PARE PROJECT NO. 08216.00

# INSPECTION REPORT
# POPE'S ISLAND MARINA
## NEW BEDFORD WATERFRONT
## FACILTIES INSPECTIONS
## NEW BEDFORD, MASSACHUSETTS


MARCH 2009

PARE CORPORATION

## EXECUTIVE SUMMARY

Pope's Island Marina is a timber "T-Pier" structure, provided with a system of floating docks. The marina opened in 1993 and provides 198 boat slips to the public.

Pare Corporation and Childs Engineering Corporation conducted the inspection of the site on November 20 & 21, 2008. In general, Pope's Island Marina pier structure was found to be in **Good** condition. Concerns and deficiencies at the site include corrosion of the low water connection hardware, minor rotting of the timber decking, wearing of the fender system, and missing and deteriorated wave fence members.

High priority repairs include the replacement of rotted decking, repairing the wave fence, and removal and replacement of the low water connection hardware. The opinion of probable cost for this work is in the order of $168,000.

Low priority repairs include the cleaning and treating of the timber decking, installation of UHMW rub rails along the fender piles, repairing an area of subsidence at the intersection of the main pier and shoreline, and repairing damaged pvc utility lines along the underside of the pier. The opinion of probable cost for this work is in the order of $174,000.

## TABLE OF CONTENTS

# 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 Pope's Island Marina pier structure 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 existing conditions at 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 pier and appurtenant structures, and to provide information that will assist in both prioritizing repair needs and planning/conducting maintenance and operation. The floating docks and guide piles were not included in the scope of the inspection.

The investigation is divided into three parts: 1) provide a description of the facility, including 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 costs.

# SECTION 2 DESCRIPTION OF SITE

*2.1 - Site Location*

Pope's Island Marina is comprised of a approximately 450 linear foot fixed timber main pier and an approximately 810 linear foot fixed timber tee pier. It is located off of US Route 6 between New Bedford and Fairhaven on the southern shore of Pope's Island as shown in Figure 1 – Locus Plan.

*2.2 - Facility Description*

The structure was built in 1993 with recent repairs completed in 2006. The facility is a public marina owned and operated by the New Bedford HDC. The timber pier and floating concrete finger docks create 198 seasonal boat slips.

The 450 foot long main pier is supported by 46 pile bents, with each bent comprised of three 12 inch timber piles and 4 inch by 8 inch cross braces. The timber pile caps measure 10 inches by 12 inches and support 4 inch by 12 inch timber stringers spaced approximately 18 inches on

center. The decking is comprised of 3 inch by 10 inch timber boards, with 42 inch high timber handrails on both sides.

The 810 foot long tee pier is supported by 84 pile bents, with each bent comprised of three 16 inch diameter timber piles and 4 inch by 8 inch cross braces. The timber pile caps measure 10 inches by 12 inches and support 4 inch by 12 inch timber stringers spaced approximately 18 inches on center. The decking is comprised of 3 inch by 10 inch timber boards, with 42 inch high timber handrails on the northern side of the tee pier and a 4 inch by 12 inch timber curb on the southern edge of the deck. The Tee Pier is protected with 12 inch diameter timber fender piles spaced 10 feet on center that extend approximately 42 inches above the deck elevation. A wave attenuator is bolted to the support piles on the southern face of the tee pier and is comprised of ten 3 inch by 8 inch timber vertical boards with 6 inch spacing and supported by three 4 inch by 8 inch timber stringers. The top of the wave attenuator is just below the pile cap and the bottom of the attenuator extends approximately 2.5 feet below the mean low water elevation. Timber ladders are located at various locations along the face of the tee pier, extending approximately 36 inch above the deck elevation.

A total of 6 aluminum gangways lead from the main pier down to floating concrete docks. Concrete finger floats provide docking space at each of the floating main docks. All of the main docks and finger floats are supported with timber guide piles. The inspection of the aluminum gangways, concrete main floats, concrete finger floats, and timber guide piles is beyond the scope of this inspection.

According to available plans, improvements were made to the pier structure in 2002 including replacement of the water lines and proposed installation of new spur piles beneath the tee pier. The spur piles were never installed, and additional repairs to the structure were completed in 2006. The repairs included the replacement of damaged finger floats, installation of rub rails along the concrete walkway floats, and the installation of 10 new timber guide piles.

Existing drawings pertaining to the facility were located in the HDC Office. Prior inspection reports have not been located at the time of this writing.

## SECTION 3 EXISTING CONDITIONS

### *3.1 - General*

Topside and underwater inspections were carried out on November 20, 2008. For reference purposes, a baseline was established during the inspection for each part of the pier structure. Along the deck of the main pier, Station 0+00 was located at the northern end of the pier at it's intersection with the shoreline and extended to Station 4+52 at the southern end of the main pier at its intersection with the tee pier. Along the deck of the tee pier, Station 0+00 was located at the eastern end of the pier and extended to Station 8+10 at the eastern end of the tee pier. Observations were made in relation to their location along the baseline as appropriate and as noted herein.

### *3.2 Observed Conditions - Topside*

The topside of Pope's Island Marina Main Pier was observed to be in generally good condition. Minor deficiencies include several locations of observed timber rot along the decking, as well as a small area of subsidence in the bituminous asphalt at its intersection with the main pier. At Station 1+60, the timber deck board was observed to have an area of rot that had been filled with a small wooden filler strip, as shown in Photo No. 3 in Appendix A - Photographs. A similar condition was observed at Station 3+50, but the rotted space measuring approximately 1.5 inches wide and 36 inches long had not been filled as shown in Photo No. 4 in Appendix A - Photographs. The small area of subsidence was observed at Station 0+00 it the intersection of the main pier and the shoreline. The depression in the bituminous pavement measured approximately 3 inches wide by 12 inches long and was approximately 2 inches deep. Further inspection of the shoreline was beyond the scope of this inspection.

The topside of Pope's Island Marina Tee Pier is in generally good condition. Minor deficiencies include observed timber rot along the decking, some evidence of mildew growth, and minor damage to the timber curb. At Station 0+05 the timber deck board at the location of a timber ladder showed signs of rot on the southern edge, adjacent to the ladder. At Station 4+55, minor damage to the timber curb was observed with some cracking and splitting noted. Typically along the entire length of the tee pier and along the curb, the timber shows signs of mildew growth. This condition is a minor deficiency, but may become slippery during wet conditions.

A timber fender system consisting of 12 inch diameter timber fender piles spaced 10 feet on center was observed along the southern face of the tee pier only. The above water portion of the timber fender system was in overall good condition. Typically the piles have significant wearing along the waterside face between mean low water and just below the bottom of the pier deck. Connecting bolts through the piles are countersunk, however some of the piles have worn down to the bolt head.

The wave attenuator (wave fence) is bolted to the southern face of the tee pier, and helps to protect the vessels and floating concrete docks from wave action. The wave fence is comprised of 3 inch by 8 inch vertical boards, with 6 inch spacing. The above water portion of the wave attenuator appeared to be in to poor condition, with many of the boards were observed to be loose, broken, or missing. Approximately 10% of the boards comprising the wave fence are missing. Specific locations of loose, broken, or missing boards are available in the underwater inspection notes in Appendix E – Field Notes.

On the underside of the main pier and tee pier, PVC pipes providing sewer and electrical utilities pass between the timber stringers. A 4 inch diameter PVC pipe hangs with galvanized hangers beneath the timber pile caps. Some of the connections along these raceways have become loose or separated. On the tee pier at approximately Station 4+05, a small wooded shed acts as a pump house for these utilities. Along both the main pier and tee pair structures, fire extinguishers and fire alarms were observed along the light posts and handrails. Water standpipes were also observed at several locations. Along the main pier, 5 electrical generator boxes were observed. The generators were located within wider sections of the pier at Station 1+57, 2+87, and 4+32.

Along the southern edge of the tee pier, six power pedestals were mounted onto the timber deck approximately 150 feet on center, providing electric power and potable water to vessels docked at the pier.

*3.3 – Observed Conditions – Underwater*

For reference purposes during the underwater inspection, notes were taken referencing numbered pile bents along the main pier and tee pier. Pile bent numbering along the main pier started with Bent No. 1 at the shoreline and ended at Bent No. 46 at the intersection of the main pier and tee pier structures. Pile bent numbering along the tee pier began with Bent No. 1 at the eastern end of the tee pier and ended at Bent No. 84 at the western end of the tee pier.

The underwater inspection of the timber pier structure indicated an overall satisfactory condition. Conditions were similar along the main pier and tee pier structures. Minor deficiencies include evidence of marine borer activity, severely corroded low water connection hardware, and loose, broken, or missing timber members along the wave attenuator.

The timber piles were observed to be in overall good condition and appeared new, with marine growth typically observed along the underwater portion of the piles. Most of the timber bracing was observed to be in good condition, however there is a small percentage of bracing that was observed to have damage due to the presence of marine borers at the low water connection. Typically the low water connection hardware was observed to be severely corroded. During the inspection of the wave attenuator, approximately 10% of the timber members were observed to be loose, broken, or missing.

## 4.0 – Structural Condition Assessment

*4.1 General*

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

4.2 *Structural Condition Assessment*

Based upon the visual inspection of topside and underwater structures, Pope's Island Marina is considered to be in generally good condition. No severe rot or deficiencies of the timber piles were observed, with no reduction in pile section noted during the underwater inspection. Some of the timber cross bracing has become detached or is likely to become detached due to the condition of the lower hardware.

## 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 these 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 cost 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 final design has not been performed, and actual construction costs may be somewhat less or considerably more than indicated, due to fluctuations in the market.

5.2 – High Priority

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

Remove and replace rotting timber deck boards. Failure to repair damaged areas may cause an unsafe condition. The opinion of probable construction cost for this work is approximately $2,000.

Repair the wave attenuator. Repairs should include removal and replacement of any rotted timber stringers, replacement of broken vertical members, reconnection of loose vertical members, and replacement of missing members. Because of the protection provided by the attenuator, critical damage to floating docks may occur if repairs are not undertaken quickly. The opinion of probable construction cost for this work is approximately $18,000.

Remove and replace underwater connection hardware. Failure to repair the connections will render the timber cross bracing ineffective, reducing the structural capacity of the pier and possibly creating an unsafe condition. The opinion of probable construction cost for this work is approximately $70,000.

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.

Powerwash the timber decking and handrails along the main pier and tee pier structures. Waterproof sealant should be applied to all untreated timber after a thorough cleaning.

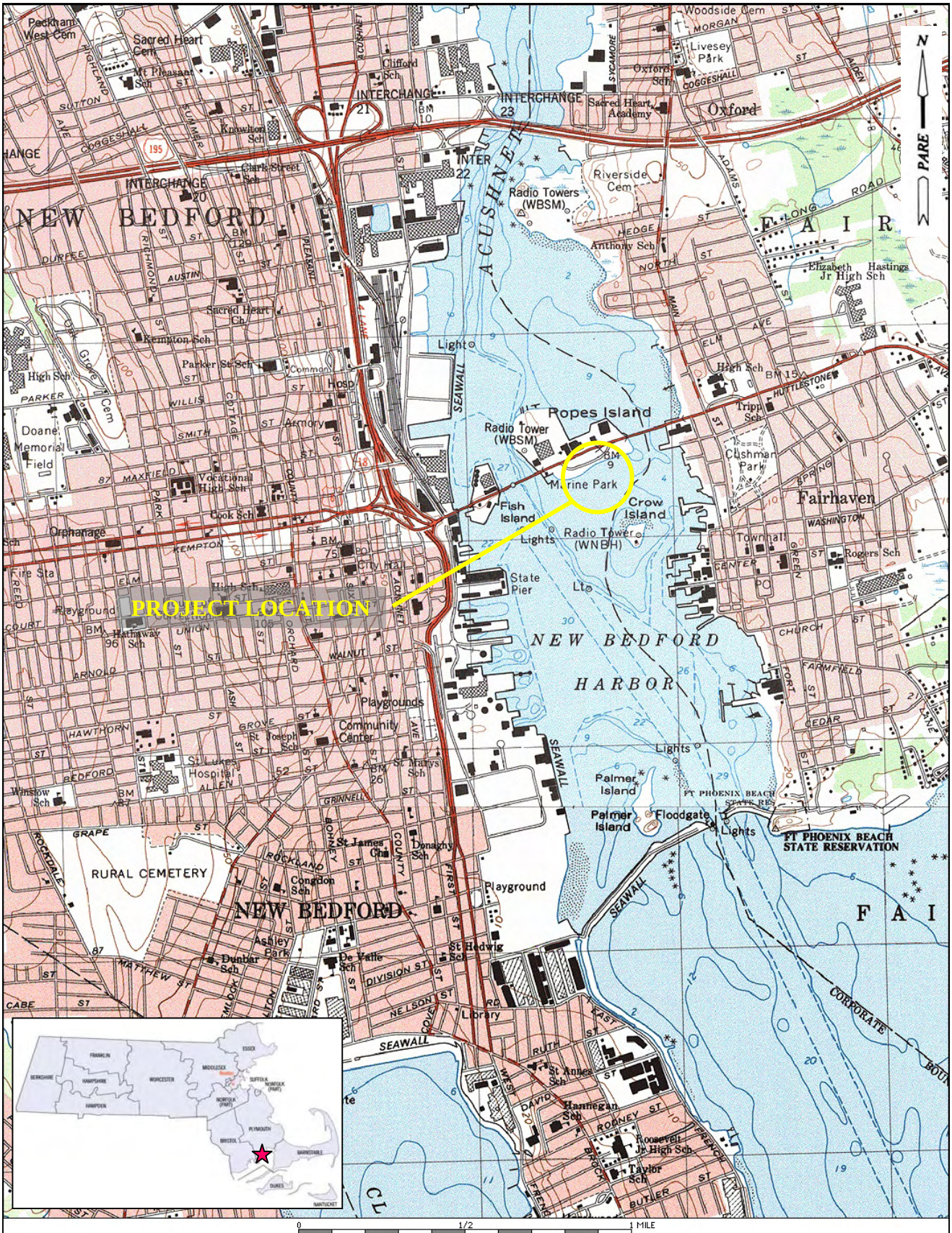
Sealing the timber is not only asthetically pleasing, it also prolongs the life of the structure by helping to protect against rot and mildew growth. The opinion of probable construction cost for this work is approximately $75,000.

Install UHMW rub rails to the face of the fender pile. The UHMW is more durable than the timber and will extend the life of the piles The opinion of probable construction cost for this work is approximately $25,000.

Backfill and regrade the area of subsidence at the intersection of the main pier and bituminous shoreline. Further investigations may be necessary to determine the cause of the depression. The opinion of probable construction cost for this work is approximately $25,000.

Repair the PVC raceways on the underside of the main pier. If not repaired the utilities in the pipes may become damaged, limiting or preventing service. The opinion of probable construction cost for this work is approximately $30,000.

***Figures***
*Pope's Island Marina*
*New Bedford, Massachusetts*




0 1/2 1 MILE
0 1000 FEET 0 500m 1000m

Printed from TOPO! ©1999 Wildflower Productions (www.topo.com)

PARE CORPORATION

# POPE'S ISLAND MARINA

NEW BEDFORD, MASSACHUSETTS

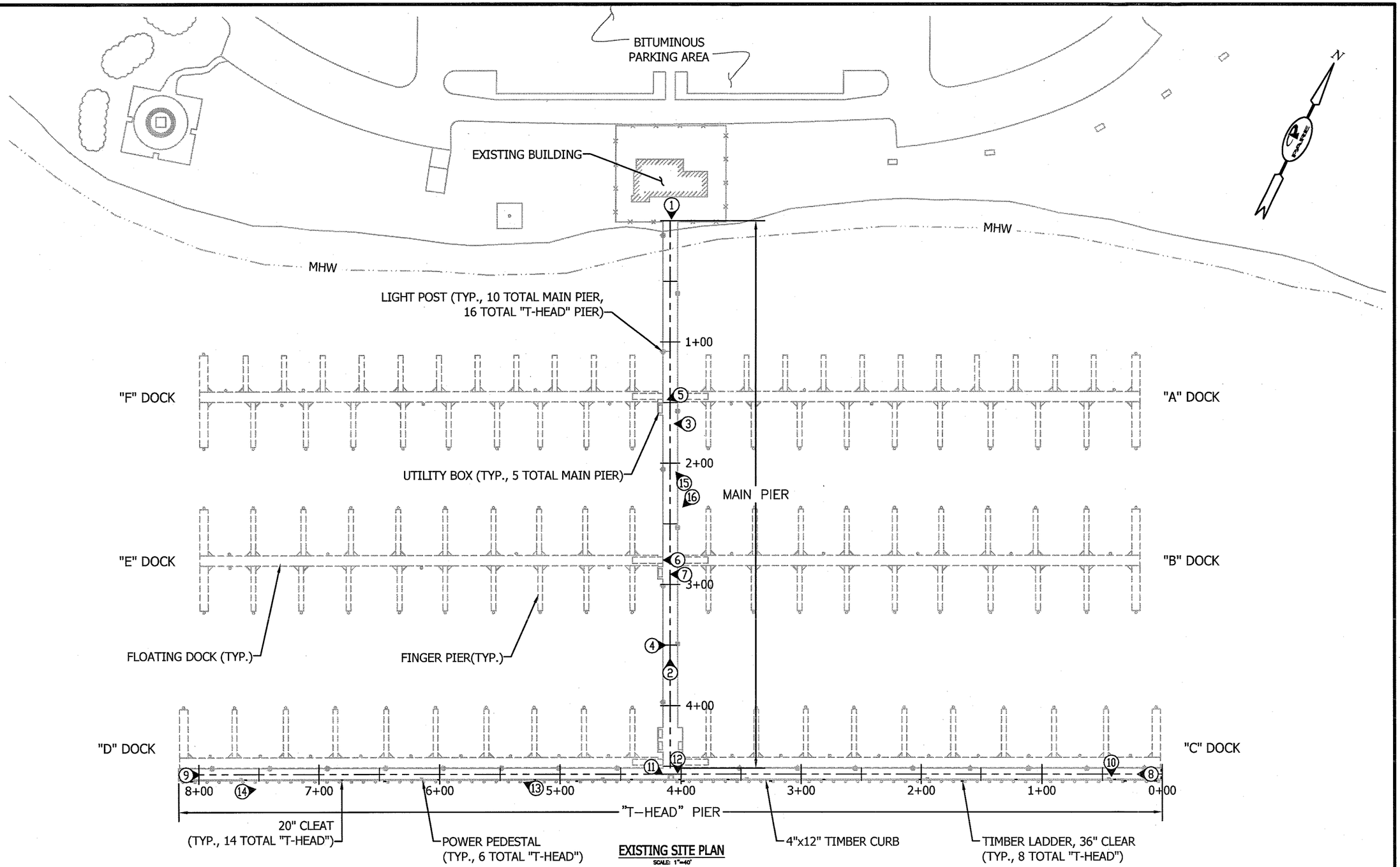
NEW BEDFORD HARBOR DEVELOPMENT COMMISSION

NEW BEDFORD WATERFRONT FACILITY INSPECTIONS

NOVEMBER 2008

FIGURE 1

LOCUS PLAN




**EXISTING SITE PLAN**
SCALE: 1"=40'

NOTES:

1. CONDITIONS INSPECTION PERFORMED BY PARE PERSONEL ON NOVEMBER 21, 2008. INSPECTION OF FLOATING DOCKS, FINGER PIERS, AND GUIDE PILES WAS BEYOND THE SCOPE OF THIS PROJECT.
2. UNDERWATER CONDITION INSPECTION PERFORMED BY CHILDS ENGINEERING CORP. ON NOVEMBER 20, 2008.
3. SITE PLAN BASED UPON DRAWING ENTITLED "MARINA IMPROVEMENT PLAN – MARINA IMPROVEMENT PROJECT" BY VINE ASSOCIATES, INC. DATED FEB. 2002, AND CONDITIONS OBSERVED DURING THE INSPECTION.

LEGEND:

- (8) ▶ APPROXIMATE PHOTO LOCATION AND DIRECTION
- 2+00 — BASELINE/STATION
- CLEAT
- LADDER
- LIGHT POST (4x6 TIMBER)

HALF SIZED

PARE
PARE CORPORATION
ENGINEERS - SCIENTISTS - PLANNERS
10 LINCOLN ROAD, SUITE 103
FOXBORO, MA 02035
508-543-1755

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

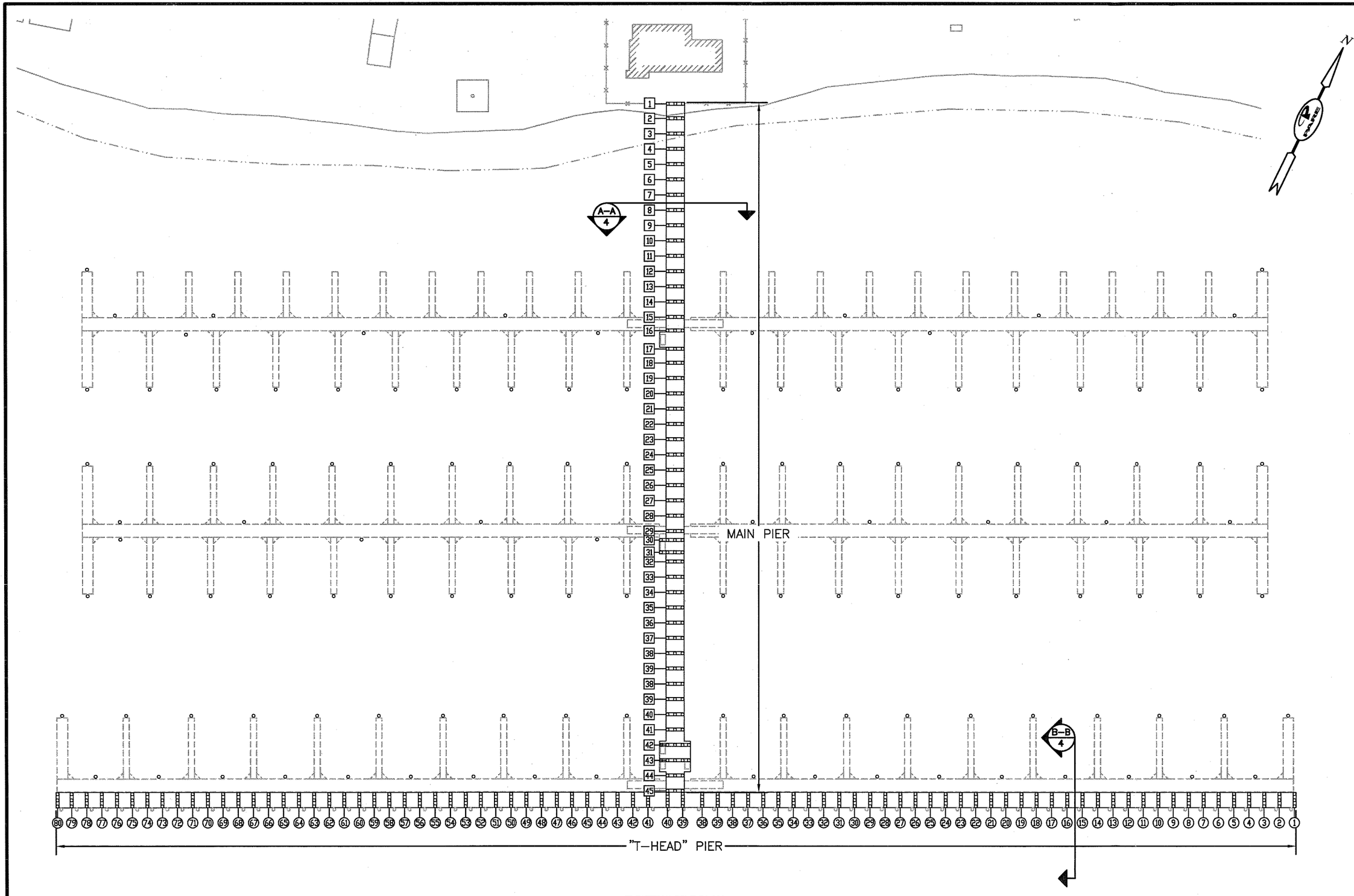
# NEW BEDFORD WATERFRONT FACILITIES INSPECTIONS
## POPE'S ISLAND MARINA
NEW BEDFORD HARBOR DEVELOPMENT COMMISSION
NEW BEDFORD, MASSACHUSETTS

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




EXISTING PILE PLAN

SCALE: 1"=30'

HALF SIZED

PARE

PARE CORPORATION
ENGINEERS - SCIENTISTS - PLANNERS
10 LINCOLN ROAD, SUITE 103
FOXBORO, MA 02035
508-543-1755

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

# NEW BEDFORD WATERFRONT FACILITIES INSPECTIONS

## POPE'S ISLAND MARINA

NEW BEDFORD HARBOR DEVELOPMENT COMMISSION
NEW BEDFORD, MASSACHUSETTS

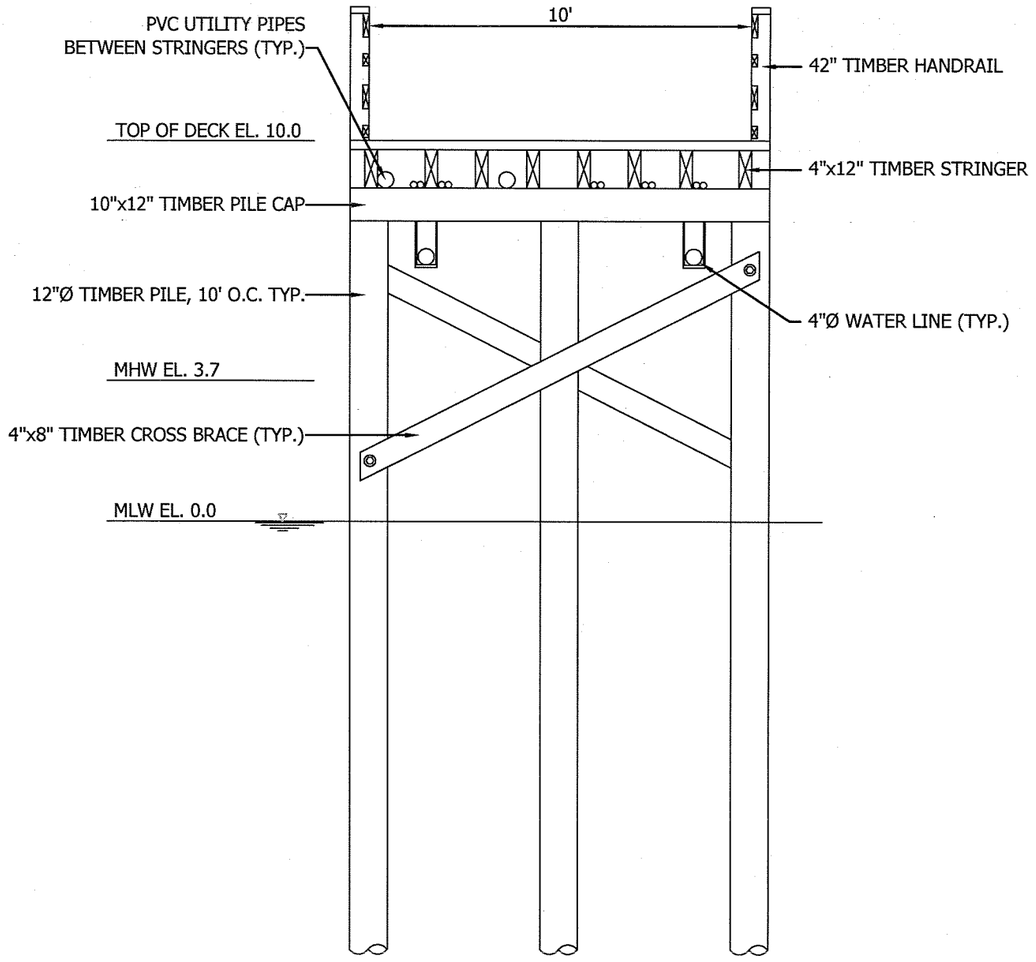
REVISIONS:

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

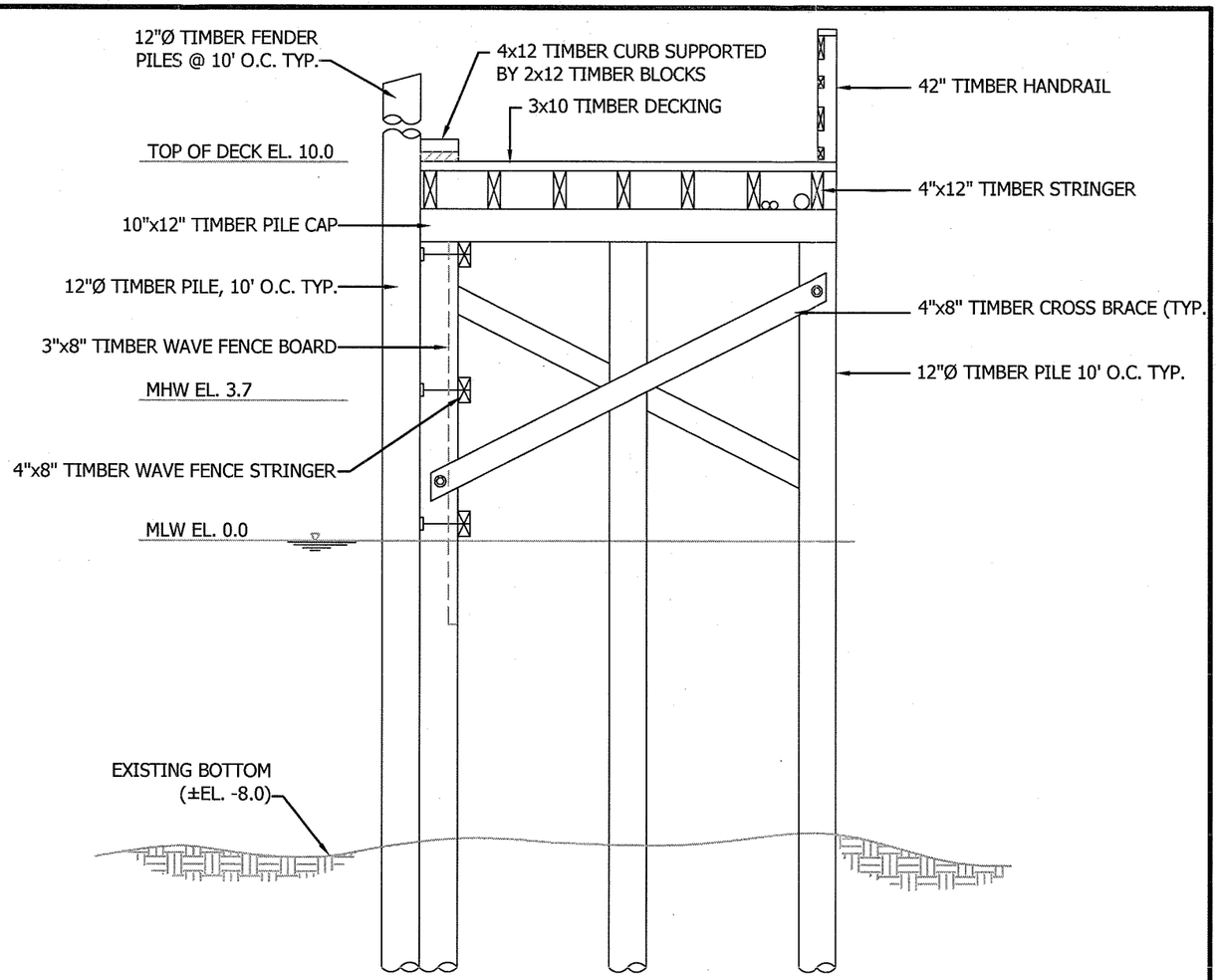
DRAWING TITLE:
EXISTING PILE PLAN

FIGURE NO.:
3

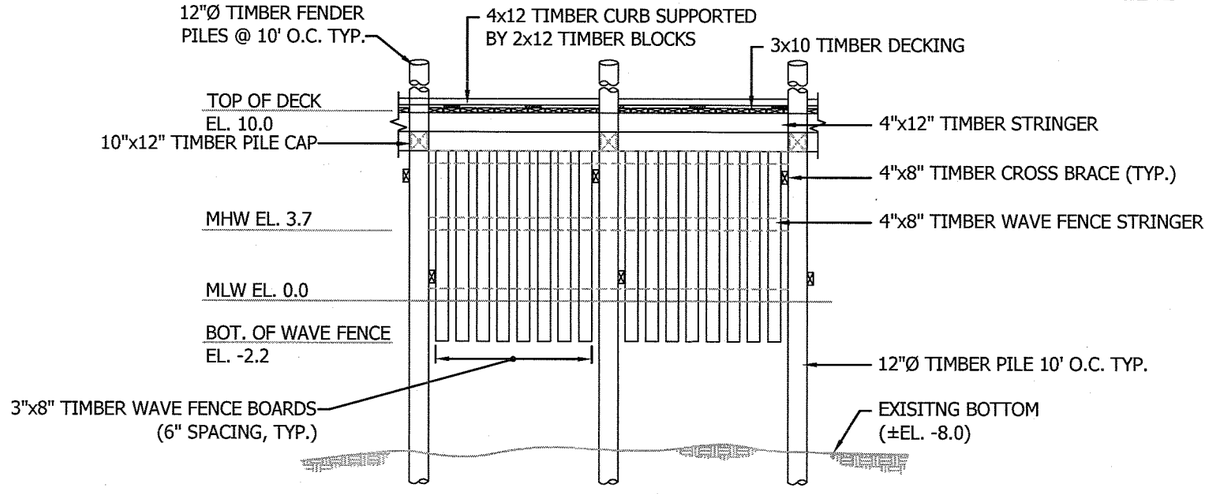
SHEET NO. 1 OF 1




MAIN PIER SECTION A-A
SCALE: 1"=2'




"T-HEAD" PIER SECTION B-B
SCALE: 1"=2'




WAVE FENCE ELEVATION
SCALE: 1"=4'

HALF SIZED

PARE
PARE CORPORATION
ENGINEERS - SCIENTISTS - PLANNERS
10 LINCOLN ROAD, SUITE 103
FOXBORO, MA 02035
508-543-1750

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

# NEW BEDFORD WATERFRONT FACILITIES INSPECTIONS
## POPE'S ISLAND MARINA
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 SECTION AND DETAILS

FIGURE NO.: 4

SHEET NO. 1 OF 1

***Appendix A***
***Photographs***
*Pope's Island Marina*
*New Bedford, Massachusetts*

Photo No. 1: Overview of the timber Main Pier.

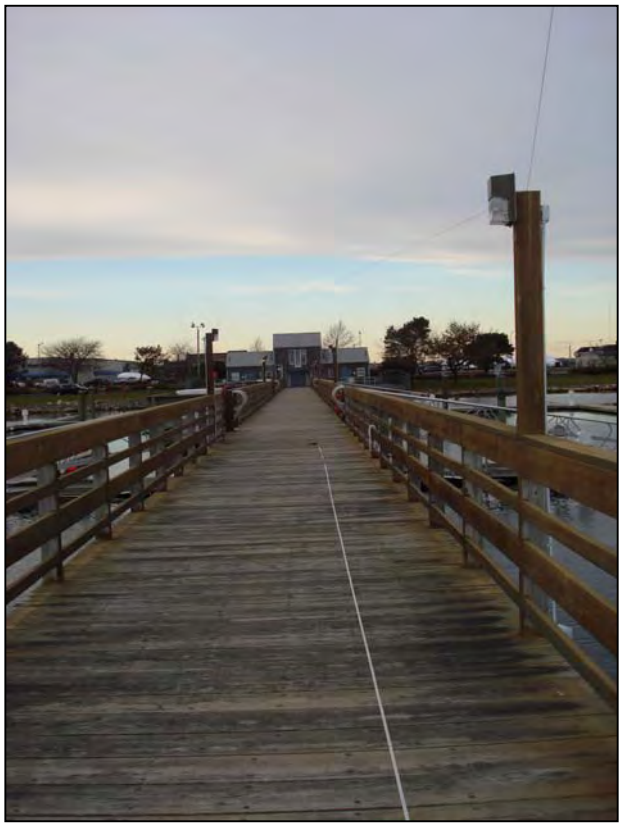


Photo No. 2: Overview of the timber Main Pier.

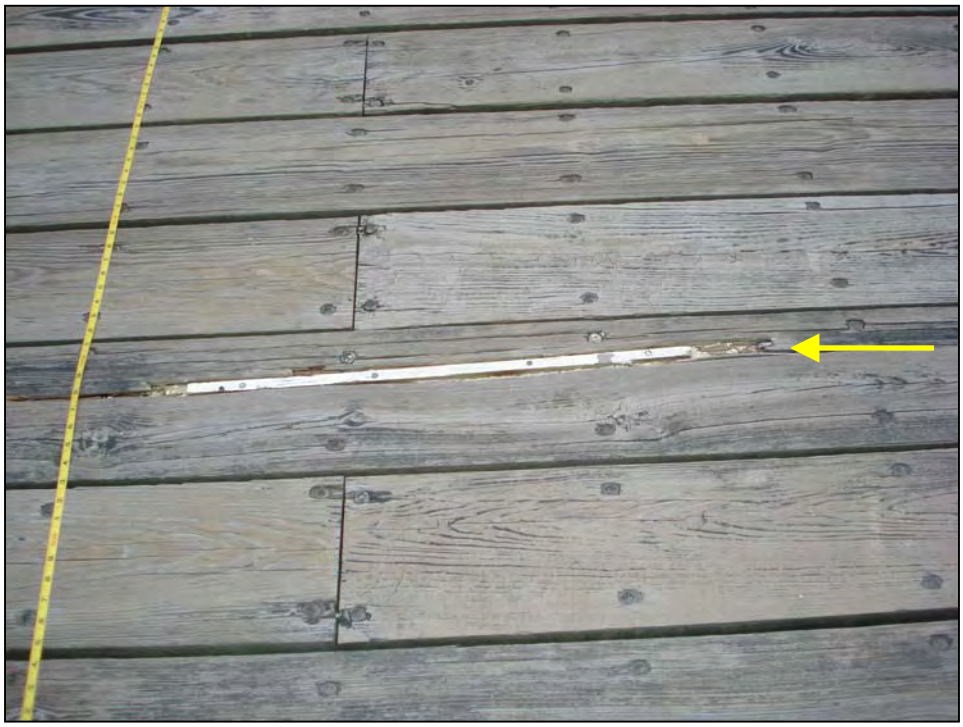


Photo No. 3: Rotted timber deck with filler piece at Station 1+60.

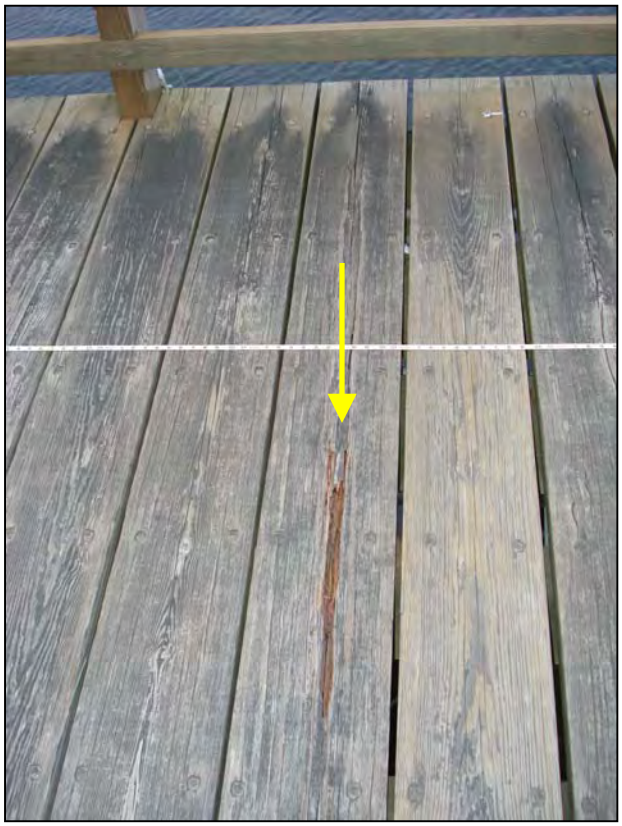


Photo No. 4: Rotted timber deck at Station 3+50.

Photo No. 5: Typical water standpipe along the pier.

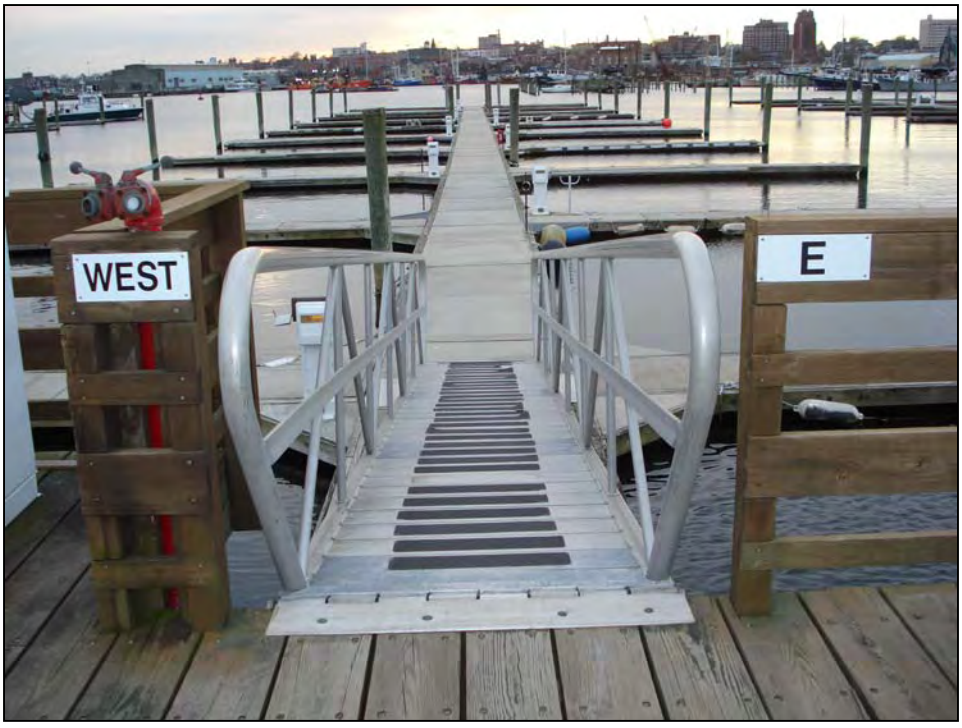



Photo No. 6: Typical gangway to floating docks.


Photo No. 7: Typical power generator along the pier.

Photo No. 8: Overview of the timber Tee Pier looking west.

Photo No. 9: Overview of the timber Tee Pier looking east.

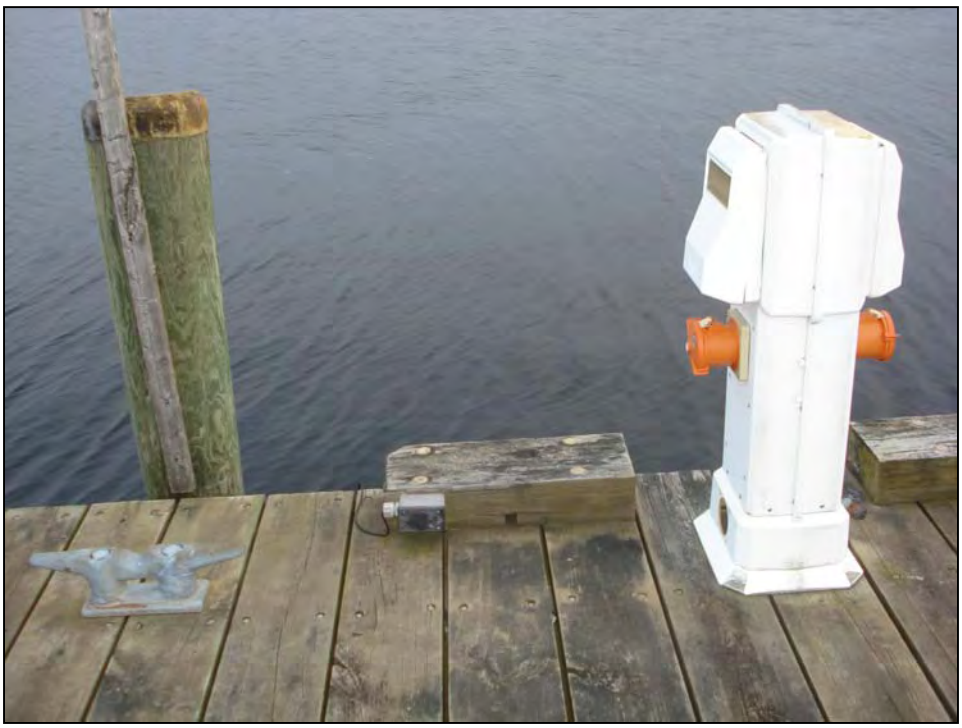


Photo No. 10: Typical power pedestal along the Tee Pier.

Photo No. 11: Utility shed on the Tee Pier at Station 4+03 to Station 4+08.

Photo No. 12: Hose rack adjacent to the utility shed.

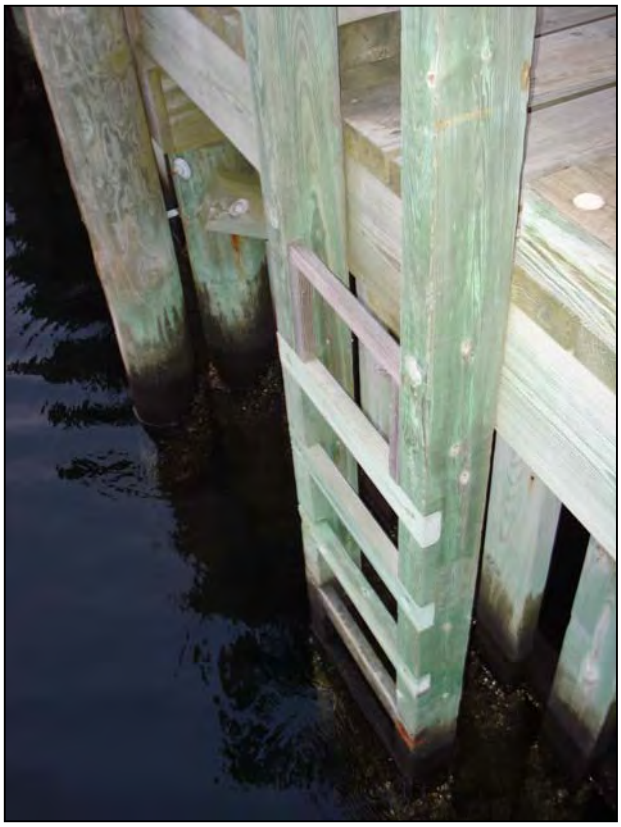


Photo No. 13: Typical timber access ladder.

Photo No. 14: Overview of the timber fender piles along the Tee Pier.

Photo No. 15: Overview of the underside of the main pier. Note PVC utility raceways between the timber stringers.

Photo No. 16: Damaged utility raceway along the underside of the main pier.

Photo No. 17: Typical hardware underwater. (Photo by Childs Engineering Corp.)

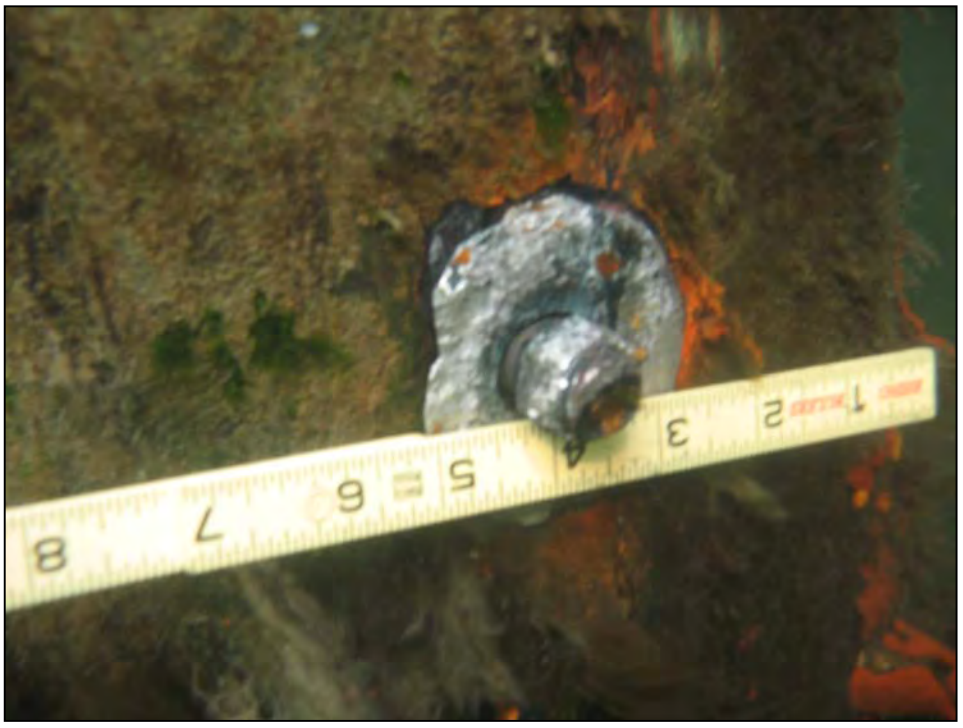


Photo No. 18: Typical low water connection hardware. (Photo by Childs Engineering Corp.)

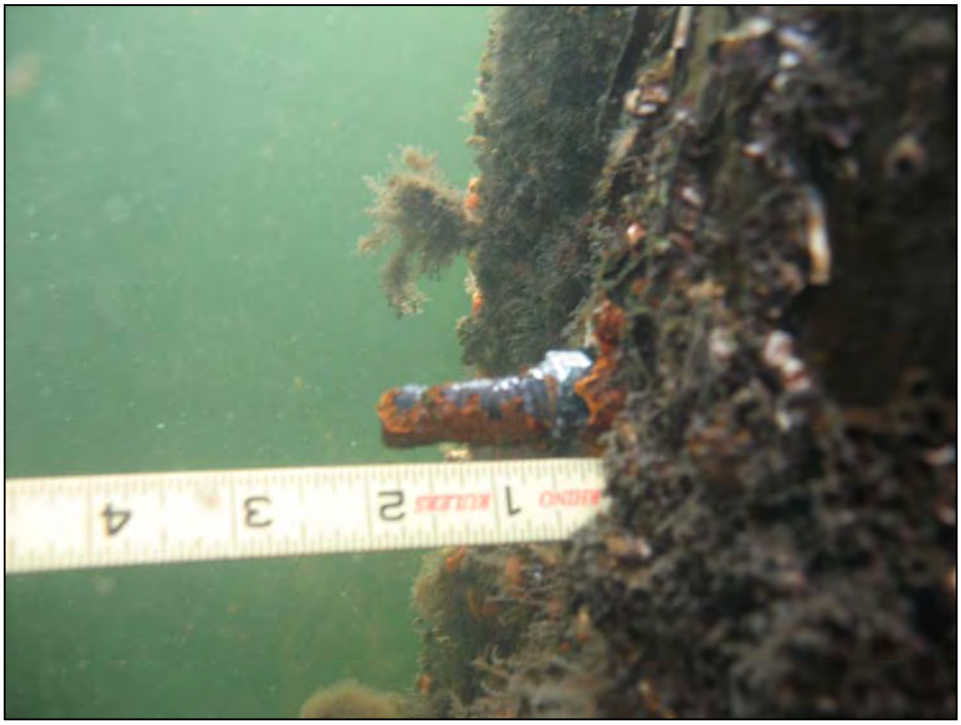



Photo No. 19: Corroded underwater connection hardware. (Photo by Childs Engineering Corp.)

Photo No. 20: Overview of the underwater portion of timber piles. (Photo by Childs Engineering Corp.)

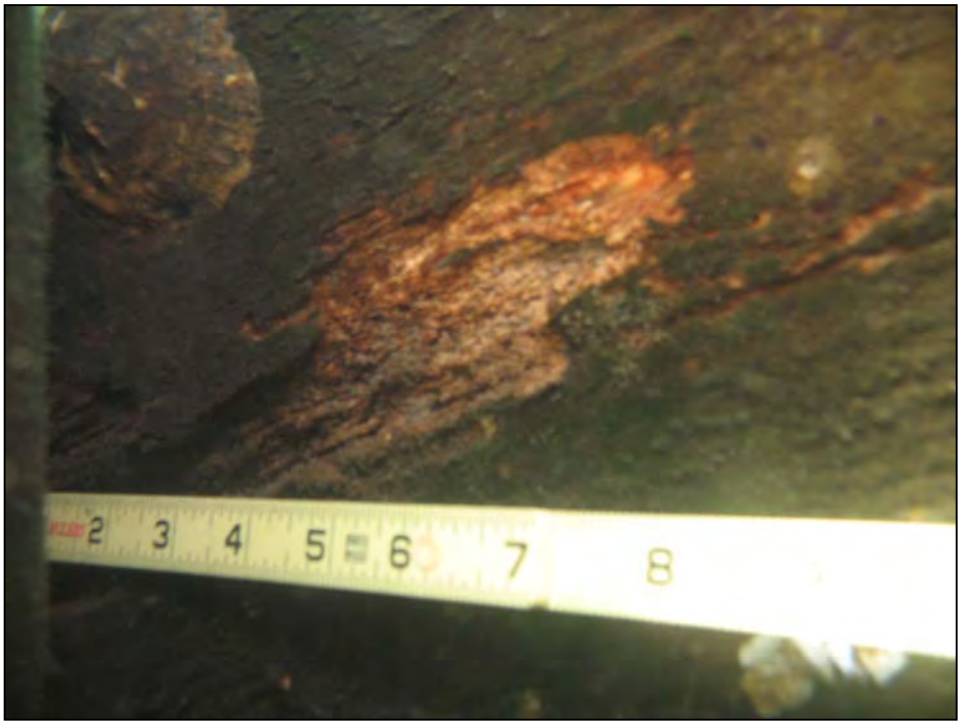



Photo No. 21: Evidence of marine borer activity along the timber cross bracing. (Photo by Childs Engineering Corp.)

Photo No. 22: Overview of the wave attenuator underwater. (Photo by Childs Engineering Corp.)

Photo No. 23: Detail of the lower portion of the wave attenuator underwater. Note heavy marine growth. (Photo by Childs Engineering Corp.)

Photo No. 24: Rotted timber wave attenuator stringer underwater. (Photo by Childs Engineering Corp.)

***Appendix B***
***Key Personnel***
*Pope's Island Marina*
*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***
*Pope's Island Marina*
*New Bedford, Massachusetts*

# POPE'S ISLAND MARINA

## OPINION OF PROBABLE CONSTRUCTION COST

February, 2009

| PIER REHABILITATION | | | | | | |
|---|---|---|---|---|---|---|
| | QTY | UNIT | UNIT PRICE | | TOTAL | |
| **High Priority Repairs** | | | | | | |
| 1. Mobilization/Demobilization | 1 | LS | $ | 25,000.00 | $ | 25,000.00 |
| 2. Demolition and Removal | 1 | LS | $ | 25,000.00 | $ | 25,000.00 |
| 3. Timber Deck Repairs | 1 | LS | $ | 2,000.00 | $ | 2,000.00 |
| 4. Wave Fence Repairs | 6 | DAY | $ | 3,000.00 | $ | 18,000.00 |
| 5. Underwater Connection Hardware | 1 | LS | $ | 70,000.00 | $ | 70,000.00 |
| | | | Subtotal | | $ | 140,000.00 |
| | | | Contingency 20% | | $ | 28,000.00 |
| | | | **Total** | | **$** | **168,000.00** |
| **Low Priority Repairs** | | | | | | |
| 1. Timber Deck Treatment | 1 | LS | $ | 75,000.00 | $ | 75,000.00 |
| 2. UHMW Fender Protection | 1 | LS | $ | 25,000.00 | $ | 25,000.00 |
| 3. Subsidence Repair | 1 | LS | $ | 15,000.00 | $ | 15,000.00 |
| 4. PVC Utility Line Repairs | 1 | LS | $ | 30,000.00 | $ | 30,000.00 |
| | | | Subtotal | | $ | 145,000.00 |
| | | | Contingency 20% | | $ | 29,000.00 |
| | | | **Total** | | **$** | **174,000.00** |

***Appendix D***
***References***
*Pope's Island Marina*
*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 "Phase I Marina Improvement Project – Pope's Island Marina", Vine Associates, Inc., March 2006.*

3. *Construction Drawings "Marina Improvement Project – Pope's Island Marina", Vine Associates, Inc., February 26, 2002.*

4. ASCE *Underwater Investigations: Standard Practice Manual (2001).*

***Appendix E***
***Field Notes***
*Pope's Island Marina*
*New Bedford, Massachusetts*

NEW BEDFORD WATERFRONT
FACILITIES INSPECTIONS

NOV. 21, 08 — 35° F — CLEAR, BRISK

## POPE'S ISLAND MARINA

HAND RAIL - 4x6 POSTS @ 60" O.C
2x6 CAPS
2x8, 2x4, 2x8, 2x4 NOTCHED
3x10 DECKING
GALV HARDWARE

## MAIN PIER

STA 0+00 - SUBSIDENCE IN ASPHALT
3"W x 12"L x 2" DEEP
STA 0+00 - 0+12 - RAMP TO FINGER PIER
STA 0+12 - LIGHT POST (4x6) RIGHT SIDE
STA 0+60 - " " " LEFT
STA 1+08 - " " " RIGHT
STA 1+21 - (3) LOOSE BOLTS LEFT END OF DECKING
STA 1+42 - FIRE EXTINGUISHER - LEFT
STA 1+45 - CL GANGWAY (LEFT = EAST = A) (RIGHT = WEST = F)
41' CLEAR (25' LONG)

STA 1152 – 1463 – 5.5' JOG IN PIER
w/ 38"D x 80"L x 48" HIGH ELEC. BOX
STA 1151 – WATER HOOKUP STANDPIPE
STA 1157 – LIGHT POST – 4X6 – LEFT
w/ FIRE ALARM
STA 1160 – ROTTED DECK BOARD
FILLED w/ WOODEN STRIP
STA 2+05 – LIGHT POST (4X6) RIGHT
STA 2+53 – " " LEFT
STA 2+75 – FIRE EXTINGUISHER
STA 2+78 – CL GANGWAY (LEFT-EAST B)
(RIGHT WEST-E)
41" CLEAR 25' LONG
STA 2+82 – 2+93 – JOG w/ ELEC BOX
(TYP
STA 2+81 – STANDPIPE
STA 3+00 – LIGHT POST (4X6) RIGHT
w/ FIRE ALARM
STA 3+48 – LIGHT POST LEFT
STA 3+50 – ROTTED DECK TIMBER
1.5" X 36" CRACK
STA 3+96 – LIGHT POST RIGHT

1 1

STA 4+22 - 4+43 - JOG IN PIER (LEFT AND RIGHT) (3) BOXES

STA 4+45 - FIRE EXTINGUISHER

STA 4+47 - CL GANGWAY (LEFT - EAST - C) (RIGHT - WEST - D)

STA 4+52 - END MAIN PIER)
LIGHT POST LEFT W/ FIRE ALARM

→ BENT 11 & 12 - WORN PILES
- #12 ≈ 4" WS OF PILE

→ BENT # 34 - PILE WORN TO BOLT HEAD

→ BENT # 40, 41, 42 - PILE WORN TO BOLT HEAD

→ BENT # 46 - EXPOSED PILE SPLICE

→ BENT #51 - BOLT HEAD
#77 " "

T-PIER - 16" Ø PILES @ 5' O.C.
4x8 X MEMBER

MAIN PIER - 12" Ø PILES @ 5' O.C.
4x12 STRINGERS @ 16" OC
10x12 - PILE CAPS
(2) 4" Ø PVC RACEWAY
↳ 24" FROM BOTTOM OF STRINGERS

# "T" HEAD PIER

STA 0+00 - LEFT END OF PIER
(2) 20" CLEATS

12" ϕ TIMBER FENDER PILES
@ 10' O.C.
4X10" CURB w/ 2"X10" BLOCKS @
42" O.C.

STA 0+05 TIMBER LADDER
16.5' CLEAR w/ 36" ABOVE
DECK / ROTTED TIMBER
DECK BOARD
* LADDER w/ 4X6 POSTS & GOOD

STA 0+15 - LIGHT POST RIGHT
STA 0+32 - TIMBER LADDER - GOOD
STA 0+40 - CLEAT
STA 0+45 - ELEC BOX
STA 0+63 - LIGHT POST
STA 1+11 - " " w/ FIRE EXT.
STA 1+21 - CLEAT
STA 1+59 - LIGHT POST
STA 1+65 - TIMBER LADDER - GOOD

STA 1+95- ELEC BOX
STA 2+00 – CLEAT
STA 2+01 – STANDPIPE
STA 2+08 – LIGHT POST
STA 2+56 – " " W/ FIRE EXT.
STA 2+80 – CLEAT
STA 3+04 – LIGHT POST
STA 3+26 – LADDER (GOOD)
STA 3+46 – ELEC Box
STA 3+61 – CLEAT
STA 3+52 – LIGHT POST
STA 3+99 – LADDER – GOOD

LEFT SIDE MAIN PIER

STA 4+00 – CLEAT
STA 4+02 – HOSE WINDER
STA 4+03-4+07.5 – 52"W X 60"D X 68" HIGH SHED
STA 4+12 – STAND PIPE
STA 4+11 – RIGHT SIDE MAIN PIER
STA 4+41 – CLEAT
STA 4+55 – TIMBER CURB DAMAGE
STA 4+53 – LIGHT POST
STA 4+66 – ELEC Box

STA 4+87 - LADDER (GOOD)
STA 5+01 - LIGHT POST
STA 5+21 - CLEAT
STA 5+49 - LIGHT POST W/ FIRE EXT
STA 5+97 - " "
STA 6+00 - CLEAT
STA 6+09 - STAND PIPE
STA 6+16 - ELEC BOX
STA 6+45 - LADDER (GOOD) / LIGHT POST
STA 6+61 - CLEAT
STA 6+93 - LIGHT POST W/ FIRE EXT
STA 7+31 - CLEAT MOUNTED TO SIDE OF FENDER PILE
STA 7+41 - CLEAT MOUNTED TO SIDE OF FENDER PILE / LIGHT POST
STA 7+61 - CLEAT
STA 7+66 - ELEC BOX
STA 7+81 - CLEAT ON SIDE OF FENDER PILE
STA 7+89 - LIGHT POST
STA 8+00 - CLEAT
STA 8+06 - LADDER (GOOD
STA 8+11 - END OF PILE / CLEAT / CLEAT ON PILE

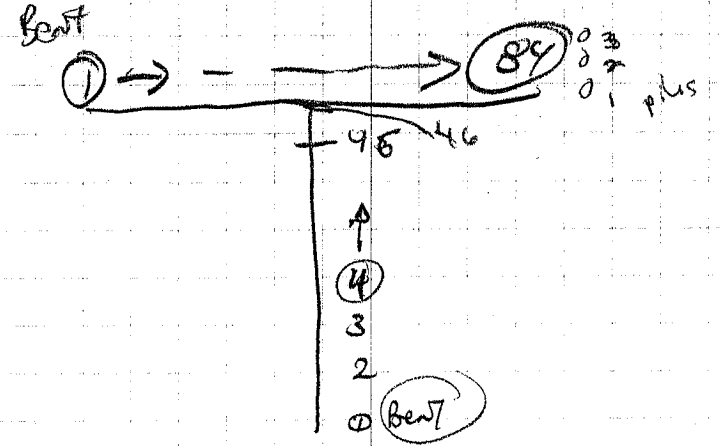
11/20/08 RPW, NBS, PDI
Leave office 6:30 – Arrive on-site 7:40

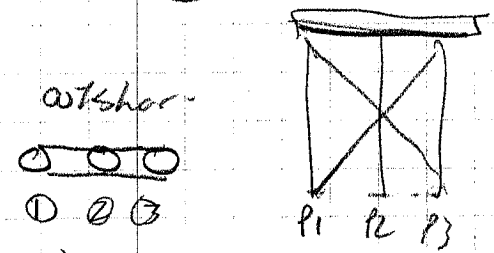
R&G → Leave 6:45 Arrive 7:35
Leave site 3:50 Back 4:50

Divers → in/out

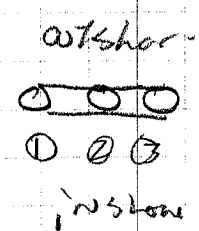


# Popes Island Marina Pier




No lower Hz Braces



Divers in 10:01

Bent 1 - 2 Bob

typ nuts hand gone 60% - 40%

remain

timber solid

NBS

Bents 3 & 4

Bent 8

NW at LW Bracing Bays

Heavy corrosion

→ typ 30% loss on hardware

Between Bents 7 + 8

One wale fender missing

Between Bents 8 + 9

2 wale fence boards not connected second from each end



Divers in R&G, NBS 10:00 AM

wale fender board after Bent 10

50% loss due to Dog Rot

Bent 12 - 13

4th Board from Bent 12 missing in wale fence

Bent 14

Inshore brass bracing plate on pile over Bob plate (?) #

Bent 14 pile 2 light ice damage ½" or less

Fender Board loss Aft Bent 16

(1, 2, 5, 6

Aft Bent 18 wave fence Boards (4,9) not connected on bottom

Bent 21 to 22 wave fence Boards are lag Bolt (4,8) not connected

all piles are hard no MB damage noted

Bents 22-23 all wave fence board not connected to Bottom plate



Bent 31 - to 32 4th board broken Bottom half

Bent 34 8th wave fence board missing photo of hardware connection

Bent 45
~~Bent~~ 8th Board fender missing

5th & 7th Board missing Aft Bent Bent 46

1 ~~missing~~ 49
1 ~~missing~~ 50
Bent 52 X Bracing is 1½" ?
See Nic

Bent 53 · Board 1 missing
3-4 section loss hole
in timber

Bent 54 1,2,7,8 Boards missing
in main Fender

Bent 55 1,4,5,7 missing
Bent 56 1,3,4,7 missing (wave fence)
Bent 59 2,4,6 missing
Bent 60 6,8 missing
Bent 61 1 missing
Bent 62 7 missing
Bent 64 5 missing
DSI Bent 69 1st missing
74 5,6,7,8 missing
75 1,2 missing

typ 2 Boards per section loss
with 16 MB and hollow

Bent 77 3rd board missing
78 4th 8th
79 all missing
80 4th 7th
last Bent 82



Bob plates wave fence Bent 76-to 77
and
Bent - 79, p3 on ~~Fender~~ Cross
~~with MB~~ Bracing with MB

Divers out 11:00 Am

Second Dive 11/19/
In

Bent 45 ~~first~~ Bent working inshore

Bent 44, P1 cross Bracing has no washers or Nut

Bent 43, P1 washer gone on cross Bracing connection

Bent 41 MB loss 8"L x 3" x 2"D on X brace on P3 photos
P1 MB 1.5"D (cross bracing is 4x8 members)
→ Hardware is 302 - 502 Remaining typ

Bent 38 P1 connection MB end grain Bolt can be seen MB 2.5"D x 5"W x 10"L

Bent 32 P1 same as ~~bent~~ bent 38 MB on cross bracing

Bent 34 MB same as 37 x 38 on P1

Bent 33 x 32 MB P1 on X Bracing same as 37 x 38

Nut missing on Bent 29 P1 for X Bracing

Bent 33 x 32 MB P3 X Bracing same as Bent 41

MB appears to be effecting end grain on some of the X Bracing as noted

No nut on X Bracing on Bent 11 P1

Drive out 12:00 pm