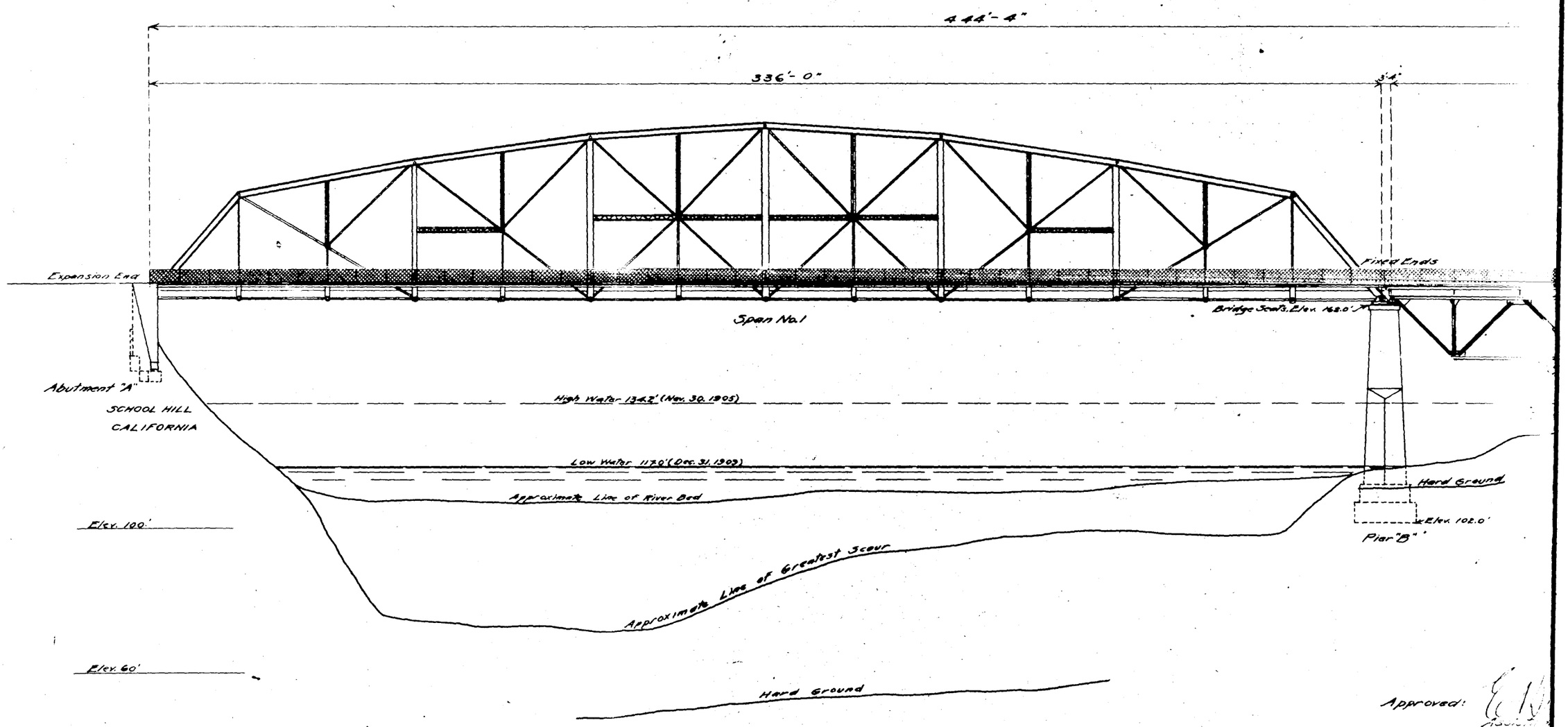
DEPARTMENT OF THE INTERIOR
OFFICE OF INDIAN AFFAIRS

PROPOSED HIGHWAY BRID
OVER COLORADO RIVER
AT
YUMA ARIZ.
FOUR SHEETS SHEET 4
MAP OF SITE
Scale: 1"=100'
P.C.H. April, 1914

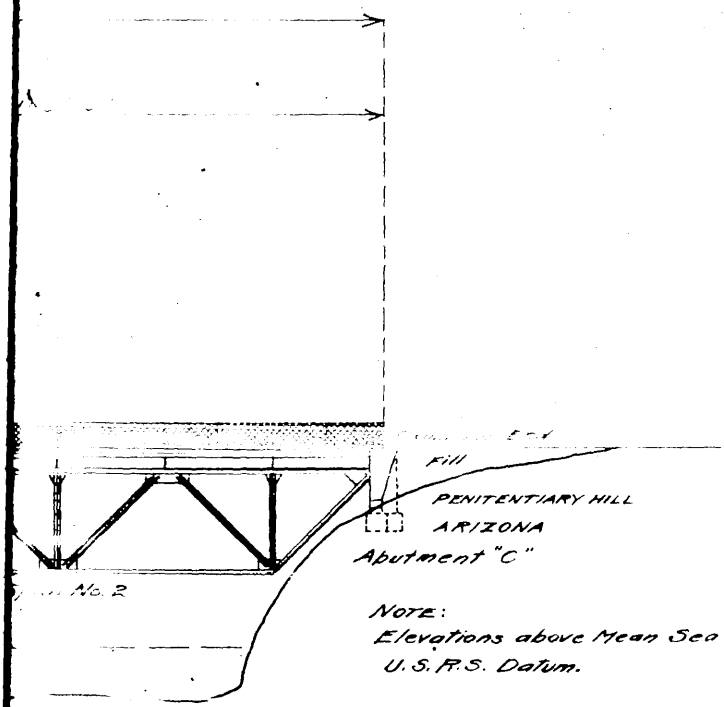
EXHIBIT "A"

CONSTRUCTION DETAILS

SEP 11 1979


444'-4"
336'-0"
3'-4"
Expansion End
Fixed Ends
Span No.1
Bridge Seats, Elev. 162.0'
Abutment "A"
SCHOOL HILL
CALIFORNIA
High Water 134.2' (Nov. 30, 1905)
Low Water 117.0' (Dec. 31, 1903)
Approximate Line of River Bed
Hard Ground
Elev. 102.0'
Pier "B"
Elev. 100'
Approximate Line of Greatest Scour
Elev. 60'
Hard Ground

Approved:

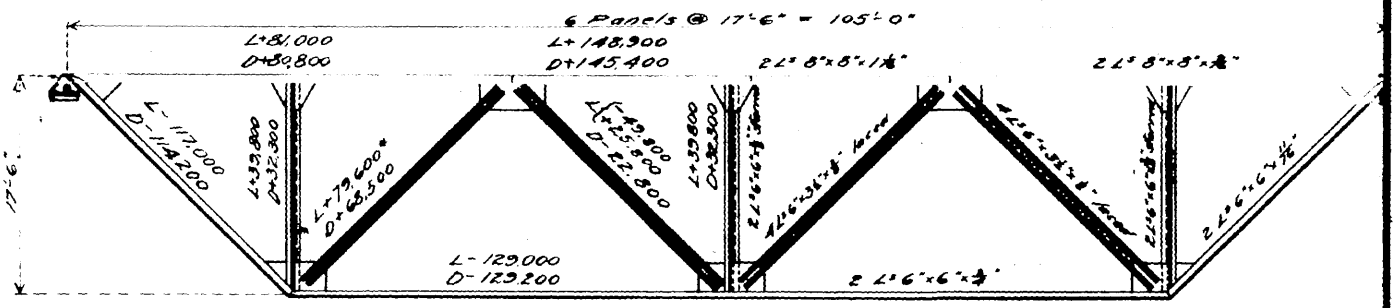


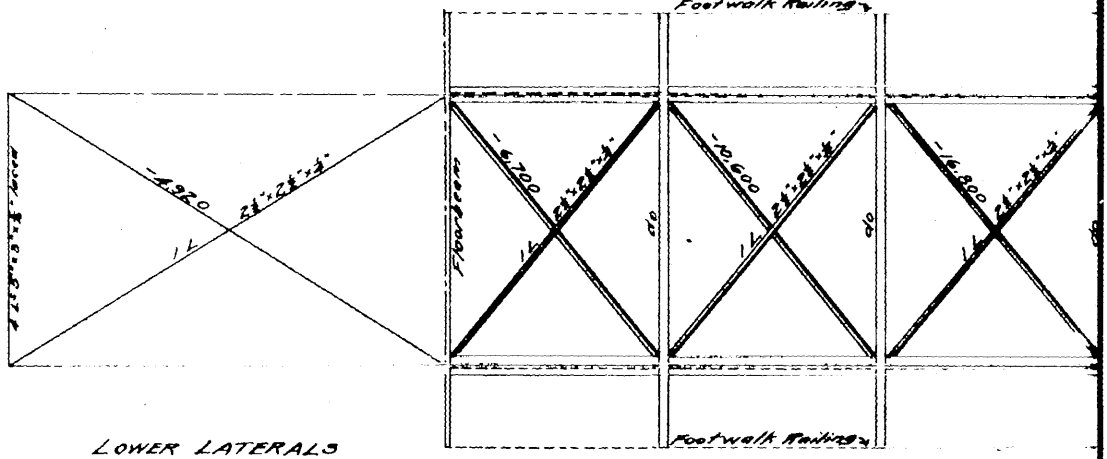
NOTE:
Elevations above Mean Sea Level
U.S.R.S. Datum.

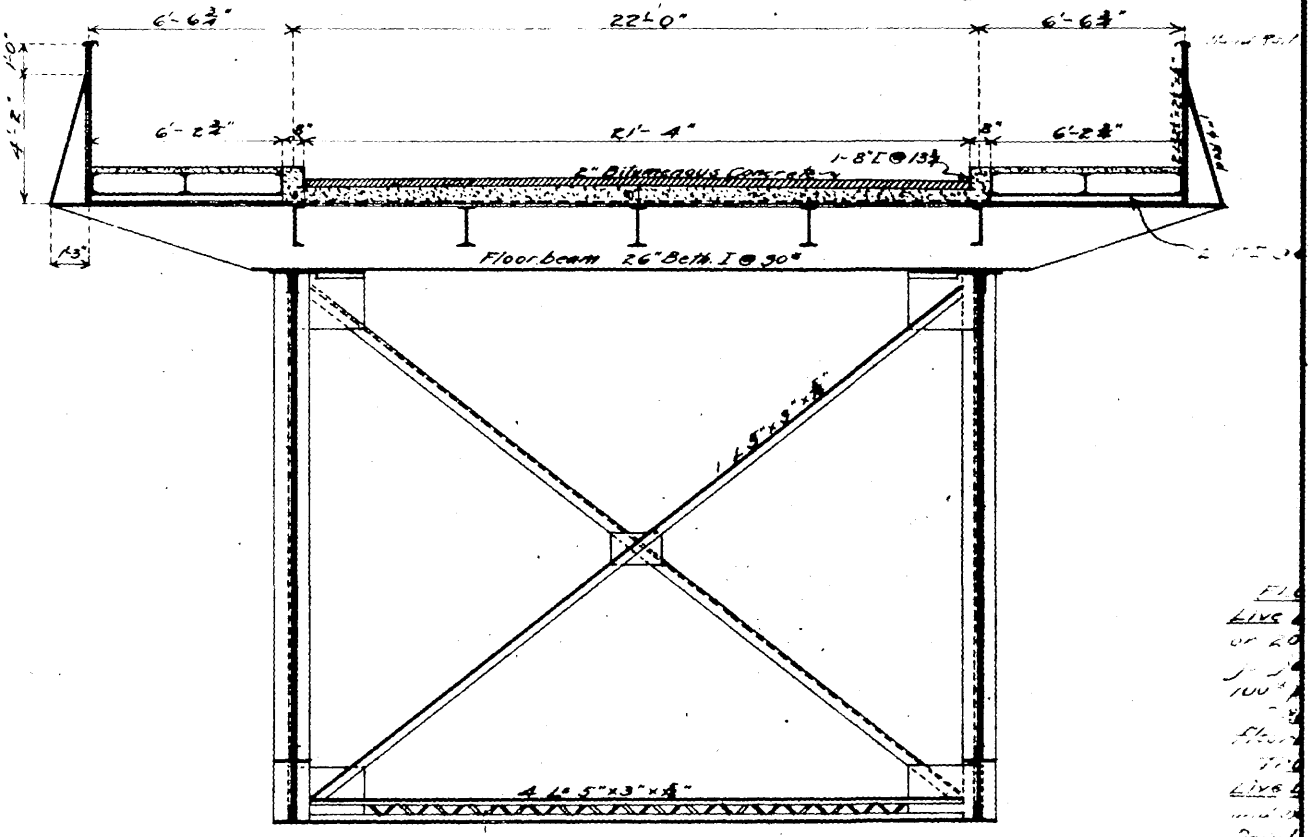
Commissioner of Indian Affairs.

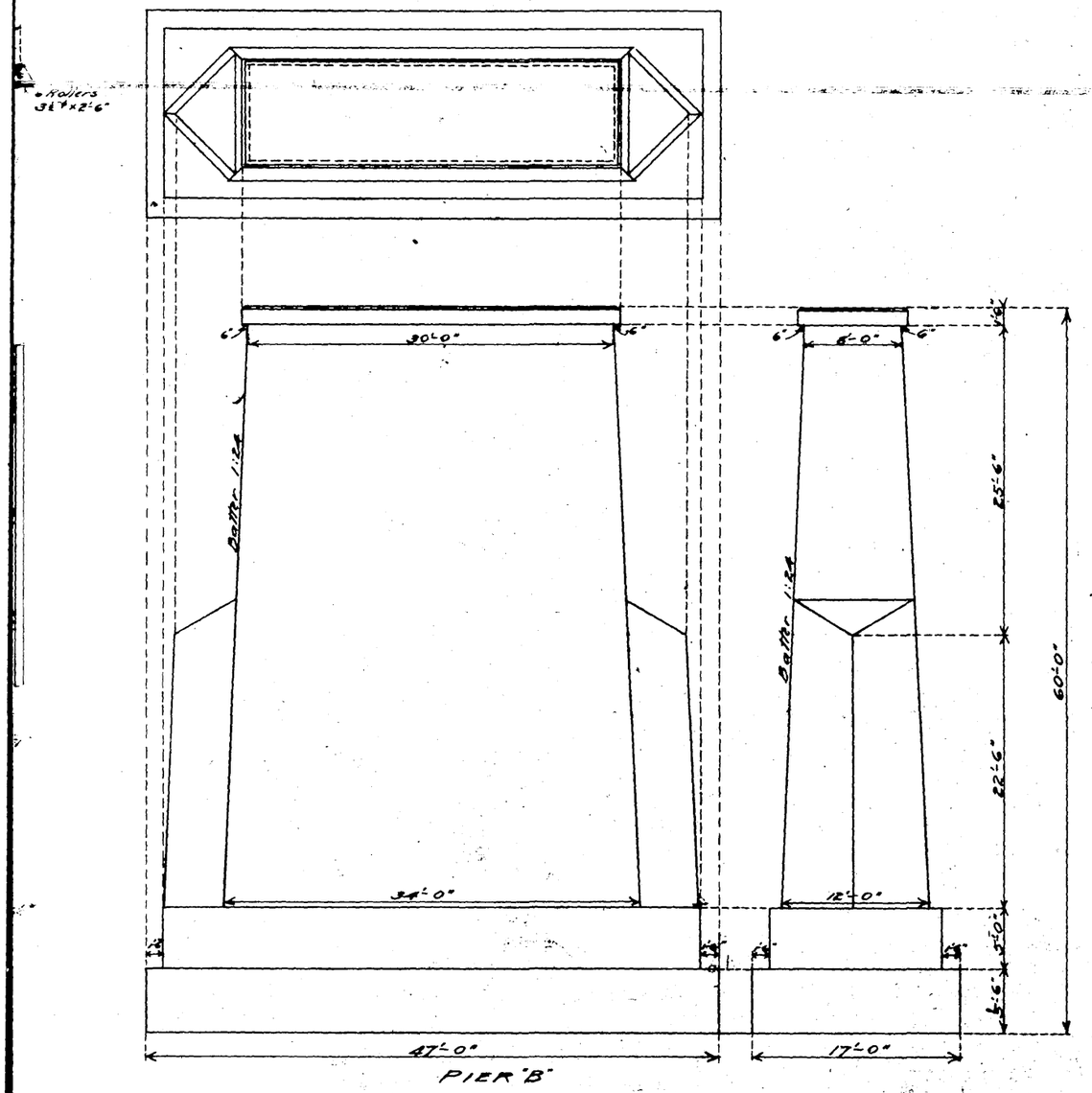
DEPARTMENT OF THE INTERIOR
OFFICE OF INDIAN AFFAIRS

[illegible] HIGHWAY BRIDGE
OVER COLORADO RIVER
AT
YUMA ARIZ.
FOUR SHEETS SHEET 1
GENERAL ELEVATION
April, 1914
Made by F.C.H.

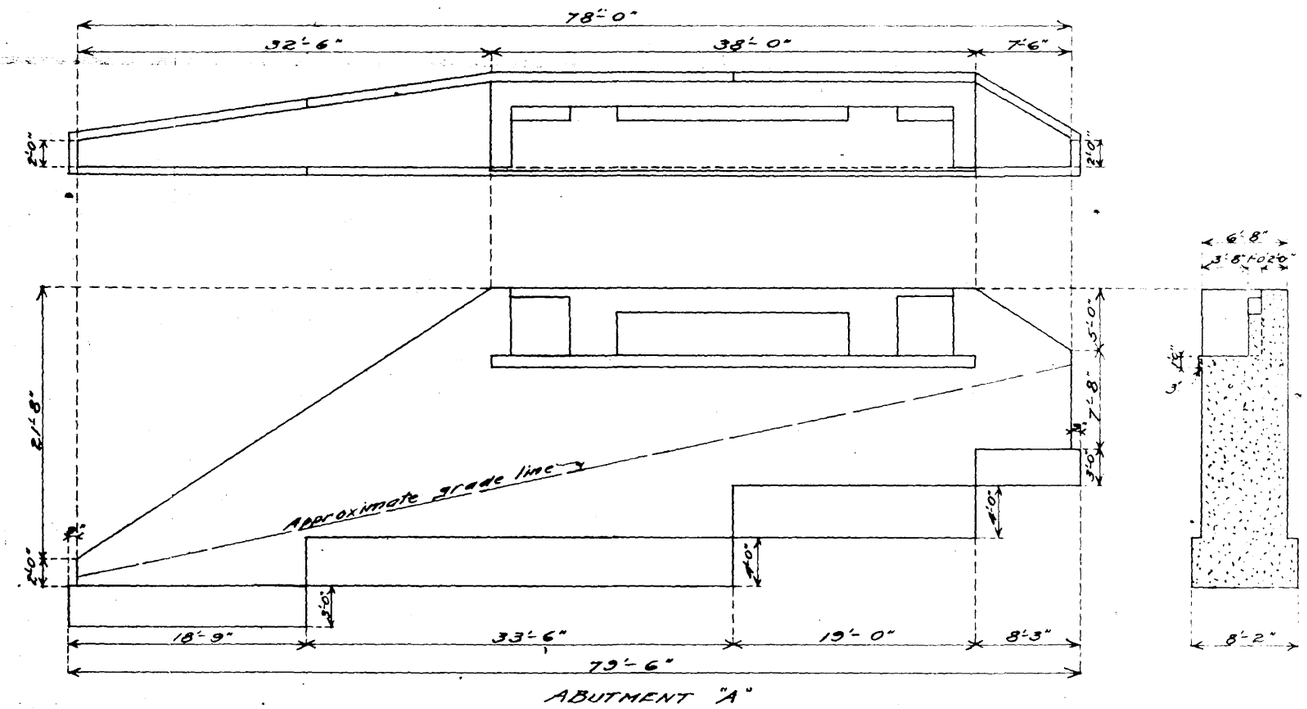

6 Panels @ 17'-6" = 105'-0"
L+81,000
D+89,800
L+148,900
D+145,400
2 L 8"x8"x1⅛"
2 L 8"x8"x⅞"
L-117,000
D-114,200
L+33,800
D+32,300
L+79,600"
D+65,500
L+43,900
D+22,800
L+33,800
D+32,300
17'-6"
L-129,000
D-129,200
2 L 6"x6"x⅞"
2 L 6"x6"x½"


Foot walk Railing
-4920
2½"x2½"x⅜"
-6,700
-10,600
-16,800
Foot walk Railing
LOWER LATERALS
UPPER LATERALS

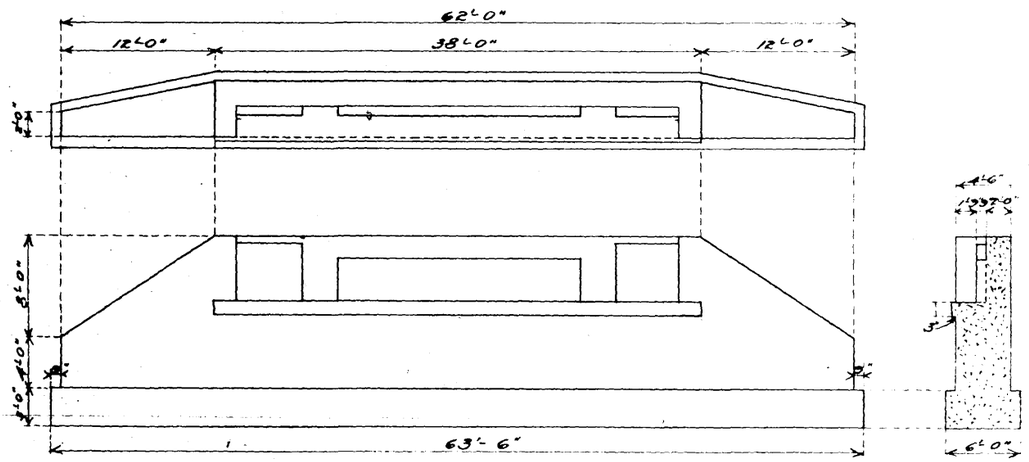

6'-6¾"
22'-0"
6'-6¾"
6'-2¾"
8"
21'-4"
8"
6'-2¾"
1'-0"
4'-2"
1-8"I @ 13½
5" Bituminous Concrete
Floor beam 26" Beth. I @ 30#
4 L 5"x3"x⅝"
SECTION



PIER "B"



ABUTMENT "A"



ABUTMENT "C"

SPAN No. 2

CAR LOADING

Load 125# per sq. ft. on roadway.
Tons on 2 axles 10' centers, 5' wheel
(14 Tons on rear axle); ¾ wheel ld. on one stringer.
[illegible] ft. on footwalks.
[illegible] actual weight of paving.
[illegible] and stringers.

[illegible] LOADING

[illegible] 3,100# per linear ft. of Span.
[illegible] load of 20,000# at any one point on span.
Load, 3700# per linear ft. of Span.

STRINGERS

Walks, 2-8" I's @ 18# 4-8" I's @ 13.75#
[illegible] 15" B[illegible] I's @ 38#, 2-15" I's @ 33#

DEPARTMENT OF THE INTERIOR
OFFICE OF INDIAN AFFAIRS

PROPOSED HIGHWAY BRIDGE
OVER COLORADO RIVER
AT
YUMA ARIZ.

FOUR SHEETS SHEET 3
STRESS SHEET SPAN No. 2
AND DETAILS OF SUBSTRUCTURE
Made by F.C.H. April, 1914

L+377,500
D+673,500

L+389,300
D+693,600

1 Cover Pl. 25"×¾"
2 L's 35"×34"×⅞"
2 Web Pls. 20"×⅜"
2 L's 6"×4"×½"

L+330,200
D+590,200

L-255,800
D-457,700

L-195,100
D-347,300

L-34,100
D-47,600

L-123,100
D-162,300

L-30,100
D-42,000

L-27,400
D-43,200

L-73,500

2 Bars 4"×⅜"

2 Bars 5"×⅞"

2 1/2"ϕ @ 25"

L-38,800
D-54,100

45'-10"

33'-6"

28'-9½"

15'-0" Clear

Crown of Roadway

8 Rollers 3½"ϕ×3'-4"

L-163,500
D-292,700

L-165,500
D-288,900

L-71,300
D-98,200

L-38,800
D-54,100

L-275,700
D-493,400

L-72,200
D-95,400

L-101,400
D-125,500

L-29,600

L-38,800
D-54,100

L-355,800
D-636,800

L-36,400
D-57,300

L-9,200
D-11,800

2 Bars 5"×⅝"

2 Bars 3"×⅜"

2 Bars 5"×⅞"

2 1/2"ϕ @ 25"

14 Panels @ 24'-0" = 336'-0"

4 Bars 7"×1¼"

℄ Footwalk Railing

End Floor Beam 44.5"×33"×⅜" Web

Anchor

Floor Beams

-67,000 2 L's 3½"×3½"×⅞"

-60,000 2 L's 3½"×2½"×⅜"

-50000 2 L's 3½"×2½"×⅜"

-40,300 2 L's 2½"×2½"×⅜"

-31,100 2 L's 2½"×2½"×⅜"

-22,300 2 L's 2½"×2½"×⅜"

-13,200 2 L's 2½"×2½"×⅜"

The Strut 44.5"×33"×⅜"

2 L's 2½"×2½"×⅜"

The Strut 44.5"×33"×⅜"

2 L's 2½"×2½"×⅜"

The Strut 44.5"×33"×⅜"

℄ Footwalk Railing

LOWER LATERALS

2 L's 5"×3½"×⅝"

2 L's 3½"×3½"×⅜"

2 L's 5"×3½"×⅝"

PORTAL

Hand Rail 3"

14"

10"

6'-6½"

5'-6½"

11L @ 6'-0"

9 @ 6'-0"

2'-0"

2" Bituminous Concrete

2 L's 3½"×2½"×⅜" & Web

Floor Beam 44.5"×33"×⅜" Web 36"×⅜"

Center Line of Bridge

FLOOR

4 L's 5"×3½"×⅝" Laced

4 L's 5"×3½"×⅝" Laced

SWAY BRACING

SPAN No. 1

FLOOR LOADING

Live Load 125 # per sq. ft. on
or 20 Tons on 2 axles 10' cente
gauge (14 Tons on rear axle)
100 # per sq. ft. on footwalks.
Dead Load, actual weight o
floorbeams and stringers.

TRUSS LOADING

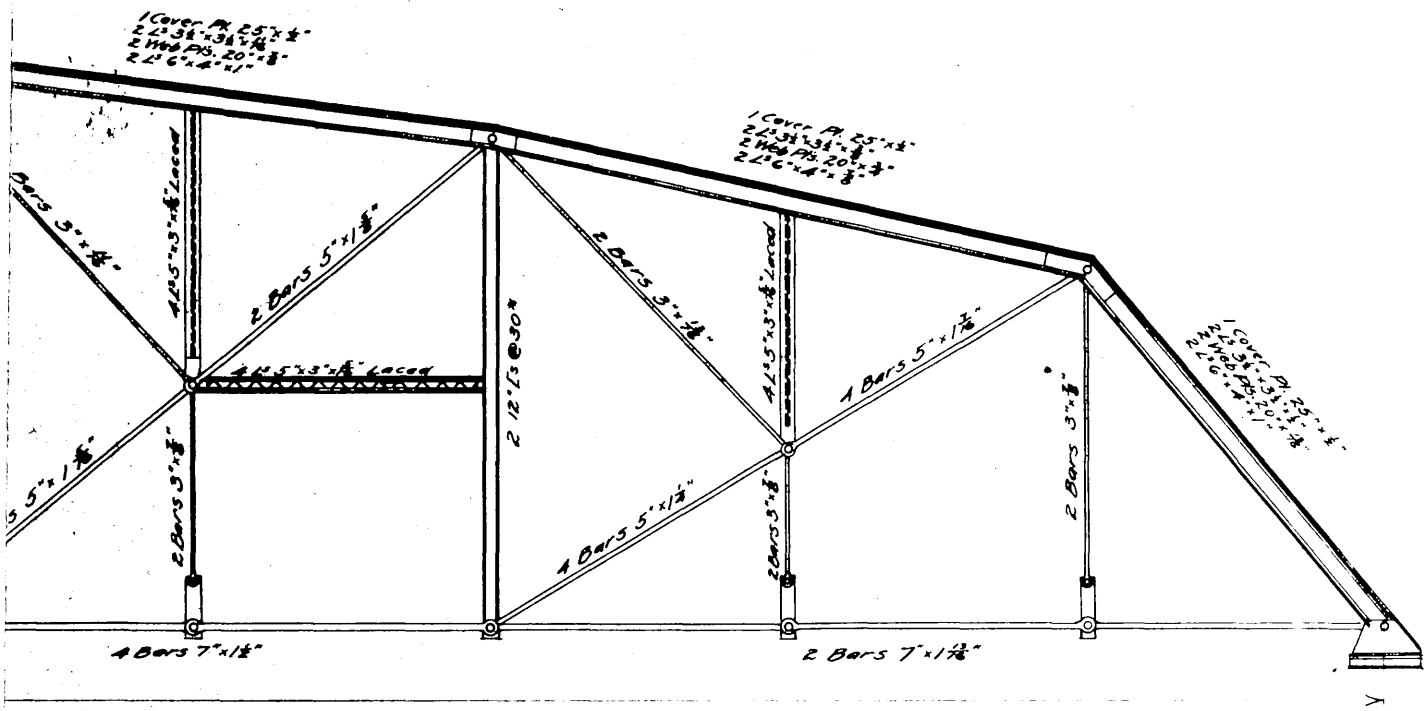
Live Load 2.400 # per linear
and excess load of 20.000 # a
Dead Load 4.510 # per linea

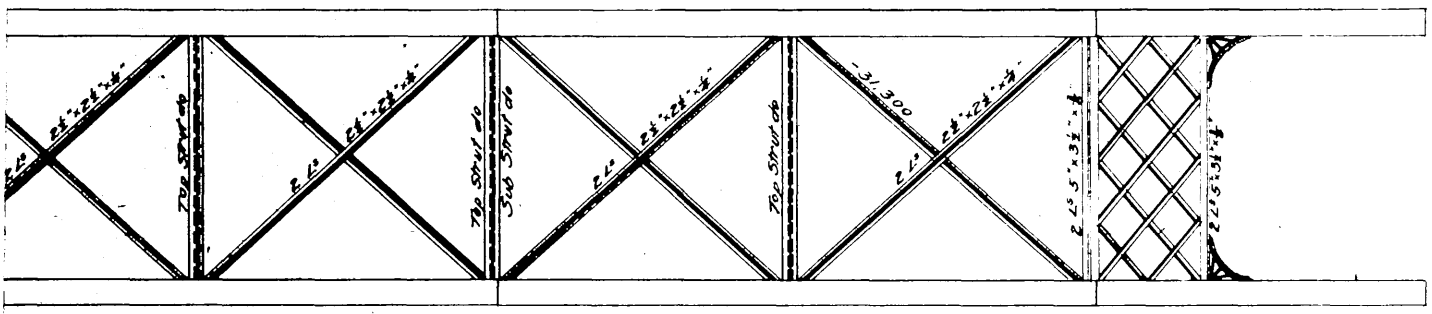
STRINGERS

Footwalks, 2-10" I's @ 30# a
Roadway, 5-18" Beth. I's @

CURB

1 Plate 36"×½"; 1 Plate 14"×⅝"





UPPER LATERALS

roadway,
's, 5' wheel
⅝ wheel load on one stringer.

f paving.

ft. of span,
t any one point on span.
- ft. of span.

10 L's @ 15'
48.5'

3 L's 3½"x2½"x⅜"

DEPARTMENT of the INTERIOR
OFFICE OF INDIAN AFFAIRS

PROPOSED HIGHWAY BRIDGE
OVER COLORADO RIVER
AT
YUMA ARIZ.

FOUR SHEETS SHEET 2
STRESS SHEET SPAN No. 1
Made by F.C.H. April, 1914.

PREV. LISTED

HABS/HAER INVENTORY

See "HABS/HAER Inventory Guidelines" before filling out this card.

1. NAME(S) OF STRUCTURE
Ocean-to-Ocean Bridge (Yuma Bridge; Penitentiary Avenue Bridge; Colorado River Bridge)
ADOT: 8533

2. LOCATION
Penitentiary Avenue over the Colorado River
Yuma; SW1/4 S25 T16S R22E
Yuma County, Arizona

3. DATE(S) OF CONSTRUCTION
1914-15

4. USE (ORIGINAL/CURRENT)
roadway bridge / roadway bridge

5. RATING
individually listed, NRHP: national signif.

6. CONDITION
good; sufficiency rating: 40.3
owner: Yuma County; City of Yuma

7. DESCRIPTION

span number : 1
span length : 336.0'
total length: 444.0'
roadway wdt.: 18.0'

superstructure: pin-connected steel, 14-panel Pennsylvania through truss w/ riveted Warren deck truss approach
substructure : concrete abutments and wingwalls w/ solid concrete piers
floor/decking : asphalt over concrete deck w/ steel stringers
other features: upper chord: 2 built-up plate channels w/ cover plate and double webbing; lower chord: 2 rectangular eyebars; vertical: 2 channels w/ webbing / 2 rectangular eyebars; diagonal: 4 rectangular eyebars; strut: 4 angles w/ double webbing; lateral bracing: 1 angle; steel lattice guardrails; commemorative plate: "1914, Built by Omaha Structural Steel Works..."

8. HISTORICAL DATA

After years of agitation by Yuma citizens, Arizona Representative Carl Hayden in 1913 passed a bill through Congress for the construction of a steel highway bridge over the Colorado River at Yuma. Ostensibly to provide a crossing for the Yuma Indian Reservation across the river in California, the Yuma Bridge was funded in part by the Office of Indian Affairs. The State of Arizona would contribute $25,000, as would Imperial County, California. OIA engineers in Washington designed this long-span through truss and located it at the foot of Prison Hill Road, near the Territorial Penitentiary. In June 1914, the agency contracted with the Omaha Structural Steel Works of Nebraska to fabricate and construct the bridge for $72,150. But the OIA engineers were unfamiliar with the vagaries of the Colorado River and problems arose soon after construction began in October. After the falsework was washed away twice that winter, Omaha opted to erect the truss on barges and float it into position. The truss was swung on March 3, the bridge opened to traffic on May 22. Since its replacement the bridge carries local traffic on the Ocean-to-Ocean Highway.

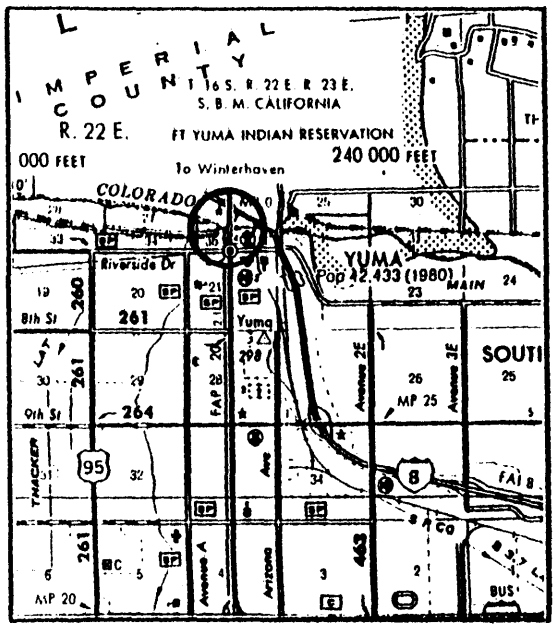
9. SIGNIFICANCE

The first train crossed the Colorado River on a bridge in September 1877, and the Yuma crossing has been a pivotal one for Southwest transportation since. The Penitentiary Avenue Bridge, located on a site originally intended for a railroad structure, formed a crucial link on the nationally important Ocean-to-Ocean Highway. "This is the first highway bridge built across the Colorado River in all its length," the Yuma Sun stated in May 1915. Although the writer neglected the bridges at the river's upper reaches in Colorado, the Yuma Bridge was the first highway span over the lower Colorado. Technologically, the bridge is significant on a statewide basis as the earliest and longest through truss, the only Pennsylvania truss and one of only five pin-connected trusses among Arizona's vehicular structures. Individually listed on NRHP in 1979, the Yuma Bridge is one of the most important early spans in the Southwest.

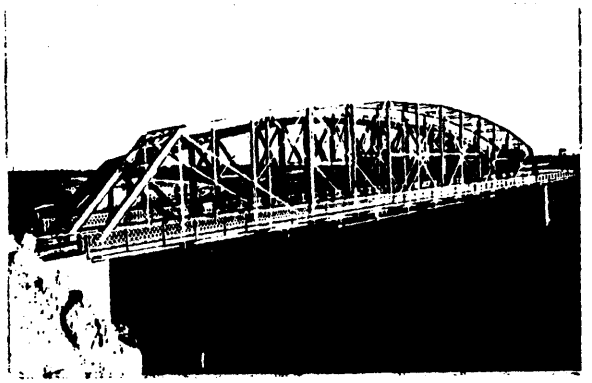
10. NAME(S) OF STRUCTURE

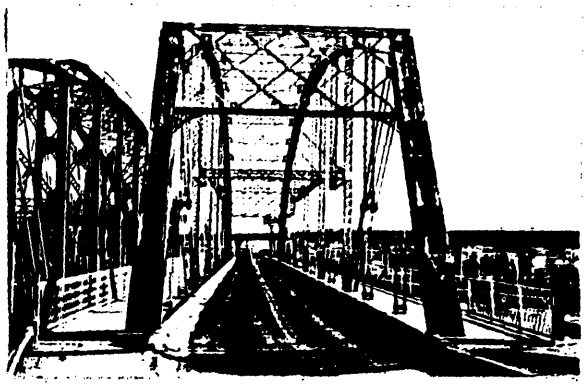
Ocean-to-Ocean Bridge (Yuma Bridge; Penitentiary Avenue Bridge; Colorado River Bridge)

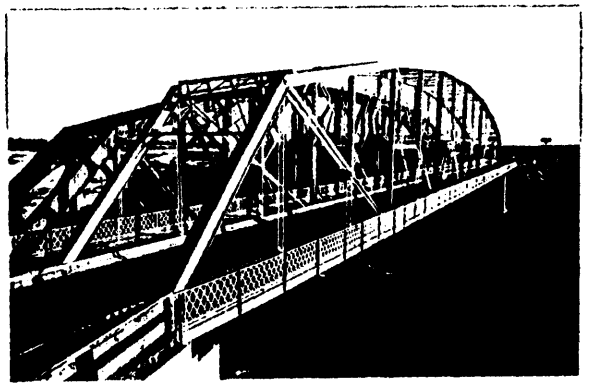
11. PHOTOS (W/ FILM ROLL & FRAME NO.) AND SKETCH MAP OF LOCATION



LOCATION MAP
TAKEN FROM DEPARTMENT OF TRANSPORTATION
GENERAL HIGHWAY MAP







12. SOURCES

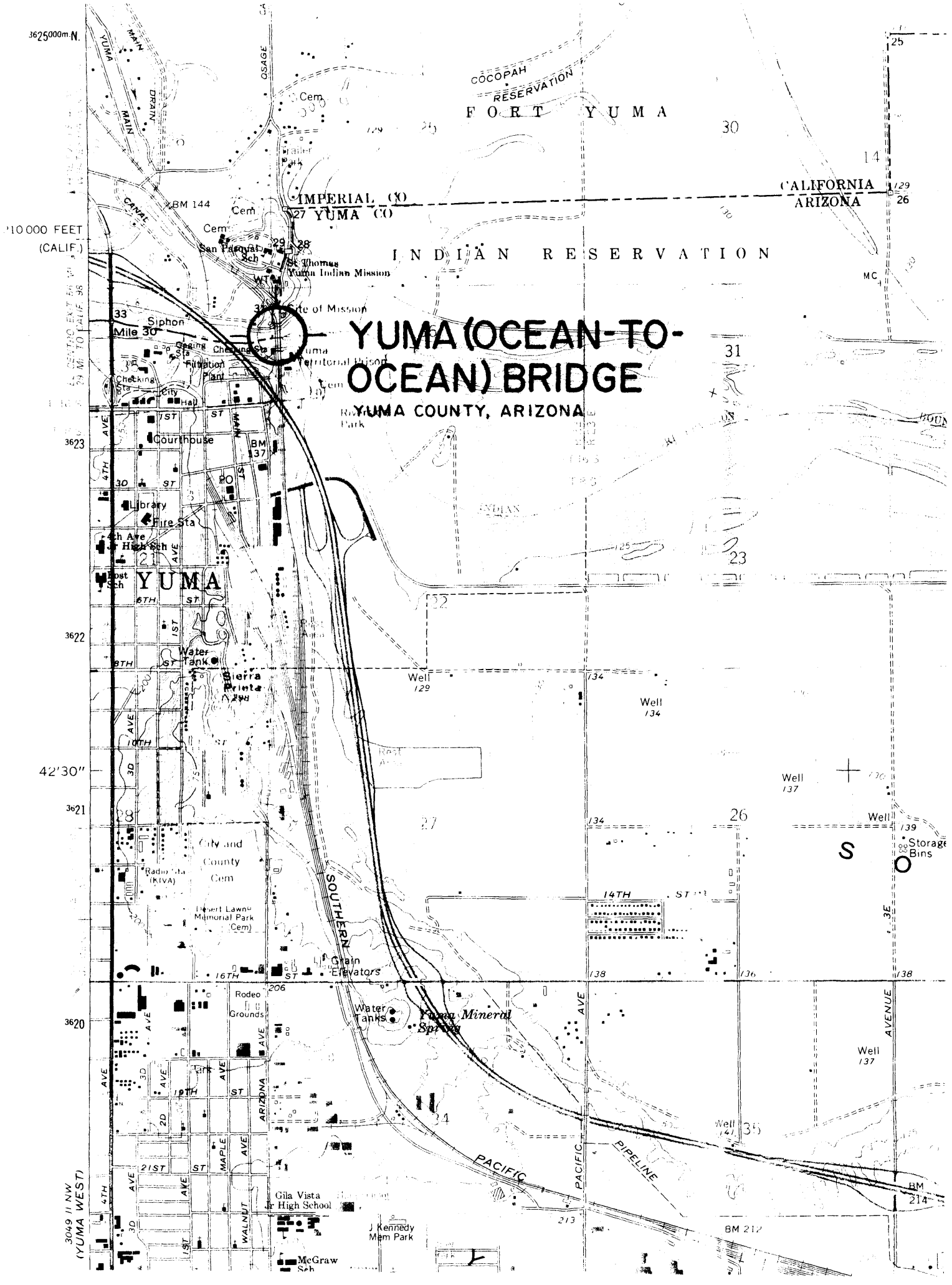
John W. Towle, "The Erection of the Yuma, Arizona, Bridge over the Colorado River," Arizona Highways: 7:1928:12-14.

U.S. Department of Interior, Office of Indian Affairs, "Proposed Highway Bridge over Colorado River at Yuma Arizona," original construction drawings, April 1914, Structures Section, Arizona Department of Transportation, Phoenix AZ.

Bridge Record, Arizona City Streets and County Roads: 8533; Structures Section, Arizona Department of Transportation, Phoenix, AZ.

Field inspection by Clayton B. Fraser, 10 December 1986.

13. INVENTORIED BY:	**AFFILIATION**	**DATE**
Clayton B. Fraser	Fraserdesign Loveland Colorado	1 April 1987


YUMA (OCEAN-TO-OCEAN) BRIDGE
YUMA COUNTY, ARIZONA
3625000m N.
10 000 FEET
(CALIF.)
42'30"
3623
3622
3621
3620
3049 II NW
(YUMA WEST)
FORT YUMA
INDIAN RESERVATION
COCOPAH
RESERVATION
CALIFORNIA
ARIZONA
IMPERIAL CO
YUMA CO
YUMA
Courthouse
Library
Fire Sta
Post Sch
4th Ave Jr High Sch
City and County Cem
Desert Lawn Memorial Park (Cem)
Radio Sta (KIVA)
Rodeo Grounds
Water Tank
Water Tanks
Yuma Mineral Spring
Grain Elevators
City Hall
Checking Sta
Siphon
Mile 30
Yuma Territorial Prison
Yuma Irrigation Project
St Thomas Yuma Indian Mission
San Pasqual Sch
Gila Vista Jr High School
Kennedy Mem Park
McGraw Sch
SOUTHERN PACIFIC
PACIFIC PIPELINE
Well
Storage Bins
BM 137
BM 214
BM 212
MAIN CANAL
MAIN DRAIN
YUMA MAIN CANAL
OSAGE CANAL