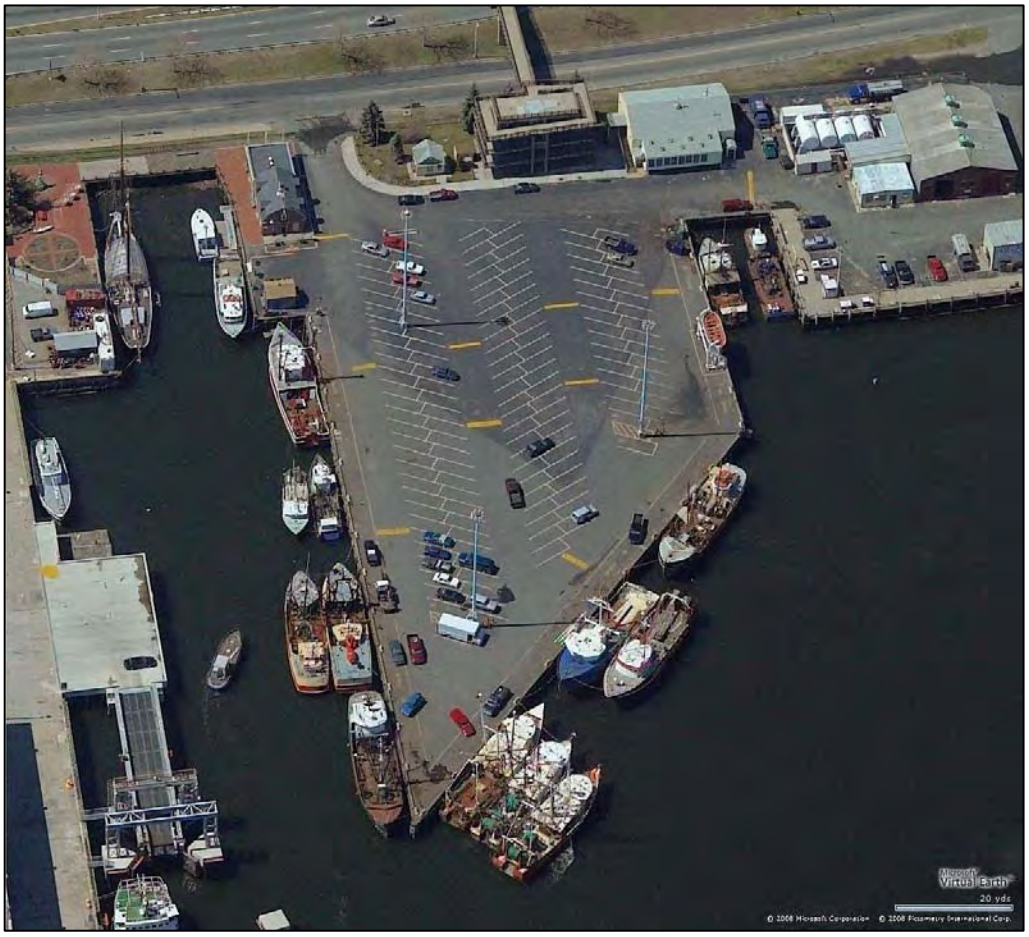
PARE PROJECT NO. 08216.00

INSPECTION REPORT
CO-OP / FISHERMAN'S WHARF
NEW BEDFORD WATERFRONT
FACILTIES INSPECTIONS
NEW BEDFORD, MASSACHUSETTS



MARCH 2009

PARE CORPORATION

EXECUTIVE SUMMARY

Fisherman's Wharf is a filled pier structure retained by steel sheet piling. The wharf is currently protected by a timber fendering system and provides operational berthage for fishing vessels

Pare Corporation and Childs Engineering Corporation conducted the inspection of the site on November 13, 2008. In general, Fisherman's Wharf was found to be in **Good** condition overall. Concerns and deficiencies at the site include corrosion of the steel sheetpile bulkhead, damaged and corroded access ladders, and wearing of the timber fender system.

High priority repairs include the repair of the fendering system and ladders. The opinion of probable cost for this work is in the order of $175,680.

Lower priority repairs include the addition of a cathodic protection system, which will increase the remaining useful life of the facility. The opinion of probable cost for this work is in the order of $192,120.

It is recommended that the facility be inspected at 3 to 5 year intervals to monitor deterioration of the facility components.

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Section 1 - Introduction

1.1 – Background and Objectives

The New Bedford Harbor Development Commission (HDC) has retained Pare Corporation (PARE) and Childs Engineering Corporation (CEC) to perform an above and below water inspection, and to develop a report of existing conditions for the Fisherman's Wharf in New Bedford, Massachusetts. Inspections were performed in accordance with the ASCE Manuals and Reports on Engineering Practice No. 101 – *Underwater Investigations: Standard Practice Manual*. The major objectives of the inspection report are to provide the HDC with an assessment of the existing conditions of the facility, and to substantiate requests for funding for the maintenance and repair of the facility.

1.2 – Scope of Work

The scope of this investigation is to provide an inspection and evaluation of the present condition of the wharf and appurtenant structures, and to provide information that will assist in both prioritizing repair needs and planning/conducting maintenance and operation.

The investigation is divided into three parts: 1) provide a description of the facility, including a review of available reports, investigations, and data previously submitted to the owner pertaining to the wharf and appurtenant structures; 2) perform a visual inspection of the site above and below water; 3) prepare and submit a final report presenting the evaluation of the structure, including recommendations for remedial actions, and associated opinions of probable cost.

Section 2 – Description of Site

2.1 - Site Location

Fisherman's Wharf a.k.a. Co-op Wharf is an approximate 1,121 foot long steel sheet pile bulkhead with solid fill. It is located north of the state pier along the New Bedford waterfront on New Bedford Harbor as shown in Figure 1 – Locus Plan.

2.2 - Facility Description

Fisherman's Wharf has been used for the docking of vessels since the 1800s. The original structure consisted of two filled piers, formerly known as City Pier #3 and City Pier #4, and was mainly used for the berthing of whaling vessels.

At present, Fisherman's Wharf is comprised of a PZ-38 steel sheet pile bulkhead, approximately 20 to 30 feet high, with solid fill. An interior steel wale and tieback

system provides the necessary lateral support for the wall. The pier provides docking space for modern fishing draggers and scallopers.

The bulkhead is protected with a timber fender system comprised of 10 inch x 10 inch vertical fenders spaced approximately 9.5 feet on center with a 3 inch x 8 inch UHMW rub rail bolted to the waterside face, with 8 inch x 10 inch timber chocks. The top of the steel sheeting is provided with a 3 inch x 12 inch cap channel. On top of the cap channel, an 8 inch x 12 inch timber curb is supported on 3 inch x 3 inch x 12 inch timber blocking spaced 36 inch on center. Docking cleats are 32 inch long and spaced approximately 28 feet on center, bolted to a concrete block measuring 54 inch long, 16 inch wide, and 12 inch high. The wharf supports an asphalt deck, primarily used for parking and access, with approximately 134 parking spaces available.

Original construction drawings for the facility have not been located at the time of this writing. According to available plans, the most recent repairs to the structure were completed in 1998. The repairs included the replacement of the original timber fender system with the current fendering, installation of fender pile clusters at the corners of the wharf, replacement of the steel sheet pile cap channel, removal of the original cathodic protection, and various repairs to the bituminous deck surface. These repairs did not include the area from Station 8+80 to Station 10+21.

Section 3 – Existing Conditions

3.1 - Observed Conditions – Topside

The topside and underwater inspections of the Fishermen's Wharf were performed on November 13, 2008. For reference purposes, a baseline was established along the top of the bulkhead during the inspection. Station 0+00 was located at the northwest corner of the bulkhead and extended to station 11+21 at the southern end of the bulkhead at its intersection with the State Pier. Observations were made in relation to their location along the baseline as appropriate and as noted herein. Reports of underwater conditions utilize the same baseline.

The timber vertical fenders were observed to be in overall good to fair condition, with the exception of several areas that were observed to be in poor condition. Typical deficiencies consist of rotting of the timber, wearing of the tops of fenders and fender faces, and impact damage causing splintering and splitting. A majority of the UHMW rub rails were observed to be missing or loose. Typically, the square top edge of the UHMW rub rail was observed to get caught on the rub rail on the docking vessels, causing them to be snagged and dislodged. The table below indicates specific locations of missing and loose rub rails.

Table 3.1 – Observed Rub Rail Deficiencies

Location	Station	Deficiency	Condition
Topside	0+50	UHMW Rub Rail	Missing
Topside	0+69 - 1+89	UHMW Rub Rail	(14) Missing
Topside	1+98	UHMW Rub Rail	Loose
Topside	1+98 - 4+12	UHMW Rub Rail	(25) Missing
Topside	4+30	UHMW Rub Rail	Missing
Topside	4+48	UHMW Rub Rail	Missing
Topside	4+65	UHMW Rub Rail	Missing
Topside	4+76	UHMW Rub Rail	Loose
Topside	4+85 - 5+05	UHMW Rub Rail	(3) Missing
Topside	5+23 - 5+88	UHMW Rub Rail	(8) Missing
Topside	6+23 - 6+61	UHMW Rub Rail	(5) Missing
Topside	6+70	UHMW Rub Rail	Loose
Topside	6+79	UHMW Rub Rail	Missing
Topside	6+88	UHMW Rub Rail	Loose
Topside	7+15	UHMW Rub Rail	Loose
Topside	7+24 - 7+82	UHMW Rub Rail	(7) Missing
Topside	8+00	UHMW Rub Rail	Loose
Topside	8+09 - 8+36	UHMW Rub Rail	(4) Missing
Topside	8+45	UHMW Rub Rail	Broken top half

From Station 0+00 to Station 3+25, the vertical fenders and chocks were observed to be in good condition with missing UHMW rub rails and minor wear of the vertical fenders. From Station 3+25 to Station 5+09 at the corner of the wall, the vertical fenders and chocks were observed to be in fair to poor condition. Several of the vertical fenders had significant wear at the top of the pile and along the fender face, the timber chocks were worn and splintered, and a majority of the UHMW rub rails were missing or loose. Also, the vertical fender at Station 4+76 was observed to be loose. The timber vertical fenders and chocks from Station 5+09 to Station 5+48 were observed to be in good to fair condition with minor wear observed along fender faces. From Station 5+48 to Station 5+75, the timber fender system was observed to be in fair to poor condition. The vertical fender at Station 5+51 is in poor condition and has been spilt vertically. The chocks and vertical fenders in this area are significantly worn and splintered. From Station 5+75 to Station 6+25, the timber chocks and vertical fenders were in good to fair condition. The timber vertical fenders and chocks from Station 6+25 to 7+00 were observed to be in fair to poor condition due to wear and impact damage. From Station 7+00 to Station 8+80, the fender system was observed to be in good condition. The docked vessel in this area utilized extra rubber fenders protecting both the vessel and fender system.

At Station 8+80, the fender system transitioned to an older fender system. The older fender system protects the steel sheetpile bulkhead from Station 8+80 to Station 10+44. It is comprised of 10 inch by 10 inch timber vertical fenders at 10 feet on center with 10 inch by 10 inch timber chocks. An 8 inch by 12 inch timber curb is supported by 3 inch by 12 inch by 12 inch blocks spaced 36 inch on center. The cleats in this area are 32 inch long and are bolted to either the cap channel or a welded steel box on top of the cap

channel. From Station 8+80 to Station 9+30, the vertical fenders and chocks are in fair condition with some signs of rot and wearing on faces. The timber curb was observed to be in poor condition with significant rot from Station 8+85 to Station 9+00. The timber chocks and vertical fenders were observed to be in fair to poor condition primarily because of wear from Station 9+30 to Station 9+80. From Station 9+80 to Station 10+44, the fender system appeared to be in good to fair condition. The older fender system terminates at Station 10+44 at the corner of the timber deck.

A 16 foot wide timber deck exists from Station 10+44 to Station 11+21 and was observed to be in overall good to fair condition. The timber decking was solid, with no loose boards noted. Some splintering and warping was observed. An existing railroad switch protruded through the deck at Station 10+95. From Station 10+06 to Station 10+44 and from Station 10+51 to Station 11+21, steel bollards with chain are mounted on top of the timber curb. Two gangways extend from the timber deck to floating docks. At Station 10+48 a 30 feet long aluminum gangway with 3.5 feet clear spacing was observed to be in good condition. At Station 11+09, as smaller 15 feet long aluminum gangway with 30 inch clear spacing extended to a floating barge and was observed to be in good to fair condition. Access to this gangway was restricted with the chain connecting two adjacent bollards.

Galvanized steel ladders are located at approximate 100 foot intervals around the bulkhead to provide access to and from the deck to the water below. Overall the ladders were observed to be in fair condition. Some of the ladders are in good condition above mean high water, while others have been damaged during impact with vessels causing damage to the rungs and buckling of the upright members. All of the ladders were observed to be corroded below mean high water rendering them unusable during times of low water.

Several areas of local subsidence were observed behind the bulkhead. At Station 1+05, a 12 inch long by 3 inch wide by 3 inch deep area of subsidence was observed with a loss of fill soils and asphalt. At Station 9+00, a 16 inch long by 6 inch wide by 1 inch deep area of subsidence was observed behind the bulkhead. A 24 inch long by 8 inch wide by 6 inch deep area of subsidence was observed at Station 9+34 with a loss of fill material and asphalt, as shown in Photo No. 18 in Appendix A - Photographs.

Life rings were observed along the bulkhead, spaced approximately 100 feet on center with a 4 inch x 4 inch post notched into the timber curb. The first life ring was observed at Station 0+16 and the final life ring positioned at Station 8+15. An emergency life boat was observed atop a steel frame from Station 0+95 and Station 1+21.

A list of all fenders, cleats, and life ring locations as well as any other deficiencies observed during the topside inspection is provided in Appendix E: Field Notes.

3.2 – Observed Conditions – Underwater

The underwater component of the underwater inspection of Fisherman's Wharf was performed by Childs Engineering Corporation on November 13, 2008. For reference purposes, the baseline that was established for the topside inspections also served as a baseline for the underwater inspection. The baseline follows the top of the bulkhead with Station 0+00 located at the northwest corner of the bulkhead extending to station 11+21 at the southern end of the bulkhead at its intersection with State Pier.

At Fisherman's Wharf, access was limited within the first 5 feet below the water line, as the vessels were docked tight to the wall with only 12 inches of timber fender separating them from the steel. Divers swam below the docked vessels and viewed elements that could be accessed safely.

Typically, at Fisherman's Wharf, the steel sheetpile bulkhead was observed to be actively corroding; however there is still significant steel section remaining. The existing coating is failing and there is a layer of black corrosion byproduct built up below the thin layer of marine growth. Corrosion has started to open up holes that were originally drilled through the sheeting for a bolted connection. The holes are typically located at about the MLW elevation. No anodes were found on the wall, consistent with a repair plan dated 1998 which indicates that anodes were to be removed from the wall at that time. The galvanized ladders are severely corroded at the bottom, with the bottom 3 rungs typically unusable. The timber fender system is in fair condition below the waterline. The timber is hard and sound and has some minor abrasion loss. There are some loose connections and missing sections because of corroded hardware. The following table indicates deficiencies observed during the underwater inspection.

Table 3.2 – Significant Underwater Conditions

Location	Station	Deficiency	Description
Underwater	0+05	Ladder	Severely corroded
Underwater	0+20 - 0+30	Lower Wale	Fastening studs broken
Underwater	0+40 - 1+73	Lower Wale	Missing lower wale
Topside	1+05	Bituminous Deck	Local subsidence (3" x 12" x 5" deep)
Underwater	1+42	Vertical fender	Loose vertical fender
Underwater	1+55	Vertical fender	Broken vertical fender
Underwater	1+67	Ladder	No rungs below water; no connection
Underwater	1+72.5	Timber Dolphin	S.S. wire rope loose
Underwater	2+00	Sheetpile Bulkhead	1.5" hole with bolt 1' below wale
Underwater	2+54 - 2+80	Lower Wale	Missing lower wale
Underwater	2+53	Vertical fender	Loose vertical fender
Underwater	2+72	Vertical fender	Loose vertical fender
Underwater	4+15	Ladder	No rungs below water
Underwater	4+15 - 5+98	Lower Wale	Missing lower wale
Underwater	4+75	Vertical fender	Loose vertical fender
Underwater	4+84	Vertical fender	Loose vertical fender

Underwater	4+93	Vertical fender	Loose vertical fender
Underwater	5+02	Sheetpile Bulkhead	1.5" hole (backfill exposed) at lower wale
Topside	5+04	Steel Cap Channel	3" hole in top of cap channel
Underwater	5+08	Timber Dolphin	Lower S.S. wire rope wraps loose (2 wraps)
Underwater	5+27	Vertical fender	Loose vertical fender
Underwater	5+50	Vertical fender	Loose vertical fender
Underwater	6+50 - 7+50	Lower Wale	Missing lower wale
Underwater	6+98	Ladder	Severely corroded
Underwater	7+98 - 8+08	Lower Wale	Missing lower wale
Underwater	8+27 - 8+37	Lower Wale	Missing lower wale
Underwater	9+05	Lower Wale	Rotting timber, hollow
Underwater	9+14	Lower Wale	Rotting timber, hollow
Underwater	9+16	Lower Wale	4" diam. bolt hole
Topside	9+34	Bituminous Deck	Local subsidence (8" x 24" x 6" deep)
Underwater	9+58 - 9+75	Lower Wale	Marine borer - 50% section loss
Underwater	9+85 - 9+87	Lower Wale	Marine borer - Hollow end section
Underwater	10+44 - 11+21	Sheetpile Bulkhead	1.5" holes in outter flange (backfill exposed) 5' below top of wall
Underwater	10+39 - 10+44	Corner of wall	Loose and hanging wale

During the inspection of the sheetpile, ultrasonic thickness (UT) and cathodic potential (CP) reading were taken. The readings were taken at the mudline, mean low water, and approximately halfway between the two. There was a large sheen of oil surrounding this structure that prevented the dive inspection team from obtaining meaningful potential readings. While passing the silver-silver chloride cell through this oil sheen the cell was contaminated and it was not reading correctly on the voltage meter. Conditions at this facility were found to be similar to adjacent facilities such as the Steamship Pier, Homer's Wharf, and Leonard's Wharf which all indicated potential readings between .3 and .5 volts. The following table illustrates the results.

Table 3.3 – Underwater Readings

STATION	ELEVATION	UT *Inner Flange*	UT *Web*	UT *Outer Flange*	CP
0+00	Mud	0.525	0.345	0.535	*ERR*
	Mid	0.485	0.280	0.485	*ERR*
	MLW	0.525	0.315	0.495	*ERR*
2+00	Mud	0.520	0.385	0.510	no reading
	Mid	0.505	0.360	0.500	*ERR*
	MLW	0.490	0.295	0.470	*ERR*
4+00	Mud	0.540	0.335	0.520	no reading
	Mid	0.535	0.345	0.505	*ERR*
	MLW	0.505	0.365	0.500	*ERR*
6+00	Mud	0.545	0.370	0.525	
	Mid	0.530	0.355	0.505	0.500
	MLW	0.510	0.340	0.460	0.500
8+00	Mud	0.550	0.385	0.525	0.663
	Mid	0.545	0.370	0.565	*ERR*
	MLW	0.550	0.370	0.525	0.602

10+00	Mud	0.520	0.335	0.515	no reading
	Mid				
	MLW	0.520	0.340	0.510	no reading
11+21	Mud				
	Mid				
	MLW	0.510	0.370	0.505	

Section 4 – Structural Condition Assessment

4.1 – Structural Condition Assessment

Based on the observations obtained from the site inspections, the following provides our assessment of the various structural components. Existing structure conditions were based on visual and tactile observations only, and were limited to accessible and visible portions of the structures.

Based upon the visual inspection of topside and underwater structures along with the observed thickness readings, Fisherman's Wharf is considered to be in generally good condition. Corrosion along the flanges of the steel sheetpile bulkhead sections was observed to be minimal, with greater loss of section observed in the web areas. The following table represents the thickness readings and estimated remaining section steel sheetpile.

Table 3.4 – Remaining Steel Sheetpile Thickness

Nominal Flange Thickness = 0.500"		**Nominal Web Thickness** = 0.375"			
Inner Flange	***Percent Remaining***	**Web**	***Percent Remaining***	**Outer Flange**	***Percent Remaining***
0.525	105.0	0.345	92.0	0.535	107.0
0.485	97.0	0.280	74.7	0.485	97.0
0.525	105.0	0.315	84.0	0.495	99.0
0.520	104.0	0.385	102.7	0.510	102.0
0.505	101.0	0.360	96.0	0.500	100.0
0.490	98.0	0.295	78.7	0.470	94.0
0.540	108.0	0.335	89.3	0.520	104.0
0.535	107.0	0.345	92.0	0.505	101.0
0.505	101.0	0.365	97.3	0.500	100.0
0.545	109.0	0.370	98.7	0.525	105.0
0.530	106.0	0.355	94.7	0.505	101.0
0.510	102.0	0.340	90.7	0.460	92.0
0.550	110.0	0.385	102.7	0.525	105.0
0.545	109.0	0.370	98.7	0.565	113.0
0.550	110.0	0.370	98.7	0.525	105.0
0.520	104.0	0.335	89.3	0.515	103.0
0.520	104.0	0.340	90.7	0.510	102.0
0.510	102.0	0.370	98.7	0.505	101.0

Typical UT readings on both the web and flanges displayed reduced thicknesses near mean low water, however the amount of section loss is considered to be minor. Thickness readings on the web indicated average section loss of 7.3% with a maximum reading of 22.3% loss. Using the average section loss and estimating the construction date to 1975, average corrosion rates cause a loss of section of approximately 0.001 inch per year or 0.2%. The minimum thickness reading indicates a section loss of 0.095 inch or 25.3%, corresponding to a maximum section loss of 0.003 inch per year or 0.75%.

Although the coating has played an important role in the corrosion protection of the sheeting, corrosion rates will accelerate if the sheeting is left untreated. Based upon average corrosion rates in the area, if left untreated, the expected life of the sheeting is anticipated to be in the order of 25 years. The installation of coatings and cathodic protection can increase this remaining useful life.

Section 5 - Recommendations and Opinion of Probable Cost

5.1 –Recommendations - General

Based on conditions observed during the inspections, and the corresponding assessments of the existing structures, the following recommendations are provided for the repair and rehabilitation of this facility. Existing structure conditions and assessments were based on visual and tactile observations only, and were limited to accessible and visible portions of the structures.

Opinions of probable cost were generated based upon current industry unit prices for similar work. Breakdowns of cost are provided in the Appendix. The opinions provided are for construction only and do not include allowances for engineering, permitting, or construction administration. A 20 percent contingency has been included with these costs. The opinions shown herein are based on a limited investigation and are provided for general information only. This should not be considered an engineer's estimate, as actual construction costs may be somewhat less or considerably more than indicated, due to fluctuations in the market and the actual repair implemented.

5.2 – High Priority

The following items are considered to have a Medium to High Priority, as they affect the usability and safety of the structure:

A. Repair and Rehabilitate the Existing Timber Fender System

This item consists of the removal and replacement of damaged, missing and excessively worn components of the timber fender system. This item also includes the replacement of the older fender system from Station 8+80 to 10+44,

which was not rehabilitated in 1998. The opinion of probable construction cost is approximately $62,400.

The opinion of probable construction cost to rehabilitate the older section of the existing timber fender system from Station 8+80 to 10+44 is approximately $41,280.

B. Remove and Replace Access Ladders

This item consists of the removal and replacement of damaged and deteriorated ladders. Also included in this item is the removal of the remaining UHMW facing. The opinion of probable construction cost is approximately $24,000.

5.3 – Lower Priority

The following items are considered to have a Lower Priority, as they presently do not affect the usability and safety of the structure, but will need to be addressed in approximately 5 to 10 years.

A. Install Cathodic Protection System

This item consists of the installation of a new aluminum anode cathodic protection system, welded to the existing steel sheet piling below mean low water. The cathodic protection system will inhibit steel section loss due to corrosion below the water line. The opinion of probable construction cost is approximately $146,100.

Figures
Fisherman's Wharf
New Bedford, Massachusetts

PARE CORPORATION

FISHERMAN'S WHARF

NEW BEDFORD, MASSACHUSETTS

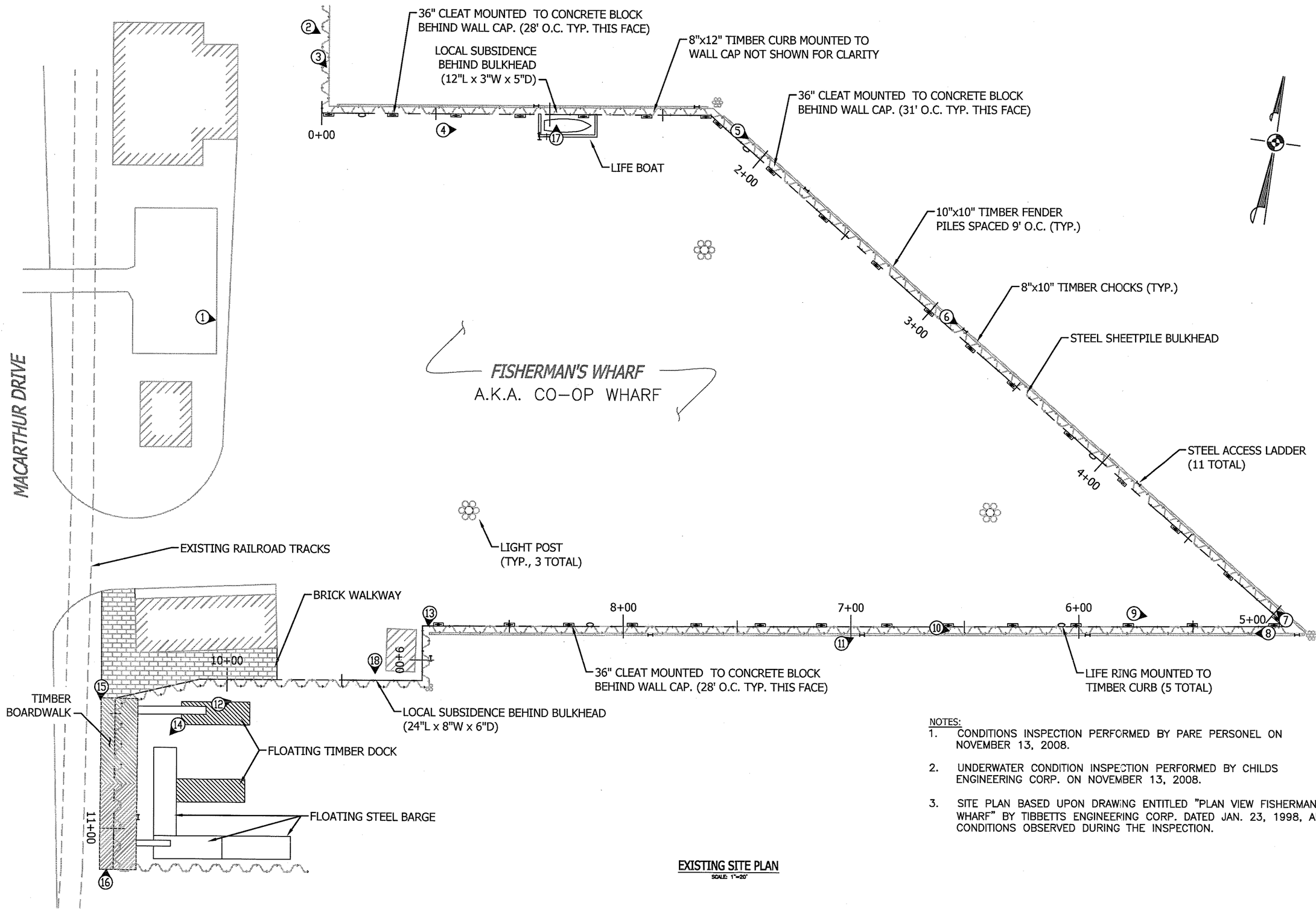
NEW BEDFORD HARBOR DEVELOPMENT COMMISSION

NEW BEDFORD WATERFRONT FACILITY INSPECTIONS

NOVEMBER 2008

FIGURE 1

LOCUS PLAN



NOTES:

1. CONDITIONS INSPECTION PERFORMED BY PARE PERSONEL ON NOVEMBER 13, 2008.
2. UNDERWATER CONDITION INSPECTION PERFORMED BY CHILDS ENGINEERING CORP. ON NOVEMBER 13, 2008.
3. SITE PLAN BASED UPON DRAWING ENTITLED "PLAN VIEW FISHERMAN'S WHARF" BY TIBBETTS ENGINEERING CORP. DATED JAN. 23, 1998, AND CONDITIONS OBSERVED DURING THE INSPECTION.

EXISTING SITE PLAN
SCALE: 1"=20'

HALF SIZED

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ENGINEERS - SCIENTISTS - PLANNERS
10 LINCOLN ROAD, SUITE 103
FOXBORO, MA 02035
508-543-1735

SCALE ADJUSTMENT GUIDE
0" 2"
BAR IS TWO INCHES ON ORIGINAL DRAWING.

NEW BEDFORD WATERFRONT FACILITIES INSPECTIONS
FISHERMAN'S WHARF
NEW BEDFORD HARBOR DEVELOPMENT COMMISSION
NEW BEDFORD, MASSACHUSETTS

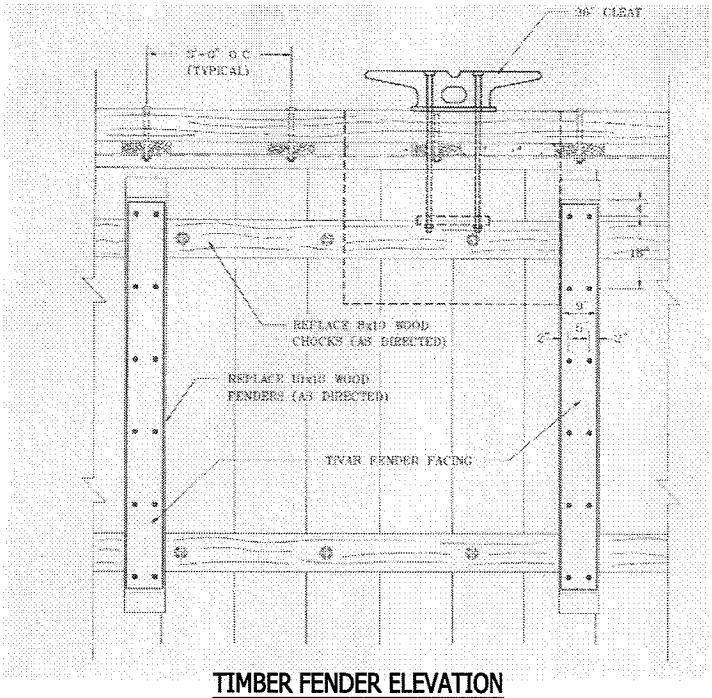
REVISIONS:

PROJECT NO.:	08216.00
DATE:	NOVEMBER 2008
SCALE:	AS NOTED
DESIGNED BY:	–
CHECKED BY:	–
DRAWN BY:	RMM
APPROVED BY:	KWH

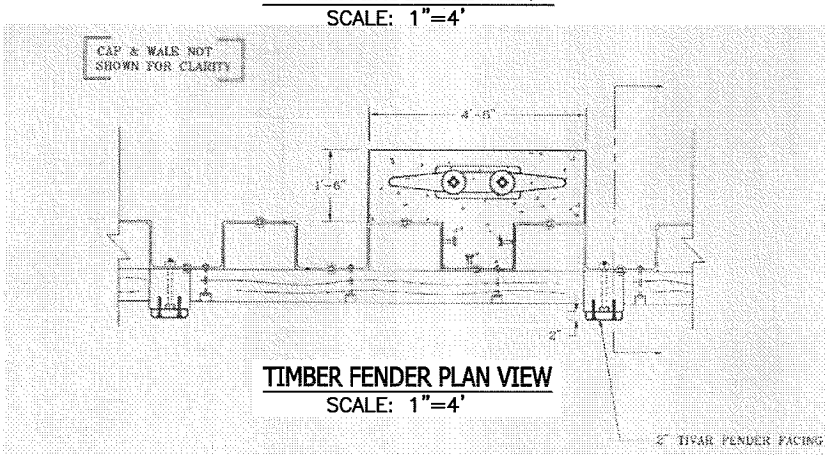
DRAWING TITLE: EXISTING SITE PLAN

FIGURE NO.: 2

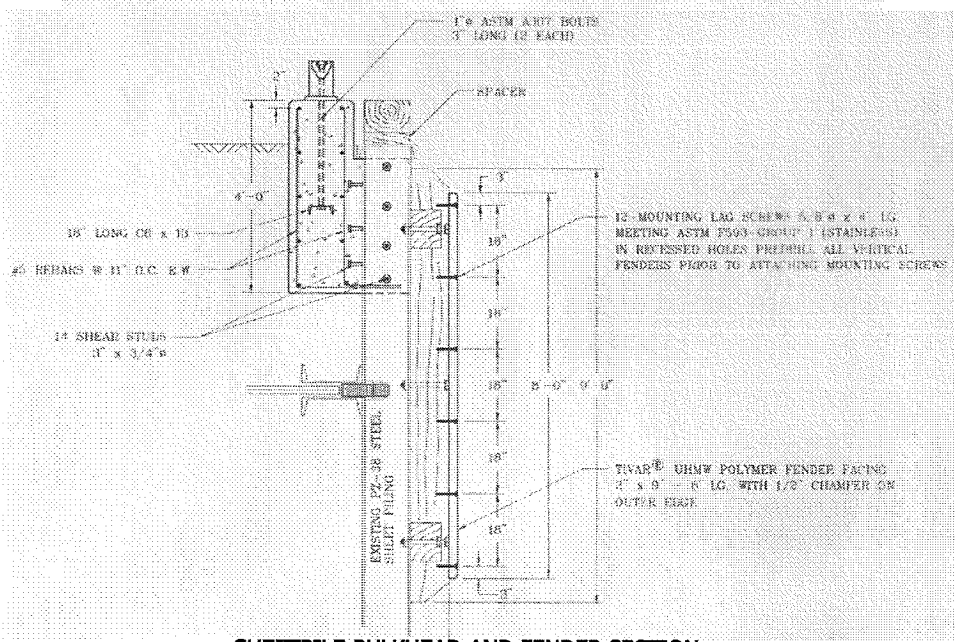
SHEET NO. 1 OF 1



TIMBER FENDER ELEVATION
SCALE: 1"=4'



TIMBER FENDER PLAN VIEW
SCALE: 1"=4'



SHEETPILE BULKHEAD AND FENDER SECTION
SCALE: 1"=4'

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NEW BEDFORD WATERFRONT FACILITIES INSPECTIONS
FISHERMAN'S WHARF
NEW BEDFORD HARBOR DEVELOPMENT COMMISSION
NEW BEDFORD, MASSACHUSETTS

EXISTING SECTION AND ELEVATION

DRAWN BY: RMM	DATE: NOVEMEBR 2008	FIGURE NO.: 3	
CHECKED BY: KWH	PROJECT NO.: 08216.00		
APPROVED BY: KWH	SCALE: AS NOTED	SHEET NO.: 1 OF 1	

Appendix A
Photographs
Fisherman's Wharf
New Bedford, Massachusetts

Photo No. 1: Overview of the Fisherman's Wharf.

Photo No. 2: Steel Sheetpile bulkhead from approximately Station 0+20 to Station 1+73.

Photo No. 3: Typical overview of the timber fender system with UHMW rub rails.

Photo No. 4: Emergency Life Boat from Station 0+95 to Station 1+21.

Photo No. 5: Typical worn fender pile with missing UHMW rub rail.

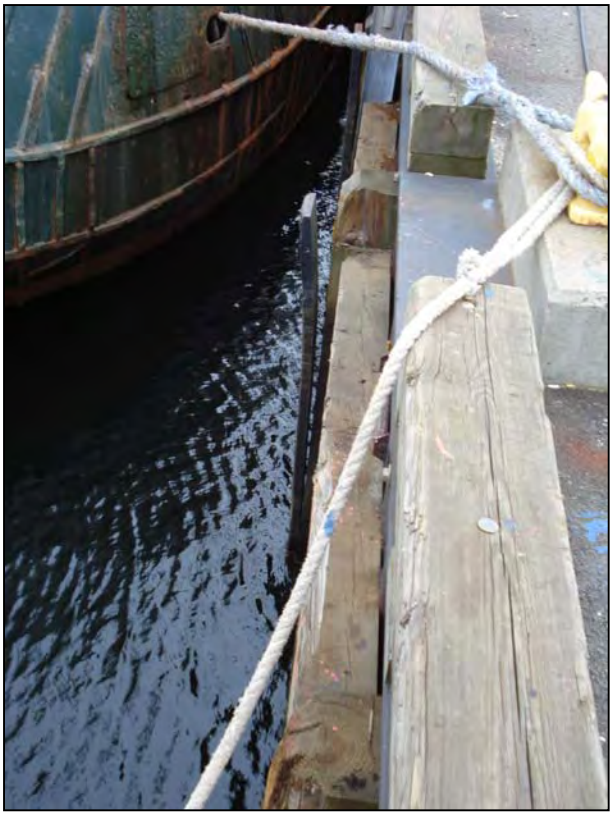


Photo No. 6: Typical loose UHMW rub rail.

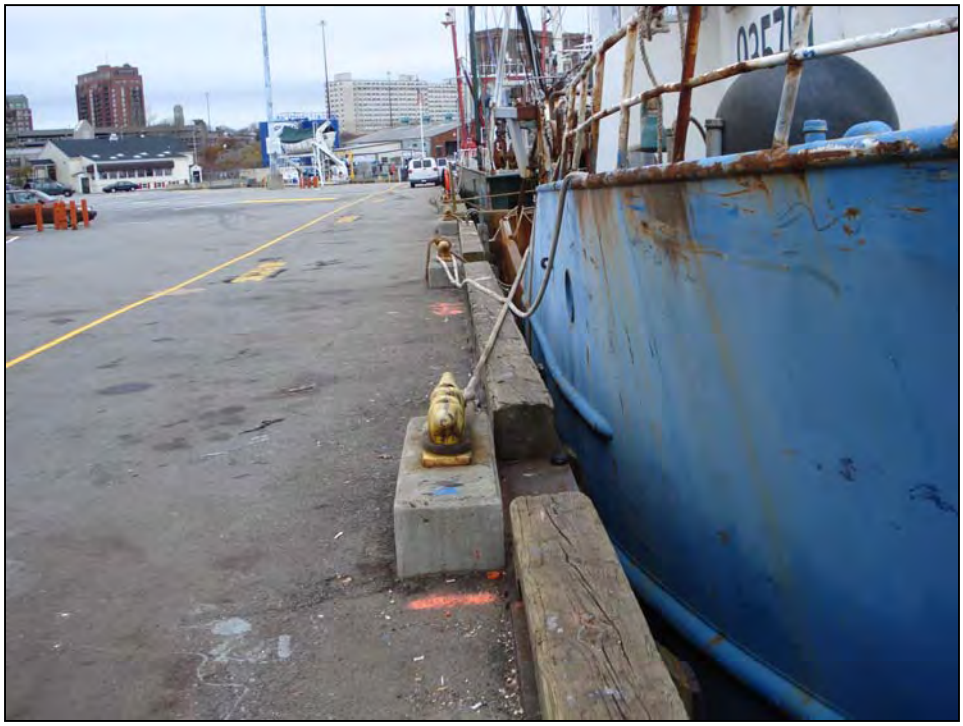


Photo No. 7: Overview of the Wharf and fender system from Station 5+09 looking northwest.

Photo No. 8: Worn fender pile in contact with a docked vessel.

Photo No. 9: Overview of the eastern corner of the wharf.

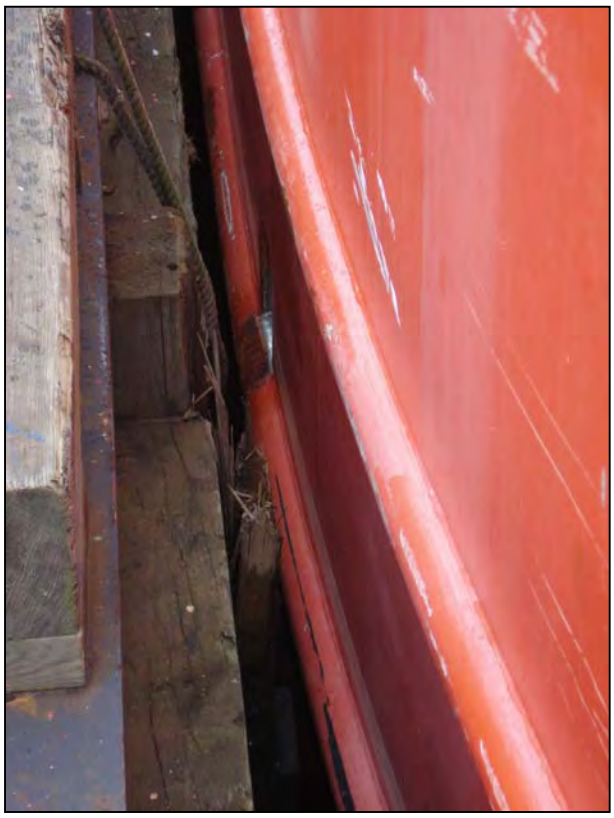


Photo No. 10: Top of a splintered and broken fender pile.

Photo No. 11: Typical access ladder with corroded rungs.

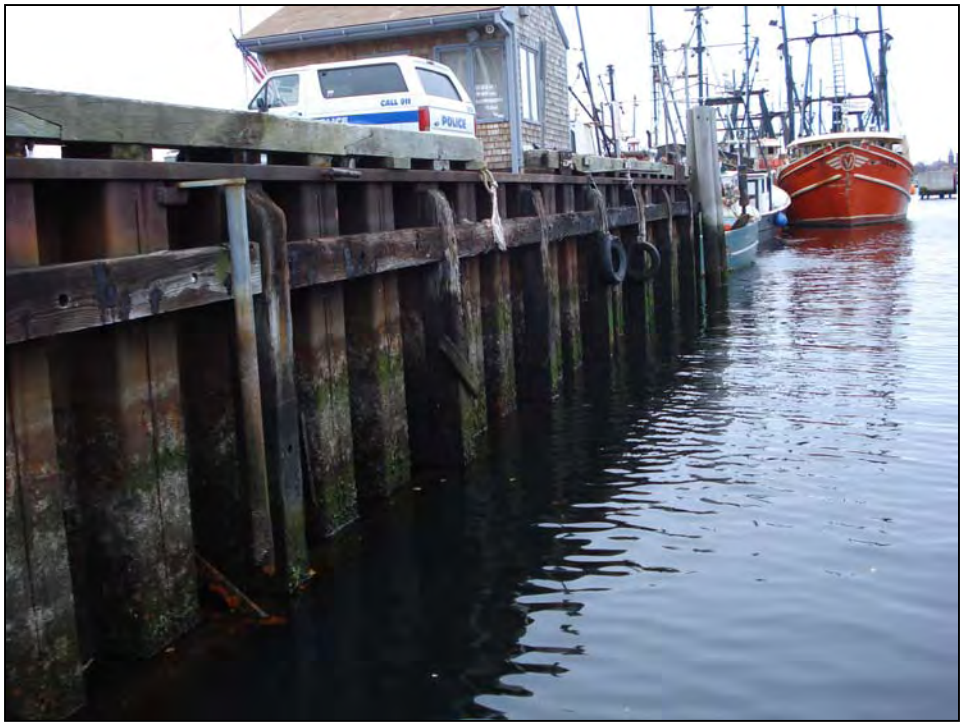


Photo No. 12: Overview of the older fender system from Station 8+84 to Station 10+44.

Photo No. 13: Older fender system with rotted timber curb and damaged chocks.

Photo No. 14: Overview of the steel sheetpile bulkhead beneath the timber deck from Station 10+44 to Station 11+21.

Photo No. 15: Overview of the timber deck from Station 10+44 to Station 11+21.

Photo No. 16: Overview of the timber curb with steel bollards along the timber deck.

Photo No. 17: Subsidence behind the steel sheetpile bulkhead at Station 1+06.

Photo No. 18: Subsidence behind the steel sheetpile bulkhead at Station 9+34.

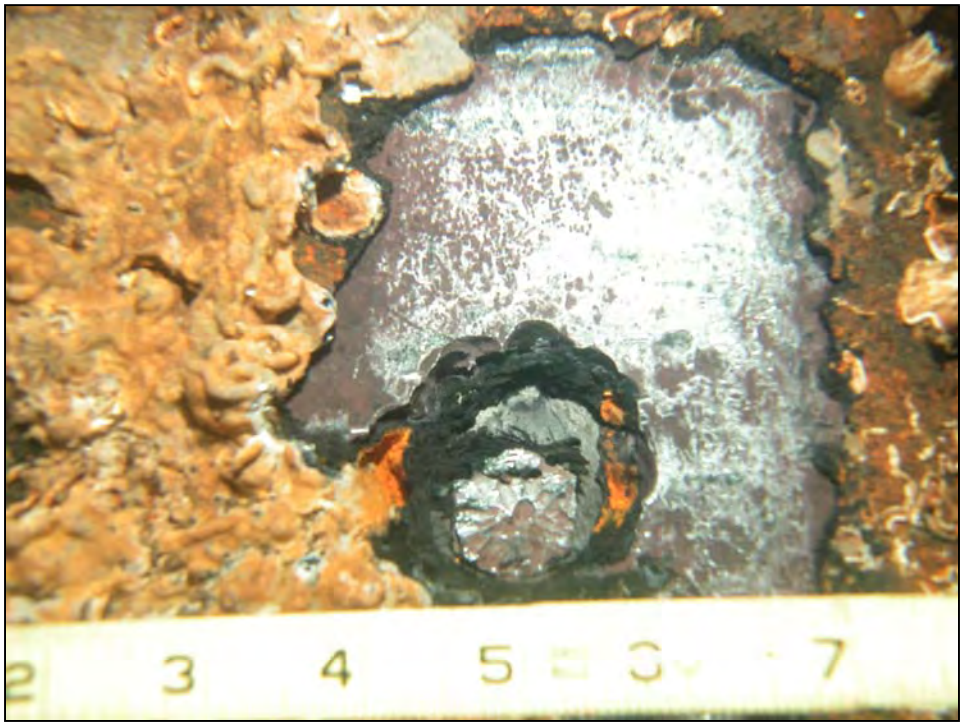


Photo No. 19: Observed steel sheetpile condition underwater (Photo by Childs Engineering Corp.)

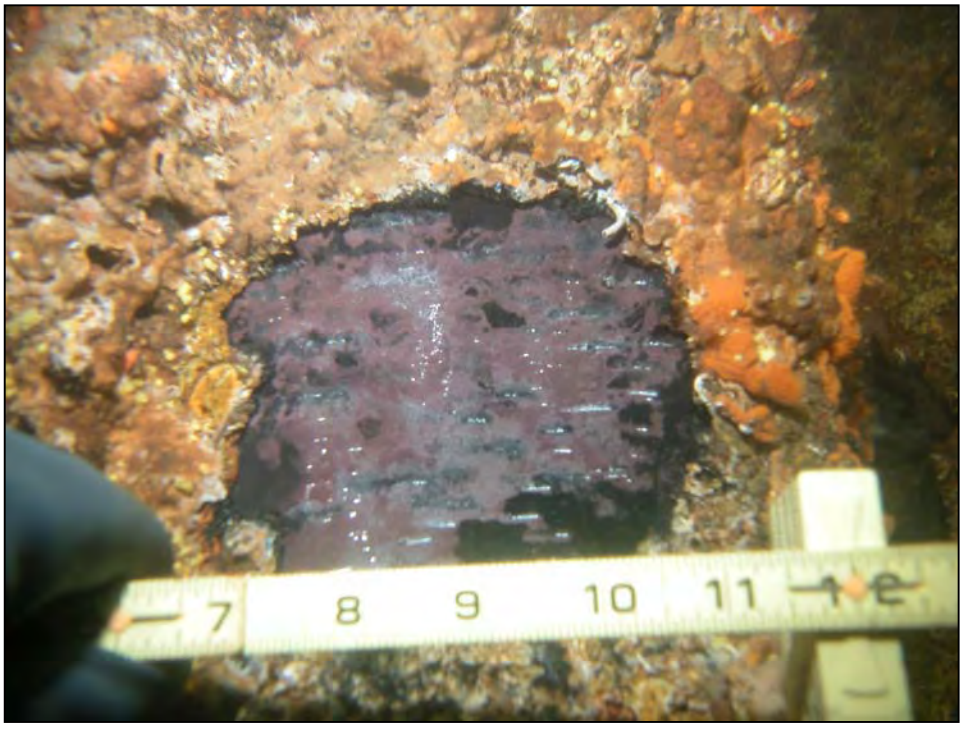


Photo No. 20: Observed steel sheetpile condition underwater (Photo by Childs Engineering Corp.)

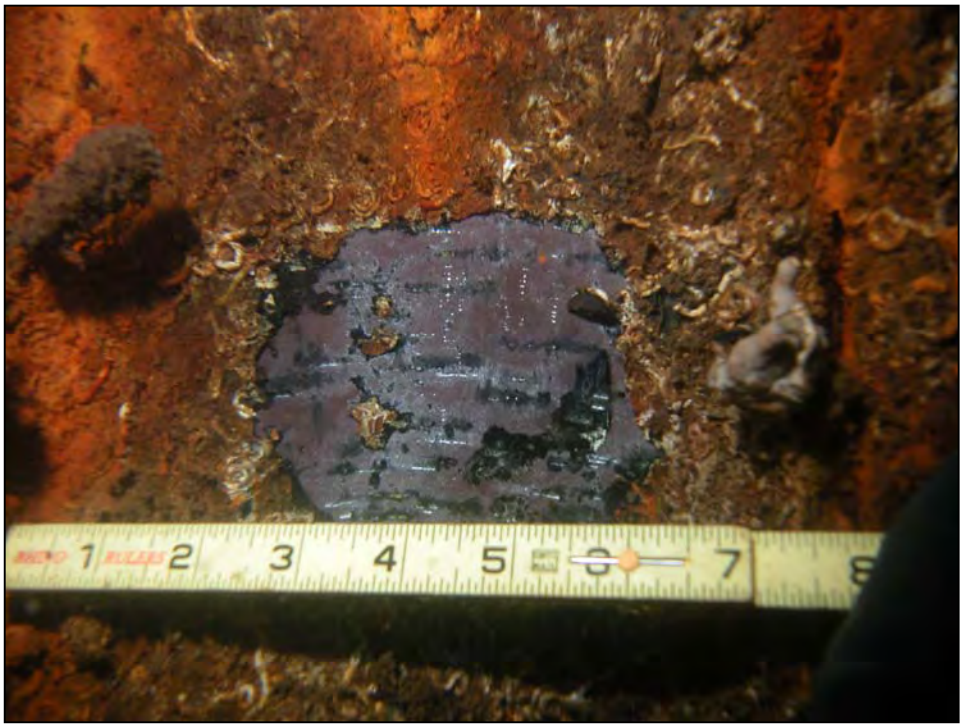


Photo No. 21: Observed steel sheetpile condition underwater (Photo by Childs Engineering Corp.)

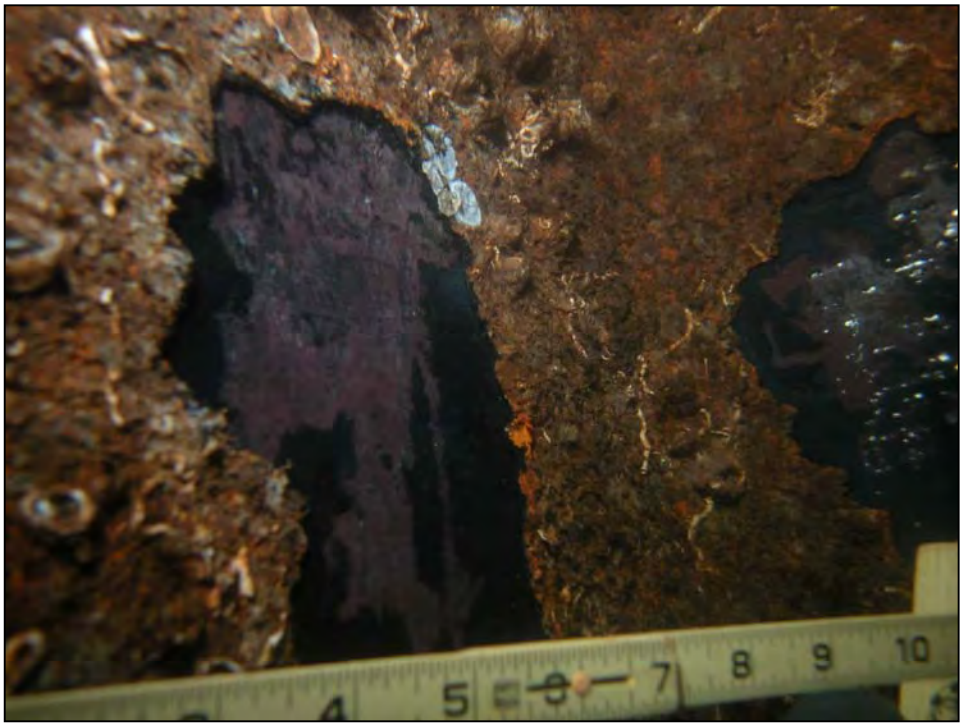


Photo No. 22: Observed steel sheetpile condition underwater (Photo by Childs Engineering Corp.)

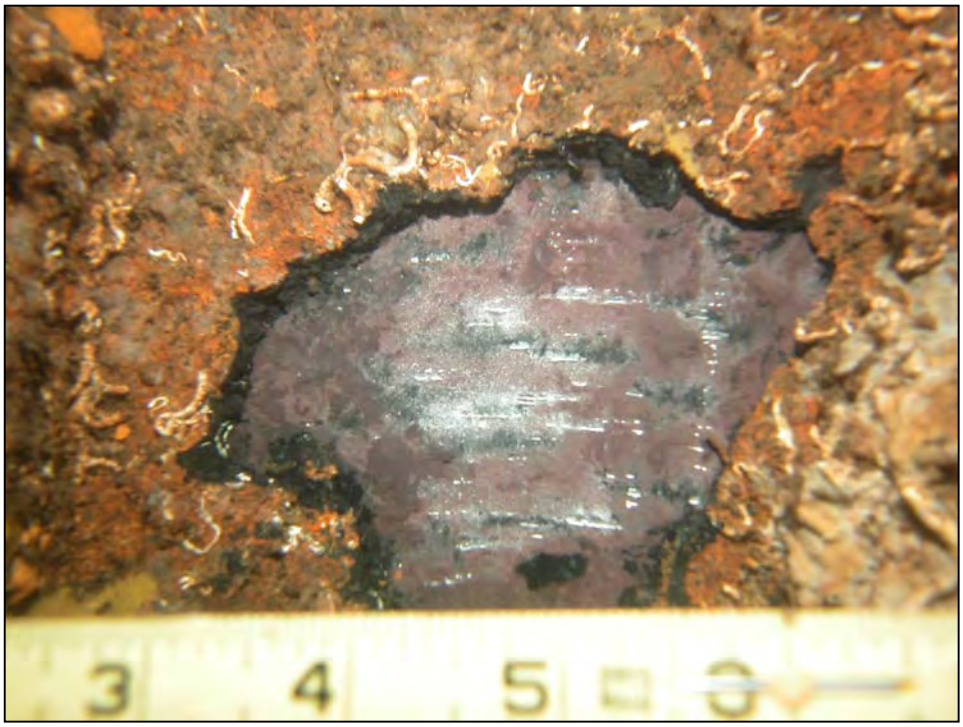


Photo No. 23: Observed steel sheetpile condition underwater (Photo by Childs Engineering Corp.)

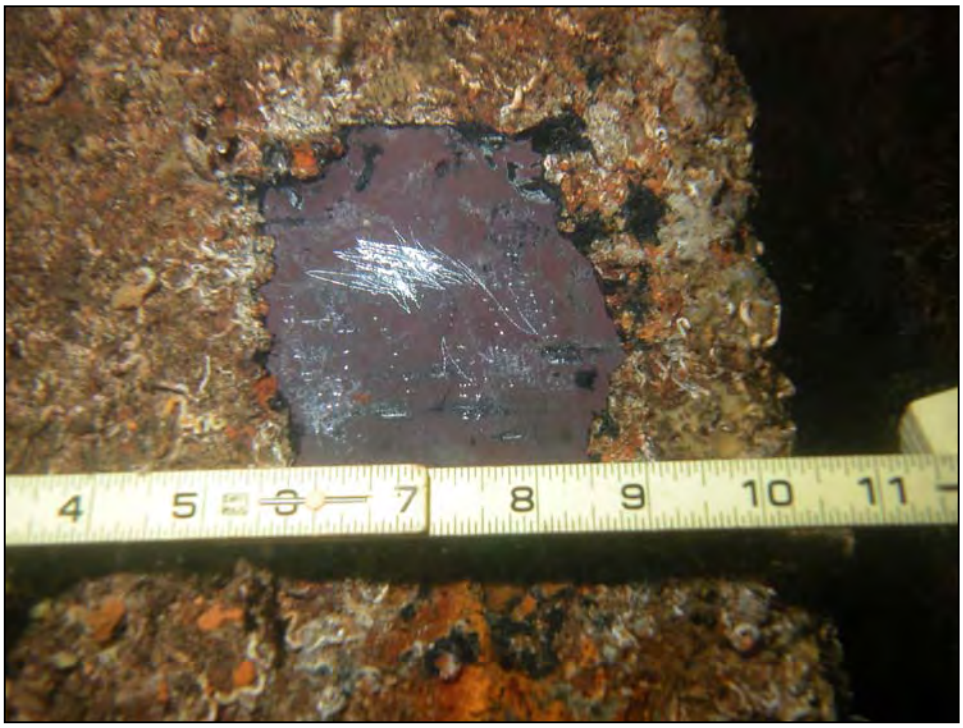


Photo No. 24: Observed steel sheetpile condition underwater (Photo by Childs Engineering Corp.)

Appendix B
Key Personnel
Fisherman's Wharf
New Bedford, Massachusetts

KEY PERSONNEL

The following personnel were involved with this project including but not limited to the topside and underwater inspections and the preparation of this report:

Name	Employer	Responsibilities
Karl Hammond, P.E.	PARE Corporation	Project Manager, Lead Engineer
Ernest O. Rabideau, Jr., P.E.	PARE Corporation	Project Reviewer
Matt Bellisle, P.E.	PARE Corporation	Principal in Charge
Craig Sams, P.E.	Childs Engineering Corporation	Principal in Charge
Robert Garrity, P.E.	Childs Engineering Corporation	Project Engineer for Underwater Inspections
Kevin Champagne, P.E.	PARE Corporation	Support Engineer
Richard Fitzgerald, P.E.	Childs Engineering Corporation	Underwater Inspection Team
Charlie Marshall Roberts	Childs Engineering Corporation	Underwater Inspection Team
Robert Welch	Childs Engineering Corporation	Underwater Inspection Team
Phil Iantosca	Childs Engineering Corporation	Underwater Inspection Team
Nicholas B. Sarata	Childs Engineering Corporation	Underwater Inspection Team
Ryan McCoy	PARE Corporation	Topside Inspection
Briscoe B. Lang	PARE Corporation	Permitting Services

Appendix C
Backup Data for Cost Estimates
Fisherman's Wharf
New Bedford, Massachusetts

FISHERMENT'S WHARF

OPINION OF PROBABLE CONSTRUCTION COST

February, 2009

WHARF REHABILITATION						
		QTY	UNIT	UNIT PRICE		TOTAL
High Priority Repairs						
1.	Mobilization/Demobilization	1	LS	$ 10,000.00	$	10,000.00
2.	Demolition and Removal	1	LS	$ 8,000.00	$	8,000.00
3.	Replace Timber Fenders	8,700	Bd.Ft	$ 12.00	$	104,400.00
4.	Ladders and Miscellaneous Timber	1	LS	$ 24,000.00	$	24,000.00
				Subtotal	$	146,400.00
				Contingency 20%	$	29,280.00
				Total Alt.1	**$**	**175,680.00**
Low Priority Repairs						
1.	Mobilization/Demobilization	1	LS	$ 10,000.00	$	10,000.00
2.	Demolition and Removal	1	LS	$ 4,000.00	$	4,000.00
3.	Install Cathodic Protection	12,175	LB	$ 12.00	$	146,100.00
				Subtotal	$	160,100.00
				Contingency 20%	$	32,020.00
				Total Alt.2	**$**	**192,120.00**

Appendix D
References
Fisherman's Wharf
New Bedford, Massachusetts

REFERENCES

The following references were utilized during the preparation of this report and the development of the recommendations presented herein:

1. "About the Port – Key Locations", New Bedford Harbor Development Commission, *http://www.newbedford-ma.gov/PortofNewBedford/AboutPort/KeyLocations.html*

2. Construction Drawings "Proposed Repairs and Improvements to Wharves and Piers in New Bedford and Fairhaven, MA", Tibbetts Engineering Corp., January 23, 1998 (Revised March 20, 1998).

Appendix E
Field Notes
Fisherman's Wharf
New Bedford, Massachusetts

RMM
KWH

FISHERMAN'S WHARF

Nov. 13, 08

N.B. WATERFRONT INSPECTIONS OVERCAST 45°F

STA 0+3.0 - 36" CLEAT 16"X55"X11" CONCRETE BLOCK
(2) 7/8" BOLTS
0+3.7 - FENDER (P)
0+5.7 - START OF CURB
→ 8" X12" TIMBER CURB
→ 3"X3"X12" BLOCKING 36" O.C
0+12.8 - FENDER (P)
0+16.0 - LIFE RING
0+22.0 - FENDER (P)
0+31.0 - CLEAT / FENDER (P)
0+40.5 - FENDER (P)
0+49.8 - FENDER (M)
0+59.0 - CLEAT / FENDER (P)
0+68.5 - FENDER (M)
0+77.8 - FENDER (M)
0+87.0 - CLEAT / FENDER (M)
0+94.0 - LADDER (BUCKLED) 18" CLEAR 7" CHANNEL
0+95.0 - LIFE RAFT FRAME
0+96.0 - FENDER (M)
1+05.5 → FENDER (M)
- LOCAL SUBSIDENCE (3" X[illegible] ASD)

* UHMW PULLED OFF BY BOAT RUB RAIL
* 10" X10" FENDER PILES * 8"X10" CHOCKS
* P = PRESENT UHMW
* M = MISSING UHMW * 3" X12" CAP CHANNEL

WATER DEPTH TO TOP OF DELIC			
→ 16'	@	STA	0+25
→ 19'	@	STA	0+50
→ 21.5'	@	STA	0+75
→ 19'	@	STA	1+00
→ 21.5'	@	STA	1+25
→ 23'	@	STA	1+50
→ 27.5'	@	STA	1+75
→ 25.5'	@	STA	2+00
→ 24'	@	STA	2+25
→ 25'	@	STA	2+50
→ 26'	@	STA	2+75
→ 24.5	@	STA	3+00
→ 25'	@	STA	3+25
→ 23'	@	STA	3+50
→ 26'	@	STA	3+75
→ 29'	@	STA	4+00
→ 30.5	@	STA	4+25
→ 28.5	@	STA	4+50
→ 26'	@	STA	4+75
→ 29'	@	STA	5+00
→ 28.5	@	STA	5+25
→ 27.5	@	STA	5+75
→ 26.5	@	STA	6+00

1+14.5 - CLEAT/FENDER (M)
1+21.0 - LIFE BOAT FRAME
1+24.0 - FENDER (M)
1+33.0 - FENDER (M)
→ FENDERS FAIR TO GOOD SLIGHTLY WORN
1+42.5 - CLEAT/FENDER (M)
1+51.0 - SHORE POWER
1+52.0 - FENDER (M)
1+61.0 - FENDER (M)
1+65.0 - LADDER (BUCKLED/RUNGS SCR.)
1+70.0 - CLEAT/FENDER (M)
1+72.5 - CORNER OF WALL
-(7) TIMBER PILE CLUSTER
1+76.0 - CLEAT
1+79.5 - FENDER (M)
1+89.0 - FENDER (M)
1+92.0 - LIFE RING
1+98.0 - FENDER (P- LOOSE)
2+07.0 - CLEAT
2+23.5 - LADDER (FAIR COND) 10" HAND GRIP
2+38.0 - CLEAT

* TOPS OF FENDERS WORN
* WILL NOTE UHMW PRESENCE (NOT MISSING)
* FENDERS SPACED 9.5' O.C (TYP.)

WATER DEPTH TO TOP OF DECK

→ 23.5 @	STA 6+50
→ 23.5 @	STA 6+75
→ 24' @	STA 7+00
→ 20.5 @	STA 7+25
→ 19' @	STA 7+50
→ 19' @	STA 7+75
→ 18.5' @	STA 8+00
→ 17.5 @	STA 8+25
→ 17.0 @	STA 8+50
→ 17.0 @	STA 8+75
→ 19.0 @	STA 9+00
→ 18' @	STA 9+25
→ 17' @	STA 9+50
→ 17.5 @	STA 9+75
→ 12' @	STA 10+00
→ 10' @	STA 10+25
→ 7 @	STA 10+50
→ 10.5 @	STA 10+75
→ 7.5 @	STA 11+00

2+69.0 - CLEAT
3+00 - CLEAT
3+17.0 - LADDER (GOOD COND)
3+24.0 - CLEAT
3+48.0 - CLEAT
3+79.0 - CLEAT
3+95.0 - LIFERING

* FENDER TOPS / TOP CHOCKS WORN/SPLINTERED

4+11.0 - CLEAT
4+18.0 - LADDER (BUCKLED)
4+20.75 - FENDER (P)
4+39.0 - FENDER (P)
4+42.0 - CLEAT
4+57.0 - FENDER (P)
4+72.0 - CLEAT
4+76.0 - FENDER (P) * LOOSE
5+00 - END CURB
5+03 - CLEAT
5+09 - CORNER OF WALL
5+11.0 - (7) TIMBER PILE CLUSTER
5+13.0 LADDER (GOOD CONDITION)
5+14.0 - FENDER (P)

INSPECTION NOTES:

5+04 - HOLE IN TOP OF WALL CAP CHANNEL ± 3"Ø

5+48 - TOP CHOCKS AND FENDER WORN (FAIR TO POOR) ± 25'

6+25 - TOP CHOCKS AND FENDER WORN (FAIR TO POOR) ± 25'

7+00 - TOP CHOCKS AND FENDERS IN GOOD TO FAIR COND ± 175' (BOAT USES TIRES BETWEEN HULL & FENDER)

8+80 - TRANSITION FROM NEW FENDER SYSTEM TO OLD F.S.

8+85 - TIMBER CURB IN POOR COND ± 15'

* OLD FENDER SYSTEM: 8"X12" TIMB. CURB
3"X12"X12" BLOCKS @ 36" O.C.
10"X10" FENDERS @ 10' O.C., 10"X10" CHOCKS

5+19.0 - START OF TIMBER CURB
5+48.0 - CLEAT
5+75.75 - CLEAT
5+96.0 - LADDER (MINOR BUCKLING)
5+97.5 - FENDER (P)
6+01.0 - CLEAT
6+04.5 - FENDER (P)
6+07 - LIFE RING
6+14.0 - FENDER (P)
6+28.5 - CLEAT
6+50.5 - FENDER PILE SPLIT VERTICALLY
6+57.0 - CLEAT
6+69.5 - FENDER (UHMW ATTACHED W/ 1 BOLT & ROPE TO CURB)
6+84.5 - CLEAT
6+88.0 - FENDER (UHMW ATT. W/ 2 BOLTS)
6+95.0 - LADDER (GOOD CONDITION)
6+97.0 - FENDER (P)
7+07.0 - FENDER (P)
7+13.0 - CLEAT
7+15.0 - FENDER (UHMW ATT. W/ BOLTS & ROPE)
7+40.75 - CLEAT

INSPECTION NOTES:

9+27 - 9+50 - OLD UTILITY PVC PIPE RUNS WATERSIDE OF CURB

9+50 - 9+62 - PITTING OF STEEL WALL CAP CHANNEL

9+40 - TOP CHOCKS AND FENDER PILES WORN (FAIR TO POOR) ± 40'

10+05 - POSSIBLE LOCAL SUBSIDENCE ± 20'

10+44 - 11+21 - 16' WIDE CANTILEVERED TIMBER DECK

10+55 - (2) 6' WIDE BENCHES (TIMBER)

10+95 - RR TRACK SWITCH THROUGH TIMBER DECK

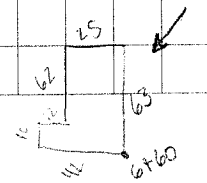
* TIMBER DECK IN GOOD TO FAIR CONDITION SEVERAL LOOSE AND WARPED BOARDS

7+68.5 - CLEAT
7+86.0 - LADDER (GOOD CONDITION)
7+90.5 - FENDER (P)
7+96.0 - CLEAT
7+99.5 - FENDER (P - LOOSE)
8+14.5 - LIFE RING
8+23.5 - CLEAT
8+45 - FENDER (P - TOP HALF MISSING)
8+50.75 - CLEAT
8+54.0 - FENDER (P)
8+63.0 - FENDER (P)
8+72.0 - FENDER (P)
8+81.0 - CLEAT / FENDER (P)
8+84.0 - CORNER OF WALL
8+99.0 - LADDER
9+09.0 - CLEAT ATTACHED TO WALL CAP CHANNEL
9+15.0 - CORNER OF WALL
- 3 TIMBER PILE CLUSTER
9+19.0 - CLEAT (36" ATT. TO WELDED BOX
9+34.0 - LOCAL SUBSIDENCE 24"L x 8"W x 6"D
- HOLE IN ASPHALT
9+39.5 - CLEAT ATT. TO WALL CAP CHANNEL

* OLD FENDER SYSTEM STARTS @ CORNER @ STA 8+84
* LOCAL SUBSIDENCE @ STA 9+00 16"L x 6"W x 1"D

DECK INSPECTION NOTES

STA 0+25 - 0+50 - PUDDLING
STA 0+95 - 1+01 - LIFE RAFT FRAME PROTECTED W/ BOLLARDS
STA 1+00 - MH 20' FROM TOW
STA 1+10 - CB 20' FROM TOW
- DRAIN MH 10' & 12' FROM TOW
STA 1+37 - ELECTRIC BOX 6' FROM TOW
STA 2+37 - SEWER MH ± 13' FROM TOW
STA 2+49 - CB ± 15 FROM TOW
- DRAIN MH @ 10' & 8' FROM TOW
* ASPHALT PATCH @ CORNER OF CB ± 15' L
STA 2+58 - MH 20' FROM TOW
STA 2+80 - 15' FROM TOW = ASPHALT PATCH ± 7' WIDE, 45' LONG
STA 6+10 - SEWER MH 22' FROM TOW
STA 6+20 - CB 18' FROM TOW
- DRAIN MH 13' & 8' FROM TOW
STA 6+15 - 12" x 12" ASPHALT MISSING ± 2' FROM TOW
STA 6+33 - MH ± 32' FROM TOW
STA 6+60 - ASPHALT PATCH

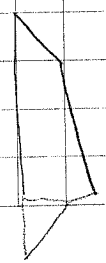


9+52 - 9+60 - GAP IN TIMBER CURB
9+70.5 - CLEAT ATT. TO WALL CAP CHANNEL
9+83.0 - CLEAT ATT. TO WALL CAP CHAN
9+91.5 - CLEAT ATT. TO WELDED BOX
10+06.0 - 10+11 - GAP IN TIMBER CURB
10.06.5 - STEEL BOLLARD (4" Ø)
10+11 - BOND IN WALL
10+13 - STEEL BOLLARD (8" Ø) TOP OF CURB
10+20.5 - STEEL BOLLARD (8" Ø) CURB
10+24, 10+40, 10+86 - 40" WIDE SIGN
10+28.5 - STEEL BOLLARD (8" Ø) CURB
10+36 - STEEL BOLLARD (8" Ø) CURB
10+43.5 - CNR TIMBER CANTILEVER WHARF
10+44.5 - STEEL BOLLARD (8" Ø) CURB
10+46.0 - 10+50.5 - GAP IN CURB
- ALUMINUM GANGWAY
3.5' CLEAR ± 30' L
10+51.5 - STEEL BOLLARD (8" Ø) CURB
10+52.5, 10+57.5, 10+62.5
- 5" X 5" X 9' TALL PVC POSTS
10+59.0 - STEEL BOLLARD (8" Ø) CURB

* STEEL BOLLARDS 8' O.C. (TYP)

DECK INSPECTION NOTES

STA 7+75 - CB 18' FROM TOW
- DRAIN MH 13' & 8' FROM TOW
STA 7+88 - SEWER MH 20' FROM TOW
STA 8+00 - MH 12' FROM TOW
STA 8+85 - PAY PHONE BOOTH (VERIZON)
STA 8+60 - ELECTRIC MH 45' FROM TOW
STA 8+75 - TELEPHONE MH 45' FROM TOW



(13)

10+95.0 - LADDER (FAIR TO POOR)

11+08.0 - 11+10.5 - ALUM. GANGWAY
- 30" CLEAR SPACING
- BOLTED TO TIMBER CURB
- ± 15' LONG
- ACCESS RESTRICTED W/ CHAIN

11+21.0 - CORNER OF WALL

11/13/08

Every 100' cleanup
Every 200' measure

Co-op/Fishermans Wharf

Station	Elevation	UT			CP
		Inner Flange	WEB	Outter Flange	
0+00	Mud	.525"	.345"	.535"	120.1 - 79.4
	Mid	.485"	.280	.485	99.8 (73.4 - 127.0)
	MLW	.525"	.315	.495	86.6
0+25	Mud				
	Mid				
	MLW				
0+50	Mud				
	Mid				
	MLW				
0+75	Mud				
	Mid				
	MLW				
1+00	Mud				
	Mid				
	MLW				
1+25	Mud				
	Mid				
	MLW				
1+50	Mud				
	Mid				
	MLW				
1+75	Mud				
	Mid				
	MLW				
2+00	Mud	.520"	.385"	.510"	No Reading
	Mid	.505"	.360"	.500"	109.4
	MLW	.490"	.295"	.470"	107.7 mV
2+25	Mud				
	Mid				
	MLW				
2+50	Mud				
	Mid				
	MLW				
2+75	Mud				
	Mid				
	MLW				
3+00	Mud				
	Mid				
	MLW				
3+25	Mud				
	Mid				
	MLW				

Readings in [illegible] - Note water covered in oil where we put silver silver chloride cell into water it was getting covered in oil which interferes with proper reading

Co-op/Fishermans Wharf

Station	Elevation	UT			CP
		Inner Flange	*WEB*	*Outter Flange*	
3+50	Mud				
	Mid				
	MLW				
3+75	Mud				
	Mid				
	MLW				
4+00	Mud	.540"	.335"	.520"	No Reading 16.8
	Mid	.535"	.345"	.505"	12.5
	MLW	.505"	.365"	.500"	17.5
4+25	Mud				
	Mid				
	MLW				
4+50	Mud				
	Mid				
	MLW				
4+75	Mud				
	Mid				
	MLW				
5+00	Mud				
	Mid				
	MLW				
5+25	Mud				
	Mid				
	MLW				
5+50	Mud				
	Mid				
	MLW				
5+75	Mud				
	Mid				
	MLW				
6+00	Mud	545"	.370"	.525"	
	Mid	.530"	.355"	.505"	.06 - 1.23 ✓
	MLW	.510"	.340"	.460"	.773 - 1.119
6+25	Mud				
	Mid				
	MLW				
6+50	Mud				
	Mid				
	MLW				
6+75	Mud				
	Mid				
	MLW				

Co-op/Fishermans Wharf

Station	Elevation	UT			CP
		Inner Flange	*WEB*	*Outter Flange*	
7+00	Mud				
	Mid				
	MLW				
7+25	Mud				
	Mid				
	MLW				
7+50	Mud				
	Mid				
	MLW				
7+75	Mud				
	Mid				
	MLW				
8+00	Mud	.550"	.385"	.525"	.663 - 1.224
	Mid	.545"	.370"	.565"	1.277 - .709
	MLW	.550	.370"	.525"	.602 - 1.062 Volts
8+25	Mud				
	Mid				
	MLW				
8+50	Mud				
	Mid				
	MLW				
8+75	Mud				
	Mid				
	MLW				
9+00	Mud				
	Mid				
	MLW				
9+25	Mud				
	Mid				
	MLW				
9+50	Mud				
	Mid				
	MLW				
9+75	Mud				
	Mid				
	MLW				
10+00	Mud	.520"	.335"	.515"	
	Mid				NO READINGS V
	MLW	.520"	.340"	510"	
10+25	Mud				
	Mid				
	MLW				

.822 - 1.185

Readings Volts

Co-op/Fishermans Wharf

Station	Elevation	UT			CP
		Inner Flange	*WEB*	*Outter Flange*	
10+50	Mud				
	Mid				
	MLW				
10+75	Mud				
	Mid				
	MLW				
11+00	Mud				
	Mid				
	MLW				
11+25	Mud				
	Mid				
	MLW				
11+50	Mud				
	Mid				
	MLW				
~~11+75~~ 21	Mud				
	Mid				
	MLW	.510"	.370"	.505"	

11/13/08 New Bedford Harbor

PDI, NBS, RPY
left office 6:20 Am
arrive on site 7:30 Am

RGF - left 7:00 Am
arrive site 7:30 AM

met w/ N.B. Harbor personnal
Pare Eng.

~~Station~~ Fisherman's Wharf
Set up dive equipment

Diver in @ 9:45 start @ Sta 0+00
visibility ≈ 8'
Sta 0+00
1/4 black by product
Surface wavy small ~~pitting~~

halt diving 9:50 for barge docking
for 5 minutes

Diver in @ 1530

@ Sta 11+21

LEVEL III .505 outside fl
.370 web
.510 inside fl

Sta 10+44 to 11+21 1½" hole on 1 outside
entire length flange 5' from Top (mid tide
backfill exposed

6'-7' of sheeting exposed
from MLW to 3' above MHW

bulkhead has exterior wale
w/ tie rods.

Sta 10+78 6' φ conc pipe a headwall
top of pipe 12"± below MLW

Conc hard, max 1/8" soft

Sta 10+39 to 10+44 @ corner
Top fender horiz wale loose
& hanging

Sta 9+15 - 10+44 (PDI Diver)
sheet piling not coated

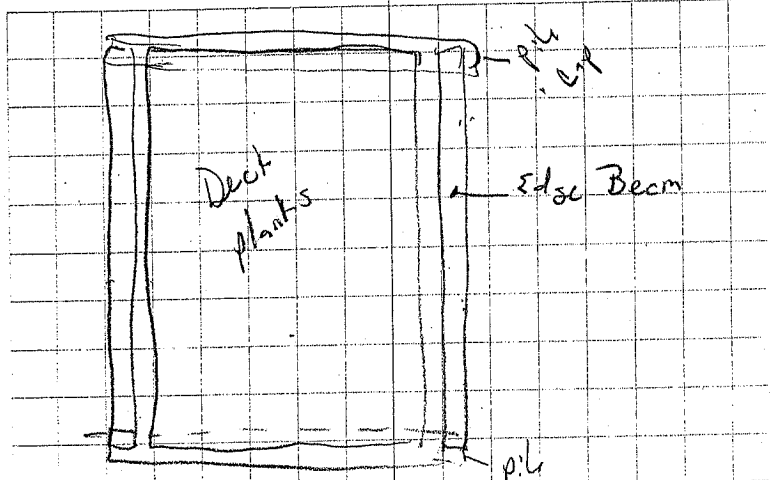
PDI, NBS, RPI Returned
to office at 6:30pm on 11/13/

11/14/08 PDI, NBS, RPI
to New Bedford at 6:30 AM
~~Bradford~~ ~~PDI~~
arrived at 7:30

11/14/08 RFG & RJW on site 7am

Divers	RJW	10:00 in
	PDI	12:30 out
	RFG	Notes
Divers	RJW	2:30 in
	PDI	4:10 out

11/14/08 ~~5:00 6:30~~ 5:00 off site
1:00 Ride Back to office



CHILDS ENGINEERING CORPORATION
Waterfront and Structural Engineering
BOX 333, MEDFIELD, MA 02052

JOB FISHERMAN'S WHARF N.B.
SHEET NO. 1 OF
CALCULATED BY RGF DATE 11/13/08
CHECKED BY DATE
SCALE

Sta 0+00 Diver IN @ 9:45
visibility ≈ 8'
steel - ¼" corrosion by-product
@ ML surface wavy w/ small pitting 1/16" - 1/8" deep + diameter

No coating on steel
Steel above MHW looks good - w/ surface corrosion
ladder @ MLW severely corroded - located @ Sta - 0+05' ±

- small hole on outside F1 @ midheight - 1½" ϕ - steel thick on edges - may be bolt hole for fender.

- 0+05 - fender lower wale - 3' dia pipe - lower wale cut for pipe
vertical wale bolts @ 2' above lower wale for fender system
bolt heads in good condition

- no lower fender wale Sta 0+20 to 0+30
studs for fastening broken off
Sta 0+40 to Sta 1+72.5 lower fender wale missing

- Sta 1+00 LTI
@ ML Red coating usable - good condition
Primer ↑ 75% intact, steel smooth - good condition

Mid - same as ML
MLW - same as below
Corrosion by-product on exposed steel w/ ⅛" max. pitting

abnt of fishing debris on bottom

Sta 1+42 vertical fender loose
+ typical timbers in good condition underwater
above tidal zone ≈ 1" WEARING
1+55 vertical fender broken, studs broken

Sta 1+67 ladder has no rungs below low wale
not connected below wale

Timber corner dolphin - 7 timber piles Sta 1+72.5
SS wire rope loose & on ML - was @ low wale
2 wraps at 4' below deck & 8' below
deck good condition

- sheet pile wale bolts - appear in good condition

Sta 2+00 black coating w/ Red primer @ ML
steel good cond.
Mid - coated steel w/ PRIMER - steel good

MLW - outer fl has 1½"φ hole w/ bolt, 1' below wale.
steel wavy ⅛" w/ ⅛" by-product
most coating missing - 80% missing

U/W Photos #1-2 Outter fl - bolt hole w/ bolt MLW
#3 - Inner fl
#4,5,6 Mid + Outter fl & Web
#7,8,9,10 @ ML inner & outter fl.

Sta 2+54 to 2+80 lower fender wale miss, w/ bolts missing

Sta 2+53 vert. fender loose, top 3' abrated 2"
only attached @ top

Sta 2+72 vert. fender loose only attached @ top

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JOB
SHEET NO. 3 OF
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Sta 3+00 LII
steel coated - black + Red primer -
@ ML 60% Black coating intact - steel smooth good cond.
Mid same as ML
MLW - 1½"ϕ bolt hole. Steel around hole - good
- steel
coating 50% intact black coating
Red primer intact

Red primer typically intact

Sta 4+05 LII Steel in good condition - Black coating 60% intact
Red primer - 30% intact

U/W Photo 3 Photos @ MLW #11, 12 & 13
@ mid #14-16
@ ML #17, #18

Ladder @ 4+15 - no lower Rungs. Bottom 4 Rungs missing.

Diver out 12:05
Move Station
Diver in 13:05

Sta 4+48 Vert fender piece loose no lower walk @ Sta 4+15 to 5+98

Sta 4+56 Vert fender loose 2 bottom bolts/studs missing
Sta 4+75 loose vert. fender bottom 2 stud miss. Rubbing on steel
4+84 " Coating miss
4+93 "

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JOB
SHEET NO. 4 OF
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Sta 5+00 LII

- ML - typical - black coating 60% intact
  Red primer 80% intact steel good condition
- Mid - same as ML
- MLW - same as ML
- above MLW steel wasting, pits ⅜" deep max × ¼" ϕ max
- sheet pile bolts - good condition - ~~Coating 50% to ML~~

Sta 5+00 to 5+08 - fender system missing

Sta 5+02 1½" hole in sheet @ low fender wale
fill visible behind

Sta 5+08
Corner dolphin - Top wrap attached other wraps, below, are loose w/ only 2 wraps left out of ≈7 wraps / wrap
8 timber piles

Sta 5+27 vert. fender loose, bottom 2 studs/bolts missing

Sta 5+50 - same as 5+27, bottom of fender wearing into sheetpile coating

Sta 6+00 LIII Black coating 75% intact - steel good
Primer - good 90% intact

U/W Photos #19 + #20 Inner + outer fl ML
#21 + 22 @ mid -
23, 24, 25 @ MLW inner, web, outer fl.

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JOB
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- Because of boat impact lower fender wale down
  Sta 6+00 to 6+50

Sta 6+50 to 7+50 lower fender wale miss

~~Steel @ 6+50~~

Steel in tidal zone - no coating
pitted ⅛ - ¼" deep x 6 ½"
steel surface wavy

Sta 6+75 2 sheets w/ calcium deposits - @ 8' below lower fender wale to mudline

ladder @ 6+98 missing bottom 3 Rungs

Sta 7+00 Level II
@ ML steel smooth 80% Red primer intact
50% black coating intact

Mid-height - same

MLW - same w/ 40% black coating intact

Sta 8+00
steel good same condition as before w/ coating & smooth steel

Sta 7+98 - 8+08 lower fender wale missing

Sta 8+27 to 8+37 lower fender wale missing

Sta 8+86 ¼ - ⅜" of corrosion by-product water ≈ 8' deep from wale

Power Out 15:00

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Diver in @ 1530
Sta 9+00 LII

Steel & coating Same as earlier - good steel
calcium build-up on sheets ⅛" thick

Lower wale long - last 12" hollow + Split

9+05 - low long wale hollow 24"

9+14 - low long wale hollow 12"

3 pile cluster on corner - no wire wrap, bolted @ top
piles in good condition

Sta 9+16 - low long wale bolt hole elongated to 4ϕ
due to marine borer or abrasion

Sta 9+35 to 9+75 low long wale severely deteriorated due to marine borer ±50% section missing

Sta 9+55 low long wale 2' marine borer damage - hollow at end

Sta 10+00 LIII ML to MLW ≈ 4'

Diver Out 16:10

See Field Book #288 Page 15 for notes
Sta 10+00 to Sta 11+21