MISSOURI PACIFIC RAILROAD BRIDGE HAER No. LA-39
(Bridge Recall No. 023620)
Carries U.S. Route 165 (US 165) over Missouri Pacific Railroad
Bonita
Morehouse 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

# HISTORIC AMERICAN ENGINEERING RECORD
## MISSOURI PACIFIC RAILROAD BRIDGE
## (Bridge Recall No. 023620)

### HAER No. LA-39

**Location:** Carries U.S. Route 165 (US 165) over Missouri Pacific Railroad in Morehouse Parish, Louisiana.

The Missouri Pacific Railroad Bridge (Bridge Recall No. 023620) is located at latitude 32.886775 north, longitude -91.721346 west.[1] The coordinate represents the center 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:** The significance of the Missouri Pacific Railroad Bridge is directly related to its funding through the U.S. Works Program Grade Crossing Program during the Depression era to provide safe highway-railroad crossings. In the 1930s increased attention was given to creating grade separations between railway lines and roads, and specific legislation was passed to provide funds for highway-railroad grade separations through the National Industrial Recovery Act (1933), Hayden Cartwright Act (1934), and Emergency Relief Appropriation Act (1935). The U.S. Works Grade Crossing Program resulted from Federal Emergency Relief Appropriation (FERA) Act funding. This bridge's association with a federal Depression-era program is documented in Louisiana Highway Commission (LHC) biennial reports. The bridge exhibits alterations to the railing and removal of original blast plates that results in a minor loss of integrity, but continues to convey its significance as the work of the LHC using FERA funding. This bridge was determined eligible for the National Register of Historic Places (National Register) in 2013 under *Criterion A: Politics/Government* and *Transportation* at the state level of significance.[2]

**Historian:** Liz Boyer, 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 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 cultural resource specialist Liz Boyer of Mead & Hunt. Dietrich Floeter completed the photography.

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[1] The bridge is also known as Structure No. 05340160509191, and is labeled as the "Galion Overpass" on the original plans.

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

## Part I. Historical Information

### A. Physical History:

1. **Date(s) of construction:** 1938.[3]

2. **Engineer:** Louisiana Highway Commission.

3. **Builder/Contractor/Supplier:** Unknown.

4. **Original plans and construction:** Photocopies of the original plan sheets are available in the General Files room at the LADOTD's Baton Rouge headquarters. The main structural components of the bridge, as well as several small details, were based on LHC standard plans, including the main span, the approach spans, piers or bents, and the approach slab. These standard plans are all included in the as-built plan set. Only the blast plates appear to be designed specifically for this bridge. The plans were approved in December 1936.[4] The contract for U.S. Works Project 4351 was awarded on October 30, 1937, from FERA fund appropriations from 1935.[5] Construction began in 1937 and the bridge was completed in 1938.

5. **Alterations and additions:** This structure has incurred slight alterations, such as the removal of the blast plate assembly and installation of a curb-mounted guardrail on the inside of the railing along the full length of the bridge and its approaches. It has also undergone periodic routine maintenance, such as cleaning and painting.

### B. Historical Context:

*Historical background*

The Missouri Pacific Railroad Bridge is best understood as part of the federal initiative taken to ensure the safe crossing of railroad intersections in the 1930s. In the decades prior, the rise in vehicular traffic coupled with poorly marked train crossings, led to increasing numbers of serious accidents.[6] The Missouri Pacific Railroad Bridge represents the federal government's initiative to address a national safety issue through the elimination of railroad grade crossings.

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[3] Although bridge inspection reports indicate 1939, a stamp in the concrete on the guardrail references 1938.

[4] Louisiana Highway Commission, "Galion Overpass of Missouri Pacific Railroad," 1937, as-built plans, available in the General Files room, Louisiana Department of Transportation and Development, Baton Rouge, La.

[5] Louisiana Highway Commission, *Ninth Biennial Report of the Louisiana Highway Commission* (Louisiana Highway Commission, Baton Rouge, La, 1937, 36.

[6] American Road Builders Association, "Proceedings, American Road Builders Association, Report of Committee on Highway Intersections and Grade-Crossing Elimination," New Orleans, La., January 11-15, 1937, 76-79.

As part of the growth of American railroads after the Civil War, Louisiana railroad lines expanded significantly, in part a response to the developing regional timber industry.[7] Where roads and railroads met there was a danger of collision between trains and horse-drawn vehicles, and later automobiles. Various means were employed to facilitate safe crossings, including employing a watchman or signage or signals; sometimes no safety measures at all were employed.

The safest crossing was one separated by grade or elevation, with the roadway either above or below the railroad. Because it was far easier and cheaper to elevate a road than a railroad, a grade separation almost always meant constructing a vehicular (or pedestrian) bridge over the rail line. Early grade separation structures in the U.S. were concentrated in large industrial cities such as New York City and Buffalo, New York, where heavy traffic justified the cost of separating the two systems. New York City enacted legislation as early as 1903 to begin addressing the safety issue of grade separation of railroad crossings.

The introduction of affordable automobiles coupled with promotion of auto touring and the success of long-haul trucking during World War I put more vehicles on the road. More automobiles and trucks meant more roads and more railroad crossings. Accident rates at these crossings soared in the 1920s.[8] Improvements in automobile engineering resulted in higher driving speeds of 50 to 60 miles per hour, causing greater impact upon collision with higher fatality and severe injury rates and increased losses in property damages. In the 1920s and 1930s railroad grade crossing accidents were a growing concern for both highway departments and the public.

Through the 1920s railroad grade crossings were largely managed at a municipal or state level, with a percentage of the cost passed on to the railroad. The percentage of railroad share varied from state to state and could be 50 percent or higher. Urban grade separation projects were funded through city/railroad partnerships or city ordinances. In more rural areas the grade separation issue was dealt with by the state highway departments and the railroads.[9] Prior to the enactment of specific legislation to support grade separation projects, progress on addressing this national safety issue was slow due to the prohibitive costs.

The first authorization of federal funds for highway construction in the automobile era occurred in 1912 with the experimental rural post-road program, followed by the Federal-aid Road Act of 1916 that funded rural post roads. These programs were national but very limited and allocated modest funding that could

[7] R. Christopher Goodwin & Associates, Inc., *Transportation in Louisiana* (prepared for Office of Cultural Development, Department of Culture, Recreation, & Tourism, May 2012), 46. http://www.crt.state.la.us/Assets/OCD/hp/nationalregister/historic_contexts/Transportation_in_Louisiana.pdf (accessed October 7, 2016)

[8] Federal Highway Administration, "FHWA Handbook, Railroad-Highway Grade Crossing Handbook," revised second edition, August 2007, http://safety.fhwa.dot.gov/xings/com_roaduser/07010/sec01.htm (accessed May 7, 2016).

[9] American Road Builders Association, 76-79.

be expended for safety improvements at railroad grade crossings with a 50/50 match. Railroads were often required to pay the state's share or more. The Federal Highway Act of 1921 again provided federal aid, but was limited to a connected system of principal roads

Federal involvement expanded dramatically during the New Deal era when safety programs could be connected with large national employment programs.[10] Passage of New Deal work-relief legislation such as the National Industrial Recovery Act (NIRA) of 1933, the Hayden-Cartwright Act of 1934, and the FERA Act of 1935, provided funds for highway and bridge construction, including the elimination of the highway traffic hazards.[11] By 1935 federal and state highway officials acknowledged the crisis level of the situation and called for a national program of railroad grade crossing elimination as "a modern-day obligation."[12] In addition, Supreme Court decisions in the era called into question the existing system of placing much of the burden of grade separation cost on the railroads. Federal and state highway agencies responded to the crisis and accepted the cost burden in order to make progress in at-grade-crossing elimination projects.[13]

Additional work-relief programs included the Public Works Administration (PWA) in 1933 and the Works Progress Administration (WPA) in 1935 (renamed the Works Projects Administration in 1939). Both the PWA and WPA provided funds for grade crossing elimination; however the WPA emphasized the public safety issue. As the largest of the New Deal programs, the WPA employed millions of people on public works projects, including the construction of grade separation structures.[14] Associated programs such as the Works Progress Grade Crossing Program (1935-1936) and the Federal Aid Grade Crossing Program (1937-1941) were created solely for the purpose of eliminating what was considered a primary public menace. The New Deal programs earmarked funds for separating grades at crossings and the relocation of highways to eliminate railroad crossings. These projects resulted in a decrease in vehicular fatalities after 1935.[15]

Meanwhile, in 1920s Louisiana the newly formed LHC observed some reduction in railroad at-grade crossing accidents through participation in a safety campaign that educated the public on the dangers of crossings and promoted more effective warning signs at crossings. The LHC also promoted the elimination of grade crossings through cooperation among the LHC, the national Bureau of Public Roads, the parishes, and the railroad companies.[16] Early grade separation examples in Louisiana include those in Caddo Parish (1927) and LaSalle Parish (1932).

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[10] Nystrom, Justin A., "Progressive Era in Louisiana," *KnowLA Encyclopedia of Louisiana,* edited by David Johnson, Louisiana Endowment for the Humanities, 2010, article published March 30, 2011. http://www.knowla.org/entry/899/ (accessed September 5, 2016).

[11] Mead & Hunt, *Louisiana Bridge Historic Context*, Section 2, 24-25.

[12] American Road Builders Association, "Proceedings, American Road Builders Association," 76.

[13] American Road Builders Association, "Proceedings, American Road Builders Association," 77.

[14] Eric Arnesen, *Encyclopedia of U.S. Labor and Working-Class History,* (New York: Routledge), 2007, 1540.

[15] Federal Highway Administration, "FHWA Handbook, Railroad-Highway Grade Crossing Handbook."

[16] Louisiana Highway Commission, *Fourth Biennial Report of the Louisiana Highway Commission* (Baton Rouge, La.: Louisiana Highway Commission, 1928), 133.

The LHC was reorganized in 1928, soon after the election of Huey Long as governor. Long was a vocal supporter of infrastructure who envisioned an ambitious program of road and bridge construction within Louisiana. Long's programs became increasingly popular for the employment opportunities they afforded as the Great Depression began. However, the Long administration's financial support of capital improvements could not be sustained as the Depression deepened. Fortunately, much of the work was picked up by the new federal work-relief programs of the New Deal beginning with the NIRA in 1933.[17]

*Construction of the Missouri Pacific Railroad Bridge*

The LHC completed grade separation projects, including the Missouri Pacific Railroad Bridge, in several parishes from 1935 to 1939, with funding provided by the Works Progress Grade Crossing Program.[18] By 1939 the LHC had used federal relief funds to complete roughly 27 grade separation projects.[19] New Deal programs began to wind down at this time and came to an end as America became involved in World War II.[20]

The Missouri Pacific Railroad Bridge project was designed as Works Progress Grade Crossing Project Number W.P.G.H. 106-B and was also State Project 4351.[21] This project was initiated to remove the grade crossing on US 165/LA 14 with the mainline Missouri Pacific Railroad. The project also addressed the roadway alignment on either side of the bridge to improve the geometric approach. The bridge design, completed in December 1936, utilized LHC standard plans almost exclusively.[22] Funded by FERA fund appropriations from 1935, the bridge contract was awarded on October 30, 1937, for $93,878.19. Work began in 1937 and the bridge was completed in 1938, one of six grade separation projects under construction in Louisiana in 1937-1938.[23]

*Engineering background*

Grade separation structures were engineered to attain a minimum vertical clearance of 23'-0" for the vehicular bridge over the railroad tracks, while overcoming challenges specific to the site.[24] Within flat terrain at the Missouri Pacific Bridge site, it was necessary to create large earthen embankments to

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[17] Louisiana Highway Commission, *Seventh Biennial Report* (Baton Rouge, La.: Louisiana Highway Commission, 1934), 22.

[18] Mead & Hunt, Inc., *Louisiana Bridge Historic Context*, 26.

[19] Louisiana Highway Commission, *Ninth Biennial Report,* 84; Louisiana Highway Commission, *Tenth Biennial Report of the Louisiana Highway Commission*, (Baton Rouge, La.: Louisiana Highway Commission, 1939), 14.

[20] Mead & Hunt, Inc., *Louisiana Bridge Historic Context, 27.*

[21] Louisiana Highway Commission, "Galion Overpass of Missouri Pacific Railroad." The W.P.G.H. designation referred to Works Program Grade projects that were located on the federal highway system outside of municipalities, while W.P.G.M. described Works Program Grade projects on the federal highway system within municipalities.

[22] Louisiana Highway Commission, "Galion Overpass of Missouri Pacific Railroad."

[23] Louisiana Highway Commission, *Ninth Biennial Report,* 128, 36.

[24] R. Fresen, "Union Pacific Railroad – BNSF Railway Guidelines for Railroad Grade Separation Projects," Union Pacific Railroad – BNSF Railway Bridge Standards, January 5, 2016, https://www.up.com/cs/groups/public/documents/document/pdf_rr_grade_sep_projects.pdf (accessed May 9, 2016)

economically lengthen the approaches beyond the approach spans. The earthen embankments were designed with a specific footprint and carefully calculated slopes. Because the embankments would support the approach end bents, the new fill was allowed to settle for three months before pilings were driven. End bents of reinforced-concrete piling bents were used instead of conventional abutments. The square pilings were designed so the top portions could remain visible above ground, as in bents 2 and 9, while only the cap is visible above the end bents, 1 and 10.[25] Reinforced-concrete deck girder spans were used for the approaches with a steel-beam main span for the longer clear span necessary over the single railroad track

Another design consideration for grade separation structures constructed during the age of steam locomotives (1820s through 1950s), including the Missouri Pacific Railroad Bridge, was protection of the steel-beam main span from the blast of locomotive smoke below. According to a 1914 *Engineering News* article, “One of the greatest problems in the design of steel grade crossing bridges is the protection of the floor systems and lower chords against the sand blast action of the locomotive exhaust and the corrosive effect of the locomotive gases.”[26] If bridges were not protected, the locomotive blasts caused damage. Engineers addressed the blast problem in a variety of ways, such as ceramic or concrete coatings, special paint, and the installation of protective wrought-iron plates. Studies carried out in the early twentieth century concluded that wrought iron withstood the corrosive blasts better than any other material.[27] Further, it was concluded that the plates were needed only in the direct path of the locomotive exhaust stack. Consequently, wrought- or cast-iron blast plates were designed to be installed in a narrow path directly over the tracks. The plates could extend up the sides of any fascia girders or exterior structure to protect the sides of the bridge. The Missouri Pacific Railroad Bridge was constructed with iron blast plates installed over the path of the tracks below and extending up and around the sides of the fascia beams. Because the tracks were aligned in a skew to the bridge, the plates extended diagonally across and beneath the steel beams of the span.

[25] Louisiana Highway Commission, “Galion Overpass of Missouri Pacific Railroad.”

[26] A.W. Earl and Thomas Chance, “Protecting Steelwork Against Locomotive Blasts,” *Engineering News* 72, no. 16 (1914): 764.

[27] Earl and Chance, “Protecting Steelwork Against Locomotive Blasts,” 764.

## Part II. Structural/Design Information

### A. General Statement:

**1. Character:** The Missouri Pacific Railroad Bridge is a steel I-beam bridge with concrete deck and bents and concrete tee-beam approach spans and is a representative example of a grade separation bridge project.

**2. Condition of fabric:** Good.

**B. Description:** The bridge carries US 165 on an east-west alignment over the Missouri Pacific Railroad main line and utility lines. The railroad tracks are aligned southwest-northeast at the crossing, but the bridge is not skewed. As a grade-separation structure erected on a flat terrain, the bridge is engineered to achieve a 23'-0" clearance between the top of the rail and the lowest portion of the steel beam of the main span. The structure height is gained largely by building up fill to a depth of approximately 25' to meet the height of the two end bents that take the place of abutments in this bridge. The east and west roadway approaches on the fill from ground line to the end bents are designed on a five percent grade. The superstructure is designed with a linear vertical curve.

The bridge has nine spans, including a steel multi-beam main span and four reinforced-concrete deck girder approach spans on each side of the main span. Two concrete approach slabs provide transition between the end bents and the roadway. The overall structure length is 390'-9". The main span length is 70'-0", the eight girder spans are each 40'-9” long, and the concrete approach slabs are each 20'-0” long. The out-to-out deck width is 29'-0" and includes a 24'-0" roadway width of two traffic lanes, a 1'-0" concrete wheel curb on each side, and a 1'-6" concrete rail anchorage on each side.

*Main span with blast plates*
The main span has six 70'-0” rolled I-beams that are spaced at 4'-8" on center with a series of diaphragms in between. The concrete deck is cast directly on the steel beams. The main span rests on rocker bearings that are fixed at the west end and expansion at the east end.

Wrought-iron plates were originally mounted on the underside of the main span to form a protective blast plate. The as-built plans called for blast plate components (plates, nuts, anchor bolts, and washers) to receive red lead and graphite coatings to further protect against corrosive engine blasts. The as-built plans specify five plates be affixed in an approximately 10' wide panel running directly above the existing tracks and extending up the sides of the bridge. Clamps over the I-beams suspended the plates from the beams. Anchor assemblies (threaded sleeves and anchor bolts) embedded in the concrete railing base held the end plates at an angle. Additional anchor assemblies were specified in the plans to allow for expansion of the blast plate to accommodate future tracks under the bridge.

*Approach spans*
The approach spans are each comprised of a 20'-0" long reinforced-concrete deck slab with five tee-beams cast integral with the deck. The approach spans feature expansion material at joints with bents.

*Railing*

A concrete handrail base is cantilevered from the outside edges of the deck and 1'-0" high concrete curbs. Integral concrete brackets are located above each bent. The handrails, which are composed of precast rectangular concrete posts and two rectangular concrete rails, are mounted on the concrete rail base. A curb-mounted guardrail, which runs the length of each side of the bridge, is comprised of steel rails mounted on wood blocks, which are bolted to each concrete rail. The steel rails are bolted to wood posts where the guardrail extends onto the bridge approaches.

*Substructure*

The bridge's substructure consists of 10 reinforced-concrete bents that are numbered on the plans from 1 to 10 from west to east. Bents 3 through 8 feature two slightly tapered, square, reinforced-concrete columns with a 26'-0" wide reinforced-concrete cap with a flat arch. Each column has a 6'-0" square footing which rests on four driven pilings. Bents 5 and 6, located underneath the main span, feature a cap with risers to accommodate the difference in girder depths of steel and concrete. Bents 5 and 6 have a reinforced-concrete web wall that acts as a crash wall between the columns. The date "1938" is stamped in the center of the web wall. Bents 3, 4, 7, and 8 feature a 3'-0" wide, horizontal, reinforced-concrete strut between the columns.

Bents 1, 2, 9, and 10 each consist of square reinforced-concrete pilings driven directly below each girder and topped with a simple flat concrete cap. The pilings are constructed such that the upper portions may be visible above grade, as in bents 2 and 9. Bents 1 and 10, also identified as the end bents, are used in place of traditional abutments. Only the caps are exposed above the embankments.

Short reinforced-concrete wingwalls are cast integrally with the end bent caps and cantilevered out perpendicular with the roadway. Atop each wingwall is a stepped concrete pilaster that terminate the railings at each corner of the bridge. Each parapet is 3'-2" tall and 6'-0" wide and features a form panel with lettering that reads "U.S. Route 165" on the southwest and northeast pilasters and the year "1938" on the northwest and southeast pilasters. Stones pave the embankment and between the bents underneath the bridge on the east end.

**C. Site Information:** The bridge spans the Missouri Pacific Railroad bed in northeast Morehouse Parish, Louisiana. The bridge is located in a rural area about 3.5 miles southwest of the village of Bonita, which was established in the early 1890s when the railroad line was extended through the area.[28] With a mild climate and generally flat terrain, early industry in the area included ranching and farming. Today Bonita has 318 residents and the surrounding landscape retains its historically agricultural character. At the bridge's location, the Missouri Pacific Railroad channel consists of a single track on a 30'-0" wide gravel base spanned by the bridge. The channel, with its relatively shallow slope, is grassy with scattered rocks at the surface. A few deciduous trees are present in the channel. At this location, US 165 carries two lanes of vehicular traffic, one in each direction.

[28] Claire D'Artois Leeper, *Louisiana Place Names* (N.p.: Louisiana State University Press, 2012), 43, https://books.google.com/books/about/Louisiana_Place_Names.html?id=ZHeeUa0xNxcC (accessed May 5, 2016).

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## INDEX TO PHOTOGRAPHS

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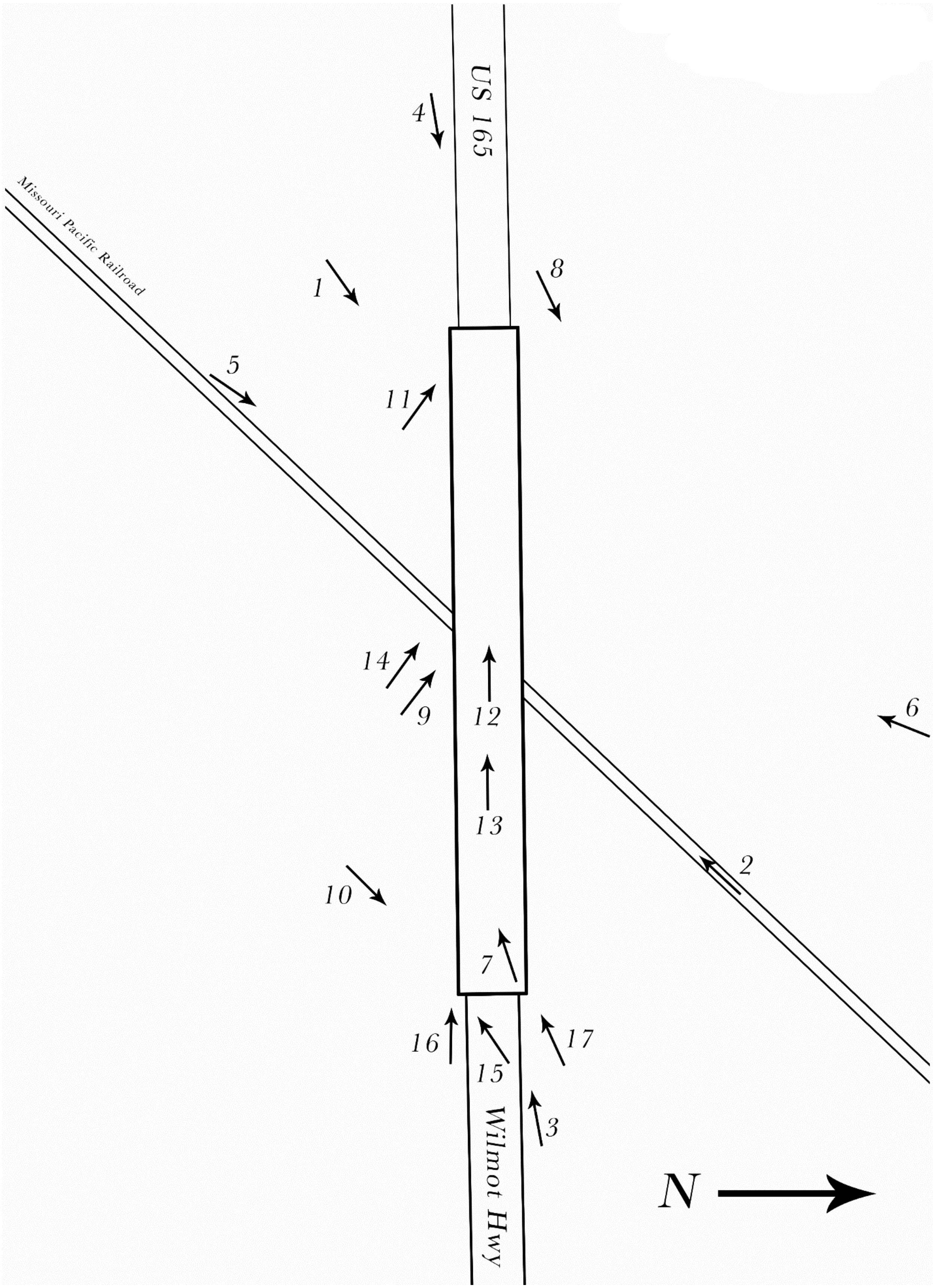
(Bridge Recall No. 023620)
Carries U.S. Route 165 (US 165) over Missouri Pacific Railroad
Bonita
Morehouse Parish
Louisiana

INDEX TO BLACK AND WHITE PHOTOGRAPHS

Dietrich G. Floeter, photographer, February and March 2016
Scale Device 8 Feet Long

| | |
|---|---|
| LA-39-1 | South elevation, from southwest |
| LA-39-2 | North elevation, from northeast |
| LA-39-3 | Detail view of deck and railings, from east |
| LA-39-4 | Detail view of deck and railings, from west |
| LA-39-5 | South elevation with 8-foot scale device, from southeast |
| LA-39-6 | Area view, from northeast |
| LA-39-7 | Detail view of deck and railings, from east |
| LA-39-8 | Detail of view to north from bridge, from southwest |
| LA-39-9 | Detail view of underside and bent cap, from southeast |
| LA-39-10 | Detail view of east end bent, from southwest |
| LA-39-11 | Detail view of west end bent, from southeast |
| LA-39-12 | Detail view of pier, on centerline with underside, from east |
| LA-39-13 | Detail view of underside, on centerline, showing concrete stringers, from east |
| LA-39-14 | Detail view of piers and railroad grade, from southeast |

| | |
|---|---|
| LA-39-15 | Detail of view to south from bridge, from northeast |
| LA-39-16 | Detail view of southeast parapet, from east |
| LA-39-17 | Detail view of northeast parapet with U.S. Route 165, from east |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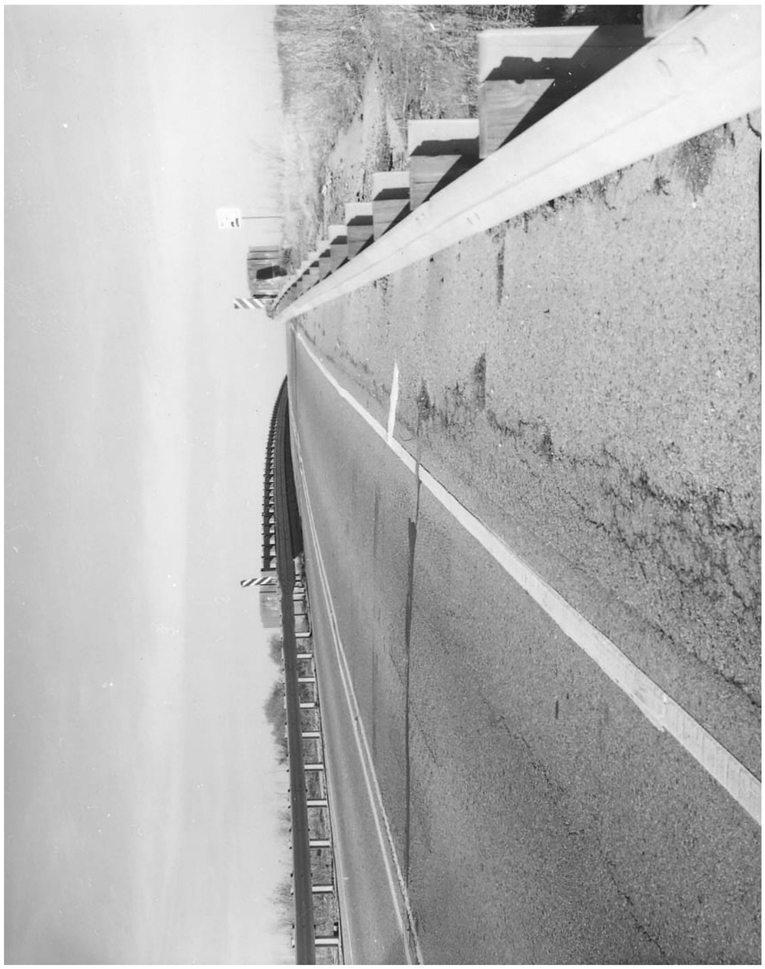
16
17

HISTORIC AMERICAN ENGINEERING RECORD
See Index to Photographs for Caption
HAER NO. LA-39-1

HISTORIC AMERICAN ENGINEERING RECORD
See Index to Photographs for Caption
HAER NO. LA-39-2

HISTORIC AMERICAN ENGINEERING RECORD
See Index to Photographs for Caption
HAER NO. LA-39-3



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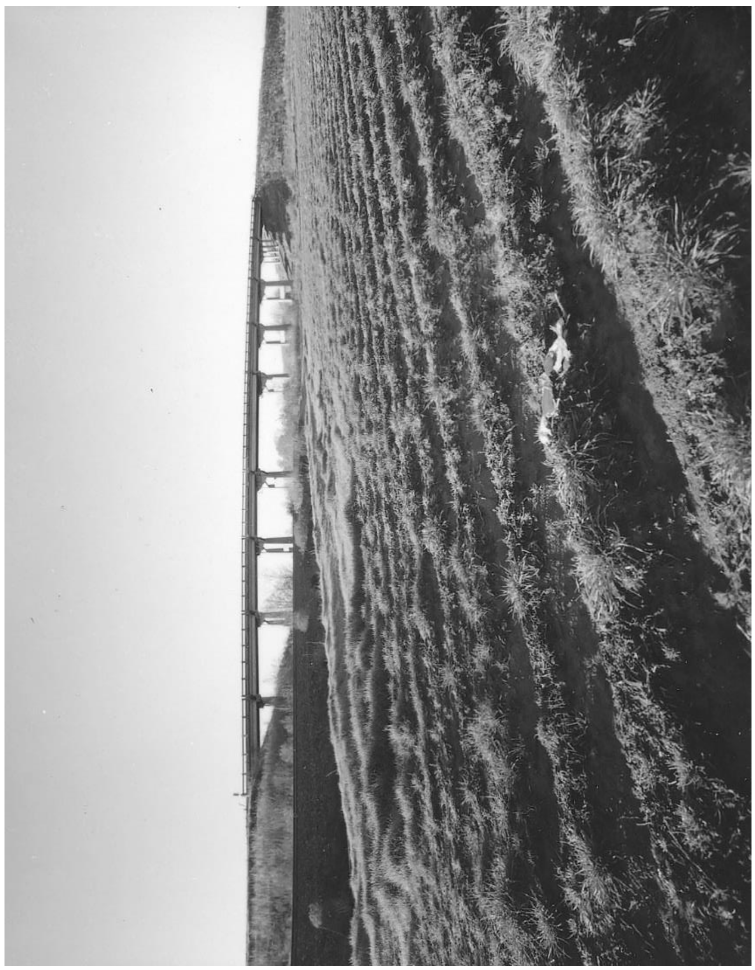
See Index to Photographs for Caption
HAER NO. LA-39-4

HISTORIC AMERICAN ENGINEERING RECORD
See Index to Photographs for Caption
HAER NO. LA-39-5

HISTORIC AMERICAN ENGINEERING RECORD
See Index to Photographs for Caption
HAER NO. LA-39-6



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See Index to Photographs for Caption
HAER NO. LA-39-7

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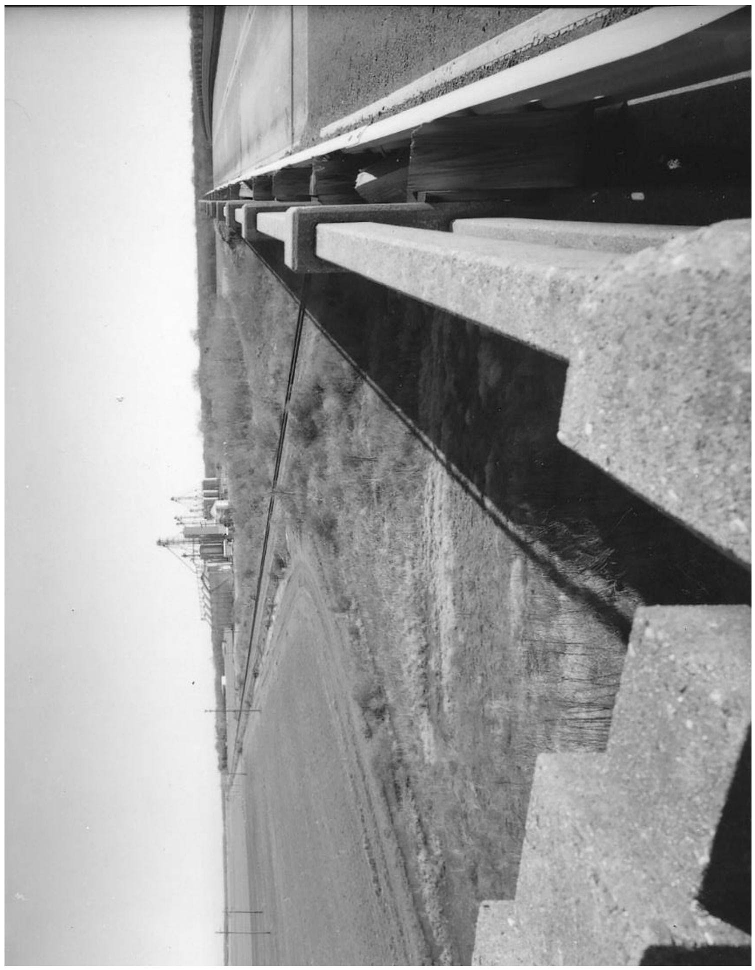
See Index to Photographs for Caption
HAER NO. LA-39-8



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See Index to Photographs for Caption
HAER NO. LA-39-9

HISTORIC AMERICAN ENGINEERING RECORD
See Index to Photographs for Caption
HAER NO. LA-39-10

HISTORIC AMERICAN ENGINEERING RECORD
See Index to Photographs for Caption
HAER NO. LA-39-11

HISTORIC AMERICAN ENGINEERING RECORD
See Index to Photographs for Caption
HAER NO. LA-39-12

HISTORIC AMERICAN ENGINEERING RECORD
See Index to Photographs for Caption
HAER NO. LA-39-13

HISTORIC AMERICAN ENGINEERING RECORD
See Index to Photographs for Caption
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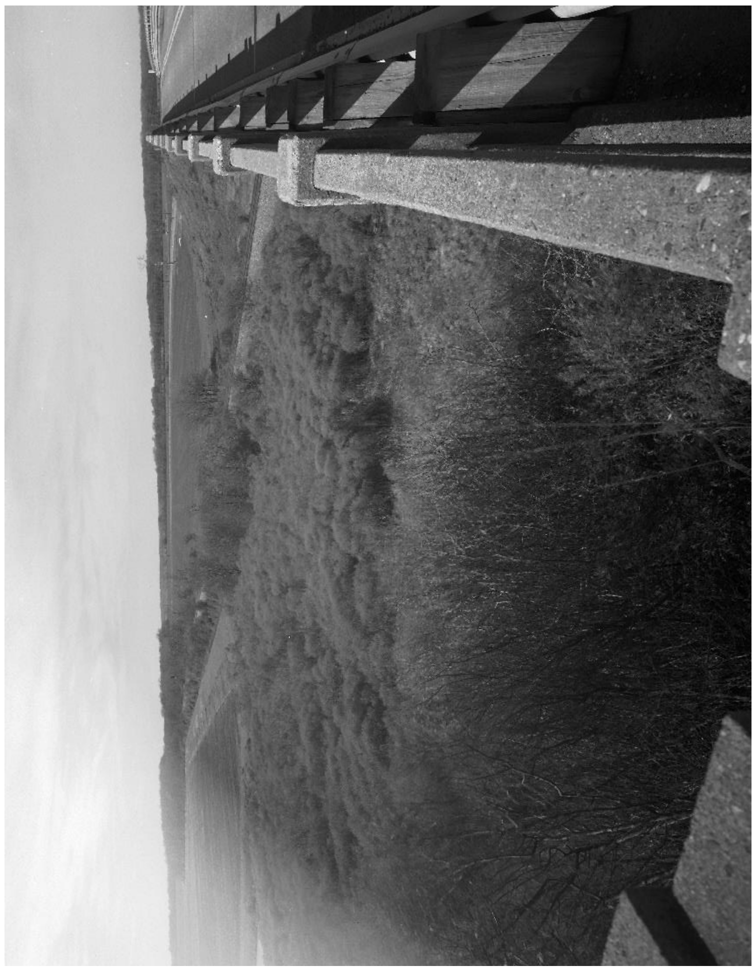

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See Index to Photographs for Caption
HAER NO. LA-39-16

HISTORIC AMERICAN ENGINEERING RECORD
See Index to Photographs for Caption
HAER NO. LA-39-17

HAER No. LA-39

6

INDEX TO SHEETS

# STATE OF LOUISIANA

# LOUISIANA HIGHWAY COMMISSION

## PLAN AND PROFILE OF PROPOSED

# STATE HIGHWAY

## GALION OVERPASS

STATE ROUTE Nº 14 OVER

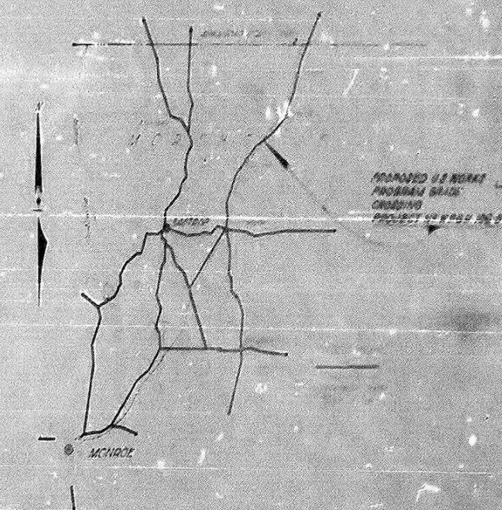
MO. PAC. RAILROAD

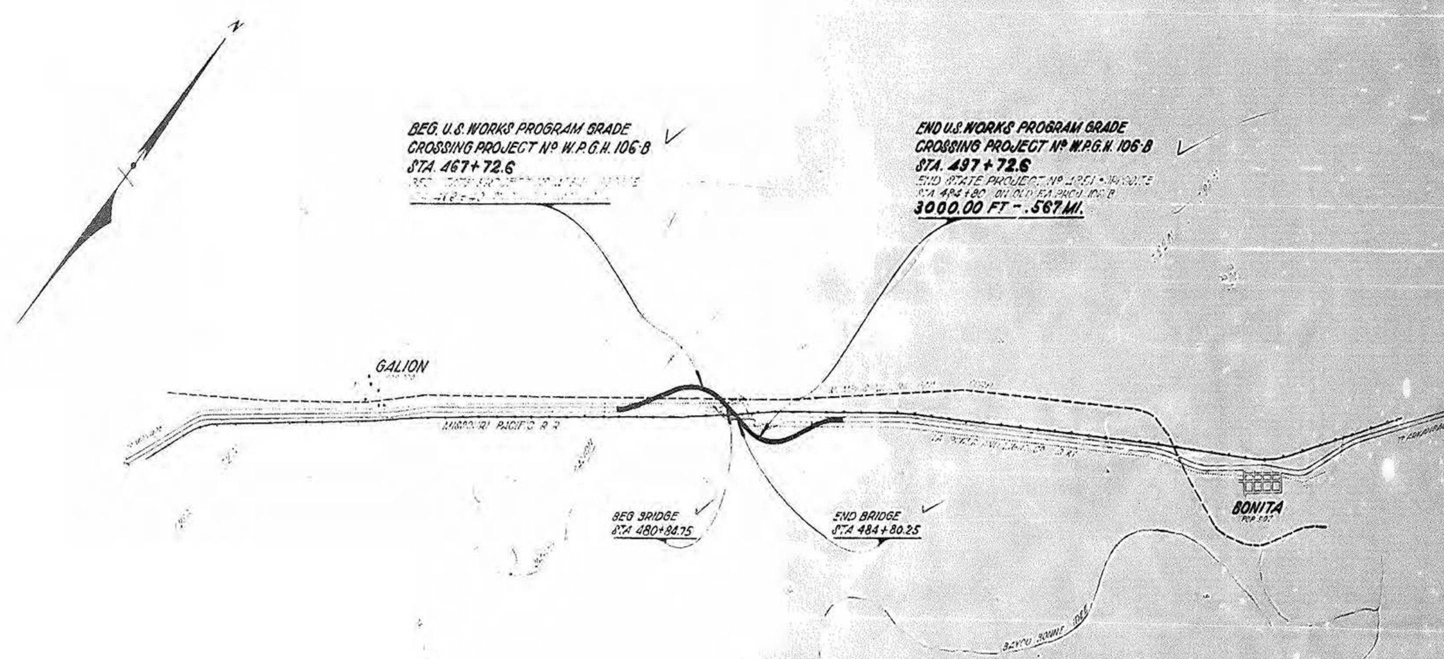
MONROE - ARK. STATE LINE HWY

MOREHOUSE PARISH

U.S. WORKS PROGRAM GRADE CROSSING PROJECT Nº W.P.G.H. 106-B

STATE PROJECT Nº 4351 → 16-05-07 New




NOTE BOOK Nº 13 524

SURVEYED BY
PLOTTED
TRACED
CHECKED
DATE

CONVENTIONAL SIGNS

LAYOUT MAP

SCALE: 1 INCH = 2640 FEET

| LENGTH OF U.S. WORKS PROGRAM GRADE CROSSING PROJECT Nº W.P.G.H. 106-B STATE PROJECT Nº 4351 | | | |
|---|---|---|---|
| STA. TO STA. | | ROADWAY | BRIDGE |
| 467+72.60 - 480+84.75 | | 1312.15 | |
| 480+84.75 - 484+80.25 | | | 395.50 |
| 484+80.25 - 497+72.60 | | 1292.35 | |
| | TOTAL FEET | 2604.50 | 395.50 |
| | TOTAL MILES | 0.493 | 0.074 |
| | GROSS LENGTH 3000.00' - 0.567 MI. | | |

SCHEDULE OF REVISIONS

H. S. Moore
Res. Eng.

APPROVED

APPROVED

[redacted]

RECOMMENDED FOR APPROVAL

[redacted]

RECOMMENDED FOR APPROVAL

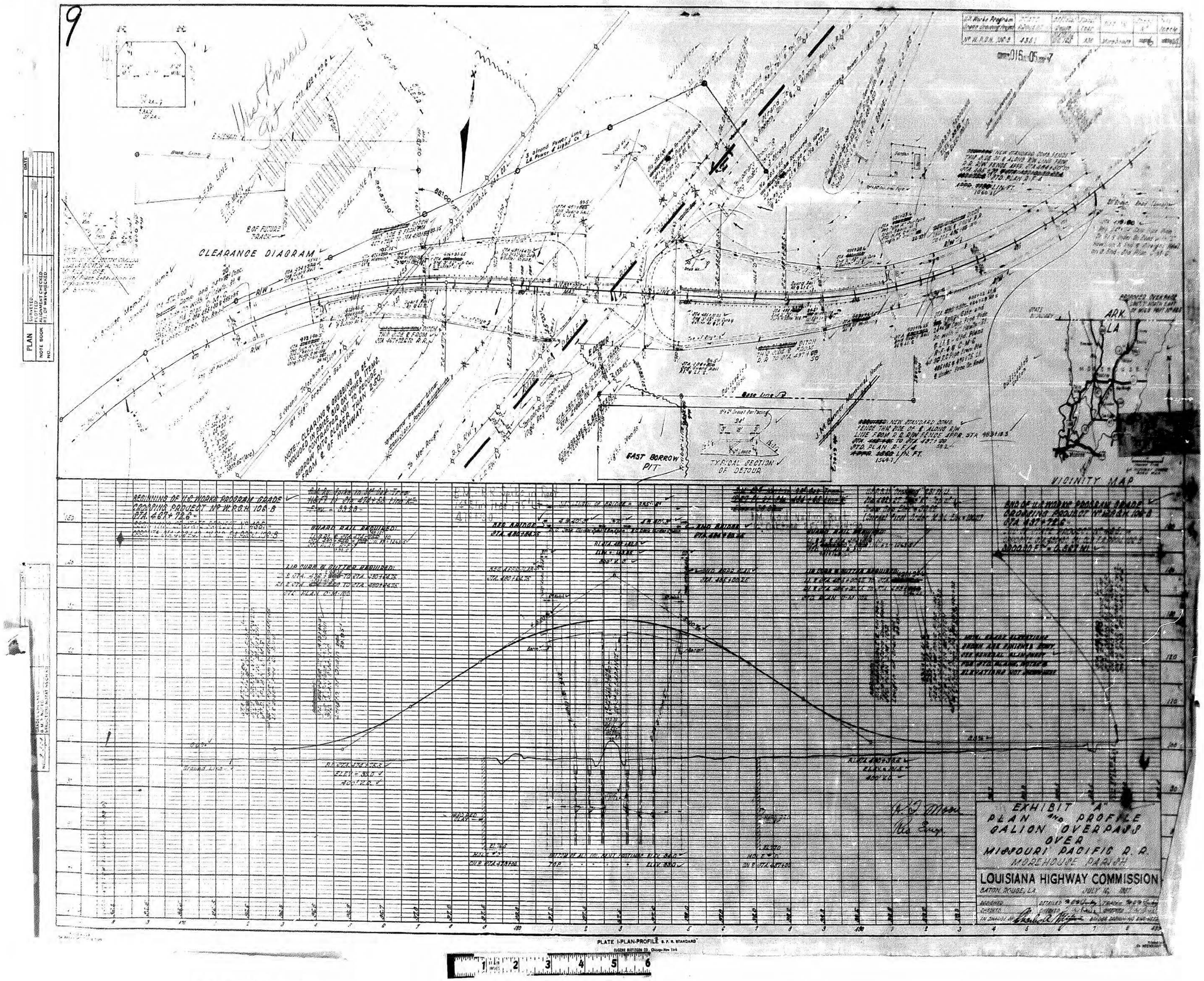
[redacted]

APPROVED

[redacted]

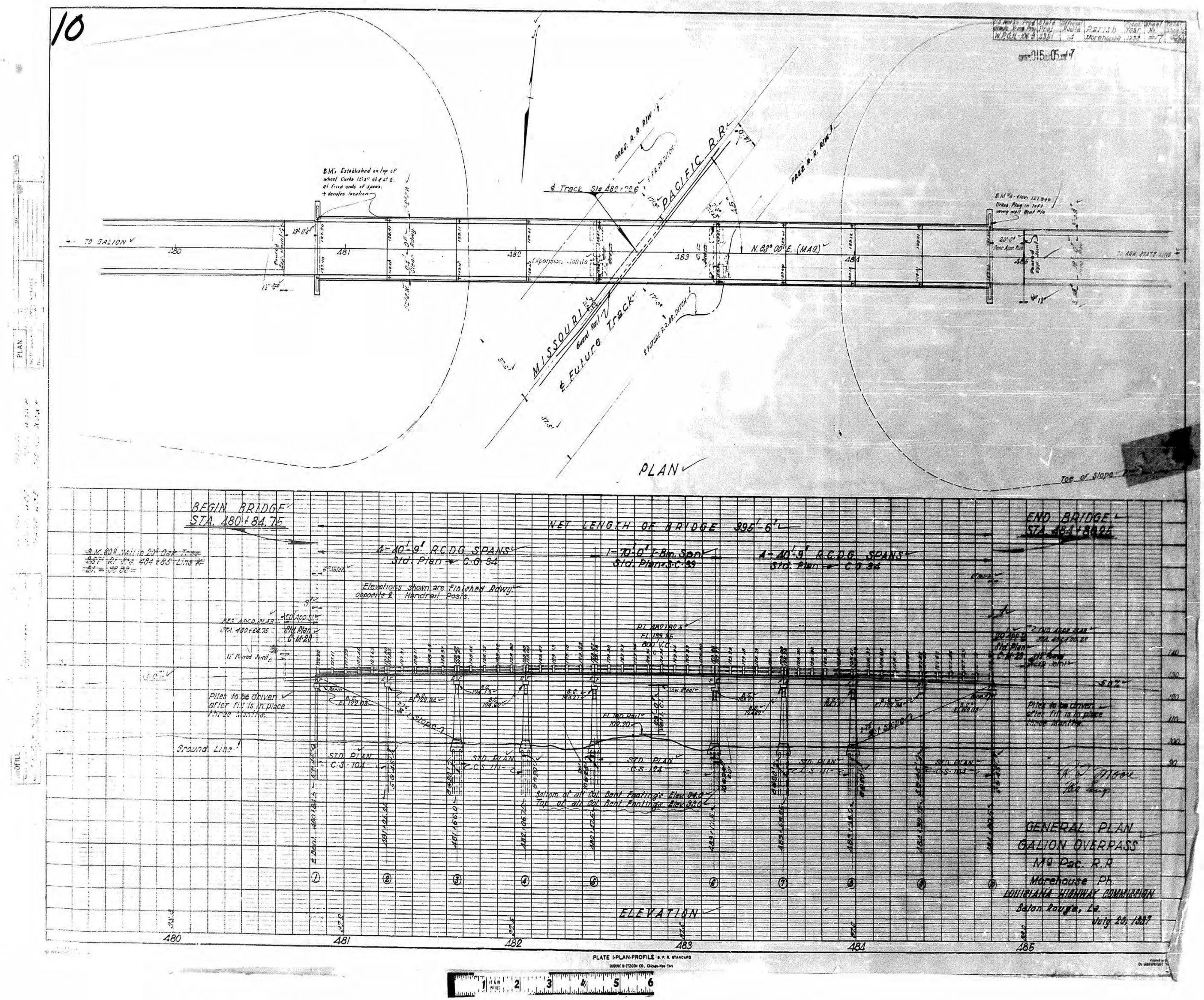
AS BUILT PLANS

HAER No. LA-39

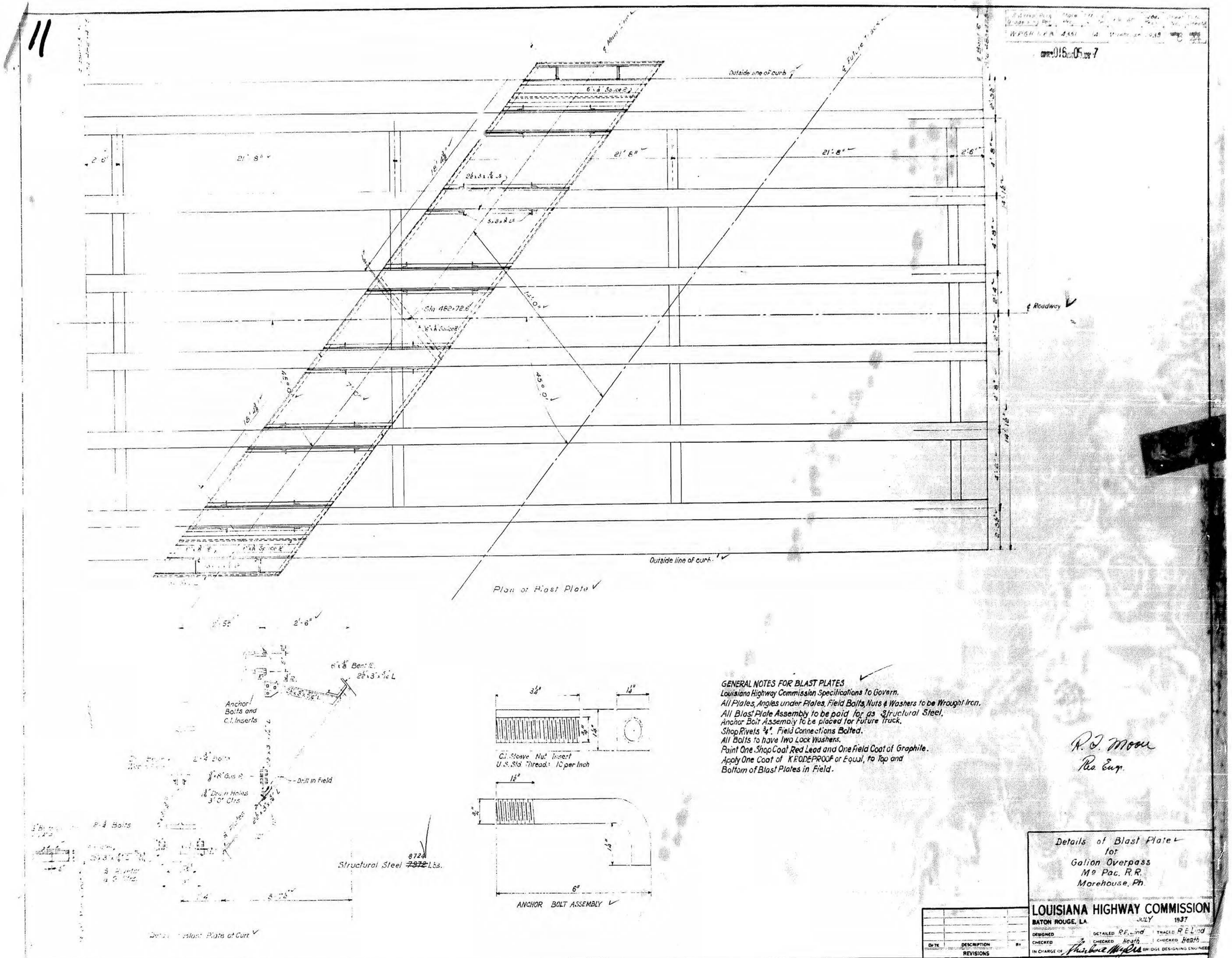



AS BUILT PLANS

HAER No. LA-39




AS BUILT PLANS

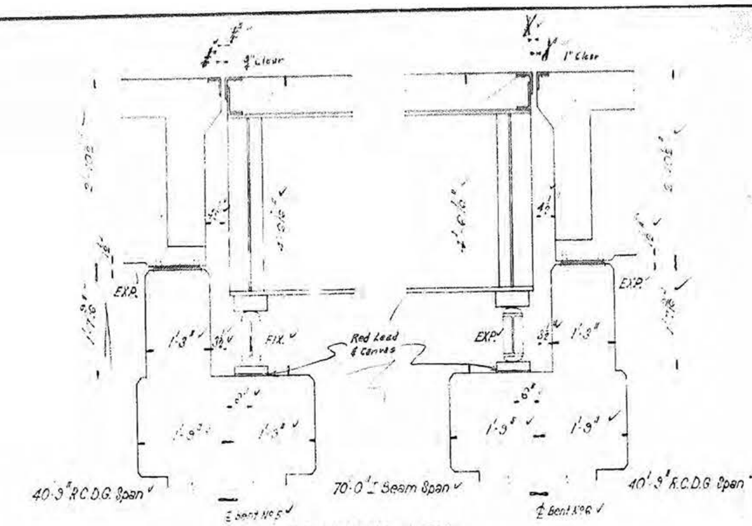



AS BUILT PLANS

HAER No. LA-39

12

| U.S. Works Program Grade Crossing Project | State Project | Official Route | Fiscal Year | Parish | Sheet |
|---|---|---|---|---|---|
| No. WPGH 106-B | 4351 | [illegible] | 1938 | Morehouse | [illegible] |




CONNECTION DETAIL

| ITEM / LOCATION | 4 | 5 | | 13 | 12 | 14.10 | 17AP, CP or EP | 36 X, B or E | 36.17 | 36.19A | 36.20A | 36.20B | 36.09 X or B | 18 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Roadway Excavation Cu. Yds. | Borrow Cu. Yds. | | Sodding Stations | Barbed Wire Fence Stations | R/W Markers No. Req. | Guard Rail Lin. Ft. | Concrete Pavement Sq. Yds. | Asphalt Filler Tons | Asphalt Filler (Alt) Tons | Fab. Reinf. Steel Pounds | Bar Reinf. Steel (Alt.) Pounds | Center Metal Strip Lin. Ft. | Signs No. Req. |
| WEST APPROACH | | ~~55557~~ | | 13.324 ~~13.12~~ | | 12 ~~9~~ | 1265.5 ~~1318~~ | 2586.36 ~~2684.30~~ | 0.0 ~~0.150~~ | ~~0.238~~ | 10.242 ~~10234~~ | 0.0 ~~15351~~ | 1293.2 ~~1292~~ | |
| BENTS 1,2,9 & 10 | | | | | | | | | | | | | | |
| BENTS 3 TO 5, 6 TO 8 | | | | | | | | | | | | | | |
| SPANS 1 TO 4, 6 TO 9 | | | | | | | | | | | | | | |
| SPAN 5 | | | | | | | | | | | | | | |
| BLAST PLATES | | | | | | | | | | | | | | |
| EAST APPROACH | ~~36~~ | ~~60630~~ | | 13.116 ~~12.92~~ | 26.25 ~~27.80~~ | 12 | 1261.5 ~~1218~~ | 2545.74 ~~2544.70~~ | 0.0 ~~0.147~~ | ~~0.233~~ | 10081 ~~10077~~ | 0.0 ~~15116~~ | 1272.8 ~~1272~~ | 2 |
| TOTAL BRIDGE | | | | | | | | | | | | | | |
| TOTAL APPROACH | [illegible] ~~36~~ | 86,163 ~~106187~~ | | 27.640 ~~26.04~~ | * 26.25 ~~27.80~~ | 24 ~~21~~ | 2527 ~~2536~~ | 5132.10 ~~5129.00~~ | 0.0 ~~0.297~~ | 1.317 ~~0.471~~ | 20323 ~~20311~~ | 0.0 ~~30467~~ | 2566 ~~2564~~ | * 2 |
| GRAND TOTAL | [illegible] ~~36~~ | 86,163 ~~106187~~ | | 27.640 ~~26.04~~ | * 26.25 ~~27.80~~ | 24 ~~21~~ | 2527 ~~2536~~ | 5132.10 ~~5129.00~~ | 0.0 ~~0.297~~ | 1.317 ~~0.471~~ | 20323 ~~20311~~ | 0.0 ~~30467~~ | 2566 ~~2564~~ | * 2 |

| ITEM / LOCATION | 60 | 61 | 66 | 70 | 70S | 90A | 90B | 93L | 94 | 116 | 136 | 51 | 48.0 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Class "A-A" Concrete Cu. Yds. | Class "A" Concrete Cu. Yds. | Deformed Reinf. Steel Pounds | Fab. Struct. Steel (Carbon) Pounds | Fab. Struct. Steel (Silicon) Pounds | 14" Precast Conc. Piles Lin. Ft. | 16" Precast Conc. Piles Lin. Ft. | Loading Test Piles No. Req. | Unloaded Concrete Test Piles No. Req. | Comb. Conc. Curb & Gutt. Lin. Ft. | Structural Excavation Cu. Yds. | [illegible] Lin. Ft. | 24" Conc. Pipe Lin. Ft. |
| WEST APPROACH | 20.20 ~~19.53~~ | 1.72 | 2755 ~~2697~~ | | | | | | | 1178.50 ~~1084.80~~ | | 40 ~~36~~ | |
| BENTS 1,2,9 & 10 | 1.66 ~~1.22~~ | 28.82 ~~23.30~~ | 5010 ~~5124~~ | | | | 990 | 2 | 16" @ 40' 2 | | | | |
| BENTS 3 TO 5, 6 TO 8 | | 235.52 ~~236.06~~ | 32080 ~~32042~~ | | | 1040 ~~1140~~ | | 1 ~~2~~ | 14" @ 35' 2 | | 123.25 ~~137~~ | | |
| SPANS 1 TO 4, 6 TO 9 | 404.06 ~~404.07~~ | | 118940 ~~118730~~ | 6832 ~~6530~~ | | | | | | | | | |
| SPAN 5 | 58.23 | | 10989 ~~10899~~ | 5789 ~~4670~~ | 53511 ~~53352~~ | | | | | | | | |
| BLAST PLATES | | | | 8724 ~~7372~~ | | | | | | | | | |
| EAST APPROACH | 20.33 ~~19.78~~ | 5.41 | 2826 ~~2781~~ | | | | | | | 1141.70 ~~1034.80~~ | | 40 ~~36~~ | 24 |
| TOTAL BRIDGE | 463.95 ~~463.32~~ | 264.34 ~~265.36~~ | 167025 ~~166355~~ | 21345 ~~19232~~ | 53511 ~~53352~~ | 1040 ~~1140~~ | 990 | 3 ~~4~~ | 4 | | 123.25 ~~137~~ | | |
| TOTAL APPROACH | 40.53 ~~33.31~~ | 7.13 | 5581 ~~5478~~ | | | | | | | 2321.20 ~~2119.60~~ | | 80 ~~72~~ | 24 |
| GRAND TOTAL | 504.48 ~~502.80~~ | 271.47 ~~272.49~~ | 172606 ~~172433~~ | 21345 ~~19232~~ | 53511 ~~53352~~ | 1040 ~~1140~~ | 990 | 3 ~~4~~ | 4 | 2321.20 ~~2119.60~~ | 123.25 ~~137~~ | 80 ~~72~~ | 24 |

~~NOTE: Pile Lengths Shown Are For Estimating Purposes Only.~~
* Non Participating Item.

LIST OF MISCELLANEOUS STRUCTURES

| [illegible] | REMARKS |
|---|---|
| [illegible] | [illegible] |

R. J. Moore
Res. Eng.

**U.S. WORKS PROGRAM**
**GRADE CROSSING PROJECT No. WPGH 106-B**

Required lettering for Project Sign - See Std. Plan R-S-6 - Two signs required.

SUMMARY SHEET
GALION OVERPASS
OVER
MISSOURI PACIFIC R.R.

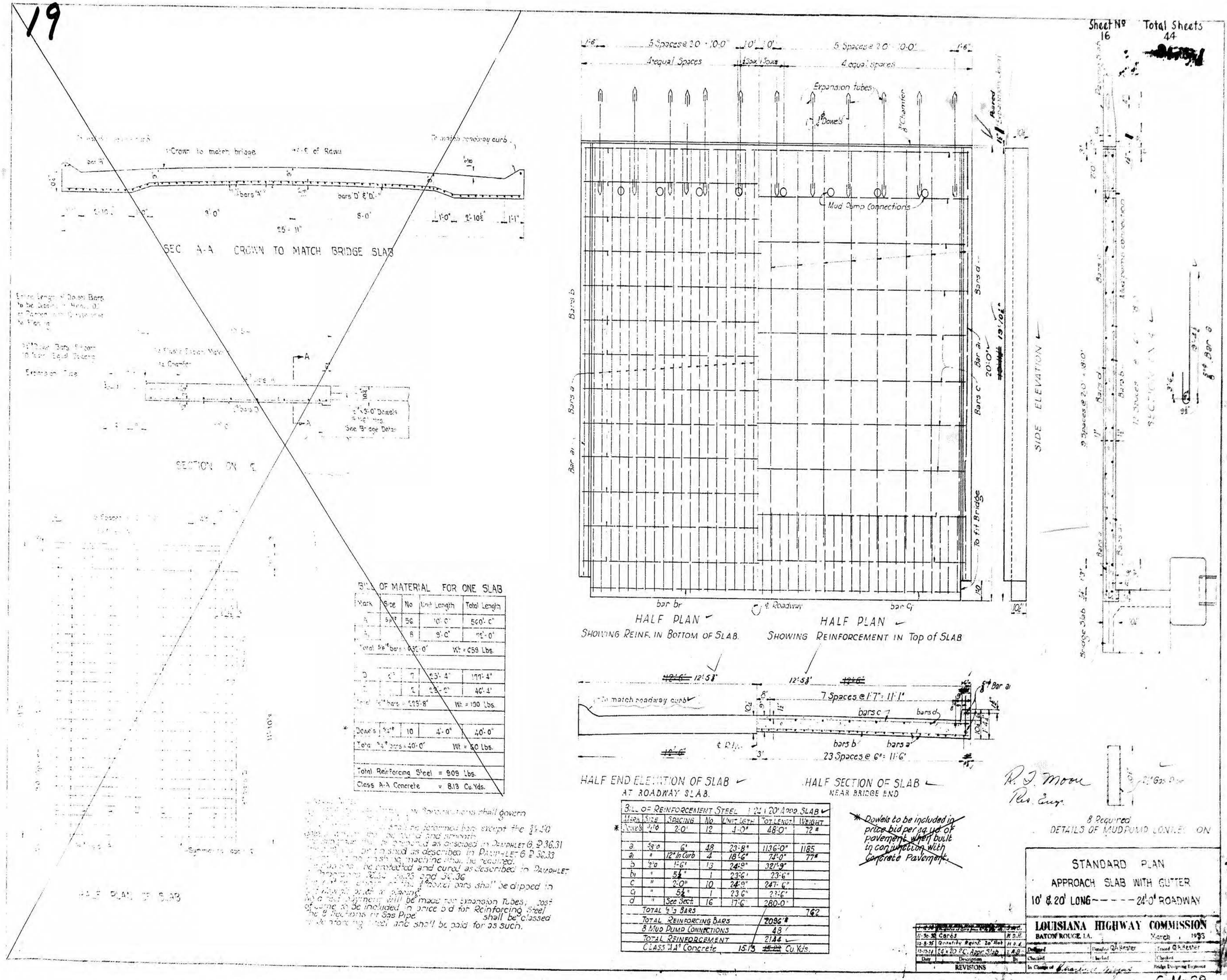
LOUISIANA HIGHWAY COMMISSION
BATON ROUGE, LA. July 1937

DATE | DESCRIPTION | REVISIONS

AS BUILT PLANS

19

Sheet Nº 16 Total Sheets 44




BILL OF MATERIAL FOR ONE SLAB

| Mark | Size | No | Unit Length | Total Length |
|---|---|---|---|---|
| A | 5/8"φ | 56 | 10'-0" | 560'-0" |
| A₁ | | 8 | 9'-0" | 72'-0" |
| Total 5/8"φ bars = 632'-0" | | | Wt = 659 Lbs. | |
| D | 1/2"φ | 7 | 25'-4" | 177'-4" |
| E | " | 2 | 23'-2" | 46'-4" |
| Total 1/2"φ bars = 223'-8" | | | Wt = 130 Lbs. | |
| * Dowels | 3/4"φ | 10 | 4'-0" | 40'-0" |
| Total 3/4"φ bars = 40'-0" | | | Wt = 60 Lbs. | |
| Total Reinforcing Steel = 909 Lbs. | | | | |
| Class A-A Concrete = 8.13 Cu.Yds. | | | | |

BILL OF REINFORCEMENT STEEL 1-24 x 20' APPR. SLAB

| Mark | Size | Spacing | No. | Unit Lgth | Tot. Length | Weight |
|---|---|---|---|---|---|---|
| * Dowels | 3/4"φ | 2'-0' | 12 | 4'-0" | 48'-0" | 72 # |
| a | 5/8"φ | 6" | 48 | 23'-8" | 1136'-0" | 1185 |
| a₁ | " | 12" In Curb | 4 | 18'-6" | 74'-0" | 77 # |
| b | 1/2"φ | 1'-6" | 13 | 24'-9" | 321'-9" | |
| b₁ | " | 5½" | 1 | 23'-6" | 23'-6" | |
| c | " | 2'-0" | 10 | 24'-9" | 247'-6" | |
| c₁ | " | 5½" | 1 | 23'-6" | 23'-6" | |
| d | " | See Sect. | 16 | 17'-6" | 280'-0" | |
| TOTAL 1/2"φ BARS | | | | | | 762 |
| TOTAL REINFORCING BARS | | | | | 2096 # | |
| 8 MUD PUMP CONNECTIONS | | | | | 48 | |
| TOTAL REINFORCEMENT | | | | | 2144 | |
| CLASS "AA" Concrete | | | | 15.13 | ~~15.22~~ Cu. Yds. | |

~~* Dowels to be included in price bid per sq. yd. of pavement when built in conjunction with Concrete Pavement.~~

R. J. Moore
Res. Eng.

| Date | Description | By |
|---|---|---|
| 11-30-32 | Curbs | M.D.H. |
| 10-8-35 | Quantity Reinf. 20' slab | H.D.J. |
| 12-17-34 | 24 x 20 R.C. Appr. Slab | L.A.B. |

REVISIONS

STANDARD PLAN
APPROACH SLAB WITH GUTTER
10' & 20' LONG ------ 24'-0" ROADWAY

LOUISIANA HIGHWAY COMMISSION
BATON ROUGE, LA. March, 1933

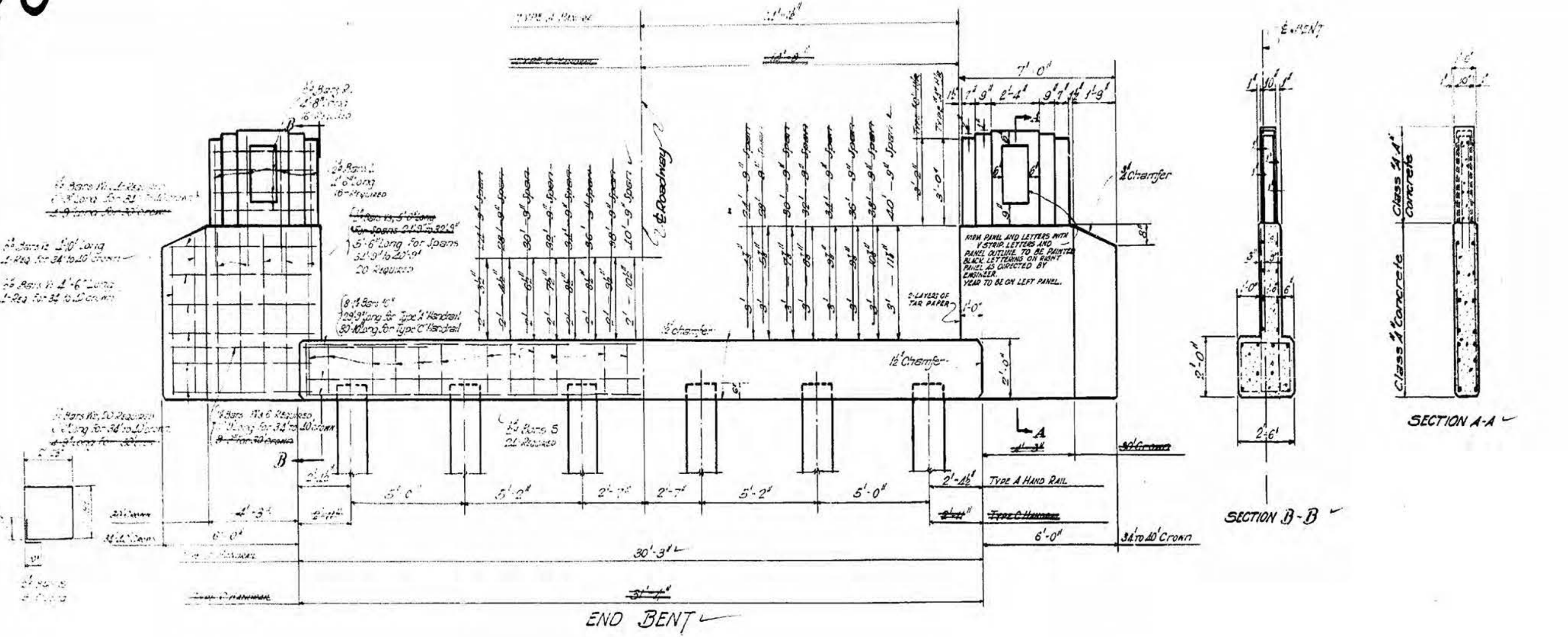
Designed | Detailed Q.A. Bester | Traced Q.A. Bester
Checked | Checked | Checked
In Charge of [signature] | Bridge Designing Engineer

C-M-29

AS BUILT PLANS

20

Sheet No. 17 Total Sheets 44




## ESTIMATED QUANTITIES

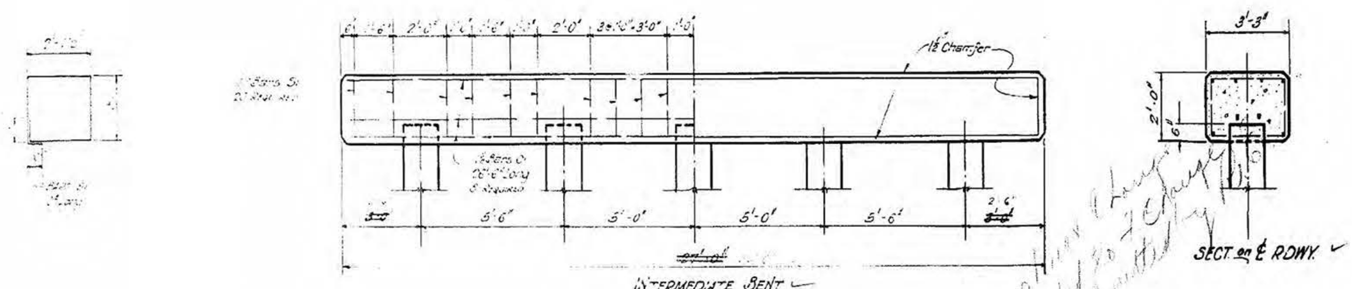
| TOTAL SPAN FEET | END BENT 34' TO 40' CROWN: Class AA Concrete Cu. Yds. | Class A Concrete Cu. Yds. | Reinforcing Steel Pounds | INTERMEDIATE BENT: Class A Concrete Cu. Yds. | Reinforcing Steel Pounds | PILE LOADING: Load Per Pile |
|---|---|---|---|---|---|---|
| ~~24'-9"~~ | ~~0.83~~ | ~~8.06~~ | ~~1616~~ | ~~6.37~~ | ~~308~~ | ~~19.2~~ |
| ~~28'-9"~~ | ~~0.83~~ | ~~8.11~~ | ~~1616~~ | ~~6.37~~ | ~~308~~ | ~~21.3~~ |
| ~~30'-9"~~ | ~~0.83~~ | ~~8.19~~ | ~~1616~~ | ~~6.37~~ | ~~308~~ | ~~22.7~~ |
| ~~32'-9"~~ | ~~0.83~~ | ~~8.24~~ | ~~1616~~ | ~~6.37~~ | ~~308~~ | ~~23.3~~ |
| ~~34'-9"~~ | ~~0.83~~ | ~~8.26~~ | ~~1624~~ | ~~6.37~~ | ~~308~~ | ~~25.1~~ |
| ~~36'-9"~~ | ~~0.83~~ | ~~8.30~~ | ~~1624~~ | ~~6.37~~ | ~~308~~ | ~~26.2~~ |
| ~~38'-9"~~ | ~~0.83~~ | ~~8.32~~ | ~~1624~~ | ~~6.37~~ | ~~308~~ | ~~27.5~~ |
| 40'-9" | 0.83 | ~~8.36~~ 8.32 | 1624 | ~~6.37~~ 6.63 | ~~308~~ 331 | 28.9 |

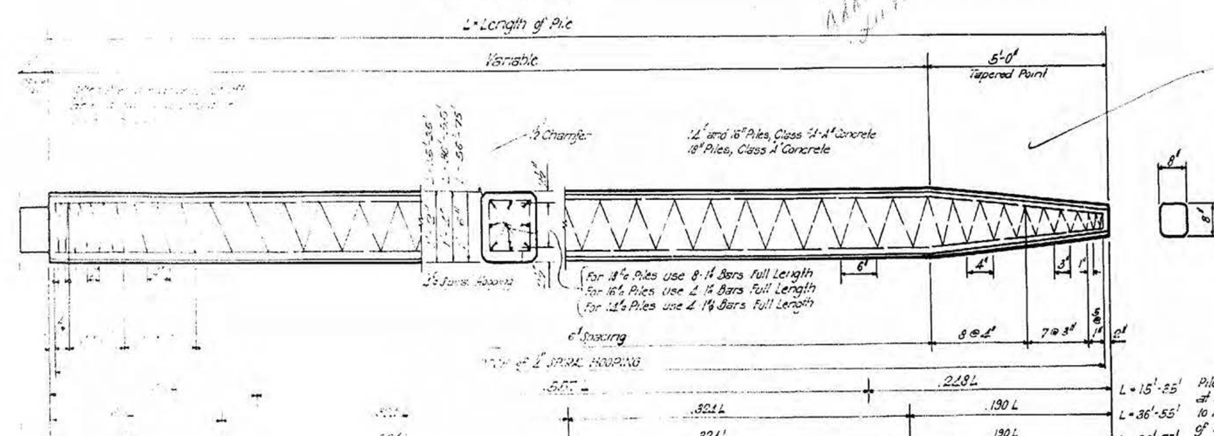
~~QUANTITIES TO BE ADDED TO END BENT FOR USE WITH TYPE "C" HANDRAIL~~

~~Class A Concrete 20 cu yds~~
~~Reinforcing Steel 29 pounds~~
~~Class AA Concrete 03 cu yds~~

~~QUANTITIES TO BE DEDUCTED FROM END BENT FOR USE WITH 30'-0" CROWN~~

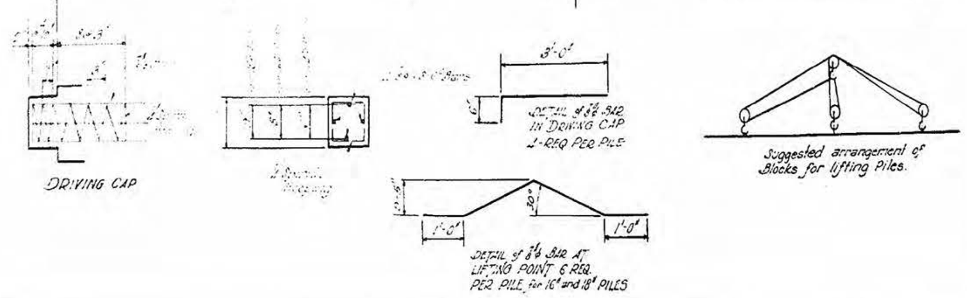
~~All Spans 107 pounds~~




L = 15'-35'
L = 36'-55'
L = 56'-75'

Piles to be marked at these points to indicate location of lifting sling.




## APPROXIMATE QUANTITIES FOR PILES

| PILE LENGTHS | DRIVING CAP TOTAL: CONCRETE Cu. Yds. | R. STEEL Pounds | VARIABLE PART PER LIN. FT.: CONCRETE Cu. Yds. | R. STEEL Pounds | TAPERED POINT TOTAL: CONCRETE Cu. Yds. | R. STEEL Pounds |
|---|---|---|---|---|---|---|
| 15'-35' | .031 | 36 | .051 | 12 | .170 | 65 |
| 36'-55' | .031 | 38 | .066 | 15 | .204 | 166 * |
| 56'-75' | .031 | 39 | .083 | 29 | .250 | 236 * |

*INCLUDES ⅞"ϕ BARS AT LIFTING POINTS

## GENERAL NOTES

Louisiana Highway Commission Specifications to govern.
Concrete to be class "A" in cap and riser.
Concrete to be class "A-A" in Handrail.
All dimensions to Reinforcing Steel are to bar ctrs.
No direct payment will be made for Reinforcing Steel in concrete piling.
The price bid per lin. ft. of piling shall include the cost of furnishing and placing all material for same.
All exposed surfaces to have a "Rubbed Finish."
All exposed corners to have ¾" chamfer unless noted.
For Year Plate see Standard Plan C.M. 97.
For Lettering see Standard Plan C.M. 95.
Quantities shown are for 14" Piles deducted

R. J. Moore
Res. Engr.

To be used with Standard Plan C-G-34 and 35 and C.M.103

**STANDARD PLAN**
**REINFORCED CONCRETE PILE BENTS**
24'-0" ROADWAY
30'-0" TO 40'-0" ROADWAY CROWN
3:1 SIDE SLOPES

LOUISIANA HIGHWAY COMMISSION
BATON ROUGE, LA. DECEMBER 1934

| DATE | DESCRIPTION | BY |
|---|---|---|
| 5-23-38 | CHANGE TO 75' PILE | L.C.C. |
| DEC 1937 | RETRACED | |

REVISIONS

DESIGNED | DETAILED L. Duclos & Wagner | TRACED C.B. & A.G.W.
CHECKED | CHECKED T. Huey | CHECKED J.T. Huey
IN CHARGE OF Charles C. Wyers BRIDGE DESIGNING ENGINEER

C-S-104

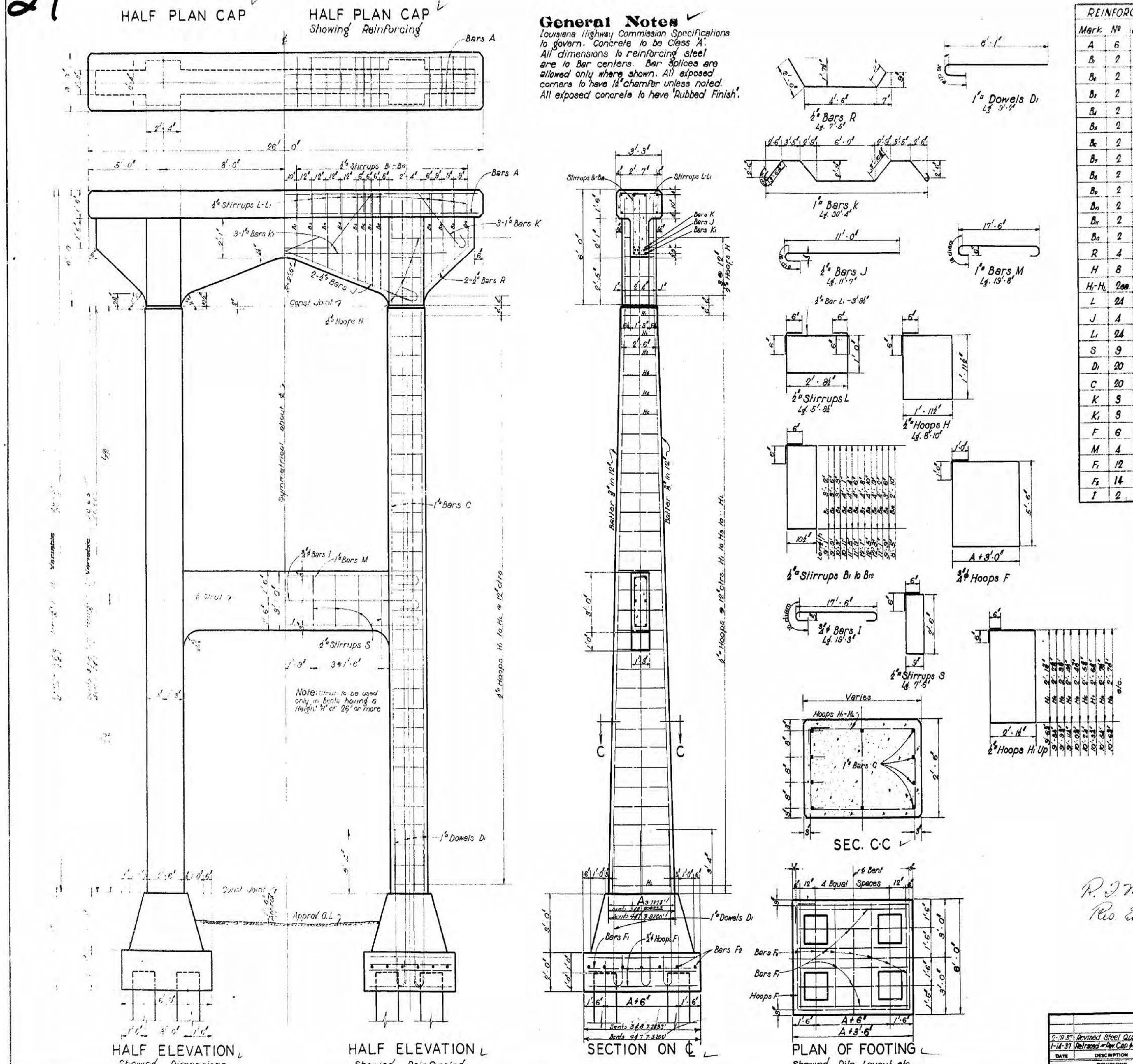
AS BUILT PLANS

21

Sheet № 18 Total Sheets 44

**General Notes**

Louisiana Highway Commission Specifications to govern. Concrete to be Class 'A'. All dimensions to reinforcing steel are to Bar centers. Bar Splices are allowed only where shown. All exposed corners to have 1½" chamfer unless noted. All exposed concrete to have 'Rubbed Finish'.




| REINFORCING STEEL IN ONE BENT | | | | |
|---|---|---|---|---|
| Mark | № | Size | Length | Location |
| A | 6 | ½" | 26'-6" | Long in Cap |
| $B_1$ | 2 | " | 9'-1" | Stirrups in Cap |
| $B_2$ | 2 | " | 9'-9" | " |
| $B_3$ | 2 | " | 10'-3" | " |
| $B_4$ | 2 | " | 10'-11" | " |
| $B_5$ | 2 | " | 11'-5" | " |
| $B_6$ | 2 | " | 11'-9" | " |
| $B_7$ | 2 | " | 12'-1" | " |
| $B_8$ | 2 | " | 12'-5" | " |
| $B_9$ | 2 | " | 12'-3" | " |
| $B_{10}$ | 2 | " | 11'-1" | " |
| $B_{11}$ | 2 | " | 9'-9" | " |
| $B_{12}$ | 2 | " | 8'-5" | " |
| R | 4 | " | 7'-5" | Cap Overhang |
| H | 8 | " | 8'-10" | Columns |
| $H_1$-$H_L$ | 2 ea. | " | Varies | " |
| L | 24 | " | 5'-8½" | Cap |
| J | 4 | " | 11'-7" | " |
| $L_1$ | 24 | " | 3'-8½" | " |
| S | 9 | " | 7'-6" | Strut |
| $D_1$ | 20 | 1"□ | 9'-2" | Column to Footing |
| C | 20 | " | H-6" | Columns |
| K | 3 | " | 30'-4" | Cap |
| $K_1$ | 3 | " | 21'-6" | " |
| F | 6 | ¾"ϕ | 19'0"+2A | Footing |
| M | 4 | 1"□ | 19'-8" | Strut |
| $F_1$ | 12 | ¾"ϕ | A+3'0" | Footing |
| $F_2$ | 14 | " | 5'-6" | " |
| I | 2 | " | 19'-3" | Strut |

| QUANTITIES | | | |
|---|---|---|---|
| H Bent Hgt | A | Class A Concrete Cu. Yds. | Reinf. Steel Lbs. |
| 40'-0" | 4'-7½" | 45.94 | 6067 |
| 38'-0" | 4'-6" | 44.03 | 5880 |
| 36'-0" | 4'-4½" | 42.16 | 5694 |
| 34'-0" | 4'-3" | 40.34 | 5509 |
| 32'-0" | 4'-1½" | 38.57 | 5325 |
| 30'-0" | 4'-0" | 36.84 | 5141 |
| 28'-0" | 3'-10½" | 35.16 | 4959 |
| 26'-0" | 3'-9" | 33.53 | 4777 |
| 24'-0" | 3'-7½" | 30.05 | 4212 |
| 22'-0" | 3'-6" | 28.50 | 4033 |
| 20'-0" | 3'-4½" | 27.01 | 3854 |
| 18'-0" | 3'-3" | 25.56 | 3676 |
| 16'-0" | 3'-1½" | 24.16 | 3498 |
| 14'-0" | 3'-0" | 22.80 | 3322 |
| 12'-0" | 2'-10½" | 21.49 | 3146 |
| 10'-0" | 2'-9" | 20.23 | 2971 |

Concrete Quantities shown are for 14" Piles deducted.
For 16" Piles, deduct 0.13 cu yds. from above Quan.
For 18" " " 0.27 " " " " "
When Timber Piles are used, add .40 cu. yds. to quantities shown then subtract actual cu yds occupied by piles used.

R. T. Moore
Res. Engr.

**STANDARD PLAN**
REINF. CONCRETE COL. BENT FOR STD. R.C. DECK GIRDER SPANS OF 32' TO 40' FT – 24' RDWY

LOUISIANA HIGHWAY COMMISSION
BATON ROUGE, LA. May 1931

| DATE | DESCRIPTION | BY |
|---|---|---|
| 2-19-37 | Revised Steel Quan. | [illegible] |
| 1-14-37 | Retraced – Rev. Cap & Quan. | W.S.S. T.B.B. |

REVISIONS

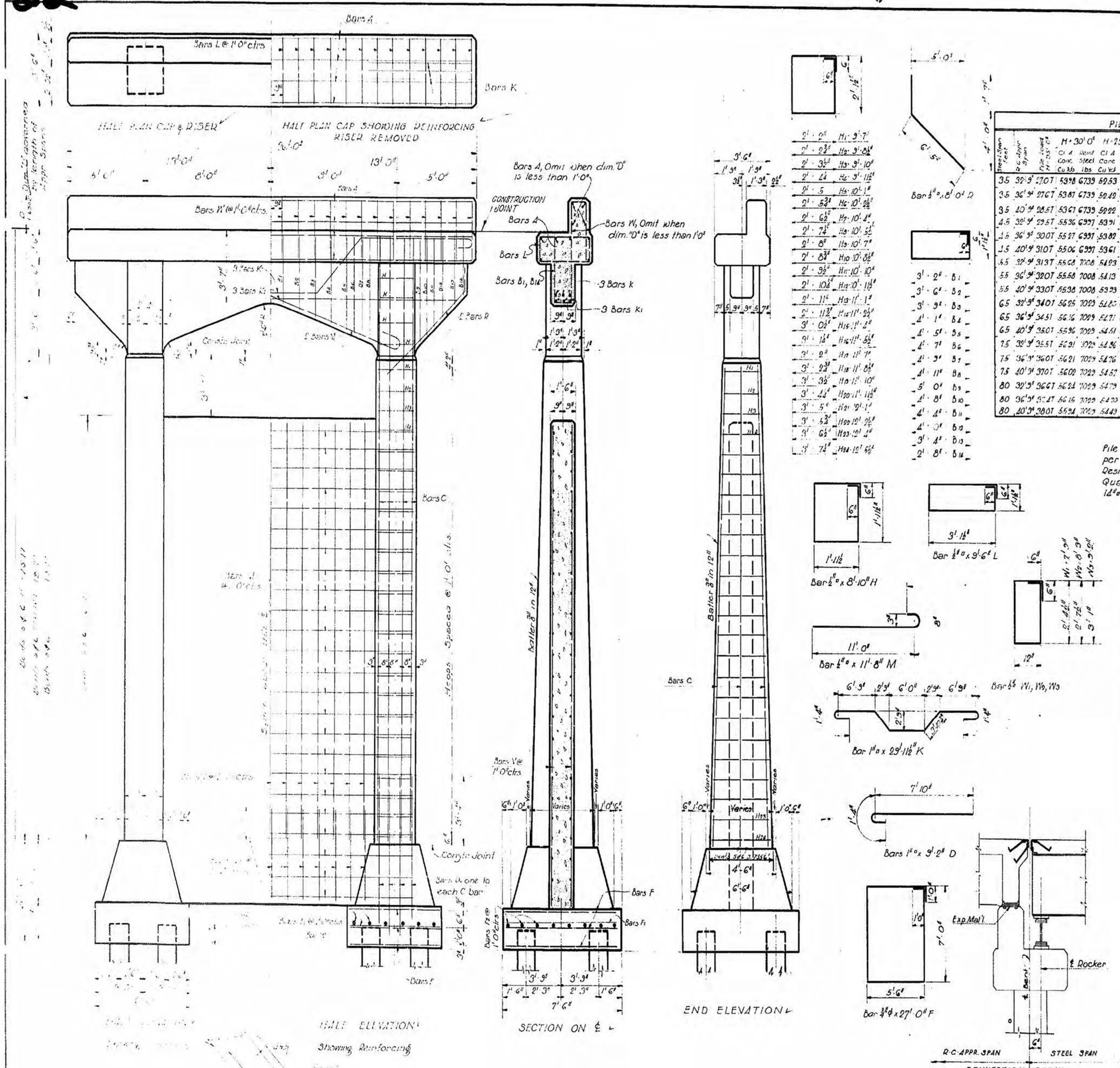
DESIGNED L.D.B. DETAILED L.D.B. TRACED [illegible]
CHECKED P.L. CHECKED P.L. CHECKED [illegible]
IN CHARGE OF [illegible] BRIDGE DESIGNING ENGINEER

C.S. III

AS BUILT PLANS

22

Sheet No. 19 Total Sheets 44




**PILE LOADING AND QUANTITIES**

| Steel Span Feet | R.C. Appr. Span | Pile Load H=35' 0" | H=30' 0" Cl. A Conc. Cu Yds | H=30' 0" Reinf. Steel lbs | H=29' 0" Cl. A Conc. Cu Yd | H=29' 0" Reinf. Steel lbs | H=28' 0" Cl. A Conc. Cu Yd | H=28' 0" Reinf. Steel lbs | H=27' 0" Cl. A Conc. Cu Yd | H=27' 0" Reinf. Steel lbs | H=26' 0" Cl. A Conc. Cu Yd | H=26' 0" Reinf. Steel lbs | H=25' 0" Cl. A Conc. Cu Yd | H=25' 0" Reinf. Steel lbs | H=24' 0" Cl. A Conc. Cu Yd | H=24' 0" Reinf. Steel lbs | H=23' 0" Cl. A Conc. Cu Yd | H=23' 0" Reinf. Steel lbs | [illegible] | [illegible] |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 35 | 32' 9" | 27.0T | 5398 | 6739 | 5253 | 6573 | 5108 | 6408 | 4963 | 6242 | 4818 | 6077 | 4673 | 5912 | 4528 | 5748 | 4383 | 5583 | [illegible] | None |
| 35 | 36' 9" | 27.6T | 5387 | 6739 | 5242 | 6573 | 5097 | 6408 | 4952 | 6242 | 4808 | 6077 | 4662 | 5912 | 4517 | 5748 | 4372 | 5583 | [illegible] | [illegible] |
| 35 | 40' 9" | 28.5T | 5361 | 6739 | 5222 | 6573 | 5077 | 6408 | 4932 | 6242 | 4788 | 6077 | 4642 | 5912 | 4498 | 5748 | 4352 | 5583 | [illegible] | [illegible] |
| 45 | 32' 9" | 29.5T | 5536 | 6997 | 5391 | 6831 | 5246 | 6666 | 5101 | 6500 | 4956 | 6335 | 4811 | 6170 | 4666 | 6006 | 4521 | 5841 | [illegible] | [illegible] |
| 45 | 36' 9" | 30.0T | 5527 | 6997 | 5382 | 6831 | 5237 | 6666 | 5092 | 6500 | 4947 | 6335 | 4802 | 6170 | 4657 | 6006 | 4512 | 5841 | [illegible] | [illegible] |
| 45 | 40' 9" | 31.0T | 5506 | 6997 | 5361 | 6831 | 5226 | 6666 | 5071 | 6500 | 4926 | 6335 | 4781 | 6170 | 4636 | 6006 | 4491 | 5841 | [illegible] | [illegible] |
| 55 | 32' 9" | 31.3T | 5568 | 7008 | 5423 | 6842 | 5278 | 6677 | 5133 | 6511 | 4988 | 6346 | 4843 | 6181 | 4698 | 6017 | 4553 | 5852 | [illegible] | [illegible] |
| 55 | 36' 9" | 32.0T | 5558 | 7008 | 5413 | 6842 | 5268 | 6677 | 5123 | 6511 | 4978 | 6346 | 4833 | 6181 | 4688 | 6017 | 4543 | 5852 | [illegible] | [illegible] |
| 55 | 40' 9" | 33.0T | 5538 | 7008 | 5393 | 6842 | 5248 | 6677 | 5103 | 6511 | 4958 | 6346 | 4813 | 6181 | 4668 | 6017 | 4523 | 5852 | [illegible] | [illegible] |
| 65 | 32' 9" | 34.0T | 5625 | 7029 | 5480 | 6863 | 5335 | 6698 | 5190 | 6532 | 5045 | 6367 | 4900 | 6202 | [illegible] | 6038 | [illegible] | 5873 | [illegible] | [illegible] |
| 65 | 36' 9" | 34.5T | 5616 | 7029 | 5471 | 6863 | 5326 | 6698 | 5181 | 6532 | 5036 | 6367 | 4891 | 6202 | 4746 | 6038 | 4601 | 5873 | [illegible] | [illegible] |
| 65 | 40' 9" | 35.0T | 5596 | 7029 | 5451 | 6863 | 5306 | 6698 | 5161 | 6532 | 5016 | 6367 | 4871 | 6202 | 4726 | 6038 | [illegible] | 5873 | [illegible] | [illegible] |
| 75 | 32' 9" | 35.5T | 5631 | 7029 | 5486 | 6863 | 5341 | 6698 | 5196 | 6532 | 5051 | 6367 | 4906 | 6202 | 4761 | 6038 | [illegible] | 5873 | [illegible] | [illegible] |
| 75 | 36' 9" | 36.0T | 5621 | 7029 | 5476 | 6863 | 5331 | 6698 | 5186 | 6532 | 5041 | 6367 | 4896 | 6202 | 4751 | 6038 | [illegible] | [illegible] | [illegible] | [illegible] |
| 75 | 40' 9" | 37.0T | 5602 | 7029 | 5457 | 6863 | 5312 | 6698 | 5177 | 6532 | 5022 | 6367 | 4877 | 6202 | 4732 | 6038 | [illegible] | 5873 | [illegible] | [illegible] |
| 80 | 32' 9" | 36.6T | 5624 | 7029 | 5479 | 6863 | 5334 | 6698 | 5189 | 6532 | 5044 | 6367 | 4899 | 6202 | 4754 | 6038 | [illegible] | [illegible] | [illegible] | [illegible] |
| 80 | 36' 9" | 37.4T | 5615 | 7029 | 5470 | 6863 | 5325 | 6698 | 5180 | 6532 | 5035 | 6367 | 4890 | 6202 | 4745 | 6038 | [illegible] | [illegible] | [illegible] | [illegible] |
| 80 | 40' 9" | 38.0T | 5594 | 7029 | 5449 | 6863 | 5304 | 6698 | 5159 | 6532 | 5014 | 6367 | 4869 | 6202 | 4724 | 6038 | 4579 | 5873 | [illegible] | [illegible] |

Pile loading for various Dimension H: reduce load per pile .4 tons per foot of decrease in value of H.
Resident Engineer to furnish dimensions and Quantities for combinations not shown
14" ϕ Concrete Piles used in calculating conc quantities

**BILL OF MATERIAL FOR ONE BENT**

| Bar | Size | No | Unit Lgth. | Total Lgth | Location |
|---|---|---|---|---|---|
| A | ½" ϕ | Varies | 25' 6" | Varies | Cap and Riser |
| B1-B14 | " | 2 Each | Varies | 313' 8" | Stirrups in Cap |
| H | " | 8 | 8' 10" | 70' 8" | Upper Column |
| H1-H24 | " | Varies | Varies | Varies | Column Hoops |
| L | " | 26 | 9' 6" | 247' 0" | Cap Hoops |
| R | " | 4 | 8' 0" | 32' 0" | Cap Overhang |
| V | " | 26 | Varies | Varies | Web |
| V1 | " | 26 | 4' 6" | 117' 0" | Lower Web |
| M | " | 4 | 11' 8" | 46' 8" | Bottom of Cap |
| W1-W2-W3 | " | 26 | Varies | Varies | Verticals in Riser |
| | Total ½" ϕ Bars, Varies | | | | |
| D | 1" ▫ | 20 | 9' 2" | 183' 4" | Footing to cols |
| C | " | 20 | Varies | Varies | Verticals in cols |
| K | " | 3 | 29' 11½" | 89' 10½" | Cap Bent Up |
| K1 | " | 3 | 22' 6" | 67' 6" | " " " |
| | Total 1" ▫ Bars, Varies | | | | |
| F | ¾" ϕ | 6 | 27' 0" | 162' 0" | Footing |
| F1 | " | 12 | 7' 0" | 84' 0" | " |
| F2 | " | 16 | 5' 6" | 88' 0" | " |
| J | " | Varies | 18' 9" | Varies | Web |
| | Total ¾" ϕ Bars, Varies | | | | |

GENERAL NOTES
Specifications La Highway Commission
Concrete to be Class "A". All dimensions to Reinforcing Steel are to bar centers.
Bar splices are allowed only where shown
All exposed corners to be chamfered 1½" unless noted. All exposed concrete to have Rubbed Finish.

R. J. Moore
Res. Eng.

| Date | Description | By |
|---|---|---|
| 10-30-37 | Chamfer on Cap | [illegible] |
| 10-17-35 | Hole for drainage in web wall | [illegible] |
| 10-14-35 | Column Dim. "H" | C.H.M. |
| 9-19-35 | Riser Height Dim. | J.T.H. |

REVISIONS

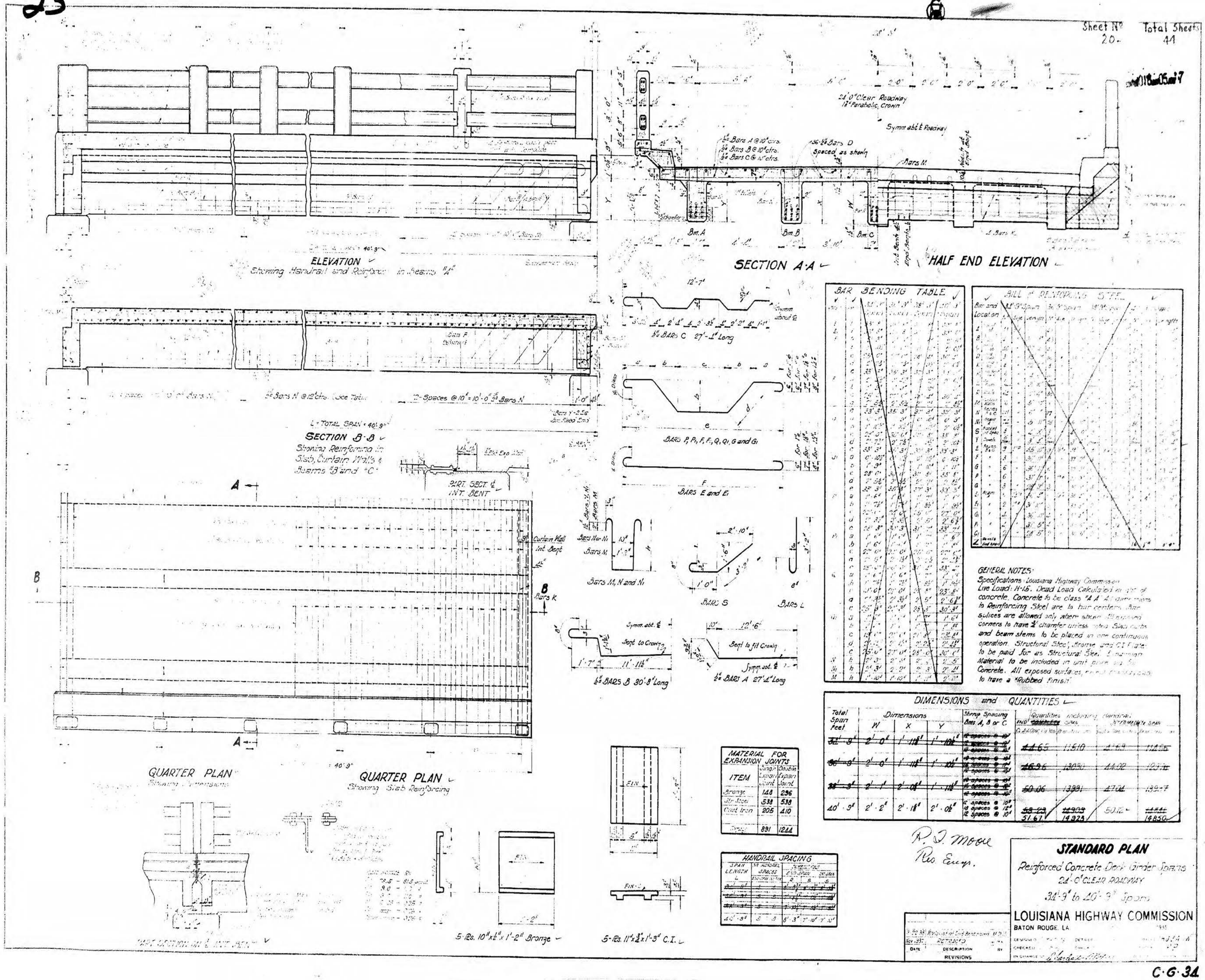
STANDARD PLAN
2 COLUMN R.C. BENT
WITH WEB WALL
Total HEIGHTS 23 To 30 Ft

LOUISIANA HIGHWAY COMMISSION
BATON ROUGE, LA. JUNE 1935
DESIGNED R. Oliver DETAILED R. Oliver TRACED A. G. Wagner
CHECKED P. Leeming CHECKED P. Leeming CHECKED [illegible]
IN CHARGE OF Charles A. Myers BRIDGE DESIGNING ENGINEER

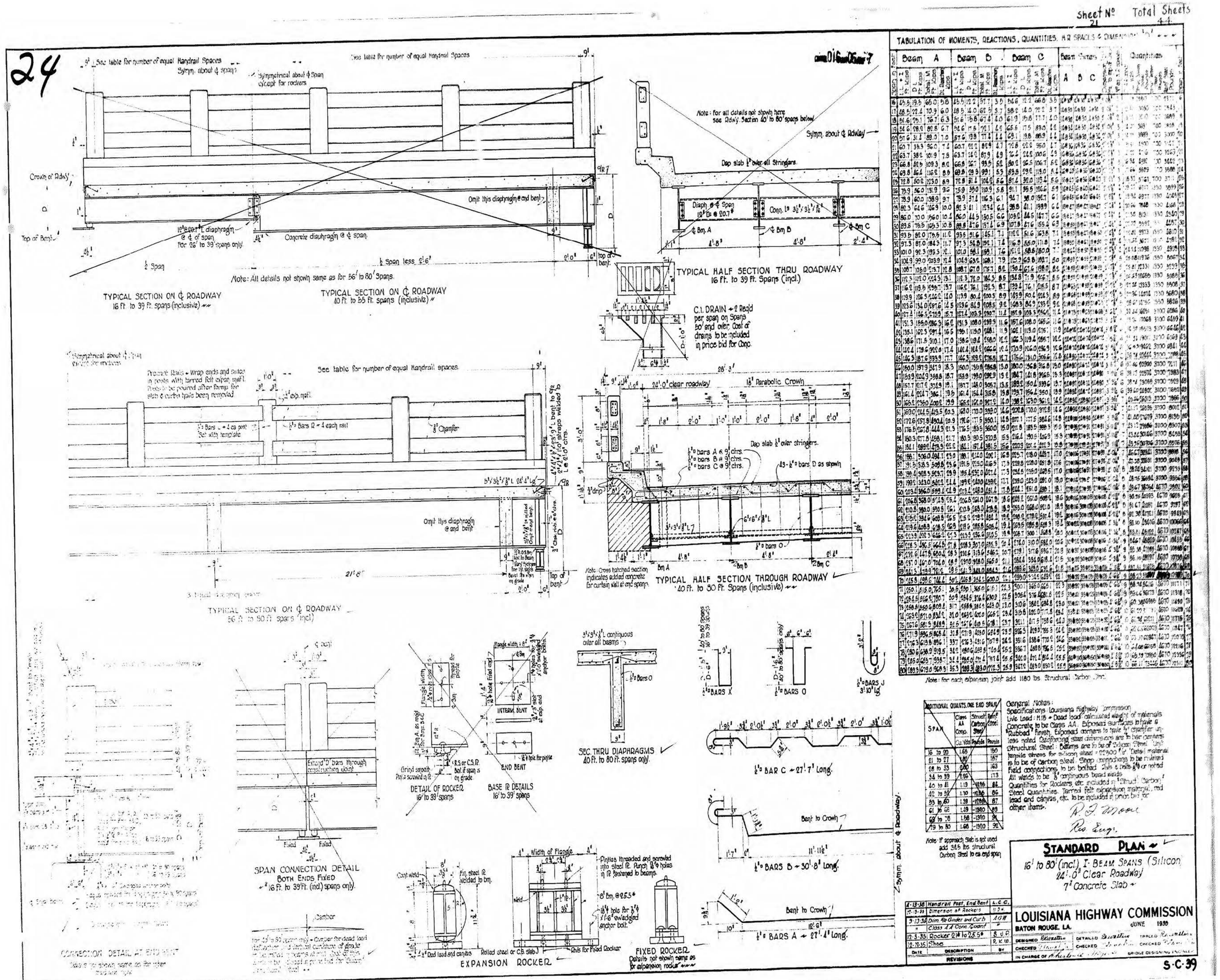
C-S-124

AS BUILT PLANS

23




AS BUILT PLANS




AS BUILT PLANS