# Massachusetts Cultural Resource Information System

## Scanned Record Cover Page

| | |
|---|---|
| **Inventory No:** | FAI.901 |
| **Historic Name:** | Fairhaven - New Bedford Bridge |
| **Common Name:** | Route 6 Bridge over Acushnet River |
| **Address:** | Rt 6 |
| **City/Town:** | Fairhaven |
| **Village/Neighborhood:** | Fairhaven |
| **Local No:** | |
| **Year Constructed:** | 1896 |
| **Architect(s):** | A and P Roberts; Pencoyd Iron Works; Stewart and McDermott; Swain, George Fillmore; Williams, William Fish |
| **Architectural Style(s):** | Plate Girder; Stringer |
| **Use(s):** | Other Engineering; Other Transportation |
| **Significance:** | Engineering; Transportation |
| **Area(s):** | |
| **Designation(s):** | Nat'l Register DOE (05/21/1980) |
| **Building Materials(s):** | |



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

# HISTORIC BRIDGE INVENTORY & EVALUATION

Date: JANUARY 22, 1980

Municipality NEW BEDFORD TO FAIRHAVEN S.H. ? N.S.H. ?

Street Name & Route # ROUTE 6

Over NEW BEDFORD - FAIRHAVEN HARBOR

(THERE ARE THREE SECTIONS TO THE BRIDGE - THE MIDDLE SECTION IS THE ONE OF INTEREST - SEE ATTACHED BRIDGE DESCRIPTION)

Bridge No. F-1-2 = N-6-1 Bridge Key # ? Dist. 6

## CRITERIA FOR DETERMINATION OF HISTORIC SIGNIFICANCE

I. Builders Contribution (THE BRIDGE WAS BUILT UNDER DIFFERT CONTRACTS APPARENTLY - THIS INFORMATION APPLIES TO THE MIDDLE SECTION.)

Quantity

Unknown ✓ Several _____ (1-10) Many _____ (10 or more)

Name of Builder: STEWARD & McDERMOTT, N.Y. (N.Y.) AND A. & P. ROBERTS COMPANY. PHILADELPHIA PA

STEEL FABRICATOR: PENCOYD IRON WORKS, PENCOYD, PA.

Designer: NOT KNOWN (COULD BE BY COUNTY'S ENGINEERING STAFF)

Plaque: Yes _____ No. ✓ (APPARENTLY NO LONGER IN EXISTENCE, SEE ATTACHED DESIGN FROM SHOP DRAWINGS

II. AGE: Pre 1850 _____ 1850-1900 ✓ 1900-1930 _____

(BRIDGE WAS BUILT IN SECTIONS DURING PERIOD FROM 1896 TO 1903 THE MIDDLE SECTION WAS BUILT IN 1897 AND 1898.)

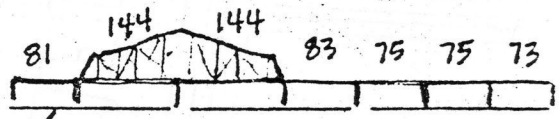
III. TECHNICAL

Bridge Type — SWING SPAN MOVABLE BRIDGE

Bridge Width 70 FEET

Total Length of Bridge 675 FEET

Number of Spans: 7 INCLUDING SWING SPAN Span Lengths




Patented: Yes _____ No _____ Unknown ✓

Load Carrying Capacity: Adequate ✓ Inadequate _____

Configuration: Unique _____ Unusual ✓ Common _____

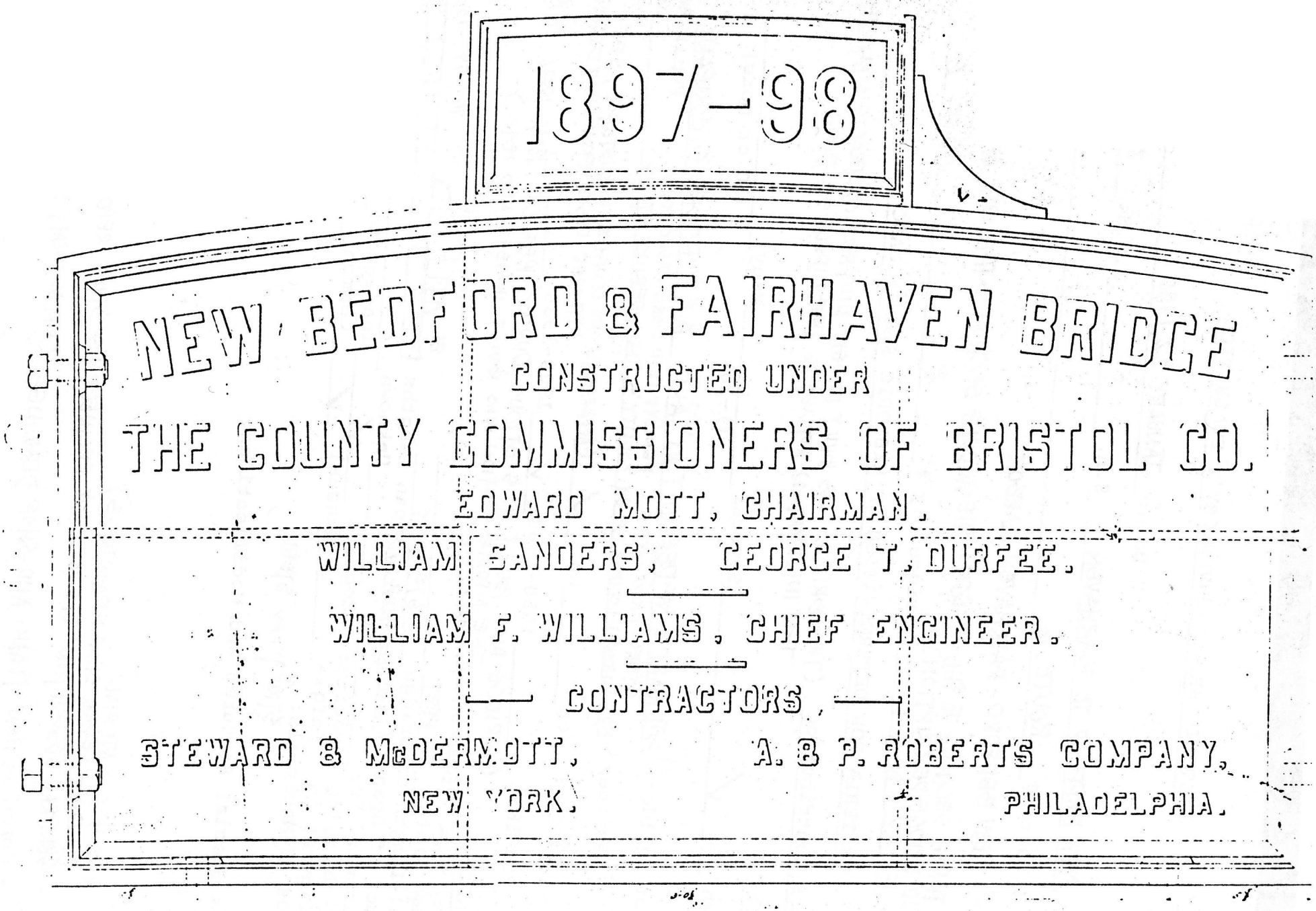
Types of Materials:

STRUCTURAL STEEL

List Special Features and Modifications:

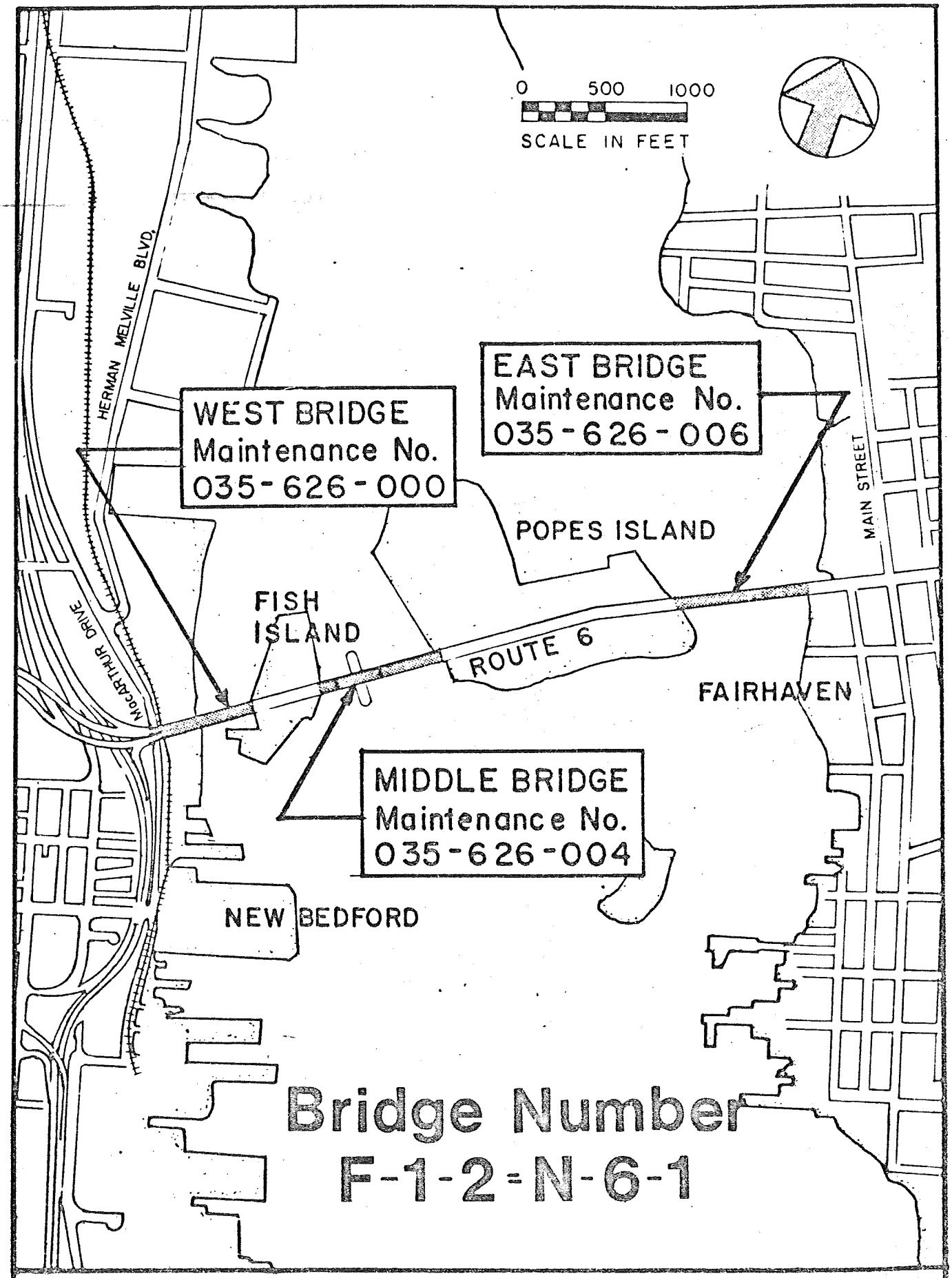
SEE ATTACHED MATERIAL

- PLAQUE (FROM SHOP DRAWINGS)
- GENERAL DESCRIPTION (FROM DRAFT ENGINEERING STUDY REPORT)
- CONSTRUCTION PLANS AND SHOP DRAWINGS (FROM DRAFT ENGINEERING STUDY REPORT
- NEWSPAPER ARTICLE "ACUSHNET RIVER BRIDGE....." JULY 19, 1978


1897-98
NEW BEDFORD & FAIRHAVEN BRIDGE
CONSTRUCTED UNDER
THE COUNTY COMMISSIONERS OF BRISTOL CO.
EDWARD MOTT, CHAIRMAN.
WILLIAM SANDERS, GEORGE T. DURFEE.
WILLIAM F. WILLIAMS, CHIEF ENGINEER.
CONTRACTORS.
STEWARD & McDERMOTT, NEW YORK.
A. & P. ROBERTS COMPANY, PHILADELPHIA.

## GENERAL DESCRIPTION

The entirety of the Route 6 harbor crossing between New Bedford and Fairhaven is referred to as the New Bedford-Fairhaven Bridge and has a single bridge number. However, it actually consists of highway sections on two harbor islands and three separate structural segments (see Figure 1, "Bridge Number F-1-2=N-6-1"). From the New Bedford side, a viaduct structure extends over MacArthur Drive, a single Conrail track and the west channel of the harbor to Fish Island. This is known as the West Bridge. The Middle Bridge, which carries the highway over the shipping channel between Fish Island and Popes Island, has a swing span bridge at the channel and fixed spans on either side approaching the swing span. The East Bridge connects Popes Island with Fairhaven over the wide but relatively shallow east channel. The total length of the crossing is approximately 4,000 linear feet.




NEW BEDFORD-FAIRHAVEN BRIDGE FIGURE 1

1. History

The first bridge connecting New Bedford and present day Fairhaven was built sometime in the 1790's. The first bridge was a wooden bridge was destroyed by a storm. A second, similar wooden bridge was constructed shortly after, also by private investment, and was destroyed by a storm in 1815. Four years elapsed before construction was complete on a third private bridge which lasted from 1819 until 1869 when it too was severely damaged in a storm.

Up to 1869, all three bridges had been privately owned and operated for profit. After the third bridge was destroyed, the two communities took over the rebuilding.

The bridge was substantially rebuilt and opened as a public facility in 1870. This bridge lasted until the turn of the century when it too was destroyed.

The construction of the present New Bedford-Fairhaven Bridge was completed in 1903. The bridge was operated jointly by New Bedford and Fairhaven until 1930 when operational responsibility was assumed by the Massachusetts Department of Public Works.

The bridge has undergone several major repairs in its history, the most recent having taken place in 1961. In 1972 the western end of the West Bridge was completely replaced in conjunction with the construction of ramps connecting to the new Route 18.

2. Structure

a. West Bridge

The West Bridge consists of ten simple spans. It starts over land on the New Bedford Mainland and ends on Fish Island with the last

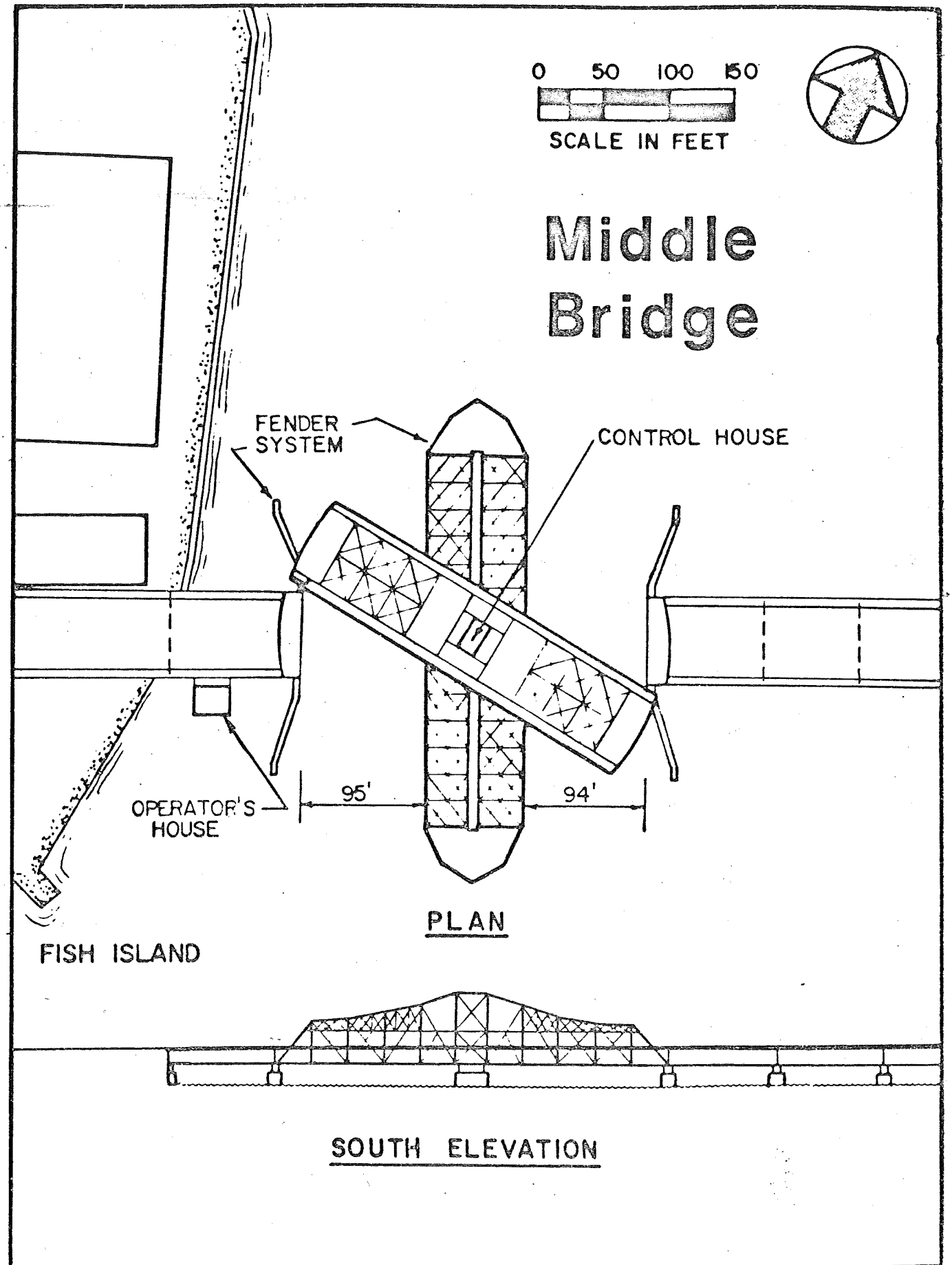
four spans crossing the west channel of New Bedford-Fairhaven Harbor. The two westerly simple stringer spans of 71 feet and 33 feet are from the 1972 replacement; they span over MacArthur Drive and one Conrail track. The remaining eight spans consist of four, 49 foot spans over land and four, 68 foot long deck plate girder spans over water.

The 1972 section is supported by a reinforced concrete abutment, a set of reinforced concrete piers, and a set of the original steel column bents. The original land section of the West Bridge superstructure is supported by steel column bents. The original section spanning over water is supported on stone piers.

The plate girder spans consist of four roadway girders spaced at approximately 17 feet on centers. The sidewalks and sidewalk fascia girders are supported on brackets attached to the outside roadway girder at the floor beam locations. The roadway stringer and deck portion of the superstructure of the girder spans were completely replaced in 1961, and major repairs were made to the girders and floor beams.

b. Middle Bridge

The Middle Bridge starts at Fish Island, crosses the center channel of New Bedford-Fairhaven Harbor, and ends at Pope's Island. It consists of five plate girder spans and the swing span (see Figure 2, "Middle Bridge"). One of the fixed spans is to the west of the swing span and four are to the east. The plate girders have spans ranging from 73 feet to 82 feet. The swing span has a total length of 289 feet. All sections are supported on stone piers.




NEW BEDFORD-FAIRHAVEN BRIDGE FIGURE 2

The swing span portion of the Middle Bridge consists of a variable depth truss along either side of the roadway. The trusses have both a top and a bottom lateral bracing system. The entire structure rests on a center pier and turntable.

When in the closed position, the swing truss acts as two simple truss spans, each about 130 feet long. When in the open position, the tower section supports the truss spans.

The plate girder fixed spans of the Middle Bridge are similar to those of the West Bridge. They also consist of four roadway girders spaced at approximately 17 feet on centers. As on the West Bridge, the roadway stringers and deck portion of the superstructure of the fixed girder spans were completely replaced in 1961 and major repairs were made to the girders and floor beams.

c. East Bridge

The East Bridge, which spans over the east channel of New Bedford-Fairhaven Harbor between Pope's Island and Fairhaven, consists of nine plate girder spans, each approximately 73 feet in length, supported on stone piers. The roadway stringers and deck portion of the superstructure of the girder spans of the East Bridge were also completely replaced in 1961 along with those of the West Bridge and the Middle Bridge.

## CONSTRUCTION PLANS AND SHOP DRAWINGS

Construction plans and shop drawings were obtained by research through the Department's records.

Original construction plans for the Middle Bridge and the East Bridge are not available. Original construction plans are available for the West Bridge however.

Shop drawings are available for the Middle Bridge for both the fixed spans and the moveable span. No original shop drawings were found for the East Bridge. Shop drawings of the West Bridge are available making a complete package of both construction plans and shop drawings for that Bridge.

Most of the construction plans for the various repairs of the Bridge that have taken place since the Department took over control in 1930 are available. The most vital of these are those of February 1961 when extensive structural alterations were made.

The construction plans and shop drawings are listed in Table 1 "Construction Plans and Shop Drawings".

# Construction Plans and Shop Drawings

| PLAN DATE | CONTENT | TITLE | SHEETS |
|---|---|---|---|
| 1896 | Shop Drawings of original East Bridge Structure | Not found | |
| 1897 | Shop Drawings or original Middle Bridge fixed spans | Pencoyd Iron Works "New Bedford and Fairhaven Bridge - Middle Bridge" | 10 |
| 1898 | Shop Drawings of original Swing Span | Pencoyd Iron Works "New Bedford and Fairhaven Bridge - 289'0" Draw Span (Swing Truss)" | 45 |
| January 1901 | Construction Plans of original West Bridge Structure | Joint Boards of Railroad Commissioners and Harbor and Land Commissioners "New Bedford and Fairhaven Bridge from the East Line of Water Street to the East Side of Fish Island" | 9 |
| 1901 | Shop Drawings of original West Bridge structure | American Bridge Company "New Bedford and Fairhaven - Bridge - Front Street to Fish Island" | 31 |

NEW BEDFORD-FAIRHAVEN BRIDGE

TABLE 1

| PLAN DATE | CONTENT | TITLE | SHEETS |
|---|---|---|---|
| January 1931 | Construction Plans for new concrete sidewalk, and new sidewalk plank, new street railway rails, new concrete barrier curbing, repairs to gates, and new ladders and walkways for access to machinery | The Commonwealth of Massachusetts "New Bedford-Fairhaven Bridge - Proposed Bridge Repairs - Bridge over New Bedford Harbor and N.Y., N.H. & HR.R." | 6 |
| January 1936 | Construction Plans for repair of fender piers and dolphins | Not Found | - |
| October 1944 | Construction Plans for replacement of selected sections of sidewalk stringers, replacement of sections of concrete sidewalk, and other miscellaneous repairs | The Commonwealth of Massachusetts "New Bedford-Fairhaven Bridge - Proposed Bridge Repairs" | 1 |
| February 1947 | Construction Plans for repairs to traffic gates and controls | Not Found | - |
| June 1948 | Construction Plans for removal of Street Railway rails and wood plank deck and replacement with steel grid deck | The Commonwealth of Massachusetts "New Bedford-Fairhaven Bridge - Proposed Reconstruction of Floor System" | 1 |
| June 1952 | Construction Plans for reconstruction of Floor System | Not Found | - |

NEW BEDFORD-FAIRHAVEN BRIDGE

TABLE 1 (cont.)

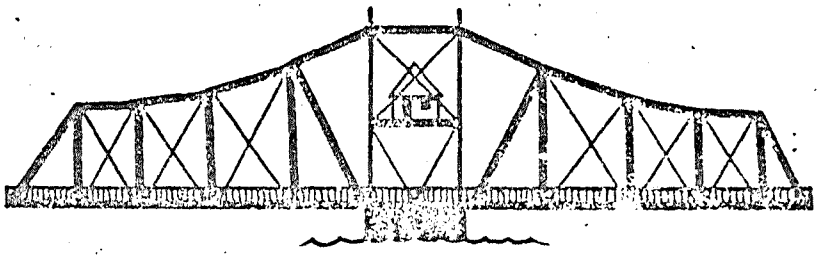
| PLAN DATE | CONTENT | TITLE | SHEETS |
|---|---|---|---|
| June 1954 | Construction Plans for revised anchorage and support for light poles | Not Found | - |
| January 1956 | Construction Plans for existing operator's house on wood piles with utility connections | The Commonwealth of Massachusetts "New Bedford-Fairhaven Bridge - Proposed Operator's House" | 3 |
| February 1961 | Construction Plans for new deck and partial new deck framing at fixed spans, alterations to abutments, column repairs, and other miscellaneous structural repairs | The Commonwealth of Massachusetts "New Bedford-Fairhaven Bridge - Proposed Bridge Repairs - Route 6 over Acushnet River and Old Colony Railroad Tracks" | 53 |
| June 1962 | Constructions Plans for filling of swing span steel grid open floor with concrete | The Commonwealth of Massachusetts "New Bedford-Fairhaven Bridge - Proposed Alterations of Floor System" | 1 |
| November 1972 | Construction Plans for new bridge over railroad tracks and frontage road to connect approach ramps from city and Route 18 approach ramps to existing Route 6 | The Commonwealth of Massachusetts "New Bedford-Fairhaven Bridge - Modifications to Existing Fairhaven-New Bedford Bridge - U. S. over Penn Central RR" | 17 |

NEW BEDFORD-FAIRHAVEN BRIDGE

TABLE 1 (cont.)

# Acushnet River bridge both bane and boon over 178 years

By Frank D. Roylance
POLITICAL AFFAIRS EDITOR



**Past·Present·Future**

**This is the first in a three-part series exploring the stormy 178-year history of the New Bedford-Fairhaven Bridge and telling why planners say it must be modernized by 1983, and why city officials favor a low-level design, even though a higher bridge would mean fewer delays on land and water.**

George Washington had been dead less than a year in 1800 when some long-forgotten New Bedford merchant dug into his breeches, turned 35 cents over to a drawtender and urged his horses over the new wooden bridge to Fairhaven.

It was the first time since the villages on the Acushnet River were settled that one could get across the broad harbor without rowing, sailing or trekking up to the Head-of-the-River bridge at Lund's Corner.

From then on residents of the area could not be indifferent to the design and condition of the slender span, which gave them a quick and convenient route to the far shore, day and night, in almost any weather.

Since that day 178 years ago the bridge has had many incarnations. It has been periodically demolished by storms, battered by boats and worn out by traffic. It has been loved and hated; it has made money and it has cost money.

It has been both an avenue and an obstacle, but tightly bound to the city's economic life, drawing sometimes desperate cries for repairs or replacement. Even before the present span was completed in 1903, there were arguments over its design.

## Green lady attacked

The venerable green lady of the bridge — the increasingly temperamental swing span, built about the time Guglielmo Marconi was tapping out his first trans-Atlantic wireless signal — has been under attack for years from modern-day planners and engineers. They see her as an inexcusable barrier to development of the vacant North Terminal, and an unpredictable dinosaur far beyond its 50-year life expectancy.

The bridge began in 1800 as a private business, built by wealthy New Bedford citizens William Rotch, William Rotch Jr., Thomas Rotch, Thomas Hazel, Edward Pope and John Howland under a 1796 authorization from the Legislature.

There were two draw openings then, each 30 feet wide. One was between Fish Island and the New Bedford shore, the other between Pope's Island and the Fairhaven shore.

Naturally, it was a toll bridge. It cost 6 cents for a pedestrian to cross, 6 cents for a horse, 35 cents for a four-wheeled wagon, and 6 cents a dozen for sheep, pigs or cattle. If you could swear on a Bible you were crossing to go to church, or if you were going to school on the other side, you could pass for free.

The venture's chief asset — its location — was also its worst liability. In 1807 a wind-driven tide inundated the narrow wooden structure and partially destroyed it. It was quickly rebuilt, but another storm in September 1815 — perhaps a hurricane — picked it up and moved it upstream, in splinters.

After four more years of rowing, sailing and walking around, residents finally had a bridge again in 1819, this one with wider draws.

## New draws built

By mid-century, the growing town's water-borne economy demanded improvements to the bridge, and the Legislature was moved to compel the bridge owners in 1851 to build two new draws, each 60-feet wide, to make

(Please turn to Page 10)

# Bridge history rife with complaints

(Continued from Page 1)

wharf property north of the bridge more accessible to larger ships, and therefore more valuable.

The same theme is being sounded today in arguments for the replacement of the present swing span.

Eighteen years later, in 1869, the new draws were wrecked in another September storm when a deep-sea merchantman and a whaleship were blown from their moorings and through the bridge at either end.

At last residents saw an opportunity to get out from under the tolls they had been charged for 69 years. By act of the Legislature, the bridge property was taken by Bristol County, with the heaviest assessments falling to taxpayers in New Bedford and Fairhaven.

Rebuilt in 1870 on stone piers and wood trusses, the bridge stretched from the foot of Middle Street in New Bedford to the end of Bridge Street in Fairhaven. It was just 33 feet at its widest point.

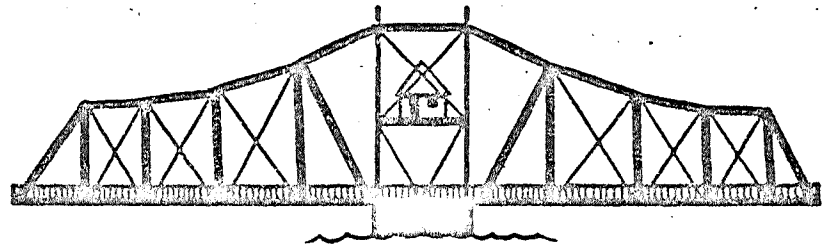
By 1876 the New Bedford and Fairhaven Street Railway Company had installed a line of tracks across the bridge, and horse-drawn cars began carrying passengers across the river. In 1893 electricity and heavier tracks were put in place.

It was in that same year, 1893, that Mayor Jethro C. Brock — predicting in his inaugural address the city's 40,000 population would double in 50 years — called on the county commissioners to replace the bridge.

Brock's speech gave birth to the bridge still standing in the harbor today. Work began on the Fairhaven shore in 1896, reached Fish Island by 1900, and finally touched down on the New Bedford mainland in 1903 and opened to traffic.

But it was no easy leap from one side to the other. The county's original cost projection of $200,000 was an underestimate that would ring in the commissioners' ears for many years.

The first loan authorization was



**Past·Present·Future**

followed in 1894 by another for $150,000, and in 1897 by a third for $450,000.

The new bridge had become a scandal. Charging the county with making extravagant land damage settlements, voters turned the New Bedford commissioner out of office.

## Debates seemed endless

The debates seemed endless. In Fairhaven, where the work began, they argued over where the eastern terminus should go. It was finally agreed to place it a block north of the old Bridge Street site.

Then the War Department insisted that the draw span be placed between Fish and Pope's Islands, instead of between Fish Island and the New Bedford shore, where it has been since 1800. Owners of wharves north of the bridge objected, saying the change would hurt their property values.

Things finally became so intolerable the project was taken out of the county commissioners hands and turned over to the city for completion.

New Bedford was authorized to borrow $450,000 more to complete the bridge's New Bedford approach, from Fish Island west. But should it go over the railroad tracks or cross at the grading? More debate, and it was decided to go overhead, to Water Street.

That work cost another $80,000, all borne by the city.

As if the screaming weren't loud enough when the final $1,387,261 price tag for the bridge came out, it got louder when the Plymouth County towns of Wareham, Marion and Mattapoisett were asked to share in the assessments.

But pay they did. New Bedford carried the lion's share of $778,814, but towns from Fall River to Wareham shared, as did Bristol County, the Old Colony Railroad and Union Street Railway.

For 30 years things went smoothly for the bridge. There were a few seven-hour shutdowns for minor repairs, but it wasn't until 1931 — a year after the state took over bridge maintenance — that it was closed for an extended period. For four days motorists had to go around while a $100,000 repair job was completed.

## The final straw

But with increasing traffic by both land and water, bridge openings were becoming more disruptive and annoying. The draw span's 6-to 8-foot vertical clearance required an opening for all but the smallest craft, and regulations gave boats the right-of-way at the toot of a horn.

In 1947 bridge openings were restricted somewhat, denying immediate openings during the rush and lunch hours to vessels drawing less than 15 feet of water. But delays at the draw were becoming an increasing irritation. And the advancing age of the span complicated the problem, requiring more and more shutdowns for repairs and tests.

The last straw came with a major project in 1962 to rebuild the bridge surface. The work took 17 months, and was plagued with strikes, steel and manpower shortages, weather delays — and horrendous traffic jams.

In 1965 the state Legislature authorized a special commission to study the feasibility of replacing the swing bridge. The 1967 study found the bridge "adequate," but recommended its eventual replacement with a medium level draw bridge.

Called a double-leaf "bascule" bridge, the recommended span would have two draws, each hinged and counterbalanced at the bridge bulkheads on either side of the 150-foot ship channel. Meeting in a closed position over the centerline of the channel, the draws would open by swinging up into vertical positions over the bulkheads, leaving unlimited overhead clearance for shipping.

Other solutions were studied in the 1967 report, and in subsequent studies. These included high and low-level fixed bridges, a tunnel and no bridge at all. The double-leaf bascule bridge remains the favored design.

But while the planners plan, traffic remains heavy, the bridge is closed more and more often for repairs and tests, and continues to be rated "poor to fair" by state inspectors.

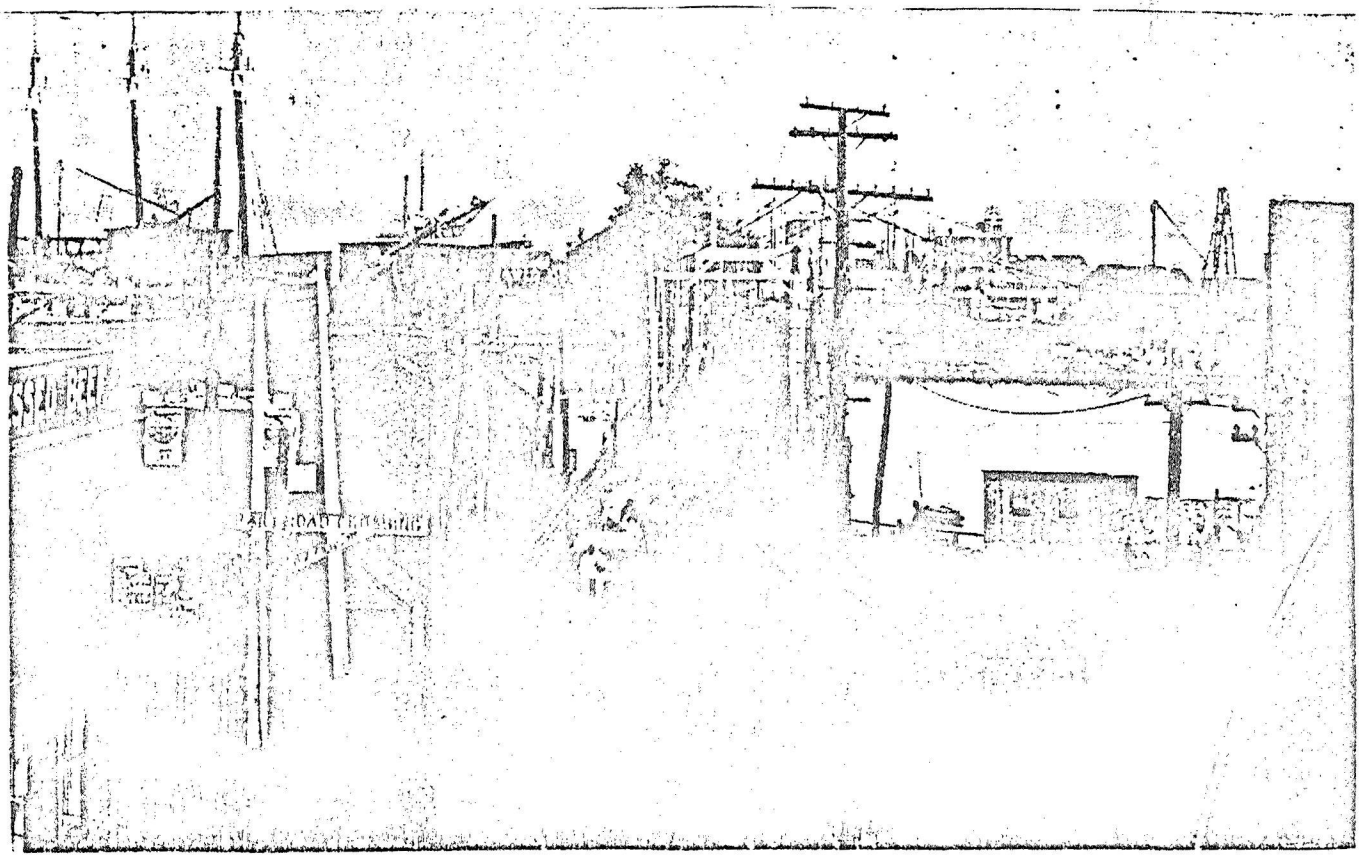
Pleas are made regularly for its speedy replacement, most recently by the Greater New Bedford Forum, a group of prominent business and civic leaders who agree with planners who fear development of the North Terminal waterfront industrial area will be choked off by the bridge's narrow ship channels.

But the bridge remains.

**Tomorrow: The bridge's place in oil exploration.**

The days of horse, buggy and sail were not yet over in 1900 when this picture was taken of the New Bedford-Fairhaven Bridge. The iron swing span, which still carries traffic today, had just been completed, and is visible directly behind the top of the telegraph pole at right center. Construction of the new bridge had stopped at Fish Island, forcing wagons onto the old drawspan to the New Bedford shore, foreground.

Standard-Times library photo



1900

The Standard-Times, July 19, 1978

*Photos: 1/4/1979*

# WHALE POSITION: STUDY RESTORATION

Reprinted from the Sunday Standard-Times, July 1, 1984, In My View - John K. Bullard

In 1978 as a member of the Greater New Bedford Forum I was an active participant in the planning of and advocacy for a replacement to the Fairhaven Bridge. I am familiar with the arguments for a new bridge and have made them many times myself. I am well aware of the frustrations that many people feel at the time taken to plan and build a new bridge. No one wants delay. No one wants the existing condition to remain.

However, I am forced to observe that conditions have changed in the last six years. Many of the reasons that the Forum, the Standard-Times and many people including myself, supported a new bridge no longer exist. Because a solution to the bridge problem will be paid for by a large number of our tax dollars, it is incumbent upon us to continue to take a hard look at this issue. We cannot afford to be blinded by impatience.

The benefits of a new bridge are fourfold: 1) a wider span will lead to economic development in the northern harbor, 2) a higher bridge will cut down the number of closings, 3) a bascule bridge will cut down the time of closings and 4) a new bridge will be more reliable. The cost of a new bridge has been calculated simply as the direct cost, estimated between $15 and $20 million.

Let us look more carefully at these benefits and costs. Let us see if they are as true today as they were six years ago.

Benefit 1. The northern harbor has developed significantly in the last six years despite the bridge. Maritime Terminal and Frionor which bring in the largest ships have grown considerably. I have never heard them ask for a new bridge. The North Terminal also has developed with businesses that serve the fishing industry. These businesses have no use for a wider span. Though there is vacant land on the Fairhaven side, the people there seem to prefer its existing residential use. There is not talk today as there was six years ago of the growth in large traffic that oil development on Georges Bank would bring. In short, it is impossible to conclude that the bridge has any bearing whatsoever on northern harbor development. In fact, one might argue that the most underutilized piece of our waterfront is the State Pier - located south of the bridge.

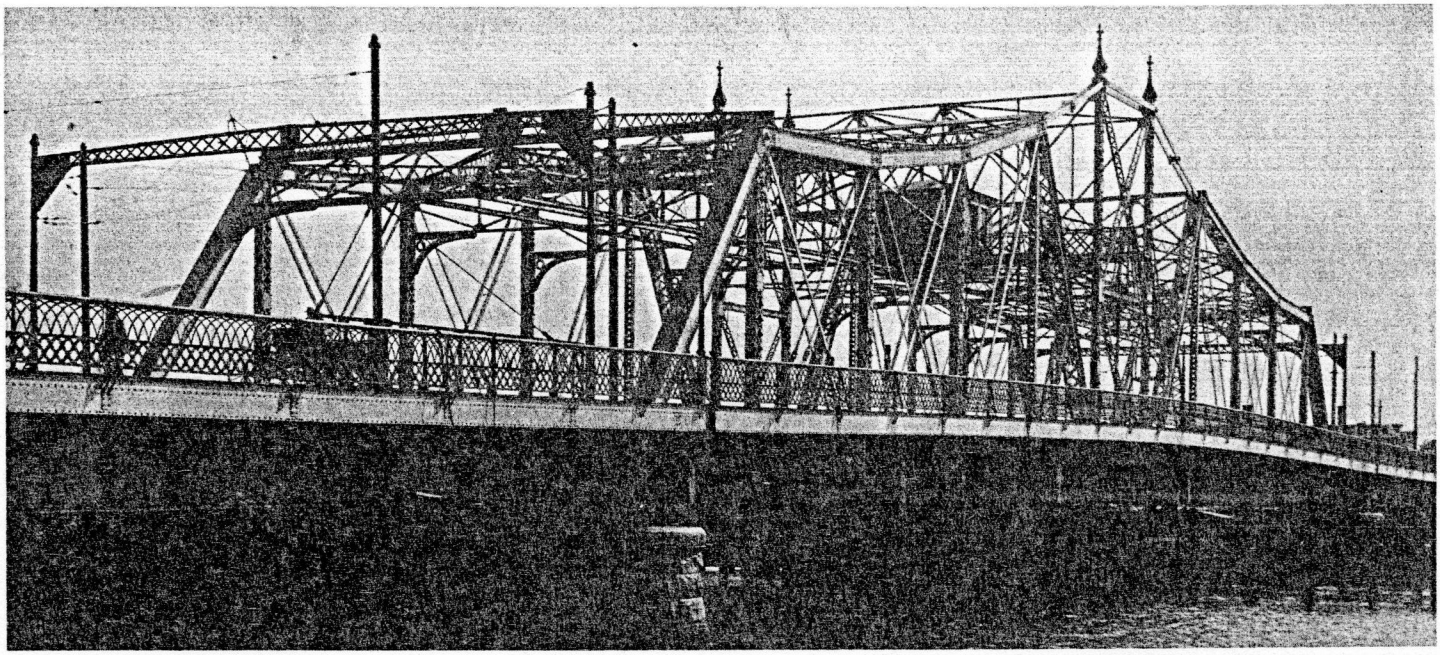
Benefit 2. The new bridge now proposed will not be significantly higher than the existing bridge. The gain in elevation of 4 feet (it is 6 feet now; the proposed new bridge is 10 feet) will require that the new bridge be opened for all but the smallest power boats. There will be no reduction in openings.

Benefit 3. A bascule bridge will clearly take a little less time to open than the existing swingbridge. A bascule bridge takes 4-6 minutes to open and close. The operator of the current bridge feels that with new hydralics the exisiting bridge can be opened and closed in 6 minutes. So the saving in time will be a couple of minutes at best. It is important to note that the increased traffic going through the bridge has caused the Chamber of Commerce to work with the fishing industry, local businesses and other parties to develop schedules for openings. This scheduling will have a much greater impact on vehicular inconvenience than the one or two minute difference in bridge types. This benefit is negligible.

***We have been struggling too long with the attitude that something can be simply "Too Old" to work. Age has nothing to do with reliability. Condition does, whether it is old buildings, old boats or bridges.***

Benefit 4. A new bridge will be more reliable than the existing bridge in its existing condition. But I am not advocating that we do nothing. I am advocating a total restoration. We have been struggling too long with the attitude that something can be simply "too old" to work. Age has nothing to do with reliability. Condition does, whether it is old buildings, old boats or old bridges. If they are kept in good condition, they will function properly. Replacing a bridge merely because it is old is as inane an arguement as saving it merely because it is old. Increased reliability can be achieved by either a new bridge or restoration. Either solution will require better maintenance than the current bridge has had.

Costs. We are learning that the cost of a new bridge is more than the $15-20



million for the bridge, itself. The recent meeting in Fairhaven identified several significant indirect costs. In all cases, restoration would provide significant savings.

First, restoration is less work than a new bridge, so the direct cost would be less.

Second restoration would involve no dredging, so the impacts of PCB disposal with its attendant political problems and time delays would be eliminated.

***I think we should give restoration an honest hard look. The impact of a new bridge on the economy, on the environment and on the taxpayer demands it.***

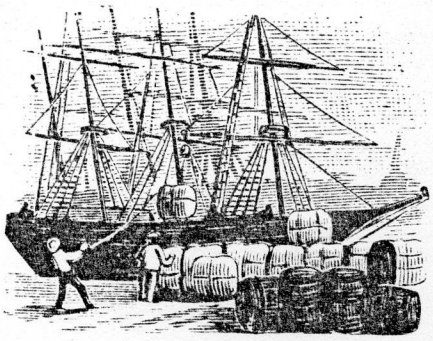
Third, restoration, unlike new construction, is an incremental process that can be scheduled with flexibility. While the bridge might have to remain shut for a few short periods (as it was recently) there would be no 18-month closings. It is impossible even to conceive of the impact of closing Route 6 for 18 months. The impact would reach far beyond Popes and Fish Islands. Downtown New Bedford and most of Fairhaven would be affected. The cost, though impossible to estimate in dollars, is more than dollars. It is the jobs and businesses that people have given their lives to. This indirect cost has been sidestepped by the new bridge engineers. Nevertheless it is enormous.

Fourth, indirect public improvements would not be required with restoration as they would be with the 18-month delay. Side roads in Fairhaven can stay side roads, saving dollars and peace of mind.

Given all this, I have come to the conclusion that the benefits of bridge replacement have been significantly overstated and the costs grossly understated. I suggest this makes the premise for a new bridge false. I advocate, as does WHALE, that in the light of this the Commonwealth of Massachusetts should commission a separate study that weighs the costs and benefits of complete restoration against those of a new bridge.

The money for this study pales in comparison to the potential savings. There should be no delay because the study would be independent of the planning now going on.

There is no question that we must do something about the existing bridge. But I have grave doubts that the solution proposed and endorsed six years ago is the best for our community. I think we should give restoration an honest hard look. The impact of a new bridge on the economy, on the environment and on the taxpayer demands it.



MASSACHUSETTS HISTORICAL COMMISSION

COMMONWEALTH OF MASSACHUSETTS
Office of the Secretary of State
294 Washington Street
Boston, Massachusetts
02108
617-727-8470

MICHAEL JOSEPH CONNOLLY
Secretary of State

September 11, 1979



Mr. Justin Radlo
Chief Engineer
Executive Office of Transportation and Construction
Department of Public Works
100 Nashua Street
Boston, Massachusetts 02114

RE: New Bedford Fairhaven Bridge Replacement

Dear Mr. Radlo:

Thank you for your letter of August 21, 1979 which supplies the Massachusetts Historical Commission with historical information regarding the swing span drawbridge between New Bedford and Fairhaven. Based on the information, MHC professional staff feel that the bridge meets the criteria for eligibility to the National Register of Historic Places, in that the bridge retains integrity of location, design, setting, materials, and workmanship, and embodies a distinctive method of construction. MHC recommends that a formal Determination of Eligibility be sought for the structure.

Because the bridge is in a deterioated condition, MHC would support the DPW if the alternative selected requires demolition. However, we would request that the structure be documented according to standards developed by the Historic American Engineering Record. Review in compliance with Section 106 of the National Historic Preservation Act of 1966 would be required according to 36 CFR 800, and the Advisory Council on Historic Preservation will require an opportunity to comment on the bridge replacement.

If you have any questions, feel free to contact Valerie Talmage, Review Director,

Sincerely,

Patricia L. Weslowski
AT

Patricia L. Weslowski
State Historic Preservation Officer
Executive Director
Massachusetts Historical Commission

PLW/cj

U. S. DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION
REGION ONE
100 Summer Street, Suite 1517
Boston, Massachusetts 02110

Subj: New Bedford - Fairhaven Bridge
New Bedford and Fairhaven, Massachusetts

IN REPLY REFER TO:
HEV-MA

May 21, 1980

Ms. Carol Shull
Acting Keeper of the National Register
of Historic Places
Heritage Conservation and Recreation Service
Department of the Interior
Washington, D.C. 20240

Dear Ms. Shull:

In accordance with 36 CFR, Part 800, the middle section of the New Bedford-Fairhaven Bridge, carrying Route 6 over the New Bedford Harbor scheduled for demolition and replacement, has been identified as a historic site possibly eligible for the National Register of Historic Places. After consulting with the Massachusetts State Historic Preservation Officer, the Federal Highway Administration has determined that this site appears eligible for inclusion in the National Register.

We are enclosing a copy of the historic bridge inventory and evaluation, upon which this determination is based, photographs of the bridge, a copy of a U.S. Geological Survey map of the New Bedford Harbor area, and a copy of the statement of opinion of the State historic Preservation Officer.

Sincerely yours,

N. J. Van Ness
Division Administrator

Edwin P. Holahan

By: Edwin P. Holahan
Assistant Division Administrator

Enclosures

cc: E. Amadon - DPW - Boston/with enclosures
P. Weslowski - MHC/with enclosures

United States Department of the Interior

HERITAGE CONSERVATION AND RECREATION SERVICE
WASHINGTON, D.C. 20240



IN REPLY REFER TO: 436

Mr. Edwin P. Holahan
U.S. Department of Transportation
100 Summer Street, Suite 1517
Boston, Massachusetts 02110

Dear Mr. Holahan:

Thank you for your letter requesting a determination of eligibility for inclusion in the National Register pursuant to Executive Order 11593 or the National Historic Preservation Act of 1966, as amended. Our determination appears on the enclosed material.

As you are aware, transportation projects requiring the use of lands from significant historic properties are also subject to the provisions of section 4(f) of the Department of Transportation Act of 1966. Your request for our professional judgment constitutes a part of the Federal planning process. We urge that this information be integrated into the National Environmental Policy Act and section 4(f) analyses in order to bring about the best possible program decisions. This determination does not represent the results of formal consultation by the Department of Transportation with the Department of the Interior pursuant to section 4(f). Such requirements would be fulfilled only when the Department of the Interior separately comments on any section 4(f) statement which may be prepared and approved by you for circulation. The determination also does not serve in any manner as a veto to uses of the property, with or without Federal participation or assistance. Any decision on the property in question and the responsibility for program planning concerning such properties lie with your agency after the Advisory Council on Historic Preservation has had an opportunity to comment.

We are pleased to be of assistance in the consideration of historic resources in the planning process.

Sincerely,

Carol D. Shull

Carol D. Shull
Acting Keeper of the National Register

# DETERMINATION OF ELIGIBILITY
# NOTIFICATION DISTRIBUTION

cc: State Historic Preservation Officer: Mrs. Patricia L. Weslowski

Federal Representative: Mr. Robert F. Crecco

Bureau Liason: Mr. Larry Isaacson

Advisory Council on Historic Preservation Washington, D.C.

# E.O. 11593

## DETERMINATION OF ELIGIBILITY NOTIFICATION

National Register of Historic Places
Heritage Conservation and Recreation Service

**Name of property:** New Bedford - Fairhaven Bridge

**Location:** Bristol County **State:** MA

**Request submitted by:** DOT/FHWA Edwin P. Holahan

**Date received:** 5/27/80 **Additional information received:**

**Opinion of the State Historic Preservation Officer:**

☒ Eligible ☐ Not Eligible ☐ No Response

**Comments:**

**The Secretary of the Interior has determined that this property is:**

☒ Eligible **Applicable criteria:** C ☐ Not Eligible

**Comments:** 36 CFR Part 63.3 Determination

☐ Documentation insufficient
(Please see accompanying sheet explaining additional materials required)

W. Ray Luce
for Keeper of the National Register

JUN 9

**Date:**

FHR 8-265 2/79

GPO 942 576

NEW BEDFORD AND FISH ISLAND

HISTORIC BRIDGE INVENTORY & EVALUATION

Date: APRIL 8, 1980

Municipality NEW BEDFORD, MASSACHUSETTS S.H. ? N.S.H. ?

Street Name & Route # U.S. ROUTE 6

Over NEW BEDFORD - FAIRHAVEN HARBOR

~~Street Name & Route #~~

Bridge No. F-1-2 = N-6-1 Bridge Key # MAINTENANCE No. 035-626-000 Dist. 6

CRITERIA FOR DETERMINATION OF HISTORIC SIGNIFICANCE

I. Builders Contribution

Quantity

Unknown ✓ Several _____ (1-10) Many _____ (10 or more)

Name of Builder: Not Known (Fabricator was American Bridge Co.)

Designer: Could be Joint Board of Railroad Commissioners and Harbor and Land Commissioners

Plaque: Yes _____ No. ✓

II. AGE: Pre 1850 _____ 1850-1900 _____ 1900-1930 ✓

II. TECHNICAL

Bridge Width 70

Total Length of Bridge 480'

Number of Spans: 8 Span Lengths 4 at 50' and 4 at 70'

Patented: Yes _____ No _____ Unknown ✓

Load Carrying Capacity: Adequate ✓ Inadequate _____

Configuration: Unique _____ Unusual _____ Common ✓

Types of Materials:

STRUCTURAL STEEL WITH CONCRETE DECK

List Special Features and Modifications:

The west end of the bridge meets 1972 construction associated with the Route 18 interchange. The roadway stringer and deck portion of the superstructure of the girder spans were completely replaced in 1961 and major repairs were made to the girders and floor beams.

Original construction plans and shop drawing of this structure are available.

IRONMENTAL

Aesthetics: Unusual _____ Good _____ Common ✓
Site Integrity: Retained ✓ Violated _____
History of Bridge and Area:

Build as part of 3 segment crossing (from Fairhaven to Popes Is., from Popes Is. to Fish Is., and from Fish Is. to New Bedford) in early 1900's. A crossing of some type has been maintained in this location for almost 200 years.

V. ECONOMICS

Owner: Municipal _____ County _____ State ✓ Federal _____

R.R. _____

What is your recommendation?
Maintenance _____ Replacement _____ Rehabilitation _____
Are materials available for Rehabilitation: Yes _____ No _____
Is structure scheduled for replacement? Yes ✓ No _____

VI. PHOTOS - INDICATE SHOTS TAKEN

1. Setting
2. Builders Plaque
3. 3/4 View
4. Thru View
5. Under View
6. Elevation
7. Joint & Connections
8. Machinery
9. Decorative Features

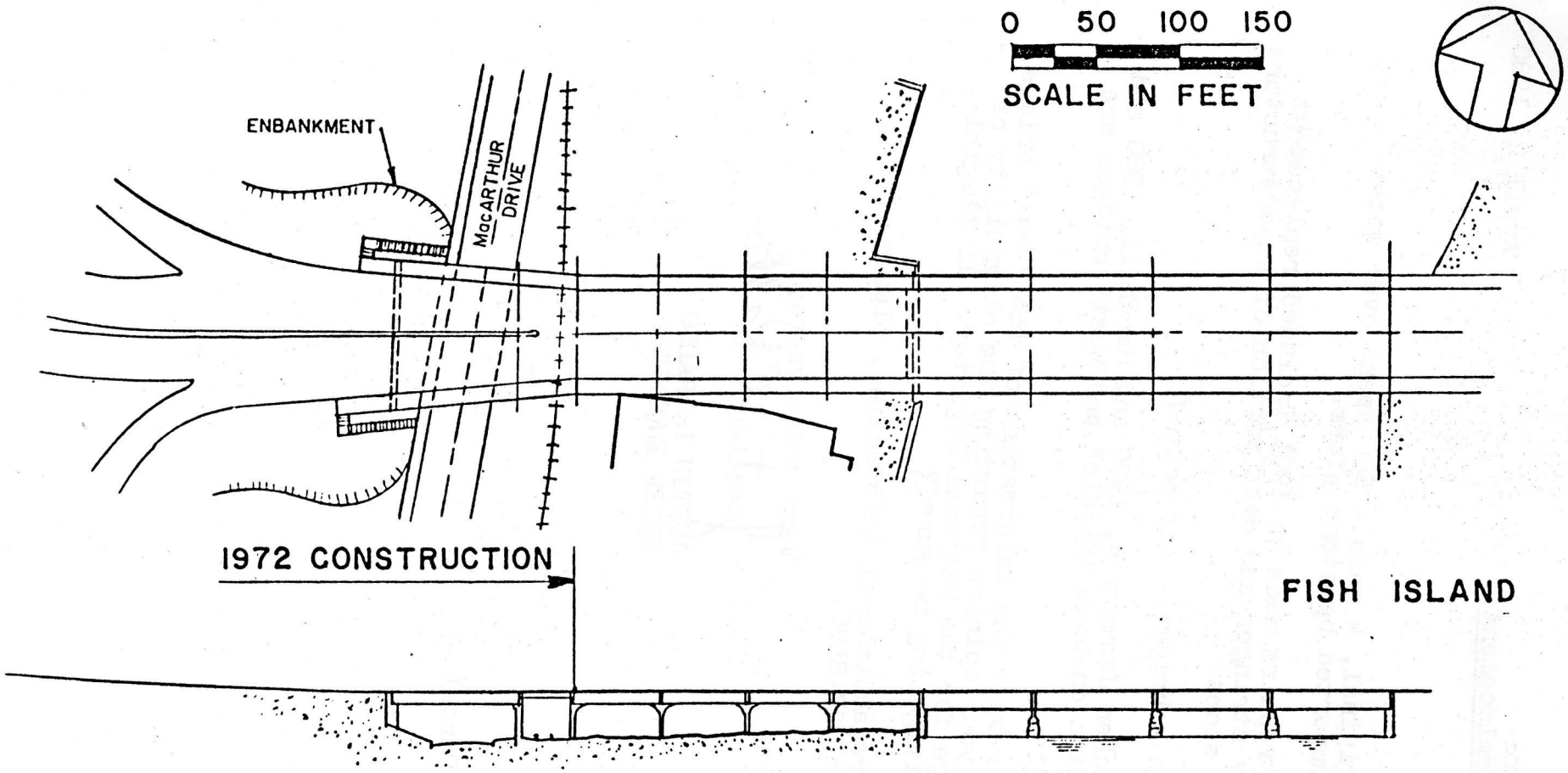
VII. COMMENTS & CONCLUSIONS

1. In your judgement, does this bridge have historic value? Yes ___ No ___
2. Please explain your answer to #1

3. Additional Comments required on back of page.

Preparer: _____
Title: _____
Date of Survey: _____

INCLUDE TOPO SHEET SHOWING LOCATION




# West Bridge

NEW BEDFORD-FAIRHAVEN BRIDGE

FIGURE 9




*West Bridge Photos: 3/11/1980*



*West Bridge Photos: 3/11/1980*

# DETERMINATION OF ELIGIBILITY (MHC OPINION)

TO: Christie

RETURN TO REVIEWER BY _____ (DATE)

FROM: Val

DATE: April 10, 19

TOWN: New Bedford

PROPERTY: Fairhaven Bridge again - West (as well as center) portion
(NAME AND ADDRESS)

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 _____

2. Statement of Significance: OR Why not eligible?

this section of the bridge does not possess the engineering significance of the Center bridge, and has been substantially altered in 1972.

☐ DOE LETTER WRITTEN

FILED IN ER FILE _____

_____ (DATE)

MASSACHUSETTS HISTORICAL COMMISSION

COMMONWEALTH OF MASSACHUSETTS
Office of the Secretary of State

294 Washington Street
Boston, Massachusetts
02108
617-727-8470

MICHAEL JOSEPH CONNOLLY
Secretary of State

April 14, 1980

Mr. Justin Radlo
Massachusetts Department of Public Works
100 Nashua Street
Boston, Massachusetts 02114

RE: New Bedford-Fairhaven Bridge, "West Bridge"

Dear Mr. Radlo:

Thank you for supplying the Massachusetts Historical Commission with information with your letter of April 2, 1980. MHC staff have reviewed the information on the "west" New Bedford-Fairhaven Bridge and feel that this bridge does not meet criteria for listing in the National Register of Historic Places. As you know, we have previously stated that the "east" bridge does meet National Register criteria. MHC recommends that the Massachusetts Department of Public Works proceed with a formal determination of eligibility for the "east" New Bedford/Fairhaven Bridge.

If you should have any further questions, please feel free to call Valerie Talmage.

Sincerely,

Patricia L. Weslowski
State Historic Preservation Officer
Executive Director
Massachusetts Historical Commission

PLW/ej

# * MASSHIGHWAY HISTORIC BRIDGE INVENTORY *

**Town/City:** Fairhaven/New Bedford **MHD Dist.:** 5
**Facility Carried:** US 6 (East Bridge)
**over**
**Feature Intersected:** Acushnet River
**Structure No:** F01002 3PG MHD NBI **Photo Nos.:** 293: 19-25; 294: 0-3
**BDEPT No.:** F-01-002/N-06-001 E **B.I.N.:** 3PG **AASHTO Rating (date):** 40.0 (8/9/01)
**Common/Historic Name (source):** Fairhaven/New Bedford East Bridge

**National Register Eligibility Finding (by/date):**

**Year Built (source):** 1896-97 (HAER report)
**Years Rebuilt (source):** 1961/62 (1961 plans, RR)
**Builder (source):** substructure - Steward & McDermott (HAER report); superstructure - Maryland Steel Co. (1896 plans)
**Designer (source):** William F. Williams, Bristol County Engineer (1896 plans)

**Structural Type/Material:** 303 (plans, sv)
9 simple spans, riveted, built-up steel deck plate girders. 4 lines of girders, 6 lines of floorbeams between the girders. 2- and 3-span continuous steel stringers carry 6½" thick concrete deck.

Cut granite block piers and abutments.

**Structure Length:** 206m **Length of Maximum Span:** 22.9m
**Skew:** 0 **Deck Width (out-to-out):** 21.7m
**Main Unit, No. Spans:** 9 **Lengths:** 22.9m
**Approaches, No. Spans:** - **Lengths:** -
**Plaque:** removed **Location:** formerly on E end posts

**Alterations, unusual features, comments:**
Major rehabilitation project in 1961/62:
the built-up girders and floorbeams were repaired (some had their cover plates extended); 10 of the 18 lines of end floorbeams were replaced entirely; the existing steel stringer/two-way buckle-plate arch/concrete deck floor system was completely replaced; new concrete bearing seats were poured on all piers and abutments; the original lattice guardrails, and all the existing utility poles/light standards were replaced.

1896 "Fixed Span" drawings show the original floor system on the fixed, plate girder spans as a timber plank deck on metal stringers, with a double-track street railway line running down the center.
However .... A 1922 inspection report for the City of New Bedford says the plate girder spans then had buckle plate floors on steel stringers, paved either with brick or asphalt on a concrete base.

**Visual Quality (bridge/setting):** **High** ☐ **Average** ☒ **Low** ☐

BDEPT No: **F-01-002/N-06-001 E**

**Site Integrity:** **Retained** ☐ **Lessened** ☐ **Violated** ☒

**Site Description:**

Bridge spans the eastern (of 3) channels of the Acushnet River as it passes through New Bedford Harbor – from Popes Island (New Bedford) on the west, to the Fairhaven mainland on the east. Northern half of Popes Island is covered with modern commercial/industrial properties, with a paved parking lot flanking the bridge abutment; a modern park/marina (Marine Park) occupies the southern half of the island. Another small park lies north of the bridge on the Acushnet shore; a modern hotel complex, with extensive paved parking lots, occupies the opposite (southern) side of the Acushnet approach to the bridge.

**History of Bridge and Site:**

A private company opened the first bridge across New Bedford Harbor to Fairhaven in 1800; that original toll bridge was composed of three separate timber pile structures spanning the three channels of the Acushnet River, with draw spans in the eastern and the western segments. This bridge was destroyed in 1815, but was replaced in 1819 with another toll structure, which was destroyed in turn by an 1869 storm. When the bridge's owners decided not to undertake repairs, the three-segment bridge was turned over to Bristol County, which repaired and reopened it in 1870. The narrow wooden bridge, however, couldn't stand up under the increasingly heavy traffic of the 1890s and, in 1894, the Massachusetts legislature approved construction of a new, three-segment bridge, with a single drawspan – this one located in the middle structure, between Popes and Fish Islands. The present eastern bridge was thus erected in the late 1890s, without a drawspan, and on a slightly different alignment than its predecessors.

**Sources:** Patrick Harshbarger, HAER No. MA-101, New Bedford-Fairhaven Middle Bridge

**BH:** Y

**RR:** 1999 Bryant Assoc.

**Plans:** partial 1896++, 1961

**OBH:** Y

**Other:**

**Summary Statement of Significance:**

One of some 400 bridges/culverts currently coded in the MassHighway bridge database as examples of the steel girder-and-floorbeam structural type. A heavily altered example in a heavily altered waterfront setting. Of minor note for the number of its spans (9) and its moderately early date. Although it shares the Bridge Department Number of the NR-eligible New Bedford-Fairhaven Middle Bridge (with its rim-bearing through truss swing span), the East Bridge is separated from the Middle Bridge by the ca. 1500' length of Popes Island.

**Statement Prepared By:** S.J. Roper, MassHighway Historic Bridge Specialist **Date:** 10/24/01

**Field Survey By:** S.J. Roper **Date:** 8/29/01

# * MASSHIGHWAY HISTORIC BRIDGE INVENTORY *

**MassHighway Recommendation -- National Register Eligibility**

| | Municipality | On/Over | BRDEPTNO |
|---|---|---|---|
| **Bridge:** | Fairhaven/New Bedford | US 6/Acushnet R. East Bridge | F-01-002/N-06-001 E |

**Significant because:**

1) **Unusual or unique type:** ☐
2) **Early example of type:** 1896-97 ☒
3) **Design advances bridge technology:** ☐
4) **Retains integrity:** ☐
5) **Builder known and important:** ☐
6) **Bridge historically important to area:** slight ☒

**Not significant because:**

1) **Common type:** steel girder-and-floorbeam ☒
2) **Not an early example of type:** ☐
3) **No advance of bridge technology:** ☒
4) **Integrity lessened because of:** **alterations:** ☒ **deterioration:** ☐
5) **Builder unimportant or not known:** ☒
6) **No known significance in area:** ☐

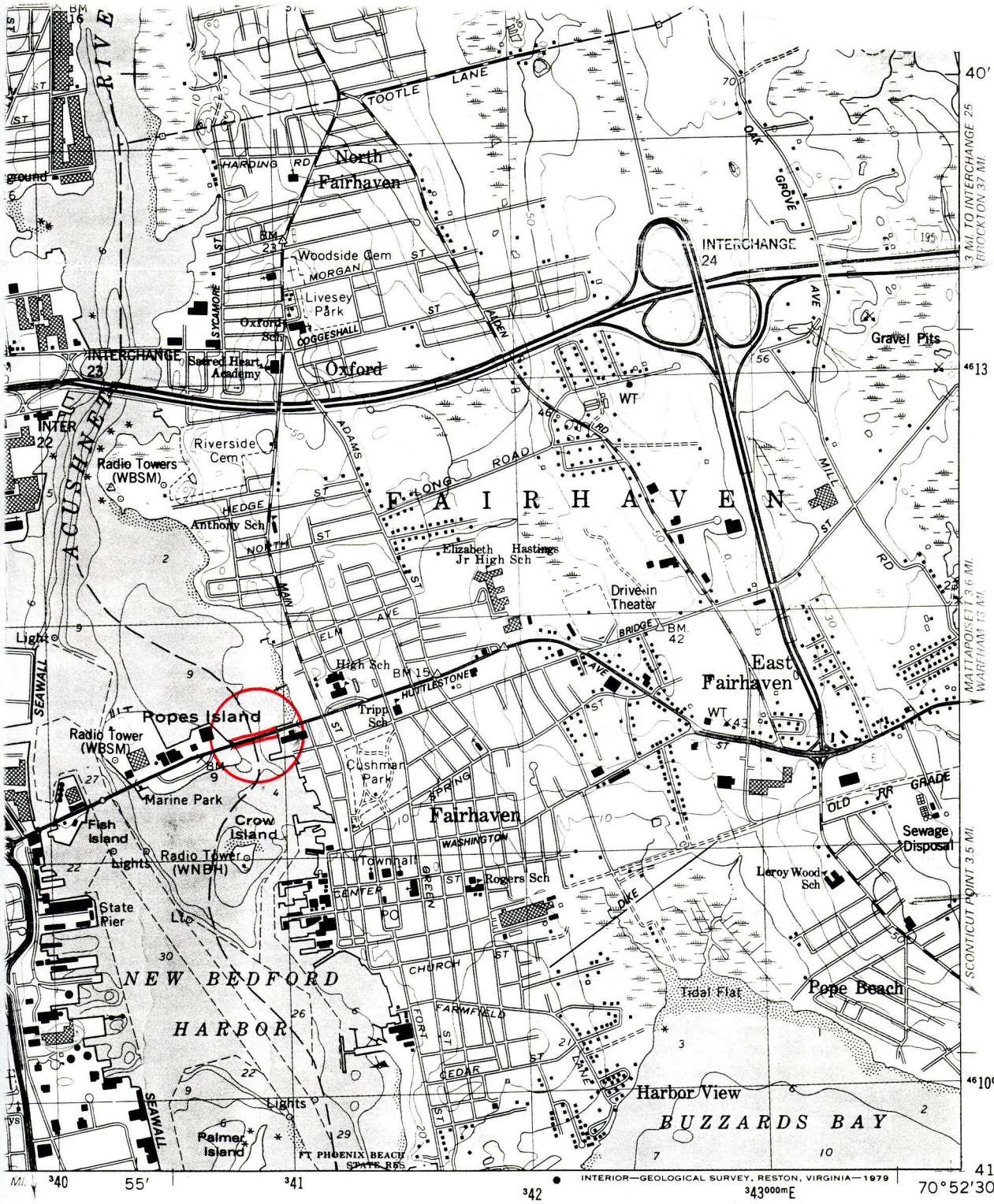
☐ **Potentially Eligible** ☒ **Not Eligible**

☐ **Not Eligible Individually BUT:** ☐ **Conditionally Not Eligible, Review at 50**

**Comments:**

A heavily altered, if moderately early, example of a common structural type. Of minor note for its number of spans (9), and as one element of a larger 1890s project which produced the fair more significant New Bedford-Fairhaven Middle Bridge, with its landmark through truss swing span. The East Bridge, however, is an independent structure located some 1500' east of the Middle Bridge, in a setting much altered by 20th century commercial and industrial development.

**Prepared by:** S.J. Roper, MassHighway Historic Bridge Specialist **Date:** 10/25/01




| | |
|---|---|
| 3 | .9144 |
| 4 | 1.2192 |
| 5 | 1.5240 |
| 6 | 1.8288 |
| 7 | 2.1336 |
| 8 | 2.4384 |
| 9 | 2.7432 |
| 10 | 3.0480 |

To convert feet to meters multiply by .3048

To convert meters to feet multiply by 3.2808

1 MILE

7000 FEET

METER

F-1-2/N-6-1 EAST BRIDGE

ROAD CLASSIFICATION

Primary highway hard surface

Light-duty road, hard or improved surface

Secondary highway, hard surface

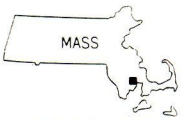
Unimproved road

Interstate Route

U. S. Route

State Route

(SCONTICUT NECK) 6867 III SE




QUADRANGLE LOCATION

# NEW BEDFORD NORTH, MASS.

N4137.5—W7052.5/7.5

1979

DMA 6867 III NW—SERIES V814

QUEST

FROM SW

FROM NE

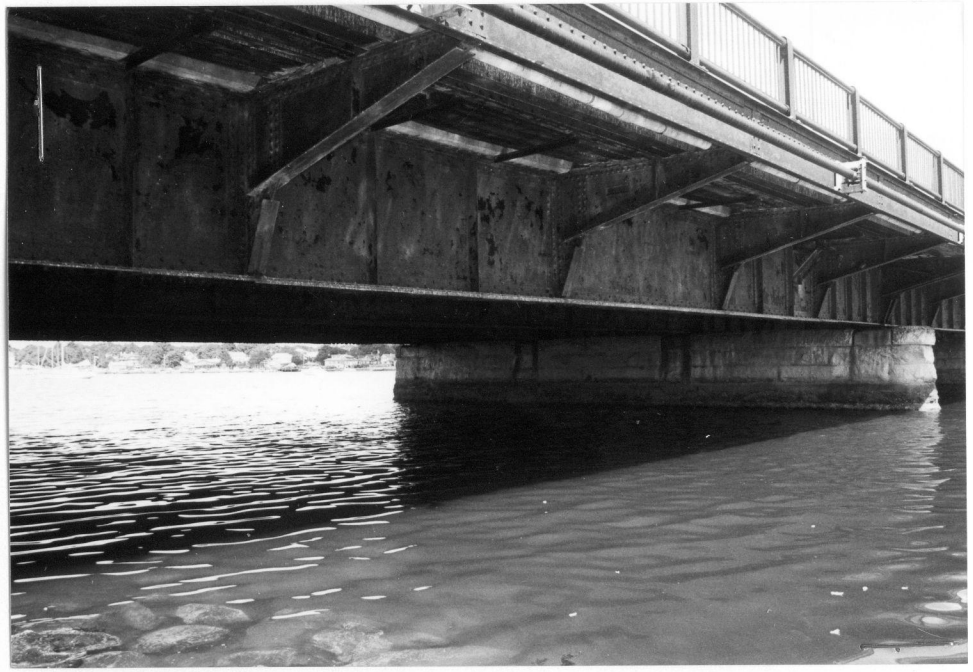
FROM E

FROM W

8-29-2001

WESTERNMOST SPAN & PIER, FROM SW

FROM SW



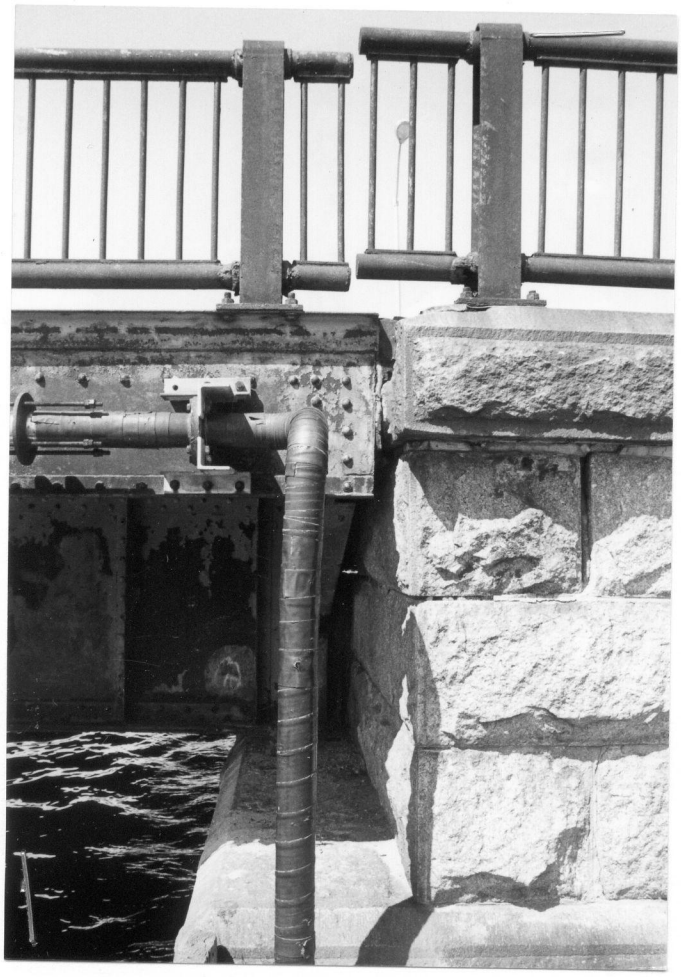
WESTERNMOST SPAN & PIER, FROM SW

FROM E

8-29-2001

**MHC INVENTORY FORM CONTINUATION SHEET** **MACRIS No.** _____ _____

*MHC Inventory scanning project, 2008-2013*



EAST ABUTMENT, FROM S

NE END POST, FROM SW

SE END POST, FROM SW

8-29-2001

# Inventory Form #_____

## NATIONAL REGISTER ELIGIBILITY OPINION

TO: **Betsy Friedberg**
DATE: **1/16/02**
FROM: **Taya Dixon**

RETURN TO REVIEWER: **TD**
DATE: 1/17/02

TOWN: **Fairhaven/New Bedford**

PROPERTY : **Bridge F-01-002/N-06-001[E. bridge]**
**US 6 [East bridge] over Acushnet River**

COMMON/HISTORIC NAME:

Does this property meet the criteria for National Register eligibility?

Individually — YES (circled) / NO

As a contributing element in a National Register District? — YES (circled) / NO

Located within, or adjacent to a historic district or potentially eligible historic district? — YES / NO (circled)

POSS. BY

O. Criteria

A. Events
B. Lives
C. Characteristics
D. Information

More information needed — YES / NO

P. Level

Local State National

Statement of Significance or why not eligible?

THE BRIDGE HAS 3 COMPONENTS - THE WEST, MIDDLE AND EAST BRIDGES. THE MIDDLE BRIDGE IS LISTED AS NRDDE AND THE WEST BRIDGE WAS DETERMINED ELIGIBLE AS PART OF A RLC PROJECT.

THOUGH THE EAST BRIDGE HAS BEEN ALTERED, THE BRIDGE TAKEN AS A WHOLE IS ELIGIBLE. ALL 3 COMPONENTS WERE BUILT IN SIMILAR MATERIALS AND TYPE, AT THE SAME TIME AND BY THE SAME ENGINEERS AND BUILDERS.

AP ~~The~~

NRDOE 5/21/1980

FAI.901 / NBE.905

New Bedford-Fairhaven Middle Bridge
Spanning the Acushnet River on U.S. Highway 6
New Bedford
Bristol County
Massachusetts

HAER No. MA-101

PHOTOGRAPHS
WRITTEN HISTORICAL AND DESCRIPTIVE DATA

Historic American Engineering Record
National Park Service
Department of the Interior
Washington, DC 20013-7127

HISTORIC AMERICAN ENGINEERING RECORD

# NEW BEDFORD-FAIRHAVEN MIDDLE BRIDGE
HAER No. MA-101

| | |
|---|---|
| Location: | Spanning the Acushnet River on U.S. Highway 6, between Fish Island and Popes Island, New Bedford Harbor, New Bedford, Bristol County, Massachusetts<br>UTM: New Bedford North, Mass., Quad. 19/340250/4611275 |
| Date of Construction: | 1899 |
| Structural Type: | Six-span steel bridge, featuring a rim-bearing through truss swing span |
| Engineer: | William Fish Williams, Supervising Engineer<br>George Fillmore Swain, Consulting Engineer |
| Fabricator/ Builder: | Stewart & McDermott, New York<br>A&P Roberts/Pencoyd Iron Works, Philadelphia |
| Previous Owner: | Bristol County, Massachusetts |
| Present Owner: | Massachusetts Department of Public Works, Boston |
| Use: | Vehicular highway bridge |
| Significance: | The New Bedford-Fairhaven Middle Bridge is a relatively early example of electric power applied to a moveable bridge span, and is one of the longest (288') surviving swing spans in Massachusetts, under Massachusetts Department of Public Works purview. The bridge was designed by two significant engineers: George F. Swain (1857-1931), a well-known structural engineer, and William F. Williams (1859-1929), New Bedford City Engineer. |
| Project Information: | Documentation of the New Bedford-Fairhaven Middle Bridge is part of the Massachusetts Historic Bridge Recording Project, conducted during the summer of 1990 under the co-sponsorship of HABS/HAER and the Massachusetts Department of Public Works, in cooperation with the Massachusetts Historical Commission.<br><br>Patrick Harshbarger, HAER Historian, August 1990 |

Description

The Route 6 harbor crossing between New Bedford and Fairhaven consists of two highway sections on harbor islands and three bridge sections between the islands and the mainland. The West Bridge between downtown New Bedford and Fish Island has ten plate girder spans ranging from 33' to 71' in length. The Middle Bridge spanning the main channel between Fish and Popes Island consists of a 288-foot swing span and five plate girder spans ranging from 73' to 82' in length. The East Bridge, which spans the channel between Popes Island and Fairhaven, has nine plate girder spans, each approximately 73' in length. The total length of the entire crossing, including the three bridge sections and portions of highway on Fish and Popes Island, is approximately 4000'. The entire crossing is known collectively as the New Bedford-Fairhaven Bridge.(See Figures 1 and 2.)

The focus of this report is the Middle Bridge, and in particular the rim-bearing swing span. The Massachusetts Department of Public Works (MDPW) replaced the superstructure of the plate girder spans in 1961. The swing span is the only portion of the Middle Bridge that has not been significantly altered.[1]

The Middle Bridge consists of a swing span and five plate girder spans, one to the west and four to the east of the swing span. All of the spans are supported on stone piers. The Middle Bridge is approximately 675' in overall length. According to the Massachusetts Department of Public Works database, the 289-foot swing span is the longest moveable span among the forty-four moveable bridges which fall under the Department's purview.[2]

The swing span measures 54'-0" in width between the trusses and 70'-0" to the edges of the sidewalks. At its highest point, the bridge is 61' from the lower chord to the coping of the central tower. The lower chord is approximately 8' above mean high water. The roadway sits about 1' above the bottom of the lower chord.

The lower chord is made of two 18-inch steel plates, spaced 20" apart, with two angle irons to each plate, tied together with lattice bars. The upper chord is made of two 21-inch plates, also 20" apart and joined by angle irons and lattice bars.

Verticals join the upper and lower chords at intervals of 26'. Steel pins ranging from 3½" to 8¼" in diameter connect the verticals and chords. The verticals are made of two 12-inch steel channels, 12" apart, joined by lattice bars.

The diagonals and counters are composed of flat eyebars from 3¼" to 7½" in width. The upper lateral bracing and struts consist of channels, some joined by lattice bars. The upper lateral struts have ornamental brackets where they join the verticals.

The structural action of the swing span changes depending upon whether the bridge is open or closed. When the swing span is open it rests solely upon the center pier and acts like a double cantilever. When the span is closed it rests upon the piers and acts like two through trusses, one on either side of an independently-standing central tower. The panels on either side of the tower differ structurally from their neighbors. The diagonals are made of two 21-inch steel plates, ⅝" thick, with four angle irons joined by lattice bars. These heavily constructed diagonals act as endposts to the

double trusses when the bridge is in the closed position.

The upper chord between the diagonals and the central tower is constructed of two pairs of eyebars joined in the middle by a 7-inch pin. In the closed position these eyebars are free from strain, but in the open position they carry the weight of either arm of the span. When the bridge reaches the closed position, hydraulic jacks lift the ends of the span approximately 3", then steel wedges are inserted between the bridge and the stone piers by hydraulic pressure. This lifting action causes the eyebar links in the upper chord to go slightly slack. When the bridge operators prepare to open the span, the wedges are released and the bridge lowered, returning strain to the eyebar links. The hydraulic jacks are 12" in diameter with a 6-inch stroke, and are held in position when at rest by four cast steel blocks which are pushed in and drawn out by hydraulic rams 4" in diameter and 36-inch stroke.

The tower verticals are made up of double channel irons with lattice bars. They are 61' high and topped by copper finials of ornamental design. The center tower is approximately 20' long and 54' wide. The operator's house, 20' above the roadway in the central tower, is a 10'x12' wood-frame structure with shed roof. The operators house contains the controls for operating the hydraulic jacks and for engaging the swing mechanism.

When open, the whole draw span rests on two box girders, 54'x54"x⅝", stiffened at 2-foot intervals by cross angle irons, and joined at the top by a steel plate, 4" thick. These two girders, in turn, rest upon a system of four girders that, in turn, rest upon the circular steel drum upon which the bridge turns. The four girders (3'x13') provide stability and distribute the weight of the swing span evenly upon the drum. The drum is 50" deep and approximately 36' in diameter. It is made of ½"-thick riveted steel plates. The drum turns on sixty-nine steel rollers, 18" in diameter. The axles of the rollers are attached to a spider frame running to the central pin of the turntable. According to the construction plans, the concrete and stone center pier rests on piles driven to a depth of 46' below the harbor floor. Two electric motors supply the power to turn the bridge. The motors are housed inside the drum. When engaged each motor turns a separate system of beveled gears that transfer the power to two vertical shafts on the drum's exterior. In turn, these shafts operate a pinion gear moving along a rack on the circumference of the drum. The gears and shafts operate in opposition to each other, 180 degrees apart on the drum's circumference. An additional electric motor inside the drum supplies power to the hydraulic pump that operates the jacks and wedges.

The floor of the bridge rests on steel floor beams riveted to the lower chord and verticals. Between the floor beams run I-beam stringers that support a steel grid deck filled with concrete. Brackets support wood plank sidewalks outside the trusses

A wood-frame bridge tender's house with lounge and lockers for the operators is cantilevered on the southern side of the western approach span to the swing bridge. During the summer, the operators open the bridge on a fixed schedule of fifteen minutes after every hour, and more frequently in the early morning when the fishing boats leave port. During the winter, the bridge operates on a reduced schedule of openings. The operators work three eight hour rotating shifts, and two bridge operators are on duty at all times. One

operator works the controls in the operating house above the deck and the other unlatches the ends of the bridge via a manual control, monitors the closing of the bridge gates, and signals the operating house when all boats have cleared the bridge.[3]

The swing span has a 95-foot navigational clearance to the west and a 94-foot clearance to the east. The eastern channel is currently closed because of fender damage caused by an errant freighter. The fenders consist of creosoted piles sheathed by wood planking.

The bridge's dedication plaque has been removed, but a drawing of it is located in the Massachusetts Department of Public Works bridge files.(See Figure 3.)

Early Bridges at New Bedford-Fairhaven

In 1897 the New Bedford newspaper proudly proclaimed, "The draw span of the New Bedford and Fairhaven bridge will be one of the longest and finest in New England, and one of the greatest draw bridges of the country. Nothing this side of New York will equal it, and in some respects it will be the only one of its kind."[4] Indeed, the Middle Bridge is noteworthy for its size and its innovative truss design. It is also important for its association with two nationally significant engineers. George F. Swain, consulting engineer for the project, pioneered in the field of structural design and developed the engineering curriculum at Massachusetts Institute of Technology (M.I.T.) and Harvard University. William Fish Williams, the supervising engineer, became well known for his ability to manage large public works projects. Following the New Bedford-Fairhaven Bridge, Williams oversaw construction of the Cape Cod Canal, and (as Massachusetts Commissioner of Public Works) over $60,000,000 in highway improvements.[5]

The citizens of New Bedford and Fairhaven consider the draw span a landmark in the history of their cities. Over the past four decades, plans to replace the swing span have met with strident calls to save the bridge. Proponents of a new bridge argue that the old draw regularly delays traffic and limits the size of ships that can enter the northern portions of New Bedford harbor. Preservationists embrace the old bridge for its historic value and beauty. They also claim that the draw can be rehabilitated more cheaply than a new bridge can be built. Local newspaper editorials show that feelings run deep on both sides of the issue.[6]

Controversy is nothing new to the New Bedford-Fairhaven Bridge. Since the 1790s the bridge has been seen as vital to the economic prosperity of New Bedford. It has been periodically damaged by storms, battered by boats, and worn out by traffic, yet it has always been repaired and rebuilt.

The First New Bedford-Fairhaven Bridge (1796-1815)

In 1796 the Massachusetts General Assembly granted to William Rotch of New Bedford the right to build a toll bridge across the Acushnet River at New Bedford Harbor. The growth of New Bedford's population, the expansion of the whaling industry, and the long overland trip around the harbor prompted the town's leading citizens to petition the General Assembly. William Rotch and the other proprietors of the New Bedford-Fairhaven Bridge owned whaling ships

and represented New Bedford's business interests. They probably hoped to build new wharfs and warehouses on Fairhaven's less-crowded shoreline while turning a profit from bridge tolls.

In 1800 the proprietors opened a 24'-wide bridge with two 30' draws, one between New Bedford and Fish Island, and the other between Popes Island and Fairhaven. The bridge appears to have been a wooden trestle supported by pilings and stone piers. It cost 6¢ for a pedestrian to cross, 6¢ for a horse, 35¢ for a four-wheeled wagon, and 6¢ for a dozen sheep, pigs or cattle. The General Assembly mandated toll rates to keep the proprietors from charging high fees for use of their bridge.

The New Bedford and Fairhaven Bridge's location made it particularly susceptible to damage from ocean storms. In 1807 a wind-driven tide inundated the bridge and partially destroyed it. Finally in September 1815, a hurricane lifted the entire bridge from its piers and dashed it into splinters.[7]

New Bedford-Fairhaven Bridge (1819-1869)

The proprietors did not complete the rebuilding of a new bridge until 1819. The facts concerning this bridge are sketchy at best. In 1851 the General Assembly passed an act authorizing the proprietors to widen the two draws to 60', although apparently they had already been widened from the original 30-foot specification. The increased navigational clearance made wharf property to the north of the bridge accessible to larger ships, and therefore more valuable.

Except for the widening of the draws, the 1819 structure appears to have survived with only routine repairs until 1869 when another September storm destroyed the bridge. Only five days after the storm, a special committee of the General Assembly met in New Bedford to discuss the bridge's fate. A survey reported that the bridge consisted of 2863' of earthenwork, 1404' of trestle work, and ranged from 26' to 33' in width. The Fairhaven-Popes Island draw had not been operated in a number of years.

At this meeting it was decided that the bridge would be taken from the proprietors, who apparently did not wish to repair the bridge, and awarded to the care of the Bristol County Commissioners. The proprietors received $22,838.93 for the bridge, one-third of the cost paid by Bristol County, one-fifth by Fairhaven, and seven-fifteenths by New Bedford. The public bridge would not charge a toll.[8]

New Bedford-Fairhaven Bridge (1870-1893)

The County Commissioners made repairs to the bridge but did not substantially alter its construction. The first photographic evidence of the bridge dates from this period and shows a narrow, wooden bridge with alternating stringers and low trusses between piers of timber cribbing and stone. The swing spans had a central tower made of iron truss work with guide wires running from the top of the tower to either end of the draw.[9]

By 1876, the New Bedford and Fairhaven Street Railway Company had installed a line of tracks across the bridge, and horse-drawn cars began carrying passengers across the river. In 1893 the railway introduced electric street cars.[10]

A New Bridge For New Bedford Harbor (1893-1896)

By the 1890s heavier traffic had begun to take its toll on the narrow wooden bridge. In 1893 newly-elected New Bedford Mayor Jethro C. Block called on the county commissioners to replace the antiquated structure. Brock's speech gave birth to the bridge that stands today, but not without Herculean efforts. Although the county commissioners operated and maintained the bridge, the Massachusetts General Assembly authorized major improvements. The cost of the new bridge would be born primarily by the city of New Bedford, and to a lesser degree by Bristol County, Fairhaven, and other surrounding towns. In Massachusetts, the town and city governments have traditionally been stronger than that of the county; with the county's commissioners making most of the decisions and the municipalities paying the largest part of the bill, a few feathers were bound to be ruffled.

The General Assembly expeditiously passed an act authorizing $200,000 for improvements, but the county commissioners continued to drag their heals. New Bedford's leading newspapers charged a commissioner from Fall River of attempting to award the bridge contract to some political cronies, and Fall River's newspapers accused New Bedford's commissioner of forcing the county to pay for a bridge that was solely to the benefit of New Bedford.

Other controversies soon arose. First, Fairhaven's residents argued over what street the new bridge would enter town. It was finally agreed to place the eastern terminus a block north of the old Bridge Street site. Second, the bridge at the New Bedford abutment crossed over the New York, New Haven, and Hartford Railroad at grade. New Bedford's city council had recently passed an ordinance abolishing at grade crossings and had entered into discussions with the railway about what portion of the costs of regrading the company should bear. The railway refused to pay for a portion of the bridge, even though it made sense to the city council that the new bridge should be extended to cross over the railroad's right of way. Third, the War Department insisted that the draw span be placed between Fish Island and Popes Island, instead of between Fish Island and New Bedford, where it had been since 1800. The War Department held authority over bridge clearances over navigable inland waterways and demanded a wider main channel than could be afforded in the old one. Owners of wharves north of the bridge objected, saying the change would hurt property values and cause problems with the natural currents of the harbor. Fourth, a manufacturer on Popes Island argued that changing the grade of the bridge would place the ground floor of his factory below the roadway. Additionally, construction would significantly disrupt the shipment of goods to and from his business. The manufacturer proceeded to seek an injunction against construction of the bridge.

The year 1895 came and went, and still no progress had been made. Finally, the situation became so intolerable that the General Assembly took the project out of the hands of the county commissioners. An agreement was reached by which the New Bedford city engineer would oversee the construction of the bridge, while the county maintained ownership.[11]

William Fish Williams

City Engineer William Fish Williams was a man with New Bedford roots.

The son of a New Bedford whaling ship captain, Williams had been born at sea somewhere between New Zealand and Tasmania. The first seven years of Williams life were spent aboard various vessels of which has father was master. He received his early education in the public schools of Oakland and San Francisco, and as a young man decided to pursue an engineering career. He graduated from Columbia University with a degree in civil engineering in 1881, and with a degree in mining engineering in 1882.

For a number of years Williams worked at mines in Utah and Colorado, and then after marrying and starting a family opened a private practice in Hartford, Connecticut. In 1892, in anticipation of a job on the Nicaraguan Canal route, Williams moved his family to his aunt's home in New Bedford. After a brief trip to Nicaragua, followed by the failure of the canal, Williams returned to New Bedford where the mayor appointed him city engineer.

In 1896 Williams took over the New Bedford-Fairhaven Bridge project and began the difficult task of negotiating its political and engineering pitfalls. By this time most of the general details of location and width of the bridge had been determined by public hearings. The plan for the bridge retained the old location of the bridge as far as the east side of Popes Island, and then moved in a more northerly direction to Main Street in Fairhaven. Construction began almost immediately on the section of bridge between Popes Island and Fairhaven with the contract being awarded to Stewart & McDermott, a general contracting firm from New York City.

Williams next directed his energy toward preparing the contracts for the Middle Bridge between Popes Island and Fish Island. The City Engineer agreed with the War Department that a new channel could be dredged between the two islands and received approval for a large draw span. Williams's considerable experience with mining and civil engineering made him an ideal choice for overseeing the earthenwork and substructure construction of the bridge. For the steel superstructure of the draw, Williams enlisted the help of Consulting Engineer George F. Swain of M.I.T.[12]

George Fillmore Swain

George Swain epitomized the modern image of a professional engineer. His education did not rely so much on practical experience as it did on theory and mathematical training. Swain, like Williams, came from a New England whaling family. He had attended a military academy as a boy and had entered M.I.T. at the age of 16. He graduated in 1877 with a degree in civil and topographical engineering and seeking a "breadth of view and experience in life," he traveled abroad and began studies at the Royal Polytechnicum at Berlin.

In 1880 Swain returned to the United States to a job with the census investigating water power in connection with manufacturing interests. His water power work was done under the direction of Gen. Francis A. Walker who shortly afterward became president of M.I.T. Swain received an appointment in the department of civil engineering and by 1887 had risen to the rank of full professor and chair.

As a professor at M.I.T. Swain already held a position of enormous influence in the engineering profession. In 1887 he rose to national attention as a witness in the Bussey bridge disaster trial. His ability to

analyze the cause of the wreck that occurred on a crowded train headed into Boston at rush hour, so impressed the Massachusetts Board of Railroad Commissioners that he was appointed the Board's first expert engineer. Swain held the office for over twenty years and affected many important changes and reforms in bridge building practice. Swain spent from three to four weeks every summer visiting large bridge works in America and Europe for the purpose of studying the process of manufacture and the methods of design.

In 1894 Swain became a member of the Boston Transit Commission and had oversight of the construction of the subway and Charlestown Bridge as well as the harbor tunnel. Swain is known to have consulted on the construction of at least ten highway bridges still surviving in Massachusetts.

In 1909 he accepted the Gordon McKay Professorship of Civil Engineering at Harvard University. Throughout his career in education, Swain worked to elevate the status of engineering and to demand rigorous standards of engineering students. He became well-known for his courses devoted to structures and his book Strength of Materials (1924) remained a standard text for many years. Swain remained active in the professional engineering societies, and among his many honors he served as President of the American Society of Civil Engineers (ASCE) in 1913.[13]

Swain appears to have spent the better part of the spring of 1897 designing the Middle Bridge's draw span. F.P. McKibben, an instructor at M.I.T., and a student of Swain's, assisted Williams in his New Bedford office elaborating on the plans and drawing the bridge contracts.[14]

## Swing Bridges

Engineers had been designing trusses that swung open from a central pivot point since at least the 1840s. By the 1870s, the swing bridge had become the dominate form of draw bridge, superseding retractile bridges, where the entire structure rolled or wheeled away from the river onto one of the banks.

Squire Whipple, perhaps America's foremost bridge engineer of the mid-century, noted that the greatest problem facing the builder of a swing bridge was countering the "reverse action in the upper and lower members, from what they would suffer if supported at the ends. That is, in the [open position], the upper members are exposed to tension, and the lower, to compression, instead of the reverse, which takes place in the [closed position]." Early swing bridges met this problem with a central tower built above the truss from which suspension cables or rods ran out toward either end of the span. These cables and rods supported the ends in the open position, but the large tower added a great deal of unwanted weight.[15]

In 1873, Whipple described a swing span which substituted a hinged member at the center of the bridge. In the closed position, wedges underneath the bridge's abutment ends lifted the structure and relaxed stress on the upper member. By the 1880s, the wide availability of structural steel led bridge engineers to have confidence in their ability to design a span where the upper and lower members both had the necessary strength to carry tension and compression, this also simplified the truss configuration.

Improvements in turntable design, largely borrowed from the railroads, further enhanced engineers' ability to design efficient swing mechanisms. In

the past it had taken a large number of men up to five or ten minutes to move a bridge. By the late 1880s, one man could move a well-built, small-size swing span in a matter of three or four minutes. In the 1890s, engineers applied electric motors, compact and efficient, to the task.[16]

Throughout the decade, engineers continued to refine their understanding of the structural action of swing spans. Although workable bridges were regularly built, comprehension of the structural action was still incomplete.

In 1892 Benjamin F. La Rue commented on the state of the art: "The theoretically correct solution of the stresses in swing-bridges is usually tedious. Sometimes the labor is shortened by use of approximate methods." La Rue offered an extension of the graphical methods of strain calculation already being applied to simple trusses. Graphical strain charts similar to the ones described by La Rue can be seen in the plans of the New Bedford-Fairhaven Bridge.[17]

The hinged upper-chord segments and the economy of material in the Middle Bridge places it well within the mainstream of swing-span construction in the mid-1890s. The tremendous size of the structure makes it an outstanding accomplishment. Swain had designed a competent bridge incorporating the latest advances in swing bridge technology discussed in engineering journals and periodicals.[18]

## Construction of the New Bedford-Fairhaven Middle Bridge

Williams placed the Middle Bridge out for bid in June 1897 and received twelve bids ranging from $250,000 to $350,000. Initially, the county commissioners awarded the contract to the Edge Moor Bridge Company of Philadelphia, but the negotiations hit a snag. From 1893 to 1897 the cost of the New Bedford and Fairhaven Bridge had risen from $200,000 to $650,000. The Eastern section of the bridge had already run to nearly $400,000 and Edge Moor's bid exceeded the total appropriation allowed by the General Assembly. The county commissioners were willing to sign a contract with Edge Moor but they could not guarantee the full amount until the legislature passed a new resolution to increase the appropriation.

When Edge Moor refused to sign an unguaranteed contract, the commissioners hastily awarded the substructure contract to Stewart and McDermott, the contractors for the Eastern Bridge, and the superstructure to A&P Roberts/Pencoyd Iron Works of Philadelphia, who would sign the contract at a few thousand dollars above their competitor's bid. Edge Moor's lawyers argued that their company was entitled to the rights to the substructure contract if not the full amount and sued the county for $25,000 in damages.

While Edge Moor took the county to court, Stewart and McDermott began work on the foundations of the Middle Bridge. By November the company had nearly finished work on the piers and abutments. The onset of winter weather brought construction to a halt.[19]

Over the winter, Williams and McKibben put the finishing touches on the drawings for the swing span's steel members. Pencoyd Iron Works prepared the shop drawings and details for the open hearth steel channels, angles, deck beams, and bars. The Pencoyd Iron Works had been founded by Algernon and Percival Roberts in 1852, when they established puddle furnaces and a mill on the banks of the Schuylkill River, about six miles north of Philadelphia. By

1893, the Roberts had expanded their factory to include a steel mill, hammer shop, blooming mill, puddle mill, machine shop, eyebar shop, forge, and bridge and construction shop. The company specialized in structural wrought iron and steel, and occasionally (under the aegis of A&P Roberts Company) undertook construction projects. In the case of the New Bedford-Fairhaven Bridge, A&P Roberts signed as dual contractors with Stewart and McDermott to provide the material and equipment to build the swing span.[20]

In June 1898 Williams visited the Pencoyd shops to check on the manufacturer's progress. He reported that Pencoyd had completed the turntable and that it would soon be shipped and put together about one-half of a mile from the bridge for inspection, before its final placement on the center pier. Pencoyd did not roll long steel plates and these had been bought from the Central Iron and Steel Company of Harrisburg. The steel used in the bridge was made by the open hearth process. On the Middle Bridge, "medium steel" with an ultimate tensile strength of not less than 60,000 lbs./sq.in. was used. The steel members had been coated in linseed oil for shipping. The bridge would be painted on site. On June 27, 1898, the erector's outfit, derricks and engines left Philadelphia.

On July 20, the laying of the steel girders for the Middle Bridge commenced. The construction crew laid the steel girder spans on either side of the draw span first, then commenced to set the carriage and drum in place on the central pier. The crew erected the tower over the drum and began to work toward either end of the draw using false work to support the steel beams. Pencoyd built the swing span in the open position. On October 30, 1898, the bridge swung into place with a perfect fit. On March 12, 1899, engineer Williams certified the Middle Bridge complete in all its details.

Williams kept careful records of the progress of the construction. The New Bedford Free Public Library has in its collection Williams's scrapbook and photographs. Williams used the 120 glass slide photographs to illustrate lectures he gave to local civics groups. They show the progress of construction from the laying of the piers to the completed bridge, and are an extremely unusual documentary record.(See Figures 4 and 5.)

The local newspaper reported on a presentation that Williams made to the Brooks Club, a local men's society. The article provides an interesting look into Williams's thinking about the structure of the bridge. Williams began by stating that modern bridge construction tended toward simplicity of design. Steel cost less than stone, and had thus been chosen for reason of economy. Steel and concrete construction might prove even more reasonable but had not been chosen because experience with these bridges had yet to prove their durability. The elevations of the superstructure had been fixed primarily by a suitable clearance above tidewater, and then by requirement of construction to secure a deck bridge. Williams chose a truss design for the draw span because of its extreme length. He estimated the live loads for the bridge at 80 lbs./sq.ft. The strength and size of floor beams was calculated using an 18-ton steam roller as the maximum live load. The dead load of the draw span, William stated, ran at about 77 lbs./sq.ft. For this reason, Williams chose wood over asphalt decking, which would have nearly doubled the weight and the cost of the draw, and increased the size and power of the machinery required for its operation.

The funding and contractual problems that had plagued the New Bedford-

Fairhaven Bridge did not end with the Middle Bridge's completion. In October 1898, Stewart & McDermott sued the county for $25,000 in bridge extras that had been unanticipated. The cost of the structure continued to exceed estimates. The final (western) section had yet to be completed, and the New York, New Haven & Hartford Railroad had yet to come to an agreement with the city about the grade crossing.

By 1899, the bridge had cost well over $1,000,000 and local citizens began calling the span the "Million Dollar Bridge." The state General Assembly grew tired of passing new appropriations bills and decided to investigate the rising costs. When the appropriation committee discovered that the county had contracted Williams at a flat 5 percent commission, the legislators smelled fraud and called the engineer to Boston to testify. A number of bridge and railroad engineers, including George Swain, reported to the committee that a flat rate of commission for a bridge project was an unusual form of payment. Williams testified that the cost of operating his office and hiring five full-time clerks used up well over half of the money he made from the project. After careful scrutiny of the records, the legislators cleared Williams of all charges and reprimanded the county commissioners for entering into such an expensive agreement.

The county let the contract for the Western Bridge to the American Bridge Company, which completed the last section in 1903. The New Bedford-Fairhaven Bridge had taken ten years to build at a cost of $1,387,261.[21]

Water vs. Land

The history of many swing spans often involves a battle between the interests of water and land transportation. Shortly after the Middle Bridge was put in operation, the war began. In April 1900, a captain of a tow boat brought charges against Drawtender Downey. The captain charged that the drawtender "has hindered and obstructed our passage through the draw, besides using vile, profane, and insulting language toward myself and employes." Apparently, the ruckus occurred over Downey's insistence of closing the draw promptly at dusk and refusing to remain at the bridge past his appointed time for a late arriving tow boat. Downy, a member of the Grand Army of the Republic and a decorated veteran, kept his public service job.[22]

In 1930 the state took over bridge maintenance from the county as a Depression measure, and in 1931 the bridge received its first major overhaul. For four days motorists and boats had to find other ways about the harbor while construction crews replanked the sidewalks, repaired gates and machinery, and added concrete barrier curbing. In 1936 the state repaired the fender piers.

Between 1936 and 1961, the bridge received minor repairs and improvements including new light poles, operators house, plank decking and removal of the street car lines. In 1961 the state's bridge engineers determined to replace the deck and deck framing of the fixed spans, and to alter and repair the abutments.[23]

Boats continued to have priority to immediate openings to the bridge until 1947 when openings were restricted somewhat during rush and lunch hours to vessels drawing less than 15' in water. By the late 1960s, the automobile age had dawned, and the bridge started opening only on a fixed schedule of

fifteen minutes every hour.

In 1965 the state Legislature authorized a special commission to study the feasibility of replacing the swing bridge. The 1967 report found the bridge adequate, but recommended eventual replacement with an elevated bascule draw bridge. The cost of this new bridge prohibited immediate plans to demolish the old swing. In the late 1970s, however, the plan revived with the oil crisis. Offshore drilling in the North Atlantic seemed a real possibility, and New Bedford, in an economic slump caused by the failure of its heavy industrial base, sought to attract the oil drillers and tankers to its harbor. It was hoped that a large bridge would complement improvements to the harbors North terminal. This plan, too, died after funding could not be secured quickly enough and offshore drilling did not become a reality. It was also discovered that PCB's resting in the harbors bottom would be disturbed by new construction, and the environmental impact might prohibit replacing the bridge.[24]

Throughout the discussions of replacing the bridge, a small but dedicated band of citizens sought to preserve the swing span as a New Bedford landmark. In 1987 the MDPW announced that it had--failing funding--determined not to replace the bridge, but to rebuild the bridge's mechanical and electrical systems. In hot weather the bridge had begun sticking open, and fire trucks had to be called to hose down the bridge in order to close it again. After some investigation, the engineers of District 6 had found the source of the problem and repaired the bridge. With this inconvenience fixed, the clamor to replace the "old rust bucket" died down. The MDPW has slated to begin further repairs in 1991.[25]

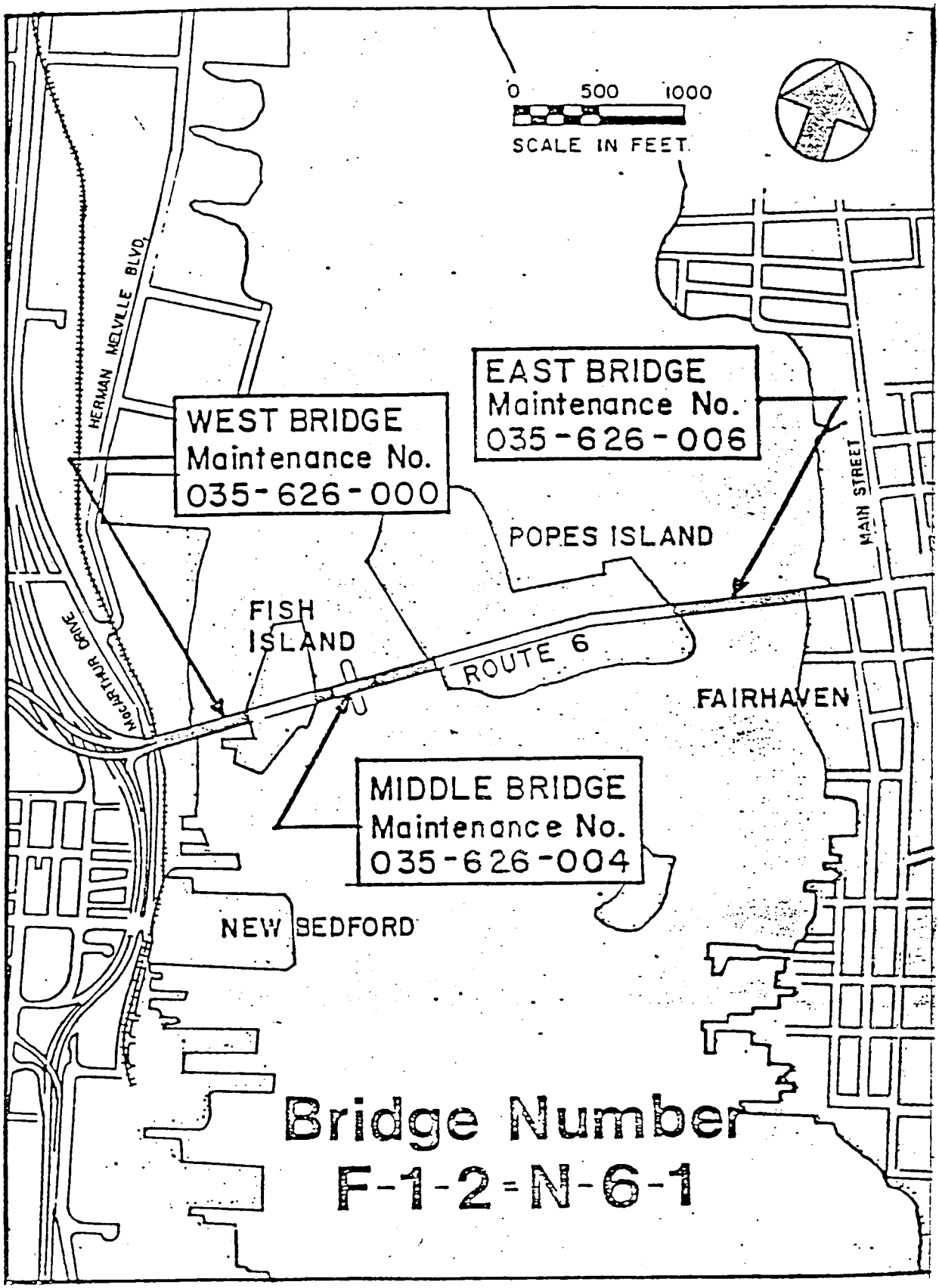



FIGURE 1: Plan of New Bedford-Fairhaven Bridge.
(Sverdrup, Parcel & Associates, "New Bedford-Fairhaven Bridge," 1979.)

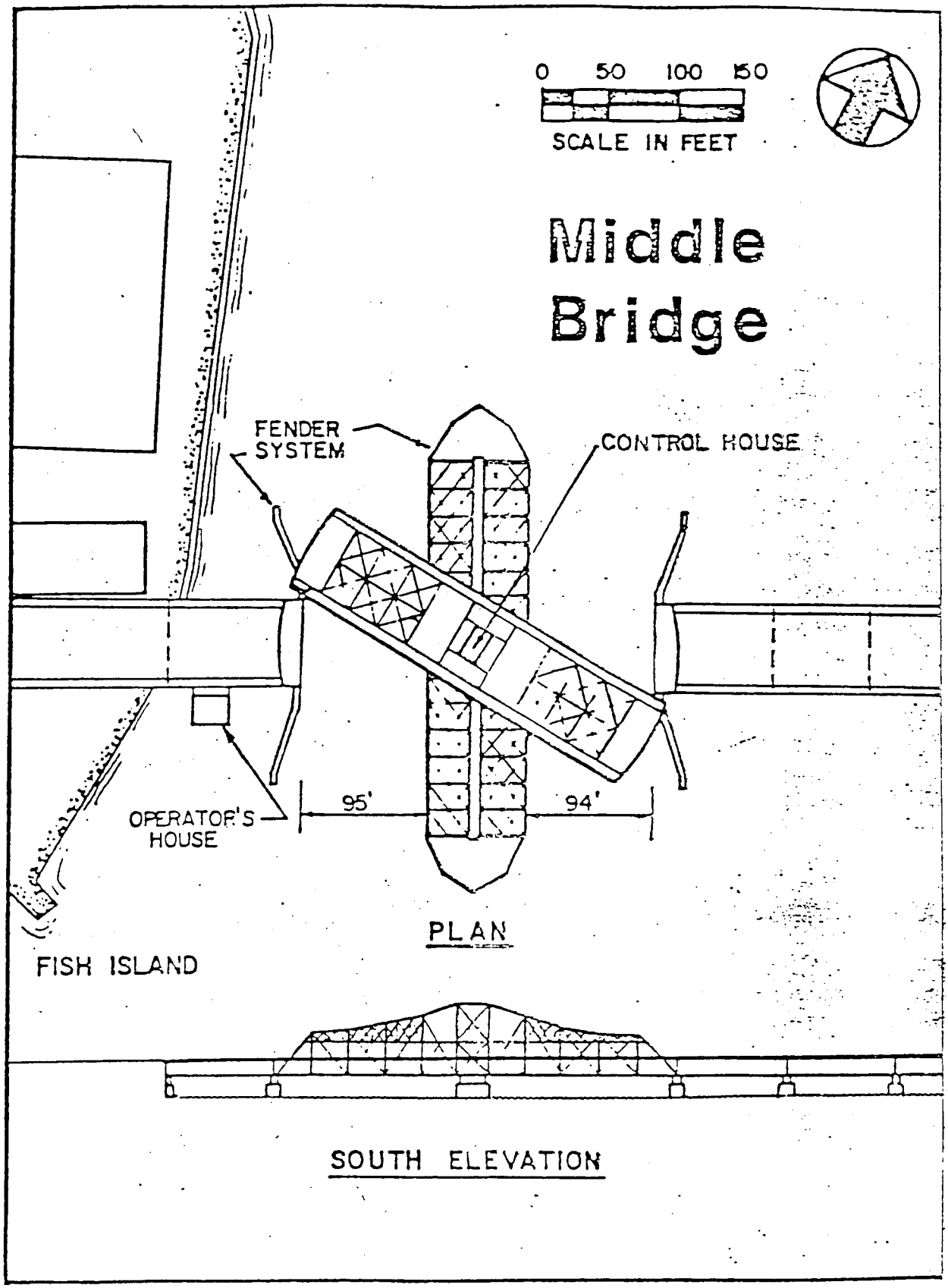



FIGURE 2: Plan of New Bedford-Fairhaven Middle Bridge.
(Sverdrup, Parcel & Associates, 1979.)

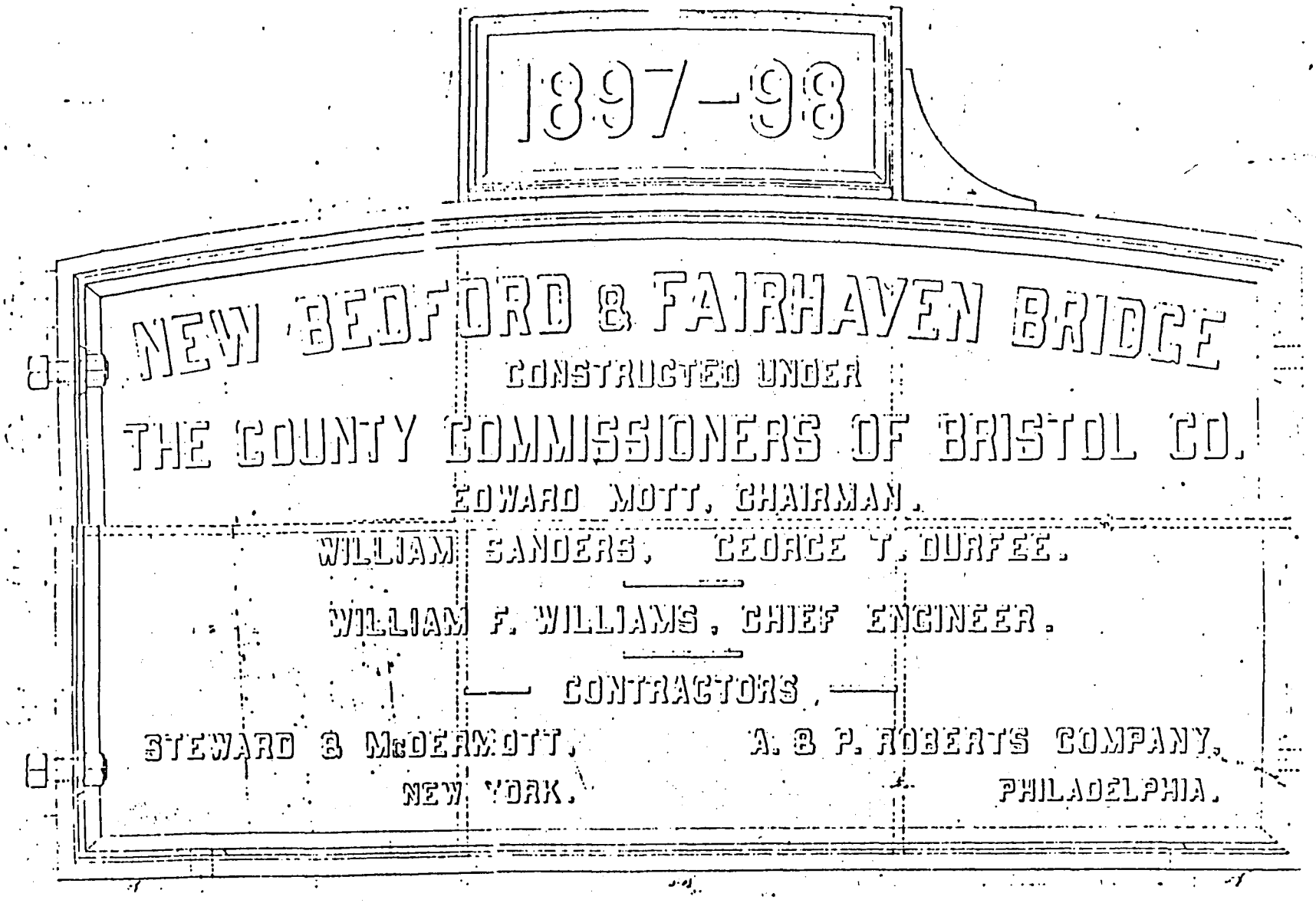



FIGURE 3: New Bedford-Fairhaven Bridge Builder's Plate.

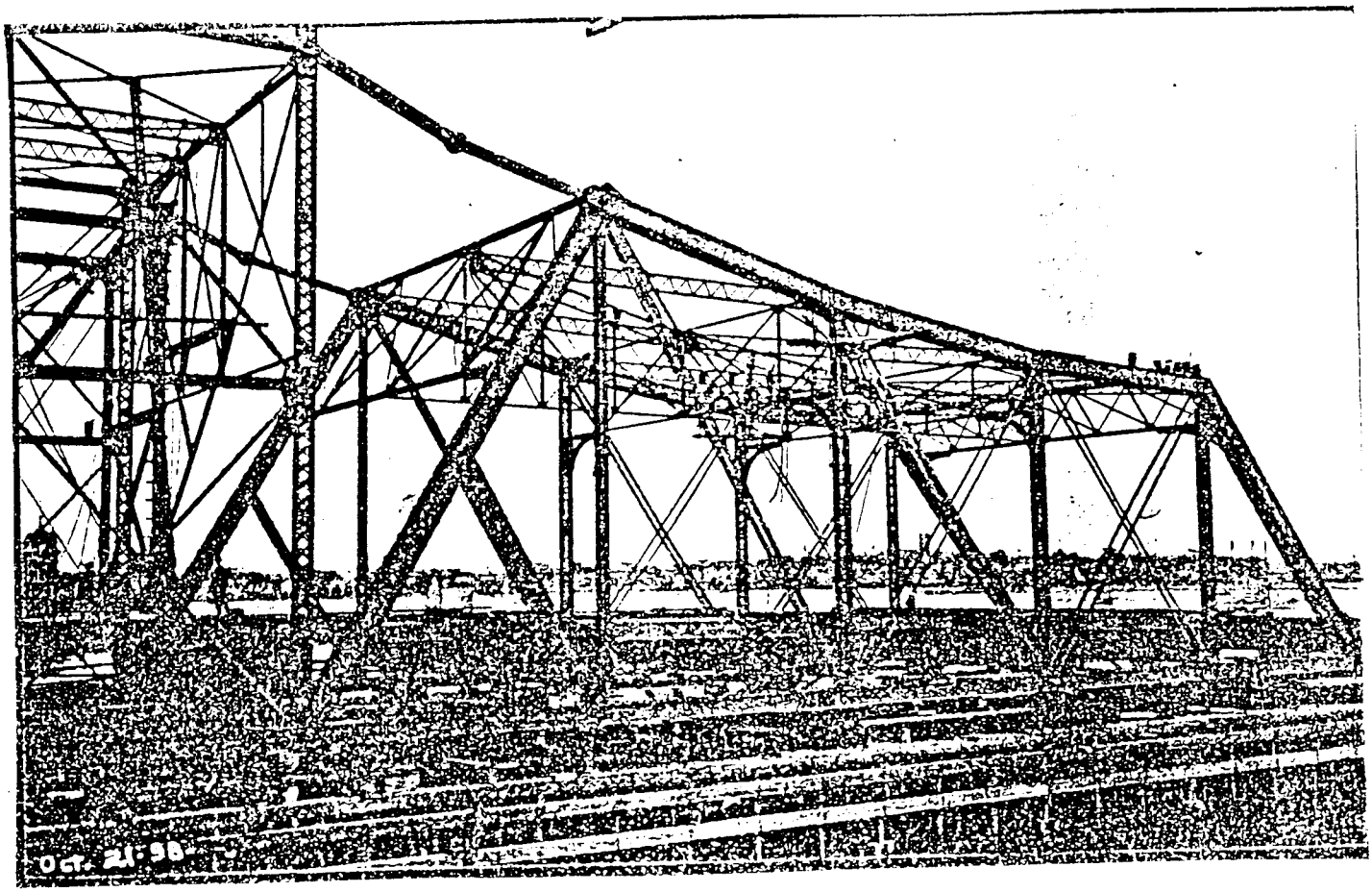



FIGURE 4: Construction photo, October 21, 1898.
(New Bedford Free Public Library Collection.)

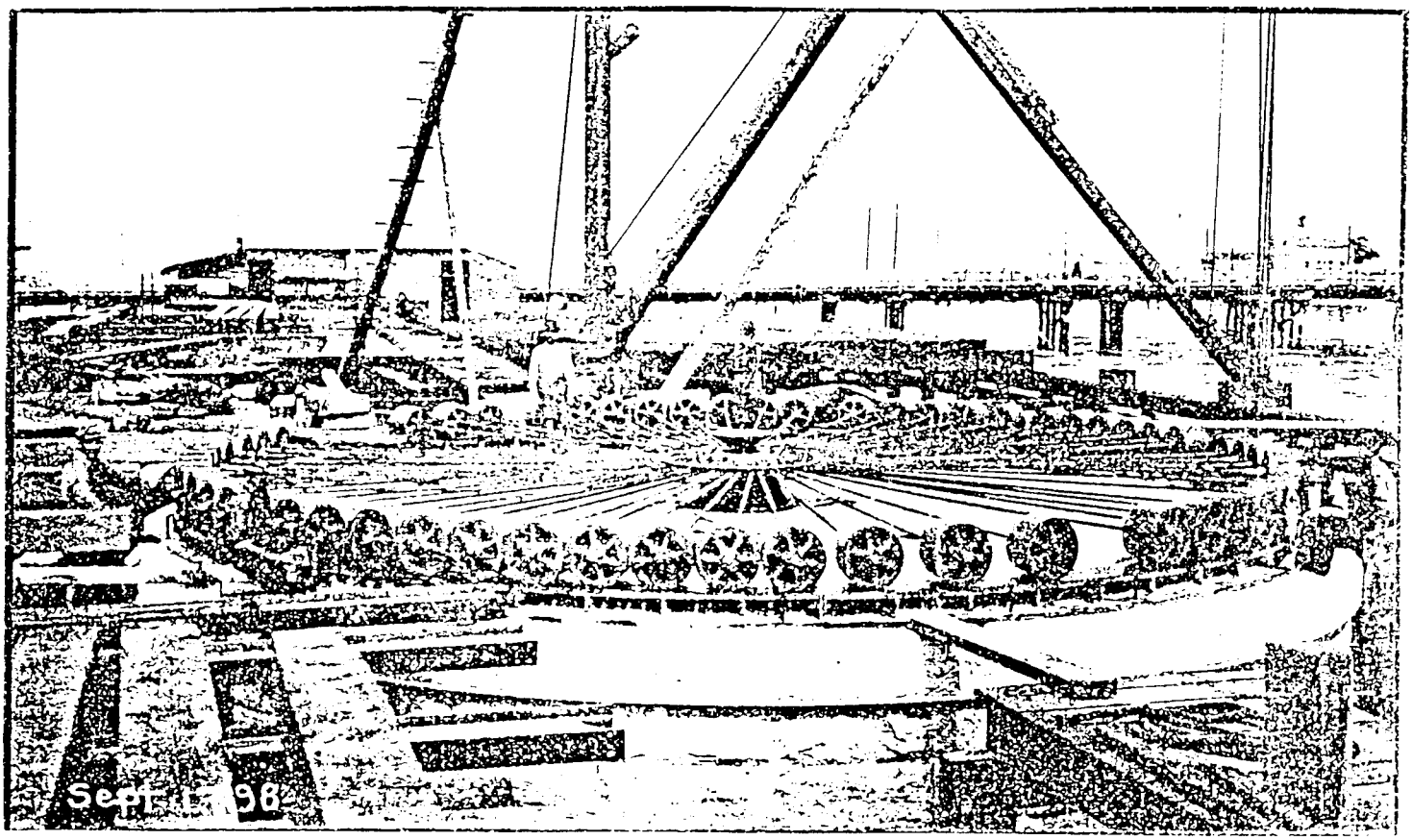



FIGURE 5: Construction photo, September 17, 1898.
(New Bedford Free Public Library Collection.)

ENDNOTES

1. Sverdrup, Parcel & Associates, "New Bedford-Fairhaven Bridge, Route 6 Over New Bedford Harbor: Draft Engineering Study Report," prepared for the Massachusetts Department of Public Works, September 1979.

2. S.J. Roper, "Massachusetts Historic Bridges Inventory," January 1985, Massachusetts Department of Public Works, Boston.

3. Terry Roche, Bridge Tender, personal interview with author, June 26, 1990.

4. Scrapbook of William Fish Williams, ca.1890-1900, New Bedford Free Public Library, New Bedford, Massachusetts.

5. "Memorial to George Fillmore Swain," Journal of the Boston Society of Civil Engineers, vol. 19 (1932), pp. 334-40; and, "Memorial to William Fish Williams," Journal of the Boston Society of Civil Engineers, vol. 19 (1932), pp. 311-13.

6. Frank D. Roylance, "Acushnet River Bridge Both Bane and Boon Over 178 Years," New Bedford Standard-Times, 1978; "Bridge Project is the Best Deal Under Difficult Circumstances," Standard-Times, December 20, 1987; and, James Stewardson, "$7.2 Million Bridge Repair Expected to Start in 1991," Standard-Times, June 9, 1988.

7. Massachusetts General Assembly, Acts of 1796, Chapter 19; Barbara Clayton and Kathleen Whitley, Guide to New Bedford (Montpelier, Vermont: Capital City Press, 1979), pp. 16-21; Roylance, "Acushnet River Bridge," 1983; and, "A Look Back Through Times Past: The New Bedford-Fairhaven Bridge," Ye Olde Fairhaven Star, October 1987.

8. Roylance, pp. 1-2; Massachusetts General Assembly, Acts of 1869, Chapter 273; and, Scrapbook of William Fish Williams.

9. New Bedford-Fairhaven Bridge historic photograph collection, New Bedford Free Public Library.

10. Scrapbook of William Fish Williams.

11. Scrapbook of William Fish Williams.

12. Scrapbook of William Fish Williams; "Memorial to William F. Williams"; "Engineering and Construction Experiences," Journal of the Boston Society of Civil Engineers, vol. 10 (1923), pp. 441-46; and, "William F. Williams Dies Suddenly," New Bedford Evening Standard, October 1, 1929.

13. "George Fillmore Swain Memorial," Journal of the Boston Society of Civil Engineers, vol. 19 (1932), pp. 364-69; Massachusetts Board of Railroad Commissioners, "Special Report by the Massachusetts Board of Railroad

Commissioners to the Legislature in Relation to the Disaster on Monday, March 14, 1887, on the Dedham Branch of the Boston & Providence Railroad," (Boston: Wright and Potter, 1887), p. 316; The National Cyclopedia of American Biography, vol. 14 (New York: James T. White, 1904), p. 276; and Dictionary of American Biography, vol. 11, sup. 1 (New York: Charles Scribner's Sons, 1944), p. 680.

14. Scrapbook of William Fish Williams.

15. Squire Whipple, An Elementary and Practical Treatise on Bridge Building, 2nd ed. (New York: D. Van Nostrand, 1873), p. 324; and, Ewing Matheson, Works in Iron: Bridge and Roof Structures (London: E. and F. Spon, 1873), pp. 84-85.

16. Whipple, pp. 319-52; and, Newburyport Daily News, July 11, 1890.

17. Benjamin F. La Rue, A Graphical Method for Swing-Bridges (New York: D. Van Nostrand Co., 1892), p. 43; and, New Bedford-Faihaven Bridge Plans, 1890, Massachusetts Department of Public Works Bridge Section files, Boston.

18. A brief glance through the Transactions of the American Society of Civil Engineers or Engineering News for this period will find numerous articles on moveable spans.

19. Scrapbook of William Fish Williams.

20. "Industrial Plants: Pencoyd Iron Works," Engineering Record, March 25, 1893, pp. 334-37; Pencoyd Iron Works, Convenient Rules, Formulae, and Tables for the Strength of Wrought Iron Shapes (1896), Trade Catalog Collection, Hagley Museum and Library, Wilmington, Delaware; and, Victor C. Darnell, A Directory of American Bridge Building Companies 1840-1900, Occasional Publication No. 4 (Washington, DC: Society for Industrial Archeology, 1984).

21. Scrapbook of William Fish Williams.

22. Ibid.

23. New Bedford-Fairhaven Bridge Plans, 1930-1961; and Roylance, "Acushnet River Bridge".

24. Sverdup and Parcel, "New Bedford-Fairhaven Bridge," pp. 1-15; and, Roylance, "Acushnet River Bridge".

25. Roylance, "Acushnet River Bridge"; "Bridge Project is the Best Deal"; and, "$7.2 million Bridge Repair".

HISTORIC AMERICAN ENGINEERING RECORD

INDEX TO PHOTOGRAPHS

New Bedford-Fairhaven Middle Bridge
Spanning the Acushnet River on U.S. Highway 6
New Bedford
Bristol County
Massachusetts

HAER No. MA-101

Martin Stupich, Photographer, Summer 1990

MA-101-1 General view from west river bank, looking southeast

MA-101-2 General view of swing span from west river bank, looking southeast

MA-101-3 Oblique view of swing span from west river bank, looking southeast

MA-101-4 Center of swing span from mid-river platform, looking north

MA-101-5 Detail of tower at center of swing span, looking north

MA-101-6 Swing span in motion, from mid-river platform, looking north

MA-101-7 Swing span in motion, from mid-river platform, looking north

MA-101-8 Swing span in open position, looking north from mid-river platform

MA-101-9 Detail of southeast corner of swing span in open position

MA-101-10 General view of east end of swing span, looking northeast

MA-101-11 Detail of central tower connections, looking northeast

MA-101-12 Detail of southeast endpost and topchord of swingspan, looking northeast

MA-101-13 Detail of lower chord and floor system on southeast side of swing span, looking northeast

MA-101-14 Detail of sidewalk floor system on southeast side of swing span, looking northeast

MA-101-15 Detail of swing mechanism at central pier at low tide

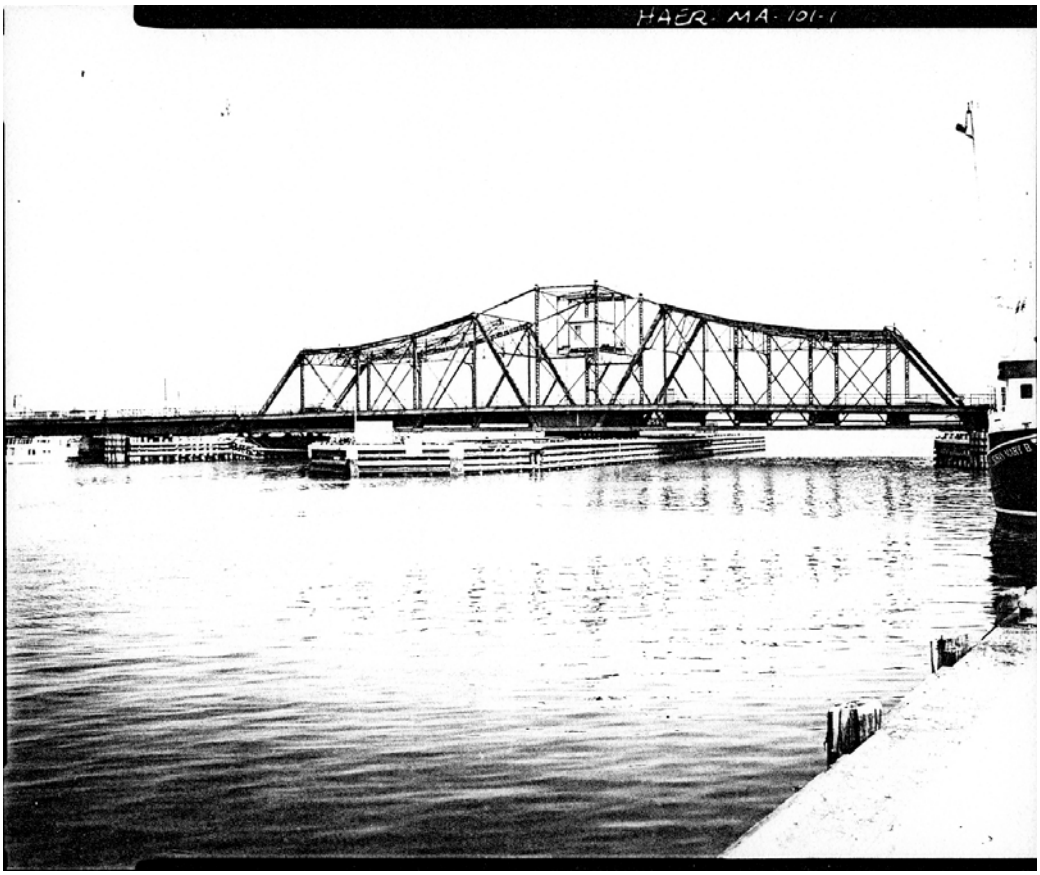
MA-101-16 General view of west portal from roadway, looking southeast

MA-101-17 Oblique view of west portal from pedestrian walkway, looking southeast

MA-101-18 General view of truss geometry and connections at west portal end of swing span, looking southeast

HISTORIC AMERICAN ENGINEERING RECORD
SEE INDEX TO PHOTOGRAPHS FOR CAPTIONS

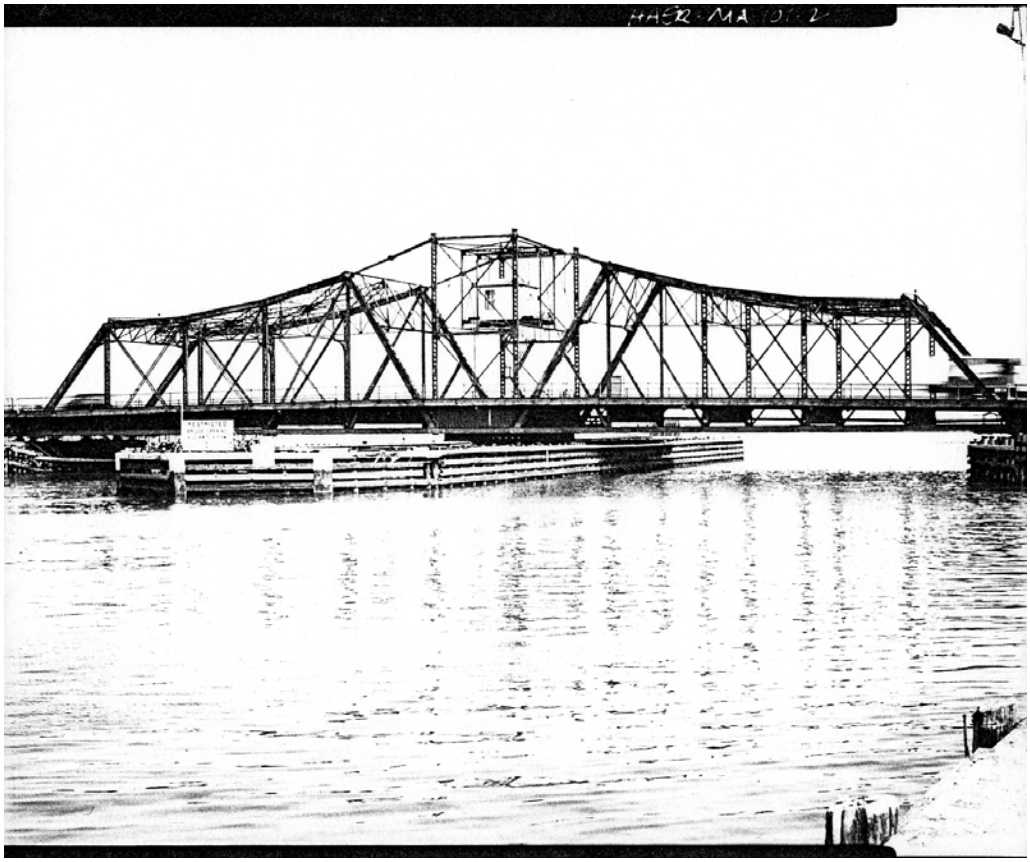
HAER No. MA-101-1
*(photocopy only available)*



FAI.901 / NBE.905

HISTORIC AMERICAN ENGINEERING RECORD
SEE INDEX TO PHOTOGRAPHS FOR CAPTIONS

HAER No. MA-101-2
*(photocopy only available)*



FAI.901 / NBE.905

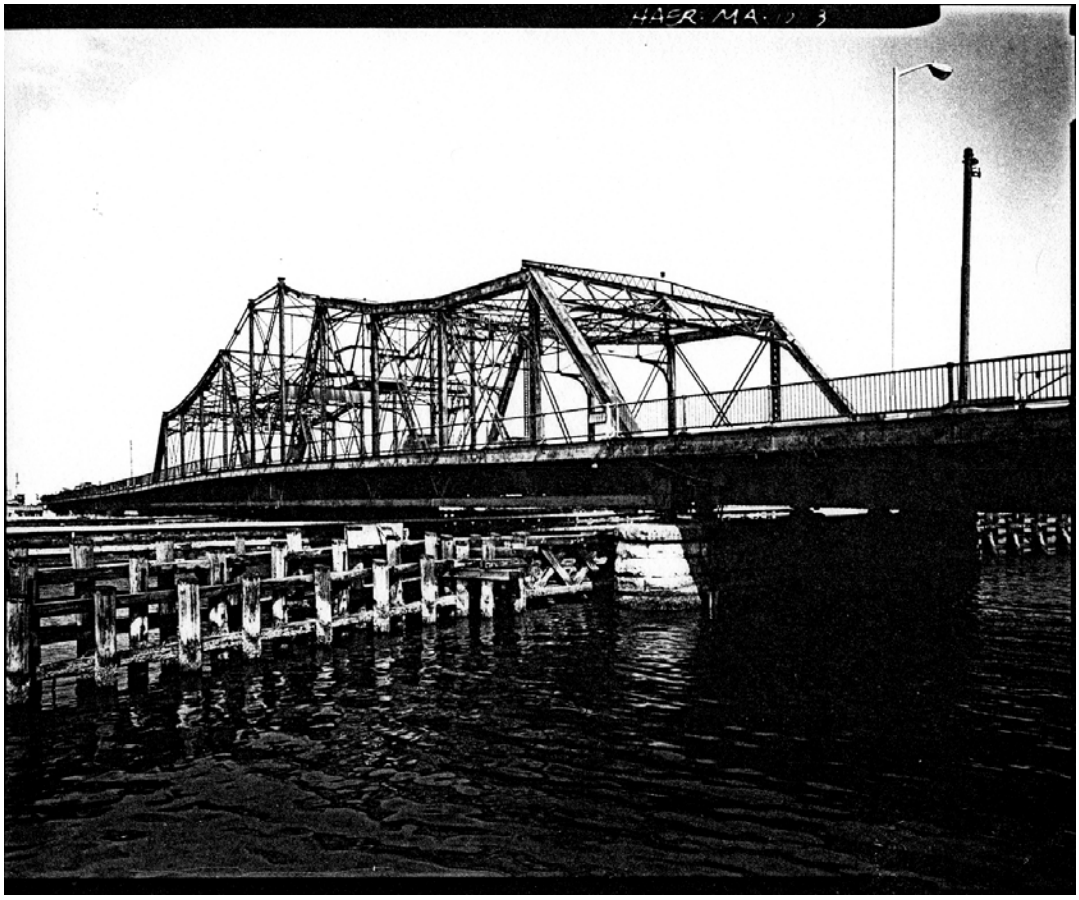
HISTORIC AMERICAN ENGINEERING RECORD
SEE INDEX TO PHOTOGRAPHS FOR CAPTIONS

HAER No. MA-101-3
*(photocopy only available)*

FAI.901 / NBE.905

HISTORIC AMERICAN ENGINEERING RECORD
SEE INDEX TO PHOTOGRAPHS FOR CAPTIONS

HAER No. MA-101-4
*(photocopy only available)*



HISTORIC AMERICAN ENGINEERING RECORD
SEE INDEX TO PHOTOGRAPHS FOR CAPTIONS

HAER No. MA-101-5

FAI.901 / NBE.905

HISTORIC AMERICAN ENGINEERING RECORD
SEE INDEX TO PHOTOGRAPHS FOR CAPTIONS

HAER No. MA-101-6

FAI.901 / NBE.905

HISTORIC AMERICAN ENGINEERING RECORD
SEE INDEX TO PHOTOGRAPHS FOR CAPTIONS

HAER No. MA-101-7

FAI.901 / NBE.905

HISTORIC AMERICAN ENGINEERING RECORD
SEE INDEX TO PHOTOGRAPHS FOR CAPTIONS

HAER No. MA-101-8

FAI.901 / NBE.905

HISTORIC AMERICAN ENGINEERING RECORD
SEE INDEX TO PHOTOGRAPHS FOR CAPTIONS

HAER No. MA-101-9

FAI.901 / NBE.905

HISTORIC AMERICAN ENGINEERING RECORD
SEE INDEX TO PHOTOGRAPHS FOR CAPTIONS

HAER No. MA-101-10

FAI.901 / NBE.905

HISTORIC AMERICAN ENGINEERING RECORD
SEE INDEX TO PHOTOGRAPHS FOR CAPTIONS

HAER No. MA-101-11

FAI.901 / NBE.905

HISTORIC AMERICAN ENGINEERING RECORD
SEE INDEX TO PHOTOGRAPHS FOR CAPTIONS

HAER No. MA-101-12

FAI.901 / NBE.905

HISTORIC AMERICAN ENGINEERING RECORD
SEE INDEX TO PHOTOGRAPHS FOR CAPTIONS

HAER No. MA-101-13

FAI.901 / NBE.905

HISTORIC AMERICAN ENGINEERING RECORD
SEE INDEX TO PHOTOGRAPHS FOR CAPTIONS

HAER No. MA-101-14

FAI.901 / NBE.905

HISTORIC AMERICAN ENGINEERING RECORD
SEE INDEX TO PHOTOGRAPHS FOR CAPTIONS

HAER No. MA-101-15

FAI.901 / NBE.905

HISTORIC AMERICAN ENGINEERING RECORD
SEE INDEX TO PHOTOGRAPHS FOR CAPTIONS

HAER No. MA-101-16

FAI.901 / NBE.905

HISTORIC AMERICAN ENGINEERING RECORD
SEE INDEX TO PHOTOGRAPHS FOR CAPTIONS

HAER No. MA-101-17

FAI.901 / NBE.905

HISTORIC AMERICAN ENGINEERING RECORD
SEE INDEX TO PHOTOGRAPHS FOR CAPTIONS

HAER No. MA-101-18