Massachusetts Cultural Resource Information System

Scanned Record Cover Page

Inventory No:	BOS.9001
Historic Name:	Summer Street Bridge over Fort Point Channel
Common Name:	
Address:	
City/Town:	Boston
Village/Neighborhood:	Central Business District; Fort Point Channel; South Boston
Local No:	
Year Constructed:	
Architect(s):	Lawler, W. J.
Architectural Style(s):	
Use(s):	Other Rail Related; Other Transportation
Significance:	Engineering; Transportation
Area(s):	BOS.CX: Fort Point Channel District BOS.WZ: Fort Point Channel Historic District
Designation(s):	Nat'l Register District (9/10/2004)

Commonwealth of Massachusetts
Massachusetts Historical Commission
220 Morrissey Boulevard, Boston, Massachusetts 02125
www.sec.state.ma.us/mhc

MASSACHUSETTS HISTORIC BRIDGE INVENTORY

Municipality: Boston District: 8

Street name/Rt. #: Summer St.
Over
Street name/Rt. #: Fort Point Channel

Bridge key #: MUN896031100 Photo ##s: 1:32A; 2:7-13

Bridge plan #: B-16-31

Common/historic name: Summer St. Bridge

Current owner: City of Boston

UTM coordinates:

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National Register status (insert date)

Entered: Potential: ERA - "Third Harbor Tunnel"?

Eligible: Non-eligible:

Field rating: (3) 2 1

****

Date built (source): 1899 (plaque)

Date(s) rebuilt (source): ca. 1967, 1975 (Rating Rep.)

Builder (source): Berlin Iron Bridge Co.-draws; A&P Roberts Co.-fixed superstructures; *

Designer (source): ? poss. John E. Cheney, Boston Assistant City Engineer? (staff)

****

Structural type/materials: paired-leaf (each single-barreled) oblique retractile drawbridge, prob. steel, poss. iron. Three lines of deck plate girders in each leaf. A portal frame on each drawspan, consisting of a pair of samson posts carrying ends of pinned eyebar stays which help support cantilevered section of drawspan when bridge is open. Angled struts support eyebars near mid-point. Four single-truck and three double-truck carriages support each drawspan (trucks do not appear to be of the 1870 Pratt patent type). Steel rails on steel-and-timber runways angled 45° to length of bridge. Runways and drawspan on timber piles. Electric motors removed, some cables and sheaves remain. Four approach spans (2 north, 2 south) are deck plate girders on **See Below

Overall length: ca. 507' Deck width/layout: 101.4' out-to-out, 4 traffic lanes, 2 sidewalks, one 10' median

Skew: -

Main unit, # spans: paired, 1 lengths: c. 132' on drawspan; ca. 60' channel span

Approaches, # spans: 4 lengths: roughly 75', 80' 85', 85'

Plaque: 2 dates location: centered on portal frames

Alterations, unusual features, comments: original (?) timber deck and stringers on drawspans replaced ca. 1967; replaced again with present steel grid deck and steel stringers in 1975. Floor beam bracing on drawspans and approaches replaced by present steel, trussed bracing system 1969. Railings repaired 1969, 1975. Several members repaired/replaced 1975.

Drawspans fixed closed, motors removed, 1970.

*W.J. Lawler, draw foundations and piers; Coffin Valve Co., trucks; Miller and Shaw, draw machinery; General Electric, motors; Ross & Fowler, piers and abuts.

**masonry piers and abutments, w/later bracing. Approaches still have plank and granite cobble deck under bituminous.

Visual quality (bridge and setting): High X Average ____ Low ____

Site integrity: Retained E.Side X Violated W.Side X

Describe: Turn-of-the-century warehouse district still lines the South Boston edge of the Fort Point Channel here; the downtown side, however, is now lined behind Dorchester Ave. by modern office blocks, the new aluminum Federal Reserve Tower, and the Pop/Modern U.S. Postal Service building. Five late-19th -early 20th c. movable bridges, all of different structural types or sub-types still cross the Fort Point Channel within its mile-and-a-quarter length.

History of bridge and site: The present northern end of South Boston, stretchin eastward from the Fort Point Channel, is "made land" created by filling in marshes and tidal flats in the late 19th c. Filling proceeded eastwardly from Fort Point Channel, and had reached the area of the present Reserved Channel by the early 1890's. The large expanse of new land between these two channels was developed around the turn of the century into railyards and a warehouse district backing up an array of new waterfront piers. Summer St. was extended across this made land some 1000' back from the waterfront, becoming a major artery for the freight wagons heading in and out of the district. The present bridge across the Fort Point Channel was built to carry this heavy traffic into downtown Boston; a smaller retractile bridge (B-16-34) had been built in 1892 to tie the other end of Summer St. to South Boston's L Street and the industria districts at the foot of the South Boston hill.

Boston Engineering Dept. Annual Report 1900 p 166

Sources:

B.H. x
Plans No — Peter Stoff, "Three Boston Bridge Districts," BPANewsletter, May 1984
" ", SIA Conference," Friday Morning Tour" Notes, 1984
(also rough draft for same)

RR UEC 1980 — Fay, Spofford, & Thorndike, "Preliminary Environmental Assessment, Seaport Access System, South Boston," 1980.

Maint.No — Vincent Marsh, Consultant, Lane Frenchman, Inc., HAER inventory card.

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Summary statement of significance: The Summer Street Bridge is one of only two known retractile drawbridges surviving in Mass. (the other, B-16-34, is that located at the other end of Summer St. over the Reserved Channel); and it is one of only four known examples of the type remaining in the entire U.S. (the other two: the Carroll St. Bridge, Brooklyn, built in 1889; and the Borden Ave. Bridge, Queens, built 1908.) All four survivors are obligue retractiles (the drawspan is pulled away from the fixed approaches at a 45° angle, rather than being pulled directly back upon the approach spans) the Summer St. Bridge is the only paired-leaf retractile, with two drawspans pulling away on opposite sides of the bridge. It is also one of only eight known 19th-c. movable bridge listed in the MDPW computer print-out.

The retractile bridge type is thought to have originated in the Boston area around the 1860's with the prominent Boston civil engineer T. Willis Pratt believed to have played a major role in its development. Eight retractiles had been built for the City of Boston by 1901; six have been removed.

The Berlin Iron Bridge Co. of East Berlin, Connecticut (earlier know as Corrugated Metal Company) was an important New England Bridge-building company in the late 19th c. The firm was particularly noted for its patented lenticular truss bridges, may of which were erected in Mass. To date, 9 ~~six~~ surviving examples of the company's bridges have been identified in the MDPW computer print-out.

The Summer St. Bridge is the central element in the proposed Fort Point Channel Historic Bridges District.

Statement prepared by: S. J. Roper Date: 8 Aug. 1984

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Field survey by: S.J.Roper, MDPW Hist. Bridges specialist Date: May 1984

MDPW RECOMMENDATION - NATIONAL REGISTER ELIGIBILITY

	Municipality	Street on	No.
Bridge:	Boston	Summer St/Fort Point Channel	B-16-31

Historic evaluation

Significant because:

1) Unusual or unique type paired-leaf, oblique retractile	X
or rare survivor of common type	___
2) Early example of type	___
3) Design - Valuable contribution to bridge technology	___
4) Retains integrity	X
5) Builder known and important Berlin Iron Bridge Co.	X
6) Bridge historically important to area	X

Not significant because:

1) Common type	___
2) Post-1931	___
3) Design - no contribution to bridge technology	___
4) Integrity lost because of: a) alterations	___
b) disintegration	___
5) Builder unimportant or not known	___
6) No known significance in area	___

[X] * Potentially eligible both individually and as part of the proposed Fort Point Channel Historic Bridges District

[ ] Not eligible

Comments: One of only 2 known retractile bridges surviving in Massachusetts; one of only 4 known examples of the retractile type still standing in the entire U.S.; and the only paired-leaf example among the 4.

One of just 8 19th-C. movable bridges (out of a total of 44) identified in the MDPW statewide computer print-out.

Built by an important New England bridge-building firm -- the Berlin Iron Bridge Co. of E. Berlin, Ct.

The centerpiece of the proposed Fort Point Channel Historic Bridges District.

S. J. Roper, MDPW Historic Bridges Specialist.

9 Jan. 1985

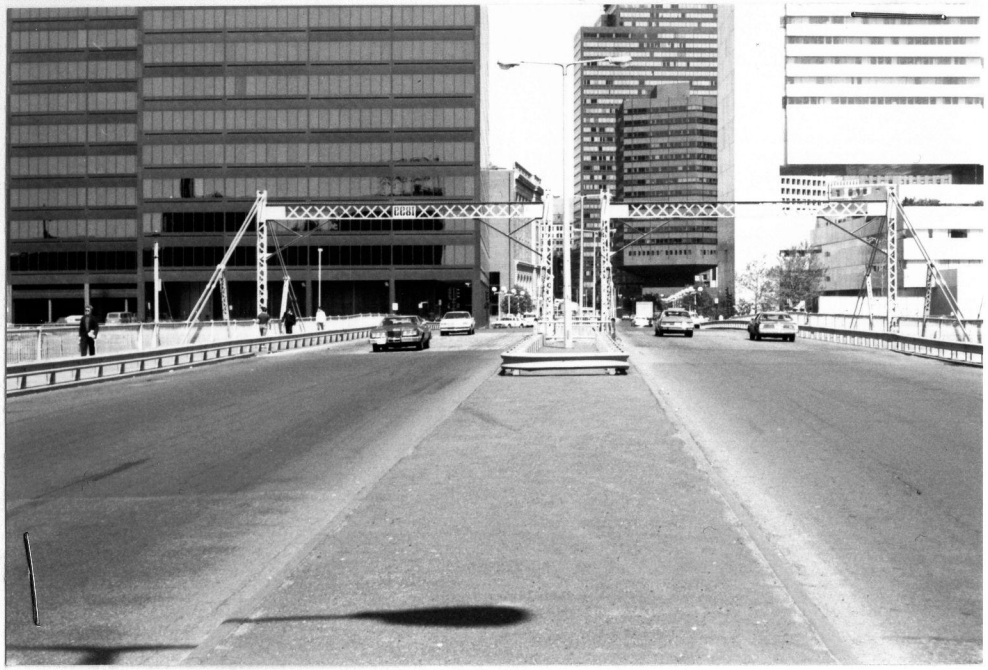

BOS.9001
B-16-31
Charlestown
Old Ironsides
Drydocks
U.S. NAVAL RES
Charlestown Bridge
Coast Guard Station
East Boston
Jeffries Point
Maverick Sq Sta
Water Tank
Camp Hill Park
SUMNER TUNNEL
CALLAHAN TUNNEL
MBTA TUNNEL
BOSTON
INNER HARBOR
East Cambridge
Courthouse
Playground
Charles River Dam
Locks
Hosp
Jr High Sch
Old North Ch High Sch
Cem
Library
North Sta
Mass General Hospital
LONGFELLOW BRIDGE
Fire Sta
City Hall
Faneuil Hall
Beacon Hill
State House
Custom House
Post Office
Frog Pond
Boston Common
Public Garden
Charles River Basin
Back Bay
Copley Square
Library
Park Sq
Police Sta
High Sch
South Sta
Fort Point Channel
Commonwealth Pier
Fish Pier
Dry Dock
U.S. ARMY RES
U.S. NAVAL RES
Reserved Channel
Pleasure Bay
Independence Square
City Point
St Peters Sch
National Shrine
Telegraph Hill
Hoar Sch
South Boston
Fire Sta
City Hospital
Franklin Square
Blackstone Square
Rotch Playground
Mackey Sch
Northeastern University
Madison Park
Eliot Cem
Orchard Park
Dearborn Sch
Andrew Square
Radio Tower
L Street Beach
Light
Head Island
INTERCHANGE 22
INTERCHANGE 23
INTERCHANGE 24
INTERCHANGE 15
INTERCHANGE 16
CONRAIL
FITZGERALD EXPRESSWAY
SOUTHAMPTON
COLUMBIA RD
DORCHESTER
BROADWAY
FIRST
WEST
E 5TH
E 7TH
E 8TH
DAY BLVD
MARINE
FARRAGUT RD
BOSTON S. QUAD.

FROM E

FROM W

GAP BETWEEN THE TWO RETRACTILE SPANS, FROM SE

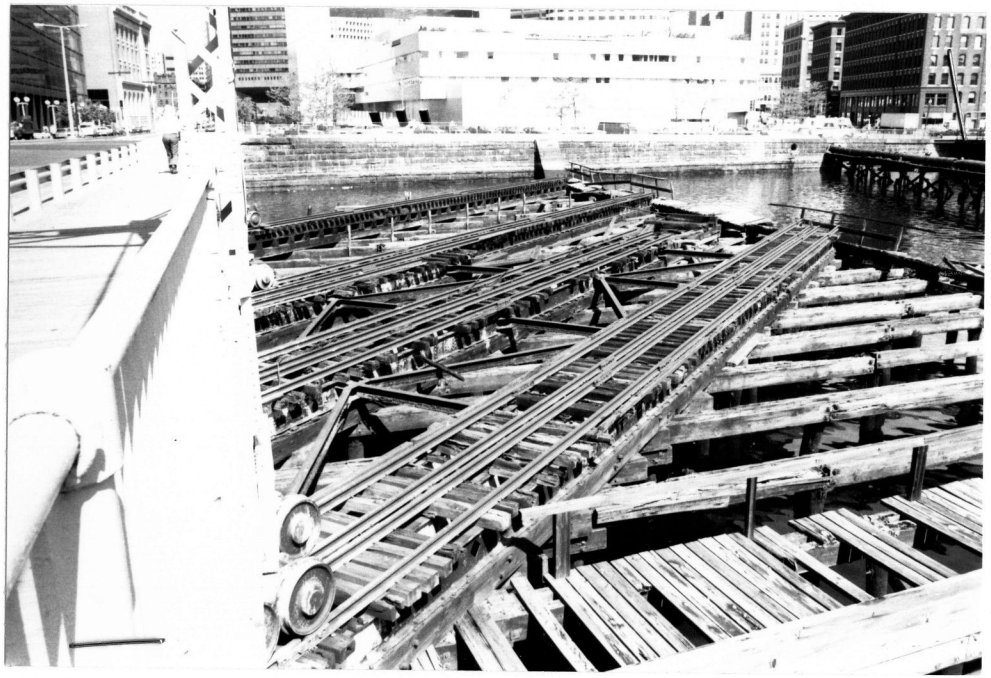
MAY 1984



FROM SE

RUNWAYS, W SIDE, FROM SE

FROM N



RUNWAYS, E SIDE FROM S

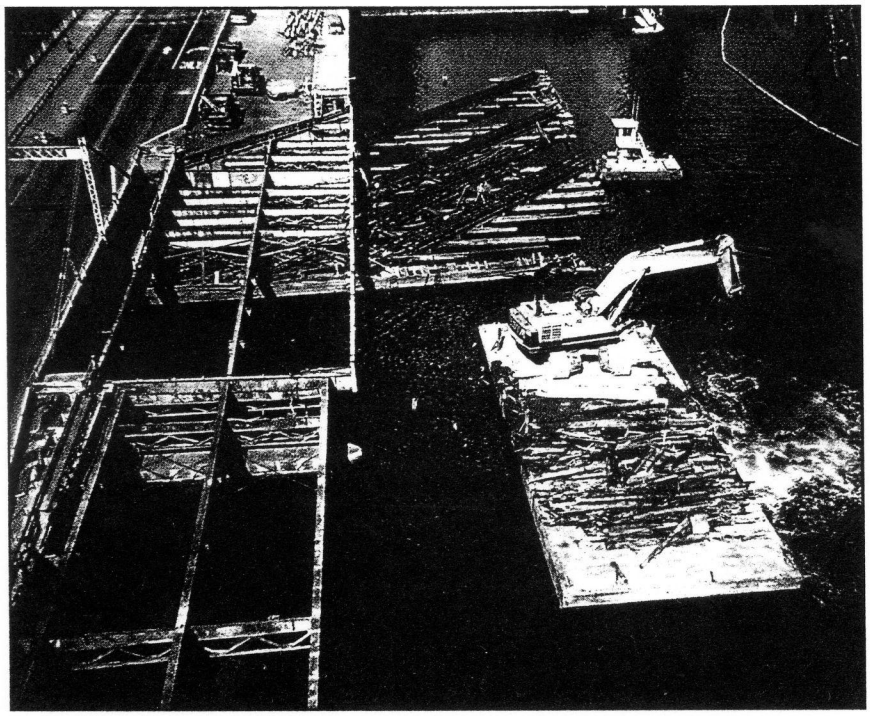
MAY 1984

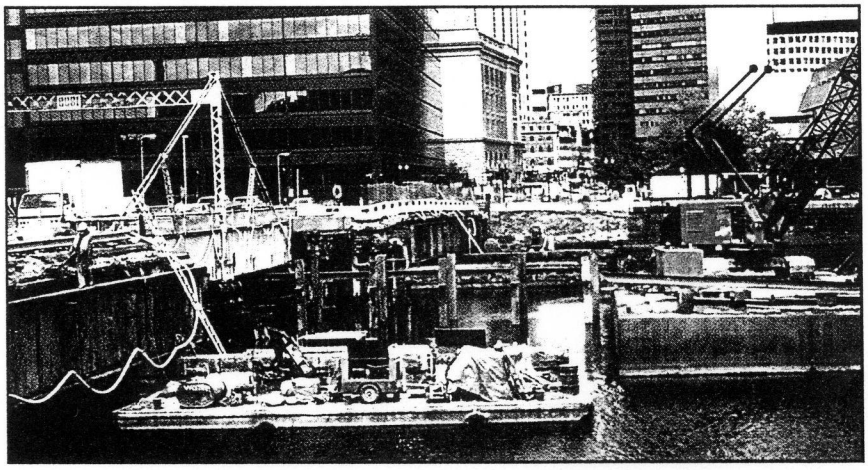
FROM NW (MAY 1984)

RENOVATION

BOSTON BRIDGE UPGRADE

Replacing the superstructure and renovating the substructure of an historic retractile bridge saved one of the last examples of this rare bridge type





The Summer Street Bridge was kept open to both pedestrian and vehicular traffic during renovation, all of which was staged from barges.

By Tom Quinlan, P.E., and Carl Goldknopf, P.E.

BOSTON IS A WONDERFUL AMALGAM OF THE OLD AND THE NEW, and the city is often faced with the dilemma of how to deal with historically significant structures. The latest problem revolved around a deteriorated 95-year-old movable bridge situated on a major vehicular and pedestrian route that connects the downtown business district with the South Boston commercial-industrial area. The bridge is the only known surviving example of an electrically operated, paired leaf, oblique retractile drawbridge—a bridge type developed and primarily used in the Boston area, beginning back in the mid 1850s. The Summer Street retractile bridge, built in 1899, represents the culmination in the evolution of this little known bridge type.

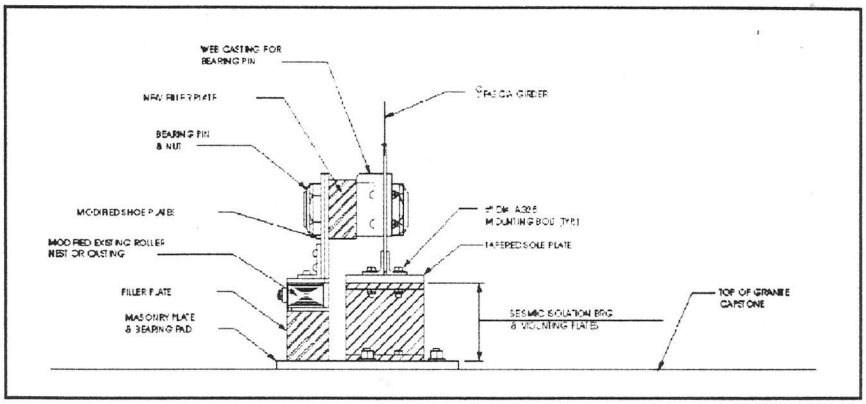
The condition of the existing bridge was critical. The steel superstructure was significantly corroded due to the harsh salt water environment of Fort Point Channel and the nearby Boston Harbor and the use of salt on the roadways during the winter. The substructure, constructed of stone masonry and concrete, was in general disrepair. Recent inspections and ratings required the bridge to be posted for an 8-ton H truck load limit.

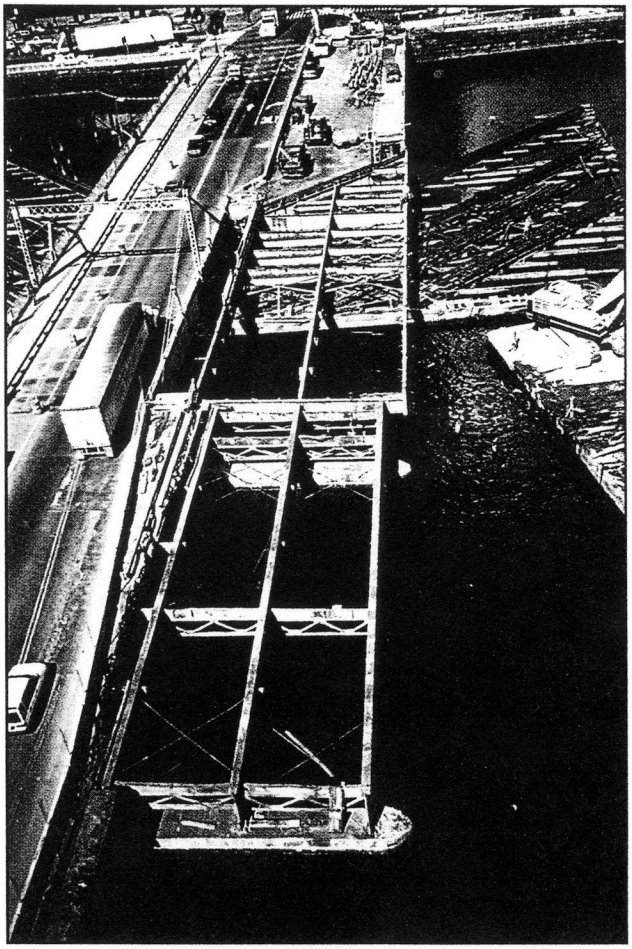
The City of Boston Public Works Department, the Massachusetts Highway Department and the Massachusetts Historical Commission were all committed to preserving this important example of 19th century American bridge engineering. However, because of the

condition of the bridge, its rehabilitation was critical. Important design issues included: maintaining its historic appearance; upgrading the bridge to carry HS20 truck live loads; keeping the bridge open to vehicular and pedestrian traffic during renovation; and retrofitting the bridge for seismic conditions.

After significant engineering analysis, it was determined that the existing substructure could be repaired, but the superstructure had to be replaced. By reusing several of the key historic bridge components, in combination with new structural steel, most of the original appearance and historic character would be maintained.

Several key historic bridge components will be refurbished and reused as part of the scheme to maintain the original appearance of the bridge. The original fascia girders of the approach spans will be utilized with rearticulated bearings. The seismic isolation bearings are to be hidden behind the shoe plates and bearing pins which originally transferred vertical loads to the roller nest bearings. Dummy roller nest bearings retain the appeal of the original construction. Other original bridge elements used in the rehabilitation included the Sampson Post Trusses, historic metal bridge railing, truck carriages and rails that supported and moved the drawspan. The refurbished truck carriages and rails will be supported on new timber draw pier framing and new timber piles. Facsimile roadway joints along the perimeter of the drawspan were fabricated and used with altered pavement colors to highlight the drawspan section of the bridge.





The original fascia girders of the approach spans are utilized with articulated bearings in the renovated bridge.

Historic Significance

The original bridge was constructed over the Fort Point Channel, a tidal estuary that serves as anchorage for fishing, shellfishing and lobstering vessels, as well as pleasure boats and rowing shells. The surrounding area, known as the Fort Point Historic District, includes five of the eight known surviving movable bridges of the 19th century noted in the Massachusetts Highway Department historic bridge survey.

Built in 1899, the bridge is an example of early steel construction and includes riveted built up plate girders and rolled medium grade steel shapes. The overall bridge is 508 ft. in length. It is constructed on timber pile supported foundations. The structure consists of two fixed approach spans between 80 to 85 ft. in length, on each side of a movable horizontally retractable drawspan. The drawspan, when open allows for a 50-ft. wide navigation channel. Due to the severe deterioration of the drawspan and the lack of maintenance required to keep the bridge operable, the bridge was fixed by federal legislation in 1959.

One of the unique features of the drawspan are the use of Sampson Post Trusses, which support the cantilever end of the drawspan in the retracted position. A portal frame on each draw leaf consist of a pair of these Sampson posts which carry the ends of pinned eyebar stays attached to the drawspan girder in a trussed configuration. Four single and three double rolling truck carriages support each of the drawspan leafs on the draw piers adjacent to the bridge. The twin drawspan leafs were mechanically retracted at a 45 degree angle to the bridge centerline.

Proposed Rehabilitation

The rehabilitation of this bridge begins with the repair of the existing substructures, since it was determined that the foundations possessed the capacity to resist the new superstructure design loads.

A new pile bent was designed to replace the foundation of the former drawspan. The new pile bent is constructed of 18 concrete-filled steel pipe piles, each 22-in. in diameter, driven to a 135-ton working load with a concrete pile cap. This foundation will support two new 89-ft.-6-in. long fixed spans, formerly occupied by the drawspan and a fixed triangular section adjacent to the drawspan.

Due to the inability of the existing granite masonry piers and abutments to tolerate large lateral forces and displacements, especially in the longitudinal direction, it was decided to incorporate lead rubber isolation bearings manufactured by Dynamic Isolation Systems Inc., to minimize the seismic forces delivered to the foundations. These bearings substantially reduce the inertial effects transmitted to the substructure, thus dramatically improving seismic performance during an earthquake.

A new six-span continuous steel superstructure constructed of M270 rolled wide flange

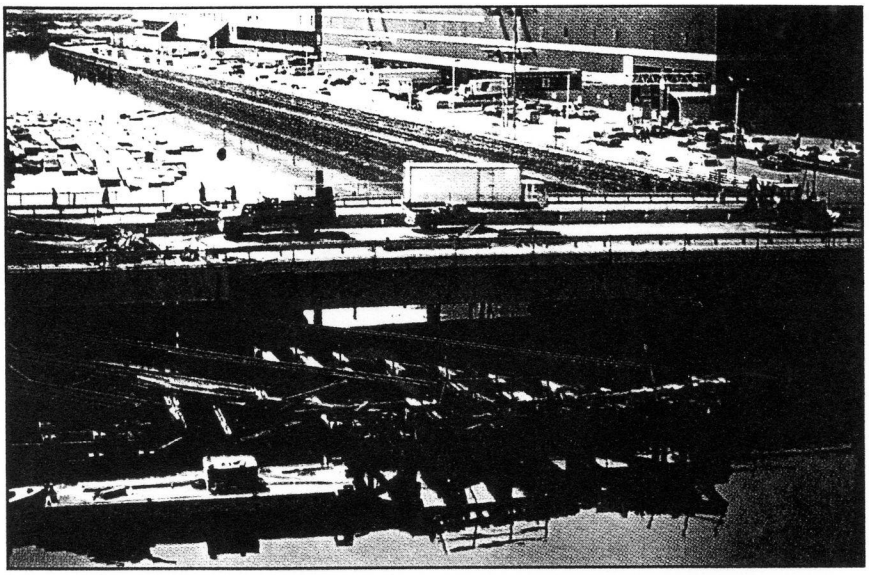
shapes, with cover plates, replaces the existing longitudinal girders, transverse floor beams and roadway stringers. There will be 15 stringers, each 36-in. deep, spaced equally across the 100-ft.width of the bridge. The stringers were made continuous to limit the number of roadway joints to simplify maintenance, provide a more economical steel design, and distribute the horizontal forces evenly among the piers. A new neoprene compression seal was designed to provide the necessary expansion capacity at each end of the bridge.

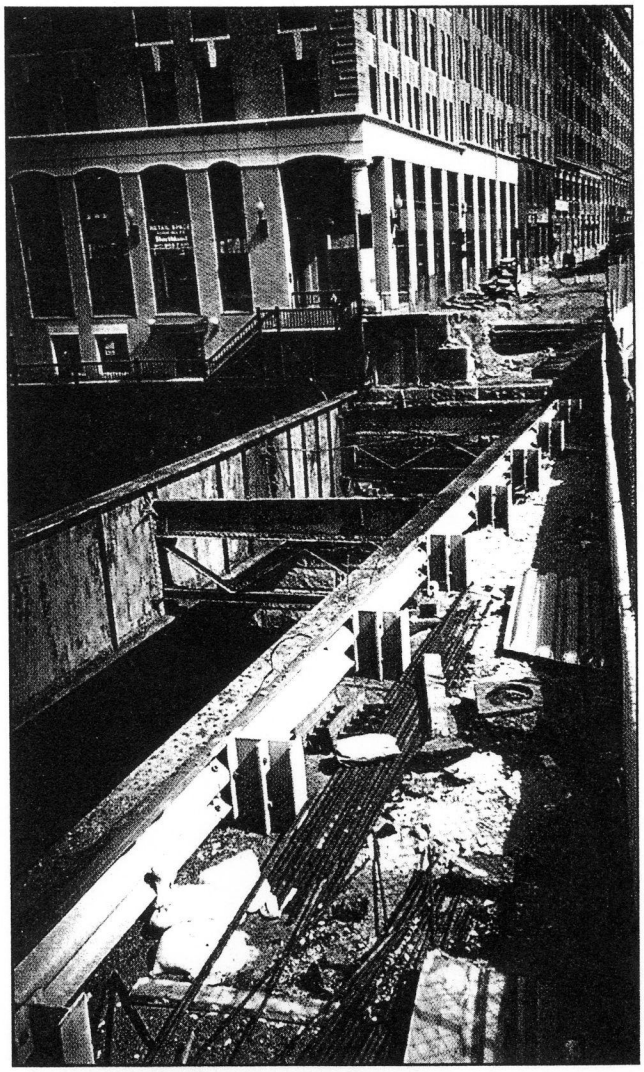
The rehabilitated structure will require 920 tons of new structural steel and an additional 50 tons of new steel was used to temporarily strengthen the existing structure for traffic during the construction period. The new pile bent added another 50 tons of A252 steel to the project

The reconstruction, started in November 1994, is taking place in two phases in order to maintain vehicular and pedestrian traffic at all times, and is currently slated to be completed in early 1997. The project was jointly funded by the Federal Highway Administration, the Massachusetts Highway Department and the City of Boston. Structural engineer on the project is STV Inc., Boston; general contractor is The Middlesex Corporation, Chelmsford, MA; construction administrator is the Masschusetts Highway Department; project owner is the City of Boston; steel erector is Converse Construction, Milton, MA; and structural steel fabricators are AISC-members Precise Fabricating Co. and High Steel Structures.

Tom Quinlan, P.E., is a project engineer and Carl Goldknopf, P.E., is chief engineer with STV Incorporated in Boston.

PHOTOS BY MICHAEL HEALEY, OF STV INC., BOSTON.





One of the difficulties of the project was the site constraints, including the necessity of keeping the bridge open to traffic and working around nearby buildings.

DETERMINATION OF ELIGIBILITY (MHC OPINION)

TO: _____ RETURN TO REVIEWER BY _____ (DATE)

FROM: W. Smith

DATE: 6/21/85

TOWN: Boston

PROPERTY: B-16-31 SUMMER St over Fort Point Channel
(NAME AND ADDRESS)
"Summer St. Bridge"

1. Does this property meet the criteria for NR eligibility?

☒ YES

☐ NO

A. Criteria
   a. events
   b. lives
   (c) characteristics
   d. information

B. Local _____ State _____ National X

Retractile

2. Statement of Significance: OR Why not eligible?

1899) one of only 2 known RETRACTILE Bridge SURVING IN MASS.; ONE of only 4 known example of Retractile BRIDGE STILL Standing in the entire U.S. AND the only paired-Leaf example among the four.

Located in an Area which may be eligible for Listing as a National Register Historic District (Fort Point Channel Bridge district)

☐ DOE LETTER WRITTEN FILED IN ER FILE _____

_____ (DATE)

Summer St. Retractile Bridge
Spanning Fort Point Channel at Summer St.
Boston
Suffolk County
Massachusetts

HAER MA-41

WRITTEN HISTORICAL AND DESCRIPTIVE DATA

PHOTOGRAPHS

Historic American Engineering Record
National Park Service
Department of the Interior
Washington, D.C. 20240

HISTORIC AMERICAN ENGINEERING RECORD

HAER MA-41

SUMMER STREET RETRACTILE BRIDGE

Date: 1899-1900

Location: Spanning Fort Point Channel at Summer St. Boston, Suffolk County, Massachusetts.

Owner: City of Boston

Significance: The Summer St. bridge is a rare movable type of bridge known as a retractile draw, in which the moving span is pulled diagonally away from the navigable channel on several sets of rails. Only four of these have been identified in the country, two of which are on Summer St in Boston. The form is thought to have been invented by T. Willis Pratt in the 1860's. This bridge is a double retractile: parallel spans pull away from the center in opposite directions. Despite its deteriorating condition, the bridge is the center element of the rich Fort Point Channel Bridge District.

Transmitted by: Dan Clement, 1984. Historical information written by Peter Stott.

ADDENDUM TO
SUMMER STREET RETRACTILE BRIDGE
Spanning Fort Point Channel at Summer Street
Boston
Suffolk County
Massachusetts

HAER No. MA-41

PHOTOGRAPHS

WRITTEN HISTORICAL AND DESCRIPTIVE DATA

HISTORIC AMERICAN ENGINEERING RECORD
National Park Service
Philadelphia Support Office
U.S. Custom House
200 Chestnut Street
Philadelphia, PA 19106

HISTORIC AMERICAN ENGINEERING RECORD
SUMMER STREET RETRACTILE BRIDGE

This report is an addendum to a one-page report completed in 1984 previously transmitted to the Library of Congress.

Location: Spanning Fort Point Channel at Summer Street, Boston, Suffolk County, Massachusetts

UTM : 19:330950.4690550
Quad: Boston South, Massachusetts

Date of Construction: Built 1899. Repaired / Altered 1918, 1931, 1939, 1954,1967, 1969-70, 1975-76, 1984-89, 1990

Architect/Engineer: William Jackson and John E. Cheney, Boston City Engineers

Present Owner: City of Boston Public Works Department
Bridge Division
1 City Hall Plaza
Boston, MA 02201

Present Use: Vehicular Bridge (former Vehicular and Street Railway Bridge)

Significance: The Summer Street Retractile Bridge is the only known surviving electrically-operated, paired-leaf oblique retractile drawbridge. Despite its poor condition and loss of much of its operating equipment and auxiliary structures (gates, Tender's House, and pedestrian waiting shelters), several of the early components (superstructure, retractile rails, wheels, and operating machinery on the south side) remain. The Summer Street Retractile Bridge is one of five surviving movable bridges located in the proposed Fort Point Channel Historic District. It is one of eight known remaining nineteenth-century movable bridges in the Massachusetts Highway Department Historic Bridge Survey.

Project Information: This documentation was initiated in 1990 in accordance with an agreement between the City of Boston and the Massachusetts SHPO as a mitigative measure prior to the reconstruction of the bridge in situ. This documentation was prepared by:

McGinley Hart & Associates
77 North Washington Street
Knecht
Boston, MA 02114

Under Subcontract to:
Seelye Stevenson Value and

230 Congress Street
Boston, MA 02110

Site Description - Context

The Fort Point Channel area was developed during the nineteenth century as a result of the filling of the South Boston Flats. Originally known as Dorchester Neck, South Boston was incorporated into the City of Boston in 1804. The peninsula initially attracted residential development as a result of the toll bridge built in 1805 by the South Boston Associates on the alignment of Dover Street, present Berkeley and Fourth Streets. The 1827 Free Bridge (later Federal Street, present Dorchester Avenue Bridge) further promoted development. The marshy area known as the Flats and the intervening South Bay later became available for commercial development as a result of the efforts of three entities: the Boston Wharf Company, the Commonwealth of Massachusetts and various railroad companies. The Boston Wharf Company was incorporated in 1836 to capitalize on new wharf development, acquiring areas along Fort Point Channel. Throughout the nineteenth century the company built 45 buildings which are potentially eligible for listing on the National Register as part of the Fort Point Channel Historic District.[1]

This construction was promoted by the reclamation and filling of the area by the Commonwealth for industrial and commercial development in the last quarter of the nineteenth century, culminating in the construction of the Commonwealth and Fish Piers in 1913. The railroad, attracted to the waterfront by the Wharf Company in the 1850s, began a large rail yard in the 1880s which became the New York, New Haven and Hartford Railroad's principal Boston freight depot in 1893. Five existing movable bridges were built across Fort Point Channel between 1870 and 1930 and are as follows:

- Northern Avenue Swing Bridge (Pratt truss swing span, 1908, HAER No. MA-37)
- Congress Street Bascule Bridge (Strauss overhead counterweight bascule, 1930, HAER No. MA-38).
- Summer Street Retractile Bridge (paired retractile draw, 1899, HAER No. MA-41)
- South Station Old Colony Railroad Bridge (Scherzer rolling lift, 1900, HAER No. MA-35)
- Broadway Swing Bridge (1875/1915)

An earlier railroad swing bridge was built in 1855 at the Summer Street site by the New England Railroad (originally the Midland Railroad) to reach its passenger and freight terminals at Dewey Square near today's South Station. The railroad was discontinued in 1896 by an Act of 1896, Chapter 535, which provided for the extension of Summer Street across Fort Point Channel.[2]

The present Summer Street Retractile Bridge was built in 1898-1899 as a result of the efforts of Boston Wharf Company President Joseph B. Russell. Its construction marked the beginning of extensive relocation of wool warehouses from the Dewey Square area to new warehouses constructed across Fort Point Channel in South Boston, particularly by the Boston Wharf

Company. The bridge thus has cultural associations with the development of South Boston. It also has historical interest as the site of the 1916 trolley disaster. The bridge is a familiar landmark to Boston Harbor and automobile traffic, and is visible from other nearby landmark bridges.

The bridge was constructed for the City of Boston by the Berlin Iron Bridge Company under the direction of the Boston Public Works Department, and linked downtown Boston with the South Boston waterfront to the southeast. The paired retractile draw is located on Fort Point Channel between Dorchester Avenue on the northwest and the Boston Wharf Company properties on the southeast. The draw sections are at the center of the bridge which is supported between masonry abutments by four fixed-span masonry piers and a series of wood bents under the retractile rails. On the north side toward the harbor at the west end is the Federal Reserve Bank, and at the east end are the Boston Wharf Company buildings in the proposed Fort Point Channel Historic District. On the south or upstream side at the west end is South Station, and on the South Boston end are the six and seven-story masonry Boston Wharf Company buildings in the proposed historic district. The bridge is a major vehicular and pedestrian route to the South Boston commercial-industrial area from South Station and the downtown Boston business district.[3]

Fort Point Channel is a tidal estuary which serves as anchorage for fishing, shellfishing and lobstering vessels, as well as pleasure boats and rowing shells. Boston Harbor is located to the northeast on the other side of the adjacent Congress Street Bascule Bridge (HAER No. MA-38) and Northern Avenue Swing Bridge (HAER No. MA-37). The tidal basin between the Summer Street and the Congress Street bridges is presently crossed by two water mains and marked by numerous old fender piles. The Summer Street Retractile Bridge is no longer operable due to extensive deterioration of the bridge structure and its pilings and the loss of its Tender's House, pedestrian waiting shelters and gates, which have greatly compromised its historic integrity. The bridge has been determined eligible for listing on the National Register of Historic Places.[4]

Design Context

The Summer Street Retractile Bridge of 1899 represents the culmination of the evolution of a bridge type which was developed and primarily utilized in Boston. A little-known engineer, Luther Drew, working with City Engineer James Slade, appears to have pioneered the retractile bridge form as attested by his drawing for the Federal Street (now Dorchester Avenue) Bridge of 1856, the earliest known structure of this type.[5] The drawings for a "Slide Draw" (in the City Engineer's Bridge Collection in the Boston Public Library) were signed by both Drew and Slade. The draw span had Samson posts (upright vertical posts supporting

tension stays. See drawing HAER Photo No. MA-41-30) with stays tightened by turnbuckles to support a diagonal retractile draw system.

Luther Drew is listed in Boston city directories as an engineer living at 105 Boylston Street from 1855 to 1857. The shipfitter's characteristics of the cantilevered, timber structure supported by metal stays, suggest he may have been a relative of the Drew family involved in the manufacture of shipbuilding tools and foundry work at Kingston and Plymouth on the South Shore.[6] James Slade is listed as a civil engineer with his home at 1 Canton Place in 1855 and at 53 Indiana Place in 1856-7. Little else is known about either man at present but their early bridge design of 1856 had a seminal role in the development of the retractile bridge type. Although the stay-support system was utilized in the construction of only a few bridges in the nineteenth century, including in the nearby 1899 Summer Street Bridge over Fort Point Channel, it has recently regained prominence in contemporary bridge design. The most recent bridge designs for Boston's Central Artery Charles River Crossing include proposed cable-stayed bridge concepts.

Thomas Willis Pratt (1812-1875), the noted civil engineer and inventor, died twenty-five years prior to the completion of the Summer Street Retractile Bridge. However, Pratt also had a significant role in the development and refinement of the retractile drawbridge type in Boston. During 1870-73 the Federal Street Bridge over Fort Point Channel was rebuilt as a double retractile draw by the City. The annual report at the time stated "each of these draw-bridges has two Pratt trusses." [7] Pratt was then involved as Superintending Engineer for the city on the construction of the adjacent Broadway Bridge built in 1870-75 over the Channel.

In 1870 Pratt also patented a system "equalizing the weight borne upon the wheels and carriages" [8] - a retractile draw support system apparently developed during the concurrent rebuilding of the Federal Street Bridge. This truck system evidently tied together his experience working for various railroads (he was Chief Engineer for the Eastern Railroad from 1871 until his death) with his expertise in bridge design. The Boston Public Library's comprehensive City Engineer's Bridge Collection includes drawings of the Federal Street Bridge dated 1869 to 1872 for various proposals for innovative wood and iron drawbridges. These proposed designs, for retractile as well as alternative schemes for "Side-Pivot Turn-Table Draw" and Swing Bridges "Not Adopted", are unsigned; however, Pratt served as consultant to City Engineer Nathaniel H. Crafts and his successor Joseph P. Davis, under whose direction the drawings were prepared. [9]

The adopted design for the Federal Street Bridge (rebuilt in 1870-1873) has composite wood/metal Pratt trusses (similar in form to Pratt's 1844 patent truss design) with a curved top chord which he patented on April 1, 1873.[10] A November 1871 drawing for a support system of trucks, although stamped "Not Adopted", is very similar to the four-wheeled trucks used over twenty-five years later on the Summer Street Retractile Bridge (HAER Photo No. MA-41-21). Other innovative drawings include those for a "Proposed Wrought Iron Slide Draw" - a retractile draw entirely of wrought iron including a metal pan deck - dated December 1869. It appears that these drawings were resurrected for the 1890-92 reconstruction of the Federal

Street Bridge for which the August 1890 drawings show a similar retractile bridge structure entirely of iron with the exception of the wooden deck. With its iron girders, Samson posts, supporting stays and pipe railing, this design was the immediate predecessor of the 1899 Summer Street Retractile Bridge.

The original drawings show that the 1870-73 Federal Street Bridge was a horse-powered, rack-and-pinion drive, counter-weighted, retractile draw based upon the earlier 1856 precedent by Drew and Slade. The alternative designs which were not adopted pre-dated the Summer Street Retractile Bridge by over twenty-five years yet apparently served as design sources for the later bridge. The early, seminal drawings in the City Engineer's Bridge Collection in the Boston Public Library are extremely important and deserve further evaluation as the basis of the later design for the reconstruction of the Federal Street Retractile Bridge in 1890-1892. This iron retractile draw was the immediate prototype for the 1899 Summer Street Retractile Bridge.

A design for an "Iron Centre Pivot Turn Table Draw" dated July 1871, as well as another design "Not Adopted" for an iron truss swing bridge supported on iron pilings with arched connectors has relevance to the study of alternative bridge designs of the period. The 1870 Broadway Bridge's early iron screw pilings failed, requiring its reconstruction in 1875. This may offer insight into the reasons for selection of the proven retractile bridge form which was often was used elsewhere: in 1870 over the Charles River to City Square in Charlestown (Warren Bridge, rebuilt in 1884, demolished), in the widening of Federal Street, in a double retractile constructed in 1877 at Dover Street (now the Fourth Street Bridge to South Boston), again in the rebuilding of Federal Street Bridge in 1890-92, and finally at Summer Street and its Extension over the Reserved Channel (the last active bridge of the type) in 1899-1900. The Federal Street Bridge drawings not only shed light on the history and evolution of the retractile bridge as a type, but also illustrate the great diversity of design solutions under consideration by engineers during the nineteenth century.

The Summer Street Retractile Bridge of 1899, which replaced an 1855 swing bridge, was preceded by earlier structures at nearby bridge crossings over Fort Point Channel. Previous swing bridges crossed to South Boston at Mount Washington Avenue (1855) and Congress Street (1874). The Summer Street Retractile Bridge was built based upon the immediate precedents of the earlier Dover Street Retractile Bridge (1877, demolished) and the Federal Street (now Dorchester Avenue) Bridge (1892, demolished by the USPS and replaced by a fixed span in the 1980's). Of the eight retractile bridges built by the City before 1901, only two remain: the Summer Street Retractile Bridge over Fort Point Channel and the single-leaf retractile bridge at the other end of Summer Street over the Reserved Channel.

Construction and Alterations

The history of the Summer Street Retractile Bridge including its original construction, rebuilding, repairs and maintenance is well-documented in the collections of the Bridge

Division of the Boston Public Works Department (records of active bridges kept at 400 Frontage Road in South Boston) and the annual reports of the earlier Bridge and Ferry Division, as well as other photographic collections such as those of the Bostonian Society and newspaper archives. The original and existing condition of both the site and the bridge are documented by the drawings and photographs accompanying this text.

The Summer Street Retractile Bridge, a paired-leaf oblique retractile bridge, has each barrel constructed of three deck-plate girders. A portal frame on each draw span consists of a pair of Samson posts which carry the ends of pinned eyebar stays which help support the cantilevered section of the draw span when the bridge is open. The general plans for the bridge were approved by the Board of Harbor and Land Commissioners on September 7, 1897. The necessary authority to construct the bridge and sea walls was obtained from the U.S. Government through the Secretary of War on September 27, 1897. The bridge was apparently the design of Boston City Engineer William Jackson who signed the drawings, possibly with the help of Assistant City Engineer John E. Cheney. It was built in conjunction with the planned extension of Summer Street to South Boston.

Contracts for building the west abutment were awarded on October 7, 1897, and the masonry abutments and piers were completed December 30, 1898. The steel superstructure of the fixed spans was completed June 15,1899 and the timber piles for the draws and necessary draw piers in August of 1899. The first of the two draws was put into service on August 14, 1899, powered by a temporary steam plant until electricity was installed. The new street approaches and operation of the draw bridge were turned over to the Boston Street Department on January 26, 1900. The draw foundation and piers were built by W. J. Lawler. The Berlin Iron Bridge Company of Berlin, Connecticut built the draws and A. & P. Roberts Company built the fixed spans. The Coffin Valve Company supplied the trucks and General Electric supplied the draw machinery which was built by Miller and Shaw. The cost of the bridge together with the Summer Street Extension, 100 feet wide and over 4,000 feet long, was $1,177,816 as of 1900, according to city records. The total expense was divided among the Commonwealth (31%), the City of Boston (30%) and the Railroad Company (39%). One of the major costs of the extension was the Summer Street Viaduct bridge in South Boston, built over the New York, New Haven and Hartford Railroad tracks at the railroad's expense.[11]

The Summer Street Retractile Bridge has undergone repairs and alterations as follows:

1909	Rebuilding of draw span and foundation.
1918	Strengthening of floor beams for street cars and 46-ton express freight cars.
1931-39	Repairs to piers, struts and draw span.

1952-54 Repairs and rebuilding of draw span.

1959 Made a fixed bridge and closed to trucks and busses.

1965 Tender's House, pedestrian shelters and gates removed.

1967 Roadbed floor framing reconstruction and strengthening of superstructure.

1975-76 Roadbed paving and repairs.

1984-89 Roadbed and stringer repairs.

1990 Roadbed and stringer repairs.

General maintenance over the years has included painting and miscellaneous minor repairs such as installation of steel patch plates and additional light fixtures; machinery, gate and railing repairs; and grouting of the mortar joints in the granite piers. The bridge is presently in a fixed position and inoperable. Recent structural rating reports on the bridge have found evidence of major decay and an extensive rehabilitation is now being designed to correct these deficiencies.[12]

Key Individuals

The Summer Street Retractile Bridge was built in response to the development efforts of the Boston Wharf Company as reported in its *Centennial History* of 1936. The bridge was apparently designed by Boston City Engineer William Jackson who signed the drawings, possibly with the help of Assistant City Engineer John E. Cheney. The Berlin Iron Bridge Company built the draws while A. & P. Roberts Company constructed the fixed spans. The nationally significant Berlin Iron Bridge Company of East Berlin, Connecticut was started as the Corrugated Metal Company which began making roof trusses in the mid-1870s and bridges about 1879. The firm was particularly noted for its patented lenticular truss bridges. Many of these were built in Massachusetts and nine surviving examples of the company's bridges have been identified in the Massachusetts Highway Department's Historic Bridge Survey. The name was changed to the Berlin Iron Bridge Company in 1883 and the company was acquired by the American Bridge Company in 1900.

The Summer Street Retractile Bridge would thus be one of the last produced by the original Berlin Iron Bridge Co., and tests reveal that the bridge was built of steel rather than iron. This may be explained by the fact that some drawings are signed by the Pencoyd Iron Works, Bridge and Construction Department. The Pencoyd Iron Works was located in Philadelphia,

Pennsylvania and was identified in the advertising of the firm as being operated by A. & P. Roberts Company, designers and builders of train sheds, viaducts, elevated railroads and all-steel structures. A.& P. Roberts began fabricating bridges about 1887 and were the contractors for the fixed spans of the Summer Street Retractile Bridge. This company, like the Berlin Iron Bridge Company, was also acquired by the American Bridge Company in 1900. Other firms which contributed to the construction effort were W. J. Lawlor and Ross & Fowler, draw foundations, piers and abutments; Coffin Valve Co. and Swett Car Wheel & Foundry Co., trucks; Miller and Shaw, draw machinery; and General Electric, motors.[13]

Alterations to the Summer Street Retractile Bridge since its original construction have been substantial. In 1918, Boston Engineering Department Bridge Division Engineer John E. Carty planned the strengthening of floor beams for street railway cars. Repairs and alterations in succeeding years were undertaken by Boston Public Works Department engineers including John J. McCall, Division Engineer, who superintended the 1952-4 repairs, and Charles Martin, Division Engineer, who superintended major repairs and reinforcement of the roadbed, superstructure and railings in 1967. Subsequent repairs have been done in consultation with Lawrence J. McCluskey, P. E., Senior Vice President of Seelye Stevenson, Value and Knecht, present engineering consultants to the department. In the past decade Balfour Engineering Co. Inc. has executed repairs and provided mechanical services. The draw is no longer in operating condition; it was made a fixed bridge in 1959.

Construction Techniques - Technical Description

a. Original Construction

Foundations - The existing channel was dredged to 50 feet in width and 16 feet in depth according to the provisions of the license granted by the Board of Harbor and Land Commissioners. Piles were driven after borings revealed a layer of clay extending to about 40 feet below the city base with sand and gravel at 50 feet. The granite rock-faced masonry foundations were built on concrete footings which rest on wood piles below the channel. The spruce piles were said to have been driven both vertically and at an inclination of 1:12 thus spreading the load over a wider area. The concrete foundations were poured using cofferdams of six-inch splined spruce sheeting driven at a 1:12 inclination as forms, and cut off at elevation 0, the city base. The concrete used in the foundations was one part Portland cement, two parts sand and four parts gravel. The top foot of each foundation was poured separately, rammed and smoothed to receive the stone pier. Similar foundations support the abutments.

Piers and abutments - The piers above the foundation are built of Cape Ann granite laid in solid Portland cement mortar, with exposed surfaces of quarry or rock-faced granite. The bottom course is composed of all headers, while the remainder of the piers are in Flemish

bond, with all headers extending through the pier. The space between the stretchers is filled with Portland cement of the same mix as the foundations. The top coping stones at the ends are doweled into the course below. The westerly abutment on the Boston side is a granite masonry structure bonded with the old seawall of the channel. The easterly abutment on the South Boston side has return walls extending about 35 feet back along both street lines; here the old seawall was spanned with the addition of five lines of 15-inch steel I-beams built into the masonry.

The four fixed-span piers are rectangular in plan with upstream and downstream ends tapered to a point. The battered section of the piers is topped by a wider coping which terminates where its supports the main girders below the bridge deck. The retractile pier which supports the draws is constructed of piles similar to other retractile draws built in Boston, with the exception of the substitution of steel I-beams, 20 inches deep which support hard pine timbers as the upper track stringers. The draw fender pier, comprised of wood piles braced and partially decked with hard pine, support the Tender's House, a half-timber structure on the southwest side of the draw. The five-span bridge has a total length of 507 feet.

Approach (Fixed) Spans - Four riveted fixed spans, two on the Boston and two on the South Boston side of the draw, were numbered one to four on the drawings. The fixed spans are made up of three lines of deck-plate girders, with transverse deck girders and longitudinal floor beams. Each approach span had a roadway constructed of 6-inch hard pine floor timbers resting in 5" x 6" hard pine sleepers which were fastened to the longitudinal steel floor beams. The approach span floor beams were in turn supported by transverse I-beams resting on the main longitudinal girders. The approach span floor paving, originally consisted of 6-inch granite blocks laid with pitch joints. Sidewalks were originally 4 inches of asphalt laid on 4-inch thick plank. Railings were pipe railings with round spindles. At the South Boston end of the draw span, cantilevered landing blocks are attached to the ends of the main girders of the fixed span in order to support the toe end of the draw when closed. The cruciform, wood-frame Tenders' House founded on wood piles at the Boston end of the approach had wood-shingled side-walls, half-timbering in the west gable end and a slate hipped roof on the south and east ends.

Draw Span - The draw spans of the bridge, a paired-leaf (each single-barreled) oblique retractile bridge, have each barrel constructed of three lines of riveted deck-plate girders. Lateral cross-bracing for the draw span decks is provided by crossed diagonal tie rods. A portal frame is on each draw span, consisting of a pair of Samson posts carrying the ends of pinned eyebar stays which help support the cantilevered section of the draw span when the bridge is open. Angled struts support the eyebars near the midpoint. Four single-truck and three-double truck carriages support each draw span. The trucks do not appear to be of the 1870 Pratt patent type, and the cast wheels are inscribed "Swett Car Wheel & Foundry, Chelsea, Mass. 1899". The

draw span piers support the draw rails on steel-and-timber runways angled at 45° to the bridge. A timber pile runway pier supports the draw machinery, drum, gearing, and electric motor.

The 132 foot wide draw leafs span a 60 foot wide channel. The steel laced-struts, Samson posts and crossbars provide lateral stability as well as additional lengthwise support to the cantilevered drawbridge upon opening. The draw span of the bridge was assembled in an open position, and closed upon completion of the truss and machinery assembly. When closed, the bridge ends are supported on cast iron shoes supported by cantilever girders projecting from the fixed span piers opposite. At the opposite end they are supported by the rear girders by means of a pin connection. Counterbalance for the draw when open is provided by cast-iron boxes filled with lead.

The draw spans originally had a 2-inch spruce decking resting on 4-inch kyanized [14] (treated) spruce timbers which in turn rested on longitudinal 6"x14" hard pine joists. These joists in turn rested on transverse I-beams which carried the weight to the longitudinal main steel girders. The draw sidewalks were of 2-inch hard pine plank resting on 3"x12" hard pine joists.

b. Repairs and Alterations

In 1918 reinforcement for street cars and 46-ton express freight cars was accomplished with the strengthening of floor beams. Between 1931 and 1939 repairs to piers, struts and the draw span were carried out. Mortar joints in the piers between high and low tide were cleaned and shot full of gunite in 1930-31, and the steel superstructure was cleaned and painted. On June 17, 1933, the steamship "Baron Murray," heading upstream, fouled the northerly draw leaf by striking the corner fascia beam. The draw leaf was knocked off its trucks and onto the draw tracks; one draw truck dropped overboard. The City's Bridge Division, assisted by W. H. Ellis & Son Co., made the necessary repairs. In 1934 the draw span was cleaned and painted by Eugene Riccardelli. New headers were placed in 1935. In 1952-4 repairs included the addition of a steel counterweight to properly balance the bridge and the reconstruction of the draw span foundation and deck. In 1959 the retractile draw was fixed and closed to trucks and busses. After 1965 the Tender's House, pedestrian shelters and gates were removed. In 1967 repairs included the reconstruction of the roadbed floor framing and strengthening of the superstructure. Supplemental trusses were inserted beneath transverse floor beams. In 1975-6 roadbed repairs and paving were undertaken; the bridge is presently covered by asphalt pavement on the approach spans with open steel grating on the draw spans. Since 1984 periodic roadbed and stringer repairs have been made, culminating in the recent emergency repairs. Wood fender piers have badly deteriorated in intervening years, although they retain their original configuration. The bridge is presently in a severely deteriorated condition and requires extensive repair; its structural load rating has been reduced from 19 tons to 8 tons.

Bridge Description and Operation

The bridge has a steel superstructure which rests on granite block piers and abutments; these in turn are supported by concrete foundations and friction piles. The Summer Street Retractile Bridge consists of five spans: the four principal fixed spans are paved-deck, steel plate-girders averaging 80 feet on support bearings. Each of the two center draw spans is a single-leaf, open-grate deck, retractile draw; each is 132 feet in length on the centerline to its cantilever leaf end which spans the 60 foot wide channel. Each deck is 44 feet wide and consists of a 32'-6" roadway and a 11'-6" sidewalk. The two bridge leaves together carry four vehicular lanes and two sidewalks.

The fixed spans are comprised of three lines of deck-plate girders with transverse floor beams and longitudinal stringers. Lateral cross-bracing for the draw span decks is provided by crossed diagonal tie rods. The center draw span has lateral bracing between two Samson posts, with an 1899 plaque in each of the two portal crossbars. The center portal, about 25 feet high measured from the bridge deck and spanning 45 feet, carries the cantilevered bridge when it is open by means of diagonal braced struts. The draw section travels on four single-truck and three double-truck carriages which support each draw span. When opening, the carriages run on draw rails supported on steel and timber runways angled at 45° to the bridge. The retractile draw machinery, drum, gearing and electric motor are supported on the timber pile runway pier. When closed, the bridge ends rest on cast-iron shoes supported by cantilever girders which project from the opposite fixed-span piers.

The bridge was operated by a draw tender with gate men to operate the gates. The original operating mechanism consisted of a system of cable winches powered by two street-car electric motors. The winches were independently mounted on the draw piers at the centerline of the tracks and the center of gravity of the bridge. Each motor was geared to a horizontal drum 3 feet in diameter from which two cables were extended, each attached to the bridge at its center of gravity. One cable passed over a sheaf at the channel face of the foundation; winding one or the other of these two cables onto the winch drum opened or closed the draw.

Each motor was operated by a controller in the Controller's House, located between the draws near the face of the channel. One person could operate both draws. A manual crank-drive system was provided in case of electrical failure. The machinery was organized to include two cable winches, gears and two main drive motors (see operating machinery drawings). Brake levers controlled the opening speed of the draws. Latches were provided at the landings so that the draws were automatically locked when closed. Gates were manually operated by gate men. In addition to the Controller's House, a Tender's House was located on the southwest fender pier and contained an office, work room and locker room. Two open-sided, hip-roofed waiting shelters were provided for pedestrians. Crook-necked street lamps provided lighting, as shown by original drawings and early photographs.

The draw was opened by the two electric motors with drive trains attached to the pier and attached by cables to the draw. These two sets of apparatus, each protected by a boxed enclosure, could operate independently. Four gates at each end of the bridge were operated manually from the roadway deck by the gate men. When the draw was closed, the gates were opened and traffic passed onto the draw. The system worked successfully except on election night in November 1916, when a trolley full of voters failed to stop at the open draw and plunged into Fort Point Channel resulting in the loss of fifty-two lives. The tragedy is described in an article in the *Patriot Ledger* by correspondent Thomas J. Holbrook. The disaster was attributed to a failed signal lantern and the driver's inability to fully stop the trolley in time to avoid plunging through the gates into the channel. After restoration of the gates the Summer Street Retractile Bridge continued to serve trolleys until the bridge roadbed was rebuilt and the span made permanently fixed in the 1950's.

NOTES

1 Central Artery/Tunnel FSEIS/R *Inventory of Historic Resources*, South Boston, pp. 59 - 66.

2 Stott, Peter. *Bridge Row, The Drawbridges of Fort Point Channel*, pp 1-11.
Roper, Stephen. MDPW (MHD) *Historic Bridge Inventory*, Survey Form, August 1984.
Spengler, Albert. *Legal History and Cost Records of... Bridges*. W.P.A. Project 18869, File No. 56.

3 *Boston Public Works Department Annual Report*, 1930; Bridge Division Records.

4 MDPW (MHD) *Bridge Inventory*, Survey Form, August 1984; *Inventory of Historic Resources*, Central Artery/ Third Harbor Tunnel, April 1989, Figure 5.

5 Boston Public Libray, Director's Office. Bridge Collection - Drawings from the City Engineer's Department.

6 Stone, Orra. History of Massachusetts Industries, V.2, p.1210.

7 Boston City Auditor's Report 1872-3. pp. 37-38.

8 U.S. Patent Office List. Patent No. 100,065 - Draw-Bridge. - T. Wilis Pratt, Boston, Mass. Feb. 22,1870.

9 Boston Public Libray. Bridge Collection - Federal Street Bridge. CIty Documents Annual Report, 1872-3.

10 Condit. American Building Art. p. 110. *National Cyclopedia* "Pratt, Thomas Willis." v. P, p.179.

11 *Boston Engineering Department Annual Reports*, 1930 - 1910; MDPW (MHD) *Bridge Inventory Form*; Bridge Division Records, WPA Project 18869, File No. 56; Stott, Peter. Notes on Summer Street Bridge.

12 Boston Public Works Department, Bridge Division Records. Seelye Stevenson Value & Knecht, Engineers and Planners, Engineering Files.

13 Schrock, Nancy, *Architectural Records in Boston, Cambridge, & Vicinity* , p.17.
Eldredge, Joseph L. *Architecture Boston*, pp. 3,4, 17 .
Galer, G.J. *The Boston Bridge Works*, pp. 51-54, 108-113.
Darnell, Victor C., *Directory of American Bridge Building Companies*, pp. 22-3, 76.

14 kyanized : wood treatment. after J.H. Kyan, Jr. (1774-1850) inventor of the process to make wood resistant to decay by treatment with a solution of corrosive sublimate, probably a distillate such as creosote.

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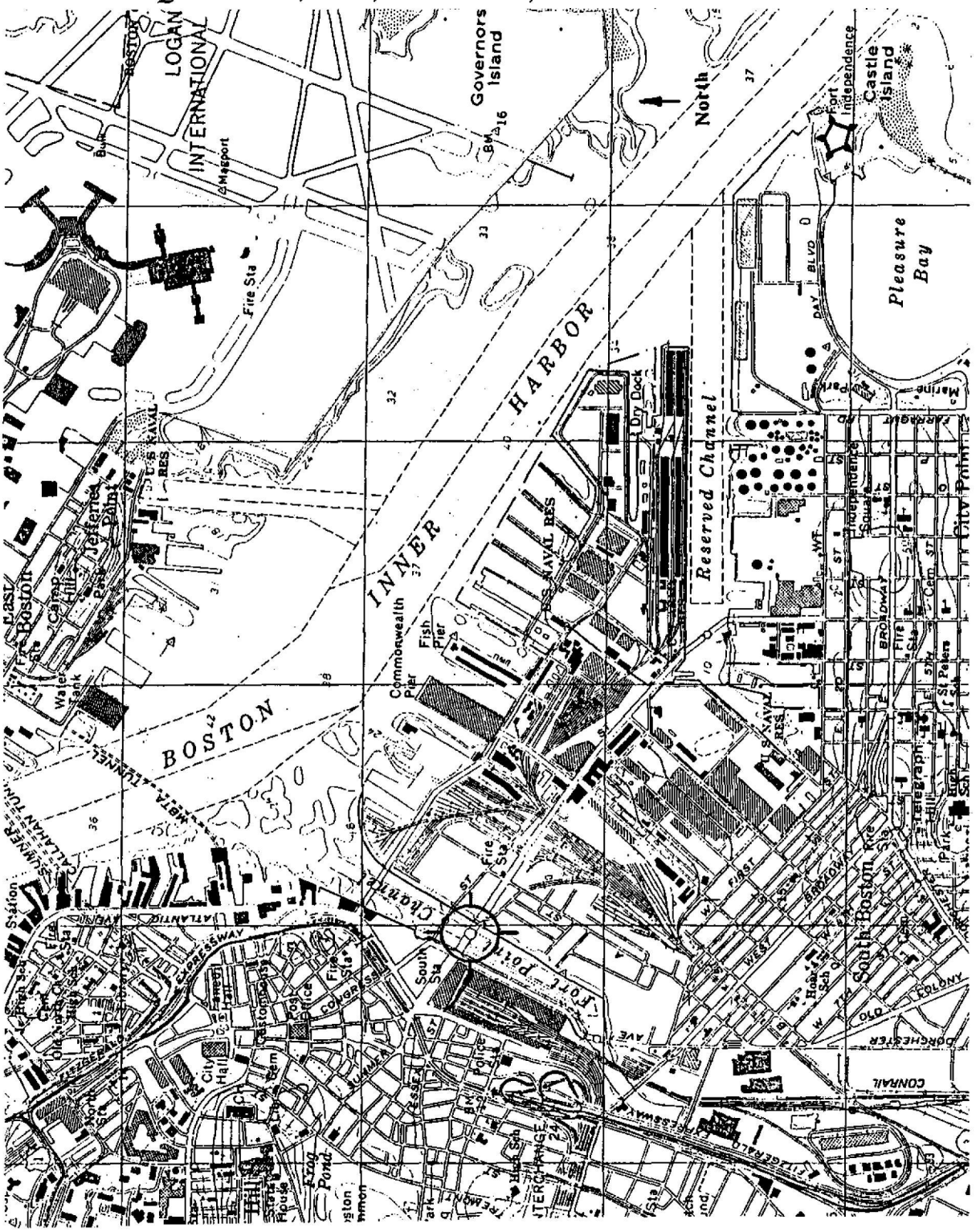
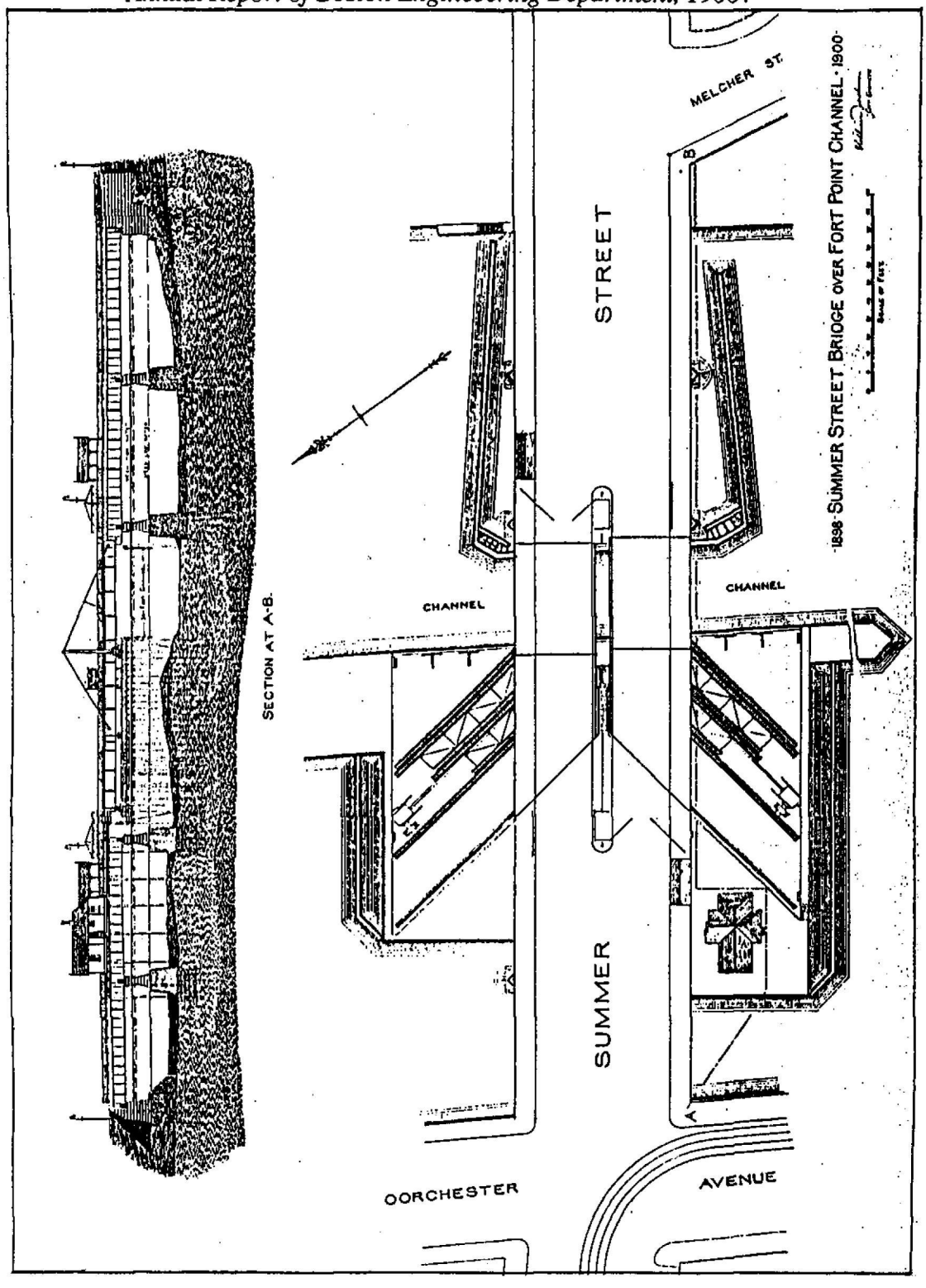
Seelye Stevenson Value & Knecht, Engineers and Planners, 230 Congress Street, Boston, Massachusetts, 02110, Engineering Files.

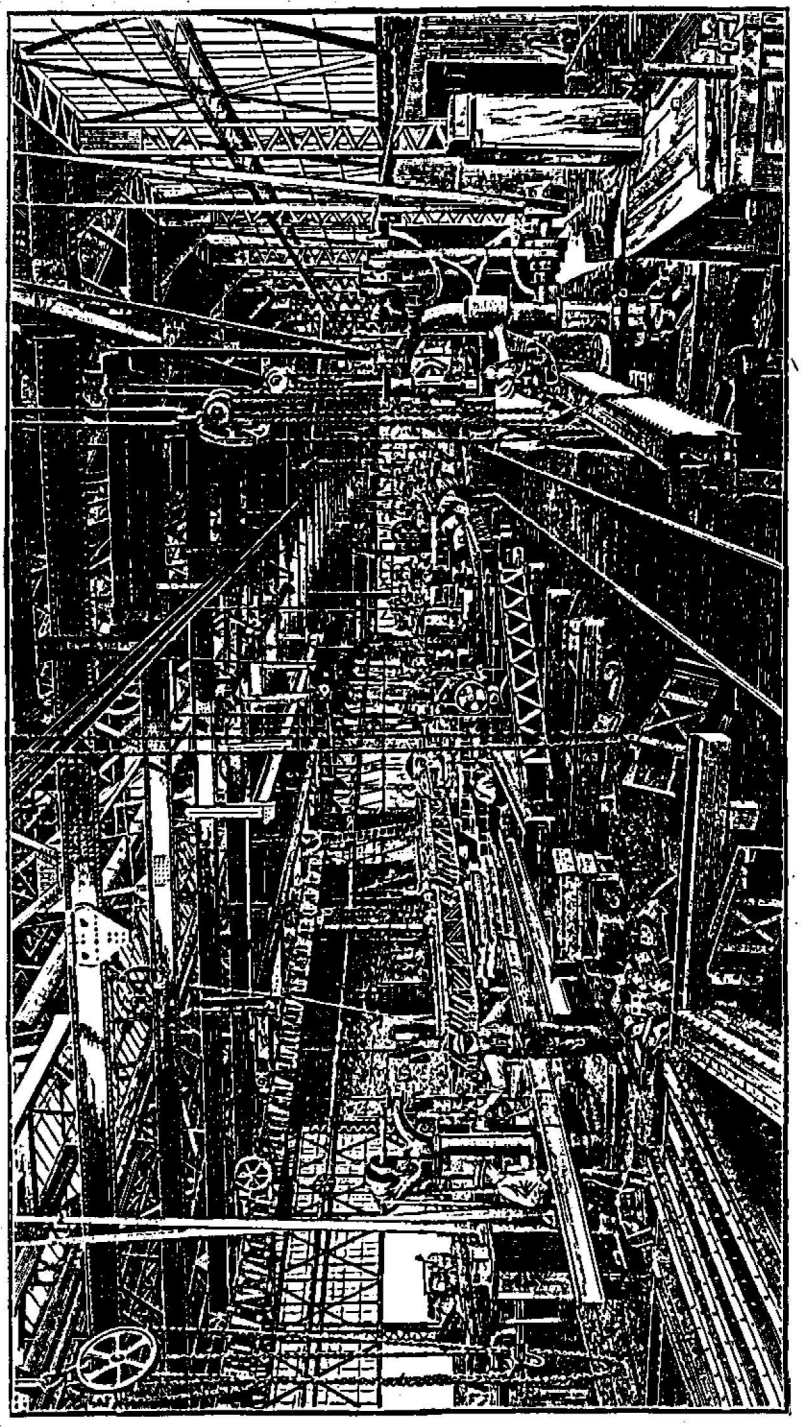
Location Plan - South Bay Area of Boston. From *USGS Map: Quad: Boston, South*, 1:25000 scale, 1979.



Historic Drawing, Summer Street Bridge over Fort Point Channel, 1898-1900.
Annual Report of Boston Engineeering Department, 1900.

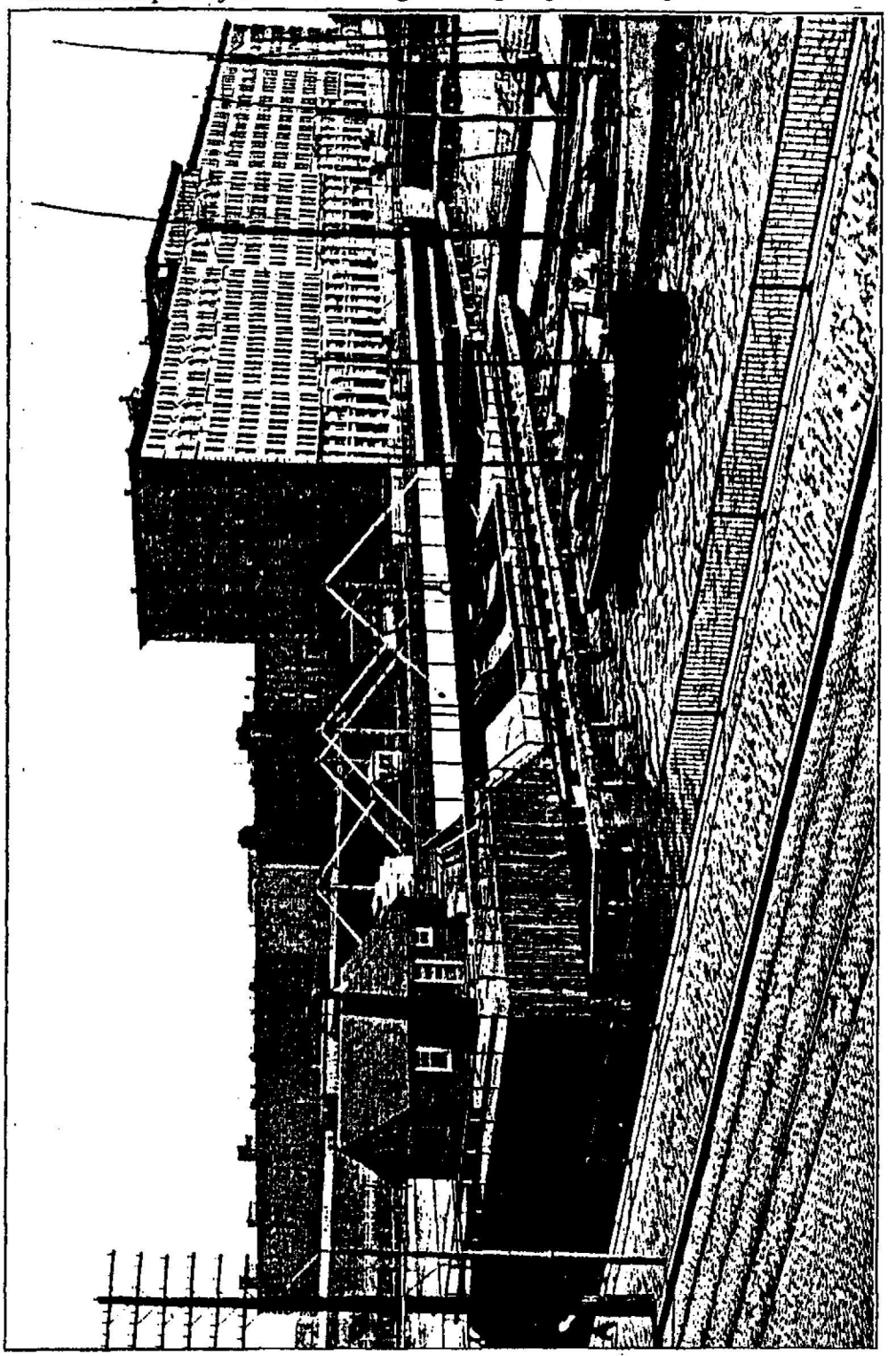


Historic View, Berlin Iron Bridge Co., fabricator of the Summer St. Retractile Bridge. Darnell, *Directory of American Bridge Building Co's, 1840-1900.*



A well-appointed bridge shop of the 1890s. The 80-by-400-foot building—itself presumably a product of the firm's works—was entirely of iron and glass with no wood used. The capacity was 1,000 tons of finished work per month. (Berlin Iron Bridge Company, East Berlin, Connecticut)

Historic View, Summer Street Retractile Bridge over Fort Point Channel.
Annual Report of the Boston Engineering Dept., 1900. p.128.



SUMMER-STREET BRIDGE OVER FORT POINT CHANNEL.

SUMMER STREET RETRACTILE BRIDGE
HAER No. MA - 41
LIST OF DRAWINGS (page 21)

Boston Public Works Department - Summer Street Retractile Bridge

Dwg. No.	Year	Drawing Title/ Description	Notes	Agency/Engineer
733	1897	"Summer St. Extension, Abutment"	"Changes made "to correspond to construction"	"Wm Jackson, City Engineer"
726	1898	Masonry Piers E. Abutmt.	Congress St. Grade Crossing	Boston PWD - Bridge Div.
731	1898	Masonry Piers E. Abutmt.	Stone Coursing	Boston PWD - Bridge Div.
732	1898	Draw foundation & fender Piers		Boston PWD - Bridge Div.
730	1898	Shows "old bridge abutment"	"old wall to remain" buried under.	"Wm Jackson, City Engineer"
729	1898	Summer St. Extension E. Abutment		"Wm Jackson, City Engineer"
C 83	1898	Layout	Ironwork sbop drawings (Order No.)	"Pencoyd Iron, Bridge & Const. Dept."
724	1898	Parapet for abutment	Stone	"Wm Jackson, City Engineer"
758	1898	Half Section of Bridge, Detail of Fl. & Railing	"Changes made to correspond with Construction"	"Boston Eng. Dept., Wm. Jackson"
757	1898	"Plates, Shoes, Castings, Etc."		"Boston Eng. Dept., Wm. Jackson"
756	1898	Sway Frames		"Boston Eng. Dept., Wm. Jackson"

SUMMER STREET RETRACTILE BRIDGE
HAER No. MA - 41
LIST OF DRAWINGS (page 22)

Boston Public Works Department - Summer Street Retractile Bridge

Dwg. No.	Year	Drawing Title/ Description	Notes	Agency/Engineer
755	1898	Stringers		"Boston Eng. Dept., Wm. Jackson"
754	1898	Sidewalk Beams & Fascias		"Boston Eng. Dept., Wm. Jackson"
753	1898	Floor Beams at Boston Abutment		"Boston Eng. Dept., Wm. Jackson"
752	1898	Floor Beams		"Boston Eng. Dept., Wm. Jackson"
751	1898	Girder C4		"Boston Eng. Dept., Wm. Jackson"
750	1898	Girder B4		"Boston Eng. Dept., Wm. Jackson"
749	1898	Girder A4		"Boston Eng. Dept., Wm. Jackson"
748	1898	Girder C3		"Boston Eng. Dept., Wm. Jackson"
747	1898	Girder B3		"Boston Eng. Dept., Wm. Jackson"
746	1898	Girder A3		"Boston Eng. Dept., Wm. Jackson"
745	1898	Girder C2		"Boston Eng. Dept., Wm. Jackson"

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Boston Public Works Department - Summer Street Retractile Bridge

Dwg. No.	Year	Drawing Title/ Description	Notes	Agency/Engineer
744	1898	Girder B2		"Boston Eng. Dept., Wm. Jackson"
743	1898	Girder A2		"Boston Eng. Dept., Wm. Jackson"
742	1898	Girder F1		"Boston Eng. Dept., Wm. Jackson"
741	1898	Girder E		"Boston Eng. Dept., Wm. Jackson"
740	1898	Girder D1		"Boston Eng. Dept., Wm. Jackson"
739	1898	Girder C (details)		"Boston Eng. Dept., Wm. Jackson"
738	1898	Girder B		"Boston Eng. Dept., Wm. Jackson"
737	1898	Girder A		"Boston Eng. Dept., Wm. Jackson"
736	1898	General Plans Spans 3 & 4 (inactive)		"Boston Eng. Dept., Wm. Jackson"
735	1898	General Plans Spans 1 & 2 (inactive)		"Boston Eng. Dept., Wm. Jackson"
728	1898	Summer St. Extension Piers		Boston Eng. Dept.

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Boston Public Works Department - Summer Street Retractile Bridge

Dwg. No.	Year	Drawing Title/ Description	Notes	Agency/Engineer
C 83 d - 6553	1899	Castings for Summer St. Bridge	Ironwork shop dwg.	"Pencoyd Iron, Bridge & Const. Dept."
C 83 a-7	1899	Span 2 (Girders A2 R & L)	Ironwork shop dwg.	"Pencoyd Iron, Bridge & Const. Dept."
C 83 a-4	1899	Span 1 (Girders A1 & F1))	Ironwork shop dwg.	"Pencoyd Iron, Bridge & Const. Dept."
C 83 a-3	1899	Buckle Plates	Ironwork shop dwg.	"Pencoyd Iron, Bridge & Const. Dept."
C 83 a-2	1899	Shoes & Rollers	Ironwork shop dwg.	"Pencoyd Iron, Bridge & Const. Dept."
C 83 a-16	1899	Cross Frames & Struts	Ironwork shop dwg.	"Pencoyd Iron, Bridge & Const. Dept."
C 83 a-15	1899	Sidewalk Stringers	Ironwork shop dwg.	"Pencoyd Iron, Bridge & Const. Dept."
C 83 a-14	1899	Floor Beams	Ironwork shop dwg.	"Pencoyd Iron, Bridge & Const. Dept."
C 83 a-13	1899	Floor Beams	Ironwork shop dwg.	"Pencoyd Iron, Bridge & Const. Dept."
C 83 a-12	1899	"Span 4 (Girders B4 R, B4 L, C4 R, C4 L)"	Ironwork shop dwg.	"Pencoyd Iron, Bridge & Const. Dept."
C 83 a-11	1899	"Span 4 (Girders A4 R, A4 L)"	Ironwork shop dwg.	"Pencoyd Iron, Bridge & Const. Dept."

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Boston Public Works Department - Summer Street Retractile Bridge

Dwg. No.	Year	Drawing Title/ Description	Notes	Agency/Engineer
C 83 a-10	1899	"Span 3 (Girders B3 R, B3 L, C3 R, C3 L) "	Ironwork shop dwg.	"Pencoyd Iron, Bridge & Const. Dept."
C 83 a-9	1899	"Span 3 (Girders A3 R, A3 L)"	Ironwork shop dwg.	"Pencoyd Iron, Bridge & Const. Dept."
C 83 a-8	1899	"Span 2 (Girders B2 R & L, C2 R & L)"	Ironwork shop dwg.	"Pencoyd Iron, Bridge & Const. Dept."
C 83 a-6	1899	Span 1 (Girders C1 & D1)	Ironwork shop dwg.	"Pencoyd Iron, Bridge & Const. Dept."
C 83 a-5	1899	Span 1 (Girders B1 & E1)	Ironwork shop dwg.	"Pencoyd Iron, Bridge & Const. Dept."
783	1899	Summer St. Extension - Draw Superstructures- including railings	"Superseded - Reconstruction 1969 ""- ref Construction Plans of 1967	"Boston Eng. Dept., W. Jackson, City Engr."
782	1899	"Struts, Castings, etc."		Boston Engineering Dept.
781	1899	"Samson Posts, Struts St. 5, 6 & 8, Rockers"	Date Plate	Boston Engineering Dept.
780	1899	Fl. Beams		"Boston Eng. Dept., Wm. Jackson"
779	1899	"Girder L, R & L pieces"		"Boston Eng. Dept., Wm. Jackson"
778	1899	"Girder K, 2 pieces"		"Boston Eng. Dept., Wm. Jackson"

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Boston Public Works Department - Summer Street Retractile Bridge

Dwg. No.	Year	Drawing Title/ Description	Notes	Agency/Engineer
777	1899	Girder I		"Boston Eng. Dept., Wm. Jackson"
776	1899	Girders G & H		"Boston Eng. Dept., Wm. Jackson"
775	1899	Girder F		"Boston Eng. Dept., Wm. Jackson"
774	1899	Girder E		"Boston Eng. Dept., Wm. Jackson"
773	1899	Girder D		"Boston Eng. Dept., Wm. Jackson"
772	1899	Girder C		"Boston Eng. Dept., Wm. Jackson"
771	1899	Girder B		"Boston Eng. Dept., Wm. Jackson"
770	1899	Girder A		"Boston Eng. Dept., Wm. Jackson"
769	1899	General Plan & Index	& End Elevation, Dwg. in poor condition	"Boston Eng. Dept., Wm. Jackson"
767	1899	Roadway Paving	Reconst. 1975-76 (Notes re: covered MBTA tracks)	"Boston Eng. Dept., Wm. Jackson"
763	1899	"Draw Landing, Span 3"		"Boston Eng. Dept., Wm. Jackson"

SUMMER STREET RETRACTILE BRIDGE
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Boston Public Works Department - Summer Street Retractile Bridge

Dwg. No.	Year	Drawing Title/ Description	Notes	Agency/Engineer
762	1899	"Draw Landing, Span 3"		"Boston Eng. Dept., Wm. Jackson"
761	1899	"Draw Landing, Span 3"		"Boston Eng. Dept., Wm. Jackson"
760	1899	"Draw Landing, Span 3"		"Boston Eng. Dept., Wm. Jackson"
759	1899	" Section of Bridge, Plan of Flooring"	Superceded -Bridge reconstruct 1969-70	"Boston Eng. Dept., Wm. Jackson"
6551 B	1899	Erection Diagram		"Pencoyd Iron Works, Pencoyd, PA"
6551 A	1899	Drawbridge Span & Summer St. Ext.	Struts & Girders	"Pencoyd Iron, Bridge & Const. Dept."
6551	1899	"Girders, Struts & Connection Plates"		"Pencoyd Iron, Bridge & Const. Dept."
764	1899	Special Fascia & Railing Near Pier 2		"Boston Eng. Dept., Wm. Jackson"
727	1899	Down Stream Fender Guard		"Wm Jackson, City Engineer"
765	1899	Superstructure - Railings		"Boston Eng. Dept., Wm. Jackson"
725	1901	Summer St. Extension W. Abutment		"Wm Jackson, City Engineer"

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Boston Public Works Department - Summer Street Retractile Bridge

Dwg. No.	Year	Drawing Title/ Description	Notes	Agency/Engineer
733	1901	"Summer St. Extension, Abutment"	Changes made "to correspond to construction"	"Wm Jackson, City Engineer"
758	1901	"Half Section of Bridge, Detail of Fl. & Railing"	Reconstruction 1976 ref. 5310-A foll/5312-A foll	"Boston Eng. Dept., Wm. Jackson"
768	1909	"Rebuilding Draw Span, Draw foundation & "		Boston PWD Bridge Div.
780 A	1918	Strengthing Fl. Bms for Street Cars		"Boston Eng. Dept. John E. Carty, Div. Engr."
736	1918	Where brackets placed on floor beams.	strengthening fl. for 46 tons express freight cars	Boston Eng. Dept.
736	1931	All new plates (in green) put on struts -	"all work denoted in green done 4/31"	Boston Eng. Dept.
6438 1 of 1	1939	Repairing draw Span - General	"Thos. H. Setton, Div. Engr."	"Boston Pub. Works, Bridge & Ferry Div."
6438 1 of 1	1952	"Draw Span - Loc. Plan., Elev., Plan, Tracks"	Repair - Steel Counterweight added	"Boston Pub. Works, Bridge & Ferry Div."
1768	1954	"Summer St. Draw Span, Foundation, Deck"	General Rebuild (Faded Xerox)	Boston PWD - Bridge Div.
7240 A 1 of 8	1967	"As Built", Plan w/soundings Gen. Plan		Boston P.W.D. - Charles Martin, Div. Eng.
7240 B 2 of 8	1967	"As Built", Existing Pile Plan	"Piles to be repaired"	Boston P.W.D. - Charles Martin, Div. Eng.

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Boston Public Works Department - Summer Street Retractile Bridge

Dwg. No.	Year	Drawing Title/ Description	Notes	Agency/Engineer
7240 C 3	1967	Pile Repair Section & Details		Boston P.W.D. - Charles Martin, Div. Eng.
7240 D 4	1967	"Exist. Approacb Spans, Superstructure"		Boston P.W.D. - Charles Martin, Div. Eng.
7240 E 5	1967	Exist. Drawspan Superstructure (Plan/Elec.)		Boston P.W.D. - Charles Martin, Div. Eng.
7240 F 6	1967	Exist. Superstructure Sections/Details		Boston P.W.D. - Charles Martin, Div. Eng.
7240 G 7	1967	Exist. Median Curb Plan	& Details for Channelling Traffic	Boston P.W.D. - Charles Martin, Div. Eng.
7240 H 8	1967	Bridge Railing Repairs		Boston P.W.D. - Charles Martin, Div. Eng.
759	1970	"Section of Bridge, Plan of Flooring"	"ref. Fisher G. Plans 7290, F - foll."	"Boston Eng. Dept., Wm. Jackson"
6438 1 of 7	1975	Summer St. Br. Reconstruction - Deck Plan	with Univ. Eng. Corp., Boston	"Boston P.W.D., Roht. S. Bowes, Div. Engr."
6438 2	1975	"Framing Plan, Typ Section"	Approach Spans	"Boston P.W.D./Univ. Eng. Corp., Boston"
6438 3	1975	Miscel. Details	Approach Spans	"Boston P.W.D./Univ. Eng. Corp., Boston"
6438 5	1975	Draw Span - Framing Plan/Typ Section		"Boston P.W.D./Univ. Eng. Corp., Boston"

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Boston Public Works Department - Summer Street Retractile Bridge

Dwg. No.	Year	Drawing Title/ Description	Notes	Agency/Engineer
6438 6	1975	Draw Span - Misc. Details		"Boston P.W.D./Univ. Eng. Corp., Boston"
6438 7	1975	Substructure - Misc. Details		"Boston P.W.D./Univ. Eng. Corp., Boston"
7240 D	1975	Title /Loc. Plan	Cover sheet for set	"Boston P.W.D./Univ. Eng. Corp., Boston"
767	1976	Roadway Paving	ref. 5310A to 4310F & 5312A to H - MBTA tracks	Universal Eng'g. Corp. & Dorel Steel Co.
758	1976	"Half Section of Bridge, Detail of Fl. & Railing"	(1901) Reconstruction ref. 5310-A foll/5312-A foll	"Boston Eng. Dept., Wm. Jackson"
7230 B	1959	Study for Replacement	Fill with Pile Bridge	
790	1899	Draw Machinery (1)	and Controller House	
791	1899	Draw Machinery (2) - Power House and Controller	"Was made afixed bridge Dec., 1959 and the control housing removed later."	
7230	1959	Proposed Boring Location Plan	Existing Condition with Tunnel	
792	1899	Draw Machinery (3)		
793	1899	Draw Machinery (4)		

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Boston Public Works Department - Summer Street Retractile Bridge

Dwg. No.	Year	Drawing Title/ Description	Notes	Agency/Engineer
733	1898	Draw Foundation and Fender Piers, Sheet 2	Approved by Water and Land Commission 10/98	
734	1898	Draw Foundation and Fender Piers, Sheet 3	Approved by Water and Land Commission 10/98	
784	1899	Date Plaque Detail		
785	1899	Draw Foundation, Sheet 2		
787	1899	Draw Foundation, Sheet 3		
788	1899	Gates - Details, Changes 1901, Sheet 1	Made fixed and closed to trucks and buses 12/12/59, Gates Removed 1967	(Fisher Co. Plans, 1967)
789	1899	Gates - Details, Changes 1901, Sheet 2		
1543	1899	Details of Counter Balances for Draw		
1544	1899	details of Latch for Draw		
1545	1899	House for Controller	(See Note #787, Controller House Removed 12/59	
1546	1900	Scotch Blocks - Details		

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Dwg. No.	Year	Drawing Title/ Description	Notes	Agency/Engineer
2255 - 2256	1900	Rails - Detail, Washers		
2517	1952	Alt. and Rep. to Railings		
2520	1950	Repairing Fender Piers		
5077	1916	Easterly Approach to Draw Span		
5097	1916	Navigation Lights		
6480	1945	Details of Landing Shoes		
6481	1945	Temporary Locking Device		
6539	1946	Public Boat Landing	Proposed Change of Stairway	
7234	1959	Soundings		
7231 A	1959	Survey Plan	w/elevations	
6607 - 6612	1954	Inspection/Pile Plans, Piers	Marine divers' survey	

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Summer Street Retractile Bridge
Spanning Fort Point Channel at Summer St.
Boston
Suffolk County
Massachusetts

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Jet Lowe, photographer, 1982

MA-41-1 SUMMER STREET BRIDGE. DRAW SPAN MOVES TOWARD VIEWER ON TRACKS VISIBLE AT CENTER OF PHOTOGRAPH.

MA-41-2 DRAW SPAN OF SUMMER STREET BRIDGE. WHEELS ARE VISIBLE BENEATH SPAN AT CENTER.

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ADDENDUM TO
SUMMER STREET RETRACTILE BRIDGE
Spanning Fort Point Channel at Summer Street
Boston
Suffolk County
Massachusetts

Photographs MA-41-1 and MA-41-2, taken in 1982, were previously transmitted to the Library of Congress.

Martin Stupich, Photographer, 1990.

MA-41-3	View southwest, elevation, abutment to abutment.
MA-41-4	View northeast, elevation, abutment to abutment.
MA-41-5	View southeast, aerial, showing entire bridge.
MA-41-6	View southeast, aerial, showing draw span.
MA-41-7	View northwest, oblique view, draw and approach.
MA-41-8	View northwest, street-level approach; context.
MA-41-9	View northwest, street-level approach; near view.
MA-41-10	View southwest, northeast side elevation.
MA-41-11	View west, oblique view, draw span.
MA-41-12	View west, oblique view, draw closeup.
MA-41-13	View west, oblique view, draw toe.
MA-41-14	View northwest, northeast draw superstructure.
MA-41-15	Detail, southwest draw superstructure.
MA-41-16	Detail, southwest draw struts.
MA-41-17	Detail, center Sampson posts and sway bracing.
MA-41-18	Detail, girder, trucks, and supports at center.
MA-41-19	Detail, southwest span, roadbed, stringers, girders

MA-41-20 Detail, southwest span, trucks and rail at heel.

MA-41-21 Detail, southwest span, truck, wheels, and rail.

MA-41-22 Detail, winch drum, housing and support remains.

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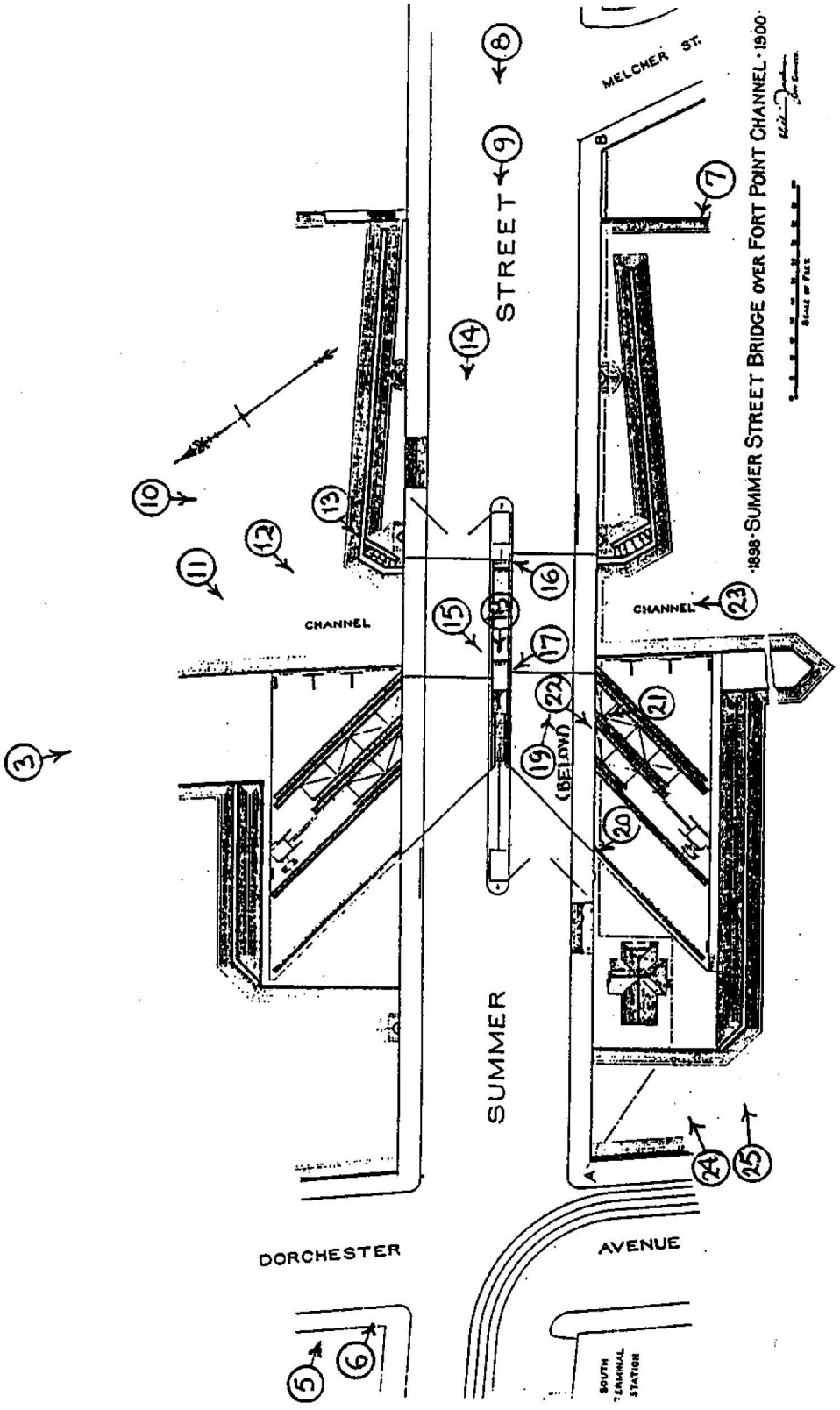

Source: *Annual Report of Boston Engineering Department, 1900.* Boston Public Library.

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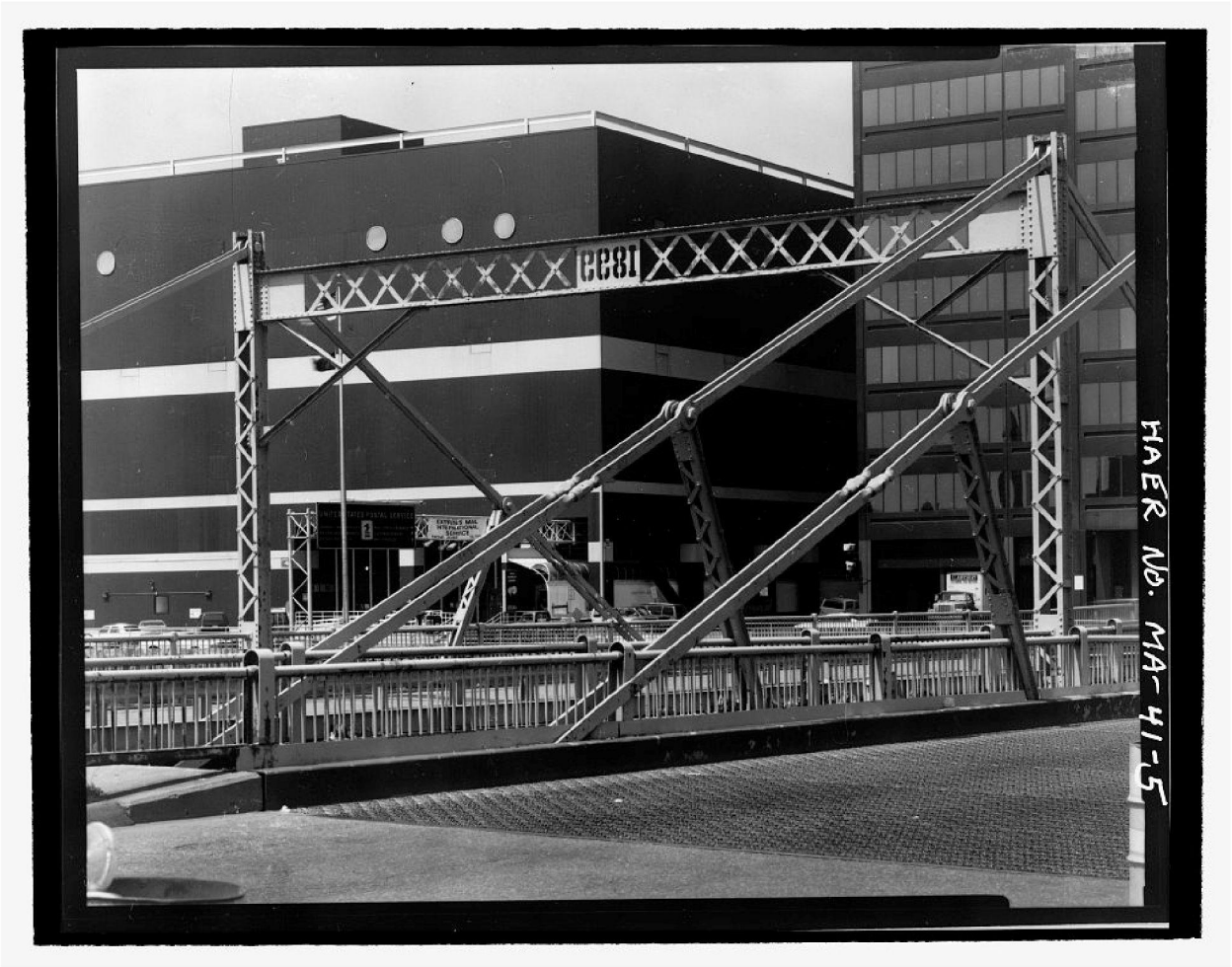

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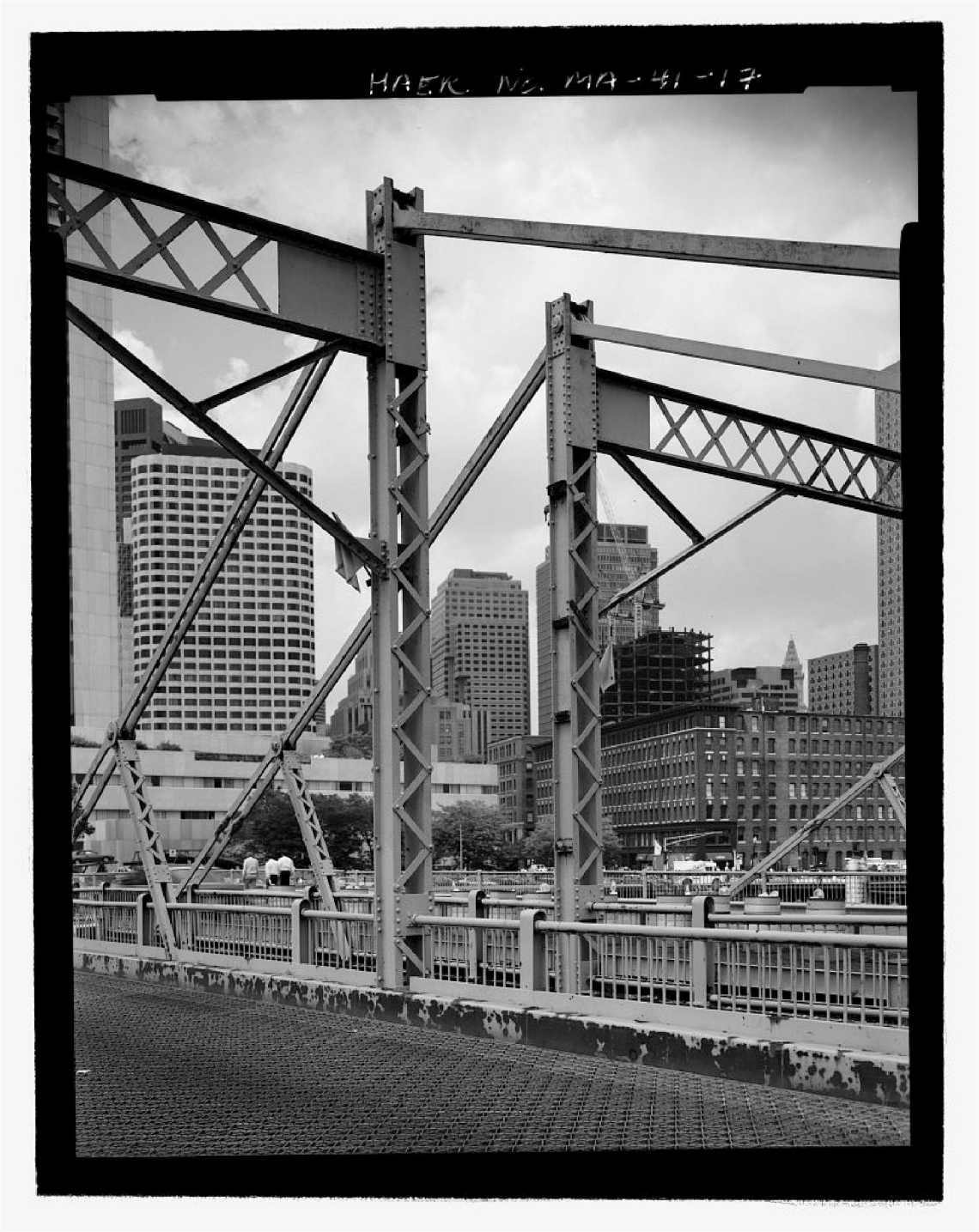

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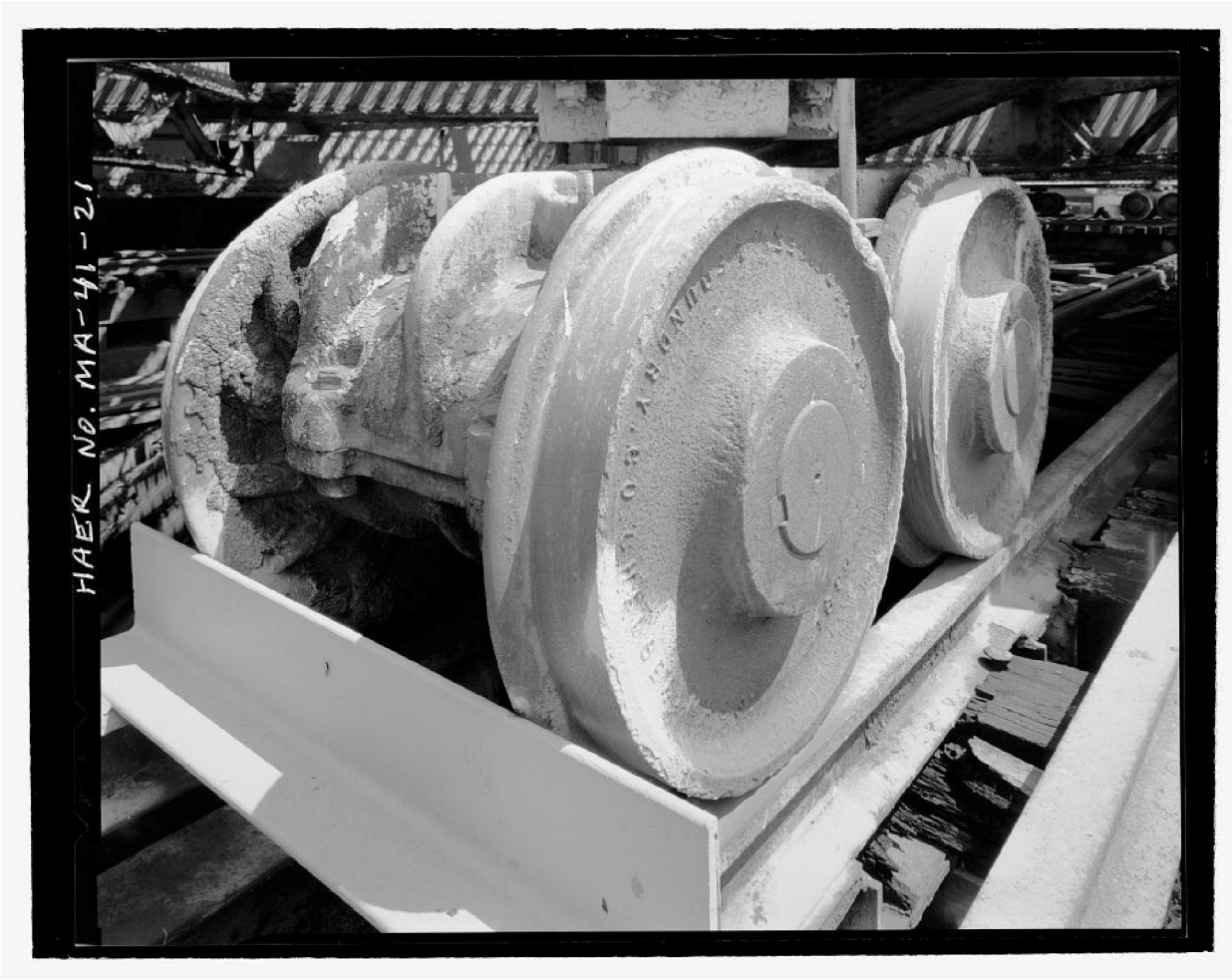

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