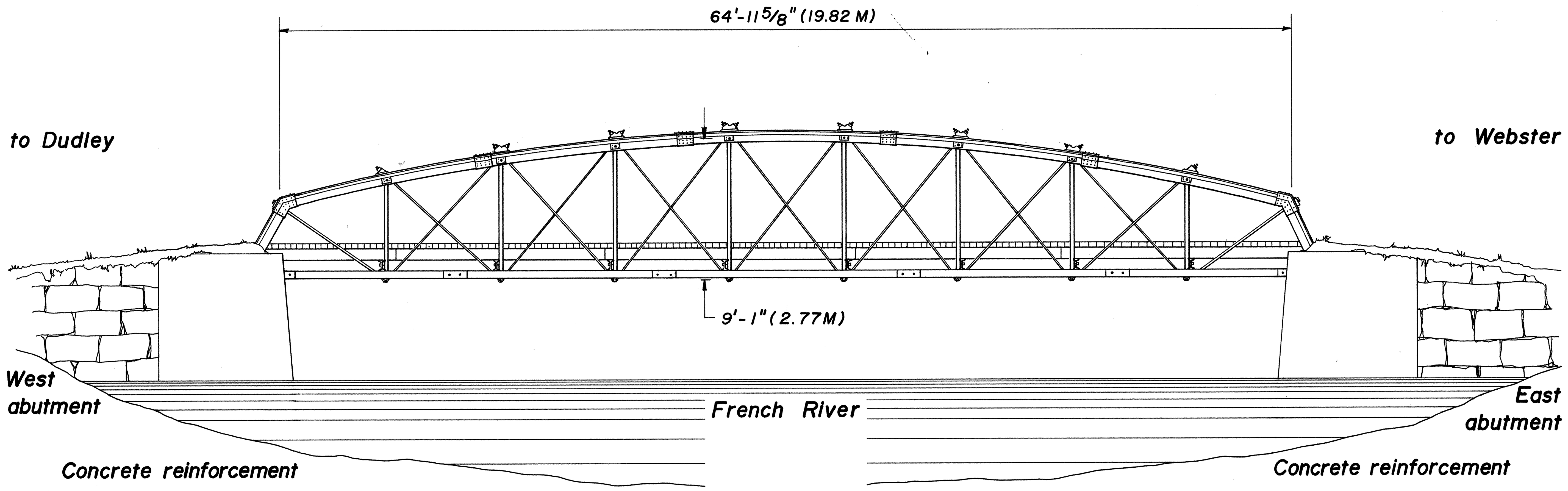
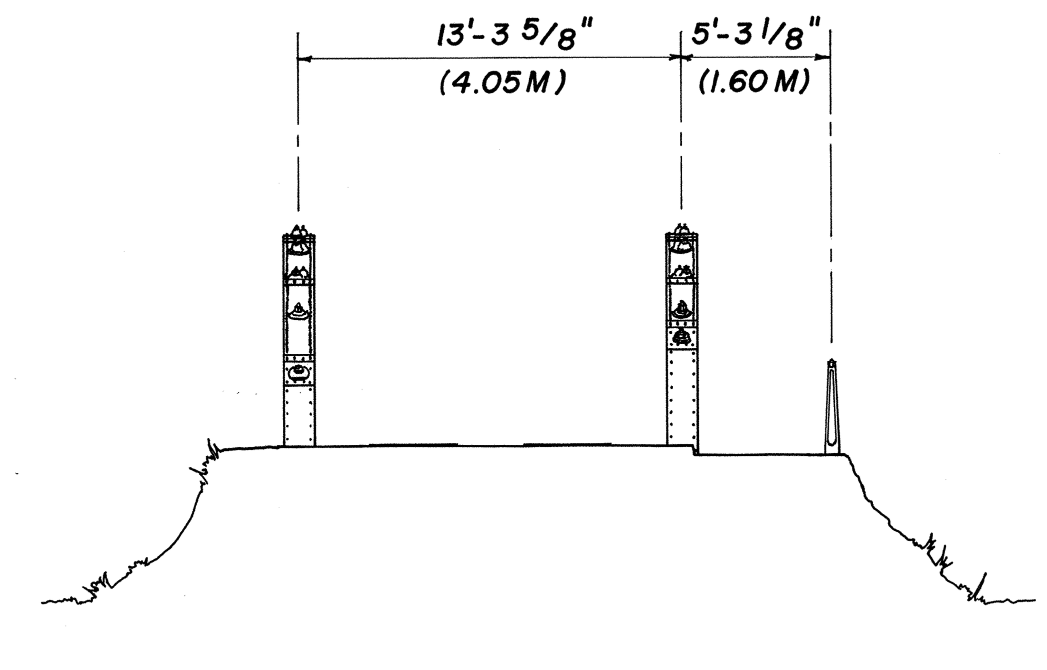
NORTH VILLAGE BRIDGE · 1871

WEBSTER, MASSACHUSETTS





East Portal

South Elevation Scale: 3/16"=1'-0"

0 1 2 3 4 5 10 15 20 FEET

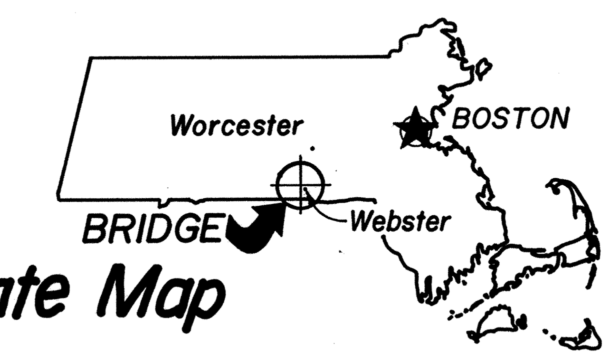
0 1 2 3 4 5 METERS 1:64

The Massachusetts Historic Bridge Project is part of the Historic American Engineering Record (HAER), a long-range program to document historically significant engineering and industrial sites in the United States. The National Park Service, U.S. Department of the Interior, administers the HAER program. The Massachusetts Department of Public Works, Jane F. Garvey, Commissioner, George R. Turner, Jr., Chief Engineer, and Stephen J. Roper, Historic Bridge Specialist; and the Historic American Engineering Record (HABS/HAER), Dr. Robert J. Kapsch, Director, co-sponsored the Massachusetts Historic Bridge Project with the cooperation of the Massachusetts Historical Commission, Elsa Fitzgerald, Acting Exec. Director. The field team under the direction of Eric DeLony, Chief and Principal Architect, HAER, consisted of Daniel L. Schodek, professor of architectural technology (Harvard University), field supervisor, Patricia Reese (Boston Architectural Center), Gary Kleinschmidt (Harvard University), Chris Payne (Columbia University), Morgen Fleisig (Harvard University), Mark Rowan (Catholic University of America), and Rudolf Sosef (Technical University of Delft, the Netherlands; US/ICOMOS), architectural technicians; Lola Bennett (University of Vermont), Patrick Harshbarger (University of Delaware/Hagley Museum and Library), and John Healey (University of Birmingham, England; US/ICOMOS), historians; and Marty Stupich (Massachusetts College of Art), photographer.

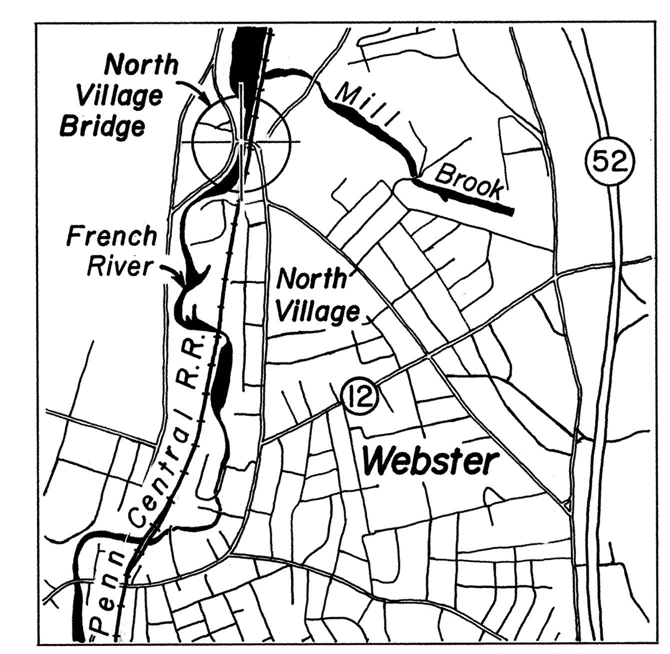
NORTH VILLAGE BRIDGE

North Village Bridge displays most of the features of Charles H. Parker's patented design of 1870 (#100,185) for an "improved truss bridge." Wrought iron was used extensively within the structure. The design was characterized by a curved upper chord terminating in inclined hips, and pin-connected Pratt configuration web members. Remaining connections used a combination of shop riveting and field bolts. Parker's design was devised to be strong, yet economical. It could be applied speedily and with little adaptation to a variety of span lengths and pre-existing crossing conditions. Variations in truss lengths were achieved through modifications in the geometry of the end panel. Parker achieved the economy of material inherent in a curved upper chord, and still maintained a uniform geometry in remaining members. Such uniformity permitted economies of production through prefabrication of standardized components.

The North Village Bridge was built in 1871, at a cost of $35-50 per foot, as a replacement for a timber span. The structure was the product of the Boston-based National Bridge and Iron Works, where Parker served as the company's "Consulting Engineer." During his 7-year tenure at the company some 150 bridges were constructed. Today, survivors are extremely rare; perhaps only 5 remain nationally, of which 3 are in Massachusetts. Within the state the bridge is one of the 4 oldest iron highway bridges. Widespread adoption of derivatives of Parker's design occurred latter in the century.



State Map



UTM 19.261750.4660800

Based on Massachusetts D.P.W. General Highway Map (1975) Region E, sheet 8 and 11.

Local Map

Scale: 1:25,000

0 1/2 1 1 1/2 Mi.

0 1 2 Km

DELINEATED BY: MARK C. ROWAN, 1990

MASSACHUSETTS HISTORIC BRIDGE PROJECT
NATIONAL PARK SERVICE
UNITED STATES DEPARTMENT OF THE INTERIOR

NORTH VILLAGE BRIDGE (NORTH MAIN STREET BRIDGE) – 1871
SPANNING FRENCH (STONEY) RIVER ON NORTH MAIN STREET
WEBSTER WORCESTER COUNTY MASSACHUSETTS

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HISTORIC AMERICAN ENGINEERING RECORD
MA – 99

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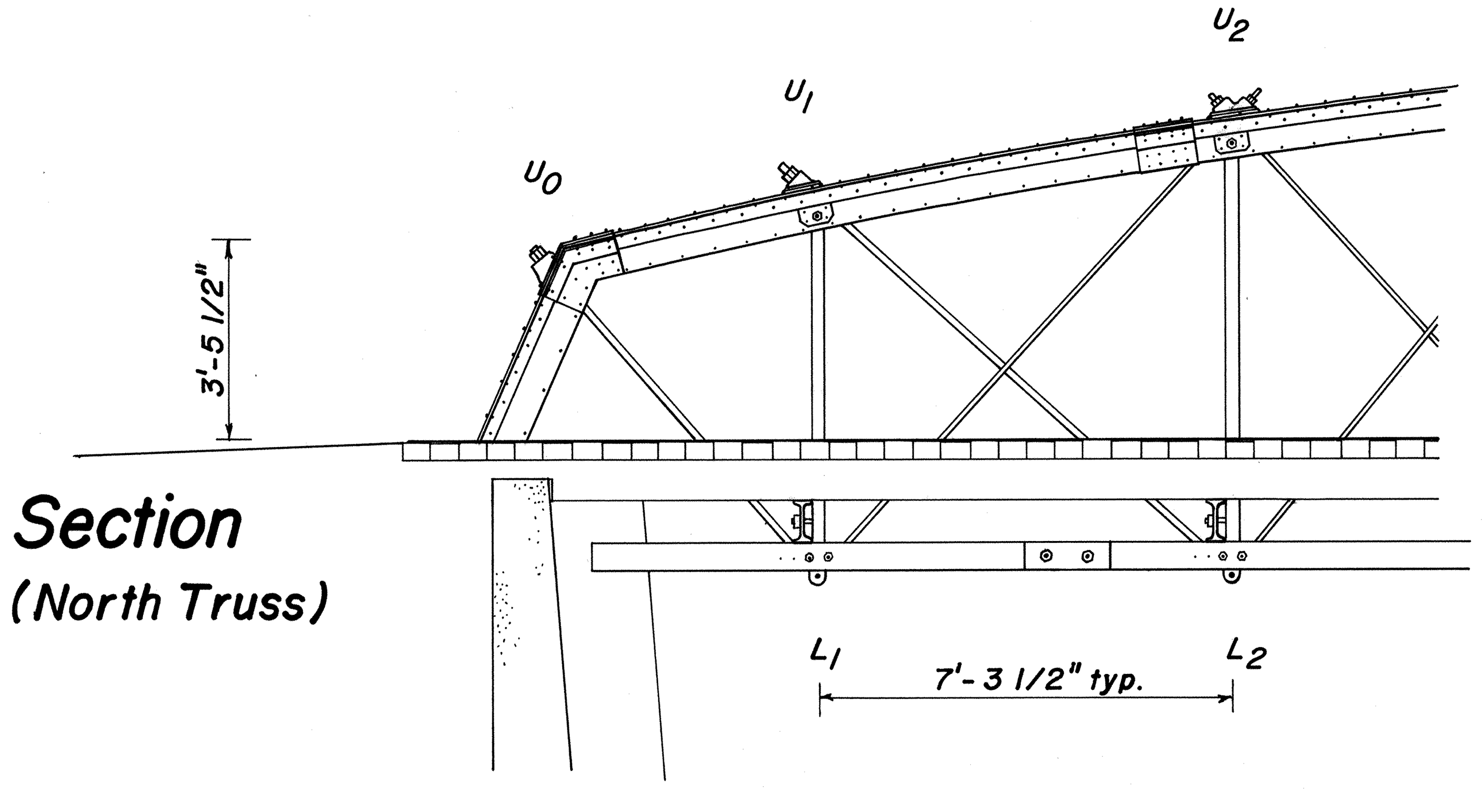
TRIM LINE



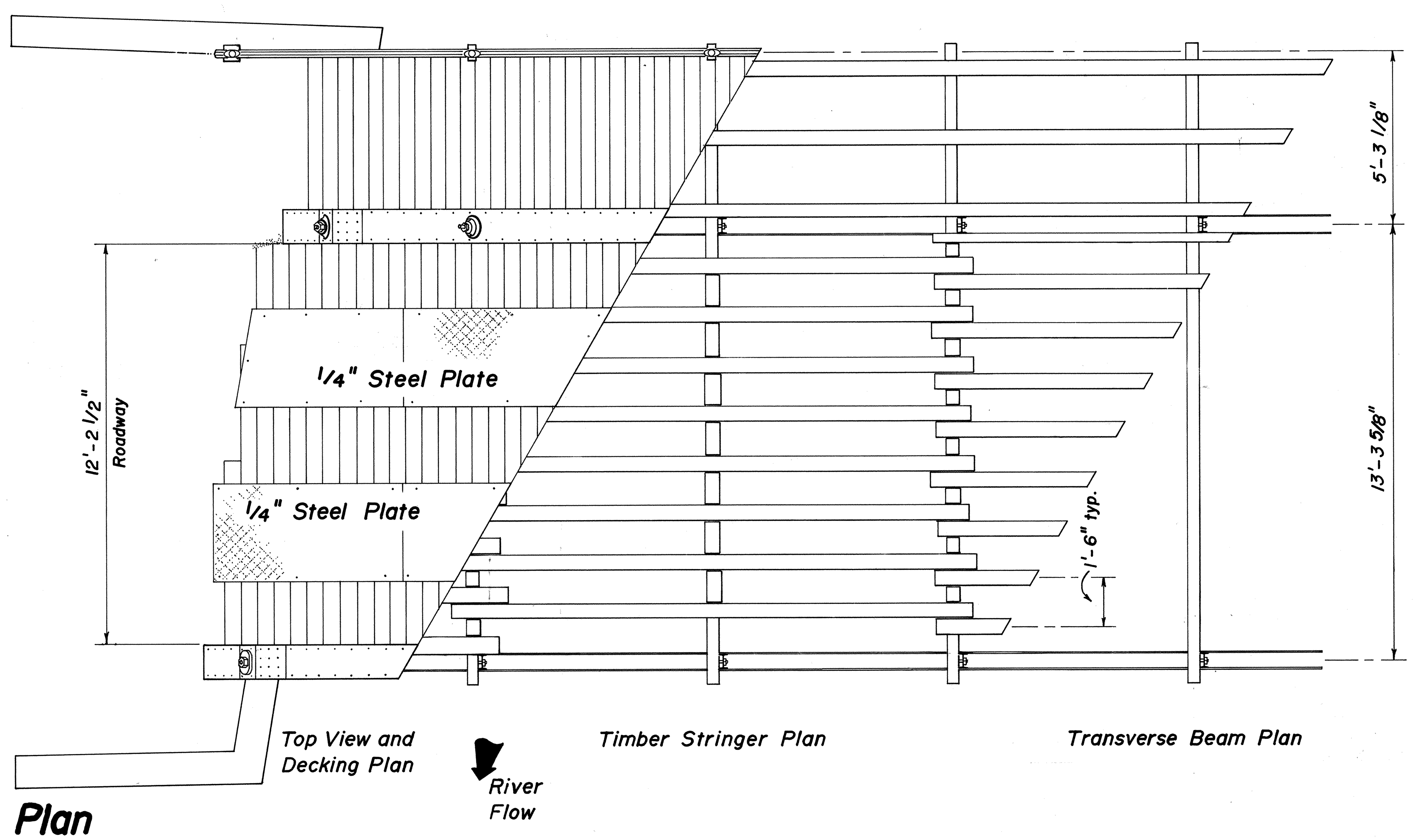
Section
(North Truss)

The North truss was made a different length from the South truss by varying the extended lengths of upper and lower chord members in the end panels only. The geometries of the remaining interior panels of the two trusses were kept identical, as were member sizes and connection details, with transverse beams placed orthogonally.

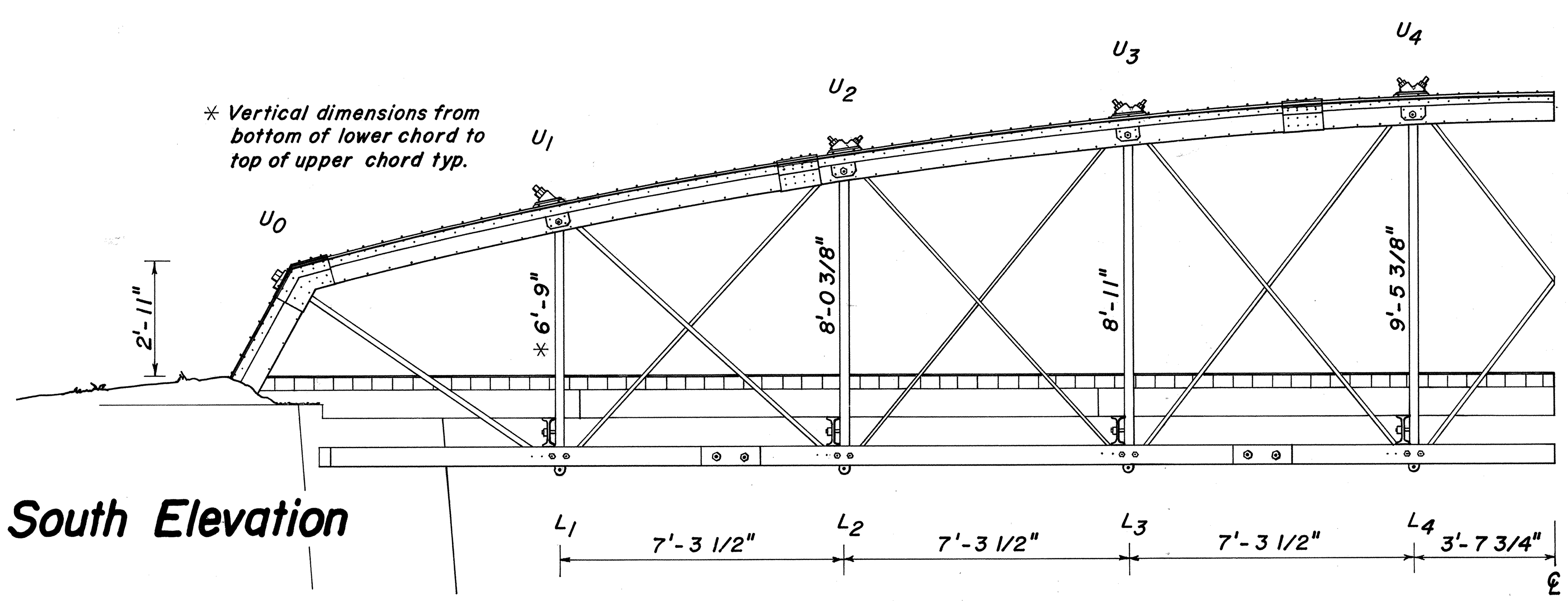
Overall Length of Exposed Truss

North Truss 63'-0" (19.22M)

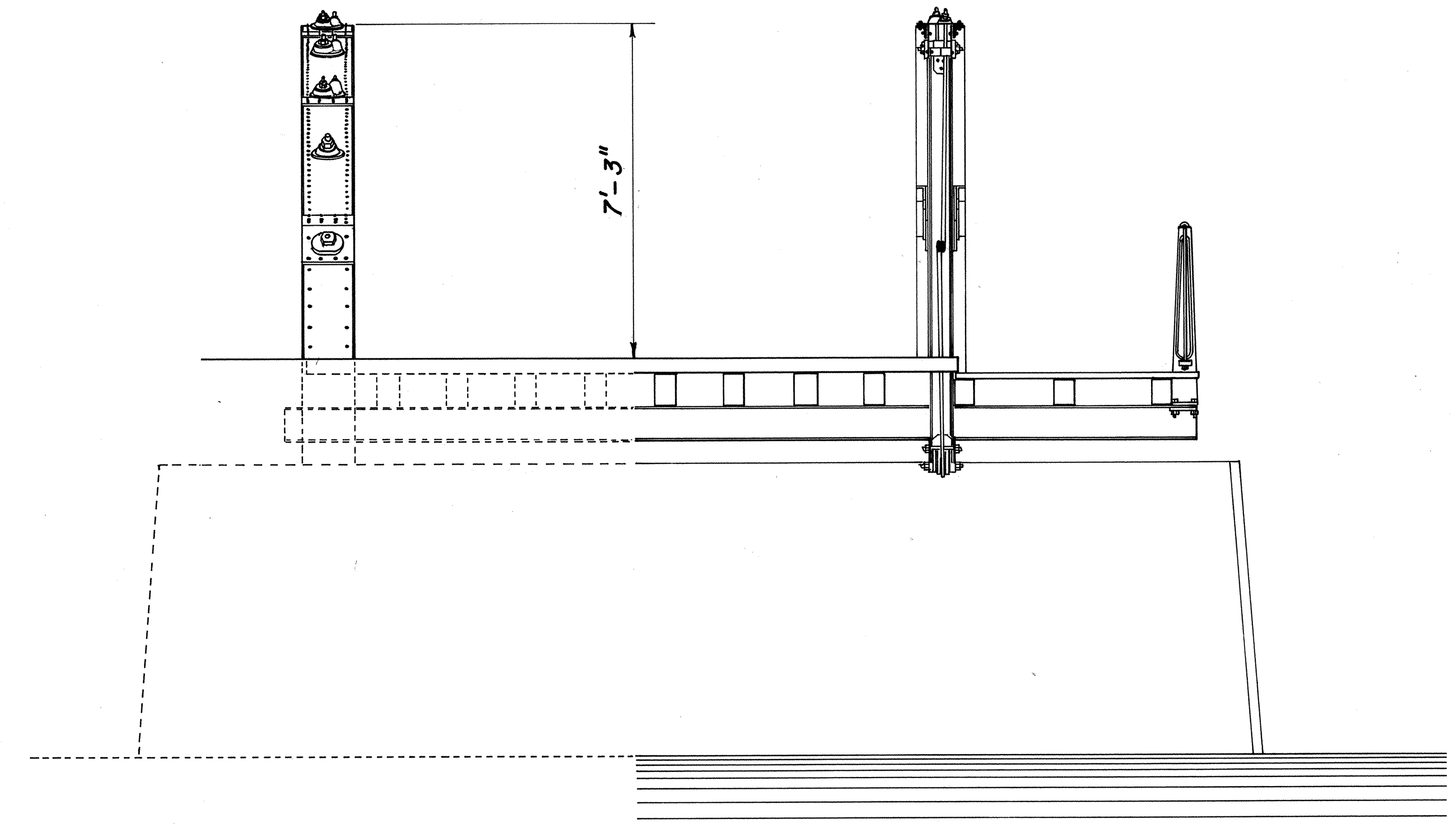
South Truss 67'-8" (20.64M)



Plan



South Elevation



Half Elevation Half Section

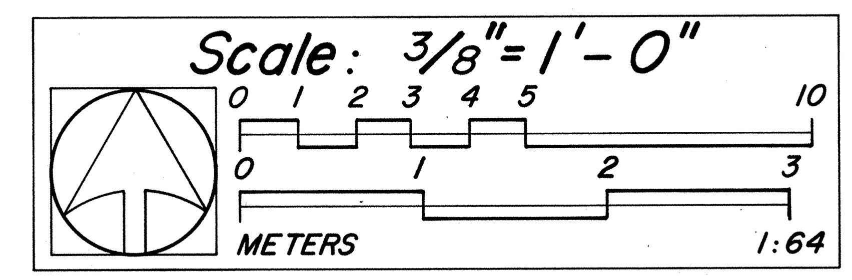
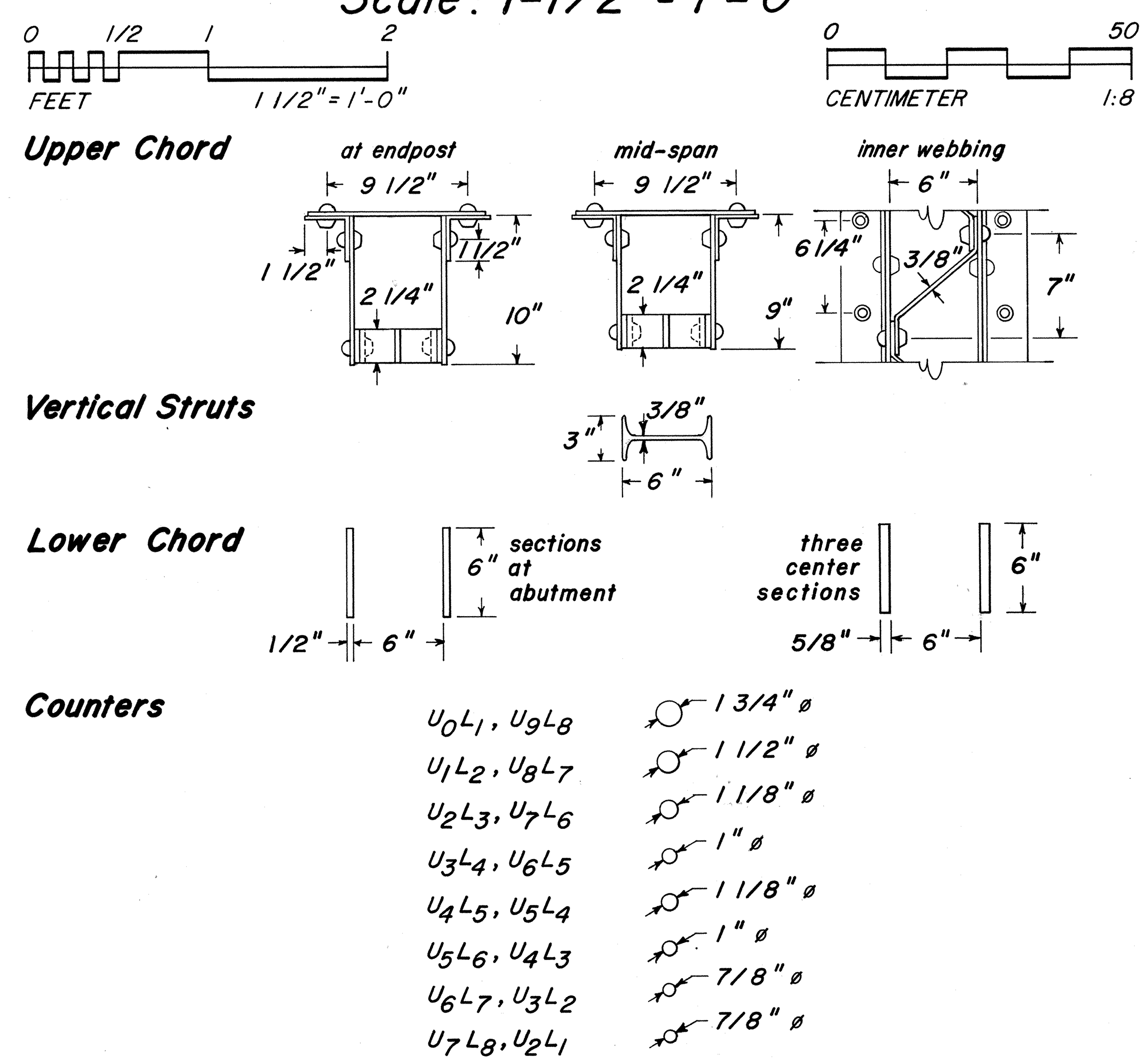


Table of Member Sections

Scale: 1-1/2" = 1'-0"



DELINEATED BY: MARK C. ROWAN, 1990

MASSACHUSETTS HISTORIC BRIDGE PROJECT

NATIONAL PARK SERVICE
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WEBSTER

NORTH VILLAGE BRIDGE (NORTH MAIN STREET BRIDGE) – 1871

SPANNING FRENCH (STONEY) RIVER ON NORTH MAIN STREET

WORCESTER COUNTY

MASSACHUSETTS

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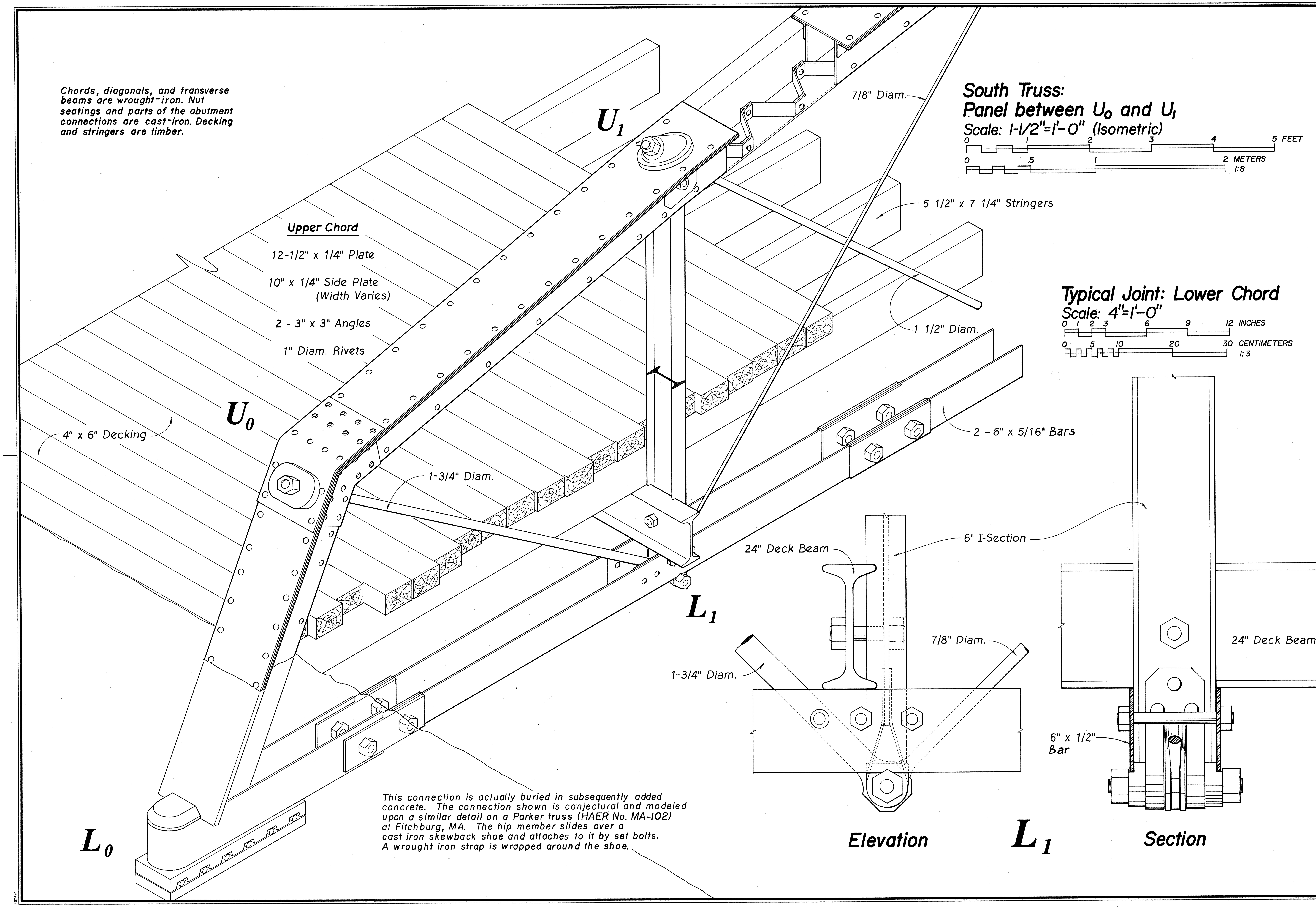
TRIM LINE



TRIM LINE

DELINEATED BY: MORGEN L. FLEISIG, 1990

MASSACHUSETTS HISTORIC BRIDGE PROJECT
NATIONAL PARK SERVICE
UNITED STATES DEPARTMENT OF THE INTERIOR

NORTH VILLAGE BRIDGE (NORTH MAIN STREET BRIDGE) – 1871

SPANNING FRENCH (STONEY) RIVER ON NORTH MAIN STREET

WEBSTER — WORCESTER COUNTY — MASSACHUSETTS

SHEET 3 of 4

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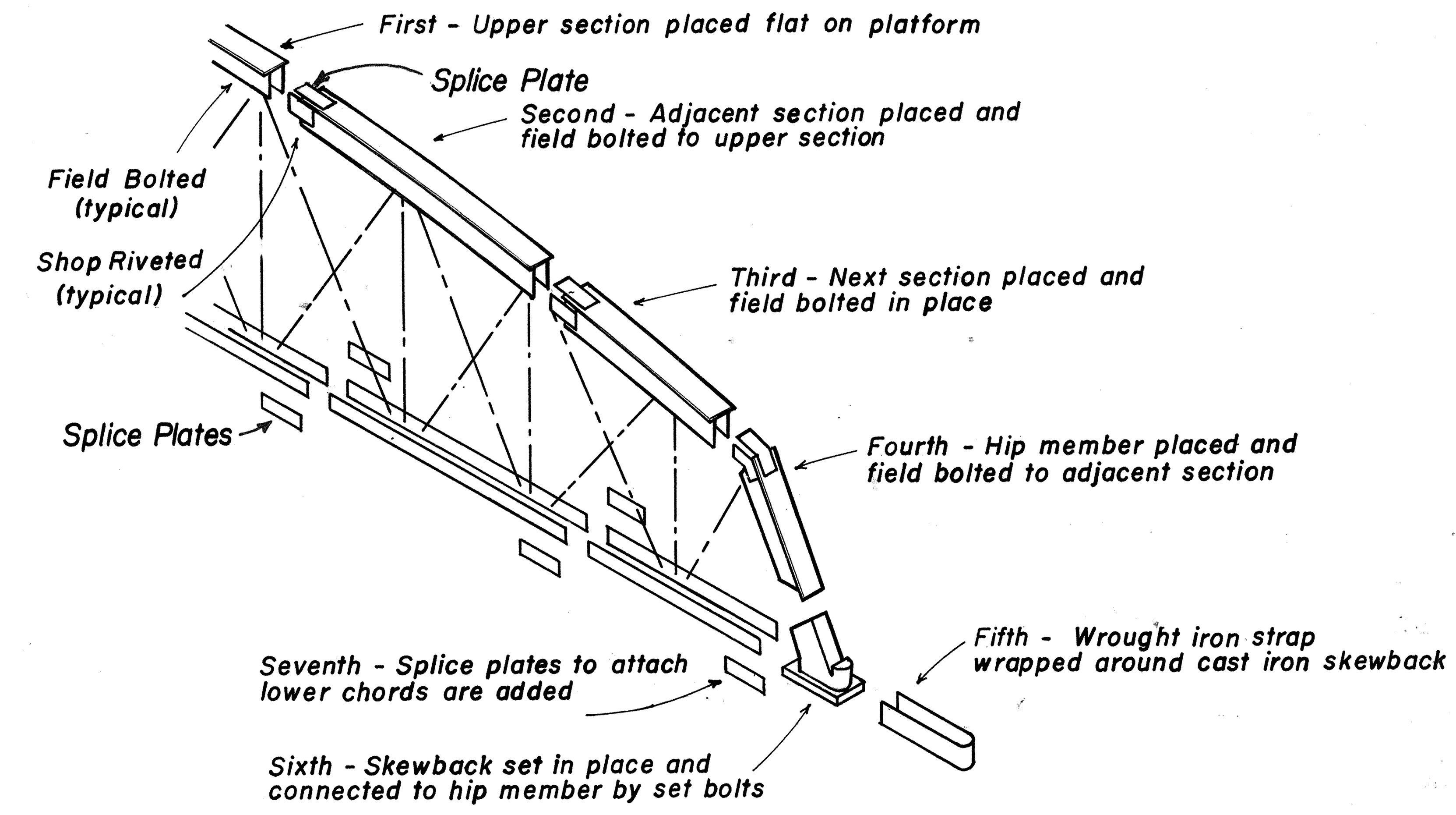
TRIM LINE

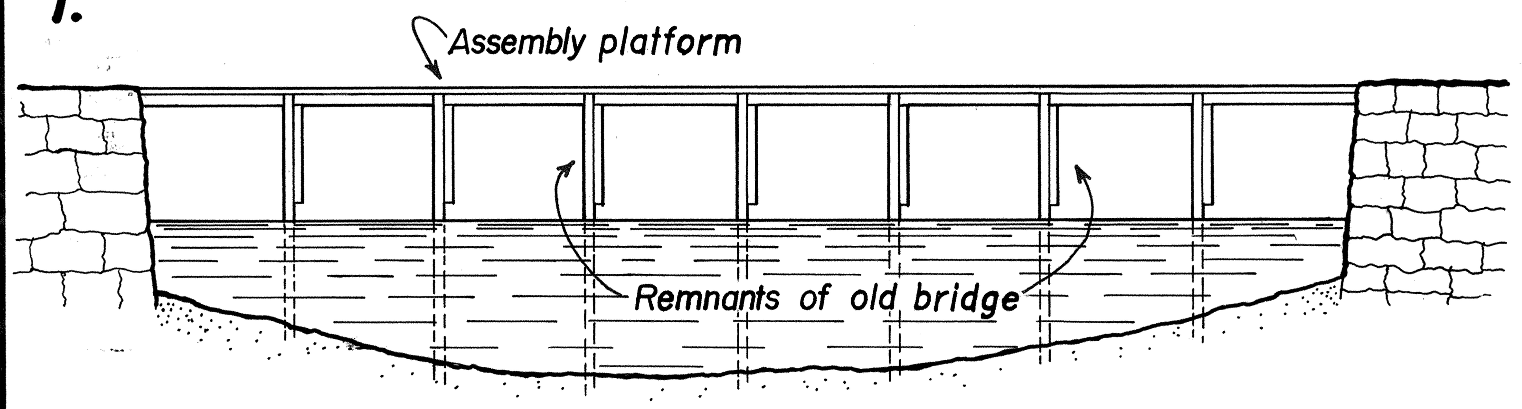
ERECTION SEQUENCE

The upper curved chord of the truss is made of five separate shop-riveted sections and connected by splice plates. The plates were shop riveted to the ends of one or another of the sections and later field bolted to adjacent sections at the site. The specific pattern of shop rivets and field bolts present suggests that the truss was designed to be assembled in a specific sequence, beginning with the topmost chord section. The following sequence is conjectural.

SEQUENCE FOR CHORD, HIP AND SKEWBACK ASSEMBLY

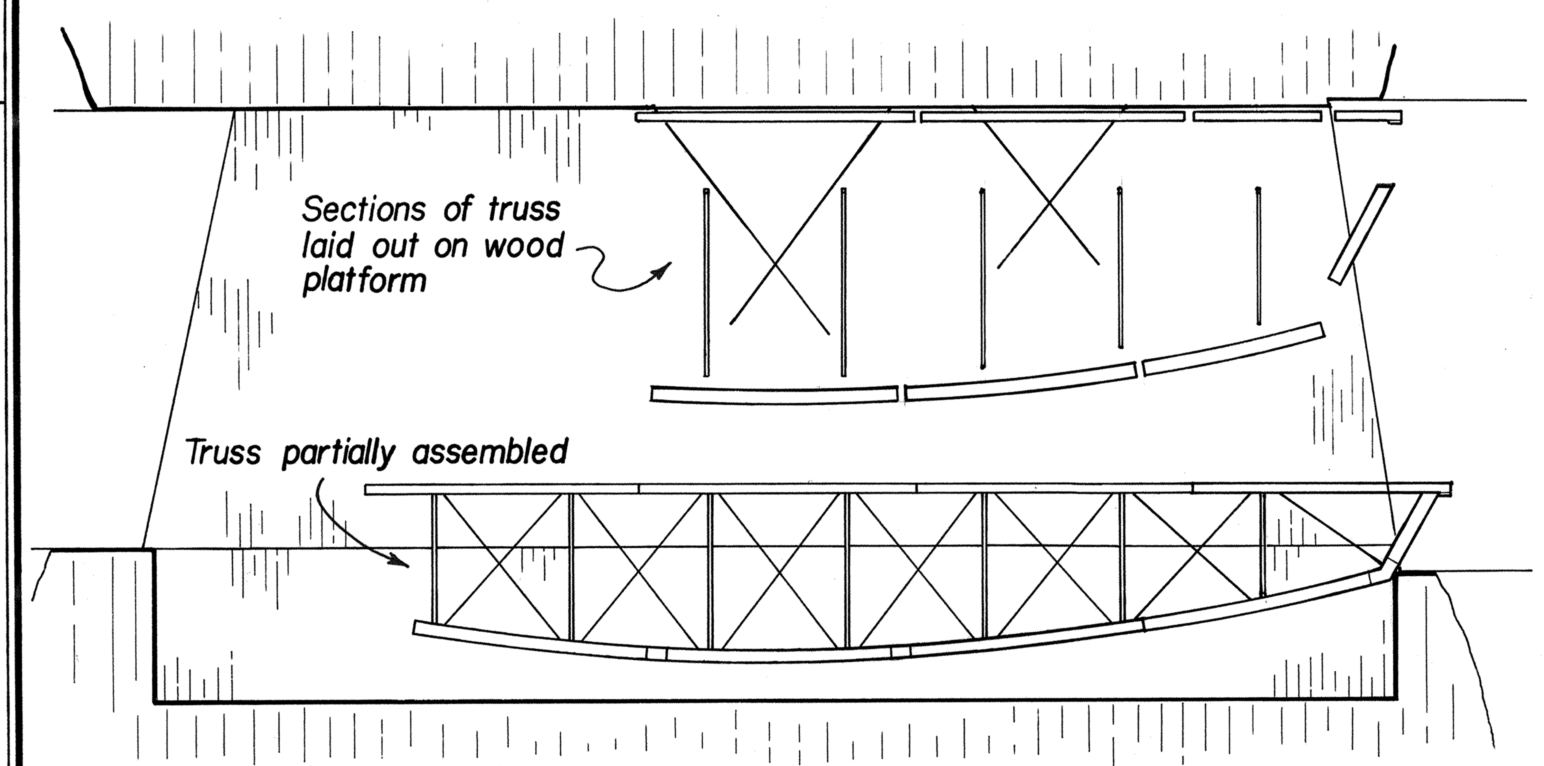


1.



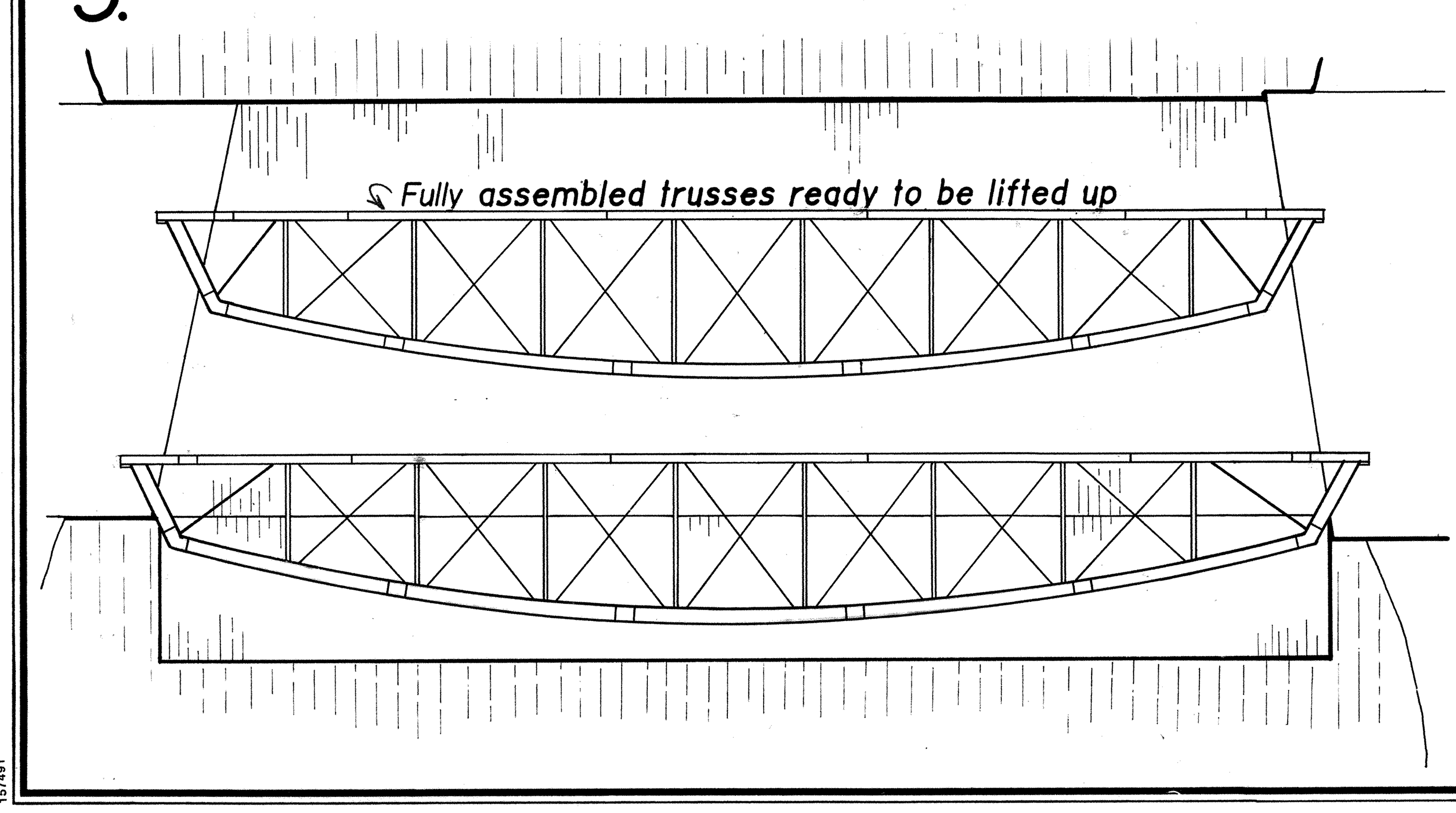
1. Evidence suggests that the old timber bridge at the site was used as a platform to build the new truss upon. Pre-manufactured sections with were laid flat on top of the platform.

2.



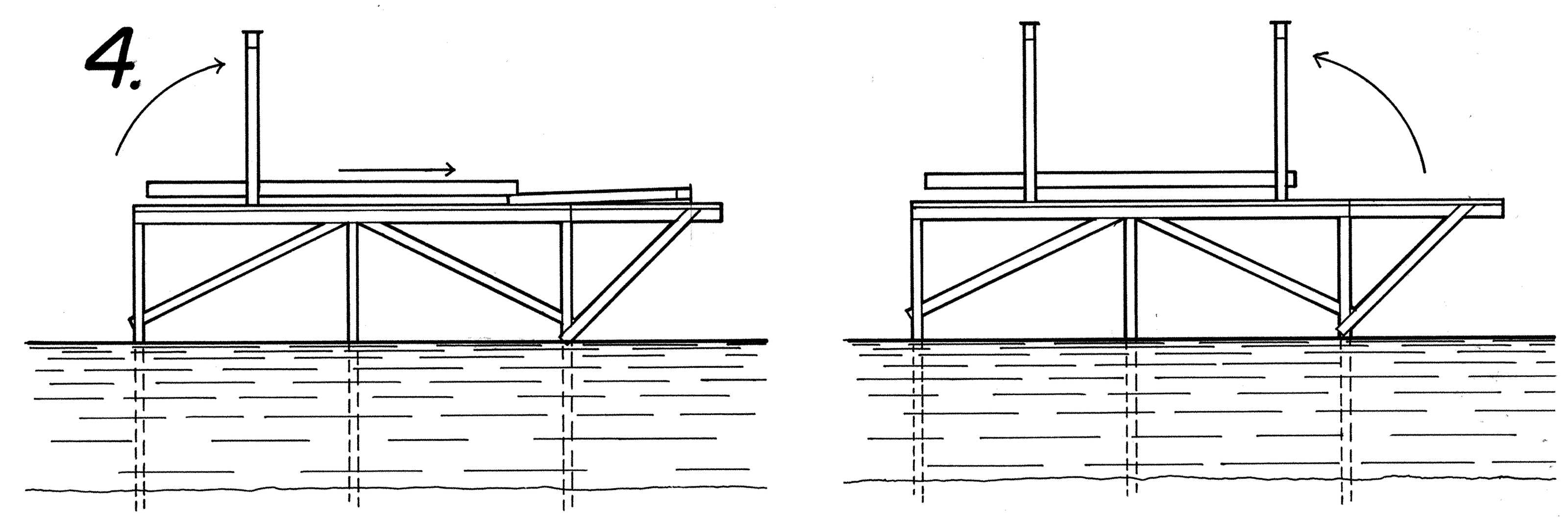
2. The topmost piece of each truss was laid in place. Adjacent sections were added, with the projecting splice plates slipping over the ends of the top piece. Members were aligned, and field bolts dropped into place. The end hips (with the lower skewback connections possibly already attached) were similarly connected to the pieces just installed. Lower chords and verticals (with lower pin receivers already attached) were then put in place. Upper pins were dropped into place. Diagonals were inserted from below. All bolts and nuts were put into place, but not tightened.

3.



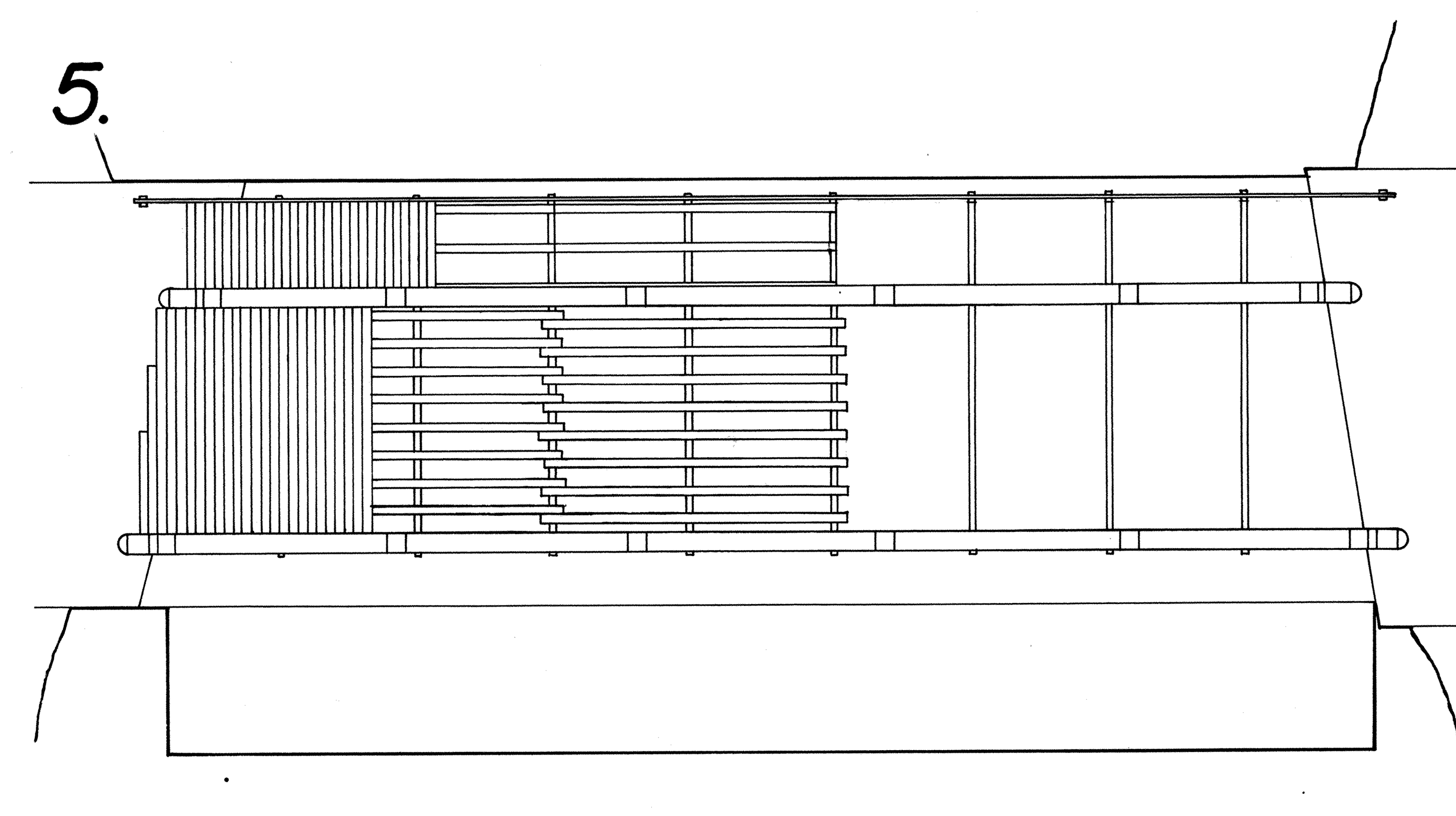
3. The final alignment of members was made. All field bolts were tightened in the upper and lower chords.

4.



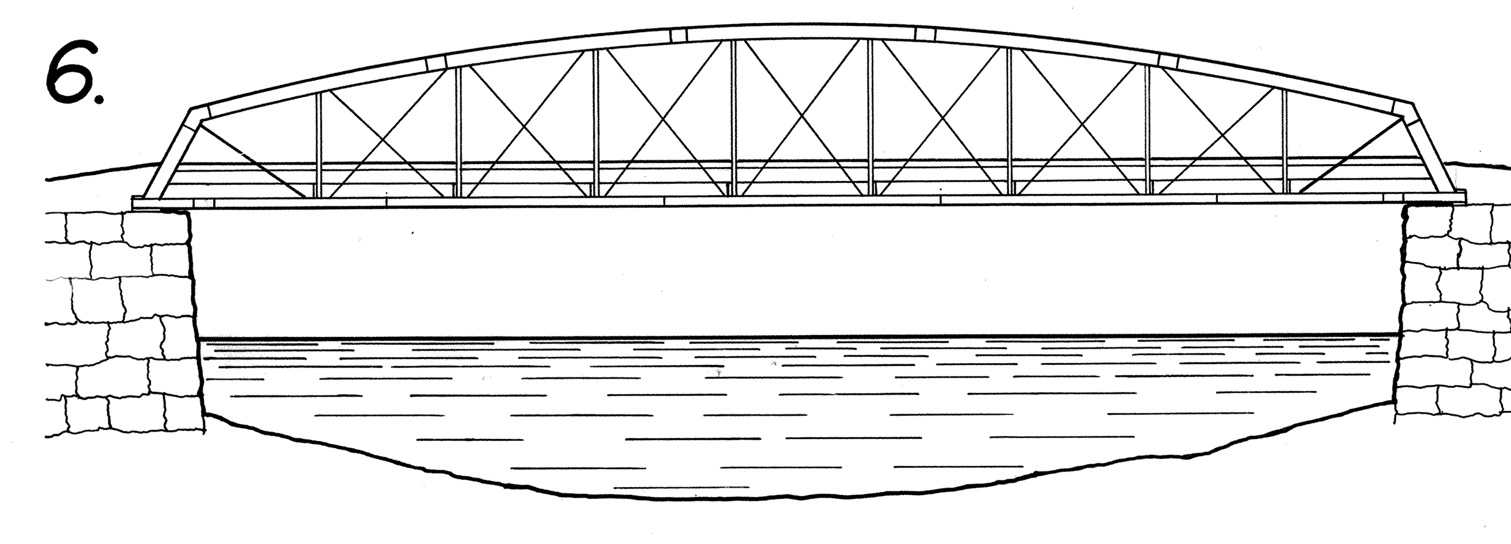
4. One truss was lifted, temporarily braced laterally, and transverse beams were inserted across the lower chord of the upright truss and on top of the lower chord of the remaining truss. The second truss was raised and laterally braced. Field bolt connections between verticals and transverse beams were made.

5.



5. The temporary lateral bracing was removed. Longitudinal timber beams (stringers) were placed, followed by the transverse decking.

6.



6. The bridge was completed by smoothing the approaches, adding railings, and removing the old timber work.

DELINEATED BY: Rudolf J.A. Sosef, 1990; Albert N. Debnam, 1991

MASSACHUSETTS HISTORIC BRIDGE PROJECT
NATIONAL PARK SERVICE
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NORTH VILLAGE BRIDGE (NORTH MAIN STREET BRIDGE) – 1882
SPANNING FRENCH (STONEY) RIVER ON NORTH MAIN STREET
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