

**Contract Documents**  
**for**  
**ROCK HARBOR COMMERCIAL WHARF IMPROVEMENTS**

**Towns of Orleans**  
**Department of Public Works**  
**40 Giddiah Hill Road**  
**Orleans, Massachusetts 02653**



**Issuance Date:**  
**MARCH 8, 2024**

**OWNER**

Town of Orleans  
19 School Road  
Orleans, MA 02653  
Tel No. (508) 240-3700

**PROJECT ENGINEER**

  
15 Creek Road  
Marion, MA 02738  
Tel No. (508) 748-0937

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- Order of Conditions, Town of Orleans, MA; MADEP File# SE54-2618; date issued 08/15/2023.

- MADEP 401 Water Quality Certification #WW08-0018-APP; date issued 06/09/2023.
- MADEP Chapter 91 Waterways License #WW01-0000211; date issued 07/24/2023.
- US Army Corps of Engineers Permit NAE-2022-02268; date issued 07/17/2023.
- Certificate of Appropriateness, Old Kings Highway District Commission, Approved: 02/01/2024.

**ATTACHMENT A:** Boring Logs

**ATTACHMENT B:** Drawings Entitled: “*Rock Harbor Commercial Wharf Improvements*”, Town of Orleans, Massachusetts, Department of Public Works; Issued for Bid on 03/08/2024 (57 total sheets, including cover sheet)

**ATTACHMENT C:** Massachusetts Prevailing Wage Rates; Issuance Date 02/26/2024  
(41 pages)

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## INVITATION FOR BIDS

The Orleans Town Manager will receive sealed bids for the Rock Harbor Commercial Wharf Improvement Project located in Rock Harbor and the Town of Orleans, MA. The project generally consists of steel bulkhead reconstruction, installation/reconstruction of timber piers, installation of new concrete commercial off-loading pier and public viewing platform, floating docks, berthing piles, site drainage, new fuel lines and dispensers, removal of existing underground fuel tanks and utility improvements including electrical and water services at the existing commercial wharf facility.

**Sealed bids will be received at the Town Manager's Office, Town Hall, 19 School Road, Orleans, Massachusetts 02653 until 2:00 P.M., prevailing time, on Friday, March 29, 2024** at which time all timely-received bids received will be publicly opened and read aloud. Any late bids received after this date and time will be rejected and returned to the applicant unopened. No exceptions will be made. Faxed/emailed bids will not be accepted.

Bids must be submitted in a sealed envelope indicating the applicant's name and address and clearly marked "**Rock Harbor Commercial Wharf Improvement Project**". Unforeseen Office Closure – if, at the time of the scheduled bid opening, Orleans Town Hall is closed due to uncontrolled events such as fire, snow, ice, wind, or building evacuation, the bid opening will be postponed until 3:00 PM. on the next normal business day. Bids will be accepted until that date and time.

Electronic bid specifications may be obtained from the Town of Orleans Website, Bid & RFP System at [www.town.orleans.ma.us/bids](http://www.town.orleans.ma.us/bids) beginning on Friday, March 8, 2024.

**A non-mandatory, Pre-Bid Conference will be conducted at the Project Site located at 113 Rock Harbor Road, Orleans, MA at 10:00 A.M. on Monday, March 18, 2024.**

**Bid Security:** Each bid shall be accompanied by a Bid Security in the form of either a Certified Check, a Bid Bond, a Treasurer's Check or Cashier's Check drawn on or issued by a responsible bank or trust company, made payable to the Town of Orleans in an amount equal to five percent (5%) of the Contractor's bid.

A Performance Bond and also a Labor and Materials Payment Bond, each of a surety company qualified to do business under the laws of the Commonwealth of Massachusetts, satisfactory to the Owner, and each in the sum of 100% of the Contract Price will be required of the successful general bidder. No Bidder may withdraw its Bid within 30 business days after the date of the Bid opening.

The bid award of a contract is subject to the availability of funding appropriation and the Owner's receipt of all regulatory approvals from local, state or federal agencies.

All bids for this project are subject to applicable bidding laws of Massachusetts, including General Laws Chapter 30, Section 39M as amended.

Prevailing Wage Rates as determined by the Commissioner of the Division of Occupational Safety of the Executive Office of Labor and Workforce Development under the provisions of the Massachusetts General Laws Chapter 149, Section 26 to 27D, as amended, apply to this project. Prevailing Wage Rates Schedule # 20240226-078 is made part of the bid

documents. A weekly certified payroll submittal shall be required of the successful bidder in accordance with MGL C149, S27B. No payments will be made by the Town until all payroll information necessary for the Town to determine compliance with prevailing wage law requirements for the time period of the payment request have been submitted.

Bidders are not to include in their Bid sales and compensating use taxes on materials and supplies purchased for this project. All materials used are tax exempt.

The Town Manager reserves the right to accept and/or reject any and all bids and to waive any informalities to the extent allowed by law, and to make the award as deemed to be in the best interest of the Town.

Kimberly Newman, Town Manager

**SECTION 001000**  
**NOTICE TO BIDDERS**

Notice is hereby given that the Town of Orleans, MA will receive bids for furnishing all labor, materials, transportation and services for the project known as:

**ROCK HARBOR COMMERCIAL WHARF IMPROVEMENT PROJECT**  
**TOWNS OF ORLEANS, MA**

- A.** Located at 113 Rock Harbor Road in Rock Harbor, Orleans, MA, 02653. Each bid shall be in accordance with the plans, specifications and other contract documents available from the Town of Orleans Website, Bid & RFP System at <https://www.town.orleans.ma.us/bids> beginning on Friday, March 8, 2024 and also on file at the Office of the Town Manager located at 19 School Road, Town of Orleans, MA 02653, where they may be examined.
- B.** Notice is also hereby given that all Bidders may be required to furnish a sworn statement of their financial responsibility, technical ability and experience before award is made to any particular Bidder.
- C.** The project generally consists of steel bulkhead reconstruction, installation/reconstruction of timber piers, installation of new concrete commercial off-loading pier and public viewing platform, floating docks, berthing piles, site drainage, new fuel lines and dispensers, removal of existing underground fuel tanks and utility improvements including electrical and water services at the existing commercial wharf facility.
- D.** A non-mandatory, Pre-Bid Conference will be conducted at the Project Site located at 113 Rock Harbor Road in Orleans, MA at 10:00 A.M. on Monday, March 18, 2024.
- E.** Each bid shall be made out on a form Section 004000 Bid and shall be accompanied by a DEPOSIT in the form of a bid bond, certified check or cashier's check, made payable to the **Town of Orleans**, in the amount of five percent (5%) of the sum of the Contractor's bid (CASH WILL NOT BE ACCEPTED) on or before March 29, 2024 at 2:00 P.M. local time. Each bid shall be in a separate sealed envelope, addressed to Town of Orleans, Rock Harbor Commercial Wharf Improvement Project c/o Kimberly Newman, Town Manager.
- F.** The above-mentioned check or bid bond shall be given as a guarantee that the bidder will enter into the contract if awarded to him/her, and will be declared forfeited if the successful bidder refuses to enter into said contract within ten (10) days after being requested to do so by the Owner.
- G.** The Owner may, if in their interest, award the contract to a responsible bidder after negotiations. The Owner reserves the right to reject any or all bids or waive any informality in a bid.

- H.** No bidder may withdraw his/her bid for a period of 30 business days after the date set for the opening thereof.
- I.** All Contractors performing work for the Owner are required to present evidence of Workers' Compensation and Employers' Liability Insurance coverages; a certificate of insurance and copies of the information or declaration page(s) for Broad Form Comprehensive General Liability or Commercial General Liability, and Business Automobile Liability Insurance policies of not less than \$2,000,000 for bodily injury or death arising out of any one occurrence and property damage limits of not less than \$3,000,000 arising out of any occurrence for each type of coverage; as well as excess liability coverage in an amount to be no less than \$5,000,000; as well as copies for said General Liability and Business Auto Liability Insurance Policies or an endorsement naming the Owner, its Board, and its officers, agents and employees as additional insureds, a standard cross-liability endorsement, an endorsement precluding cancellation or reduction in coverage before the expiration of thirty (30) days after Owner has received written notification by first class mail from the insurance carrier of such cancellation or reduction, and an endorsement stating that the insurance afforded thereby to Owner and its officers, agents and employees shall be primary insurance to the full limits of the policy, and that if Owner and its officers and employees have other insurance against a loss covered by such a policy, such other insurance shall be excess insurance only. Contractor shall further procure for the Owner benefit, course of construction insurance coverage for all risks of loss in an amount equal to the completed value of the project. The certificates of insurance and copies of information or declaration page(s) and of endorsements are to be reviewed and approved as to form by the Owner before work commences. Bidders that may "self-insure" are to provide detailed evidence of coverage and may be required to produce additional financial disclosures, such that any and all concerns raised by any Owner shall be redressed to the satisfaction of said Owner. A bidder that fails to comply with said additional requests by Owner may be deemed to be unresponsive and as such may be precluded from any further consideration by the Owner(s).
- J.** The award of a contract is subject to the Owner's receipt of all regulatory approvals from local, state or federal agencies. The award is also subject to availability of sufficient funding.
- K.** The "Contract Documents" consist of this Notice to Bidders; Section 002000 Bid Requirements, Section 004000 Bid; Section 005000 Agreement; Section 005100 Notice of Award; Section 006100 Faithful Performance Bond; Section 006200 Payment Bond; Section 007000 General and Special Conditions; Section 007010 Supplemental Conditions, General Requirements, Technical Specifications, Construction Drawings and any and all exhibits attached to any of the above listed documents. Bidders may obtain complete set(s) of Contract Documents from the Town of Orleans Website, Bid & RFP System at [www.town.orleans.ma.us/bids](http://www.town.orleans.ma.us/bids) beginning on Friday, March 8, 2024. All who register with the Town for the bid documents will automatically be emailed with any addenda or bid updates posted.



- L. Any questions pertaining to the plans, specifications, or any of the Contract Documents shall be in writing, addressed and submitted via email to the attention of: Ms. Christine Player, Owner's Project Engineer, Foth Infrastructure & Environment, LLC at [Christine.Player@foth.com](mailto:Christine.Player@foth.com). **To be given consideration, all questions must be received by no later than 12:00 P.M. on Thursday, March 21, 2024. No questions will be received or responded to after this date and time.** Any and all interpretations and any supplemental instructions will be in the form of written Addenda to the Contract Documents which, if issued, will be provided via email to all persons on record as having received a complete set of Contract Documents at the respective email addresses furnished for such purposes. Such Addenda will be provided not later than 48 hours prior to the time set for opening of bids. Failure of any Bidder to receive any Addendum or interpretation shall not relieve such bidder from any obligation under his Bid as submitted.
- M. The Owner reserves the right to request change orders at any time.
- N. A successful bidder shall provide proof of a current business license issued by the jurisdiction where the work of improvement is to be conducted upon award of the Contract.
- O. A successful bidder shall, within ten (10) days from the date of a request by the Owner, enter into a contract with the Owner, which contract shall be accompanied by a payment bond and a faithful performance bond, each in a sum equal to 100% of the amount of the bid, and all documents evidencing insurance coverage requested by the Owner. **Contract award to the successful bidder will be made subject to funding availability and approval at 2024 Annual Town Meeting to be held on May 13, 2024 and Annual Town Elections to be held on May 21, 2024. A Notice-To-Proceed (NTP) is anticipated to be issued by the Owner on/about June 10, 2024.**
- P. On-site work by the selected Contractor may commence on/after October 1, 2024, noting that Contractor activities must accommodate vessel access to/from the commercial bulkhead (excluding the off-loading pier) through October 14, 2024. All Construction shall be completed by no later than April 30, 2025.
- Q. The prevailing wages to be paid mechanics, apprentices, teamsters, chauffeurs, and laborers on the Project shall be established by the Prevailing Wage Schedule, as determined by the Commissioner of Labor and Industries, pursuant to the provisions of M.G.L. Chapter 149, Section 26 to 27D, inclusive, as amended, which schedule is included in **Attachment C** of the Contract Documents.
- R. The bidding documents may be examined at, but not removed or taken from, the Office of the Town Manager, 19 School Road., Town of Orleans, MA during normal business hours.
- S. All Bidding procedures will be in accordance with the Massachusetts General Laws Chapter 30, section 39M, as amended, and applicable provisions of General Laws, Chapter 149, sections 26-27D, and Chapter 30, sections 39F-39P, which are included herein by reference.

**SECTION 002000**  
**BID REQUIREMENTS**

**PART 1: GENERAL**

**1.01 SECURING DOCUMENTS**

- A. Bidders may obtain complete set(s) of electronic Contract Documents from the Town of Orleans Website, Bid & RFP System at [www.town.orleans.ma.us/bids](http://www.town.orleans.ma.us/bids) beginning on Friday, March 8, 2024. All who register with the Town for the bid documents will automatically be emailed with any addenda or bid updates posted.

**1.02 BID REQUIREMENTS**

In order to receive consideration, bids shall be prepared and submitted in conformance with the requirements and instructions:

- A. Bidders shall carefully examine the site of the contemplated work and the Contract Documents therefore. It will be assumed that the bidder has investigated and is satisfied as to the conditions to be encountered, and as to the character, quality and quantities of work to be performed, and materials to be furnished, and as to the requirements of these contract documents.
- B. Specific data required in regard to the location of existing public utility companies' pipes, conduits and structures shall be obtained by the Contractor from the respective public utility companies.
- C. Bids shall be prepared and submitted only on the forms supplied by the Owner and shall be signed by the bidder. Contractors must complete all bid items; no incomplete bids will be accepted. Written amounts shall prevail over numbers. If the unit price and the total amount named by the bidder for any item do not agree, the unit price shall govern. The Bidder Certification, fully completed and executed by the bidder, shall accompany the bid.
- D. If the bid is by an individual, his/her name and address shall be shown; if by a firm, the firm or partnership name shall be shown; or if by a corporation, the bid shall show the name and the State under the laws of which the corporation is chartered, and addresses of the President and of the Secretary and/or Treasurer. All bids shall be signed in long-hand and executed by a principal duly authorized to make contracts. Oral, telegraphic, or telephonic bids or modifications will not be considered. Bidders shall include with their bid a completed Certificate of Vote of Authorization. Such forms are included with the bid documents.
- E. Bids shall not contain any recapitulation of the work to be done. Alternative bids will not be considered unless called for. The completed form shall be without interlineations or alterations.

- F. All bids shall be presented to the Owner under sealed cover, and plainly marked on the outside with the title of the work being bid and the name of the bidder. It is the sole responsibility of the bidder to insure that his/her bid is received by the Owner prior to the time specified for receipt of bids. Any bid received after the scheduled closing time for receipt of bids shall be returned to the bidder unopened and will be deemed unresponsive and thus rejected by the Owner(s). Bids will not be accepted via electronic mail or facsimile.

### **1.03 BIDDER'S GUARANTY**

- A. Each bid must be accompanied by cashier's check, or check certified by a responsible bank, or by bid bond issued by a corporate surety licensed to do business in the Commonwealth of Massachusetts, payable to the **Town of Orleans** in a sum not less than 5% of sum of the Contractor's bid. Bid security will be returned to all but the two lowest responsible and eligible bidders within ten (10) days, Saturdays, Sundays and legal holidays excluded, after the opening of the bids. The bid deposits of the two lowest responsible and eligible bidders shall be returned upon the execution and delivery of a Contract and furnishing of a Performance Bond and Labor and Materials Payment Bond, or, if no award is made, upon the expiration of the time for making an award. Notwithstanding the foregoing, should any bidder fail to perform his agreement to execute a contract and furnish the required bonds, his bid deposit shall become and be the property of the Town of Orleans to which it is payable, as liquidated damages; provided that the amount of the bid deposit which becomes the property of the Town of Orleans shall not, in any event, exceed the difference between his bid price and the bid price of the next lowest responsible and eligible bidder; and provided further, that, in case of death, disability, bona fide clerical or mechanical error of a substantial nature, or other similar unforeseen circumstances affecting the bidder, his bid deposit shall be returned to him.

### **1.04 BID QUANTITIES**

- A. **Exhibit A** of the Bid provides bid quantities; also refer to **Section 010250, Measurement and Payment**.

### **1.05 CONTRACTOR'S LICENSE**

- A. Prior to submitting bids, bidders shall be licensed (if applicable) as Contractors under the laws of the Commonwealth of Massachusetts to perform the type and class of work contemplated by the Contract Documents.
- B. Sub-Contractors of bidding general Contractors shall be licensed under the laws of the Commonwealth of Massachusetts to perform the type and class of work contemplated by the Contract Documents.

### **1.06 WITHDRAWAL OF BID**

- A. Any bid may be withdrawn by the bidder prior to, but not after, the time fixed for the opening of bids, either personally or by telegraphic or written request. The withdrawal of a bid shall not prejudice the right of a bidder to file a new bid. No bid may be withdrawn for a period of 30 business days after the bid opening. Contract

award is contingent upon funding and receipt of permits. Any withdrawal after that time shall be in writing and shall not be effective until received by Owner.

#### **1.07 INTERPRETATION OF DOCUMENTS AND PLANS**

- A. If any person contemplating submitting a bid for the proposed contract is in doubt as the true meaning of any part of the plans, specifications or other contract documents, or finds discrepancies in, or omissions from the drawings or specifications, he/she may submit to the Project Engineer a written request for an interpretation or corrections thereof. The person submitting the request will be responsible for its prompt delivery. Any interpretation or corrections of the proposed documents will be made only by addendum duly issued and a copy of such addendum will be mailed or delivered to all persons known by the Project Engineer to have received a set of Contract Documents. Neither the Owner nor the Project Engineer will be responsible for any other explanations or interpretations of the proposed Contract Documents.

#### **1.08 ADDENDA**

- A. The Contract Documents are subject to revision prior to the time fixed for opening bids by submitting the revision, in writing, to all persons who are known by Owner to have secured such documents for purposes of submitting bids. All addenda issued shall become an integral and integrated part of the contract documents and shall be included in any bid submitted.

#### **1.09 OPENING OF BIDS**

- A. Sealed Bids for the Contract will be received by Kimberly Newman, Town Manager, 19 School Road., Town of Orleans, Orleans, MA 02653 **until 2:00 P.M., local time on Friday, March 29, 2024** and at that time and place will be publicly opened and read aloud.

#### **1.10 AWARD OF CONTRACT OR REJECTION OF BIDS**

- A. Bids may be rejected if they show any alterations of form, additions not called for, conditional bids, incomplete bids, erasures, or irregularities of any kind. The Owner reserves the right to waive any irregularities in the bids as received.
- B. The basis for determining the lowest bid will be the lowest total sum of Bid Items 1 through 23 as listed on "Exhibit A" to Bid – Bid Schedule (see Section 004000 Bid).
- C. The Owner reserves the right to reject any or all bids. More than one bid from an individual, firm or partnership, corporation or association, under the same or different name, will not be considered. Reasonable grounds for believing that a bidder is interested in more than one bid for work contemplated, will cause the rejection of all bids in which said bidder is interested. Bids in which prices are considered unbalanced may be rejected by the Owner.

### **1.11 COMPETENCY OF BIDDERS**

- A. Bidders may be required to furnish evidence of financial competency, organizational ability and experience to enable him/her to undertake and successfully complete the work to be performed, including past performance which shall include past performance on projects performed for the Owner.

### **1.12 BONDS AND INSURANCE**

- A. Bidder's attention is directed to the provisions of the contract documents relating to the requirements of contract bonds. The successful bidder, simultaneously with execution of the Agreement, will be required to furnish a faithful performance bond in an amount equal to at least one hundred percent (100%) of the contract price, and a labor and material bond in an amount equal to at least one hundred percent (100%) of the contract price; both said bonds to be secured from a corporate surety admitted in the Commonwealth of Massachusetts and shall be satisfactory to the Owner.
- B. Bidder's attention is further directed to the provisions relating to the Contractor's insurance requirements, and the prescribed form of Bidder's Bond, Agreement, Contract Bonds and insurance documentation.

### **1.13 CONTRACT PROGRESS SCHEDULE**

- A. Bidder's attention is directed to the provisions of the Contract Documents relating to the requirement for the submission of a contract progress schedule after the receipt of the Notice to Proceed.

### **1.14 LEGAL RELATIONS AND RESPONSIBILITIES**

- A. Bidder's attention is specifically directed to the provisions of the General Conditions concerning laws to be observed, hours of labor, minimum wages, employment of labor, safety codes, patents, taxes, and other matters of concern to the bidder.
- B. The prevailing wages to be paid mechanics, apprentices, teamsters, chauffeurs, and laborers on the Project shall be established by the Prevailing Wage Schedule, as determined by the Commissioner of Labor and Industries, pursuant to the provisions of M.G.L. Chapter 149, Section 26 to 27D, inclusive, as amended, which schedule is included in the Contract Documents (See **Attachment C**).

### **1.15 SUB-CONTRACTORS**

- A. Each bidder must state in his/her bid the Sub-Contractors he/she intends to employ to perform any work or labor, or render service to the Contractor for the construction of the work or improvement in an amount in excess of one half of one percent of the Contractor's bid. This statement shall include the name of each Sub-Contractor, the location of his/her place of business, and the nature of the work to be performed by him/her.

**\*\*\*END OF SECTION\*\*\***

**SECTION 004000**

**BID**

Dear Owner:

The undersigned, as a bidder, declares that he/she has carefully examined the location of the proposed work, the proposed form of Agreement, and Contract Documents, and he/she proposes and agrees that, if this bid is accepted, he/she will contract with the Owner to provide all necessary machinery, tools and apparatus, to do all the work and furnish all the materials specified in the Contract Documents in the manner and time therein set forth required to complete the

**ROCK HARBOR COMMERCIAL WHARF IMPROVEMENT PROJECT  
TOWNS OF ORLEANS, MA**

The work to be performed pursuant to this Bid shall be in strict conformity with the Contract Documents prepared therefore by the Owner, copies of which are on file in the office of the Town Manager, which Contract Documents are hereby made a part thereof, and incorporated by this reference as if fully set forth herein.

The bidder proposes and agrees to contract with the Owner to furnish and perform all of the above described work, for the following **TOTAL BID PRICE**, to wit:

(\$) \_\_\_\_\_ U.S. Dollars

A breakdown of the Contract pricing is attached hereto marked **Exhibit "A"** and incorporated by this reference.

Owner reserves the right to add or delete items from this list. The price of the contract shall be adjusted accordingly. The price set forth herein includes any and all costs and expenses of whatever source or nature for the work to be performed pursuant to the terms and conditions of the Contract Documents.

If awarded the contract, the undersigned hereby agrees to sign said contract and to furnish the necessary bonds and insurance certificates within ten (10) days after being requested to do so by the Owner.

The undersigned has examined the location of the proposed work and is familiar with the Contract Documents and the local conditions at the place where the work is to be done.

The undersigned has checked carefully all of the above figures and understands that the Owner will not be responsible for any errors or omissions on the part of the undersigned in making up this bid.

The undersigned hereby certifies that this bid is genuine, and not sham or collusive, or made in the interest or in behalf of any person not herein named, and that the undersigned has not directly or indirectly induced or solicited any other bidder to put in a sham bid or any other person, firm or corporation to refrain from bidding and that the undersigned has not in any manner sought by collusion to secure for himself or herself an advantage over any other bidder.

Enclosed find bidder's bond or certified check in the amount of five (5%) percent of the TOTAL Bid for \_\_\_\_\_ (\$\_\_\_\_\_) to guarantee execution of contract and furnishing of the necessary bonds as above provided, if awarded the contract.

The undersigned has satisfied him/herself by personal examination of the location of proposed work, and by such other measures as they may prefer, as to the actual conditions and requirements of the work, and shall not, after submission of the bid, dispute, complain or assert that there was any misunderstanding in regard to the nature or amount of the work to be done.

**Contractor acknowledges receipt of Addenda Nos. \_\_\_\_\_ through \_\_\_\_\_.**

**Company:** \_\_\_\_\_

**Principal's Signature:** \_\_\_\_\_

**Signed by :** \_\_\_\_\_

**Title :** \_\_\_\_\_

**Address :** \_\_\_\_\_

\_\_\_\_\_

**Telephone :** \_\_\_\_\_ **Fax:** \_\_\_\_\_

**Email:** \_\_\_\_\_

**Dated this \_\_\_\_\_ day of \_\_\_\_\_, 20\_\_**

**License No. \_\_\_\_\_ Class(es) \_\_\_\_\_**

**Exp. Date:** \_\_\_\_\_

**NOTE:** Bidders must hold current licenses as required under the laws of the Commonwealth of Massachusetts and all Federal Statutes.

**EXHIBIT "A" TO BID**

**BID SCHEDULE**

ITEM NUMBER	QUANTITY	ITEM WITH UNIT BID PRICE WRITTEN IN WORDS	UNIT PRICE		AMOUNT	
			DOLLARS	CENTS	DOLLARS	CENTS
1	1	MOBILIZATION/DEMOBILIZATION  Dollars (                    ) per LUMP SUM (LS)				
2	1	SITE PREPARATION  Dollars (                    ) per LUMP SUM				
3	1	DEMOLITION, REMOVAL AND DISPOSAL  Dollars (                    ) per LUMP SUM (LS)				
4	1	UNDERGROUND TANK REMOVAL & DISPOSAL  Dollars (                    ) per LUMP SUM (LS)				
5	1,625	FURNISH AND INSTALL ASPHALT PAVEMENT  Dollars (                    ) per SQUARE YARD (SY)				
6	353	FURNISH AND INSTALL STEEL SHEET PILE REPLACEMENT BULKHEAD  Dollars (                    ) per LINEAR FOOT (LF)				
7	14	DRILLED GROUND ANCHORS  Dollars (                    ) per EACH (EA)				
8	42	FURNISH AND INSTALL 24" DIAMETER STEEL PIPE PILES  Dollars (                    ) per EACH (EA)				



TOWN OF ORLEANS  
 ROCK HARBOR COMMERCIAL WHARF IMPROVEMENT PROJECT  
 113 ROCK HARBOR ROAD, ORLEANS MA

ITEM NUMBER	QUANTITY	ITEM WITH UNIT BID PRICE WRITTEN IN WORDS	UNIT PRICE		AMOUNT	
			DOLLARS	CENTS	DOLLARS	CENTS
9	1	FURNISH AND INSTALL PILE-SUPPORTED CONCRETE COMMERCIAL WHARF WITH PUBLIC VIEWING AREA  Dollars ( ) per LUMP SUM (LS)				
10	660	FURNISH AND INSTALL TIMBER TOWN PIER  Dollars ( ) per SQUARE FOOT (SF)				
11	380	FURNISH AND INSTALL TIMBER COMMERCIAL LANDING PIER  Dollars ( ) per SQUARE FOOT (SF)				
12	2,176	FURNISH AND INSTALL TIMBER FLOATS  Dollars ( ) per SQUARE FOOT (SF)				
13	64	FURNISH AND INSTALL GREENHEART TIMBER BERTHING, FLOAT AND FENDER PILES  Dollars ( ) per EACH (EA)				
14	470	FURNISH AND INSTALL TIMBER RAILING SYSTEM  Dollars ( ) per LINEAR FOOT (LF)				
15	142	FURNISH AND INSTALL STEEL GUARD RAIL  Dollars ( ) per LINEAR FOOT (LF)				
16	13	FURNISH AND INSTALL CONCRETE-FILLED STEEL BOLLARDS  Dollars ( ) per EACH (EA)				

TOWN OF ORLEANS  
 ROCK HARBOR COMMERCIAL WHARF IMPROVEMENT PROJECT  
 113 ROCK HARBOR ROAD, ORLEANS MA

ITEM NUMBER	QUANTITY	ITEM WITH UNIT BID PRICE WRITTEN IN WORDS	UNIT PRICE		AMOUNT	
			DOLLARS	CENTS	DOLLARS	CENTS
17	1	FURNISH AND INSTALL NEW FUEL DISPENSERS, UNDERGROUND LINES AND CONTROL SYSTEMS  Dollars (                    ) per LUMP SUM (LS)				
18	1	FURNISH AND INSTALL PUMP-OUT SERVICE UPGRADES  Dollars (                    ) per LUMP SUM (LS)				
19	1	FURNISH AND INSTALL 1-TON JIB CRANE  Dollars (                    ) per LUMP SUM (LS)				
20	8	FURNISH AND INSTALL EMERGENCY ACCESS LADDERS  Dollars (                    ) per EACH (EA)				
21	1	FURNISH AND INSTALL DRAINAGE SYSTEMS  Dollars (                    ) per LUMP SUM (LS)				
22	1	FURNISH AND INSTALL ELECTRICAL SERVICE & LIGHTING  Dollars (                    ) per LUMP SUM (LS)				
23	1	FURNISH AND INSTALL WATER SYSTEMS  Dollars (                    ) per LUMP SUM (LS)				
<b>TOTAL BID AMOUNT (ITEMS 1 -23)</b>						

**SEE MEASUREMENT AND PAYMENT SECTION 010250 - FOR DESCRIPTION OF BID ITEMS REFERENCED ABOVE.**

**LIST OF SUB-CONTRACTORS**

Any person making a bid or offer to perform the work, shall in his or her bid or offer, set forth:  
(a) The name and location of the place of business of each Sub-Contractor who will perform work or labor or render service to the prime Contractor in or about the construction of the work or improvement, or a Sub-Contractor licensed by the Commonwealth of Massachusetts who, under subcontract to the primary Contractor specially fabricates and installs a portion of the work or improvement according to detailed drawings contained in the plans and specifications, in an amount in excess of one-half of 1 percent of the prime Contractor's total bid; (b) The portion of the work which will be done by each such Sub-Contractor under this act. The prime Contractor shall list only one Sub-Contractor for each such portion as defined by the prime Contractor in his or her bid.

Any item of work, which does not set forth a designated Sub-Contractor will be done by the Prime Contractor.

**Name & Address**

**Portion of Work**

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\_\_\_\_\_  
(Prime Contractor)

Signed by: \_\_\_\_\_

Title : \_\_\_\_\_

**(TO BE EXECUTED BY BIDDER AND SUBMITTED WITH BID)**

**TOWN OF ORLEANS**  
**CERTIFICATE OF NON-COLLUSION**

Project Name: **Rock Harbor Commercial Wharf Improvement Project**

Pursuant to M.G.L. Ch. 30B Section 10, the undersigned certifies under penalties of perjury that this bid or bid has been made and submitted in good faith and without collusion or fraud with any other person. As used in this certification, the word “person” shall mean any natural person, business, partnership, corporation, union, committee, club, or other organization, entity, or group of individuals.

\_\_\_\_\_  
(Signature of individual submitting bid or bid)

\_\_\_\_\_  
(Name of business)

**(TO BE EXECUTED BY BIDDER AND SUBMITTED WITH BID)**

**STATEMENT OF STATE TAX COMPLIANCE**

Project Name: **Rock Harbor Commercial Wharf Improvement Project**

Pursuant to Ch. 233 of the Acts of 1983, §49A(b),

I, \_\_\_\_\_, acknowledge that I am the authorized signatory for \_\_\_\_\_, whose principal place of business is at \_\_\_\_\_, and as such, do hereby certify under the pains of penalties of perjury that this company has complied with all laws of the Commonwealth relating to taxes.

Social Security or Federal ID Number \_\_\_\_\_

Subscribed and sworn to this \_\_\_\_ day of \_\_\_\_\_, 20\_\_\_\_.

\_\_\_\_\_  
Notary Public

**(TO BE EXECUTED BY BIDDER AND SUBMITTED WITH BID)**

**ACKNOWLEDGEMENT OF PRINCIPAL, IF A CORPORATION:**

State of \_\_\_\_\_

County of \_\_\_\_\_ SS:

On this \_\_\_\_\_ day of \_\_\_\_\_, 20\_\_\_\_, before me personally came and appeared \_\_\_\_\_ to me known, who, being by me duly sworn, did depose and say to me that he resides at \_\_\_\_\_, that he is of \_\_\_\_\_, the corporation described in and which executed the foregoing instrument; that he knows the seal of said corporation; that one of the impressions affixed to said instrument is an impression of such seal; that it was so affixed by the order of the directors of said corporation, and that he signed his name thereto by like order.

\_\_\_\_\_  
Contractor's Signature

(Seal)

\_\_\_\_\_  
Notary Public Signature

My Commission expires on: \_\_\_\_\_

**ACKNOWLEDGEMENT OF PRINCIPAL, IF A PARTNERSHIP:**

State of \_\_\_\_\_

County of \_\_\_\_\_ SS:

On this \_\_\_\_\_ day of \_\_\_\_\_, 20\_\_\_\_, before me personally came and appeared to me known, and known to me to be one of the members of the firm of described in and which executed the foregoing instrument and he acknowledged to me that he executed the same as and for the act and deed of said firm.

\_\_\_\_\_  
Contractor's Signature

(Seal)

\_\_\_\_\_  
Notary Public Signature

My Commission expires on: \_\_\_\_\_

## **BIDDER CERTIFICATIONS**

### **1.01 GENERAL**

A. The undersigned Bidder certifies to the Owner, as set forth in sections 1 through 12 below.

**1. Certificate of Non-Discrimination**

By my signature hereunder, on behalf of the Bidder making this Bid, the undersigned certifies that there will be no discrimination in employment with regard to race, color, religion, gender, sexual orientation, or national origin; that all federal, state, and local directives and executive orders regarding non-discrimination in employment will be complied with; and that the principle of equal opportunity in employment will be demonstrated positively and aggressively.

**2. State of Convictions**

By my signature hereunder, I hereby swear, under penalty of perjury, that no more than one final, unappealable finding of contempt of court by a Federal Court has been issued against Bidder within the past two years because of failure to comply with an order of a Federal Court or to comply with an order of the National Labor Relations Board.

**3. Previous Disqualifications**

By my signature hereunder, I hereby swear, under penalty of perjury, that the below indicated Bidder, any officer of such Bidder, or any employee of such Bidder who has a proprietary interest in such Bidder, has never been disqualified, removed or otherwise prevented from bidding on, or completing a Federal, State, or local government project because of a violation of law or a safety regulation except as indicated on the separate sheet attached hereto entitled "Previous Disqualifications." If such exceptions are attached, please explain the circumstances.

**4. Certification of Workers Compensation Insurance**

By my signature hereunder, as the Contractor, I certify that I am aware of the provisions of Title 28-29 Labor and Labor Relations of the General Laws of Massachusetts which require every employer to be insured against liability for worker's compensation or to undertake self-insurance in accordance with the provisions of that law, and I will comply with such provisions before commencing the performance of the Work of this Contract.

**5. Certificate Of Non-Collusion**

In accordance with Massachusetts General Law Chapter 40, Section 4B ½, Chapter 30, Section 39M and/or Chapter 30B, Section 10: Undersigned certifies under penalties of perjury that this bid or bid is in all respects bona fide and fair

and has been made and submitted in good faith without collusion or fraud with any other person. As used in this certification, the work "person" shall mean any natural person, joint venture, business, partnership, corporation, union, committee, club, organization, group of individuals, or other business or legal entity.

**6. Conflict Of Interest**

The bidder must certify that no official or employee of the Town of Orleans has a financial interest in the bidder's bid or executed Contract, or in the expected profit to arise therefrom, unless there has been compliance with the provisions of MGL C 43, Section 27 (Interest in Public Contracts by Public Employees) and of provisions of MGL C 268A, Section 20 (Conflict of Interest Law).

**7. Indemnification Agreement**

The contracted Bidder hereby indemnifies and shall at all times save and hold harmless the Town of Orleans, and its officers, attorneys, employees, and agents from and against any and all claims (including workers' compensation and wage claims), demands, suits, actions, liabilities, damages, penalties, judgments, and costs and expenses, including without limitation the costs and expenses of litigation, of or by anyone that in any way is caused by, arises out of, or is occasioned by the performance, activities, operations, conducts, negligence, or omissions of the contracted Bidder, or any of its agents or employees.

**8. Taxes Paid**

Pursuant to Massachusetts General Laws, Chapter 62C, Section 49A, the undersigned certifies under the penalties of perjury that, to the best of my knowledge and belief, all Massachusetts State Tax returns and all Massachusetts State Taxes required under law have been paid, and I have complied with the reporting of employees and Contractors, and withholding and remitting of child support.

**9. Right To Know Law**

Bidder agrees to submit a Material Safety Data Sheet (MSDS) for each toxic or hazardous substance or mixture containing such substance, pursuant to MGL Chapter 111F, Sections 8, 9, 10 and the regulations contained in 454 CMR 21.06 when deliveries are made; and agrees to deliver all containers properly labeled pursuant to MGL Chapter 111F, Section 7 and 454 CMR 21.05. Failure to submit an MSDS and/or label on each container will place the vendor in non-compliance with the Purchase Order and/or Contract. Failure to furnish MSDS and/or labels on each container may result in civil or criminal penalties. All vendors furnishing substances or mixtures subject to MGL Chapter 111F or 454 CMR are cautioned to obtain and read the Law and Rules and Regulations. Failure to comply with these requirements could result in cancellation of Contract.



**10. Foreign Corporation**

In Accordance with Massachusetts General Laws Chapter 30, Section 39L, any foreign Contractor or Sub-Contractor is required to provide a certificate from the Secretary of State stating that such corporation has complied with Massachusetts General Laws Chapter 181, Section 3 and 5, including the date of compliance. Further, bidder's attention is called to Massachusetts General Laws Chapter 268A, in connection with which the bidder is requested to submit the information requested in the signature section of this document.

**11. Compliance**

The undersigned is in compliance with all of the provisions, and shall remain in full compliance with the provisions for the life of any Contract resulting from this solicitation. Bidder is qualified to perform any such Contract and possesses, or shall obtain, all requisite licenses and/or permits to complete performance; shall maintain all unemployment, workers' compensation, and personal liability insurance policies sufficient to cover its performance under any such Contract; and shall comply with relevant prevailing wage rates and employment laws. To the best of its knowledge and belief has paid all local taxes, tax titles, utilities, motor vehicle excise taxes, water and wastewater bills in Massachusetts as required by Law.

**12. Affirmative Action Plan**

In witness whereof, the bidder certifies under the pains and penalties of perjury, that as an employer, it is committed to non-discrimination in employment and if selected to execute contracts with the Commonwealth of Massachusetts and/or the Town of Orleans shall also be committed to procure commodities, services and supplies from certified minority and women-owned business enterprises, businesses owned by individuals with disabilities and businesses owned and controlled by socially or economically disadvantaged individuals, both in the performance of contracts with the Commonwealth of Massachusetts and/or the Town of Orleans execution of this certification by an authorized signatory of the bidder as of the last date indicated below.

**1.02 INSURANCE AND BOND VERIFICATION**

A. The undersigned Bidder Certifies that he has the following insurance coverage:

1. **Workers' Compensation:**

Carrier: \_\_\_\_\_

Address: \_\_\_\_\_

Phone and Fax: \_\_\_\_\_

Policy Number: \_\_\_\_\_

2. **General Liability:**

Carrier: \_\_\_\_\_

Address: \_\_\_\_\_

Phone and Fax: \_\_\_\_\_

Policy Number: \_\_\_\_\_

Policy Limits: \$ \_\_\_\_\_

A.M. Best Rating: \_\_\_\_\_

3. **Automotive Liability:**

Carrier: \_\_\_\_\_

Address: \_\_\_\_\_

Phone and Fax: \_\_\_\_\_

Policy Number: \_\_\_\_\_

Policy Limits: \$ \_\_\_\_\_

A.M. Best Rating: \_\_\_\_\_

4. **All-risk Course of Construction (as applicable):**

Carrier: \_\_\_\_\_

Address: \_\_\_\_\_

Phone and Fax: \_\_\_\_\_

Policy Number: \_\_\_\_\_

Policy Limits: \$ \_\_\_\_\_

A.M. Best Rating: \_\_\_\_\_

5. **Excess Liability (if applicable):**

Carrier: \_\_\_\_\_

Address: \_\_\_\_\_

Phone and Fax: \_\_\_\_\_

Policy Number: \_\_\_\_\_

Policy Limits: \$ \_\_\_\_\_

A.M. Best Rating: \_\_\_\_\_

**B. Additional endorsements to insurance are required for the following coverages:**

**1. Additional Insured**

It is hereby understood and agreed that Additional Insured for General Liability and Auto Liability Coverage shall include: The Owner, its Board, commissions, committees, boards, officers, employees, and agents as additional insured as respects to work done by Named Insured.

**2. Primary Coverage**

With respect to claims arising out of the operations of the Name Insured, such insurance as afforded by the policy is primary, and is not additional to or contributing with any other insurance carried by or for the benefit of the above Additional Insureds.

**3. Cross Liability/Severability of Interest**

The naming of more than one person, firm or corporation as insured under this policy shall not, for that reason alone, extinguish any rights of the insured against another, but this endorsement, and the naming of multiple insureds, shall not increase the total liability of the Company under this policy.

**4. Notice of Cancellation for General Liability and Auto Liability**

It is understood and agreed that in the event of cancellation of or reduction in the policy for any reason, including non-payment of premium, 30 days written notice will be sent to the Project Engineer.

**C. The name of the Bidder's Bonding Company is as follows:**

Carrier/Surety: \_\_\_\_\_

Address: \_\_\_\_\_

Phone and Fax: \_\_\_\_\_

A.M. Best Rating: \_\_\_\_\_

**1.03 RELEVANT EXPERIENCE**

- A. List Bidder’s comparable projects completed by Bidder in the last five (5) years, with Owner contact information. (Attach separate sheets if necessary).

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- B. List any projects where Bidder has been default terminated by an Owner or has been involved in arbitration/litigation with an Owner on a construction project. Provide Owner contact information:

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**1.04 SAFETY & EXPERIENCE RECORD**

- A. The following statements as to safety and experience of Bidder are submitted, and Bidder

- B. guarantees the truthfulness and accuracy of the information:

1. **Safety**

- a. List Bidder’s Interstate Experience Modification Rate for the last three years.

2021: \_\_\_\_\_  
2022: \_\_\_\_\_  
2023: \_\_\_\_\_

- b. State the name of Bidder’s safety Project Engineer/manager or Site Safety Officer: \_\_\_\_\_

**1.05 CONTRACTOR EXPLANATION OR NOTES ON ANY OF THE ABOVE:**

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**1.06 LIST OF ALL EQUIPMENT TO BE USED ON THIS PROJECT (include year, type, size and condition):**

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**1.07 CONTRACTOR'S NARRATIVE ON CONSTRUCTION SCHEDULE AND METHODOLOGY:** *(Please describe in as much detail as possible how your firm/company will proceed with the work as described within the contract documents. Attach or utilize additional sheets if necessary. The Construction Schedule will be requested upon the award of the Contract).*

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**CERTIFICATE OF VOTE OF AUTHORIZATION**  
(TO BE SUBMITTED WITH BID)

I, Clerk of \_\_\_\_\_  
(Name of Corporation)

the principal office of which is located at:  
\_\_\_\_\_  
(Address of Principal Office)

do hereby certify that a duly authorized meeting of the Board of Directors of the above-named corporation held on: \_\_\_\_\_, at which all Directors were  
(Date)

present or waived notice, it was VOTED that:

\_\_\_\_\_  
(Name)  
\_\_\_\_\_ of this corporation be and hereby is authorized to  
(Office)

execute contracts, bonds, and other instruments in the name and behalf of said corporation and affix its corporate seal thereto, and such execution of any contract or other instrument or obligation in this corporation's name on its behalf by the above-named officer shall be valid and binding on this corporation.

I hereby certify that I am the Clerk of this corporation and that the above-named officer was duly elected to the above-stated office and that the above-stated VOTE has not been amended or rescinded and remains in full force and effect as of the date of this contract executed with the Town of Orleans.

A true copy,

Attest:  
\_\_\_\_\_  
, Clerk

(Corporate Seal)

## OSHA TRAINING CERTIFICATION OF CONTRACTORS

The Town of Orleans will comply with the amended M.G.L. C. 30 section 39S “**Contracts for Construction: Requirements**” as follows:

The Town of Orleans in all bids and contracts that fall under the application of this law, as amended, will require bidders and/or Contractors to comply with the requirements of certifying that they and their employees have complied with M.G.L. C.30 section 39S. This law requires successful completion of a 10 hour OSHA safety training course prior to working on the Town’s worksite or in the work subject to the bid or contract.

The Town will reject any bids that do not include proper certification submitted with the bids at the posted time for bid opening, however, the town may, at its sole discretion, allow up to two (2) working days for the Contractor to submit the required certification. In those cases where contracts are offered without using the sealed bid process, the same certification will be due upon contract signing.

It is expected that the Contractor, by signing the certification form provided with the bid is fully meeting the language of the law, as amended, and that they are accepting the responsibilities to comply with the law for the full term of the work.

The statute indicates that with the first certified payroll submitted to the Town, documentation must be provided that each employee on the payroll documents submitted to the Town has successfully completed the OSHA training.

Any employee whose name does not appear on the first certified payroll must submit certification with the first payroll they do appear on. Failure to provide full documentation may result in a delay in payment to the vendor as the packet submitted for payment would be determined to be incomplete.

Any employee found on a worksite subject to this section without documentation of successful completion of a course in construction safety and health approved by the United States Occupational Safety and Health Administration that is at least 10 hours in duration shall be subject to immediate removal.

This certification requirement will go into effect for any bids received or contracts awarded in accordance with M.G.L. C30 39s as amended by Chapter 306 of the Acts of 2004.



**CERTIFICATION FORM**  
**(To Be Attached and Submitted with Bid)**

**OCCUPATIONAL SAFETY AND HEALTH ADMINISTRATION  
(OSHA) TRAINING**

In accordance with Massachusetts General Law Chapter 30, Section 39S, as amended by Chapter 306 of the Acts of 2004, for all contracts for the construction, reconstruction, alteration, remodeling or repair of any public work or the construction, reconstruction, installation, demolition, maintenance or repair of any public building estimated to cost more than \$10,000. The Contractor hereby certifies to the following:

(a) (1) that he is able to furnish labor that can work in harmony with all other elements of labor employed or to be employed in the work; (2) that all employees to be employed at the worksite will have successfully completed a course in construction safety and health approved by the United States Occupational Safety and Health Administration that is at least 10 hours in duration at the time the employee begins work and who shall furnish documentation of successful completion of said course with the first certified payroll report for each employee; and (3) that all employees to be employed in the work subject to this bid have successfully completed a course in construction safety and health approved by the United States Occupational Safety and Health Administration that is at least 10 hours in duration.

(b) Any employee found on a worksite subject to this section without documentation of successful completion of a course in construction safety and health approved by the United States Occupational Safety and Health Administration that is at least 10 hours in duration shall be subject to immediate removal.

(c) The attorney general, or his designee, shall have the power to enforce this section including the power to institute and prosecute proceedings in the superior court to restrain the award of contracts and the performance of contracts in all cases where, after investigation of the facts, he has made a finding that the award or performance has resulted in violation, directly or indirectly, of subsection (b), and he shall not be required to pay to the clerk of the court an entry fee in connection with the institution of the proceeding.

The undersigned hereby certifies under the penalties of perjury to the above:

**Company:** \_\_\_\_\_

**Authorized Signature:** \_\_\_\_\_

**Print Name:** \_\_\_\_\_

**Title:** \_\_\_\_\_

**Date:** \_\_\_\_\_

**Telephone:** \_\_\_\_\_ **Email:** \_\_\_\_\_

**SECTION 005000**  
**AGREEMENT**

Made in triplicate this the \_\_\_\_ day of \_\_\_\_\_ 2024 between the **Town of Orleans, MA AND \_\_\_\_\_**, hereafter the "Contractor".

**WITNESSETH:** That for and in consideration of the following mutual covenants contained herein the parties agree with each other as follows:

**ARTICLE 1 – PROJECT REQUIREMENTS:** The Contractor agrees to sell and/or deliver to the Town materials and/or services in accordance with the following:

The contractor shall perform everything required to be performed, shall provide and furnish all of the labor, equipment, materials, and tools to perform, within 113 calendar days after the NOTICE TO PROCEED, which is anticipated to be given on/about June 10, 2024 and contingent upon funding appropriation authorized at Town Meeting on May 13, 2024 and Annual Town Elections to be held on May 21, 2024. for the following work:

**ROCK HARBOR COMMERCIAL WHARF IMPROVEMENT PROJECT**  
**TOWNS OF ORLEANS, MA**

in strict accordance with the Contract Documents pertaining thereto and signed by the Project Engineer for the Owner, which Documents are incorporated herein and made a part of this Agreement as if herein fully set forth. Subject to all authorized modifications, **on-site work by the selected Contractor may commence on/after October 1, 2024, noting that Contractor activities must accommodate vessel access to/from the commercial bulkhead (excluding the off-loading pier) through October 14, 2024. All Construction shall be completed by no later than April 30, 2025.**

- Exhibit 1. Bid Documents**
- Exhibit 2. Bid**
- Exhibit 3. Certificate of Non-Collusion**
- Exhibit 4: Statement of State Tax Compliance**
- Exhibit 5. Acknowledgment of Principal**
- Exhibit 6. Certificate of Insurance**
- Exhibit 7. 100% Performance Bond**
- Exhibit 8. 100% Payment Bond**
- Exhibit 9. Addenda (if issued)**
- Exhibit 10. Prevailing Wage Schedule # 20240226-078**

**ARTICLE 2 – CONTRACT AMOUNT:** The Town agrees to process the bills for payment to the Contractor upon the execution of the contract, satisfactory completion of the services as outlined in the specifications and approval by the appropriate Department Manager, Town Manager and Town Accountant in the amount of \_\_\_\_\_ -- and 00/100 (\$\_\_\_\_\_.00) Dollars.

**ARTICLE 3 - SUPERVISION:** All of the work to be done shall be done under the direction and supervision of, and to the approval of, Owner or its authorized representative, and the work shall be done in the best workmanlike manner, conforming strictly to the provisions of the specifications and plans made thereof.

**ARTICLE 4 - COMPLIANCE WITH LAWS:** The Contractor shall comply with all applicable provisions of the Massachusetts General Laws inclusionary of any and all Labor and Labor Relations Statutes.

Before the Agreement between Owner and Contractor is entered into, Contractor shall submit written evidence that it and any Sub-Contractors have obtained for the period of the Contract full Workers' Compensation insurance coverage for all persons whom they employ or may employ in carrying out the work under this Contract. This insurance shall be in accordance with the requirements of the most current and applicable state Workers' Compensation insurance laws. The Contractor in signing this Agreement certifies to Owner as true the following statement:

*I am aware of the provisions of Massachusetts General Laws, which requires every employer to be insured against liability for workers' compensation or to undertake self-insurance in accordance with the provisions of that Code, and I will comply with such provisions before commencing the performance of the work of this Contract.*

**ARTICLE 5 - PERFORMANCE STANDARDS:** The Work must be performed and completed in accordance with all requirements of law and no Work shall be undertaken until Contractor has been issued all required permits from all applicable municipal, state and federal governmental bodies. "Completion" of the Work includes obtaining all certificates, or amendments of existing certificates, as the case may be, which relate to the performance of the Work. Unless otherwise specified in this Agreement, the Work must be performed in a good and workmanlike manner and in accordance with the best modern practice and with materials and workmanship of the highest quality. Contractor shall check and verify all dimensions, grades, and levels before commencement of performance and whenever necessary during the progress thereof.

**ARTICLE 6 – PAYMENTS:** Owner shall pay the Contractor for complete and accepted performance of the Work, subject to additions and deductions by Change Orders. The Contractor agrees to provide with each payment application (invoice), lien waivers sufficient to discharge any liability from the Owner to Contractor. Partial payments shall cover work completed through the 25th calendar day of each month for contracts where the number of working days exceeds twenty (20). No partial payments will be made for contracts having a time limit of twenty (20) days or less, unless completion has been significantly delayed by causes which are clearly not the fault of the Contractor. When partial payments are to be made, the Contractor shall submit to the Owner, on Owner' forms, an estimate of the total amount of work accomplished, which will show the computed amount due less a retention which shall be 5% of the value of the work

accomplished. No partial payments will be made for materials stored on the job but not yet installed, unless otherwise provided in the Contract Documents. Each request for payment application must be approved by the Project Engineer and will not be considered as submitted until the Owner, Contractor and Project Engineer agree to unit qualities covered by the payment application. Once Owner has received the approved request for payment application, Owner shall process the Contractor's invoice and pay Contractor any undisputed amount within thirty (30) calendar days from the date of receipt of a complete application for payment from Contractor.

**ARTICLE 7 - JOB SITE:** The Contractor shall at all times enforce strict discipline and good order among its employees and shall not employ on the Work any unfit person or anyone not skilled in the assigned task. The Contractor at all times shall keep the job site free from accumulation of waste materials or rubbish caused by its operations. At the completion of the Work, it shall remove all its waste materials and rubbish from and about the job site as well as its tools, construction equipment, machinery and surplus materials. The Contractor shall comply with all laws, ordinances, rules, regulations, and lawful orders of any public authority bearing on the performance of the Work, the safety of persons and property and their protection from damage, injury, or loss. Contractor shall provide repair response within twenty-four (24) hours of request by Owner during the course of performance of the Work under this Agreement for any repair work that has been poorly constructed and or performed or any work that results in either consequential or actual damage to any property associated with the Contractor's operations.

**ARTICLE 8 - STORAGE OF MATERIALS:** Materials and equipment shall be stored in a neat and orderly manner at locations designated by the Owner, taking all necessary precautions to prevent fire hazards and spontaneous combustion and to conform to the requirements of all applicable regulatory agencies and insurance policies.

**ARTICLE 9 - EQUIPMENT AND MATERIALS:** Contractor shall furnish all labor, tools, scaffolding, ladders, equipment, supplies and materials required in performing all Work under this Agreement. Owner assumes no liability or responsibility for the care, safety, or preservation of any tools, machinery, equipment, material or supplies and all risks thereof are assumed by Contractor.

**ARTICLE 10 - SAFETY PROCEDURES:** Contractor shall at all times take all necessary and customary precautions in introducing and maintaining safety measures to protect the persons and property of others on or adjacent to the Work site against all damage, loss, or injury resulting from the Work involved under this Agreement. Contractor shall comply with any site specific safety plans for the individual project properties. Protective arrangements will be taken in all instances to prevent Work operations from in any way damaging the premises or any personal property or any other work or operations, and from causing or allowing any pollution to leak, flow, or escape into any waterway or sewer. Contractor's obligation to protect shall include the duty to provide, place, and adequately maintain at or about the Worksite suitable and sufficient guards, lights,

barricades, and enclosures. Contractor shall dispose of all hazardous materials used or produced in connection with this Agreement in the manner required by law.

**ARTICLE 11 - PERMITS AND TAXES:** The Contractor shall pay any and all federal, state, and municipal taxes for which the Contractor may be liable in carrying out this Agreement.

**ARTICLE 12 - LIQUIDATED DAMAGES:** Subject to all authorized modifications, it is hereby agreed by the parties to the Agreement that in case all work called for under the Agreement is not finished or completed on or before the time set forth in this Agreement, damage will be sustained by Owner, and that it is and will be impracticable and extremely difficult to ascertain and determine the actual damage which the Owner will sustain in event of and by reason of such delay; Liquidated damages have been read, negotiated and agreed to by both parties as set forth in the project specifications at \$1,500.00 per calendar day. Time is of the essence in all respects on this Contract. The contractor shall accordingly prosecute all Work diligently, using such means and methods of construction as will assure full completion not later than the dates set forth, respectively, as such dates may for good cause (as set forth in the Construction Documents) be extended by the Owner. Nothing in this Article, however, grants the Contractor the privilege to use means or methods that do not accord with sound and accepted practices. The amounts of liquidated damages shall be cumulative and may, at Owner's option, be deducted in whole or in part as a credit from any Contract Sum amounts then owed Contractor or which may have been paid to the Contractor. If no amounts are then owed to Contractor, Contractor shall pay to Owner the amount of liquidated damages upon written demand. The liquidated damages shall cease once the Contractor has fully and completely any breach as set forth hereunder.

**ARTICLE 13 - ABANDONMENT; INCREASE:** All Work shall be performed according to a mutually agreed upon schedule. The suspension of work by the Contractor for any reason (other than the sole fault of the Owner) which exceeds four hundred and eighty hours (480) hours shall be deemed abandonment of the project by the Contractor, and the Owner shall have available any and all remedies, including but not limited to surety participation pursuant to the terms of the Performance Bond.

It is further agreed that in case the work called for under this Agreement is not completed in all of its parts and requirements within the number of calendar days specified, Owner shall have the right to increase the number of calendar days or not, as may seem best to serve the interest of Owner; and if it is decided to increase the said number of calendar days, Owner shall further have the right to charge to Contractor, and deduct from the final payment for the work, all or any part, as Owner may deem proper, of the actual cost of engineering, inspection, superintendence, and other overhead expenses of Owner which are directly chargeable to this Agreement, except that the cost of final surveys and the preparation of the final estimate shall not be included in such charges to be paid by Contractor.

**ARTICLE 14 – INDEMNIFICATION:** The Contractor hereby indemnifies and shall at all times save and hold harmless the Town of Orleans, and its officers, attorneys, employees, and agents from and against any and all claims (including workers' compensation and wage claims), demands, suits, actions, liabilities, damages, penalties, judgments, and costs and expenses, including without limitation additional engineering costs and attorney's fees and the costs and expenses of litigation, of or by anyone that in any way is caused by, arises out of, or is occasioned by the performance, activities, operations, conducts, negligence, or omissions of the Contractor, or any of its agents or employees, including Sub-Contractors.

**ARTICLE 15– INSURANCE:** Contractor, at its sole cost and expense, shall acquire and maintain in full force and effect throughout the term of this Agreement Workers' Compensation, employer's liability, commercial general liability, and owned, non-owned and hired automobile liability insurance coverage relating to Contractor's Work to be performed hereunder covering Owner' and Department's respective risks, as their interest may appear, in form subject to the approval of the Owner. The minimum amounts of coverage corresponding to the aforesaid categories of insurance per insurable event shall be as follows:

<u><b>Insurance Category</b></u>	<u><b>Minimum Limits</b></u>
Workers' Compensation	Statutory minimum and endorsement for United States Longshoremen's & Harbor Workers Act, the Jones Act Coverages
Employer's Liability	Statutory minimum per accident for bodily injury or disease.
Commercial General Liability	\$1,000,000/\$3,000,000 per occurrence for bodily injury, personal injury and property damage.
Excess Liability (Umbrella)	\$5,000,000
Automobile Liability	\$2,000,000 per accident for bodily injury and property damage (coverage required to the extent applicable to Contractor's vehicle usage in performing work hereunder).

Any deductibles or self-insured retentions must be declared to, and approved by Owner. At the option of Owner either Contractor's insurer shall reduce or eliminate the deductibles or self-insured retentions with respect to Owner, it's Board, commissions, boards, committees, officers, agents and employees, or Contractor

shall procure a bond guaranteeing payment of losses and related investigations, claim administration and defense expenses.

Concurrently with the execution of this Agreement, Contractor shall furnish Owner with certificates of the insurance required hereunder and, with respect to evidence of commercial general liability automobile liability and fire insurance coverage, original endorsements:

- (a) Precluding cancellation or reduction in coverage before the expiration of thirty (30) days after Owner shall have received written notification of cancellation or reduction in coverage first class mail.
- (b) Providing that Contractor's insurance shall apply separately to each insured against whom claim is made or suit is brought, except with respect to the limits of the insurer's liability (cross liability endorsements);
- (c) Naming Owner, its Board, commissions, boards, committees, officers, employees and agents as additional insured's; and
- (d) Providing that Contractor's insurance shall be primary insurance relating to Contractor's work hereunder with respect to Owner, and further providing that any insurance or self-insurance maintained by Owner shall not be excess of Contractor's insurance and shall not be contributory with it.

**ARTICLE 16 - FAITHFUL PERFORMANCE BOND:** Contractor shall provide, on the execution of this Agreement, a good and sufficient corporate surety bond in the penal sum of one hundred percent (100%) of amount bid, which bond shall be conditioned upon the faithful performance of all work required to be performed by Contractor under this Agreement. Said bond shall be liable for any and all penalties and obligations which may be incurred by Contractor under this Agreement. Acceptance of the bond by the Owner is subject to the review and approval of the bond by the Owner Counsel's office. See the attached sample Performance Bond.

**ARTICLE 17 - PAYMENT BOND:** In addition to the faithful performance bond required herein, Contractor shall furnish a good and sufficient corporate surety bond in the penal sum of one hundred percent (100%) of amount of bid. Acceptance of the bond by the Owner is subject to the review and approval of the bond by the Owner Counsel's office. See the attached sample Payment Bond.

**ARTICLE 18 - TIME DELAYS:** If the Contractor is delayed in the performance of the Work due to changes ordered in the Work by the Owner or, by labor disputes, fire, unusual delay in transportation, unavoidable casualties, certified natural disasters, then the contract time may be extended by a Change Order for such reasonable time as both parties have mutually agreed upon. Winter weather conditions are not a reason for a delay in the

performance of work. Contractor agrees, as a special inducement to the Owner, to make no claim for damages for delay in the performance of this Contract occasioned by the Owner act, or omission to act, or anyone acting on the Owner' behalf; and Contractor agrees that any claim for delays by the Owner shall be fully compensated for by an extension of time to complete performance of the Contract Work.

**ARTICLE 19 - PAYMENT OF MATERIALMAN AND LABORERS:** The Contractor shall make prompt payment of all claims for labor performed and materials furnished, used or consumed in the Work, including without limitation fuel, lumber, building materials, machinery, vehicles, tractors, equipment, fixtures, apparatus, tools, appliances, supplies, electric energy, gasoline and other motor oil, lubricating oil and greases, and the premiums for Worker's Compensation insurance. Contractor shall indemnify and hold Owner harmless for any and all losses or expenses from any and all mechanic's or material man's liens from being filed on any Owner' Property. Should any mechanic's liens or materials man's liens be filed by Contractor agrees to have any and all releases cleared and satisfied prior to any payments being released. The Owner shall, in its discretion notify Contractor and or Contractor's representative of any lien and require Contractor to release liens as a condition precedent to further monthly progress payments.

**ARTICLE 20 - FINAL PAYMENT:** Upon completion of all the Work included under the Contract, the Contractor shall submit its final invoice. The Owner will, at the expiration of thirty (30) days after delivery of the approved payment application and acceptance, pay, and hereby binds itself to pay the Contractor for accepted work, except such sum or sums of money as may have been already paid, and as may be lawfully retained under any of the provisions of the Agreement herein set forth. Prior to the final payment, the Contractor will deliver to the Owner waivers of lien from all those who supplied labor, material, or services in completion of the Contract, together with satisfactory proof of full payment to such suppliers.

**ARTICLE 21 - PAYMENTS AND COMPLETION:** Any payment not made when duly due and owing to the Contractor shall bear interest at the rate of seven percent (7%) per annum from the date on which said amount is found to be due and payable until the date, which it is paid. Payments may be withheld on account of (1) Work defects not remedied, (2) claims filed, (3) failure of the Contractor to make payments properly to sub-Contractor's or for labor, materials or equipment, (4) damage of the Owner' property or neighboring property, or (5) failure to carry out the Work in accordance with this Agreement or any other breach of this Agreement.

**ARTICLE 22 - CHANGE ORDERS:** (a) Contractor understands that the Owner may modify or change the details of the Project so as to require the performance of extra Work. All change orders or modifications to the Agreement shall be in writing, signed by the Contractor and the Owner. If any changes are made, Contractor will perform the same but only after receiving a written order for such performance from the Owner, it being understood by Contractor that under no circumstances shall any extra Work be performed unless and until such written order is given to Contractor by the Owner. For any such extra Work performed, Contractor shall be compensated by the Owner at the unit prices set forth in the Contract Documents, or for unspecified items shall be negotiated by the Owner and



Contractor in a commercially reasonable amount at the time the Change Order is signed. The Owner may at its election omit items from the Contract Work whenever the Owner deems it advisable to do so. And if the Owner shall notify Contractor of such omission, the omitted Work shall not be performed and there shall be deducted from the Contract price at the stated amounts set forth in the Contract Documents or for unspecified items, a commercially reasonable amount at the time the Change Order is signed to compensate for the omission.

If any dispute shall arise at any time on a claim by Contractor that an item of Work is not Contract Work but extra Work, Contractor shall nevertheless perform the same if directed to do so by the Owner. However, to preserve Contractor's right to claim extra compensation for the disputed Work, Contractor must, prior to the commencement of the disputed Work, notify the Owner in writing that Contractor is performing the same under protest. The same procedure shall prevail as to any dispute as to a deduction for omitted Work (or as the case may be, to sustain Contractor's contention as to the appropriate compensation for extra Work that is not disputed to be an "extra" as long as the Contractor so notifies the Owner prior to commencement of the "extra") the notice in that circumstance to be given no later than ten (10) days after the tender of payment by the Owner to Contractor of the reduced amount (failing such written protest, it shall be deemed that Contractor has acquiesced to the Owner's contention that the Work is not extra but Contract Work or that the reduction (or amount of compensation for a non-disputed "extra" is correct, as the case may be). The giving of the protest provided for above, and giving it timely, are express conditions precedent to maintaining any remedial procedure, whether arbitration or otherwise, pertaining to Contractor's claim.

**ARTICLE 23 - WARRANTIES AND CORRECTION OF WORK:** Contractor warrants materials and workmanship to be in compliance with all applicable codes, ordinances and laws, constructed according to sound engineering and construction standards, in a workmanlike manner, and to be free from defects and liens at the time of installation and performance and as of the Completion Date. Contractor shall promptly perform such work and supply such materials necessary to correct, at its own expense, defects in materials and workmanship, and any Work failing to conform to the Agreement. In the event that Contractor fails to perform any Warranty Work within thirty (30) days of written notice by the Owner, or in the event that performance is not possible within such time period because of weather or other unavoidable delays and if the Contractor fails to provide a written undertaking to the Owner to perform such Warranty Work within a specific time period after notice, then the Owner shall be entitled to contract for the repairs or replacement of the defective work with a third party and Contractor agrees to reimburse the Owner for the costs of such Warranty Work promptly upon demand, together with interest at the rate provided herein on any sums unpaid under the Agreement and all costs of collection, including reasonable attorney's fees, if such reimbursement is not made within thirty (30) days of written demand therefore by the Owner.

**ARTICLE 24 - COOPERATION WITH CONSULTANT:** Contractor understands and agrees that the Owner has hired Foth Infrastructure & Environment, LLC (FOTH) as Construction Manager, Project Engineer and Project Consultant. Contractor agrees to fully

cooperate with FOTH or any other such person or organization with regard to such oversight.

**ARTICLE 25 - DEFAULT AND TERMINATION:** The following shall be considered to be Events of Default under the Contract:

- a. Contractor's failure to complete all Work in accordance with the schedule provided for in the Agreement;
- b. Contractor's failure to perform the Work described in the Agreement in accordance with the scope of services and specifications provided;
- c. The dissolution, termination of existence, insolvency, or business failure of the Contractor;
- d. The appointment of a receiver for any property belonging to Contractor;
- e. Contractor's making of an assignment for the benefit of creditors, or the commencement of proceedings under a bankruptcy or insolvency law by or against the Contractor;
- f. The failure of the Contractor to obtain or maintain any insurance coverage required under the contract; and
- g. Contractor's failure to comply with any of the Agreement terms as set forth in the specifications plans and permits required.

If an Event of Default is not corrected or remedied within five (5) working days of written notice of such default, then the Owner shall be entitled to terminate this Agreement without further notice. In such event, the Owner shall be entitled to contract for the completion of the Work to be performed under the Agreement by a third party and Contractor shall be responsible for all extra costs and damages incurred by the Owner.

**ARTICLE 26 – NOTICES:** Notices to be given under this Agreement shall be in writing and may be personally delivered or sent by United States mail, first class postage prepaid, addressed to the respective party at the address set forth above, or to such other addresses that the parties shall designate in writing from time to time. Notices shall be deemed given when personally delivered or three (3) business days after mailing.

**ARTICLE 27 – CAPTIONS:** Any captions to or headings of the sections, paragraphs or subparagraphs of this Agreement are solely for the convenience of the parties, are not a part of this Agreement and shall not be used for the interpretation or determination of the validity of this Agreement or any provision hereof.

**ARTICLE 28 – INCONSISTENCIES:** To the extent that any term or provision of the Contractor's Bid is inconsistent with any term or provision contained in this document, the terms and provisions contained in this document shall supersede and control this Agreement. To the extent that any term or provision in this agreement is found to be void or unenforceable, nevertheless any and all remaining terms shall remain in full force.

**ARTICLE 29 – DEFINITIONS:** Terms and phrases, which are defined in any part of this Agreement, shall have the defined meanings wherever used throughout this Agreement. The terms “hereunder” and “herein” and similar terms used in this Agreement shall refer to this Agreement in its entirety and not merely the article, section, sub-section, paragraph or sub-paragraph in which they are used.

**ARTICLE 30 - STATE LAW:** This Agreement and its application shall be governed by the laws of the Commonwealth of Massachusetts. Any and all disputes shall be brought in the trial court for **Barnstable County**, Massachusetts

**ARTICLE 31 - ENTIRE AGREEMENT; INTEGRATION:** This Agreement supersedes any and all other Agreements, either oral or in writing, and contains all of the covenants and agreements between the parties. Each party to this Agreement acknowledges that no representations, inducements, promises or agreements, orally or otherwise, have been made by either party or anyone acting on behalf of any party to this Agreement, which is not embodied herein, and that no other agreement, statement or promise not contained in this Agreement shall be valid or binding. Any modification of this Agreement will be effective only if it is in writing, signed by the party to be charged. If any provision in this Agreement is held by a court of competent jurisdiction to be invalid, void or unenforceable, the remaining provisions will nevertheless continue in full force without being impaired or invalidated in any way. Failure of any party hereto at any time to require performance by the other party of any provision of this Agreement shall not affect the right of such party to require performance of that provision, and any waiver by any party of any breach of any provision of this Agreement shall not be construed as a waiver of any continuing or succeeding breach of such provision, a waiver of the provision itself, or a waiver of any right under this Agreement. This Agreement may be executed in any number of counterparts by different parties hereto in separate counterparts, each of which when so executed and delivered shall be deemed to an original and all of which counterparts of this Agreement, taken together, shall constitute but one and the same instrument. Neither Contractor nor Owner shall assign, sublet or transfer any rights under or interest of this Agreement (including, but without limitation, moneys that may become due or moneys that are due) without the prior written consent of the other, except to the extent that any assignment, subletting or transfer is mandated by law or the effect of this limitation may be restricted by law. Unless specifically stated to the contrary in any written consent to an assignment, no assignment will release or discharge the assignor from any duty or responsibility under this Agreement. Contractor and Owner each is hereby bound, and the partners, successors, approved assigns, executors, Managers, and legal representatives of each are hereby bound to the other party to this Agreement and to the partners, successors, approved assigns, executors, Managers, and legal representatives of such other party, in respect to all covenants, agreements and obligations of this Agreement.

The documents listed below are part of the Contract Documents and are incorporated by this reference as if fully set forth herein. Contractor shall pay particular attention to any and all mitigation measures set forth in the permit documents and shall comply with same.

- A. Contract Specifications
- B. Contract Drawings

- C. Addendums
- D. Invitation for Bids
- E. Notice to Bidders
- F. Bid Requirements
- G. Bid
- H. Agreement
- I. Notice of Award
- J. Faithful Performance Bond
- K. Payment Bond
- L. General and Special Conditions
- M. Supplemental Conditions
- N. General Requirements
- O. Technical Specifications
- P. Attachments:

PERMITS

- Order of Conditions, Town of Orleans, MA; MADEP File# SE54-2594; date issued 09/20/2022.
- Order of Conditions, Town of Orleans, MA; MADEP File# SE54-2618; date issued 08/15/2023.
- MADEP 401 Water Quality Certification #WW08-0018-APP; date issued 06/09/2023.
- MADEP Chapter 91 Waterways License #WW01-0000211; date issued 07/24/2023.
- US Army Corps of Engineers Permit NAE-2022-02268; date issued 07/17/2023.
- Certificate of Appropriateness, Old Kings Highway District Commission, Approved: 02/01/2024.

ATTACHMENT A: Boring Logs

ATTACHMENT B: Drawings Entitled: *“Rock Harbor Commercial Wharf Improvements”*, Town of Orleans, Massachusetts, Department of Public Works; Issued for Bid on 03/08/2024 (57 total sheets, including cover sheet)

ATTACHMENT C: Massachusetts Prevailing Wage Rates; Issuance Date 02/26/2024 (41 pages)

ATTACHMENT D: Historic Record Information

**ARTICLE 32 - UNDISPUTED PAYMENTS:** The acceptance by the Contractor of an undisputed payment made under the terms of the Contract shall operate as, and shall be, a release to the Owner, and their duly authorized agents, from all claims of and/or liability to Contractor arising by virtue of the Contract related to those amounts. Disputed contract

claims in stated amounts may be, specifically excluded by the Contractor from the operation of the release.

**ARTICLE 33 - SUBSTITUTION OF SECURITIES:** The Contractor may substitute securities for the amounts retained by the Owner to ensure performance of the Contract in a form acceptable to the Owner(s).

**ARTICLE 34 - STATEMENT UNDER PENALTY OF PERJURY:** The representations made herein, including the Bidder's licensing information hereinafter furnished, are made under penalty of perjury. The undersigned understands that any bid not containing said licensing information, or containing any information, which is subsequently proven false, shall be considered non-responsive, and shall be rejected by Owner.

**ARTICLE 35 – UNENFORCEABILITY:** In the event that any provision of this Agreement is unenforceable or held to be unenforceable, then the parties agree that all other provisions of this Agreement have force and effect and shall not be affected thereby.

**ARTICLE 36 - FINAL PAYMENT SUBJECT TO ACCEPTANCE:** Final Payment is subject to acceptance of the Project by Owner.

**ARTICLE 37 - FORCE MAJEURE:** Either party's performance under this agreement is subject to acts of God, war (declared or undeclared), government regulation, terrorism, disaster, strikes, civil disorder, curtailment of transportation facilities, or similar occurrence beyond the party's control, making it impossible, illegal or commercially impracticable for one or both parties to perform its obligations under this agreement, in whole or in part. Either party may terminate this agreement without liability for any one or more of such reasons upon written notice to the other party within ten (10) days of such occurrence or receipt of notice of any of the above occurrences.

**ARTICLE 38 – AUTHORIZATION:** Each party by signing below hereby warrants that they are fully and duly authorized to enter into this agreement, do so freely and have read and understand the conditions and terms set forth herein along with any and all other documents forming the Contract Documents.

**IN WITNESS:** Whereof the respective parties hereto have caused this instrument to be duly subscribed and sealed.

**TOWN OF ORLEANS**

**(INSERT CONTRACTOR'S NAME)**

\_\_\_\_\_  
Kimberly Newman  
Town Manager

\_\_\_\_\_  
Signature of Individual or  
Corporate Name (Mandatory)

APPROVED AS TO APPROPRIATIONS:

\_\_\_\_\_  
Corporate Officer  
(Mandatory, If applicable)

\_\_\_\_\_  
Orleans Town Accountant

SOURCE: \_\_\_\_\_

\_\_\_\_\_  
EIN # (Mandatory)

Not to Exceed: \$ \_\_\_\_\_

**\*\*\*END OF SECTION\*\*\***

**SECTION 005100**  
**NOTICE OF AWARD**

DATE : \_\_\_\_\_

TO: \_\_\_\_\_  
\_\_\_\_\_

ADDRESS: \_\_\_\_\_  
\_\_\_\_\_

**RE: ROCK HARBOR COMMERCIAL WHARF IMPROVEMENT PROJECT  
TOWN OF ORLEANS, MA**

The Contract Sum of your contract is \_\_\_\_\_ Dollars  
(\$ \_\_\_\_\_).

Four (4) copies of each of the Contract Documents accompanying will be delivered separately or otherwise made available to you.

You must comply with the following conditions precedent within ten (10) calendar days after the date of this Notice of Award, that is by \_\_\_\_\_.

- A. You must deliver to the Owner four (4) fully executed counterparts of the Agreement. Each of the Contract Documents must bear your signature.
- B. You must deliver to the Owner the Performance Bond, executed by you and your surety.
- C. You must deliver to the Owner the Construction Labor and Material Payment Bond, executed by you and your surety.
- D. Provide all certificates of insurance and endorsement pages required hereunder to the Owner.

Failure to comply with these conditions within the time specified will entitle the Owner to consider your Bid abandoned, to annul this Notice of Award, and to declare your Bid Security forfeited.

Within ten (10) Days after you comply with those conditions, the Owner will return to you one fully signed counterpart of the Agreement.

Owner: (Town of Orleans)

BY: \_\_\_\_\_  
(Name and Title)

**SECTION 006100**  
**FAITHFUL PERFORMANCE BOND**

KNOW ALL MEN BY THESE PRESENTS: that, WHEREAS, Town of Orleans ("Owner"), Commonwealth of Massachusetts, has awarded to \_\_\_\_\_, hereinafter designated as the "Principal", a contract (the "Contract"), the terms and provisions of which Contract are incorporated herein by reference, for constructing the following project:

**ROCK HARBOR COMMERCIAL WHARF IMPROVEMENT PROJECT**  
**TOWN OF ORLEANS, MA**

and

**WHEREAS**, said Principal is required under the terms of said Contract to furnish a bond for the faithful performance of said Contract;

**NOW, THEREFORE**, we, the Principal, and \_\_\_\_\_, as surety, are held and firmly bound unto Owner, in the penal sum of \_\_\_\_\_ and \_\_\_\_/100 Dollars (\$ \_\_\_\_\_), lawful money of the United States, being one hundred percent (100%) of the Contract amount, for the payment of which sum well and truly to be made, we bind ourselves, our heirs, executors, Managers and successors, jointly and severally, firmly by these presents.

**THE CONDITION OF THIS OBLIGATION IS SUCH**, that if the above bounden Principal, his or its heirs, executors, Managers, successors or assigns, shall in all things stand to and abide by, and will truly keep and faithfully perform the covenants, conditions, and agreements in the said Contract and any alterations made as therein provided, on his or their part, to be kept and performed at the time and in the manner therein specified, and in all respects according to their true intent and meaning, and shall indemnify and save harmless, Owner, its Board, officers, employees and agents, as therein stipulated, then this obligation shall be null and void; otherwise it shall be and remain in full force and virtue.

As a condition precedent to the satisfactory completion of the said Contract, the above obligation shall hold good for a period of one (1) year after the completion and acceptance of the said work, during which time if the above bounded Principal, his or its heirs, executors, Managers, successors or assigns shall fail to make full, complete and satisfactory repair and replacements or totally protect the said Owner from loss or damage made evident during said period of one (1) year from the date of acceptance of said work, and resulting from or caused by defective materials or faulty workmanship, in the prosecution of the work done, the above obligation shall be and remain in full force and virtue.



And the said Surety, for value received, hereby stipulates and agrees to waive any consent to change, extension of time, alteration, or addition to the terms of the Contract or to the work to be performed thereunder or the Specifications accompanying the same shall in any way affect its obligations on this bond; and it does hereby waive notice of any such change, extension of time, alteration or addition to the terms of the Contract, or to the work, or to the Specifications.

In the event Owner, or its successors or assigns, shall be the prevailing party in an action brought upon this bond, then, in addition to the penal sum hereinabove specified, we agree to pay to the said Owner, or its successors or assigns, a reasonable sum on account of attorney's fees in such action, which sum shall be fixed by the court.

**IN WITNESS THEREOF**, the above bounden parties have executed this instrument under their seals this day of \_\_, \_\_\_\_\_, 20\_\_, the name and corporate seal of each corporate party being hereto affixed, and these presents duly signed by its undersigned representative, pursuant to authority of its governing body.

**Principal**

**Witness as to Principal**

By:

\_\_\_\_\_  
**Address**

\_\_\_\_\_  
**Surety**

ATTEST:

**Witness to Surety**

**Attorney-in-Fact**

(Seal)

If **Contractor** is partnership, all partners must execute **BOND**.

**\*\*\*END OF SECTION\*\*\***

**SECTION 006200**  
**PAYMENT BOND**

KNOW ALL MEN BY THESE PRESENTS: That we, \_\_\_\_\_

as Principal, and, \_\_\_\_\_ organized and existing under the laws of the Commonwealth of Massachusetts, and authorized to execute bonds and undertaking as sole surety, as Surety, are held and firmly bound unto any and all persons named whose claim has not been paid by the Contractor, company or corporation in the aggregate total of \_\_\_\_\_ and \_\_\_\_/100 Dollars (\$\_\_\_\_\_) (being 100% of the Contract amount) for the payment whereof, well and truly to be made, said Principal and Surety bond themselves, their heirs, Managers, successors, and assigns, jointly and severally, firmly by these presents.

**THE CONDITION OF THE FOREGOING OBLIGATION IS SUCH** that, whereas the above with Town of Orleans ("Owner") to do the following work, to-wit:

**ROCK HARBOR COMMERCIAL WHARF IMPROVEMENT PROJECT**  
**TOWN OF ORLEANS, MA**

**NOW, THEREFORE**, if the above-bounden Principal or his Sub-Contractors fail to pay any of the persons named or unnamed, or amounts due under the Unemployment Insurance Code with respect to work or labor performed under the Contract, or for any amounts required to be deducted, withheld, and paid over to the Employment Development Department from the wages of employees of the Contractor and his Sub-Contractor pursuant to the Unemployment Insurance Code of the Commonwealth of Massachusetts, with respect to such work and labor, the surety will pay for the same, in the amount not exceeding the sum specified in this bond, and also, in case suit is brought upon this bond, a reasonable attorney's fee, to be fixed by the Court.

This bond shall inure to the benefit of any person named or who has provided goods or services so as to give a right of action to them or their assignees in suit brought upon this bond.

And the said Surety, for value received, hereby stipulates and agrees to waive the provisions regarding consent to change, extension of time alteration, or addition to the terms of the Contract, or to the work to be performed thereunder, or the Specifications accompanying the same, shall in any way affect its obligations on this bond; and it does hereby waive notice of any such change, extension of time, alteration, or addition to the terms of the Contract, or to the work, or to the Specifications.

**IN WITNESS WHEREOF**, the above bounden parties have executed this instrument under their seals this \_\_\_\_\_ day of \_\_\_\_\_, 20\_\_ the name and corporate seal of each corporate party being hereto affixed and these presents duly signed by its undersigned representative, pursuant to authority of its governing body.

**Principal**

**Witness as to Principal**

By: \_\_\_\_\_

\_\_\_\_\_  
**Address**

\_\_\_\_\_  
**Surety**

ATTEST:

\_\_\_\_\_  
**Witness to Surety**

**Attorney-in-Fact**

\_\_\_\_\_(Seal)

If **Contractor** is partnership, all partners must execute **BOND**.

**\*\*\*END OF SECTION\*\*\***

**SECTION 007000**  
**GENERAL AND SPECIAL CONDITIONS**

**PART 1: GENERAL**

**1.01 SCOPE OF WORK**

- A.** The project generally consists of steel bulkhead reconstruction, installation/reconstruction of timber piers, installation of new concrete commercial off-loading pier and public viewing platform, floating docks, berthing piles, site drainage, new fuel lines and dispensers, removal of existing underground fuel tanks and utility improvements including electrical and water services at the existing commercial wharf facility. All work shall be performed as shown on the Contract Drawings, specified herein and/or is evidently required to complete the work and the specifications set forth herein. Performance Bond shall equal 100% of contract price. Payment Bond shall equal 100% of contract price.
- B.** The Owner may select a Contractor based upon bids received and provided there are sufficient funds available and regulatory approvals are in-hand. The Owner will require an executed contract, which it will prepare, bonds and insurance certificates as set forth herein prior to any activities being commenced by the selected Contractor.
- C.** Owner reserves the right to reject any and all Bids if it is deemed to be in the best interest do so.
- D.** The bid and schedule of value(s) as proposed by the Contractor in its offer shall be firm and include any and all labor, materials, equipment, supplies, overhead and profit to perform and deliver a complete project as set forth herein and on the project plans.
- E.** The Contractor must include any and all materials, labor, equipment or other items in each bid item. If an item includes ancillary work or apparatuses then the item must be priced by the Contractor to include such other work.
- F.** Measurements and calculations shall be reviewed for accuracy by the Project Engineer and prepared for submission to the Owner. The Contractor shall coordinate any and all construction activities to allow the Project Engineer to verify quantities such that verification activities are minimal and the processing of payment application is effectuated in a timely and organized manner.
- G.** Any requests for information (RFI's) shall be submitted to the Project Engineer in writing. The Project Engineer shall endeavor to have all responses from Contractor's request for information within seven (7) working days of the submitted date, thereby the Contractor is to plan construction activities accordingly.

- H.** The Contractor is an independent entity and shall act as an independent Contractor and not as an agent or employee of Owner or Project Engineer. Nothing herein creates a relationship of partnership, joint venture, or principal and agent between the parties. The Contractor shall have complete professional, managerial, technical and supervisory responsibility for the work provided hereunder including the direction and control of all personnel providing goods, equipment, materials and/or services pursuant to or in furtherance of the work whether directly or indirectly employed or working for the Owner or the Project Engineer. The Owner and the Project Engineer shall retain the right to stop and start the work, adjust the schedule of work, coordinate the Contractor's work with other work and receive reports; however, such rights shall not be construed as controlling the details of the work.

### **1.02 PROJECT SITE**

- A.** The work to be performed is located 113 Rock Harbor Road, Orleans, MA 02653. The exact project locations are denoted as shown on the Contract Drawings that have been issued.

### **1.03 DRAWINGS AND SPECIFICATIONS**

- A.** All work shall conform and be in accordance with these specifications and/or the accompanying drawings entitled:

**“ROCK HARBOR COMMERCIAL WHARF IMPROVEMENTS”**

Contract Drawings issued for bid on 03/08/2024 consisting of a total of 57 sheets (including Cover Sheet) as prepared by Foth Infrastructure & Environment, LLC (Foth), 15 Creek Road, Marion, MA 02738 and stamped by Alex I. Mora P.E. and Scott Skuncik, P.E. (Foth). Robert P. Coluccio, P.E., Web Engineering Associates, Inc (WEB) and David P. Columbo P.E., Power Engineers, LLC. Drawings are on file with the Owner and any changes, drawings and direction(s) that may from time to time be furnished by the Project Engineer.

### **1.04 WORK SEQUENCE**

- A.** General: There are certain essential criteria relative to the preparation of a work sequence and time schedule that the Contractor will be required to implement and follow during the performance of all work. The Contractor shall begin work by providing and establishing horizontal and vertical control, locating the project limits and mobilization of all necessary equipment to the project site.
- B.** The Contractor's work methods and schedule shall be planned and carried out such that there is no damage to any existing structures. Any and all existing structures are to be carefully and adequately protected, such that they are not in any way damaged or compromised. Any damage to adjacent structures or any property which is in any way damaged as a result of (directly or consequently) to any activities undertaken by the Contractor shall remain at all times at the Contractor's expense and peril.

- C. On-site work by the selected Contractor may commence on/after October 1, 2024, noting that Contractor activities must accommodate vessel access to/from the commercial bulkhead (excluding the off-loading pier) through October 14, 2024. All Construction shall be completed by no later than April 30, 2025.**
- D.** The Order of Work shall be developed by the Contractor and submitted in his/her construction schedule. The Contractor will be responsible for coordinating construction activities with the Owner's facility schedules.
- E.** Hours of Operation: Working hours are allowed seven (7) days a week between the hours of 7:00 A.M. and 5:00 P.M unless otherwise specified or approved by the Owner.

#### **1.05 CONTRACTOR'S LIABILITY INSURANCE**

- A.** The Contractor shall purchase and maintain such insurance as will protect him/her from the Contractor's operations under the Contract, whether such operations be by himself/herself or by any Sub-Contractor or by anyone directly or indirectly employed by any of them or by anyone for whose acts any of them may be liable.
- B.** Insurance similar to that required of the Contractor shall be provided by or on behalf of all Sub-Contractors to cover their operations performed under the Contract Documents. The Contractor shall be held responsible for compliance with and enforcement of the insurance requirements and for any modifications of these insurance requirements as they apply to Sub-Contractors. The Contractor shall not permit any Sub-Contractor commence work until such Sub-Contractor has furnished evidence that insurance has been procured and certificates of insurance have been obtained by the Contractor providing that, in the event of restrictions in or cancellation of Sub-Contractor policies, thirty (30) days advance written notice be given to Contractor by U.S. first class mail.
- C.** The Contractor shall purchase and maintain during the life of this Contract:
  - 1. Insurance sufficient to discharge its obligations under all applicable workers' or workmen's compensation laws of the territories and States of the United States.
  - 2. Employer's liability insurance with minimum limit per accident or disease as required by statute.
  - 3. Statutory disability and other employee benefit insurance.
- D.** The Contractor shall purchase and maintain during the term of this Contract, at a minimum, comprehensive liability insurance including a comprehensive broad form endorsement and covering the full scope of this contract with limits not less than \$1,000,000 per occurrence and \$3,000,000 per occurrence and aggregate for property damage. All policies issued shall include permission for partial or total occupancy of the premises by the Owner within the scope of this Contract. Such insurance shall include at least the following:

1. Comprehensive general liability insurance, including all products, premises-operations, and completed operations liability, independent Contractors, additional interests of employees, incidental medical malpractice liability, including notice of occurrence and knowledge of occurrence endorsements satisfactory to the Owner.
2. Comprehensive business automobile liability insurance covering use of any motor vehicle to be used in conjunction with this contract with a minimum coverage of \$2,000,000. A compulsory Massachusetts automobile policy is acceptable for vehicles registered in Massachusetts only.
3. Coverage for loading and unloading of any motor vehicle must be covered by endorsement to the comprehensive (or compulsory) automobile liability policy.
4. Blanket contractual liability insurance covering all liabilities assumed under the Contract Documents, including, but not limited to, Contractor's obligations under the General Conditions.
5. Personal injury coverage endorsement (coverages A, B, and C), with no exclusions for liability assumed contractually or injury sustained by employees of Contractor.
6. Excess Liability coverage in an amount which is to be no less \$5,000,000.
7. Broad form coverage for damage to property of the Owner, as well as other third parties, while in the care, custody, or control of Contractor.
8. Insurance sufficient to discharge its obligations under all applicable workers' or workmen's compensation laws of the territories and states of the United States., the United States Longshoremen's & Harbor Workers Act, the Jones Act and Admiralty or Maritime Law. If any operations performed within the scope of this Contract by Contractor or its Sub-Contractors require the use of any aircraft or watercraft (owned or un-owned), Contractor shall maintain liability insurance satisfactory to, and naming as an additional insured, the Owner.
9. Insurance similar to that required of the Contractor shall be provided by or on behalf of all Sub-Contractors to cover their operations performed under the Contract Documents. The Contractor shall be held responsible for compliance with and enforcement of the insurance requirements and for any modifications of these insurance requirements as they apply to Sub-Contractors. The Contractor shall not permit any Sub-Contractor commence work until such time as the Sub-Contractor has furnished evidence that insurance has been procured and certificates of insurance have been obtained by the Contractor, forwarded to the Owner and provide that, in the event of restrictions in or cancellation of Sub-Contractor policies, thirty (30) days advance written notice be given to Contractor and Owner by registered mail.

10. Insurance certificates acceptable to the Owner evidencing the above coverages are to be furnished to the Owner prior to execution of any Contract. Any and all such certificates and all insurance policies required by these Insurance Requirements shall contain provisions requiring at least 30 (thirty) days prior written notice to the Owner of any cancellations of, or material change in the policies. Certificates shall indicate effective dates of expiration of policies and shall refer to the corresponding subparagraphs listed above. An additional certificate evidencing continuation of all insurance coverages is required to remain in force after final payment, and neither final payment nor any remaining retainage under this contract shall be due until such certificate has been submitted to the Owner.
11. All insurance policies provided pursuant to the foregoing provisions of these Insurance Requirements shall be in the form and written by companies satisfactory to the Owner, and the Owner shall be named as an additional insured. All such policies shall contain provisions or endorsements necessary to assure coverage of claims by one insured against another. All required insurance policies are to be endorsed to state that the Contractor's policies shall be primary to all other insurance available to the Owner for liability arising out or resulting from the Contractor's operations under the Contract, whether such operations be by Contractor or by a Sub-Contractor or by anyone directly to indirectly employed by any of them or by anyone for whose acts any of them may be liable.
12. The purchase of insurance to satisfy the above requirements, or the furnishing of certificates evidencing same, shall not be a satisfaction of Contractor's liability under this Contract or in any way modify Contractor's indemnification of the Owner.
13. Without limitation of any other provisions of the Contract Documents, if (a) the Contractor's agreement herein to insure or to name as an insured the Owner with respect to contractual liability assumed by the Contractor under the terms of the Contract Documents or otherwise, or (b) any contract of insurance between the Contractor or any Sub-Contractor and its or their insurance company, shall to the extent be or be determined to be void and unenforceable, it is the intent of the Owner that such circumstances shall not otherwise affect the validity or enforceability of the Contractor's agreements and obligations under the Contract documents nor the validity or enforceability of such contract or insurance, each of which shall be enforced to the fullest extent permitted by law. Insurance sufficient to discharge its obligations under all applicable workers' or workmen's compensation laws of the territories and states of the United States, the United States Longshoremen's & Harbor Workers Act, the Jones Act and Admiralty or Maritime Law.
14. Without limitation of any other provisions of the Contract Documents, if (a) the Contractor's agreement herein to insure or to name as an insured the



Owner with respect to contractual liability assumed by the Contractor under the terms of the Contract Documents or otherwise, or (b) any contract of insurance between the Contractor or any Sub-Contractor and its or their insurance company, shall to the extent be or be determined to be void and unenforceable, it is the intention of the parties that such circumstances shall not otherwise affect the validity or enforceability or the Contractor's agreements and obligations under the Contract documents nor the validity or enforceability of such contract or insurance, each of which shall be enforced to the fullest extent permitted by law.

15. The Contractor shall purchase and maintain during the term of this contract property insurance in the amount of the contract value plus any subsequent revisions of the contract. Such insurance shall name the Owner as an additional insured and shall insure against all perils normally covered in an "all risk" form, including flood and earthquake. This insurance shall include coverage of owned and rented tools, equipment, temporary facilities and other items, whether or not the capital value of which has been included in the contract amount, and shall also include coverage for portions of the work stored off the site or in transit which are included in any application for payment. Deductibles in the Contractor's coverage shall be the responsibility of the Contractor. Certificates or binders of insurance indicating that the Contractor has obtained the aforesaid property insurance coverage shall be filed with the Owner prior to execution of the Contract. If binders are filed, certificates shall then be filed for the coverage prior to the expiration date of the binder. The policy shall be written with an insurance company with a Best's insurance rating classification of "A" or better. Such certificates and binders shall be in form and substance reasonably acceptable to the Owner and shall contain a provision that such property insurance coverage shall not be materially changed or canceled until at least 30 (thirty) days prior to written notice has been given to the Owner.
16. In the event that the Contractor or the Contractor's insurance company fails to provide the Owner with documentation sufficient in the Owner's sole discretion to remedy all damage and loss to any property referred to in the above section.

#### **1.06 SURETY BONDS**

- A. The Contractor shall obtain a payment and performance bond for one hundred percent of the contract value naming the Owner and project and present the bond to the Owner prior to the commencement of any work on the project. The surety shall be "AAA" rated admitted in the Commonwealth of Massachusetts with duly granted authority to produce bonds and shall be approved by the Project Engineer as an acceptable security for the project. Any modifications, additions or deletions to the Contractor's bid during the contract performance shall be the Contractor's expressed responsibility to notify the surety where the bond(s) are procured. A failure to notify the surety of a material addition, deletion or

modification to the project shall be at the Contractor's peril and shall be deemed as accepted by the Contractor's surety as ratified. The Contractor hereby warrants to the Owner that the Contractor's surety has had ample opportunity to review the plans, specifications and agreements and by issuing a payment and performance bond ratifies and agrees to be bound to the conditions and terms set forth herein and the Contractor's surety agrees to the same.

- B.** The Contractor and Owner agree that any and all costs for procuring, securing or otherwise obtaining any of the aforementioned insurance and/or bonds is the expressed responsibility of the Contractor and has been included in the Contractor's bid to the Owner.

### **1.07 PRE-BID MEETING**

- A.** A non-mandatory, Pre-Bid Conference will be conducted at the Project Site located at 113 Rock Harbor Road, Orleans, MA at 10:00 A.M. on Monday, March 18, 2024 which will overview and acquaint the Contractor with the work set forth hereunder. The Contractor is to fully apprise himself or herself of the site conditions, access to the project site and price their bid in order to take any and all constraints into account such that the Contractor is prepared to provide whatever means and at whatever costs necessary to insure that measures are in place to insure that the project is executed according to the plans and specification set forth herein. Questions regarding the site or to coordinate any access that the Contractor wants to undertake prior to the submission of a bid may be addressed to the Project Engineer. As such the Contractor shall examine the existing conditions and thoroughly acquaint himself or herself with the obstacles and advantages of performing the work. The Contractor shall also study the Contract Drawings and compare the same with the information gathered during his examination of the site, as no extra compensation will be authorized for work resulting from the Contractor's unfamiliarity with the site and/or the drawings, or the conditions peculiar to this job. If the Contractor chooses not to attend this meeting, he/she shall waive the right to raise their non-attendance as a defense or claim for any cause whatsoever for any information provided at this meeting.

### **1.08 SUBMITTALS**

- A.** Shop drawings and brochures shall be submitted in accordance with the requirements of the General Conditions and Section 013000, Submittal Procedures. Submittals are required for the items whether named or not. Additional submittals may be required by the Project Engineer which the Contractor will comply with at no additional cost(s) to be charged to the Owner(s).

### **1.09 PROJECT SCHEDULE**

- A.** A project schedule will be required for this project and is to be forwarded in writing to the Project Engineer five (5) days after the Notice to Proceed prior to the start of any work. No work may begin under the contract until the project

schedule has been approved by the Owner and the Project Engineer. Failure to submit a project schedule shall be adequate grounds for the Owner to suspend any and all Contractor operations at no cost or liability to the Owner whatsoever.

- B.** Time required for review and approval of these items shall not constitute a basis for time extension. Full compensation for supplying the "Project Schedule" and all required updates shall be considered as included in the contract prices paid for the various bid items and no separate payment will be made.

#### **1.10 SUBSURFACE CONDITIONS**

- A.** Boring logs associated with the Project Site are provided in **Attachment A**. This data is considered to provide a general representation of subsurface conditions anticipated to be encountered during construction activities. The Contractor is expected to examine the locations where work shall be performed along with the data provided in **Attachment A** and decide for themselves if additional information is required to support means and methods that will be used during construction. Any additional subsurface information deemed required to support the Contractor's selected means and methods shall be covered in the Contract Price.

#### **1.11 DIFFERING SITE CONDITIONS**

- A.** The Contractor shall promptly, and before such conditions are disturbed, notify the Project Engineer in writing of: subsurface or latent physical conditions at the site, of an unusual nature, differing materially from those ordinarily encountered and generally recognized as inhering in work of the character provided for in this contract. The Project Engineer shall promptly investigate the conditions, and if he finds that such conditions do materially so differ and cause an increase or decrease in the Contractor's cost of, or the time required for, performance of any part of the work under this contract, whether or not changed as a result of such conditions, an equitable adjustment shall be made and the contract modified in writing accordingly. The decision of the Project Engineer is final and binding on the parties, but subject to the claim resolution procedures set forth in Section 1.26 below.
- B.** No claim of the Contractor under this clause shall be allowed unless the Contractor has given the notice required in A. above; provided, however, the time prescribed therefore may be extended by the Owner.
- C.** No claim by the Contractor for an equitable adjustment hereunder shall be allowed if asserted after final payment under this contract.

#### **1.12 CLEANING AND EQUIPMENT**

- A.** During the progress of the work, the site shall be cleaned daily of all rubbish, packing materials or other debris. No debris capable of being windblown or washed away by rainfall shall be left unsecured on the site overnight. All roadways that have been used as access routes shall be swept on a regular basis, and kept in reasonably clean condition. "Reasonably clean" shall be defined as

a condition acceptable to the local Department of Public Safety, and/or Department of Public Works having jurisdiction over the specific roadways. All equipment shall be located as authorized by the Project Engineer to provide that at the end of work day or shift the site or roadways are left in a passable condition and all equipment is safe and secure.

### **1.13 CONTRACT DOCUMENTS IN THE FIELD**

- A.** The Contractor must keep a copy of the contract documents including but not limited to plans, specifications, schedule, materials list, daily reports, materials safety data sheets, and safety reports at the site of the work at all times while work is being performed and said copy is to be available to those in charge of the work, including Owner and Project Engineer.

### **1.14 CONSTRUCTION SEQUENCE**

- A.** For the protection of life and property any and all construction operations shall be phased such that the site is safe and secure. The Contractor shall insure that no equipment or materials are left unattended.
- B.** The Contractor is responsible for the requisition and logistics of on-site local law enforcement detail where required by state or local law. Contractor's responsibilities include all Contractor and Sub-Contractor sites associated with the project and are inclusive of any and all pricing set forth herein.

### **1.15 UTILITIES**

- A.** Prior to commencing work, the Contractor is responsible for obtaining the location, size and depth of all existing underground or underwater utilities and structures. Dig Safe Systems, Inc. (DIGSAFE) may assist in this task, but should not be considered comprehensive.
- B.** The Contractor shall assume that there are existing utility lines in the vicinity of the work, whether they appear on the drawings or not and should be independently verified by the Contractor using commercially reasonable methods that are normal and customary in the business of marine construction work.
- C.** Existing utilities may not be known by the Owner or Project Engineer. The Contractor assumes any and all risks associated with the damage, disruption or repair of any utilities that are disturbed by any action(s) of the Contractor in the prosecution of the work set forth herein. As such, the Contractor will assure the Owner that any and all repairs to utilities that are damages by Contractor's operations will be made expeditiously, in a professional, workman like manner and must be satisfactory to both the Owner and Project Engineer at no additional cost to the Owner.
- D.** It is not the intent of the plans to show the exact location of existing or relocated utilities, and the Owner assumes no responsibility therefore. Whenever any such utilities are indicated thereon, the Contractor shall be responsible for verifying

their actual location and depth in the field. The Contractor shall notify DIG SAFE (1-800-272-4480) and local Water Department (508-255-1200) and Department of Public Works (508-240-3790) prior to excavation.

- E.** The Contractor has reviewed the Project Site and areas surrounding the project and shall take full responsibility for existing utilities or apparatuses which may in any way impede, hamper or delay the Contractors performance of the work set forth herein. The Owner(s) shall bear no responsibility for the removal of or temporary relocation of any existing utilities or apparatuses.
- F.** Where excavations are performed in the vicinity of underground utility mains and/or services the Contractor shall, as necessary, perform initial exploratory excavations to determine their exact depth and location. Extreme care shall be exercised to avoid damage, and it will be the Contractor's responsibility to have repairs made to existing facilities at his/her expense in the event of damage.
- G.** Construction work for each site shall be coordinated with any work by other Contractors and utility entities to avoid conflicts. It is anticipated that any necessary work by others will be identified and performed prior to operations by the Contractor.
- H.** Schedule constraints will be discussed at the pre-construction conference and the Contractor shall consider such adjustments in contract scheduling as necessary.
- I.** Full compensation for complying with the above provisions shall be considered as included in the contract price for the various bid items and no separate payment will be made.

#### **1.16 BARRICADES, GUARD LIGHTS AND TRAFFIC CONTROL**

- A.** Barricades, signs, fences, and similar safety and warning devices shall be provided as required in order to insure the protection of the public at large as well as employees of the Contractor and all Sub-Contractor employees.
- B.** Barricades, signs, fences, and similar safety and warning devices shall be provided as required in order to insure the protection of the public as well as employees.
- C.** All signs and other warning devices (including construction and warning signs placed beyond the limits of work), shall be provided by the Contractor, and shall remain his/her property after the completion of the contract. All flaggers shall be provided by the Contractor at his/her expense.
- D.** Barricades, Guard Lights and Traffic Control shall include furnishing all labor (including flaggers and detours, when necessary), materials and equipment necessary to provide for the convenience and safety of the public and to facilitate the performance of the contract work as shown on the plans and specified herein. Full compensation for complying with the above provisions shall be considered as included in the contract price for the various bid items and no separate payment will be made.

### **1.17 PROTECTION OF WORK AND PROPERTY**

- A.** The Contractor shall be responsible for the preservation of all public and private property or their prosecution of the work and shall carefully protect the property from disturbance or damage.
- B.** The Contractor shall be responsible for all damage or injury to public or private property resulting from any act, omission, neglect, or misconduct in, or either the Contractor's or its Sub-Contractors' manner or method of executing the work, or in consequence of the non-execution thereof. Furthermore, the Contractor shall be responsible for all such damage due to defective materials or acts. The Contractor shall restore, at its own expense such property to a condition similar or equal to that existing before such damage or injury was done, by repairing, rebuilding, or otherwise restoring as directed by the Project Engineer.
- C.** All work is to be carefully protected so that no injury will come to it from water, frost, accident or other cause, and any injury, which will come to the work, is to be repaired by the Contractor at his expense. The Contractor shall protect the Owner's property, equipment and fixtures from injury, or loss. The Contractor shall protect the Owner' property from injury or loss arising in connection with this contract and he shall make good any damage, injury, or loss. The Contractor shall also adequately protect adjacent property as provided by statute and the contract documents.
- D.** The Contractor shall take all necessary precautions for the safety of employees on the work. The Contractor shall comply with all applicable provisions of federal, state and municipal safety laws and building codes to prevent accidents or injury to persons on, about, or adjacent to the premises where the work is being performed. The Contractor shall erect, properly maintain, at all times, as required by the conditions and progress of the work, all necessary fences, barriers, warning signs and lights that may be necessary to adequately protect the general public.
- E.** The Contractor shall provide temporary containment for all fuel tanks, pumps and appurtenances as a precaution against accidental spills or leaks. The Contractor shall maintain no greater than a two (2) day supply of fuel to any piece of equipment located on the site. The containment structures shall be capable of preventing releases of any fuel or other hazardous liquids to the environment, shall have volumes greater than that of the fuel tanks to be contained and shall be covered if necessary to eliminate the intrusion of rain water. In accordance with State or local laws and permit requirements, the Contractor shall furnish and maintain all other necessary containment materials to insure zero release of hazardous materials to the environment.

### **1.18 RESTORATION**

- A.** The Contractor shall be solely responsible for performing any necessary acts and providing any materials required to restore areas disturbed during construction

to their pre-construction condition. During the Pre-Bid time period prior to submitting a Bid, the Contractor shall note the condition of all areas within the project and include costs in their Bid for full and complete restoration.

### **1.19 PERMITS, FEES AND BONDS**

- A.** The Contractor shall obtain and comply with all required permits, pay all fees and provide all bonds necessary to complete the work as specified. The Contractor shall be advised that there are no permit fees associated with this project. The Contractor shall be solely responsible for performing any necessary acts and providing any materials required in order to comply with any and all terms and conditions set forth in any permits and licenses.
- B.** The Contractor shall obtain all construction permits required for Contract operations, not a part of the Contract, in accordance with the requirements of the regulations of the appropriate authorities.

### **1.20 INTERPRETATION OF CONTRACT DOCUMENTS IN CASE OF CONFLICT**

- A.** Where reference is made in the Contract Documents to publications, standards, or codes issued by associations or societies, such reference shall be interpreted to mean the current edition of such publications, standards, or codes, including revisions in effect on the date of the Advertisement, notwithstanding any reference to a particular date. The foregoing sentence shall not apply to the dates, if any, specified with respect to insurance policy endorsement forms.
- B.** In case of any conflict among the Contract Documents, unless the context clearly otherwise requires, the Contract Documents shall be construed according to the following priorities:

First Priority:        Contract Modifications

Second Priority:     Contractor Agreement

Third Priority:       General Conditions of the Contract

Fourth Priority:     Drawings

Schedules take precedence over enlarged detail Drawings, and enlarged Detail Drawings take precedence over reduced scale Drawings; figured dimensions shall prevail over scale.

Fifth Priority:       Specifications

### **1.21 GENERAL CLAUSES AND CONDITIONS**

- A.** Suspension of work: The Owner may order the Contractor, in writing, to suspend, delay, or interrupt all or any part of the work of this contract for the period of time that the Project Engineer determines appropriate for the convenience of the Owner.

- B.** If the performance of all or any part of the work is, for an unreasonable period of time, suspended, delayed, or interrupted by an act of the Owner in the administration of this project, or by the Owner's Project Engineer, failure to act within the time specified in this contract (or within a reasonable time if not specified), an adjustment shall be made for any increase in the cost of performance of this project (excluding profit) necessarily caused by the unreasonable suspension, delay, or interruption, and the contract modified in writing accordingly. However, no adjustment shall be made under this clause for any suspension, delay, or interruption to the extent that performance would have been so suspended, delayed, or interrupted by any other cause, including the fault or negligence of the Contractor.
- C.** A submittal shall not be allowed for any costs incurred more than twenty (20) days before the Contractor shall have notified the Owner in writing of the act or failure to act involved (but this requirement shall not apply as to a claim resulting from a suspension or work notice), and unless the claim, in an amount stated, is asserted in writing as soon as practicable after the termination of the suspension, delay, or interruption, but not later than the date of final payment under the contract.

## **1.22 SUSPENSION OF WORK**

- A.** The Owner may order the Contractor, in writing, to suspend, delay, or interrupt all or any part of the work of this contract for the period of time that the Project Engineer determines appropriate for the convenience of the Owner.
- B.** If the performance of all or any part of the work is, for an unreasonable period of time, suspended, delayed, or interrupted by an act of the Owner in the administration of this project, or by the Owners' failure to act within the time specified in this contract (or within a commercially reasonable time if not specified), an adjustment shall be made for any increase in the cost of performance of this project (excluding profit) necessarily caused by the unreasonable suspension, delay, or interruption, and the contract modified in writing accordingly. However, no adjustment shall be made under this clause for any suspension, delay, or interruption to the extent that performance would have been so suspended, delayed, or interrupted by any other cause, including the partial fault or partial negligence of the Contractor.
- C.** The Project Engineer reserves the right to suspend all or any portion of the work for any reasons during the execution of the work. If the work is suspended for a period of time and the Contractor believes the period is unreasonable and additional compensation and/or contract time is due, the Contractor shall submit to the Project Engineer in writing a request for adjustment within seven (7) calendar days of receipt of the notice to resume work. The request shall include the justification for adjustment.
- D.** Upon receipt, the Project Engineer will consider the Contractor's request. If the Project Engineer agrees that the cost and/or time required for the performance



of the contract has increased as a result of such suspension and was caused by conditions beyond the control of and not the fault of the Contractor, suppliers, Sub-Contractors, the Project Engineer will make an equitable adjustment (excluding profit) and modify the contract in writing accordingly. No contract adjustment will be allowed unless the Contractor has submitted a request for adjustment within the time prescribed.

- E.** The Owner may terminate for their convenience, performance of work under in whole or, from time to time, in part if the Owner determines that a termination is in the Owners' interest. The Owner shall terminate by delivering to the Contractor a Notice of Termination specifying the extent of termination and the effective date. After receipt of a Notice of Termination, and except as directed by the Owner or Project Engineer, the Contractor shall immediately proceed with the following obligations, regardless of any delay in determining or adjusting any amounts due under this provision. Stop work as specified in the notice. Place no further subcontracts or orders (referred to as subcontracts in this clause) for materials, services, or facilities, except as necessary to complete the continued portion of the contract. Terminate all subcontracts to the extent they relate to the work terminated. With approval or ratification to the extent required by the Project Engineer, settle all outstanding liabilities and termination settlement bids arising from the termination of subcontracts; the approval or ratification will be final for purposes of this clause. The Owner shall be obligated to pay the Contractor for work in place and Contractor agrees that Owners' responsibility regarding the subject contract shall be limited only to work in place and the Contractor waives any rights or claims against the Owner for consequential damages should this project be terminated by the Owner for its Convenience.

### **1.23 STAND-BY AND IDLE EQUIPMENT TIME**

- A.** Equipment that is in operational condition and is standing by with the Project Engineer's approval will be paid for at 50 percent of the appropriate hourly rate as determined by the provisions set forth by the United States Army Corp of Engineers, Construction Equipment Ownership Schedule (EP 1110-1-8) less operating costs. Payment for such "stand-by" will be limited to not more than 8 hours in a 24 hour day or 40 hours in a normal work week.
- B.** No compensation will be allowed for equipment that is inoperable due to breakdown.
- C.** No payment will be allowed for equipment that is not operating because the work has been suspended in accordance with the specifications unless the suspension is for the convenience of the State. No payment will be allowed for equipment that is not operating because the work has been suspended by the Contractor for the Contractor's own reasons.

- D. The hourly rate of compensation for idle equipment will be the monthly rate times a factor of 0.50 divided by 176 hours per month, regardless of the duration of the delay or stand-by.
- E. The time for which such compensation will be paid will be the actual normal working time during which such delay condition exists, but will in no case exceed 8 hours in any one day.
- F. The days for which compensation will be paid will be the number of working days charged during the existence of such delay. No compensation will be made for days that are considered lost due to weather as determined by the Project Engineer.
- G. Compensation will only be made for equipment physically located at the work site that would be used to prosecute the delayed work during the existence of such delay.

#### **1.24 SIGNIFICANT CHANGES IN SCOPE OF WORK**

- A. The Project Engineer reserves the right to make, at any time during the work, such increases or decreases in quantities and such alteration in the work as necessary to satisfactorily complete the project. Such increases or decreases and alterations shall not invalidate the contract nor release the Surety, and the Contractor agrees to perform the work as altered.
- B. If the increase on any item of work for which a unit price exists in the contract does not exceed the lesser of \$100,000.00 or five percent of the total contract price, then such increase shall be regarded as covered by the unit bid price for such items as contained in the original contract.
- C. If the decrease on any item of work for which a unit price exists in the contract does not exceed 25 percent of the contract quantity, then such decrease shall be regarded as covered by the unit bid price for such item as contained in the original contract.
- D. If the alteration or decrease in an item of work significantly changes the scope or the character of the work, then an adjustment may be made to the unit price. The basis for the adjustment shall be agreed upon prior to the performance of the work. If a basis cannot be agreed upon, an adjustment will be made either for or against the Contractor in an amount as the Project Engineer may determine to be fair and equitable.

#### **1.25 ELIMINATED ITEMS**

- A. Should any items contained in the bid be found unnecessary for the proper completion of the work, the Project Engineer may, upon written order to the Contractor, eliminate such items from the contract, and such action shall in no way invalidate the contract.
- B. If the Contractor is notified of the decrease or elimination of an item, reimbursement will be made for the reasonable cost of material incurred, in

connection with such item or portions, prior to the date of such decrease or elimination made by order of the Project Engineer but in no case shall such compensation exceed the contract bid price for the item.

- C. No claim shall be made by the Contractor for any loss of anticipated profits because of any alteration or variation between the approximate quantities and the quantities of work as done.

### **1.26 RESOLUTION OF CONSTRUCTION CLAIMS**

- A. **JURISDICTION:** This Contract shall be interpreted by the laws of the Commonwealth of Massachusetts and any suit brought pursuant to this Contract shall be commenced only in the Trial Court for Barnstable County, Massachusetts.
- B. For Construction claims the Owner and Contractor expressly agree to utilize informal conferences, non-binding judicially supervised mediation, and if necessary judicial arbitration to resolve disputes on construction claims of \$375,000 (three hundred and seventy-five thousand dollars) or less.
- C. “Claim” means a demand or assertion by one of the parties seeking, as a matter of right, adjustment, or interpretation of contract terms, payment of money, extension of times or other relied with respect to the terms of the Contract. The term “Claim” also includes other disputes and matters in question between the Owner and Contractor arising out of or relating to the Contract. Claims must be initiated by written notice. The responsibility to substantiate Claims shall rest with the party making the Claim.
- D. For any claim subject to this section, the following requirements apply:
1. Claims, including those alleging an error or omission by the Owner, shall be referred initially to the Owner for decision. An initial decision by the Owner shall be required as a condition precedent to mediation, arbitration, or litigation of all claims between the Contractor and Owner arising prior to the date final payment is due, unless 15 days have passed with the Owner failing to respond within the time prescribed. The Owner will not decide disputes between the Contractor and persons or entities other than the Owner
  2. The claim shall be in writing and include the documents necessary to substantiate the claim. Claims must be filed on or before the date of final payment but in no event shall be filed later than 30 days after the occurrence of the event giving rise to such claim or within 30 days after the claimant first recognizes the condition giving rise to the claim, whichever is later. Nothing in this subsection is intended to extend the time limit or supersede notice requirements otherwise provided by contract for the filing of claims.
  3. For claims of less than \$50,000 (fifty thousand dollars)
    - a. The Owner shall respond in writing to any written claim within forty-

- five (45) days of receipt of the claim or may request in writing within thirty (30) days of receipt of the claim, any additional documentation supporting the claim or relating to defenses to the claim the Owner may have against the Contractor.
- b. If additional information is thereafter required, it shall be requested and provided upon mutual agreement of the Owner and the Contractor.
  - c. The Owner's written response to the claim, as further documented, shall be submitted to the Contractor within fifteen (15) days after receipt of the further documentation or within a period of time no greater than that taken by the Contractor in producing the additional information or requested documentation, whichever is greater.
4. For claims of over fifty thousand dollars (\$50,000) and less than or equal to three hundred seventy-five thousand dollars (\$375,000)
- a. The Owner shall respond in writing to all written claims within sixty (60) days of receipt of the claim, or may request, in writing, within thirty (30) days of receipt of the claim, any additional documentation supporting the claim or relating to defenses to the claim the Owner may have against the Contractor.
  - b. If additional information is thereafter required, it shall be requested and provided upon mutual agreement of the Owner and the Contractor.
  - c. The Owner's written response to the claim, as further documented, shall be submitted to the Contractor within thirty (30) days after receipt of the further documentation or within a period of time no greater than that taken by the Contractor in producing the additional information, whichever is greater.
5. The decision of the Owner is final and binding on the parties, unless the Contractor notifies the Owner, in writing, either within 15 days of receipt of the Owner's response or within 15 days of the Owner's failure to respond within the time prescribed, respectively, and demands an informal conference to meet and confer for settlement the issues in dispute. Upon a demand, the Owner shall schedule a meet and confer process, including any period of time utilized by the meet and confer process.
6. If following the meet and confer conference, the claim or any portion remains in dispute, the Contractor may file a claim. For purposes of those provisions, the running of the period of time within which a claim must be filed shall be tolled from the time the Contractor submits his or her written claim pursuant to the aforementioned parameters until the time the claim is denied as a result of the meet and confer process, including any period of time utilized by the meet and confer process.
7. This section does not apply to tort claims and nothing in this section is intended nor shall be construed to change the statutory time period for

filing tort claims or actions specified by Massachusetts State Law or any applicable Federal Statute.

8. The following procedures are established for all civil actions filed to resolve claims subject to this section:
  - a. Within sixty (60) days, but no earlier than thirty (30) days, following the filing or responsive pleadings, the court shall submit the matter to non-binding mediation unless waived by mutual stipulation of both parties. The mediation process shall provide for the selection within fifteen (15) days by both parties of a disinterested third person as mediator, shall be commenced within thirty (30) days of the submittal, and shall be concluded within fifteen (15) days from the commencement of the mediation unless a time requirement is extended upon a good cause showing to the court or by stipulation of parties. If the parties fail to select a mediator within the fifteen (15) day period, any party may petition the court to appoint a mediator.
  - b. If the matter remains in dispute, the case shall be submitted to judicial arbitration. Notwithstanding any other provision of the law, upon stipulation of the parties, arbitrators appointed for purposes of this article shall be experienced in construction law, and, upon stipulation of the parties, mediators and arbitrators shall be paid. necessary and reasonable hourly rates of pay not to exceed their customary rate, and such fees and expenses shall be paid equally by the parties, except in the case of arbitration where the arbitrator, for good cause, determines a different division. In no event shall these fees or expenses be paid by State or County funds.

E. The Owner shall not fail to pay money as to any portion of a claim, which is undisputed except as otherwise provided in the Contract.

### **1.27 CONTRACTOR ABANDONMENT**

- A. The Contractor may not remove any mobilized equipment that is material to this project at located within Rock Harbor without the expressed written consent of the Project Engineer.

## **PART 2: PRODUCTS**

### **2.01 GENERAL**

- A. A statement indicating the source of each proposed import material shall be submitted by the Contractor. The statement shall indicate that the proposed import does not include any contamination or hazardous material and the results of analytical testing. If the source of import material is questionable or if the preliminary analytical test results indicate the presence of contamination or hazardous material, the Owner may require performance of additional analytical testing at no cost to the Owner prior to approval of proposed import materials.

- B.** Any and all products, materials and workmanship shall be warranted by the Contractor for a period of not less than one (1) year from the date of completion of the project. Completion shall be deemed as acceptance by the Owner of the final payment application prepared by the Contractor.

## **2.02 APPROVAL OF MATERIALS**

- A.** As soon as practicable but not to exceed five (5) calendar days after award of the contract and before any materials or equipment are purchased, the Contractor shall submit to the Project Engineer a complete list of material and equipment to be incorporated in the work, together with the names and addresses of the manufacturer and their catalog numbers and trade names. Approval of materials will be based on manufacturer's published ratings. Materials that are incorporated into the project that have not been expressly approved by the Project Engineer will be subject to removal, replacement and or verification by the Project Engineer on behalf of the Owner and shall be solely at the Contractor's expense and peril.

## **2.03 SUBSTITUTIONS**

- A.** If a specific means, method, technique, sequence, or procedure of construction is indicated in or required by the Contract Sections, the Contractor may furnish or utilize a substitute means, method, sequence, technique, or procedure of construction acceptable to the Owner, if the Contractor submits sufficient information to allow the Owner to determine that the substitute proposed is equivalent to that indicated or required by the Contract Sections, in quality, warranty, life-cycle costs, design cost, construction time, warranty, and efficiency considerations. Contractor may submit requests for substitution up to thirty-five (35) days following Notice of Award after which time the Owner will consider substitutions in its sole discretion.
- B.** The Owner will respond in writing to the Contractor within ten (10) days indicating the time necessary to evaluate each proposed substitute. The Owner will be the sole judge of acceptability, and no substitute will be ordered, installed, or utilized without the Owner's prior written acceptance, which will be evidenced by either a change order or an approved shop drawing. The Owner may require the Contractor to furnish at the Contractor's expense a special performance guarantee or other surety with respect to any substitute.
- C.** The Owner will record time required by the Owner and the Owner's consultants in evaluating substitutions proposed by the Contractor and in making changes in the Contract Sections occasioned thereby. Regardless of whether or not the Owner accepts a proposed substitute, the Contractor shall reimburse the Owner for the charges of the Owner and Owner's consultants for evaluating each proposed substitute.
- D.** Cost or time impacts to other items of Contract work, which are caused by any Contractor initiated request for substitution, whether anticipated or unforeseen, shall be the responsibility of the Contractor.

## **2.04 TRADE NAMES**

- A. Whenever the Trade Name of a product, or the name of a Manufacturer appears in these Contract Documents or on the Plans, it shall be understood to specify the product so identified or its approved equal. The words "or equal" or "approved equal" shall mean equal in the opinion of and approved by the Project Engineer in writing. For convenience in designation, certain equipment or parts or materials may be designated under trade name or the name of a manufacturer or product and his catalogue information. The use of alternative equipment or an Part or material which is of equal quality and of the required characteristics for the purpose intended will be permitted, subject to the written approval of the Project Engineer, in accordance with the following requirements:
1. The burden of proof as to the comparative quality and suitability of alternative equipment or Parts or materials shall be upon the Contractor and he shall furnish, at his own expense, all information necessary or related thereto as required by the Project Engineer. The Project Engineer shall be the sole judge as to the comparative quality and suitability of alternative equipment or Parts or materials and the decision of the Project Engineer shall be final.
  2. The above provisions shall not be construed as permitting the use of alternative equipment or Parts or materials for equipment or Parts or materials which are not designated under a Trade Name or the name of a manufacturer or producer and his catalogue information, and for which detail specifications are set forth.

## **PART 3: EXECUTION-NOT USED**

**\*\*\*END OF SECTION\*\*\***

SECTION 007010

SUPPLEMENTAL CONDITIONS

1.1 INTRODUCTION

- A. If, during the performance of the Work, the Contractor finds a conflict, error, or discrepancy in the Contract Documents, the Contractor shall so report to the Project Engineer in writing at once. Before proceeding with the Work affected thereby, the Contractor shall obtain a written interpretation or clarification from the Project Engineer. Any work done before the Project Engineer renders his decision is at the Contractor's sole risk.
- B. In case of an inconsistency between Drawings and Specifications, or within either document not clarified by Addendum, the better quality or greater quantity of work shall be provided in accordance with the Project Engineer's interpretation.
- C. The Contractor guarantees that in the performance of work, he/she, and every person in his/her direct or indirect employment (i.e., subcontractors) shall abide by and comply with all Federal, State, and local laws including the Occupational Safety and Health Act.
- D. The term Owner, as used throughout the Contract Documents, designates the Owner, Town of Orlean, MA, or its duly authorized representative.
- E. The term Owner's Representative, as used throughout these Specifications, indicates the Owner's authorized representative for a particular activity.
- F. The term Project Engineer or Engineer-Of-Record, as used throughout the Contract Documents, designates Foth Infrastructure & Environment, LLC, or its duly authorized representative.
- G. On-site work by the selected Contractor may commence on/after October 1, 2024, noting that Contractor activities must accommodate vessel access to/from the commercial bulkhead (excluding the off-loading pier) through October 14, 2024. The Work shall be substantially complete no later than April 30, 2025. If, in the opinion of the Owner, the Contractor has not mobilized sufficient plant or material and/or if the Contractor does not demonstrate that sufficient work is underway within 30 days after Award of Contract, the Owner reserves the right to terminate the Contract.
- H. In the event of termination of the Contract pursuant to the conditions set forth herein, such termination shall not act so as to relieve the Contractor from liability for any damages sustained by the Owner as a result of any breach by the Contractor of the terms of the Contract.



I. Definitions

1. Work: Material, equipment and labor required for the project, or the part of the project considered.
2. Provide: Furnish and install; provide in place.
3. Furnish: Furnish only, not including installation.
4. Install: Install in place materials or structures furnished by others.
5. Shall: Mandatory requirement (understood to be applicable whether or not “shall” is used in the sentence structure): omission of “shall” does not make the Specification or Contract Drawing non-mandatory.
6. Contract Sum: This shall be read as the Total Bid amount including any Owner accepted Alternates as included in the Form of Bid.
7. Day: For the purposes of this contract a “day” shall equal a “calendar day” including weekends, holidays, and any other non-work periods.

1.2 DESCRIPTION OF THE WORK: the Work shall include, but not be limited to:

- A. Mobilization to and demobilization from the site.
- B. Selective demolition of items scheduled for removal and/or reuse.
- C. Steel bulkhead reconstruction, installation/reconstruction of timber piers, installation of new concrete commercial off-loading pier and public viewing platform, floating docks, berthing piles, site drainage, new fuel lines and dispensers, removal of existing underground fuel tanks and utility improvements including electrical and water services at the existing commercial wharf facility.

1.3 SCOPE OF WORK

A. Schedule

Unless otherwise stated, the following submittal schedule of all shop drawings, etc., for review by the Project Engineer, shall be as follows:

1. Contractor’s Submittal

Certain critical items are to be submitted by the Contractor within time frames listed in these Specifications. Unless specifically noted as such, the Contractor shall be responsible for the timely submittal of all required items, taking into account the Project Engineer’s review period as outlined herein, in order to maintain satisfactory progress of the Work.

2. Project Engineer Review and Comments

Within fourteen (14) days after receipt of Contractor's submittal.

- B. The Work shall be performed in a general sequence developed by the Contractor and submitted to the Project Engineer for review, in accordance with the requirements of the Contract. The Contractor is solely responsible for the means and methods of construction and for the sequences and procedures to be used.
- C. The Contractor shall furnish and coordinate all plant, labor, supervision, materials, or shall furnish and coordinate all plant, labor, supervision, materials, equipment and appliances for all demolition and/or construction work in connection with the demolition and/or construction of the marine facilities.
- D. It is the responsibility of the Contractor to coordinate work with other activities at the site to complete all work in a timely and cost-effective manner.

1.4 EXAMINATION OF EXISTING CONDITIONS

Before submitting a bid, it is a requirement of this Contract that each bidder visit the site to determine the conditions under which the Work is to be done. Such examination shall include, but not be limited to:

- A. Structural detail of the existing structures and related facilities.
- B. Various onsite utilities and structures not within the Scope of this Contract, but that may impact the execution of the Work. These will remain fully operational throughout the construction period.
- C. The layout and structural condition of the existing structures.
- D. Access space and possible work and staging areas.

1.5 LIST OF CONTRACT DRAWING

The Contract Drawings which form part of these Specifications are listed in Section 010100, Summary of Work.

1.6 PERMITS

The Owner has secured certain permits required by Federal, and State authorities for the proposed activities. Copies of these permits are attached to the Contract Document. It is the responsibility of the Contractor to perform the Work in accordance with the terms and conditions of the permits. The Contractor shall post copies of the permits at the site throughout the course of the Work. The Contractor is responsible to obtain all permits associated with the legal disposal of construction debris and materials. The Contractor

shall also secure all required local authorizations and permits required for the scope of work.

#### 1.7 CONTRACTOR FURNISHED MATERIALS

- A. The Contractor shall furnish all materials for installation in the completed Work as specified hereinafter.
- B. The Contractor shall handle these materials as they are delivered to the site or off-site work areas and shall store them in a designated storage area agreeable to the Owner.
- C. The Contractor furnished material is subject to review by the Owner or Project Engineer at the plant of manufacture at the Owner's option. Review by the Owner or Project Engineer is not to be construed as technical in nature and in no way shall be deemed to relieve the Contractor from its obligation herein to ensure the quality and integrity of the materials supplied by the Contractor for this project.
- D. Project material furnished by the Contractor shall conform to the requirements of the Specifications stated hereinafter. The Contractor shall, as part of the Contract fee, also furnish all consumable materials necessary to complete the Work, such as, but not limited to, welding electrodes, safety equipment, etc.

#### 1.8 INDEMNITY BY CONTRACTOR

The Contractor will indemnify and save harmless the Owner and Project Engineer from and against all losses and all claims, demands, payments, suits, actions, recoveries, and judgments of every nature and description brought or recovered against the Owner and Project Engineer by reason of any act or omission of the Contractor, or of any subcontractor to the Contractor, or of any person directly or indirectly employed by the Contractor or any such subcontractor, in the performance of any work for, or the rendering of any services to, the Owner.

#### 1.9 INSURANCES

Contractor agrees that, at its own cost and expense, it shall procure and continue in force, insurance coverage. Such insurance shall be written by a company or companies authorized to engage in the business of general liability insurance in the state in which the demised premises are located, and there shall be delivered to the Owner with the bid customary certificates evidencing such paid-up insurance, which certificates are to be issued by the insurance companies. Such insurance shall be written by good and responsible companies reasonably acceptable to the Owner.

#### 1.10 LAYOUT

- A. The Contractor shall be solely responsible for the accuracy of all locations,

dimensions, and levels and no plea as to instructions or order received from any other sources other than information contained on Contract Drawings, Specifications or in written orders of the Owner or Project Engineer shall justify departure from the dimensions and elevations required by the Contract Drawings.

- B. The Contractor shall take his own measurements at the site, verifying same with the Contract Drawings and existing facilities, and will be held responsible for the proper fit and alignment of completed work in position.

#### 1.11 GUARANTEE

- A. The Contractor shall guarantee to the Owner all materials and workmanship against original defects, or against injury from proper and usual wear when used for the purpose intended, for one (1) year of final payment certifications and shall maintain all items in perfect condition during the period of guarantee.
- B. Defects appearing during the period of guarantee shall be made good by the Contractor at his expense upon demand of the Owner, it being required that all work shall be in perfect condition when the period of guarantee shall have elapsed. In the event of default by the Contractor, the Company shall have the right to make good any and all defects and bill the Contractor cost plus 15% for administration fees.

#### 1.12 PARKING, STORAGE AND ACCESS TO WORK AREA

The Contractor shall coordinate with the Owner for available parking, storage and access to and use of the work area. In no event shall these area interrupt or disturb the Owner's operations. The Contractor shall protect the stored equipment and material from the elements in such a manner as to be satisfactory to the manufacturer of the equipment or material and the Owner.

#### 1.13 SUBCONTRACTORS

- A. A list of Subcontractors, pre-qualified by the Contractor, shall be submitted to the Owner by the Contractor with his bid as specified in Section 004000 Bid. The Owner has the ultimate right to accept or reject any one or more of the subcontractors, and must do so in writing after receipt of said list from the Contractor. No deviations shall be allowed from this list without approval of the Owner. Valid insurance certificates for subcontractors shall be submitted by the Contractor to the Owner with his bid.
- B. The Owner shall receive, upon completion of this Contract in full, from the Contractor, any reduction in the Subcontractor's price, which may result from a reduced scope of the Contractor's work.

1.14 NEATNESS OF SITE

At the Contractor's expense, the Contractor's working areas shall be cleaned on a day-to-day basis, with all rubbish removed from the site and all work areas cleaned at the end of each day. At final completion of all work the Contractor shall leave the entire premises, within the site of his operations, clean and free from the rubbish resulting from his construction operations.

1.15 UTILITIES

The Contractor is responsible to provide and maintain any and all utilities he deems necessary to affect the Work. It is the responsibility of the Bidder to verify the suitability of existing site utilities for their needs.

1.16 FIRE PROTECTION

The Contractor shall provide and maintain at his expense all required fire protection systems and devices as necessary to safely perform the Work in accord with the applicable regulations. It shall be operational throughout the period of construction.

1.17 COMPLIANCE WITH CONTRACT

The Owner shall have the right to withhold without penalty any payment described above, or sections referenced herein, for completed work should the Contractor fail to meet any obligations or requirements of the Contract. Any withheld payment shall be promptly made upon the Contractor's full compliance with the Contract.

1.18 ENVIRONMENTAL PROTECTION

Comply with all Local, State, and Federal requirements for protection of the environment during the Work. No later than 21 days following award of contract, submit a comprehensive plan describing the means and methods to be employed for protection, containment, and clean up. Ensure that personnel are properly trained and that sufficient equipment and materials are readily available for use if required. Abide by State and Federal spill reporting requirements.

1.19 EROSION AND SEDIMENTATION CONTROL

During execution of the Work, the Contractor is required to install and maintain any and all required sedimentation and erosion control measures to protect adjacent waterways, streets, and properties. Measures may include, but are not limited to, silt sacks, hay bales/silt fence, compost filter tubes (wattles) and/or approved equals in accordance with regulatory authorizations issued for the project. Temporary materials and equipment shall conform to requirements for Temporary Work.

1.20 TEMPORARY WORK

Labor, equipment, and materials required to perform the Work that, upon completion, are not a part of the Work, shall be furnished, installed, maintained and subsequently removed from the site by the Contractor.

1.21 SAFETY PLAN

No later than 21 days following award of contract, the Contractor shall submit a project-specific Safety Plan (see Section 019000, General Safety Requirements).

1.22 MATERIAL SAFETY DATA SHEETS

No later than 21 days following award of contract, submit two three-ring bound sets of all Material Safety Data Sheets (MSDS) for materials anticipated for use in execution of the Work. As the Work progresses and new materials are used on the project, submit copies of the corresponding MSDS's for these new materials no later than the time of arrival of the materials on site.

1.23 WORK SCHEDULE REQUIREMENTS

Access to the site and acceptable working hours are limited to those specified within the Contract herein and as agreed to with the Owner.

1.24 ENGINEERING SERVICES CHARGABLE TO THE CONTRACTOR

The Owner reserves the right to charge the Contractor for additional engineering services if required due to the Contractor's actions or inactions.

1.25 CONTRACTOR'S REPRESENTATIVE

The Contractor shall assign an individual to be the single point of contact for all job-related correspondence and issues. This individual shall be assigned to the project from start to finish and shall not be replaced without permission from the Owner. This individual shall be responsible to disseminate information to other members of the Contractor's staff and to applicable subcontractors as necessary. This individual shall be the Contractor's designated representative at the site, and shall be authorized to conclude all matters, financial and otherwise, on the Contractor's behalf. The Contractor's Representative shall attend all project meetings and shall be on site at all times while the Contractor or his Subcontractors are present on site.

1.26 MEANS AND METHODS

The structures have been designed to be self-supporting and stable after construction is complete. The stability of the structures prior to completion is solely the responsibility of the Contractor. This responsibility extends to related aspects of the construction activity

including, but not limited to, erection methods, erection sequence, connections, temporary bracing, forms, shoring, use of equipment, and similar construction procedures. Review of construction by the Owner and Project Engineer is for general conformance with the Contract Documents only. Lack of comment by the Owner and Project Engineer with regard to construction procedures shall not be interpreted as approval or acceptance of any such procedures.

1.27 PRECEDENCE

It is expressly understood and agreed that failure by the Owner or Project Engineer to exercise his authority or prerogative to order the Contractor for any duly authorized purpose shall not be considered to set a precedent for any other activities.

1.28 SAFETY OF PERSONS AND PROPERTY

The Contractor is solely responsible for the safety of his operations. The Contractor shall take reasonable precautions for the safety of, and shall provide reasonable protection to prevent damage, injury, or loss to:

- A. Persons employed by the Contractor in performance of the Work, and persons nearby that may be affected by the Contractor's operations or the Work,
- B. The Work, including all equipment and materials which will be incorporated in the Work,
- C. Other properties and structures at the site, or on adjacent properties.

1.29 UNCOVERING WORK

If any Work is covered prior to acceptance by the Owner or Project Engineer, the Work shall, if requested by the Owner, be uncovered for the Owner's observation, and then be re-covered at the Contractor's sole cost and expense.

1.30 DAILY CONSTRUCTION REPORT

For each day that Work is performed at the site, prepare, and submit a Daily Construction Report to the Project Engineer. Include the following information in the report, as a minimum:

- A. Project name.
- B. Contractor name.
- C. Date.
- D. Hours worked.

- E. Weather conditions.
- F. Subcontractors working on site.
- G. Material deliveries (material, quantity, and vendor).
- H. Trades working on site (trade and number of workers per trade).
- I. Equipment on site (manufacturer and model number, with notation of whether the equipment was idle or was used in the Work).
- J. Specific work performed, location and type of work.
- K. Visitors to the site.
- L. Materials or Equipment leaving the site (including debris removal).

Submit reports no later than twelve o'clock noon for the previous day's work.

#### 1.31 MONITORING OF EXISTING STRUCTURES DURING CONSTRUCTION

The Owner reserves the right to establish an independent monitoring program in order to evaluate the effect of the Work on the existing structures to remain on site. Such monitoring may include, but are not necessarily limited to settlement gauges, tilt plates, and crack gauges.

The Owner reserves the right to suspend the Contractor's operations at any time based upon the monitoring data.

#### 1.32 SUBSURFACE OBSTRUCTIONS

Obstructions are defined as unforeseen objects, which impede progress. Objects that are made known to the Contractor will not be considered obstructions. Notify the Project Engineer immediately upon encountering unforeseen objects. No consideration will be given for additional compensation on this account without this timely notification.

**END OF SECTION**



SECTION 010100

SUMMARY OF WORK

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division Specification Sections, apply to this section.

1.2 SUMMARY

The “Work” that is required by this Contract is set forth in the following documents:

- A. General requirements and technical specifications titled:

**ROCK HARBOR COMMERCIAL WHARF IMPROVEMENT PROJECT  
TOWN OF ORLEANS, MA**

- B. Contract Drawings Entitled: “Rock Harbor Commercial Wharf Improvements” and Issued for Bid on 03/08/2024, Drawings consist of a total of 57 sheets (including Cover Sheet) as prepared by Foth Infrastructure & Environment, LLC (Foth), 15 Creek Road, Marion, MA 02738 and stamped by Alex I. Mora P.E. and Scott Skuncik, P.E. (Foth). Robert P. Coluccio, P.E., Web Engineering Associates, Inc (WEB) and David P. Columbo P.E., Power Engineers, LLC. Drawings are on file with the Owner and any changes, drawings and direction(s) that may from time to time be furnished by the Project Engineer.
- C. The Contractor shall furnish all supervision, labor, equipment, appliances and materials, and carry out all operations, including monitoring and other field engineering, as necessary to accomplish the Work, complete. The Contractor shall perform the work in strict accordance with these specifications and the Contract Drawings, and subject to the terms and conditions of the Contract and all applicable permits, certifications, codes and regulations and in accordance with the schedules for completion set forth herein.
- D. In case of any conflict among the Contract Documents, unless the context clearly otherwise requires, the Contract Documents shall be construed according to the following priorities:
1. First Priority: Contract Modifications
  2. Second Priority: Contractor Agreement
  3. Third Priority: General Conditions of the Contract

4. Fourth Priority: Drawings - Schedules take precedence over enlarged detail Drawings and enlarged Detail Drawings take precedence over reduced scale Drawings; figured dimensions shall prevail over scale.
5. Fifth Priority: Specifications

### 1.3 DESCRIPTION OF WORK

The general description below is given to indicate the approximate scope of the proposed project only. It does not limit the work required under the Contract Drawings and specifications. For reference, the word "Project Site" shall mean the parcel of land located at 113 Rock Harbor Road at the Commercial Wharf Facility and the waterways adjacent thereto, the structures and land adjacent thereto, and any stockpiling, laydown areas and adjacent areas.

In general, the Work to be performed shall consist of steel bulkhead reconstruction, installation/reconstruction of timber piers, installation of new concrete commercial off-loading pier and public viewing platform, floating docks, berthing piles, site drainage, new fuel lines and dispensers, removal of existing underground fuel tanks and utility improvements including electrical and water services at the existing Commercial Wharf Facility.

The Work to be performed includes all labor, materials, and transportation, environmental protection, safety, and all other items incidental to complete the proposed project.

On-site work by the selected Contractor may commence on/after October 1, 2024, noting that Contractor activities must accommodate vessel access to/from the commercial bulkhead (excluding the off-loading pier) through October 14, 2024. All Construction shall be completed by no later than April 30, 2025.

### 1.4 PROJECT/SITE CONDITIONS

Data and information furnished or referred to below is for the Contractor's information. Neither the Owner nor the Project Engineer shall be responsible for any interpretation of or conclusion drawn from the data or information by the Contractor.

#### A. Site Conditions:

1. The indications of physical conditions on the Contract Drawings and in the specifications are the result of site investigations and surveys. The conditions represented prevailed at the time the investigations and surveys were made.
2. Historic record information found to be available and relevant to the Project Site is provided in **Attachment D**.

#### B. Staging Area: A Contractor staging and laydown area will be coordinated with and provided by the Owner. Any additional or supplemental staging areas required by the

Contractor will be the responsibility of the Contractor and at the Contractor's expense.

- C. Weather Conditions: The monthly normal mean temperature and the monthly normal mean precipitation for the site may be obtained by the Contractor from the nearest U.S. National Weather Service Office.
- D. Transportation: The Contractor shall make his own investigation on transportation to the Project Site.
- E. Height Limitations: While there are no specific height limitations imposed at the Project Site, the Contractor shall be aware of existing overhead wires located along Bay View Drive and in the vicinity of work.

## 1.5 SEQUENCING AND SCHEDULING

### A. Mandatory Schedule Milestone

**A Project Schedule must be prepared and submitted by the Contractor with the bid.** All work items shall be shown on the project schedule along with days of performance and completion dates. The milestone shall be graphically depicted on the schedule clearly delineating the completion of work and the overall progress earning for said work, depicting reaching the interim Milestone schedule along with substantial and final completion of the project or the Contractor will be subject to liquidated damages.

- 1. Failure to achieve completion of the work required by the Mandatory Scheduled Milestones and reaching substantial and final completion in accordance with the Contract requirements will incur Liquidated Damages.

### B. Hours of Operations

- 1. Working hours are allowed seven (7) days a week between the hours of 7:00 A.M. and 5:00 P.M unless otherwise specified or approved by the Owner.
- 2. Any request for revised work hours shall be provided in the form of a written request to the Owner for consideration.

### C. Weekly Progress Schedules

- 1. Weekly progress schedules shall be in the form of a chart graphically indicating the sequence proposed to accomplish each work feature or operation. Contractor shall indicate on the chart the important work features or operations that are critical to the timely overall completion of the project. Key dates for such important work features and portions of work features are milestone dates and shall be so indicated on the chart. This schedule will be the medium

through which the timeliness of the Contractor's construction effort is appraised. Anticipated adverse weather delay days shall be included in the schedule. Preparation of the weekly progress schedules shall be completed in accordance with Section 013100, Construction Progress Schedules. Progress meetings with the Owner's Project Engineer are anticipated on a weekly basis order to go over problems, issues, questions, etc.

D. Organization at the Site

1. General

The Contractor shall employ ample personnel and sufficient equipment to accomplish the Work within the timeframes specified herein.

2. Rate of Progress

Should the Contractor fail to maintain a satisfactory rate of progress such that there is a reasonable basis to find that the Mandatory Schedule Milestone will not be achieved, the Owner's Project Engineer may require that additional personnel and equipment be placed on the Work and weekend and overtime work be performed, in order that the work be brought up to schedule and maintained. All costs associated with the acceleration of work to meet the mandatory schedule milestones shall be the responsibility of the Contractor and shall not be deemed Liquidated Damages.

1.6 WORK LIMITS

- A. The Work shall be restricted to the areas as shown on the Contract Drawings.

1.7 COORDINATION

- A. The Contractor is required to coordinate its activities with the appropriate authorities and affected parties within the vicinity of the Project Site. A partial list of the parties to coordinate with is included in the sub-sections below. (This list is not intended to be a complete listing of the entities that may require notification, coordination, and/or action, but rather represents examples of the entities that will require coordination.)
- B. To the maximum extent practicable, the area shall remain operational; and the Contractor shall conduct their work in such a manner to assure minimal interference and complete communication with local operations. This shall include, but not be limited to, the construction site and roadways.
- C. Before commencing work, the Contractor shall coordinate with the Town of Orleans Department of Public Works and Harbormaster and the Owner's Project Engineer/representatives.

1.8 SECURITY

A. Personnel Security (NOT USED)

B. Equipment Security

The Contractor will be responsible for security of equipment while that equipment is onsite.

At all times, the Contractor is responsible to ensure that public access to equipment is precluded, except for authorized personnel.

PART 2 - PRODUCTS (NOT USED)

PART 3 – EXECUTION (NOT USED)

**END OF SECTION**

SECTION 010250

MEASUREMENT AND PAYMENT

PART 1 - GENERAL

1. LUMP SUM PAYMENT ITEMS

Payment items for the Work for which contract lump sum payments will be made are listed in Section 004000, Bid, "Exhibit A" to Bid – Bid Schedule, and described below. All costs for items of Work, which are not specifically mentioned to be included in a particular lump sum or unit price payment item, shall be included in the listed item most closely associated with the Work involved. The lump sum price and payment made for each item listed shall constitute full and final compensation for furnishing all supervision, labor, materials, and equipment, and performing any associated Contractor quality control, environmental protection, meeting safety requirements, tests and reports, and for performing all Work required for which separate payment is not otherwise provided.

2. UNIT PRICE PAYMENT ITEMS

Payment items for the Work of this contract on which the contract unit price payments will be made are listed in Section 004000, Bid, "Exhibit A" to Bid – Bid Schedule, and described below. The unit price and payment made for each item listed shall constitute full compensation for furnishing all supervision, plant, labor, materials, and equipment, and performing any associated Contractor quality control, environmental protection, meeting safety requirements, tests and reports, and for performing all Work required for each of the unit price items.

3. BIDDING SCHEDULE

Payment Items for the Work of this contract on which the contract progress payments will be based are listed in Section 00400, Bid, "Exhibit A" to Bid – Bid Schedule, and described below. All costs for items of Work, which are not specifically mentioned to be included in a particular Bidding Schedule payment item, shall be included in the listed item most closely associated with the Work involved.

4. BID ITEMS

**BID ITEM NO. 1 - MOBILIZATION/DEMobilIZATION**

A. WORK COVERED BY CONTRACT PRICE

1. This item includes all costs associated with Contractor's mobilization and demobilization for the Rock Harbor Commercial Wharf Improvement Project.

Costs shall include, but are not limited, to work shown on the Contract Drawings and described in the specifications herein.

2. Mobilization shall also include the completion of pre-construction submittals, obtaining any necessary permits and approvals not already in place for the work specified in accordance with the Contract, full reimbursement for the premiums actually paid for payment bond, all costs connected with the mobilization of the Contractor's equipment and supported vessels, coordination, submittals and preparation of site and staging area as required; equipment and tools, purchase of materials needed for construction, temporary facilities, security measures, coordination with the regulatory agencies, and any other work that is necessary to mobilize for project.
3. Demobilization shall include removal of all equipment and temporary construction facilities from the site.
4. There will be only one (1) mobilization and one (1) demobilization paid. If, for any reason, the Contractor must shut down and remove their equipment from the site, then remobilize, the Owner will not be responsible for the payment of additional costs associated with such Work or undertaking, and this is to remain the sole responsibility of the Contractor.
5. Demobilization shall include general preparation for transfer of equipment to its home base, restoration as required from the Contractor's operations, and preparation of as-built drawings.

**B. MEASUREMENT**

1. Unit of Measure – LUMP SUM (LS)
2. Mobilization and demobilization will be measured as a lump sum to include compensation for project preparations, procurement and assembly of all equipment, materials, supplies, permits, labor, submittals and bonds required for the prosecution of the work not otherwise included in other pay items and upon completion of the work as specified and directed, the clean-up of the work areas, removal of equipment, materials and supplies from the work area.
3. Payment will be made for costs associated with mobilization and demobilization for operations including all incidental work described in the specifications and contract documents.
4. 60% of the lump sum price for mobilization/demobilization unit will be paid to the Contractor upon completion of mobilization with the remaining 40% paid upon acceptance of Work by the Owner, submission & acceptance of As-Built Drawings and completion of demobilization from the Project Site. In the event that the Owner considers the lump sum price for the bid item does not bear a reasonable relationship to the cost of the work in this contract, the Owner may require the Contractor to produce cost data to justify the price bid to the satisfaction of the Owner. If the Contractor fails to substantiate the price bid, then payment will be made for actual mobilization and demobilization costs as determined by the Owner. Payment for this item will be considered full compensation for all labor, materials, off-site disposal, and other fees, equipment, supervision, and supplies required for the work.

**BID ITEM NO. 2 - SITE PREPARATION**

**A. WORK COVERED BY CONTRACT PRICE**

1. This item includes all work and costs associated with Contractor's Site Preparation for the Rock Harbor Commercial Wharf Improvement Project. Costs shall include, but are not limited to, work shown on the Contract Drawings and described in the specifications herein.
2. Site preparation shall include the furnishing, installation and maintenance of erosion and sedimentation controls, coordination of temporary electrical service during construction, temporary safety fence, temporary relocation/reinstallation of existing prefabricated fuel shed, installation and maintenance of environmental controls required by the Permits; staging area/stockpile management, suppression of dust onsite as necessary, management of odors and noise, final site cleanup/restoration, and all other miscellaneous work obviously required to complete the project, but not covered by individual items in the contract.
3. Site Preparation shall include all site investigation work to identify site conditions including, but not limited to, the location of existing utilities and coordination.
4. Site Preparation shall include efforts and costs associated with the Contractor application to obtain any/all additional permit(s)/authorization(s) that may be required beyond those provided herein and as required for the scope of work to be completed herein.
5. Site Preparation shall include all miscellaneous clean up required to restore the Project Site to pre-construction conditions.

**B. MEASUREMENT**

1. Unit of Measure - LUMP SUM (LS)
2. This item will be measured as the lump sum to include compensation for the work covered by contract price.
3. Payment will be made for costs associated with this bid item including all incidental work described in the specifications and Contract Documents.
4. Payment shall be for all costs, including but not limited to, furnishing all labor, materials, equipment, and incidentals as required for installation of this bid item in accordance with the Contract Documents.

**BID ITEM NO. 3 – DEMOLITION, REMOVAL AND DISPOSAL**

**A. WORK COVERED BY CONTRACT PRICE**

1. This item includes all work and costs associated with performing all required demolition, removal and disposal for the Rock Harbor Commercial Wharf Improvement Project as shown on the Contract Drawings and specified herein.
2. This item shall include the demolition, removal, disposal and reuse of existing above and below ground infrastructure. including but not limited to: steel sheet piles; untreated, CCA-treated and creosote treated timber and pilings; tie-backs/anchor system(s); connections, fasteners, appurtenances or other items not suitable for reuse; utilities, including water lines, electrical panels, overhead lines, poles and



- underground conduit, underground fuel lines, fuel dispensers, drainage structures and pump-out service; ladders, floating docks and gangways; asphalt pavement; concrete sidewalk; riprap, and any other miscellaneous demolition.
3. This item includes the removal of backfill/soils located between the existing bulkhead and proposed new bulkhead to the limits and elevations shown on the Contract Drawings, dewatering (as necessary), stockpiling, on-site reuse and/or off-site disposal, as required.
  4. This item shall include removing all materials; removal and storage of any utilities scheduled for re-installation, labor, transportation and equipment to demolish to the extent shown on the plans. Bid item shall also include all work such as disconnecting, trimming, disposal of excess, splicing, transitions, bracing, staging, water and erosion control, manpower, fueling, maintenance, operation, field engineering, environmental protection, purchase of materials, and disposal of all waste associated with demolition work. Items to remain shall be removed and replaced to facilitate work as indicated on the Contract Drawings or as directed by the Engineer.
  5. The Contractor shall be responsible removal and proper off-site disposal of all materials.

**B. MEASUREMENT**

1. Unit of Measure – LUMP SUM (LS)
2. This item will be measured as the lump sum to include compensation for the work covered by contract price.
3. Payment will be made for costs associated with this bid item including all incidental work described in the specifications and Contract Documents.
4. Payment shall be for all costs, including but not limited to, furnishing all labor, supervision, materials, equipment, tools, expenses and incidentals as required for installation of this bid item in accordance with the Contract Documents.

**BID ITEM NO. 4 – UNDERGROUND FUEL TANK REMOVAL AND DISPOSAL**

**A. WORK COVERED BY CONTRACT PRICE**

1. This item includes all work and costs associated with the removal and disposal of (2) existing 2,000 gallon (each) underground abandoned fuel storage tanks and concrete cover pad.
2. This item shall include any/all required temporary stabilization, excavation, backfilling and grading.
3. Costs shall include, but are not limited to, work shown on the Contract Drawings and described in the specifications herein.

**B. MEASUREMENT**

1. Unit of Measure – LUMP SUM (LS)
2. This item will be measured as a lump sum to include compensation for the work covered by contract price.
3. Payment shall be for all costs, including but not limited to, furnishing all labor, supervision, materials, equipment, tools, expenses and incidentals as required for

complete, in place installation of this bid item in accordance with the Contract Documents.

**BID ITEM NO. 5 – FURNISH AND INSTALL ASPHALT PAVEMENT**

**A. WORK COVERED BY CONTRACT PRICE**

1. This item includes all work and costs associated with the purchase, delivery, installation of asphalt paving complete-in place as required for the Rock Harbor Commercial Wharf Improvement Project.
2. This item shall include all work necessary for the replacement of asphalt pavement disturbed during construction for installation of the proposed bulkhead, tieback anchor system, removal/installation of underground utilities and drainage improvements along with new areas previously not paved and shall include, but not be limited to, installation of asphalt pavement section and base course and any other item as necessary for the full depth restoration of pavement.
3. Costs shall include furnishing and installing parking curb stops and pavement striping/markings.
4. Costs shall include, but are not limited to, work shown on the Contract Drawings and described in the specifications herein.

**B. MEASUREMENT**

1. Unit of Measure: SQUARE YARD (SY)
2. This item will be measured per square yard of asphalt paving installed in-place to the grades and limits shown on the Contract Drawings.
3. Payment shall be for all costs, including but not limited to, furnishing all labor, supervision, materials, equipment, tools and incidentals as required for installation of this bid item in accordance with the Contract Documents.

**BID ITEM NO. 6 – FURNISH AND INSTALL STEEL SHEET PILE REPLACEMENT BULKHEAD**

**A. WORK COVERED BY CONTRACT PRICE**

1. This item includes all work and costs associated with, including but not limited to, furnishing all labor, materials, equipment, and any other incidentals for the installation of the steel sheet pile bulkhead for the Rock Harbor Commercial Wharf Improvement Project.
2. This item includes the investigation of existing structures in proximity of work and temporary bracing and shoring as needed to protect existing structures.
3. This item includes installation of AZ19-700 and AZ14-770 steel sheet piles to the lines and elevations shown on the Contract Drawings, falsework, steel wales, hardware and bearing plates, welding, protective marine coatings and field touch up, reinforced cast-in-place concrete caps, tie-rods and any other miscellaneous metals including steel plates, steel piles and flowable fill required for the closure of the bulkhead, installation of geotextiles, backfill material, excavation/compaction,

installation of anodes and any other item as necessary to construct the new bulkhead as shown on the Contract Drawings.

4. Driving through any obstructions, if encountered, shall be considered incidental to the sheet pile installation.
5. Costs shall include, but are not limited to, work shown on the Contract Drawings and described in the specifications herein.

**B. MEASUREMENT**

1. Unit of Measure – LINEAR FOOT (LF)
2. This item will be measured per linear foot complete in-place to include compensation for the work covered by the contract price.
3. Payment shall be made for all costs, including but not limited to, furnishing all labor, supervision materials, equipment, tools and incidentals as required to install the steel sheet pile replacement bulkhead in accordance with the Contract Documents. The Contractor shall provide an itemized cost breakdown of the LF cost of this item as a submittal prior to start of construction.

**BID ITEM NO. 7 – DRILLED GROUND ANCHORS**

**A. WORK COVERED BY CONTRACT PRICE**

1. This item includes all work and costs associated with, including but not limited to, furnishing all labor, materials, equipment, and any other incidentals for the installation of drilled ground anchors to stabilize the AZ19-700 replacement bulkhead for the Rock Harbor Commercial Wharf Improvement Project.
2. This item includes the investigation of existing structures in proximity of work and temporary bracing and shoring as needed to protect existing structures.
3. This Item includes all costs including, but not limited to, furnishing all labor, materials, equipment, and incidentals required to install the drilled ground anchors at locations shown on the on the Contract Drawings. All drilling and grouting equipment and procedures, stressing equipment and calibration thereof and mill test results for pre-stressing steel wire, strand or bars, anchorage head materials, bearing plates, trumpets, epoxy coatings, grout, sheathing, corrosion inhibitors, miscellaneous metal fabrications are considered part of or incidental to this Bid item. Calibrations and field testing are also included in this Bid item.
4. A detailed design with supporting calculations to achieve the specified ultimate stress as shown on the Contract Drawings shall be provided by the Contractor, certified by a Professional Engineer licensed in the Commonwealth of Massachusetts.
5. Costs shall include, but are not limited to, work shown on the Contract Drawings and described in the specifications herein.

**B. MEASUREMENT**

1. Unit of Measure – EACH (EA)

2. This item will be measured per each drilled ground anchor complete in-place to include compensation for the work covered by the contract price.
3. Payment shall be made for all costs, including but not limited to, furnishing all labor, supervision materials, equipment, tools and incidentals as required to install the drilled ground anchors in accordance with the Contract Documents.

**BID ITEM NO. 8 – FURNISH AND INSTALL 24” DIAMETER STEEL PIPE PILES**

**A. WORK COVERED BY CONTRACT PRICE**

1. This item includes all work and costs associated with, including but not limited to, furnishing all labor, materials, equipment, and any other incidentals for the installation of 24” diameter steel pipe piles to support the concrete commercial off-loading and public viewing deck for the Rock Harbor Commercial Wharf Improvement Project.
2. This item includes the investigation of existing structures in proximity of work and temporary bracing and shoring as needed to protect existing structures.
3. This item includes the installation of 24-inch diameter steel pipe piles, plug plate, pile shoes, falsework, pile load testing with Pile Driving Analyzer (PDA) on 2 test piles to be specified by the engineer in the field, GRLWEAP analysis, marine protective coatings, welding, and all other incidentals related to this item.
4. Driving through any obstructions, if encountered, shall be considered incidental to the pile installation.
5. Costs shall include, but are not limited to, work shown on the Contract Drawings and described in the specifications herein.

**B. MEASUREMENT**

1. Unit of Measure – EACH (EA)
2. This item will be measured per each 24” diameter pipe pile installed in-place to include compensation for the work covered by the contract price.
3. Payment shall be made for all costs, including but not limited to, furnishing all labor, supervision materials, equipment, tools and incidentals as required to install steel pipe piles at the locations and to the limits shown on the Contract Drawings and in accordance with the Contract Documents.

**BID ITEM NO. 9 – FURNISH AND INSTALL PILE-SUPPORTED CONCRETE COMMERCIAL WHARF WITH PUBLIC VIEWING AREA**

**A. WORK COVERED BY CONTRACT PRICE**

1. This item includes all work and costs associated with, including but not limited to, furnishing all labor, materials, equipment, and any other incidentals for the installation of pile-supported concrete commercial off-loading and public viewing deck for the Rock Harbor Commercial Wharf Improvement Project.
2. This item includes the investigation of existing structures in proximity of work and temporary bracing and shoring as needed to protect existing structures.

3. This item includes the steel reinforcement within the driven piles, cast in place concrete elements including deck, pile caps/curbs, sidewalk, curb and planter, precast concrete pile caps and planks, flagpole and base, mooring cleats, concrete stamping, marine hardware, welding and all other incidentals related to this item.
4. Costs shall include, but are not limited to, work shown on the Contract Drawings and described in the specifications herein.

**B. MEASUREMENT**

1. Unit of Measure – LUMP SUM (LS)
2. This item will be measured as a lump sum for the pile-supported concrete off-loading and public viewing area installed complete in-place to include compensation for the work covered by the contract price.
3. Payment shall be made for all costs, including but not limited to, furnishing all labor, supervision materials, equipment, tools and incidentals as required to install the pile-supported concrete off-loading and public viewing area in accordance with the Contract Documents.

**BID ITEM NO. 10 – FURNISH AND INSTALL TIMBER TOWN PIER**

**A. WORK COVERED BY CONTRACT PRICE**

1. This item includes all work and costs associated with, including but not limited to, furnishing all labor, materials, equipment, and any other incidentals for the replacement of the existing timber Town Pier for the Rock Harbor Commercial Wharf Improvement Project.
2. This item includes the installation of 12-inch diameter CCA-treated timber piles (vertical and battered), GRLWEAP analysis, falsework, cast-in-place reinforced concrete pad, timber stringers, split caps, decking and cross-bracing, marine hardware and all other incidentals related to this item.
3. Driving through any obstructions, if encountered, shall be considered incidental to the pile installation.
4. Costs shall include, but are not limited to, work shown on the Contract Drawings and described in the specifications herein.

**B. MEASUREMENT**

1. Unit of Measure – SQUARE FOOT (SF)
2. This item will be measured per square foot of pile-supported timber Town Pier installed complete in-place to include compensation for the work covered by the contract price.
3. Payment shall be made for all costs, including but not limited to, furnishing all labor, supervision materials, equipment, tools and incidentals as required to install the pile-supported timber Town Pier in accordance with the Contract Documents.

**BID ITEM NO. 11 – FURNISH AND INSTALL TIMBER COMMERCIAL LANDING PIER**

**A. WORK COVERED BY CONTRACT PRICE**

1. This item includes all work and costs associated with, including but not limited to, furnishing all labor, materials, equipment, and any other incidentals for the installation of a new timber Commercial Landing Pier for the Rock Harbor Commercial Wharf Improvement Project.
2. This item includes the installation of 12-inch diameter CCA-treated timber piles (vertical and battered), GRLWEAP analysis, falsework, timber stringers, split caps, decking and cross-bracing, marine hardware, aluminum gangways and connections, gangway gantry and all other incidentals related to this item.
3. Driving through any obstructions, if encountered, shall be considered incidental to the pile installation.
4. Costs shall include, but are not limited to, work shown on the Contract Drawings and described in the specifications herein.

**B. MEASUREMENT**

1. Unit of Measure – SQUARE FOOT (SF)
2. This item will be measured per square foot of pile-supported timber Commercial Landing Pier installed complete in-place to include compensation for the work covered by the contract price.
3. Payment shall be made for all costs, including but not limited to, furnishing all labor, supervision materials, equipment, tools and incidentals as required to install the pile-supported timber Commercial Landing Pier in accordance with the Contract Documents.

**BID ITEM NO. 12 – FURNISH AND INSTALL TIMBER FLOATS**

**A. WORK COVERED BY CONTRACT PRICE**

1. This item includes all work and costs associated with, including but not limited to, furnishing all labor, materials, equipment, and any other incidentals for the installation of new timber floats for the Rock Harbor Commercial Wharf Improvement Project.
2. This item includes CCA-treated timber framing and decking, marine hardware, cleats, floatation, fendering, shop drawings, pile guides and all other incidentals required for installation of two commercial floating dock systems.
3. Costs shall include, but are not limited to, work shown on the Contract Drawings and described in the specifications herein.

**B. MEASUREMENT**

1. Unit of Measure – SQUARE FOOT (SF).
2. This item will be measured per square foot of timber floats installed complete in-place to include compensation for the work covered by the contract price.

3. Payment shall be made for all costs, including but not limited to, furnishing all labor, supervision materials, equipment, tools and incidentals as required to install the timber floats in accordance with the Contract Documents.

**BID ITEM NO. 13 – FURNISH AND INSTALL GREENHEART TIMBER BERTHING, FLOAT AND FENDER PILES**

**A. WORK COVERED BY CONTRACT PRICE**

1. This item includes all work and costs associated with, including but not limited to, furnishing all labor, materials, equipment, and any other incidentals for the installation of 12-inch diameter greenheart piles for commercial vessel berthing, fendering at the Town Pier, Commercial Landing Pier, Bulkhead and Commercial Wharf and anchoring of new timber floats for the Rock Harbor Commercial Wharf Improvement Project.
2. This item includes installation of greenheart piles, treated timber wales and chocks, marine hardware, banding, fiberglass capping and all other incidentals required for berthing, fendering and floating dock support.
3. Driving through any obstructions, if encountered, shall be considered incidental to the pile installation.
4. Costs shall include, but are not limited to, work shown on the Contract Drawings and described in the specifications herein.

**B. MEASUREMENT**

1. Unit of Measure – EACH (EA).
2. This item will be measured per each pile installed complete in-place to include compensation for the work covered by the contract price.
3. Payment shall be made for all costs, including but not limited to, furnishing all labor, supervision materials, equipment, tools and incidentals as required to install the greenheart piles at the locations and to the elevations and as specified in the Contract Documents.

**BID ITEM NO. 14 – FURNISH AND INSTALL TIMBER RAILING SYSTEM**

**A. WORK COVERED BY CONTRACT PRICE**

1. This item includes all work and costs associated with, including but not limited to, furnishing all labor, materials, equipment, and any other incidentals required for the installation of a timber railing system for the Rock Harbor Commercial Wharf Improvement Project.
2. This item includes treated timber railings and posts, post connections, composite top rail, galvanized steel mesh, hardware and all other incidentals required for installation of a railing system at the locations and to elevations shown on the Contract Drawings.
3. Costs shall include, but are not limited to, work shown on the Contract Drawings and described in the specifications herein.

**B. MEASUREMENT**

1. Unit of Measure – LINEAR FOOT (LF).
2. This item will be measured per linear foot of timber railing system installed complete in-place to include compensation for the work covered by the contract price.
3. Payment shall be made for all costs, including but not limited to, furnishing all labor, supervision materials, equipment, tools and incidentals as required to install a timber railing system in accordance with the Contract Documents.

**BID ITEM NO. 15 – FURNISH AND INSTALL STEEL GUARD RAIL**

**A. WORK COVERED BY CONTRACT PRICE**

1. This item includes all work and costs associated with, including but not limited to, furnishing all labor, materials, equipment, and any other incidentals required for the installation of steel guardrail for the Rock Harbor Commercial Wharf Improvement Project.
2. This item includes steel guard rail and posts, excavation, backfilling and compaction, hardware and all other incidentals required for installation of guard rail at the locations and to elevations shown on the Contract Drawings.
3. Costs shall include, but are not limited to, work shown on the Contract Drawings and described in the specifications herein.

**B. MEASUREMENT**

1. Unit of Measure – LINEAR FOOT (LF).
2. This item will be measured per linear foot of guard rail installed complete in-place to include compensation for the work covered by the contract price.
3. Payment shall be made for all costs, including but not limited to, furnishing all labor, supervision materials, equipment, tools and incidentals as required to install steel guard rail in accordance with the Contract Documents.

**BID ITEM NO. 16 – FURNISH AND INSTALL CONCRETE-FILLED STEEL BOLLARDS**

**A. WORK COVERED BY CONTRACT PRICE**

1. This item includes all work and costs associated with, including but not limited to, furnishing all labor, materials, equipment, and any other incidentals required for the installation of concrete-filled steel safety bollards for the Rock Harbor Commercial Wharf Improvement Project.
2. This item includes steel pipe, excavation, backfilling and compaction, concrete fill, painting, reflective tape and all other incidentals required for installation of safety bollards at the locations and to elevations shown on the Contract Drawings.
3. Costs shall include, but are not limited to, work shown on the Contract Drawings and described in the specifications herein.

**B. MEASUREMENT**



1. Unit of Measure – EACH (EA).
2. This item will be measured per each steel bollard installed complete in-place to include compensation for the work covered by the contract price.
3. Payment shall be made for all costs, including but not limited to, furnishing all labor, supervision materials, equipment, tools and incidentals as required to install steel bollards in accordance with the Contract Documents.

**BID ITEM NO. 17 – FURNISH AND INSTALL NEW FUEL DISPENSERS,  
UNDERGROUND LINES AND CONTROL SYSTEMS**

**A. WORK COVERED BY CONTRACT PRICE**

1. This item includes all work and costs associated with, including but not limited to, furnishing all labor, materials, equipment, and any other incidentals required for the installation of new diesel fuel and gasoline dispensers, associated underground lines along with all mechanical and electronic controls to support the new above-ground fuel tank system (installed by others) for the Rock Harbor Commercial Wharf Improvement Project.
2. This item includes concrete apron and island for new diesel and gasoline dispensers, new diesel and gasoline dispensers, containment sumps with leak detector, buried fuel piping, conduits, couplings, excavation, backfilling and compaction, select trench bedding material, geotextile fabric, electrical and mechanical monitoring systems, testing, training and all other incidentals required to establish fuel service from the new above-ground fuel tank system installed at the site in Spring 2024.
3. Costs shall include, but are not limited to, work shown on the Contract Drawings and described in the specifications herein.

**B. MEASUREMENT**

1. Unit of Measure – LUMP SUM (LS).
2. This item will be measured as lump sum installed complete in-place to include compensation for the work covered by the contract price.
3. Payment shall be made for all costs, including but not limited to, furnishing all labor, supervision materials, equipment, tools and incidentals as required to install all fuel-related service components in accordance with the Contract Documents.
4. Contractor shall provide an itemized cost breakdown of the LS cost of this item as a submittal prior to start of construction.

**BID ITEM NO. 18 – FURNISH AND INSTALL PUMP-OUT SERVICE UPGRADES**

**A. WORK COVERED BY CONTRACT PRICE**

1. This item includes all work and costs associated with, including but not limited to, furnishing all labor, materials, equipment, and any other incidentals required for the installation of a new pump-out system for the Rock Harbor Commercial Wharf Improvement Project.

2. This item includes new pump, hose, PVC piping, electronics, timber fencing with gate, reuse/relocation of existing holding tank and all other incidentals required to improve/upgrade the existing pump-out service.
3. Costs shall include, but are not limited to, work shown on the Contract Drawings and described in the specifications herein.

**B. MEASUREMENT**

1. Unit of Measure – LUMP SUM (LS).
2. This item will be measured as lump sum installed complete in-place to include compensation for the work covered by the contract price.
3. Payment shall be made for all costs, including but not limited to, furnishing all labor, supervision materials, equipment, tools and incidentals as required to install all pump-out service components in accordance with the Contract Documents.

**BID ITEM NO. 19 – FURNISH AND INSTALL 1-TON JIB CRANE**

**A. WORK COVERED BY CONTRACT PRICE**

1. This item includes all work and costs associated with, including but not limited to, furnishing all labor, materials, equipment, and any other incidentals required for the installation of a new 1-ton capacity jib crane for the Rock Harbor Commercial Wharf Improvement Project.
2. This item includes a new 1-ton jib crane assembly with electric hoist system, base plate, hardware, any other miscellaneous metals, and all other incidentals required for installation at the new Commercial Wharf.
3. Costs shall include, but are not limited to, work shown on the Contract Drawings and described in the specifications herein.

**B. MEASUREMENT**

1. Unit of Measure – LUMP SUM (LS).
2. This item will be measured as lump sum installed complete in-place to include compensation for the work covered by the contract price.
3. Payment shall be made for all costs, including but not limited to, furnishing all labor, supervision materials, equipment, tools and incidentals as required to install the new jib crane in accordance with the Contract Documents.

**BID ITEM NO. 20 – FURNISH AND INSTALL EMERGENCY ACCESS LADDERS**

**A. WORK COVERED BY CONTRACT PRICE**

1. This item includes all costs including, but not limited to, furnishing all labor, materials, equipment, and incidentals for the complete in place installation of new emergency ladder access at the new Town Pier, Commercial Landing Pier and Commercial Wharf for the Rock Harbor Commercial Wharf Improvement Project.
2. This item includes complete in-place installation of emergency ladders at the locations and to the elevations shown on the Contract Drawings, including but not

limited to, installation of horizontal bracing, hardware, welding, and all other incidental items as necessary.

3. Costs shall include, but are not limited to, work shown on the Contract Drawings and described in the specifications herein.

**B. MEASUREMENT**

1. Unit of Measure – EACH (EA).
2. This item will be measured per each emergency access ladders installed complete in-place to include compensation for the work covered by the contract price.
3. Payment shall be made for all costs, including but not limited to, furnishing all labor, supervision materials, equipment, tools and incidentals as required to install emergency access ladders in accordance with the Contract Documents.

**BID ITEM NO. 21 – FURNISH AND INSTALL DRAINAGE SYSTEMS**

**A. WORK COVERED BY CONTRACT PRICE**

1. This item includes all costs including, but not limited to, furnishing all labor, materials, equipment, and incidentals for the complete in place installation of drainage system improvements for the Rock Harbor Commercial Wharf Improvement Project.
2. This item includes complete in-place installation of new precast concrete catch basins, manholes and oil-water separators, crushed stone, backfill, HDPE pipe, connections, trench drains, stormwater infiltration chambers, geotextile fabric, excavation, backfilling and compaction and all other incidental items as necessary and to the lines, grades and elevations shown on the Contract Drawings.
3. Costs shall include, but are not limited to, work shown on the Contract Drawings and described in the specifications herein.

**B. MEASUREMENT**

1. Unit of Measure – LUMP SUM (LS).
2. This item will be measured as a lump sum to install all required to install complete in-place drainage systems for the work covered by the contract price.
3. Payment shall be made for all costs, including but not limited to, furnishing all labor, supervision materials, equipment, tools and incidentals as required to install drainage system improvements in accordance with the Contract Documents.
4. Contractor shall provide an itemized cost breakdown of the LS cost of this item as a submittal prior to start of construction.

**BID ITEM NO. 22 – FURNISH AND INSTALL ELECTRICAL SERVICE & LIGHTING**

**A. WORK COVERED BY CONTRACT PRICE**

1. This item includes all costs including, but not limited to, furnishing all labor, materials, equipment, and incidentals for the complete in place installation of

underground electrical service and lighting for the Rock Harbor Commercial Wharf Improvement Project.

2. This item includes complete in-place installation of underground electrical service as required to support shore power, jib crane, and pump-out, all lighting including new aluminum light poles with LED fixtures, light pole base connections to timber piers, concrete caps, concrete deck and reinforced, cast-in-place foundation below subgrade, PVC Schedule 80 conduit, bulkhead-mounted LED fixtures, flag pole lighting, meter socket, panelboard, CT cabinet, stainless steel cabinets, electrical hand holes, electrical manholes, excavation, backfilling and compaction and all other incidental items as necessary and to the lines, grades and elevations shown on the Contract Drawings.
3. Costs shall include, but are not limited to, work shown on the Contract Drawings and described in the specifications herein.

**B. MEASUREMENT**

1. Unit of Measure – LUMP SUM (LS).
2. This item will be measured as a lump sum to install all required to install complete in-place electrical service, lighting, base connections/foundation and all ancillary items for the work covered by the contract price.
3. Payment shall be made for all costs, including but not limited to, furnishing all labor, supervision materials, equipment, tools and incidentals as required to install electrical service, lighting, base connections/foundation and all ancillary items in accordance with the Contract Documents.
4. Contractor shall provide an itemized cost breakdown of the LS cost of this item as a submittal prior to start of construction.

**BID ITEM NO. 23 – FURNISH AND INSTALL WATER SYSTEMS**

**A. WORK COVERED BY CONTRACT PRICE**

1. This item includes all costs including, but not limited to, furnishing all labor, materials, equipment, and incidentals for the complete in place installation of water service for the Rock Harbor Commercial Wharf Improvement Project.
2. This item includes complete in-place installation of 2” water service to the face of the bulkhead. Including water service piping and apparatuses, valves, mechanical joints or thrust block, fittings, water meeting vault, backflow preventor and backflow preventor vault, expansion tank, pressure reducing valves, and all other incidental items as necessary as shown on the Contract Drawings.
3. Costs shall include, but are not limited to, work shown on the Contract Drawings and described in the specifications herein.

**B. MEASUREMENT**

1. Unit of Measure – LUMP SUM (LS).
2. This item will be measured as a lump sum to install all required to install complete in-place water service and all ancillary items for the work covered by the contract price.

3. Payment shall be made for all costs, including but not limited to, furnishing all labor, supervision materials, equipment, tools and incidentals as required to install water service and all ancillary items in accordance with the Contract Documents.
4. Contractor shall provide an itemized cost breakdown of the LS cost of this item as a submittal prior to start of construction.

**END OF SECTION**

SECTION 010500

FIELD ENGINEERING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Specification Sections, apply to this section.

1.2 SUMMARY

A. Engineering Services

The Contractor shall provide and pay for field engineering services required for the project, including:

1. Survey work required in execution of this project, except for surveys performed by the Owner's Project Engineer as indicated in these specifications.
2. Civil, geotechnical, structural or other professional engineering services specified, or required to execute Contractor's construction methods.
3. Equipment positioning work required in the execution of the project.

B. Existing Control Points

Existing control points available for the project are provided on the Contract Drawings. The Contractor shall be responsible for supplying any/all additional control points as required in the performance of the Work. In the instances where data is provided in differing vertical datum, it shall be the responsibility of the Contractor to ensure that the proper offsets are applied to the data to ensure that the project datum is utilized. All measured field locations shall be converted to Mean Low Water (MLW) prior to submittal. The Contractor shall then base all elevations when performing surveys on MLW.

C. Survey Datum

The Project Datum for this project shall be Mean Low Water (MLW). MLW is 5.71 feet below North American Vertical Datum of 1988 (NAVD88) for the Project Site as calculated by VDATUM Online and shown in the "Project Notes" that are provided as part of the Contract Drawings. In the instances where data is provided in differing datum, it shall be the responsibility of the Contractor to ensure that the proper offsets

are applied to the data to ensure that the project datum is utilized. All measured field locations shall be converted to MLW prior to submittal. The Contractor shall (and the Owner will) then base all elevations/soundings when performing surveys on MLW.

All horizontal positions will be reported in NAD83 state plane coordinates, Massachusetts Mainland, in U.S. Survey feet. All coordinates and elevations shall be recorded to the nearest 100<sup>th</sup> of a foot.

### 1.3 SUBMITTALS

The following shall be submitted in accordance with Section 013000, Submittal Procedures:

A. Field Data and Survey Data

The Contractor shall submit sufficient field data in a digital format with ASCII files containing Easting, Northing, and Elevations in the Project Datum, along with any field survey notes for installed conditions. The field data submittal shall have enough detail to allow the Project Engineer to reproduce the Contractor's survey plot by referring only to this field data.

B. Survey Personnel

Furnish a complete listing of the personnel who will perform the survey work required by the contract. The listing shall include a brief summary of the topographic survey experience of each person. The list shall be submitted prior to the preconstruction conference. The survey personnel shall include a licensed Professional Engineer (PE) or a licensed Professional Land Surveyor (PLS). The PLS shall have responsible charge and oversee the as-built survey. The state of licensure shall be Massachusetts.

C. Site Specific Survey Plan and Quality Assurance/Quality Control (QA/QC) Document

D. Submit survey plans specified below:

1. Record As Built Plans

The Contractor shall provide record measurements and as-built plans for the Project. As built plans shall be prepared and stamped by a Professional Land Surveyor (PLS) registered in Commonwealth of MA. Plans shall be provided in AutoCAD as well as a stamped paper plan set. The Contractor shall not demobilize from the Project Site until these plans are reviewed and accepted by the Project Engineer and Owner.

### 1.4 EXAMINATION

A. Examination of Site and Verification of Conditions

1. Before starting operations, the Contractor shall examine site to become acquainted with conditions to be encountered.
2. The Contractor shall verify exact locations of all above and below ground utilities including sewers, water mains, gas mains, telephone/ communications lines, above or below ground electrical wires, other utilities, conduits and structures which may interfere with work.

B. Utility Company Contacts

It is the Contractor's sole responsibility to conduct its own due diligence concerning the presence of utilities within the work area, and to protect all utilities from damage (of any kind) as a result of any of the Contractor's activities. Additional utility companies, appurtenances, and municipal and private utilities may be present in the work areas. The Contractor is responsible to contact Dig Safe prior to the start of work, before excavation of any kind and to implement all necessary and appropriate safeguards to prevent damage or disturbance to buried utilities and appurtenances.

1.5 EASEMENTS AND RIGHTS-OF-WAY

- A. Easements and rights-of-way reasonably necessary for performance of the Work, unless otherwise specified herein, will be provided by the Owner.
- B. The Contractor shall confine construction operations within limits indicated on drawings and/or within limits of approved easements or public ways.
- C. The Contractor shall place construction tools, equipment, materials and supplies, so as to cause least possible damage to property and interference with traffic.

1.6 LAYOUT OF WORK

- A. The Project Engineer will furnish a benchmark for the project.
- B. The Contractor shall lay out the Work by establishing all lines and grades at the site necessary to control the Work and shall be responsible for all measurements that may be required for the execution of the Work as prescribed in the specifications and/or shown on the Contract Drawings. All field notes, sketches, recordings and computations made by the Contractor shall be available at all times during the progress of the work for ready examination by the Project Engineer.
- C. The Contractor shall furnish, at his/her own expense, all such stakes, spikes, steel pins, templates, platforms, equipment, tools and material and all labor as may be



required in laying out any part of the Work from the control points established by the Owner. It shall be the responsibility of the Contractor to maintain and preserve all stakes and other markers established by him/her until authorized to remove them. If the control point(s) established at the site by the Owner are destroyed by or through the activities of the Contractor (prior to their authorized removal), said point shall be replaced by the Owner or the Project Engineer. The expense of replacement will be deducted from any amount due or which may become due the Contractor. The Project Engineer may require Work be suspended at any time when horizontal and vertical control points established at the site by the Contractor are not reasonably adequate to permit checking the Work. Such suspension will be withdrawn upon proper replacement of the control points.

## 1.7 CONTRACTOR SURVEYS

### A. Personnel

The Contractor survey Work, to be performed under this contract, shall be accomplished by, reviewed, and approved by a PE or PLS and having a minimum of ten (10) years of personal experience with land surveys within the state of Massachusetts.

### B. Site-Specific Survey Plan and QA/QC Document

To ensure that the method of surveying is acceptable, the Contractor shall submit a detailed, Site Specific Survey Plan and QA/QC document setting out the proposed method of surveying. This plan will include a description of all equipment, personnel, and specific methods that will be employed to ensure surveys are of the highest quality. Prior to the start of any Work at the site, the Contractor shall prepare a plan describing the method(s) to be used:

1. to complete the layout and sequencing of the Work;
2. to conduct the topographic surveys; and
3. to confirm data quality for all submitted data.

### C. Quality Control Surveys

The Contractor shall examine his work by conducting surveys to determine that the locations for structures have been achieved. Surveys shall be performed upon completion of separable portions of the work and upon completion of the entire work. The Contractor shall prepare plans based on the results of these surveys. These plans shall be used, by the Contractor, to satisfy himself of the effectiveness of his operations.

1.8 FINAL EXAMINATION AND ACCEPTANCE

A. Final Examination

As soon as practicable after the completion of the entire Work and after examination by the Contractor the work will be thoroughly examined by the Project Engineer. Examinations by the Project Engineer will be made at the expense of the Owner.

B. Final Acceptance

Final acceptance of the whole or any part of the Work, and the deductions or corrections of deductions made thereon will not be reopened after having once been made, except on evidence of collusion, fraud, or obvious error.

PART 2 – PRODUCTS (NOT USED)

PART 3 – EXECUTION (NOT USED)

**END OF SECTION**

## SECTION 013000

### SUBMITTAL PROCEDURES

#### PART 1 - GENERAL

##### 1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Specification Sections, apply to this section.

##### 1.2 SUMMARY

This section specifies the general methods and requirements of submissions applicable to the following work-related submittals.

- A. Product Data
- B. Planning Documents
- C. Equipment Specifications
- D. Progress Schedules
- E. Construction Photographs

Detailed submittal requirements are specified in the technical specifications section.

##### 1.3 SUBMITTALS

The following shall be submitted in accordance with Section 013000, Submittal Procedures noting that the Contractor shall provide any additional submittals requested by the Owner and/or Project Engineer:

1. Progress Schedule
  - a. In accordance with the requirements of Section 013100, Construction Project Schedules, the Contractor shall, within five (5) days after receipt of Notice to Proceed or as otherwise determined by the Project Engineer, submit for approval, a progress schedule. If changes are authorized that result in contract time changes, the Contractor shall submit a modified chart for approval by the Project Engineer.
2. Submittal Register
  - a. The Contractor shall provide a complete list of all submittals included in the technical specifications for use as a submittal register to track the dates for

- submission, comment, resubmission and final acceptance of the project submittals.
3. Request for Information (RFI)
  4. Project Schedule
  5. Verification of Underground Utilities (DIGSAFE)
  6. Substitutions
  7. Project Layout Plan/Staging Area Plan
  8. Equipment List, Inspections and Certifications
  9. Project Health and Safety Plan
  10. Environmental Protection Plan – including, but not limited to: Storm Water Pollution Prevention Plan (as necessary), Spill Prevention Control and Countermeasure Plan, Emergency Procedures Plan, Contaminant Prevention Plan and Erosion and Sedimentation Control Plan
  11. Quality Control Plan
  12. Accident Prevention Program
  13. Daily Construction Reports (to be submitted weekly)
  14. List of all Sub-Contractors
  15. Excavation, Earthwork and Materials Handling Plan
  16. Earthwork Operations and Sequence Plan
  17. Material gradation, moisture density curves, and representative material samples
  18. Dewatering Plan (as required)
  19. Removal and Demolition Plan
  20. Solid Debris Management Plan
  21. Severe Weather Plan
  22. Sheet Pile and Soil Anchor Installation Plan (including temporary false work details & plan)
  23. Steel and Timber Piles including, but not limited to the following:
    - a. Driving plan and schedule for installation of piles.
    - b. Method of installation of piles including size and type of pile hammer.
    - c. Templates and falsework to be used for support and layout of piles during driving, as applicable.
    - d. Submit technical data for all pile driving equipment proposed for use.
    - e. Submit shop drawings with details of splices in piles, pile plug, etc.
    - f. Piling manufacturer and Piling fabricators.
    - g. Submit the results of a wave equation analysis (WEAP) using GRLWEAP, or equivalent performed in selecting pile-driving equipment, for review and acceptance of the Engineer. The GRLWEAP, or equivalent analysis, shall include a drivability analysis, relationship between blow count and capacity,

- or assessment of energy transferred to the pile and an analysis of driving stresses in the pile during driving.
- h. Submit results of load tests using the Pile Driving Analyzer (PDA) for installation of steel pipe piles at the Commercial Wharf.
24. Crushed stone, sand fill, sub-base material, pea stone (grain size data and samples)
  25. Gravel Borrow
  26. Processed Gravel Base
  27. Concrete Design Mix
  28. Concrete Batch Tickets
  29. Concrete Testing Results
  30. Precast Concrete Panels
  31. Asphalt Mix
  32. Product Data: Submit copies of manufacturer's printed product data, specifications, standard details, installation instructions, use limitations and recommendations for each material used. Provide certifications that materials and systems comply with specified requirements.
  33. Material list with treatment, sizes/lengths and quantities.
  34. Protective Coating for Steel Piles (including statement by the coating applicator that the protective coating was installed in strict accordance with manufacturers written instructions, including all surface preparation)
  35. Pile Driving Logs
  36. Shop Drawings detailing fabrication of each metal fabrication indicated and all structural members.
  37. Submit manufacturer's certifications showing that the products meet or exceed the required standards for the following items:
    - a. Bolts, including nuts and washers.
    - b. Threaded rods including all hardware.
    - c. Filler material and flux for welding.
    - d. Expansion bolts.
  38. Submit Certified Mill Test Reports indicating structural strength, destructive and non-destructive test analysis, chemical and physical properties of each type of steel and conformance with ASTM A6.
  39. Weight slips, material shipping records, completed bills of lading, certificates of disposal and/or hazardous waste manifests (as applicable) for material generated at the site and transported and disposed of offsite.
  40. Timber Floating Docks
    - a. Manufacturer's Qualifications and Warranty
    - b. Shop Drawings
    - c. Stamped Design Calculations
    - d. Manufacturer's handling and system installation instructions.

41. Aluminum Gangways
  - a. Manufacturer's Qualifications and Warranty
  - b. Shop Drawings
  - c. Stamped Design Calculations
  - d. Manufacturer's handling and system installation instructions.
42. Emergency Access Ladders
43. Jib Crane
44. Flag Pole
45. Parking curb stop
46. Gantry Beam
47. Pre-construction Photographs
48. Maintenance & Operation Manuals (as applicable)
49. As-built Plans

#### 1.4 CONTRACTOR'S RESPONSIBILITIES

The Contractor shall review product data, including those by subcontractors, prior to submission to determine and verify the following.

- A. Field measurements
- B. Field construction criteria
- C. Catalog numbers and similar data
- D. Conformance with the Specifications
  1. Each submittal shall have affixed to it the following Certification Statement including the Contractor's Company name and signed by the Contractor.  
Certification Statement: "By this submittal, I hereby represent that I have determined and verified all field measurements, field construction criteria, materials, dimensions, catalog numbers and similar data, and I have checked and coordinated each item with other applicable approved submittals and all Contract requirements." Submittals and product data sheets 11 inch x 17 inch or smaller shall be bound together in an orderly fashion and bear the above Certification Statement on the cover sheet. The cover sheet shall fully describe the packaged data and include a listing of all items within the package. Provide to the Project Engineer a copy of each submittal transmittal form for product data and samples at the time of submittal of said product data and samples to the Project Engineer.
    - a. Submittals received "WITHOUT" Certification Statement shall not be reviewed.

2. If a submittal shows any deviation from the requirements of the Contract Documents, the Contractor shall make specific mention of the deviations in the Transmittal Form furnished by the Project Engineer and provide a description of the deviations in a letter attached to the submittal.
3. The review and acceptance of samples or product data by the Project Engineer shall not relieve the Contractor from his responsibility with regard to the fulfillment of the terms of the Contract. All risks of error and omission are assumed by the Contractor, and the Project Engineer will not have responsibility therefore.
4. No portion of the work requiring a submittal shall be started nor shall any materials be fabricated, placed, or installed prior to the acceptance or qualified acceptance of such item. Fabrication performed, materials purchased, or on-site construction accomplished which does not conform to accepted submittals and data shall be at the Contractor's risk. The Owner will not be liable for any expense or delay due to corrections or remedies required to accomplish conformity.
5. Project work, materials, fabrication, and installation shall conform with approved applicable samples and product data.
  - a. Manufacturer's printed installation instructions, a part of product data submitted to the Project Engineer will not be reviewed and are for informational purposes only.

## 1.5 SUBMISSION REQUIREMENTS

Make submittals promptly in accordance with approved schedule, and in such sequence as to cause no delay in the Work or in the work of any other contractor.

- A. All complete submittals shall be submitted sufficiently in advance of construction requirements to provide no less than five (5) days, excluding Saturdays, Sundays and legal holidays for review from the time received at the Project Engineer's reviewing office. For submittals of major equipment that require more than five (5) days to review, due to its sheer complexity and amount of detail and also requiring review by more than one engineering discipline, a letter will be sent by the Project Engineer, or his/her designee, to the Contractor informing him/her of the circumstances and the date the submittal is expected to be returned to the Contractor.
- B. Number of Submittals Required
  1. Shop Drawings: Unless otherwise stated in the respective Specifications Sections, submit one (1) electronic version.
  2. Product Data: Unless otherwise stated in the respective Specifications submit one (1) electronic version.

C. Submittal Content

1. The date of submission and the dates of any previous submissions.
2. The Project title and number.
3. Contractor identification.
4. The names of:
  - a. Contractor
  - b. Supplier
  - c. Manufacturer
5. Identification of the product, with the specification section number, page and paragraph(s)
6. Field dimensions, clearly identified as such.
7. Relation to adjacent or critical features of the Work or materials.
8. Applicable standards, such as ASTM or Federal Specification numbers.
9. Identification of deviations from Contract Documents.
10. Identification of revisions on resubmittals.
11. An 8 inch x 3 inch blank space for Contractor and Project Engineer stamps.
12. Each shipment of drawings shall be accompanied by a transmittal form furnished by the Project Engineer giving a list of the drawing numbers and the names mentioned above.

1.6 REVIEW OF SHOP DRAWINGS, PRODUCT DATA, WORKING DRAWINGS AND SAMPLES

- A. The Project Engineer's review is for general conformance with the design concept and contract drawings. Markings or comments shall not be construed as relieving the Contractor from compliance with the contract plans and specifications or from departures therefrom. The Contractor remains responsible for details and accuracy, for coordinating the work with all other associated work and trades, for selecting fabrication processes, for techniques of assembly, and for performing work in a safe manner.
- B. The review of shop drawings, data, and samples will be general. They shall not be construed:
1. As permitting any departure from the Contract requirements.
  2. As relieving the Contractor of responsibility for any errors, including details, dimensions, and materials.
  3. As approving departures from details furnished by the Project Engineer, except as otherwise provided herein.
  4. If the shop drawings, data or samples as submitted describe variations and show a departure from the Contract requirement which the Project Engineer finds to be in the interest of the Owner and to be so minor as not to involve a change in Contract Price or time for performance, the Project Engineer may return the reviewed drawings without noting an exception.
  5. Two (maximum) copies of shop drawings or product data will be returned to the Contractor.



6. Submittals will be returned to the Contractor under one of the action codes indicated and defined on the transmittal form furnished by the Project Engineer.
7. Resubmittals will be handled in the same manner as first submittals. The Contractor shall direct specific attention, in writing, on the letter of transmittal and on resubmitted shop drawings by use of revision triangles or other similar methods, to revisions other than the corrections requested by the Project Engineer, on previous submissions. Any such revisions which are not clearly identified shall be made at the risk of the Contractor. The Contractor shall make corrections to any work done because of the type of revision that is not in accordance to the Contract Documents as may be required by the Project Engineer.
8. Partial submittals may not be reviewed. The Project Engineer will be the only judge as to the completeness of a submittal. Submittals not complete will be returned to the Contractor and will be considered "Rejected" until resubmitted. The Project Engineer may at his option provide a list or mark the submittal directing the Contractor to the areas that are incomplete.
9. If the Contractor considers any correction indicated on the shop drawings to constitute a change to the Contract Documents the Contractor shall give written notice thereof to the Project Engineer at least seven (7) working days prior to release for manufacture.
10. When the shop drawings have been completed to the satisfaction of the Project Engineer, the Contractor shall carry out the construction in accordance therewith and shall make no further changes therein except upon written instructions from the Project Engineer.

## 1.7 GENERAL PROCEDURES FOR SUBMITTALS

### A. Coordination of Submittal Times

Prepare and transmit each submittal sufficiently in advance of performing the related work or other applicable activities, or within the time specified in the individual work sections of the Specifications so that the installation will not be delayed by processing times including disapproval resubmittal (if required), coordination with other submittals, inspection, testing (off-site and on-site), purchasing, fabrication, delivery and similar sequenced activities. No extension of time will be authorized because of the Contractor's failure to transmit submittals sufficiently in advance of the Work.

## 1.8 CERTIFICATION FORMS

If specified in other sections of these Specifications, the Contractor shall submit the applicable certification form for each item required (see attached). The form shall be completely filled in and stamped.

## 1.9 PRECONSTRUCTION SUBMITTALS

At a minimum, the following submittals shall be provided in sufficient time to support the scheduled date for mobilization:

- A. Certificates of insurance.
- B. Surety bonds.
- C. List of proposed subcontractors.
- D. List of proposed products and major equipment.
- E. Construction project schedule.
- F. Submittal register.
- G. All planning documents referenced in other sections, include:
  - 1. Environmental Protection Plan as described in Section 01355, Environmental Protection
  - 2. Equipment including applicable inspections and certification as described in Section 01600, Equipment
  - 3. Health and Safety Plan as described in Section 01900, General Safety Requirements

PART 2 – PRODUCTS (NOT USED)

PART 3 – EXECUTION (NOT USED)

**END OF SECTION**

## CERTIFICATE OF DESIGN

The undersigned hereby certifies that he/she is a Professional Engineer (P.E.) registered in the state of \_\_\_\_\_ and that he/she has been employed by (Name of Contractor) \_\_\_\_\_ to design \_\_\_\_\_ in accordance with Specifications Section \_\_\_\_\_ for the (Name of Project) \_\_\_\_\_

The undersigned further certifies that he/she has performed similar designs previously and has performed the design of the \_\_\_\_\_; that said design is in conformance with all applicable local, state, and federal codes, rules, and regulations and professional practice standards; that his/her signature and P.E. Stamp have been affixed to all calculations and drawings used in, and resulting from, the design; and that the use of that stamp signifies the responsibility of the undersigned for that design.

The undersigned hereby certifies that he/she has Professional Liability Insurance or will be covered by an Employer Policy with limits of \$1,000,000.00 and a Certificate of Insurance is attached.

The undersigned hereby agrees to make all original design drawings and calculations available to the Owners representative with seven (7) days following written request therefore by the Owner.

\_\_\_\_\_  
P.E. Name

\_\_\_\_\_  
Contractor's Name

\_\_\_\_\_  
Signature

\_\_\_\_\_  
Signature

\_\_\_\_\_  
Title

\_\_\_\_\_  
Title

\_\_\_\_\_  
Address

\_\_\_\_\_  
Address

SECTION 013100

CONSTRUCTION PROJECT SCHEDULES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Specification Sections, apply to this section.

1.2 SUMMARY

- A. Contractor shall prepare and submit to Owner's Project Engineer for review within five (5) days after Notice to Proceed, a detailed construction project schedule, in Microsoft Project software or equivalent.

1.3 FORM OF SCHEDULES

- A. Prepare schedules in form of a horizontal bar chart.
  - 1. Provide separate horizontal bar for each trade or operation.
  - 2. Horizontal time Scale: Identify first work date of each week.
  - 3. Scale and spacing to allow space for notations and future revisions.
- B. Format of Listings: Chronological order of start of each item of work.
- C. Identification of Listings: By scope of work.

1.4 CONTENT OF SCHEDULES

- A. Construction Project Schedule
  - 1. Show complete sequence of construction by activity.
  - 2. Show dates for beginning and completion of each major element of construction and installation dates for major equipment items. Elements shall include, but not be limited to, the following:
    - a. Receipt of submittal data from supplier/manufacturer submitted to Owner's Project Engineer, review and return to supplier/manufacturer.
    - b. Material and equipment order, manufacturer, delivery and installation, and checkout.
    - c. Mobilization of equipment.
    - d. 25, 50, 75 and 100 percent complete of mandatory milestones as specified in Section 010100, Summary of Work.
    - e. Subcontractors' items of work.
    - f. Final cleanup.

- g. Allowance for inclement weather.
- 3. Show projected percentage of completion for each item as of first day of each month.

#### 1.5 SCHEDULE REVISIONS

- A. Every 15 days Contractor shall revise construction schedule to reflect changes in progress of work and to indicate progress of each activity at date of submittal.
- B. Changes occurring since previous submittal of schedule shall be indicated including:
  - 1. Changes in scope.
  - 2. Activities modified since previous submittal.
  - 3. Revised projections of progress and completion.
  - 4. Other identifiable changes.
- C. Provide a narrative report as needed to define:
  - 1. Problem areas, anticipated delays, and impact on schedule.
  - 2. Corrective action recommended and its effect.
  - 3. Effect of changes on schedules of other affected parties.

#### 1.6 SUBMITTAL REQUIREMENTS

- A. For initial submittal of construction schedule and subsequent revisions thereof, furnish one (1) electronic copy of schedule to the Project Engineer.

PART 2 – PRODUCTS (NOT USED)

PART 3 – EXECUTION (NOT USED)

**END OF SECTION**

SECTION 013200

EXECUTION AND CLOSEOUT REQUIREMENTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Specification Sections, apply to this section.

1.2 DESCRIPTION

Work included: Provide an orderly and efficient transfer of the completed Work to the Owner.

1.2 QUALITY ASSURANCE

- A. Prior to requesting review by the Project Engineer, use adequate means to assure that the Work is completed in accordance with the specified requirements and is ready for the requested review.
- B. Submit written certification that Contract Documents have been reviewed by the Contractor, the Work has been inspected by the Contractor, and that the Work is complete and in accordance with the Contract Documents.

1.3 PROCEDURES

- A. Substantial Completion:
  - 1. Substantial Completion is defined as the stage in the progress of the Work when the Work or designated portion thereof is sufficiently complete in accordance with the Contract Documents so the Owner can occupy or utilize the Work for its intended use.
  - 2. When the Contractor considers that the Work, or a portion thereof which the Owner agrees to accept separately, is substantially complete, the Contractor shall prepare and submit to the Project Engineer a comprehensive list of items to be completed or corrected.
  - 3. Prepare and submit the list required by Paragraph 1.3-A-2 above.
  - 4. Within a reasonable time after receipt of the list, the Project Engineer will review to determine status of completion.
  - 5. Should the Project Engineer determine that the Work is not substantially complete:

- a. The Project Engineer promptly will so notify the Contractor, in writing, giving the reasons, therefore.
    - b. Remedy the deficiencies and notify the Project Engineer when ready for additional review.
    - c. The Project Engineer will review the Work.
  6. When the Project Engineer concurs that the Work is substantially complete:
    - a. The Project Engineer will prepare a “Certificate of Substantial Completion”, accompanied by the Contractor’s list of items to be completed or corrected, as verified by the Project Engineer.
    - b. The Project Engineer will submit the Certificate to the Owner and to the Contractor for their written acceptance of the responsibilities assigned to them in the Certificate.
- B. Final Completion:
1. Prepare and submit to the Project Engineer a notice that the Work is complete and ready for final review and acceptance.
  2. Certify that:
    - a. Contract Documents have been reviewed.
    - b. Work has been reviewed for compliance with the Contract Documents.
    - c. Work has been completed in accordance with the Contract Documents.
    - d. Equipment and systems have been tested as required and are operational.
    - e. Work is completed and ready for final review.
  3. The Project Engineer will make a review to verify status of completion.
  4. Should the Project Engineer determine that the Work is incomplete or defective:
    - a. The Project Engineer promptly will so notify the Contractor, in writing, listing the incomplete or defective work.





equipment, and similar items which were provided as part of the Work.

PART 2 – PRODUCTS (NOT USED)

PART 3 - EXECUTION

3.1 Closeout procedures are described in Part 1 above.

**END OF SECTION**

SECTION 013550

ENVIRONMENTAL PROTECTION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Specification Sections, apply to this section.
- B. The publications listed below are incorporated into these Technical Specifications by reference. The publications are referred to in the text by basic designation only. The Contractor shall comply with all applicable local, state and federal regulations whether specifically listed or not in this Section.

U.S. NATIONAL ARCHIVES AND RECORDS ADMINISTRATION (NARA)

33 CFR 328	Definitions
40 CFR 68	Chemical Accident Prevention Provisions
40 CFR 129	Toxic Pollutant Effluent Standards
40 CFR 260	Hazardous Waste Management System: General
40 CFR 261	Identification and Listing of Hazardous Waste
40 CFR 302	Designation, Reportable Quantities, and Notification
40 CFR 355	Emergency Planning and Notification
49 CFR 171 - 178	Hazardous Materials Regulations

1.2 EROSION AND SEDIMENTATION CONTROLS

- A. All temporary erosion and sediment controls as required for proper management of the Project Site shall be installed by the Contractor and shall be approved by the Project Engineer and the Orleans Conservation Commission prior to commencing any Work. (see Contract Drawings and Section 312500, Erosion and Sedimentation Controls, for additional information).

1.3 DEFINITIONS

A. Environmental Pollution

Environmental pollution is the presence of chemical, physical, or biological elements or agents which adversely affect human health or welfare; unfavorably alter ecological balances of importance to human life; affect other species of importance to humankind; or degrade the environment aesthetically, culturally and/or historically.

B. Environmental Protection

Environmental protection is the prevention/control of environmental pollution and habitat disruption that may occur to the environment during the Work. The control of environmental pollution requires consideration of land, water, and air; biological and cultural resources; and includes management of visual aesthetics; noise; solid, chemical, gaseous, and liquid waste; radiant energy and radioactive material as well as other pollutants.

C. Contractor Generated Hazardous Waste

Contractor generated hazardous waste means materials that, if abandoned or disposed of, may meet the definition of Hazardous Wastes as defined by Massachusetts Department of Environmental Protection (MassDEP) regulation 310 CMR 30. These waste streams would typically consist of material brought on site by the Contractor to execute Work, but are not fully consumed during the course of construction. Examples include, but are not limited to, excess paint thinners (i.e. methyl ethyl ketone, toluene etc.), waste thinners, excess paints, excess solvents, waste solvents and sediment admixtures.

D. Waters of the United States

All waters which are under the jurisdiction of the Clean Water Act, as defined in 33 CFR 328.

E. Wetlands

Wetlands means those areas that are inundated or saturated by surface or ground water at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands generally include swamps, marshes, and bogs.

1.4 ENVIRONMENTAL PROTECTION REQUIREMENTS

A. General

The Contractor shall minimize environmental pollution and damage that may occur as the result of construction operations. The environmental resources within the project

boundaries and those affected outside the limits of permanent Work shall be protected during the entire duration of this contract. The Contractor shall comply with all applicable environmental Federal, State, and local laws and regulations. The Contractor shall be responsible for any delays resulting from failure to comply with environmental laws and regulations.

#### 1.5 SUBCONTRACTORS

The Contractor shall ensure compliance with this section by subcontractors.

#### 1.6 FINES AND PENALTIES

The Contractor shall be solely responsible for any and all permit violations and fines levied thereto as a result of their construction or operations. The Contractor indemnifies the Owner from any fines or penalties levied and shall defend said fines or penalties as it sole coast with the Owner's cost relating to any defense of said fines or penalties to be assessed to the Contractor.

#### 1.7 SUBMITTALS

The following shall be submitted in accordance with Section 013300, Submittal Procedures:

A. Preconstruction Submittals:

1. Environmental Protection Plan:

The Environmental Protection Plan shall include the following plans as further described herein:

a. Spill Control and Countermeasure Plan

2. Storm Water Pollution Protection Plan (SWPPP): The Contractor shall be responsible for the development and implementation of a SWPPP developed specifically for the site as needed. This plan will utilize EPA guidance to ensure that construction phase impacts are mitigated for the site. Special care shall be taken to install proposed drainage structures in a manner that provides the maximum feasible protection of adjacent resource areas. The schedule for this project may require installation of stormwater structures outside of the paving window, the installed structures must function to provide stormwater treatment for effluent running off exposed unpaved roadway. All structures are to be cleaned prior to acceptance by the Owner.

3. Erosion and Sediment Control Plan including details of Contractor proposed maintenance (see Contract Drawings, Section 007010, Supplementary Conditions and Section 312500, Erosion and Sedimentation Controls).

a. Controls shall be deployed to enclose all Work areas near bodies of water.

- b. The Contractor's plan for installment of controls shall be submitted to the Project Engineer for review and inspected by the Orleans Conservation Commission prior to the start of Work.
- c. The Contractor shall submit the Erosion and Sedimentation Control Plan at least five (5) days prior to commencing installation. The Plan shall incorporate the requirements specified herein with respect to the material regarding installation and anchoring procedures. Additionally, the plan shall provide information on the specific materials/appurtenances, delivery of the control materials to the Project Site, handling, storage, placement, and maintenance procedures. Fabrication details and installation techniques shall also be documented.

## 1.8 ENVIRONMENTAL PROTECTION PLAN

Prior to commencing construction activities or delivery of materials to the site, the Contractor shall submit an Environmental Protection Plan for review and approval by the Project Engineer. The purpose of the Environmental Protection Plan is to present a comprehensive overview of known or potential environmental issues which the Contractor must address during the Work. Issues of concern shall be defined within the Environmental Protection Plan as outlined in this Section. The Contractor shall address each topic at a level of detail commensurate with the environmental issue and required construction task(s). Topics or issues which are not identified in this Section, but which the Contractor considers necessary, shall be identified and discussed after those items formally identified in this section. Prior to submittal of the Environmental Protection Plan, the Contractor shall meet with the Project Engineer for the purpose of discussing the implementation of the initial Environmental Protection Plan; possible subsequent additions and revisions to the plan including any reporting requirements; and methods for administration of the Contractor's environmental plans. The Environmental Protection Plan shall be current and maintained onsite by the Contractor.

### A. Compliance

No requirement in this Section shall be construed as relieving the Contractor of any applicable Federal, State, and local environmental protection laws and regulations. During Construction, the Contractor shall be responsible for identifying, implementing, and submitting for approval any additional requirements to be included in the Environmental Protection Plan.

### B. Contents

The Environmental Protection Plan shall include, but shall not be limited to, the following:

1. Name(s) and cell phone of person(s) within the Contractor's organization who is(are) responsible for ensuring adherence to the Environmental Protection Plan.
2. Name(s), cell phone, and qualifications of person(s) responsible for managing waste to be removed from the site, if applicable.

3. Name(s), cell phone, and qualifications of person(s) responsible for training the Contractor's environmental protection personnel.
4. Description of the Contractor's environmental protection personnel training program.
5. Work area plan showing the proposed activity in each portion of the site and identifying the areas of limited use or nonuse. Plan should include measures for marking the limits of use areas including methods for protection of features to be preserved within authorized work areas.
6. The Spill Prevention Control and Countermeasure Plan shall include the procedures, instructions, and reports to be used in the event of an unforeseen spill of a substance regulated by 40 CFR 68, 40 CFR 302, 40 CFR 355, and/or regulated under State or Local laws and regulations (such as 310 CMR 40.0000, The Massachusetts Contingency Plan). Any spill above a reportable quantity should be reported to MassDEP at (888) 304-1133. The proper notifications need to comply with 310 CMR 40. This plan shall include as a minimum:
  - a. The name of the individual who will report any spills or hazardous substance releases and who will follow up with complete documentation. This individual shall immediately notify the Project Engineer in addition to the legally required Federal, State, and local reporting channels (including the National Response Center 1-800-424-8802) if a reportable quantity is released to the environment. The plan shall contain a list of the required reporting channels and telephone numbers.
  - b. The name and qualifications of the individual who will be responsible for implementing and supervising the containment and cleanup.
  - c. A list of materials and equipment to be immediately available at the job site, tailored to cleanup work of the potential hazard(s) identified.
  - d. The names and locations of suppliers of containment materials and locations of additional fuel oil recovery, cleanup, restoration, and material-placement equipment available in case of an unforeseen spill emergency.
  - e. The methods and procedures to be used for expeditious contaminant cleanup.
7. A Contaminant Prevention Plan that identifies potentially hazardous substances to be used on the job site; identifies the intended actions to prevent introduction of such materials into the air, water, or ground; and details provisions for compliance with Federal, State, and local laws and regulations for storage and handling of these materials. A copy of the Safety Data Sheets (SDS) and the maximum quantity of each hazardous material to be on site at any given time shall be included in the Contaminant Prevention Plan. As new hazardous materials are brought on site or removed from the site, the plan shall be updated.

## 1.9 ENVIRONMENTAL ASSESSMENT OF CONTRACT DEVIATIONS

Any deviations, requested by the Contractor, from the drawings, plans and specifications which may have an environmental impact will be subject to approval by the Project Engineer and may require an extended review, processing, and approval time. The Project Engineer reserves the right to disapprove alternate methods, even if they are more cost effective, if the Project

Engineer determines that the proposed alternate method will have an adverse environmental impact.

The Project Engineer will notify the Contractor in writing of any observed noncompliance with Federal, State or local environmental laws or regulations, project performance standards, and other elements of the Contractor's Environmental Protection plan. The Contractor shall, after receipt of such notice, inform the Project Engineer of the proposed corrective action and take such action when approved by the Project Engineer. The Project Engineer may issue an order stopping all or part of the work until satisfactory corrective action has been taken. No time extensions shall be granted or equitable adjustments allowed to the Contractor for any such suspensions. This is in addition to any other actions the Project Engineer may take under the contract, or in accordance with the Federal Acquisition Regulation or Federal Law.

## PART 2 - PRODUCTS

### 2.1 MATERIALS

- A. Materials for use as erosion and sedimentation control devices shall be in accordance with the Contract Drawings and MassDOT's Standard Specifications for Highways and Bridges (2023) unless otherwise instructed/approved by the Project Engineer.
- B. Acceptable sediment control devices include, but are not limited to, silt sacks, compost filter tube (wattles), hay bales and silt fence and/or approved equal(s). Sediment control devices shall be constructed in accordance with MassDOT's Standard Specifications for Highways and Bridges (2023), unless otherwise instructed by the Project Engineer. The sediment control methods and materials shall be approved, in writing by the Project Engineer, prior to commencement of work in accordance with Section 013000, Submittal Procedures.

## PART 3 - EXECUTION

### 3.1 GENERAL

The Contractor shall be responsible for complying with all environmental regulations required by Federal, State, Regional, and local environmental laws and regulations.

#### A. Delivery

All materials shall be delivered to the site and installed prior to any Work. Geotextiles shall be labeled, shipped, stored, and handled in accordance with ASTM D4873 and as specified herein. Materials damaged as a result of delivery, storage, or handling shall be repaired or replaced, as directed, at no additional time or cost.

#### B. Handling

No hooks, tongs, or other sharp instruments shall be used for handling the geotextiles. Geotextiles shall not be dragged along the ground.

C. Storage

All materials shall be stored according to manufacturer's specifications. Geotextiles shall be stored in areas where water cannot accumulate, elevated off the ground, and protected from conditions that will affect the properties or performance of the geotextile. Storage location preparation shall be the responsibility of the Contractor. Prior to installation, the geotextile shall not be exposed to direct sunlight for more than 14 days. Any materials damaged during delivery, storage, or handling shall be repaired or replaced as directed by the Project Engineer at no additional time or cost.

D. Placement

Controls shall be placed and/or maintained at the installed areas. Means of assuring that controls are properly aligned and anchored shall be incorporated into the placement methodology presented in the Contractor's Erosion and Sediment Control Plan. At the time of installation, fabric shall be rejected if it has defects, rips, holes, flaws, deterioration, or damage incurred during transportation, storage, or installation.

E. Damages

Damaged materials shall be replaced or repaired by Contractor. Materials that cannot be repaired shall be replaced. Anchoring system components and fasteners shall be replaced if damaged at no additional cost.

### 3.2 LAND RESOURCES

The Contractor shall confine all activities to areas defined by the Contract Drawings and specifications. Prior to the beginning of any construction, the Contractor shall identify any land resources to be preserved within the Work area.

A. Work Area Limits

Prior to commencing construction activities, the Contractor shall mark the areas that need not be disturbed under this contract. Isolated areas within the general work area which are not to be disturbed shall be marked or fenced. Monuments and markers shall be protected before construction operations commence. Where construction operations are to be conducted during darkness, any markers shall be visible in the dark. The Contractor's personnel shall be knowledgeable of the purpose for marking and/or protecting particular objects.



B. Erosion and Sediment Controls

The Contractor shall be responsible for providing erosion and sediment control measures in accordance with Federal, State, and local laws and regulations and as per Massachusetts Department of Transportation (MassDOT) Standard Specifications for Highways and Bridges (2023).

C. Contractor Facilities and Work Areas

The Contractor's field offices, staging areas, stockpile storage, and temporary facilities shall be placed in areas designated on the Contract Drawings or as directed by the Owner and/or the Project Engineer. Temporary movement or relocation of Contractor facilities shall be made only when approved by the Project Engineer.

3.3 WATER RESOURCES

The Contractor shall monitor construction activities to prevent pollution of surface and ground waters. Toxic or hazardous chemicals shall not be applied to soil or vegetation. All water areas affected by construction activities shall be monitored by the Contractor. For construction activities immediately adjacent to impaired surface waters, the Contractor shall be capable of quantifying sediment or pollutant loading to that surface water as required by the Clean Water Act.

A. Wetlands

The Contractor shall not enter, disturb, destroy, or allow discharge of contaminants into any wetlands. The Contractor shall be responsible for the protection of wetlands shown on the drawings in accordance with the applicable permits. Authorization to enter specific wetlands identified shall not relieve the Contractor from any obligation to protect other wetlands within, adjacent to, or in the vicinity of the construction site and associated boundaries.

3.4 AIR RESOURCES

Equipment operation, activities, or processes performed by the Contractor shall be in accordance with all Federal and State air emission and performance laws and standards.

A. Particulates

Dust particles; aerosols and gaseous by-products from construction activities shall be controlled at all times, including weekends, holidays and hours when work is not in progress. The Contractor shall maintain the work areas within or outside the project boundaries free from particulates which would cause the Federal, State, and local air pollution standards to be exceeded or which would cause a hazard or a nuisance. Sprinkling, chemical treatment of an approved type, baghouse, scrubbers,

electrostatic precipitators or other methods will be permitted to control particulates in the work area. The Contractor must have sufficient, competent equipment available to accomplish these tasks. The Contractor shall implement particulate control measures whenever a particulate nuisance or hazard occurs. The Contractor shall comply with all State and local visibility regulations.

B. Odors

Odors from construction activities shall be controlled at all times. The odors shall not cause a nuisance or health hazard and shall be in compliance with State regulations and/or local ordinances.

C. Sound Intrusions

The Contractor shall keep construction activities under surveillance and control to minimize environment damage by noise. The Contractor shall comply with the provisions of the Commonwealth of Massachusetts rules.

D. Additional Dust, Odor and Noise Control

If, in the opinion of the Project Engineer, the dust, odor and noise control measures are inadequate or insufficient to meet the intent of the specification, the Contractor shall be requested to implement additional measures to control dust, odor and noise at no additional cost to the Owner.

E. Diesel Exhaust

Impacts to air quality shall be mitigated with the addition of after engine emission controls and the use of low sulfur diesel fuel (500 ppm sulfur) in accordance with MassDEP's diesel retrofit program.

### 3.5 MATERIALS MANAGEMENT AND WASTE DISPOSAL

Disposal of wastes shall be as directed below, unless otherwise specified in other sections and/or shown on the drawings.

A. Solid Wastes

Solid waste shall be managed in accordance with all applicable regulations.

B. Contractor Generated Hazardous Wastes/Excess Hazardous Materials

Hazardous wastes are defined in 40 CFR 261, or are as defined by applicable State and local regulations. Hazardous materials are defined in M.G.L. Chapter 21E and 49 CFR 171 - 178. The Contractor shall take sufficient measures to prevent spillage

of hazardous and toxic materials during performance of the work. The Contractor shall segregate hazardous waste from other materials and wastes, shall protect it from the weather by placing it in a safe covered location, and shall take precautionary measures such as berming or other appropriate measures against accidental spillage. The Contractor shall be responsible for storage, describing, packaging, labeling, marking, and placarding of hazardous waste and hazardous material in accordance with 49 CFR 171 - 178, State, and local laws and regulations. The Contractor shall transport Contractor generated hazardous waste off Government property within thirty days in accordance with the Environmental Protection Agency and the Department of Transportation laws and regulations. The Contractor shall dispose of hazardous waste in compliance with Federal, State and local laws and regulations. Spills of hazardous or toxic materials shall be immediately reported to the Project Engineer. Cleanup and cleanup costs due to spills shall be the Contractor's responsibility. The Contractor shall coordinate the disposition of hazardous waste that is unearthed as a result of the dredging activity with the Project Engineer. The Contractor shall provide to the Project Engineer three quotes for the disposal of such hazardous materials for consideration of payment as a changed condition.

C. Fuel and Lubricants

Storage, fueling and lubrication of equipment and motor vehicles shall be conducted in a manner that affords the maximum protection against spill and evaporation. Fuel, lubricants and oil shall be managed and stored in accordance with all Federal, State, Regional, and local laws and regulations. Used lubricants and used oil to be discarded shall be stored in marked corrosion-resistant containers and recycled or disposed in accordance with 40 CFR 279, State, and local laws and regulations. Fuel storage at the project site must comply with all appropriate, relevant and applicable regulations.

3.6 RECYCLING AND WASTE MINIMIZATION

The Contractor shall participate in State and local government sponsored recycling programs. The Contractor is further encouraged to minimize solid waste generation throughout the duration of the project.

3.7 BIOLOGICAL RESOURCES

The Contractor shall make every reasonable effort to minimize interference with, disturbance to, and damage to fish, wildlife, and plants including their habitat. The Contractor shall be responsible for the protection of threatened and endangered animal and plant species including their habitat.

The Contractor shall clean all previously used construction equipment prior to bringing it onto the project site. The Contractor shall ensure that the equipment is free from soil residuals, egg deposits from plant pests, noxious weeds, and plant seeds.

### 3.8 TRAINING OF CONTRACTOR PERSONNEL

The Contractor's personnel shall be trained in all phases of environmental protection and pollution control. The Contractor shall conduct environmental protection/pollution control meetings for all Contractor personnel prior to commencing construction activities. Additional meetings shall be conducted for new personnel and when site conditions change. The training and meeting agenda shall include: methods of detecting and avoiding pollution; familiarization with statutory and contractual pollution standards; installation and care of devices, vegetative covers, and instruments required for monitoring purposes to ensure adequate and continuous environmental protection/pollution control; anticipated hazardous or toxic chemicals or wastes, and other regulated contaminants; recognition and protection of archaeological sites, artifacts, wetlands, and endangered species and their habitat that are known to be in the area.

### 3.9 POST CONSTRUCTION CLEANUP

The Contractor shall clean up all areas used for Construction ("Construction Areas" shall be defined as any area used by the Contractor) to their pre-construction condition. The Contractor shall, unless otherwise instructed in writing by the Project Engineer, obliterate all signs of temporary construction facilities such as work areas, structures, construction trailers, staging areas, stockpiles of excess or waste materials, and all other vestiges of construction prior to final acceptance of the Work.

**END OF SECTION**

## SECTION 014510

### CONTRACTOR QUALITY CONTROL

#### PART 1 - GENERAL

##### 1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Specification Sections, apply to this section.

#### PART 2 - PRODUCTS (NOT USED)

#### PART 3 - EXECUTION

##### 3.1 GENERAL REQUIREMENTS

- A. The Contractor is responsible for quality control and shall establish and maintain an effective quality control system. The quality control system shall consist of plans, procedures, and organization necessary to produce an end product which complies with the contract requirements. The system shall cover all construction operations, both onsite and offsite, and shall be keyed to the proposed construction sequence. The site project superintendent will be held responsible for the quality of work on the job and is subject to removal by the Project Engineer for non-compliance with the quality requirements specified in the contract. The site project superintendent in this context shall be the highest-level manager responsible for the overall construction activities at the site, including quality and production. The site project superintendent shall maintain a physical presence at the site at all times, except as otherwise acceptable to the Project Engineer, and shall be responsible for all construction and construction related activities at the site.

##### 3.2 COORDINATION MEETING

- A. After the Pre-Construction Meeting and before start of construction, the Contractor shall meet with the Project Engineer and discuss the Contractor's quality control system. During the meeting, a mutual understanding of the system details shall be developed, including the forms for recording operations, control activities, testing, administration of the system for both onsite and offsite work, and the interrelationship of Contractor's Management and control with the Owners' Quality Assurance. Minutes of the meeting shall be prepared by the Project Engineer and signed by both the Contractor and the Project Engineer. The minutes shall become a part of the contract file. There may be occasions when subsequent conferences

will be called by either party to reconfirm mutual understandings and/or address deficiencies in the quality control system or procedures which may require corrective action by the Contractor.

### 3.3 CONTROL

A. Contractor Quality Control is the means by which the Contractor ensures that the construction, to include that of subcontractors and suppliers, complies with the requirements of the contract. At least three phases of control shall be conducted by the Contractor for each definable feature of work as follows.

B. Preparatory Phase

This phase shall be performed prior to beginning work on each definable feature of work, after all required plans/documents/materials are approved/accepted, and after copies are at the work site. This phase shall include:

1. A review of each paragraph of applicable specifications, reference codes, and standards. A copy of those sections of referenced codes and standards applicable to that portion of the work to be accomplished in the field shall be made available by the Contractor at the preparatory inspection. These copies shall be maintained in the field and available for use by Project Engineer until final acceptance of the work.
2. A review of the Contract Drawings.
3. A check to assure that all materials and/or equipment have been tested, submitted, and approved.
4. Review of provisions that have been made to provide required control inspection and testing.
5. Examination of the work area to assure that all required preliminary work has been completed and is in compliance with the contract.
6. A physical examination of required materials, equipment, and sample work to assure that they are on hand, conform to approved shop drawings or submitted data, and are properly stored.
7. A review of the appropriate activity hazard analysis to assure safety requirements are met.

8. Discussion of procedures for controlling quality of the work including repetitive deficiencies. Document construction tolerances and workmanship standards for that feature of work.
9. A check to ensure that the portion of the plan for the work to be performed has been accepted by the Project Engineer.
10. Discussion of the initial control phase.
11. The Owner and Project Engineer shall be notified at least 48 hours in advance of beginning the preparatory control phase. This phase shall include a meeting attended by the superintendent, and the foreman responsible for the definable feature. The results of the preparatory phase actions shall be documented by separate minutes prepared by the Contractor and attached to the Contractor's daily report. The Contractor shall instruct applicable workers as to the acceptable level of workmanship required in order to meet contract specifications.

C. Initial Phase

This phase shall be accomplished at the beginning of a definable feature of work. The following shall be accomplished:

1. A check of work to ensure that it is in full compliance with contract requirements. Review minutes of the preparatory meeting.
2. Verify adequacy of controls to ensure full contract compliance. Verify required control inspection and testing.
3. Establish level of workmanship and verify that it meets minimum acceptable workmanship standards.
4. Resolve all differences.
5. Check safety to include compliance with and upgrading of the safety plan and activity hazard analysis. Review the activity analysis with each worker.
6. The Project Engineer shall be notified at least 48 hours in advance of beginning the initial phase.
7. The initial phase should be repeated for each new crew to work onsite, or any time acceptable specified quality standards are not being met.

D. Follow-up Phase

Daily checks shall be performed to assure control activities, including control testing, are providing continued compliance with contract requirements, until completion of the particular feature of work. The checks shall be made a matter of record in the Contractor's daily report. Final follow-up checks shall be conducted and all deficiencies corrected prior to the start of additional features of work which may be affected by the deficient work. The Contractor shall not build upon nor conceal non-conforming work.

E. Additional Preparatory and Initial Phases

Additional preparatory and initial phases shall be conducted on the same definable features of work if: the quality of on-going work is unacceptable; if there are changes in the applicable staff, onsite production supervision or work crew; if work on a definable feature is resumed after a substantial period of inactivity; or if other problems develop.

3.4 COMPLETION INSPECTION

A. Pre-Final Inspection

The Owner and/or Project Engineer will perform the pre-final inspection to verify that the work is complete. An Owner and/or Project Engineer Pre-Final Punch List may be developed as a result of this inspection. The Contractor shall ensure that all items on this list have been corrected before notifying the Owner and/or Project Engineer, so that a final acceptance inspection can be scheduled. Any items noted on the Pre-Final inspection shall be corrected in a timely manner. These inspections and any deficiency corrections required by this paragraph shall be accomplished within the time slated for completion of the entire work or any particular increment of the work if the project is divided into increments by separate completion dates.

B. Final Acceptance Inspection

The Contractor's superintendent or other primary management person, and the Project Engineer shall be in attendance at the final acceptance inspection. Additional Owner personnel may also be in attendance.

3.5 DOCUMENTATION

A. The Contractor shall maintain current records providing factual evidence that required quality control activities and/or tests have been performed. These records shall include the work of subcontractors and suppliers and shall be on an acceptable form that includes, at a minimum, the following information:

1. Contractor/subcontractor and their area of responsibility.



2. Operating plant/equipment with hours worked, idle, or down for repair.
  3. Work performed each day, giving location, description, and by whom.
  4. Test and/or control activities performed with results and references to specifications/drawings requirements. The control phase shall be identified (Preparatory, Initial, Follow-up). List of deficiencies noted, along with corrective action.
  5. Quantity of materials received at the site with statement as to acceptability, storage, and reference to specifications/drawings requirements.
  6. Submittals and deliverables reviewed, with contract reference, by whom, and action taken.
  7. Offsite surveillance activities, including actions taken.
  8. Job safety evaluations stating what was checked, results, and instructions or corrective actions.
  9. Instructions given/received and conflicts in plans and/or specifications.
  10. Contractor's verification statement.
- B. These records shall indicate a description of trades working on the project; the number of personnel working; weather conditions encountered; and any delays encountered. These records shall cover both conforming and deficient features and shall include a statement that equipment and materials incorporated in the work and workmanship comply with the contract. The original and one copy of these records in report form shall be furnished to the Owner daily within 24 hours after the date covered by the report, except that reports need not be submitted for days on which no work is performed. As a minimum, one report shall be prepared and submitted for every 7 days of no work and on the last day of a no work period. All calendar days shall be accounted for throughout the life of the contract. The first report following a day of no work shall be for that day only. Reports shall be signed and dated by the Contractor. The report from the Contractor shall include copies of test reports and copies of reports prepared by all subordinate quality control personnel.

### 3.6 NOTIFICATION OF NONCOMPLIANCE

- A. The Project Engineer will notify the Contractor of any detected noncompliance with the foregoing requirements. The Contractor shall take immediate corrective action after receipt of such notice. Such notice, when delivered to the Contractor at the work site, shall be deemed sufficient for the purpose of notification. If the Contractor fails or refuses to comply promptly, the Project Engineer may issue an order stopping all or part of the work until satisfactory corrective action has been taken. No part of the time lost due to such stop orders shall be made the subject of claim for extension of time or for excess costs or damages by the Contractor.

**END OF SECTION**

SECTION 015000

TEMPORARY FACILITIES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Specification Sections, apply to this section.

1.2 SUMMARY

- A. This Section specifies requirements for temporary services and facilities, including utilities, construction and support facilities, security and protection.
- B. Temporary utilities may be required and include but are not limited to:
1. Portable electric power and light.
  2. Cellular Telephone service.
- C. Temporary construction and support facilities required include, but are not limited to:
1. Sanitary facilities, including drinking water.
  2. Office Trailer
- D. Security and protection facilities required include but are not limited to:
1. Environmental protection.
  2. Emergency Spill Response Kit.

1.3 QUALITY ASSURANCE

- A. Regulations: Comply with industry standards and applicable laws and regulations of authorities having jurisdiction, including but not limited to:
1. Building Code requirements.
  2. Health and safety regulations.
  3. Utility company regulations.
  4. Police, Fire Department and Rescue Squad rules.
  5. Environmental protection regulations.

1.4 PROJECT CONDITIONS

- A. Conditions of Use: The Contractor shall keep temporary services and facilities clean and neat in appearance. Operate in a safe and efficient manner. Take necessary fire prevention measures. Do not overload facilities or permit them to

interfere with progress. Do not allow hazardous, dangerous or unsanitary conditions, or public nuisances to develop or persist on the site.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION

3.01 INSTALLATION

- A. The Contractor shall use qualified personnel for installation of temporary facilities. Locate facilities where they will serve the Project adequately and result in minimum interference with performance of the Work. The Contractor shall relocate and modify facilities as required.
- B. The Contractor shall provide each facility ready for use when needed to avoid delay. The Contractor shall maintain and modify as required. The Contractor shall not remove any facility until facilities are no longer needed, or are replaced by authorized use of completed permanent facilities.

3.02 TEMPORARY CONSTRUCTION AND SUPPORT FACILITIES  
INSTALLATION

- A. The Contractor shall locate sanitary facilities and any other temporary construction and support facilities, as required, for easy access.
- B. The Contractor shall maintain temporary construction and support facilities until near Substantial Completion. Remove prior to Substantial Completion. Personnel remaining after Substantial Completion will be permitted to use permanent facilities, under conditions acceptable to the Owner and/or Project Engineer.
- C. The Contractor shall install self-contained toilet units. Shield toilets to ensure privacy. Use of pit-type privies will not be permitted. Provide toilet tissue, paper towels, paper cups and similar disposable materials for each facility. Provide covered waste containers for used material.
- D. The Contractor shall provide containerized tap-dispenser bottled-water type drinking water units, including paper supply.

3.03 PERMITS AND CODES

- A. Comply with all applicable codes, ordinances, rules, regulations and laws of all local, municipal, and state authorities having jurisdiction over the work, without additional cost to the Owner.

**END OF SECTION**

SECTION 016000

EQUIPMENT

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Specification Sections, apply to this section.

1.2 SUBMITTALS

- A. Section 016000, Equipment, shall be submitted in accordance with Section 013000, Submittal Procedures.
- B. Submit a list of the equipment the Contractor intends to employ in the performance of the Work of this Contract. (See Section 004000, Bid)

1.3 EQUIPMENT

- A. Sufficient Capacity

The Contractor shall keep on the job sufficient equipment to meet the requirements of the Work. The equipment shall be in satisfactory operating condition and be capable of safely and efficiently performing the Work. The equipment shall be subject to inspection by the Project Engineer at all times.

- B. Minimum Capacity

The equipment listed on an Equipment Schedule, submitted with the Contractor's bid, is the minimum which the Contractor shall place and keep on the job unless otherwise determined by the Project Engineer. The listing of equipment is not to be construed as an agreement on the part of the Owner that the equipment is adequate to perform the required Work.

- C. Reduction in Capacity

No reduction in the capacity of the equipment employed on the Work shall be made except by written permission of the Project Engineer. The measure of the capacity of the equipment shall be its actual performance on the Work covered by this Contract.

- D. Inspections and Certifications

Prior to commencement of Work at the site, the Contractor shall submit to the Project Engineer for review, copies of all applicable inspections and certifications of equipment as required by Federal, State and local laws and regulations. Such inspections and certifications shall be current and maintained in force for the duration of this contract. Each item of equipment shall have on board a waste oil management plan which details the intended disposal method for waste oil. All equipment used in the prosecution of the work that uses fuel, oil or hydraulic fluid shall be inspected daily for leakage.

1.4 LICENSE REQUIREMENTS

Each piece of equipment used during the work shall be manned by a properly licensed person.

1.5 PERMIT REQUIREMENTS

The Contractor's equipment employed on the work shall meet the requirements of all applicable permits, certifications, and performance standards issued for the project as specified in these specifications.

1.6 HEIGHT LIMITATIONS (NOT USED)

PART 2 – PRODUCTS (NOT USED)

PART 3 – EXECUTION (NOT USED)

**END OF SECTION**

## SECTION 019000

### GENERAL SAFETY REQUIREMENTS

#### PART 1 - GENERAL

##### 1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Specification Sections, apply to this section.

##### 1.2 REFERENCES

- A. The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by the basic designation only.

###### 1. CODE OF FEDERAL REGULATIONS (CFR)

29 CFR 1910	Occupational Safety and Health Standards
29 CFR 1926	Safety and Health Regulations for Construction

###### 2. NATIONAL FIRE PROTECTION ASSOCIATION (NFPA)

NFPA 70	(1996) National Electrical Code
NFPA 241	(1996) Safeguarding Construction, Alteration, and Demolition Operations

###### 3. NATIONAL INSTITUTE FOR OCCUPATIONAL SAFETY AND HEALTH

NIOSH Pub No. 85-115	(1985) Occupational Safety and Health Guidance Manual for Hazardous Waste Site Activities
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##### 1.3 REGULATORY REQUIREMENTS

Work performed under this contract shall comply with Occupational Safety and Health Administration (OSHA) requirements in 29 CFR 1910 and 29 CFR 1926, especially OSHA's Hazardous Waste Operations and Emergency Response Standard 29 CFR 1926.65/29 CFR 1910.120 and state specific OSHA requirements where applicable. Matters of interpretation of standards shall be submitted to the appropriate administrative agency for resolution before starting work. Where the

requirements of this specification, applicable laws, criteria, ordinances, regulations, and referenced documents vary, the most stringent requirements shall apply.

#### 1.4 SUBMITTALS

- A. Submit the following for acceptance by the Project Engineer. Follow the administrative procedures for making submittals as specified in Section 013000, Submittal Procedures.
- B. Statements
  - 1. Site Specific Accident Prevention Plan.
  - 2. Equipment / Machinery Inspection Certification:
    - a. Submit certifications that equipment is in safe operating condition.
  - 3. Modification to Equipment:
    - a. Submit manufacturers' written approval of modifications or additions to equipment. Owner acceptance of submittal must be attained before such equipment can be brought on the job site.
  - 4. Safety Meeting Report:
    - a. Submit safety meeting reports detailing the subjects discussed at safety meetings within three days after each meeting.
- C. Accident Prevention Plan Submittal
  - 1. List all major definable features of work to be completed under this Contract.
  - 2. Accident Reporting
    - a. All accidents shall be investigated and a report prepared that outlines basic causes and proposed actions to prevent future occurrence.
  - 3. Severe Weather Plan: The Contractor shall submit a Severe Weather Plan describing the actions to be taken to protect persons and property in the event of severe weather warnings. This plan shall include but not be limited to the following:



- a. The types of storms anticipated (winter storm, hurricane, tornado)
- b. The time intervals before storms when action will be taken and the details of the actions to be taken.
- c. List of the equipment to be used on the project and its ability to handle adverse weather.
- d. Location equipment will be secured if not at the work site.
- e. Method of securing equipment that is moved.
- f. Methods of securing equipment not moved.
- g. Plan of evacuation to include immediate reaction plans to be taken for all storm occurrences, particularly sudden storms.
- h. A statement that full time monitoring of the National Oceanic and Atmospheric Administration (NOAA) marine weather broadcasts and other local commercial weather forecasting services will be the Contractor's primary source of information in the decision process to implement action under the severe weather plan.

#### 1.5 UNFORESEEN HAZARDOUS MATERIAL

If hazardous materials are encountered during construction operations that may be dangerous to human health upon disturbance, stop that portion of work and notify the Project Engineer immediately.

#### PART 2 - PRODUCTS (NOT APPLICABLE)

#### PART 3 - EXECUTION

##### 3.1 WEEKLY SAFETY MEETINGS

At least once a month, the Contractor shall conduct a safety meeting for all supervisors and foremen. Additionally, at least one safety meeting per week shall be conducted by the foremen for all workers. After each safety meeting, a safety meeting report shall be completed. A copy of a suggested weekly safety meeting form is attached at the end of this section.

**END OF SECTION**

# WEEKLY SAFETY MEETING

Date Held: \_\_\_\_\_

Time \_\_\_\_\_

CLIENT: \_\_\_\_\_ CONTRACT: \_\_\_\_\_

PROJECT: \_\_\_\_\_

PERSONNEL PRESENT: \_\_\_\_\_

CONDUCTED BY: \_\_\_\_\_

**All persons attending the meeting must sign the bottom or back of this form.**

Subjects discussed (Note, delete, or add)

Accident Prevention Plan \_\_\_\_\_ Individual Protective Equipment \_\_\_\_\_

Prevention of Falls \_\_\_\_\_ Back Injury/Safe Lifting Techniques \_\_\_\_\_

Fire Prevention \_\_\_\_\_ Sanitation, First Aid, Waste Disposal \_\_\_\_\_

Tripping Hazards \_\_\_\_\_ Clean-up - trash, nails in lumber \_\_\_\_\_

Staging, Ladders, Concrete Forms, Safety Nets \_\_\_\_\_

Hand Tools, Power Tools, Machinery, Chain Saws \_\_\_\_\_

Equipment Inspection & Maintenance (Zero Defects) \_\_\_\_\_

Hoisting Equipment, Winch and Crane Safety \_\_\_\_\_

Ropes, Hooks, Chains and Slings \_\_\_\_\_

Vehicle Operation Safety \_\_\_\_\_

Electrical Grounding, Temporary Wiring, GFCI \_\_\_\_\_

Lockouts/Safe clearance procedures (electrical, pressure, moving parts)

Welding, Cutting \_\_\_\_\_ Excavation Hazard/Rescue \_\_\_\_\_

Loose Rock/Steep Slopes \_\_\_\_\_ Explosives \_\_\_\_\_

Water Safety \_\_\_\_\_ Boat Safety \_\_\_\_\_

HAZMAT, Toxic hazards, SDS, respiratory, ventilation \_\_\_\_\_

Other items of concern specific to this contract: \_\_\_\_\_

SECTION 018900

SITE PREPARATION

PART 1: GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and general provisions of Contract, including General and Special Conditions and Specification sections, apply to work of this section.

1.02 SUMMARY

- A. The work under this section shall include: Mobilization and demobilization of all equipment, labor, materials, supervision, survey and any incidentals required to satisfactorily complete this project in accordance with any permit requirements, these Specifications, the Contract Drawings and shall include, but not be limited to the following:
1. Furnishing, installation and maintenance of erosion and sedimentation controls, temporary safety fence, temporary relocation/reinstallation of existing prefabricated fuel shed, installation and maintenance of environmental controls required by the Permits; staging area/stockpile management, suppression of dust onsite as necessary, management of odors and noise, final site cleanup/restoration, and all other miscellaneous work obviously required to complete the project, but not covered by individual items in the contract.
  2. All required site investigation work to identify/confirm existing above and below ground site conditions including, but not limited to, the location of existing utilities and coordination.
  3. Obtaining any/all additional permit(s)/authorization(s) that may be required beyond those provided and as required for the scope of work to be completed herein.
  4. Miscellaneous clean up required to restore the Project Site to pre-construction conditions.
- B. Where applicable, locate and identify existing underground and overhead service and utilities within the Contract limits. Provide adequate means of protection of utilities and services designated to remain. Repair utilities and services damaged by the Contractor's equipment and/or work force during the Contract work operations, to the satisfaction of the Town, at the sole expense of the Contractor.
- C. Where applicable, arrange for the disconnection, disconnect and seal all utilities and services designated to be removed before the start of site work operations. Perform all work in accordance with the requirements of applicable utility company or agency involved.
- D. When uncharted or incorrectly charted underground or underwater piping of utilities and services are encountered during the progression of work, notify the applicable utility company or agency to obtain procedure directions. Cooperate with the applicable utility company or agency in maintaining active services in operation.

- E. Perform site work operations and the removal of debris and waste materials to assure minimum interference with navigation, streets, walks, parking facilities, buildings and all other adjacent facilities.
- F. Obtain governing authorities written permission, when required, to close or obstruct street, walks and adjacent facilities. Provide alternate routes around closed or obstructed traffic ways, when required by governing authorities.
- G. Obtain written permission from property owners to trespass and/or transgress their properties where an easement has not been granted.
- H. Control dust caused by the work. Dampen surfaces as required. Comply with pollution control regulations of governing authorities.
- I. If the Contractor, in the course of excavation, uncovers or otherwise encounters any artifacts, whether historic or prehistoric, he shall bring them to the immediate attention of the Town, and stop all work in that vicinity of said artifacts until directed by the Town.
- J. If the Contractor, in the course of excavation, uncovers or otherwise encounters any suspected hazardous or unidentified substances, he shall bring them to the immediate attention of the Town, and stop all work in that vicinity of said substances until directed by the Town.
- K. Where applicable, protect and maintain all light poles (and lights), utility poles and services, traffic signal control boxes, curb boxes, fire hydrants, fire department connections, valves and other services, except items that are designated to be removed or reworked.
- L. Contractor shall be responsible for replacement in-kind of any existing structures that are damaged or undermined during the construction process.
- M. The Contractor shall be responsible for verifying the existing conditions prior to construction and establishing survey control to develop a baseline for the proposed bulkhead. The Contractor shall coordinate with the Project Engineer and the Town to ensure the proposed baseline is established prior to construction.
- N. The Contractor shall coordinate directly with the Project Engineer, Owner, all applicable Owner's staff and selected Contractors that will be responsible for performing additional services beyond the scope of work defined under the contract herein and as required for the location, relocation, installation and/or replacement of existing utilities.

### 1.03 REFERENCES

- A. For all items within this Contract without specific technical specifications and/or publications denoted, and to supplement all conditions of this Contract above and beyond all references mentioned, refer to the Commonwealth of Massachusetts, Department of Public Works, Standard Specifications for Highways and Bridges 1988 Edition, and all amendments; which is herein made part of this Contract in its entirety. Herein after known as the Standard Specifications.

## PART 2: PRODUCTS (NOT USED)

PART 3: EXECUTION

3.01 INSTALLATION

- A. Examine the areas and conditions of the proposed work for this project. Do not proceed with the work until unsatisfactory conditions are corrected.
- B. Consult the records and drawings of adjacent work and of existing services and utilities, which may affect the progression of the project.
- C. Notify "Dig Safe" and local utilities and services as applicable prior to conducting any work in order to have all known utilities and services marked out before work begins.
- D. Protect existing buildings, seawalls, revetment, bulkheads, ramps, paving, floats, gangways, moorings, piers, monuments and all other structures and facilities that are adjacent to the work area, from damage caused by the project operations. Repair all damage caused to the satisfaction of the Town, at the sole expense of the Contractor.
- E. Contractor shall provide temporary chain link fencing around perimeter of work area and staging area to prevent public access. Fencing shall be a minimum of 6' high and constructed of galvanized steel chain link with posts at 8' on center. Fence shall be supported by blocks to receive posts and shall have an access gate.
- F. Contractor shall replace any damage to ramps, bulkhead, grass area, utilities, drainage, revetment, pavement or sidewalk within the staging area upon completion of work whether or not area was used by the Contractor. Contractor shall also be responsible for restoring any disturbed/damaged area back to its original condition.
- G. All areas to be backfilled shall be free of construction debris, refuse, compressible or decayable materials, and standing water. Do not place fill when fill materials are frozen. No fill material containing ice or frozen lumps shall be used.
- H. Contractor shall notify the Town when areas to be filled are ready for formal inspection.

END OF SECTION

## SECTION 024100

### DEMOLITION

#### PART 1 - GENERAL

##### 1.1 RELATED DOCUMENTS

Drawings and general provisions of Contract, including General and Special Conditions and Specification sections, apply to work of this section.

##### 1.2 SUMMARY

Description of work:

The project scope as described herein is generally as follows:

1. Carefully demolish and remove from the site those items scheduled to be so demolished and removed.
2. Carefully remove and store off or on-site items scheduled to be reused. Replace these items as indicated on the Contract Drawings such that they are undamaged and fit for their intended purpose.
3. All utility lines that are altered or relocated during the construction are to be of an equal standard to those now existing and are to be acceptable to the Owner and the appropriate Utility Company. The Contractor is to inform and liaise with the Owner regarding all work that may affect the existing utilities. The Owner will make arrangements with the Utility Company for services to be cut-off if required during construction. The Contractor is responsible for notification of local utilities.

##### 1.3 DEFINITIONS

- A. To Be Removed: Detach items from existing construction and legally dispose of them off-site, unless indicated to be removed and reinstalled.
- B. Remove and Reinstall (Reuse): Detach items from existing construction, prepare them for reuse, and reinstall them where indicated.
- C. Existing to Remain: Existing items of construction that are not to be removed and that are not otherwise indicated to be removed, removed and salvaged, or removed and reinstalled.

##### 1.4 SUBMITTALS

- A. Submit a plan and schedule of demolition activities to the Project Engineer before starting work. Indicate detailed sequence of selective demolition and removal work, with starting and ending dates for activities at each repair/improvement location. Indicate locations of temporary barriers.
- B. Pre-demolition Photographs or Videotapes: Show existing conditions of adjoining construction and site improvements, including finish surfaces that might be misconstrued as damage caused by selective demolition operations.
- C. Temporary Shoring Design and Calculations shall be stamped by a Massachusetts Licensed Professional Engineer experienced in Marine Construction design and be submitted to the Project Engineer before starting work.
- D. Except for items specifically scheduled for reuse, demolished material shall be considered property of the Contractor and shall be completely removed from the job site and disposed of in legal manner. The Contractor shall submit a detailed disposal plan to the Engineer. The disposal plan shall include the name, address, and telephone number of the disposal site. The Contractor shall submit to the Project Engineer a signed manifest and trip ticket stating that the debris was disposed at the stated site within 24 hours after the material has left the site.

#### 1.5 QUALITY ASSURANCE

- A. Regulatory Requirements: Comply with governing local, state, and federal regulations before beginning selective demolition. Comply with hauling and disposal regulations of authorities having jurisdiction.
- B. Standards: Comply with ANSI/ASSE A10.6 Safety and Health Program Requirements for Demolition Operations.
- C. Pre-demolition Conference: Conduct conference at the Project site with the Owner and the Project Engineer.

#### 1.6 PROJECT CONDITIONS

- A. Conditions existing at time of inspection for bidding purpose will be maintained by Owner as far as practical.
- B. Notify Owner/Project Engineer of discrepancies between existing conditions and Drawings before proceeding with selective demolition.
- C. Hazardous Materials: Handle and dispose of hazardous materials offsite in accordance with State and Federal regulations. Generate all necessary chain-of-custody reports and include special trucking and disposal costs in the bid price. Storage or sale of removed items or materials on-site is not permitted.

- D. Existing Utilities to Remain: Support and protect existing adjacent utilities against damage during demolition operations.

## PART 2 - PRODUCTS (NOT USED)

## PART 3 - EXECUTION

### 3.1 EXAMINATION

- A. Verify location of existing utilities.
- B. Survey existing conditions and correlate with requirements indicated to determine extent of selective demolition required.
- C. Inventory and record the condition of items to be reused.
- D. Contractor shall coordinate with the Project Engineer to verify lengths of repairs and proposed structures required in locations indicated in the Contract Drawings prior to start of work.
- E. When unanticipated mechanical, electrical, or structural elements that conflict with intended function or design are encountered, investigate, and measure the nature and extent of conflict. Promptly submit a written report to the Project Engineer.
- F. Survey of Existing Conditions: Record existing conditions by use of preconstruction surveying, photographs and/or videotapes.

### 3.2 PREPARATION

- A. Site Access and Temporary Controls: Sequence and conduct selective demolition and debris-removal operations to ensure minimum interference with operations at the work area and adjacent occupied and used facilities.
  - 1. The Contractor will be responsible for coordinating construction activities with the Owner's schedules. As this is an active waterway and pedestrian area, the Contractor may be required to move equipment to allow the Owner or the Project Engineer access to the site for other operations. No additional payment will be made for these moves. Questions regarding the site or to coordinate any access that the Contractor wants to undertake prior to the submission of a proposal may be addressed to the Project Engineer. This shall include parking of crew vehicles and on-site utility usage.



- B. Temporary Facilities: Provide temporary fencing, barricades and other protection as indicated, and as required, to prevent injury to people and damage to adjacent facilities to remain.
- C. Temporary Shoring: Provide and maintain shoring, bracing, and structural supports as required to preserve stability and prevent movement, settlement, erosion, or collapse of existing or proposed construction and finishes to remain, and to prevent unexpected or uncontrolled movement or collapse of construction being demolished. Contractor shall provide any and all shoring necessary in order to complete the project in accordance with the Contract Documents.

### 3.3 DEMOLITION

- A. Do not begin demolition until notified to proceed by the Owner or the Project Engineer.
- B. General: Demolish and remove existing construction only to the extent indicated. Use methods required to complete the Work within limitations of governing regulations and as follows:
  - 1. Use cutting methods least likely to damage construction to remain or adjoining construction. Use hand tools or small power tools sized to minimize disturbance of adjacent surfaces.
  - 2. Do not use cutting torches until work area is cleared of flammable materials. At concealed spaces verify condition and contents of hidden space before starting flame-cutting operations. Maintain portable fire-suppression devices during flame-cutting operations.
  - 3. Locate selective demolition equipment and remove debris and materials so as not to impose excessive loads on supporting framing.
  - 4. Dispose of demolished items and materials promptly.
- C. Existing Items to Remain: Protect construction indicated to remain against damage and soiling during selective demolition.
- D. If the Contractor's equipment or methods result in damage to adjacent structures or elements to remain or cause demolition beyond indicated limits or acceptable limits necessary to complete successful repairs, or results in damage to other property of the Owner, then the Project Engineer will direct the Contractor to modify demolition operations. Such modification shall be performed at no additional expense to the Owner. Demolition beyond accepted limits shall be repaired by the Contractor at no additional expense to the Owner.

### 3.4 DISPOSAL OF DEMOLISHED MATERIALS

General: Except for items or materials indicated to be reused or otherwise indicated to remain Owner's property, remove demolished materials from Project site and legally dispose of them at appropriate disposal facilities.

1. Burning: Do not burn demolished materials.
2. Disposal: Transport demolished materials off Owner's property and legally dispose of them.

### 3.5 DAMAGE DURING DEMOLITION

Any damage due to the Contractor's operations to the portions of the existing structures that are to remain in place shall be repaired by the Contractor at no cost to the Owner.

1. The repair shall be approved by the Project Engineer.

### 3.6 CLEANING

Clean adjacent structures and improvements of dust, dirt, and debris caused by demolition operations. Return adjacent areas to condition existing before selective demolition operations began.

END OF SECTION

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SECTION 028100

TRANSPORTATION AND DISPOSAL

PART 1 - GENERAL

1.1 SCOPE OF WORK

- A. Contractor shall properly transport and dispose of all items, including solid hazardous and non-hazardous wastes removed from the site, to appropriate disposal facilities. Contractor shall characterize both all wastes prior to offsite disposal in order to determine if they are hazardous or non-hazardous. This includes wastes designated for disposal by the Project Engineer as well as the wastes generated by Contractor. The Contractor shall be responsible, and will be held accountable, for assuring that all sampling, analysis, transportation, and disposal requirements of the receiving facility and federal, state, and local governments are complied with and properly documented.

1.2 SUBMITTALS

- A. All final versions of weight slips, material shipping records, completed bills of lading, or hazardous waste manifests for material generated at the site and transported and disposed of offsite.

1.3 PERMITS AND REGULATIONS

- A. The Contractor shall comply with all federal, state, and local regulations regarding transportation and disposal of hazardous and nonhazardous material. These include, but are not limited to:
  - 1. Trucks used for transportation of hazardous material for disposal off site shall be permitted pursuant to 310 CMR 30.0000.
  - 2. Vehicle operator possession of a commercial driver's license with hazardous materials endorsement (if applicable).
  - 3. Registration of vehicle as a hazardous waste carrier (if applicable).
  - 4. Utilization of shipping papers, bills of lading, and/or hazardous waste manifest (40 CFR 262.20).
  - 5. Proper marking and placarding of vehicles.
  - 6. Placement of emergency response procedures and emergency telephone numbers in vehicle, and operator familiarity with emergency response procedures.
  - 7. Compliance with load height and weight regulations.

PART 2 - PRODUCTS

2.1 MATERIALS AND EQUIPMENT

- A. All equipment supplied shall be in good working condition. Equipment and

machinery delivered to the site, including haul trucks that have visible oil or hydraulic fluid leaks, will not be allowed on site until satisfactorily repaired. Contractor is responsible for the cleanup of any oil or hydraulic fluid spills at Contractor's expense.

- B. Contractor shall not allow soil/sediment to be tracked off site at any time during the Project. Contractor shall wash trucks before they leave the site. Visible soil tracks on streets will not be allowed. Contractor shall take sufficient precautions to prevent loose soils from adhering to tire treads, wheel wells, etc. Any loose soil spread shall be cleaned up.
- C. Contractor shall not allow fugitive dust emissions to be generated from trucks containing soil/sediment when leaving the site or at any time offsite. Contractor shall provide covers, such as a tarpaulin or other means, for the trucks to prevent the generation of dust prior to their arrival at the ultimate reuse or disposal location.

### PART 3 - EXECUTION

#### 3.1 TRANSPORTATION

- A. All waste disposal facilities used by the Contractor shall be submitted to the Project Engineer for approval. Contractor shall not use any disposal facility that does not have the Project Engineer's approval. Prior to shipment of wastes off the site, Contractor shall confirm with the Project Engineer by written communication from the designated Transportation, Storage, or Disposal Facility (TSDF) that it is authorized, has the capacity, and will provide or assure that the ultimate disposal method is followed for the particular hazardous waste on the manifest. Additionally, the Contractor shall confirm by written communication from the designated transporter(s) that they are authorized to deliver the manifested waste to the designated TSDF or Solid Waste Management Facility (SWMF).
- B. Any transported materials must be covered to prevent the loss of material and to prevent the generation of dust.

#### 3.2 ANTI-TRACKING PAD

- A. An Anti-Tracking Pad shall be constructed by the Contractor so that soil/sediment is not tracked off site. The pad shall be constructed with a layer of filter fabric per Section 310519.13 GEOTEXTILE FABRIC above the existing grade and a minimum 8-inch thick layer of 1 ½-inch crushed stone. The pad shall be graded so that water is directed away from the pad.

#### 3.3 MANIFESTING AND DOCUMENTATION

- A. Contractor shall complete all required manifest forms and Bill of Lading forms for proper transportation and disposal of materials off site. Contractor shall present the

documents for proper signatory by the Owner. Contractor shall promptly provide Project Engineer copies of all final bills of lading, manifests, Certificates of Disposal, and/or papers involved in shipping of material off of the site, as well as any weight tickets or receipts for delivery of materials to the site, or delivery to a disposal facility.

END OF SECTION

SECTION 033000

CAST-IN-PLACE CONCRETE

PART 1 – GENERAL

1.1 WORK SPECIFIED

Work included: The Work covered under this Section of these Specifications consist of furnishing all plant, labor, supervision, equipment, appliances, and materials and in performing all operations in connection with the installation of reinforced concrete for all aspects of the project, all in strict accordance with the Contract Documents.

1.2 SUBMITTALS

A. Shop Drawings and Product Data.

Shop drawings and product data showing all fabricated dimensions and locations for placing of the reinforcing steel and accessories shall be submitted for review. Shop Drawings shall provide sufficient technical data to demonstrate compliance with the specified requirements. Products, materials, or information submitted for review shall not be used or fabricated until after receipt of the Project Engineer's review comments. Distribute only reviewed shop drawings to the job site.

B. Mix Design.

Submit concrete mix design, with known test results, to the Project Engineer for review. The concrete mix design submittal shall consist of at least the following:

1. Type of cement.
2. Dry weight of cement.
3. Saturated surface-dry weights of fine and coarse aggregates.
4. Specific gravity of fine and coarse aggregates.
5. Quantities, type, name, and producer of admixtures, as applicable.
6. Total weight of water, including the water that is absorbed by and on the surface of the aggregates.
7. Water to cement ratio.
8. Slump: Maximum slump, taken at the truck, will be determined based on the pump hose length. The mix designs shall include the anticipated loss of slump per 100-foot length of specified hose size.

9. Strength test data of the proposed mix design as specified herein.
  10. Distribute reviewed mix design to testing laboratory, batch plant, and job site.
- C. Submit concrete batch tickets for each truck delivered to site. Each ticket shall note at least the following data: design mix strength; batch proportions including actual water and aggregate moisture contents; date and batch time; arrival time at site; discharge time; concrete volume; and any change to concrete made at the site.
- D. Construction Joints: Submit proposed construction and control joint details and locations for Project Engineer’s review.
- E. Curing and protection procedures: including product data on materials proposed for use.
- F. Test Reports
- 1 Concrete Temperature
  - 2 Concrete Slump
  - 3 Concrete Air Content
  - 4 Compressive Strength Tests
- G. Hot and Cold Weather Concreting: Submit proposed compliance method.

## PART 2 – PRODUCTS

### 2.1 MATERIALS

- A. Quality Assurance:
1. Use adequate numbers of skilled workmen who are thoroughly trained and experienced in the necessary crafts and who are completely familiar with the specified requirements and the methods needed for proper performance of the work of this Section.
  2. The Owner, through the Project Engineer, reserves the right of approval of any Subcontractor pre-qualified and selected for this portion of the Work by the Contractor. Approval will be based, in part, on a documented successful experience in performing work of a similar nature.
  3. Cast-In-Place Concrete work shall conform to all requirements of ACI 301, “Specifications for Structural Concrete for Buildings”.

4. Detailing, fabrication, and erection of reinforcing steel shall conform to ACI 318, "Building Code Requirements for Structural Concrete and Commentary" and ACI 315, "Details and Detailing of Concrete Reinforcement".
5. Ready mix plant equipment and facilities shall conform to the "Check List for Certification of Ready Mixed Concrete Production Facilities" of the NRMCA.

B. Concrete:

1. Portland cement: Type II - low alkali conforming to ASTM C 150, "Standard Specification for Portland Cement".

Portland cement may be replaced by one of the following supplementary cementitious materials:

- a. Ground Granulated Blast Furnace (GGBF) Slag at a minimum of 40 percent of total cementitious material.
  - b. Fly Ash or natural pozzolan at a minimum of 20 percent of total cementitious material.
  - c. Silica fume at a minimum of 7 percent of total cementitious material.
2. Aggregate, general:
    - a. Shall be normal weight and uniformly graded and clean conforming to ASTM C33, "Standard Specification for Concrete Aggregates".
    - b. Do not use aggregate known to cause excessive shrinkage.
  3. Aggregate, coarse: Crushed rock or washed gravel with a maximum size of 3/4".
  4. Aggregate, fine: Natural washed sand of hard and durable particles varying from fine to particles passing a 3/8" screen, of which at least 12% shall pass a 50-mesh screen.
  5. Water: Clean and potable.
  6. Air entraining admixture shall conform to ASTM C260, "Standard Specification for Air Entraining Admixture for Concrete". The air entraining agent shall be a nontoxic concentrated solution of neutralized Vinsol resin, such as "Daravair 1000" as manufactured by GCP Applied Technologies or equivalent accepted by the Project Engineer.



7. Water reducing admixture shall conform to ASTM C494 "Standard Specification for Chemical Admixtures for Concrete." Water reducing agent shall be of Type A, F, or G (as noted in concrete mix design) such as "Daracem-100" as manufactured by GCP Applied Technologies or equivalent accepted by the Project Engineer.

C. Reinforcing Steel:

1. All reinforcing steel shall conform to ASTM 615 Grade 60, "Specification for Deformed and Plain Billet Steel Bars for Concrete Reinforcement".
2. Reinforcing steel shall be fusion bond epoxy coated per ASTM A775 or hot dip galvanized per ASTM A767.
3. Fabricate reinforcement to the required shapes and dimensions, within fabrication tolerances stated in the CRSI "Manual of Standard Practices."
4. Do not use reinforcement having any of the following defects:
  - a. Bar lengths, depths, or bends exceeding the specified fabricating tolerances.
  - b. Bends or kinks not indicated on the Drawings or required for this Work.
  - c. Bars with cross section reduced due to excessive rust or other causes.

D. Moisture Protection:

Curing materials for concrete cast above the tidal zone shall conform to ASTM C309, "Standard Specification for Liquid Membrane-Forming Compounds for Curing Concrete", wet burlap, or plastic membrane.

E. Accessories:

All spacers, chairs, bolsters, and other devices necessary for proper reinforcing steel placement shall be epoxy coated with nylon tipped legs. All reinforcing steel shall be adequately tied with nylon, epoxy, or plastic-coated tie wire and supported with epoxy-coated chairs that hold the bars to the specified clearance. One chair sample shall be submitted to the Project Engineer for review. No clay or concrete bricks or any other material other than reviewed chairs shall be permitted to support reinforcing steel.

F. Bonding Agent and Fusion Bonded Epoxy Coating Touch-Up:

Bonding agent shall be Sika Armatec 110 Epocem, as manufactured by Sika Corporation or an equivalent accepted by the Project Engineer.

G. Product Delivery, Storage, and Handling:

Conform to the recommendations of ACI 304, "Guide for Measuring, Mixing, Transporting, and Placing Concrete".

## PART 3 – EXECUTION

### 3.1 INSTALLATION

A. Concrete Mix Proportioning

1. Concrete shall be proportioned by the Contractor in accordance with ACI 301. The proposed design mix, together with all the Test Records, or Trial Mix Data, as required by ACI 301, shall be submitted to the Project Engineer for review at least two weeks prior to the first intended placement. Submit a separate pump mix if different from concrete mix placed by conventional methods.
2. Concrete shall be normal weight with a minimum compressive strength of 5000 psi at 28 days, unless noted otherwise (UNO).
3. Concrete shall have a maximum water to cement ratio of 0.40, UNO.
4. Concrete shall be proportioned to have a slump of 4 inches,  $\pm$  1 inch, at the discharge end of the pump hose. Use a water reducing agent as required to achieve the desired slump range. Addition of water at site will not be permitted.
5. Concrete shall contain 4% to 6% entrained air (based on 3/8" coarse aggregate).

B. Form Construction

1. Design, erect, support, brace, and maintain formwork so it will safely support vertical and lateral loads which might be applied until such loads can be supported safely by the concrete structure in accordance with ACI 347.
2. Construct forms to the exact sizes, shapes, lines, and dimensions shown, and as required to obtain accurate alignment, location, grades, and level and plumb work in the finished structure.
3. Form coating or water shall be applied to all forms. If coating is used, it shall be applied prior to placement of reinforcing steel.

4. Form ties and spreaders shall be of such type as to leave no metal closer than 3 inches from any exposed concrete surface.

C. Reinforcement Placement

1. All coated reinforcing steel shall be protected from damage to the coating during handling and placement. Any coated reinforcing steel, where the coating has been damaged shall be either removed from the site or re-coated, at the Project Engineer's discretion with strict conformance to the manufacturer's instructions at the Contractors expense.
2. Place reinforcement to obtain the required coverage for concrete protection. Minimum concrete cover for all reinforcing shall be 3 inches except where specifically noted otherwise.
3. Clean reinforcement and remove loose dust, earth, and other materials which reduce bond or destroy bond with concrete other than coating.
4. Position, support, and secure reinforcement against displacement by forms, construction, and the concrete placement operations.
5. All reinforcing steel shall be continuous unless specifically detailed otherwise on the Contract Drawings. Provide dowels or lap splices of the appropriate class to maintain continuity. Unless otherwise shown on the Contract Drawings lap bars in compliance with ACI 318. Dowels or splices shall be shown on the shop drawings and shall be subject to the field review of the Project Engineer. No more than 60% of the total number of bars shall be spliced at one location.

D. Embedded Items

1. Install embedded items furnished under this Section and other Sections. All sleeves, inserts, anchors, and embedded items required for adjoining work or for its support shall be placed prior to casting concrete. All embedded items shall be positioned accurately and supported against displacement.
2. Where existing timber pile tops are to be embedded in the concrete, thoroughly clean the embedded portion of the piles of all debris and foreign matter prior to concrete placement. Do not damage the existing piles by cleaning.

E. Concrete Mixing

1. Transit-mix the concrete in accordance with provisions of ASTM C94.
2. Do not use concrete after 90 minutes from time of introduction of water to the mix.

F. Concrete Placement

1. All concrete work shall conform to the requirements of ACI 318, "Building Code Requirements for Structural Concrete".
2. Preparation:
  - a. Remove foreign matter accumulated in the forms.
  - b. Rigidly close openings left in the formwork.
  - c. Wet wood forms immediately prior to concrete placement. Wet wood forms sufficiently to tighten up cracks. Wet other material sufficiently to maintain workability of the concrete.
  - d. Use only clean tools.
3. Conveying:
  - a. Perform concrete placing at such a rate that concrete which is being integrated with fresh concrete is still plastic.
  - b. Deposit concrete as nearly as practicable in its final location so as to avoid separation due to re-handling and flowing.
  - c. Do not use concrete which becomes non-plastic and unworkable, or does not meet required quality control limits, or has been contaminated by foreign materials.
  - d. Remove rejected and excess concrete from the job site.
4. Placing concrete in forms:
  - a. Concrete shall be cast to full dimensions in one operation.
  - b. Free-fall of concrete during placement greater than eight feet is prohibited. The contractor shall place concrete with a tremie tube for drops greater than eight feet.
  - c. Deposit concrete in horizontal layers not deeper than 24 inches and avoid inclined construction joints.
  - d. Remove temporary spreaders in forms when concrete has reached the elevation of the spreaders.
  - e. Place concrete within 90 minutes after cement has been mixed with aggregates. Each batch of concrete delivered at the job site shall be

accompanied by a time slip issued at the batching plant, bearing the time of charging of the mixer drum with cement and aggregates.

5. Consolidation

- a. Consolidate each layer of concrete immediately after placing, by use of internal concrete vibrators supplemented by hand spading, rodding, or tamping.
- b. Do not use vibrators to transport concrete inside the forms. Place vibrators to rapidly penetrate placed layer and at least 6" into preceding layer. Do not insert vibrators into lower layers of concrete that have begun to set.

6. Construction Joints

- a. Do not use horizontal construction joints.
- b. Secure the Project Engineer's review of joint design and location prior to start of concrete placement.

G. Curing And Protection

1. Absorptive Cover: Burlap cloth made from jute or kenaf, weighing approximately 9 oz. per sq. yd., complying with AASHTO M 182, Class 2.
2. Beginning immediately after placement, concrete shall be protected from premature drying, excessively hot or cold temperatures, and mechanical damage and shall be maintained with minimal moisture loss at a relative constant temperature for the period necessary for hydration of the cement and hardening of the concrete.
3. Concrete surfaces not covered by forms or within the inter-tidal elevations shall be protected from loss of surface moisture for not less than seven days using moisture protection as specified herein.
4. If cold-weather concreting is anticipated, a preconstruction meeting should be held to define how cold weather concreting methods will be used. When the mean daily ambient temperature is at or below 40 degrees F or 45 degrees F and falling the Contractor shall follow the requirements of ACI 306.1, "Standard Specification for Cold Weather Concreting":
  - a. Set up proper enclosure and heat to 50 degrees F for at least two (2) hours before starting any pour. Set up individual thermometers within enclosure to monitor ambient temperatures near the face of fresh concrete. Thermometers shall be placed at a maximum of 50-foot centers, at major corners or returns, and at ends of concrete

sections. Monitor and record temperatures in a log at early morning, noon, and early evening.

- b. Use a water-reducing admixture with an accelerated set, but do not use or rely upon any material as an anti-freeze. Use of calcium chloride is forbidden.
  - c. Use vented heaters with blowers so placed that they do not produce localized hot spots which may dry out the concrete. Exposure to exhaust gases from combustion heaters is prohibited for the first 24 hours of the curing period.
  - d. Maintain the temperature of the formwork at not less than 50 degrees F but not greater than 70 degrees F for 48 hours after completion of pour; formwork may be stripped after 72 hours after completion of pour. After 48 hours of maintaining at least 50 degrees F, the temperature may be allowed to drop gradually and shall be kept above 32 degrees F for a period of seven (7) days after completion of pour. Protection during this period may be provided by existing enclosure or by means indicated in note e below.
  - e. Protection may be provided by use of insulation methods. Adequate insulation shall consist of at least one of the following:
    - 12" of dry earth; provide moisture cover if over slab concrete.
    - 4" of hay under adequate moisture cover.
    - 1" of insulation blankets with vapor barrier seal.
    - Other insulating material acceptable to the Project Engineer.
- NOTE: Extreme conditions of temperature or wind may require more protection.
- f. Concrete may not be placed on frozen ground.
  - g. All frozen concrete shall be removed from the job and replaced at a cost to the Contractor.
5. When the mean daily ambient and substrate temperature is above 80 degrees F, the Contractor shall follow the requirements of ACI 305.1, "Standard Specification for Hot Weather Concreting". Concrete shall be protected from thermal damage. Provisions for windbreaks, shading, fog spraying, sprinkling, ponding, or wet covering with a light-colored material shall be

made in advance of placement and such protective measures shall be taken as quickly as concrete hardening and finishing operations will allow.

- a. No concrete shall be placed when the air temperature is above 90 degrees F unless the air is still, and relative humidity is above 80%.
- b. Set up proper windbreakers for concrete surfaces whenever the relative humidity is less than 70% for slight air motion or 80% for light breezes.
- c. Provide shade for pours otherwise exposed to the sun.
- d. Concrete is to be at a temperature of 80 degrees F or less when placed. If necessary, the batching plant shall cool aggregates by spraying or by using chilled water or ice. All such water shall be accounted for as part of the mixing water.
- e. Use an admixture with a retarded set.
- f. All forms shall be thoroughly wetted at least daily and more often when the relative humidity is low.
- g. For slabs, maintain the required materials for curing on hand, so they may be placed immediately upon finishing. All concrete placed in ambient temperatures over 80 degrees F shall be kept wet for a minimum of 24 hours. Intermittent spraying will not be permitted. No water shall be applied before concrete has acquired its initial set. When the concrete temperature of any slab goes above 100 degrees F, place a layer of sand on it and keep it continuously wet until the temperature is below 80 degrees F.

H. Finishing

1. Remove all fins, blemishes, and defective concrete areas and patch where required with reworked cement mortar of the same proportions as that used in the concrete.
2. Form tie holes shall be plugged solid with reworked cement mortar of the same proportions as that used in the concrete.
3. Exposed surfaces of concrete shall receive a wood float finish or a light broom finish, unless noted otherwise.
4. Areas designated as Stamped Concrete (Public Viewing Area) shall be colored Sand Stone or approved equal with New Brick Running Bond pattern or approved equal.

3.2 CONCRETE TESTING

Concrete testing shall comply with ACI-318. Test reports shall be submitted to the Project Engineer for review.

END OF SECTION



SECTION 034533

PRECAST STRUCTURAL CONCRETE

PART 1 – GENERAL

1.1 WORK SPECIFIED

Work included: The Work covered under this Section of these Specifications consist of furnishing all plant, labor, supervision, equipment, appliances, and materials and in performing all operations in connection with the installation of precast structural concrete for all aspects of the project, all in strict accordance with the Contract Documents.

1.2 SUBMITTALS

A. Shop Drawings and Product Data.

Shop drawings and product data showing all fabricated dimensions and locations for placing of the reinforcing steel and accessories shall be submitted for review. Shop Drawings shall provide sufficient technical data to demonstrate compliance with the specified requirements. Products, materials, or information submitted for review shall not be used or fabricated until after receipt of the Project Engineer's review comments. Distribute only reviewed shop drawings to the job site.

B. Concrete Mix Design.

The minimum compressive strength of concrete at 28 days must be 5000 psi, unless otherwise indicated. Add air entraining admixtures to produce between 4-6 percent air by volume. For marine exposure, ensure a dense concrete free of shrinkage cracks, with a minimum degree of permeability. The maximum water cement ratio must be 0.4.

Submit concrete mix design, with known test results, to the Project Engineer for review. The concrete mix design submittal shall consist of at least the following:

1. Type of cement.
2. Dry weight of cement.
3. Saturated surface-dry weights of fine and coarse aggregates.
4. Specific gravity of fine and coarse aggregates.
5. Quantities, type, name, and producer of admixtures, as applicable.

6. Total weight of water, including the water that is absorbed by and on the surface of the aggregates.
  7. Water to cement ratio.
  8. Slump: Maximum slump, taken at the truck, will be determined based on the pump hose length. The mix designs shall include the anticipated loss of slump per 100-foot length of specified hose size.
  9. Strength test data of the proposed mix design as specified herein.
  10. Distribute reviewed mix design to testing laboratory, batch plant, and job site.
- C. Submit concrete batch tickets for each ready-mixed concrete truck delivered to the plant. Each ticket shall note at least the following data: design mix strength; batch proportions including actual water and aggregate moisture contents; date and batch time; arrival time at site; discharge time; concrete volume; and any change to concrete made at the site.
- D. Curing and protection procedures: including product data on materials proposed for use.

## PART 2 – PRODUCTS

### 2.1 MATERIALS

- A. Quality Assurance:
1. Use adequate numbers of skilled workmen who are thoroughly trained and experienced in the necessary crafts and who are completely familiar with the specified requirements and the methods needed for proper performance of the work of this Section.
  2. The Owner, through the Project Engineer, reserves the right of approval of any Subcontractor pre-qualified and selected for this portion of the Work by the Contractor. Approval will be based, in part, on a documented successful experience in performing work of a similar nature.
  3. Cast-In-Place Concrete work shall conform to all requirements of ACI 301, “Specifications for Structural Concrete for Buildings”.
  4. Detailing, fabrication, and erection of reinforcing steel shall conform to ACI 318, “Building Code Requirements for Structural Concrete and Commentary” and ACI 315, “Details and Detailing of Concrete Reinforcement”.

5. Ready mix plant equipment and facilities shall conform to the "Check List for Certification of Ready Mixed Concrete Production Facilities" of the NRMCA.

B. Concrete:

1. Portland cement: Type II - low alkali conforming to ASTM C 150, "Standard Specification for Portland Cement".

Portland cement may be replaced by one of the following supplementary cementitious materials:

- a. Ground Granulated Blast Furnace (GGBF) Slag at a minimum of 40% of total cementitious material.
  - b. Fly Ash or natural pozzolan at a minimum of 20 percent of total cementitious material.
  - c. Silica fume at a minimum of 7 percent of total cementitious material.
2. Aggregate, general:
    - a. Shall be normal weight and uniformly graded and clean conforming to ASTM C33, "Standard Specification for Concrete Aggregates".
    - b. Do not use aggregate known to cause excessive shrinkage.
  3. Aggregate, coarse: Crushed rock or washed gravel with a maximum size of 3/4".
  4. Aggregate, fine: Natural washed sand of hard and durable particles varying from fine to particles passing a 3/8" screen, of which at least 12% shall pass a 50-mesh screen.
  5. Water: Clean and potable.
  6. Air entraining admixture shall conform to ASTM C260, "Standard Specification for Air Entraining Admixture for Concrete". The air entraining agent shall be a nontoxic concentrated solution of neutralized Vinsol resin, such as "Daravair" as manufactured by GCP Applied Technologies or equivalent accepted by the Project Engineer.
  7. Water reducing admixture shall conform to ASTM C494 "Standard Specification for Chemical Admixtures for Concrete." Water reducing agent shall be of Type A, B, C, D, E, F, or G (as noted in

concrete mix design) such as “Daracem-100” as manufactured by GCP Applied Technologies or equivalent accepted by the Project Engineer.

C. Reinforcing Steel:

1. All reinforcing steel shall conform to ASTM 615 Grade 60, “Specification for Deformed and Plain Billet Steel Bars for Concrete Reinforcement”.
2. Reinforcing steel shall be fusion bond epoxy coated per ASTM A775 or hot dip galvanized per ASTM A767.
3. Fabricate reinforcement to the required shapes and dimensions, within fabrication tolerances stated in the CRSI "Manual of Standard Practices."
4. Do not use reinforcement having any of the following defects:
  - a. Bar lengths, depths, or bends exceeding the specified fabricating tolerances.
  - b. Bends or kinks not indicated on the Drawings or required for this Work.
  - c. Bars with cross section reduced due to excessive rust or other causes.
5. Prestressing Strands
  - a. Use uncoated, 7-wire strand stress-relieved, in compliance with ASTM A416, Grade 270, strand with a minimum diameter of ½”.

D. Moisture Protection:

Curing materials for concrete cast above the tidal zone shall conform to ASTM C309, “Standard Specification for Liquid Membrane-Forming Compounds for Curing Concrete”, wet burlap, or plastic membrane.

E. Accessories:

All spacers, chairs, bolsters, and other devices necessary for proper reinforcing steel placement shall be epoxy coated with nylon tipped legs. All reinforcing steel shall be adequately tied with nylon, epoxy, or plastic-coated tie wire and supported with epoxy-coated chairs that hold the bars to the specified clearance. One chair sample shall be submitted to the Project

Engineer for review. No clay or concrete bricks or any other material other than reviewed chairs shall be permitted to support reinforcing steel.

F. Bonding Agent and Fusion Bonded Epoxy Coating Touch-Up:

Bonding agent shall be Sika Armatec 110 Epocem, as manufactured by Sika Corporation or an equivalent accepted by the Project Engineer.

G. Product Delivery, Storage, and Handling:

Conform to the recommendations of ACI 304, "Guide for Measuring, Mixing, Transporting, and Placing Concrete".

## 2.2 PRODUCTION QUALITY CONTROL

A. Surface Finish

- a. Repairs located in a bearing area must be accepted by the Engineer of Record prior to repairs.
- b. Unformed surfaces – provide rough finish.
- c. Formed surfaces – provide a smooth rubbed finish.

B. Acceptance/Rejection of Defects

a. Minor Defects

All honeycombed areas, chipped corners, air pockets over ½" in diameter, and other minor defects involve less than 36 square inches of concrete must be repaired. Form offsets of fins over 1/8" must be ground smooth. All unsound concrete must be removed from defective areas prior to repairing. Precast containing hairline cracks which are visible and are less than 0.01" in width, may be accepted, except any cracks larger than 0.005" in width for surfaces exposed to the weather must be repaired.

b. Major Defects

Major defects are those which involve more than 36 square inches of concrete or expose stressing tendons or reinforcing steel. If one or more major defects appear in a member, it will be rejected. Cracks of a width of more than 0.01" will be cause for rejection of the member.

## 2.4 TESTS, INSPECTIONS, AND VERIFICATIONS

1. Chloride Ion Concentration Test

Maximum water-soluble chloride ion concentrations in hardened concrete at ages 28 to 42 days contributed from the ingredients including water, aggregates, cementitious materials, and admixtures must not exceed 0.06 percent by weight of cement. Sampling and determination of water-soluble chloride ion content in accordance with ASTM C1218.

2. Chloride Ion Penetration Test

Concrete must be proportionated to have the chloride ion penetration test in accordance with ASTM C1202 and be below 1500 coulombs for concrete specimens tested at 28 days.

PART 3 – EXECUTION

3.1 EXAMINATION

Prior to erection, and again after installation, precast members must be checked for damage, such as cracking, spalling, and honeycombing. Members that do not meet the surface finish requirements specified in paragraph Surface Finish must be repaired or removed and replaced with new precast members.

3.2 ERECTION

Precast members must be erected after the concrete has attained the specified compressive strength, unless otherwise approved by the precast manufacturer. Erect in accordance with the approved shop drawings.

3.3 BEARING SURFACES

Must be flat, free of irregularities, and properly sized. Size bearing surfaces to provide for the indicated clearances between the precast member and adjacent precast members or adjoining field placed surfaces. Correct bearing surface irregularities with non-shrink grout.

3.4 ANCHORAGE

Provide anchorage for fastening work in place. Conceal fasteners where practicable. Make threaded connections up tight and nick threads to prevent loosening.

3.5 WELDING

Welding shall be performed in compliance with AWS D1.1 and AWS D1.4 for welding connections and reinforcing splices. Protect the concrete and other reinforcing from heat during welding. Welding of epoxy-coated reinforcement is not allowed.

3.6 OPENINGS

Holes or cuts requiring reinforcement steel to be cut, which are not indicated on the approved shop drawings, must only be made with the approval of the Project Engineer and the precast manufacturer. Drill holes less than 12-inches in diameter with a diamond tip core drill. Ensure cuts are straight and at 90 degrees to the surfaces without breaking or spalling the edges.

### 3.7 GALVANIZING REPAIR

Touch-up of Galvanizing: Thoroughly clean galvanized steel by SSPC-SP 3 Power Tool Cleaning method at all damaged, scratched and field-welded galvanized surfaces. Apply a zinc-rich primer such as Cathacoat 304V by Devco Coatings or equivalent accepted by Project Engineer. Touch-up repair shall conform to ASTM A780 and shall overlap a minimum of 2" with hot dip galvanized surfaces. Allow to dry to a minimum dry film thickness of 2.0-4.0 mils.

### 3.8 GROUTING

Clean and fill keyways between precast members and other indicated areas, solidly with non-shrink grout or cementitious grout. Remove excess grout before hardening.

### 3.9 PROTECTION AND CLEANING

Protect exposed-to-view surfaces against staining and other damage until completion of work. Upon completion of installation, swept clean and leave ready slab surfaces to receive concrete topping, or other covering.

### 3.10 CONCRETE TOPPING

Provide as indicated and as specified in Section 033000 CAST-IN-PLACE CONCRETE.

### 3.11 CONSTRUCTION RECORDS

Complete construction records must be kept of the manufacturing, handling, and erection of the precast concrete members and submitted. Records must be kept for, but not limited to, the following items:

- a. Specifications for material used in the manufacture of the members.
- b. Time-temperature history of the concrete members from casting to the transfer of the prestress force.
- c. Records of the tendon stressing operation including initial prestress force, measured elongation, how it was measured, and how the tendons were stressed and destressed.

- d. Records of inspection of the members before and after the prestress force is transferred to the members.
- e. Records of the inspection of the members each time they are moved.
- f. Records of any defects in the member and any corrective measures taken.

**END OF SECTION**



SECTION 051200

STRUCTURAL STEEL

PART 1 – GENERAL

1.1 WORK SPECIFIED

Work included: Provide miscellaneous structural steel items, including but not limited to, accessories as shown on the Contract Drawings, specified herein, and needed for a complete and proper installation.

1.2 SUBMITTALS

- A. Sufficient technical data to demonstrate compliance with the specified requirements.
- B. Complete shop drawings detailing all members, profiles, sizes, spacing, proposed cuts, connections, camber, holes, openings, fasteners, and similar data. Erection plans showing the location and field connection of all members. Identify members by piece numbers which correspond to erection numbers. Structural steel connection details not specifically shown in the Contract Documents shall be detailed by the Contractor and included with shop drawing submittals.
- C. Submit manufacturer's certifications showing that the products meet or exceed the required standards for the following items:
  - 1. Bolts, including nuts and washers.
  - 2. Threaded rods including all hardware.
  - 3. Filler material and flux for welding.
  - 4. Expansion bolts.
- D. Submit Certified Mill Test Reports indicating structural strength, destructive and non-destructive test analysis, chemical and physical properties of each type of steel and conformance with ASTM A6.
- E. Submit welder's certificates certifying welders employed on the Work, verifying AWS qualifications within the previous twelve months.

PART 2 – PRODUCTS

2.1 MATERIALS

- A. Quality Assurance

1. Use adequate number of skilled workmen who are thoroughly trained and experienced in the necessary crafts and who are completely familiar with the specified requirements and the methods needed for proper performance of the Work of this section.
2. Perform welding with electric arc process and in accordance with AWS "Code for Arc and Gas Welding in Building Construction".
3. In addition to complying with pertinent codes and regulations, comply with:
  - a. The American Institute of Steel Construction, AISC, "Steel Construction Manual", Fifteenth Edition.
- B. Structural Steel Shapes, including steel sheet pile, shall conform to ASTM A992, A690, or A572 Grade 60.
- C. Steel Angles, Channels and Plates shall conform to ASTM A572 Grade 50.
- D. Anchor rods shall conform to ASTM F1554, for Grades 36, 55 and 105.
- E. Carriage bolts and Lag screws shall conform to ASTM A307, Grade A.
- F. High Strength Structural Bolts: Shall conform to ASTM F3125 Grade A325 with hexagonal heads.
- G. Nuts: Shall be hexagonal and conform to ASTM A563.
- H. Washers (except against timber): Shall conform to ASTM F436.
- I. Threadbar Rods and Nuts: DYWIDAG Threadbar or equivalent accepted by the Engineer, shall conform to ASTM A615 for Grades 60, 70, 80, and 100, and ASTM A722 Grade 150.
- J. Adhesive Anchors: Adhesive shall be HIT RE 500 V3 Injection Adhesive Anchor as manufactured by Hilti Corporation, or equivalent acceptable to the Engineer. Anchor rods shall be as specified above for threadbar anchors.
- K. Expansion bolts: Shall be stainless steel HILTI KWIK BOLT 3, as manufactured by HILTI or equivalent accepted by the Engineer.
- L. Welding Materials: AWS D1.1; Type E70XX or type required for materials being welded.
- M. Grout: Non-shrink, non-metallic, high-performance cement-based grout conforming to ASTM C827 such as Sikagrout 212 as manufactured by Sika Corporation or equivalent accepted by the Engineer.

N. Fabrication:

1. Fabricate items of structural steel in accordance with AISC specifications and as shown on the accepted shop drawings.
2. Properly mark materials for field assembly and for identification of the structure and location intended. Fabricate for delivery sequence which will expedite erection and minimize field handling of Materials.
3. Provide bolts, nuts, and washers of all types and sizes required for completion of field erection.
4. Comply with AWS code for procedures, appearance, and quality of welds, and methods used in correcting welded work.
5. Cut, drill, or punch holes perpendicular to metal surfaces. Do not flame cut holes or enlarge holes by burning. Drill holes in bearing plates. No holes will be allowed unless first shown on the Shop Drawings and accepted by the Engineer.
6. Should holes be required in addition to those provided under this Section, provide all such holes, and strengthen the area as required to compensate but only as accepted by the Engineer.
7. Moment connections shall develop the full strength of joined members. The cold weather welding requirements of AWS shall be required and enforced.
8. Where finishing is required, complete the assembly, including welding of units, before start of finishing.
9. Provide finish surfaces of members exposed in the final structure free from markings, burrs, and other defects.
10. Assemble and weld built-up sections by methods which will produce true alignment of axes without warp.

O. Protective Coating

1. General: Unless specifically noted otherwise, all items scheduled to receive protective coating shall be fully fabricated with holes, cuts, threads, etc. prior to receiving protective coating, prior to delivery to site.

2. Steel Sections: Unless specifically noted otherwise, all steel sections shall be shop coated prior to delivery to site in accordance with Section 099713 Coating on Steel Waterfront Structures.
3. Bolts, Nuts, and Washers: All bolts, nuts, and washers shall be hot dipped galvanized in accordance with ASTM A153.
4. Threadbar Rods, and Nuts: Epoxy coated in accordance with ASTM A775.
5. Adhesive Anchor Rods: anchor rods, nuts, and washers shall be hot-dipped galvanized in accordance with ASTM A153.
6. Field Touch-Up of Epoxy-Coated Items: Shall be performed in accordance with Section 099713 Coating on Steel Waterfront Structures.
7. Field Touch-Up of Hot-Dipped Galvanized Items: Touch-up shall be performed with Tnemec 90-97 Tneme-Zinc primer or equivalent accepted by the Engineer. Surface preparation and coating application shall be in strict accordance with manufacturers written instructions.

P. Other Material

Provide other materials, not specifically described but required for a complete and proper installation, as selected by the Contractor subject to the review of the Engineer prior to final installation.

Q. Product Handling and Storage

1. Deliver materials to the job site properly marked to identify the location for which they are intended.
2. Use markings corresponding to markings shown on the reviewed shop drawings.
3. Store in a manner to maintain identification and prevent damage, off the ground, using pallets or other supports, and to permit easy access for inspection.

## PART 3 – EXECUTION

### 3.1 INSTALLATION

A. Surface Conditions

Examine the areas and verify the conditions under which work of this section will be performed. Correct conditions detrimental to timely and proper completion of the Work. Do not proceed until unsatisfactory conditions are corrected.

B. Erection

1. Surveys:
  - a. Establish benchmarks necessary for accurate erection of structural steel.
  - b. Check elevations of concrete surfaces, and locations of anchor bolts and similar items, before erection proceeds.
2. Temporary shoring and bracing:
  - a. Provide temporary shoring and bracing members with connections of sufficient strength to bear imposed loads.
  - b. Provide temporary guy lines to achieve proper alignment of the structure as erection proceeds.
  - c. Remove temporary connections and members when permanent members are in place and final connections are made.
  - d. Field touch-up protective coating where damaged.
3. Anchor bolts:
  - a. Install anchor bolts and other connectors required for securing structural steel to adjacent work as shown on the Contract Drawings.
  - b. Provide templates and other devices as needed for presetting bolts and other anchors to accurate locations.
4. Field Assembly:
  - a. Set structural frames accurately to the lines and elevations indicated.
  - b. Align and adjust the members forming part of a complete frame or structure before fastening permanently.
  - c. Clean the bearing surfaces and other surfaces which will be in permanent contact before assembly.

- d. Adjust as required to compensate for discrepancies in elevation and alignment.
  - e. Level and plumb individual members of the structure within specified AISC tolerances.
  - f. Establish required leveling and plumbing measurements on the mean operating temperature of the structure, making allowances for the difference between temperature at time of erection and the mean temperature at which the structure will be when completed and in service.
  - g. Comply with AISC specifications for bearing, adequacy of temporary connections, alignment, and removal of paint on surfaces adjacent to welds.
5. Gas cutting:
- a. Do not use gas cutting torches for correcting fabricating errors in structural framing, except on secondary members where acceptable to the Engineer.
  - b. When gas cutting is permitted, finish the gas cut section to a sheared appearance acceptable to the Engineer.
6. Expansion Bolts and Adhesive Anchors: Install anchors in strict accordance with manufacturers written instructions.
7. Field Welding: Where field welds are scheduled, surfaces to be joined are to be properly prepared, including removal of any existing coatings prior to welding. Following welding, prepare and touch-up all areas requiring coating as set forth in Section 099713 Coating on Steel Waterfront Structures.

END OF SECTION

## SECTION 055013

### MISCELLANEOUS METAL FABRICATIONS

#### PART 1 – GENERAL

##### 1.1 WORK SPECIFIED

The Work covered under this Section of these Specifications consists of providing all plant, labor, supervision, equipment, appliances, and materials, and in performing all operations in connection with the installation of metal fabrications (miscellaneous steel), all in strict accordance with the Contract Documents. The Work covered under this Section includes, but is not necessarily limited to, the following: rough hardware; pipe supports; railings and related connections; expanded metal mesh; grating; steel plate; steel diamond plate; pipe bollards; flag pole; galvanized ladders; and fasteners. Provide accessories as needed for a complete and proper installation as shown on the Contract Drawings and specified in the Contract Document herein.

##### 1.2 SUBMITTALS

- A. The Contractor shall submit shop drawings detailing fabrication and erection of each metal fabrication indicated. Include plans, elevations, sections, and details of metal fabrications and their connections. Show anchorage and accessory items. Provide templates for anchors and bolts specified for installation under other Sections.
- B. Product data for gratings; shop paint products; anchor bolt systems; and grout.
- C. The Contractor shall provide the Project Engineer with copies of the manufacturer's documentation including installation drawings for all guard rail components and end treatments indicating acceptance by the Federal Highway Administration as meeting the requirements of NCHRP Report 350, Test Level 2, for the conditions at the intended location.
- D. The Contractor shall provide a detailed list of the system components for maintenance purposes. No work shall commence under these items until the Project Engineer has received all documentation.
- E. Brochures shall be submitted in accordance with the General Conditions as supplemented describing all materials to be used and naming the manufacturer of such materials.

#### PART 2 – PRODUCTS

##### 2.1 MATERIALS

A. Quality Assurance

1. Use adequate number of skilled workmen who are thoroughly trained and experienced in the necessary crafts and who are completely familiar with the specified requirements and the methods needed for proper performance of the Work of this Section.
2. The Owner reserves the right of approval of any Subcontractor selected for this portion of the Work by the Contractor. Approval will be based, in part, on:
  - a. Documented successful experience in performing work of a similar nature.
  - b. Acceptable schedule of unit prices for measurement and payment in event of changes in the Work of this Section.
3. Fabricator Qualifications: Firm experienced in producing metal fabrications similar to those indicated for this Project with a record of successful in-service performance, and with sufficient production capacity to produce required units without delaying the Work.
4. Perform welding with electric arc process and in accordance with "Structural Welding Code-Steel" (ANSI/AWS D1.1). All structural welds shall be performed by American Welding Society (AWS) welders certified for the appropriate welding application.
5. In addition to complying with pertinent codes and regulations, comply with:
  - a. The American Institute of Steel Construction, AISC, "Steel Construction Manual", Fifteenth Edition.
6. All connections shall be designed by the steel fabricator except those specifically detailed on the Contract Documents. Submit design calculations for review if requested by Owner.
7. All references to SSPC shall be interpreted as Steel Structures Painting Council Manual, Systems and Specifications, now part of the Association for Materials Protection and Performance (AMPP).
8. Standard guardrail and post shall be single face, as specified in MA Department of Public Works, Standard Specifications for Highways and Bridges 1988 Edition, and all amendments; – Construction Standards; Subsection 601 GUARDRAIL and Section E.401.1 – and E.401.11.0.



B. Ferrous Metals

1. Steel Plate, Diamond Plate, and Bar Stock: ASTM A 36.
2. Steel Pipe: ASTM A 53, standard weight (Schedule 40).
3. Welding Rods and Bare Electrodes: Select according to AWS specifications for the metal alloy to be welded.

C. Protective Coating

1. General: Unless specifically noted otherwise, all items scheduled to receive protective coating shall be fully fabricated with holes, cuts, threads, etc. prior to receiving protective coating, prior to delivery to site.
2. Steel Sections: Unless specifically noted otherwise, all steel sections shall be shop coated prior to delivery to site in accordance with Section 099713 Coating of Steel Waterfront Structures.
3. Bolts, Nuts, and Washers: All bolts, nuts, and washers shall be hot dipped galvanized in accordance with ASTM A153.
4. Field Touch-Up of Epoxy-Coated Items: Shall be performed in accordance with Section 099713 Coating of Steel Waterfront Structures.
5. Field Touch-Up of Hot-Dipped Galvanized Items: Touch-up shall be performed with Tnemec 90-97 Tnemec-Zinc primer or equivalent accepted by the Project Engineer. Surface preparation and coating application shall be in strict accordance with manufacturers written instructions.

D. General Fabrication

1. Form metal fabrications from materials of size, thickness, and shapes indicated but not less than that needed to comply with performance requirements indicated. Work to dimensions indicated or accepted on shop drawings, using proven details of fabrication and support. Use type of materials indicated or specified for various components of each fabrication.
2. Form exposed work true to line and level with accurate angles and surfaces and straight sharp edges.
3. Remove sharp or rough areas on exposed traffic surfaces.
4. Weld corners and seams continuously to comply with the following:

- a. Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals.
  - b. Obtain fusion without undercut or overlap.
  - c. Remove welding flux immediately.
  - d. At exposed connections, finish exposed welds and surfaces smooth and blended so that no roughness shows after finishing, and contour of welded surface matches those adjacent.
5. Form exposed connections with hairline joints, flush and smooth, using concealed fasteners wherever possible. Use exposed fasteners of type indicated or, if not indicated, Phillips flathead (countersunk) screws or bolts. Locate joints where least conspicuous.
  6. Provide for anchorage of type indicated; coordinate with supporting structure. Fabricate and space anchoring devices to secure metal fabrications rigidly in place and to support indicated loads.
  7. Shop Assembly: Preassemble items in shop to greatest extent possible to minimize field splicing and assembly. Disassemble units only as necessary for shipping and handling limitations. Use connections that maintain structural value of joined pieces. Clearly mark units for reassembly and coordinated installation.
  8. Cut, reinforce, drill, and tap metal fabrications as indicated to receive finish hardware, screws, and similar items.
  9. Fabricate joints that will be exposed to weather in a manner to prevent water entry or provide weep holes where water may accumulate.

E. Guardrail

1. Guard Rail Materials shall meet the requirements:
  - a. Fasteners
    - 1.1) Bolts ASTM F568 Class 4.6
    - 1.2) Nuts ASTM A563M Grade A or Better
    - 1.3) Washers ASTM F436M
2. Wood

- a. Unless indicated otherwise, wood posts shall be Western Red Cedar having a modulus of elasticity E equal to 7,580 MPa or greater and an allowable stress in bending of Fb equal to 4.65 MPa or greater.
  - b. Unless indicated otherwise, wood rails shall be Western Red Cedar having a modulus of elasticity E equal to 6,895 MPa or greater and a modulus of rupture equal to 48.95 MPa or greater.
  - c. The Contractor shall not commence any excavation or construction work until the Surveyor's verification has been received and approved by the Project Engineer.
3. Steel Posts
- a. Steel posts and channel members for anchor posts shall be fabricated from new structural steel sections conforming to the dimensions and design shown on the plans.
  - b. Posts shall conform to the requirements of ASTM A36. Galvanizing shall meet the requirements of M7.10.0: Galvanized Coatings
4. Wood Posts
- a. The posts shall be rough sawn (unplaned) with nominal dimensions as indicated on the plans and with tolerances of 1 in. in length and ¼ in. in width and thickness. All holes in the posts shall be drilled prior to pressure application of the preservative at a wood preserving facility.
  - b. The stress grade shall be 1,000 psi or more in extreme fiber bending. Grading for stress-graded timber shall be in accordance with AASHTO M 168.
  - c. Prior to treatment, all posts shall be seasoned, conditioned, and completely machined in accordance with AWPA M1.
  - d. Posts shall be treated with chromated copper arsenate, type C (CCA-C) conforming to AWPA P23, to a minimum retention of 0.60 pcf. Treatment shall be full length under pressure by the empty-cell or full-cell process in accordance with AWPA U1.
  - e. Manufacturers shall adhere to the processing and treatment limitations in AWPA T1. No unnecessary cutting of treated posts will be allowed after treatment. All posts with surfaces damaged by cutting, drilling or any other cause shall be field

treated with a preservative solution in accordance with AWPA M4.

- f. Certificates of compliance and certificates of inspection bearing the independent inspection agency's verification for each lot of wood must be presented before installation and contain the species of wood, the type of preservative, the retention rate and penetration of the preservative.
  - g. The certificates of inspection and compliance do not signify mandatory acceptance of the entire lot. The Department still has the option of rejecting posts (included in any particular lot) that the Project Engineer considers sub-standard because of unsound knots and shakes, excessive checking or other defects that may be detrimental to the structural integrity of the posts.
  - h. The fabricator shall retain an independent inspection agency to inspect and certify the treated posts in accordance with these specifications and AWPA M2, Part A.
  - i. All treated posts shall be marked in accordance with AWPA U1 (and M6 as required). (The mark is to include the identifying lot and/or charge number). The post shall also be stamped with the Inspector's identification. The mark is to be placed on the upper side head of the post and located so that it is not obstructed by the offset blocks, rails, or any other appurtenances. The Inspector's stamp shall be legibly hammer-stamped on the head of the post, in accordance with AWPA M2 and the above.
5. Offset Blocks
- a. The blocks shall be of the same type throughout the project. Requirements for specific material types are as follows:
    - 1.1 Wood Offset Blocks: Wood offset blocks shall meet the requirements of A. Posts, Wood Posts, above. When wood offset blocks are used on wood posts, they shall be the same species as the posts.
    - 1.2 Plastic Offset Blocks: Plastic offset blocks shall meet all applicable performance requirements of MASH and be listed on the QTCE. Each block shall be stamped at the factory with the manufacturer's identification and lot number and conform to the dimensions shown on the plans.

- b. Prior to approval and use of the plastic guardrail offset blocks, the manufacturer shall submit to the Project Engineer, the manufacturers name, the product brand name and/or model number, a copy of the MASH test results, a Material Safety Data Sheet, and a sample block. Acceptance of the material will be based on the manufacturer's certification.

6. Rail Element and Terminal Sections

- a. The steel rail element, transition panels, terminal sections and connecting hardware shall conform to AASHTO M 180, Type II, Class A with the following additions:
- b. The length of the rail shall be according to the Contract Drawings.
- c. Each end of the steel rail for every stretch of guard shall be fitted with a terminal section as shown on the Contract Drawings.
- d. The projecting heads of all connection and splice bolts shall be button head type so no appreciable projection will obstruct a vehicle sliding along the rail. Steel rail elements with a radius of 150 ft or less shall be shop bent.
- e. The manufacturers are required to submit a Brand Registration and Guarantee document annually to RMS showing compliance of the Guardrail Components with AASHTO M 180 Specification.

7. Guardrail End Treatment

- a. The same type of tangent end or flared end treatment shall be used throughout the project.
- b. All steel components and hardware shall conform to M8.07.0: Guardrail. All metal work shall be done in the shop.
- c. The approach end shall have Type 3 Object Marker sheeting that conforms to the requirements of the MUTCD. The sheeting material shall meet the requirements of M9.30.0: Retroreflective Sheeting

F. Flagpole

- 1. Flagpole shall be a fiberglass reinforced composite (FRC) Nautical Double Masted Flagpole with Yardarm/Gaff as manufactured by PLP composite Technologies or approved equal. Color shall be

standard white and base to be provided per manufacturers recommendation.

2. Minimum mounting height of 25-feet.
3. Minimum butt diameter of 6-inches.
4. Load calculations shall be based on AASHTO and NAAMM standards designed for 150 m.p.h. winds, unflagged with a 1.3 gust factor.
5. Flagpole, yardarm, and gaff shall be sanded smooth and coated with UV protection and weatherability.
6. Flagpole shall be equipped with the following:
  - a. S.S.T. swivel snaps/covers.
  - b. Powder coated aluminum cleats.
  - c. 6" gold anodized aluminum ball.
  - d. #10 polyester halyard.
  - e. Yardarm pulleys.
  - f. Aluminum gaff truck.

G. Rough Hardware

1. Furnish bent, or otherwise custom-fabricated, bolts, plates, anchors, hangers, dowels, and other miscellaneous steel and iron shapes as required for framing and supporting woodwork, and for anchoring or securing woodwork to concrete or other structures.
2. Fabricate items to sizes, shapes, and dimensions required. Furnish malleable-iron washers for heads and nuts that bear on wood structural connections and furnish steel washers elsewhere.

H. Miscellaneous Steel Trim

1. Unless otherwise indicated, fabricate units from structural steel shapes, plates, and bars of profiles shown with continuously welded joints, and smooth exposed edges. Miter corners and use concealed field splices wherever possible.
2. Provide cutouts, fittings, and anchorages as required to coordinate assembly and installation with other work. Provide anchors, welded

to trim, for embedding in concrete or masonry construction, spaced not more than 6 inches from each end, 6 inches from corners, and 24 inches o.c., unless otherwise indicated.

3. Galvanize miscellaneous steel trim at all exterior locations and as indicated.

#### I. Steel Finishes

1. Rust-inhibitive, Alkyd Primer: Product to be Devguard 4160 manufactured by Devoe Coatings or equivalent accepted by Project Engineer. Apply 1 coat minimum 2.0-2.5 mils dry film thickness; color to be selected by Owner.
2. Galvanizing: For those items indicated for galvanizing, apply zinc coating by the hot dip process complying with the following requirements:
  - a. ASTM A153 for galvanizing iron and steel hardware.
  - b. ASTM A123 for galvanizing both fabricated and unfabricated iron and steel products made of uncoated rolled, pressed, and forged shapes, plates, bars, and strip 0.0299 inch thick or thicker.
3. Epoxy Coating: Finish items per Section 099713 Coating of Steel Waterfront Structures, where noted on the Contract Drawing and specifications provided in the Contract Documents.

### PART 3 – EXECUTION

#### 3.1 INSTALLATION

##### A. Field Measurements

Check actual locations of walls and other construction to which metal fabrications must fit by accurate field measurements before fabrication. Show recorded measurements on final shop drawings. Coordinate fabrication schedule with construction progress to avoid delaying the Work. Where field measurements cannot be made without delaying the Work, guarantee dimensions and proceed with fabricating products without field measurements. Coordinate construction to ensure that actual dimensions correspond to guaranteed dimensions. Allow for trimming and fitting.

##### B. Preparation

1. Coordinate and furnish anchorages, setting drawings, diagrams, templates, instructions, and directions for installing anchorages, including concrete inserts, sleeves, anchor bolts, and miscellaneous items having integral anchors that are to be embedded in concrete or masonry construction. Coordinate delivery of such items to Project site.
  2. Set sleeves in concrete with tops flush with finish surface elevations. Protect sleeves from water and concrete entries.
- C. General Installation
1. Fastening to In-Place Construction: Provide anchorage devices and fasteners where necessary for securing miscellaneous metal fabrications to in-place construction. Include threaded fasteners for concrete inserts, toggle bolts, through-bolts, and other connectors as required.
  2. Ladders: Contractor shall install emergency ladders in accordance with the Contract Drawings.
  3. Cutting, Fitting, and Placement: Perform cutting, drilling, and fitting required for installing miscellaneous metal fabrications. Set metal fabrication accurately in location, alignment, and elevation; with edges and surfaces level, plumb, true, and free of rack; and measured from established lines and levels.
  4. Provide temporary bracing or anchors in formwork for items that are to be built into concrete masonry or similar construction.
  5. Fit exposed connections accurately together to form hairline joints. Weld connections that are not to be left as exposed joints but cannot be shop-welded because of shipping size limitations. Do not weld, cut, or abrade the surfaces of exterior units that have been hot dip galvanized after fabrication and are intended for bolted or screwed field connections.
  6. Field Welding shall comply with the following requirements:
    - a. Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals.
    - b. Obtain fusion without undercut or overlap.
    - c. Remove welding flux immediately.



- d. At exposed connections, finish exposed welds and surfaces smooth and blended so that no roughness shows after finishing, and contour of welded surface matches those adjacent.

D. Guardrail

1. Guardrail: Furnish and Install standard guardrail and post in accordance with Massachusetts Department of Transportation – Construction Standards; Section E – Single Face SP Base Anchor.
2. Posts shall be set plumb, in hand or mechanically dug holes, or driven, then backfilled with acceptable material placed in layers and thoroughly compacted.
3. Posts to be set in areas of proposed bituminous concrete surfaces shall be erected prior to laying the surrounding finished surface.
4. Steel Beam Rail: The rail shall be erected so as to form a smooth continuous rail conforming to the required line and grade. The rail elements and splices shall be per the plans. All bolts, except where otherwise required at expansion joints, shall be drawn tight.
5. Guardrail Panel: The rail shall be erected in a smooth continuous rail conforming to the required line and grade. All rail elements and splices shall be per the plans. The rail shall make full contact at each splice. Massachusetts Department of Transportation – Highway Division Standard Specifications for Highways and Bridges II.299 2024 Edition
  - a. All bolts, except where otherwise required at expansion joints shall be drawn tight. Bolts through expansion joints shall be drawn up as tightly as possible without being too tight to prevent the rail elements from sliding past one another longitudinally.
  - b. Curved guardrail shall be used when the radius is 150 ft or less.
  - c. Guardrail delineators shall be installed at intervals as indicated on the plans. Retroreflective sheeting shall conform to the following colors:
    - 1.1 White on the upstream face in the right shoulder.
    - 1.2 Yellow on the upstream face in the left shoulder.

1.3 Red on the downstream (wrong-way travel direction) face within 1,000 ft upstream of a median break of a divided highway or interchange.

H. Guardrail End Treatment: Proprietary end treatment systems shall be installed in accordance with the manufacturers' specifications and recommendations.

E. Flagpole

1. Flagpole: Flagpole shall be mounted to the cast-in-place concrete topping slab deck at the location shown on the Contract Drawings. Installation detail shown on the Contract Drawings shall be used to secure the items to the deck section as required, or with the manufacturers recommendation upon coordination and approval with the Owner and Project Engineer.

F. Field Touch-Up of Finishes

1. Touch-up of Galvanizing: Thoroughly clean galvanized steel by SSPC-SP 3 Power Tool Cleaning method at all damaged, scratched and field-welded galvanized surfaces. Apply a zinc-rich primer such as Cathacoat 304V by Devoe Coatings or equivalent accepted by Project Engineer. Touch-up repair shall conform to ASTM A780 and shall overlap a minimum of 2" with hot dip galvanized surfaces. Allow to dry to a minimum dry film thickness of 2.0-4.0 mils.

2. Touch-up of Epoxy Coating: Thoroughly clean all field-welded, damaged, scratched, and chipped coating areas per SSPC-SP 2 Hand Tool Cleaning. Remove all rust and weld slag. Field touch-up areas shall be coated with epoxy coating with material specified in Section 099713 Coating of Steel Waterfront Structures. Overlap touch-up 2" minimum with existing coating.

END OF SECTION

SECTION 061333

TIMBER CONSTRUCTION

PART 1 - GENERAL

1.1 DESCRIPTION OF WORK

The Work covered by this Section of these Specifications consists of furnishing all plant, labor, supervision, equipment, appliances, and materials and in performing all operations in connection with the timber construction, all in strict accordance with this Section of the Specifications and the applicable Drawings and subject to the terms and conditions of the Contract.

1.2 QUALITY ASSURANCE

- A. Use adequate number of workmen who are thoroughly trained and experienced in the necessary crafts and who are completely familiar with the specified requirements and the methods needed for proper performance of the work in this Section.
- B. The Owner reserves the right of approval of any Subcontractor pre-qualified and selected for this portion of the Work by the Contractor. Approval will be based, in part, on:
  - 1. Documented successful experience in performing work of a similar nature.
  - 2. Acceptable schedule of unit prices for measurement and payment in event of changes in the Work of this Section.
- C. Comply with the requirements of the "Wood Project Engineering Handbook" by US Forest Products Laboratory, except as may be modified herein, and
- D. All visually graded structural lumber and wood construction shall conform to the "National Design Specification for Wood Construction", and its Supplement, "Design Values for Wood Construction" by the National Forest Products Association.

1.3 SUBMITTALS

No later than the time of delivery of materials to the site, submit certificates as to conformance with the specified species, grade, and treatment prior to installation of any timber or hardware.

1.4 PRODUCT DELIVERY AND STORAGE

- A. The Contractor shall notify the Owner and Project Engineer twenty-four hours in advance of delivery of timber materials. The Contractor guarantees timber shall be

stored in a safe manner within designated area(s) provided at the Project Site.

- B. Store off the ground in a manner to prevent damage and to permit easy access for inspection.

## PART 2 - PRODUCTS

### 2.1 TIMBER

- A. Timber shall meet the requirements of the Southern Pine Inspection Bureau Inspection Rule, for Southern Yellow Pine No. 1, Paragraph 508 Marine Grade minimum.
- B. Clean-peel and preservative pressure treat timber in accordance with AWWA Service Condition Use Category UC4B (Marine, out-of-water, saltwater splash, above ground, ground contact) for Micronized Copper Azole (MCA). All timber components without in-water use except as noted below shall have a minimum retention of 0.23 pounds per cubic foot (pcf) or equivalent as accepted by the Project Engineer.
- C. Clean-peel and preservative pressure treat all timber that will have continuous marine exposure in accordance with AWWA Service Use Category UC5A and P5 for Chromated Copper Arsenate (CCA) to a minimum retention of 2.5 pcf or equivalent accepted by the Project Engineer.
- D. All material used shall be sound, well-seasoned, and straight grained, free from shakes and large or loose knots, and shall have no decayed wood, worm holes, or any defects which the Project Engineer determines will impair its strength or durability.
- E. Pieces of exceptionally lightweight will not be accepted.
- F. Lumber shall be surfaced four sides unless otherwise noted.
- G. Alternate preservative treatment shall be submitted for review and acceptance by Project Engineer.

### 2.2 HARDWARE

- A. All hardware for CCA treated timber, including all bolts, nuts and washers shall be galvanized steel conforming to ASTM A307, Grade A. Galvanizing shall conform to the requirements of ASTM A153.
- B. All hardware for MCA treated timber, including all bolts, nuts and washers shall be stainless steel conforming to Grade A316. Galvanized hardware shall not be used in contact with MCA treated timber.
- C. Finish of all hardware and metal fittings shall be hot dipped galvanized after

fabrication.

- D. Furnish Certificates of Compliance with ASTM Specifications and Standards specified herein. Each certificate to be signed by Contractor and Galvanizer certifying that steel materials, bolts, nuts, washers and items of iron and steel hardware in conformance to specified requirements, and that the galvanizing is in full conformance with these Specifications.
- E. Galvanized materials are to be given passivating treatment to prevent wet storage stain. Treatment shall consist of quenching newly galvanized material in a water quench containing not more than 0.2% sodium dichromate.

### PART 3 - EXECUTION

#### 3.1 HANDLING, CUTTING AND FRAMING

- A. Handle lumber and timber carefully, without sudden dropping, breaking of outer fibers, bruising, or penetrating the surface with tools. Accurately cut and frame lumber to a close fit in such a manner that the joints shall have an even bearing over the entire contact surface. All drilled holes and field cuts shall be treated with a preservative (product to be submitted for review by the Contractor and approved by the Owner) in accordance with AWWA M4 - "Standard for the Care of Preservative Treated Wood Products" prior to erection of timber member or installation of bolts.
- B. All lumber shall be accurately cut and framed to a close fit in such a manner that joints shall have even bearing over the entire contact surface. No shimming will be permitted in making joints nor will open joints be accepted.

#### 3.2 HARDWARE

- A. A washer of the size and type specified shall be used under all bolt heads and nuts which would otherwise come in contact with timber. The nuts of all bolts shall be effectively locked after they have been finally tightened.
- B. Field touch-up of hot-dipped galvanizing shall be 90-97 Tnemec-Zinc zinc-rich coating as manufactured by Tnemec Company, Inc. of Kansas City, MO, or equivalent accepted by the Project Engineer. Material shall be applied in strict accordance with manufacturers written instructions.

**END OF SECTION**

SECTION 079000

EXPANSION AND CONTRACTION JOINTS

PART 1 - GENERAL

1.1 SUMMARY:

- A. Section includes:
  - 1. Expansion joint fillers.
  - 2. Contraction joints.

1.2 REFERENCES:

- A. American Society for Testing and Materials (ASTM)
  - 1. ASTM D1751 Spec. for Preformed Expansion Joint Fillers for Concrete Paving and Structural Construction (Nonextruding and Resilient Bituminous Types).
  - 2. ASTM D1752 Spec. for Preformed Sponge Rubber, Cork, and Recycled PVC Expansion Joint Fillers for Concrete Paving and Structural Construction.
- B. American Concrete Institute (ACI)
  - 1. ACI 302.1 Guide for Concrete Floor and Slab Construction

1.3 SUBMITTALS:

- A. Provide the following information in accordance with Section 013000, "Submittal Procedures."
- B. Producer's certification that supplied materials meet requirements of applicable specifications.
- C. Samples of each type of joint filler to be used, when requested by Project Engineer.

PART 2 - PRODUCTS

2.1 MATERIALS:

- A. Joint Fillers
  - 1. ASTM D1752, Type III (self-expanding cork).
  - 2. Alternative joint fillers that may be required on the Contract Drawings:
    - a. ASTM D1751.
    - b. ASTM D1752, Type I, II or IV.

## PART 3 - EXECUTION

### 3.1 EXPANSION JOINTS:

- A. Location and geometry of expansion joints shall be as shown on the Contract Drawings.
- B. Extend filler full width and depth of concrete, with top slightly below finished surface of concrete.

### 3.2 CONTRACTION JOINTS:

#### A. Location

- 1. Locate contraction joints where shown on the Construction Drawings, or according to the following criteria:
  - a. Cast-In-Place Concrete Deck:
    - 1) Cuts Spanning East/West Direction - along the centerline of Bents "B", "C", "D", "G", & "H". Use bent spacing width as maximum allowable spacing.
    - 2) Cuts Spanning North/South Direction - maximum 16-foot spacing.
  - b. Cast-In-Place Concrete Sheet Pile Bulkhead Cap:
    - 1) Maximum 15-foot allowable spacing.
  - c. Concrete Sidewalk:
    - 1) Cuts Spanning East/West Direction - along the centerline of sidewalk.
    - 2) Cuts Spanning North/South Direction - maximum 5-foot spacing.
  - d. Locate no contraction joint less than 5 feet from any other joint.
  - e. Locate joints so as to match like joints in previously constructed adjacent slabs.
  - f. Unless shown otherwise on the Contract Drawings, joints shall not deviate more than 5 degrees from a right angle measured at intersecting joints and at slab edges.
    - 1) No joint shall deviate more than 1/2 inch from a straight line.

#### B. Dimensions of Contraction Joints

- 1. Depth:
  - a. Minimum 1 inch.
- 2. Width:
  - a. Minimum 3/4 inch.
  - b. Maximum 7/8 inch.

- C. Permissible Types of Joints
  - 1. Tooled joint.
  - 2. Strip-formed joint.
  - 3. Sawed joint.
  
- D. Formation of Tooled Joints
  - 1. Insert a metal parting strip into concrete after it has been struck off and consolidated, and while concrete is still plastic.
  - 2. Remove strip when concrete is able to retain its shape.
  
- E. Formation of Strip-Formed Joints
  - 1. Use plastic joint former with removable top portion.
  - 2. Remove upper portion of strip, after concrete has sufficiently hardened, in such a manner as to prevent damage to surface of slab.
  
- F. Formation of Sawed Joints
  - 1. Conform to ACI 302.1.
  - 2. Saw joints as soon as practicable after concrete has set sufficiently to preclude raveling during sawing and before any shrinkage cracking takes place in concrete.

END OF SECTION



SECTION 099713

COATING OF STEEL WATERFRONT STRUCTURES

PART 1 - GENERAL

1.1 WORK SPECIFIED

The work includes: The furnishing of all plant, labor, materials, tools and equipment, and the performance of all operations and incidentals necessary for the coating, handling, storing, and shipping of plant coated steel sheet piling, steel pipe piling, structural steel, and miscellaneous ancillary items.

1.2 QUALITY ASSURANCE

- A. Use adequate numbers of skilled workmen who are thoroughly trained and experienced in the necessary crafts and who are completely familiar with the specified requirements and the methods needed for proper performance of the work of this Section.
- B. The Owner, through the Project Engineer, reserves the right of approval of any Subcontractor pre-qualified and selected for this portion of the Work by the Contractor. Approval will be based, in part, on:
  - 1. Documented successful experience in performing work of a similar nature.
  - 2. Acceptable schedule of unit prices for measurement and payment in event of changes in the Work of this Section.
- C. Coating materials shall be handled, stored, and applied in accordance with the manufacturer's specifications, or as directed by an authorized representative of the coating manufacturer.
- D. All references to SSPC shall be interpreted as Steel Structures Painting Council, part of Association for Materials Protection and Performance.
- E. Structural steel fabrications shall be received by coating applicator free of all oil and grease.

1.3 SUBMITTAL

Submit material certification and product data for the coating system to the Project Engineer for review no later than the time of delivery of materials to the site. Certification shall include a statement by the coating applicator that the protective coating was installed in strict accordance with manufacturers written instructions, including all surface preparation.

1.4 PRODUCT DELIVERY AND STORAGE

The Contractor guarantees that material shall be stored in a safe manner within the designated area(s) provided at the site and as shown on the Contract Drawings.

## PART 2 - PRODUCTS

### 2.1 EPOXY COATING

- A. Material used for factory epoxy coating shall be BAR-RUST 235 Multi-Purpose Epoxy Coating as manufactured by Devoe Coatings or equivalent accepted by the Project Engineer for steel sheet piles.
- B. Material used for factory epoxy coating shall be Scotchkote Fusion Bond Epoxy Coating 6233 as manufactured by 3M or equivalent accepted by the Project Engineer for steel pipe piles.
- C. Epoxy coating field touch-up material shall be identical to factory coating specified in paragraph 2.1-A above.
- D. The topcoat color for all surfaces is to be black.

## PART 3 - EXECUTION

### 3.1 SURFACE PREPARATION

- A. Surfaces shall be prepared in strict accordance with the protective coating system manufacturers written instructions. Surfaces are to be abrasion-blasted to a near-white surface cleanliness in accordance with SSPC-SP-10. Blast profile on steel shall be 1.5 to 2.5 mils in depth and be of a sharp, jagged nature as opposed to a “peen” pattern (from shot blasting). Surfaces must be sound, dry, clean, free of oil, grease, dirt, mildew, form release agents, curing compounds, loose and flaking paint, grit dust, and other foreign substances. Roto blasted surfaces are not acceptable.
- B. Surfaces requiring field touch-up shall be prepared as described in paragraph 3.1-A above.

### 3.2 PROTECTIVE COATING APPLICATION

- A. The protective coating shall be installed in strict accordance with manufacturers written instructions. Coating is to be applied in two coats to achieve a minimum overall dry film thickness of 15 mils.
- B. All holidays or other imperfections in the coating shall be removed or repaired at the Contractors expense prior to final acceptance of the Work.
- C. Surfaces requiring field touch-up of any required areas shall be prepared as described in paragraph 3.1-A above or by the following procedure:
  - 1. Clean all surfaces to be repaired per SSPC-SP1 Solvent Clean to remove

chlorides and general surface contamination.

2. Grind all welded areas to provide a smooth surface with no sharp edges.
3. Feather existing coatings back to sound material.
4. Clean all other surfaces to be repaired per SSPC-SP2 (Hand Tool Clean) or SSPC-SP3 (Power Tool Clean). Do not grind surfaces smooth; maintain adequate surface profile from original blast cleaning.
5. Prime-coat all welds and edges with the epoxy coating prior to painting to insure adequate film thickness.

END OF SECTION

SECTION 310000

EARTHWORK

PART 1 - GENERAL

1.1 DESCRIPTION OF WORK

- A. The work covered by this specification consists of furnishing all plant, labor, equipment, and materials and performing all operations in connection with excavation, excavation of unsuitable organic soils, subgrade preparation, placement and compaction of fill materials, and grading required for the site development and fill placement associated with the Rock Harbor Commercial Wharf Improvement Project.

1.2 CODES AND STANDARDS

- A. ASTM D422-63(R90) Standard Test Method for Particle-Size Analysis of Soils
- B. ASTM D1556-92 Standard Test Method for Density and Unit Weight of Soil in Place by the Sand-Cone Method
- C. ASTM D1557-91 Standard Test Method for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lb/ft (2700 kN-m/m))
- D. ASTM D2216-92 Standard Test Method for Laboratory Determination of Water (Moisture) Content of Soil and Rock
- E. ASTM D2922-91 Standard Test Methods for Density of Soil and Rock in Place by Nuclear Methods (Shallow Depth)
- F. ASTM D3017-88 Standard Test Method for Water Content of Soil and Rock in Place by Nuclear Methods (Shallow Depth)
- G. ASTM D4318-93 Standard Test Method for Liquid Limit, Plastic Limit, and Plasticity Index of Soils
- H. ASTM D4643-93 Standard Test Method for Determination of Water (Moisture) Content of Soil by the Microwave Oven Method

1.3 SUBMITTALS

- A. Testing of On-Site Sources for Gradation: Testing turnaround review time to be 8 hours or less upon being presented to the Project Engineer for review.
- B. Earthwork Operation and Sequence Plan

1. Submit an Earthwork Operation and Sequence Plan outlining types of equipment, daily volumes, and grading, excavation, subgrade preparation, proof compacting, backfilling, and compaction sequence to the Project Engineer for review at least 10 working days prior to commencement of construction. The earthwork operations plan shall include details of material handling operations such as material segregation procedures, temporary stockpile locations, excavation dewatering operations (where required or proposed), and material processing and placement operations.
2. Plan to include sequencing placement of reuse material including backfilling bulkhead, commercial wharf area, and fuel tank excavation area, grading of proposed pavement area, and limited excavation for installation of piers.

C. Dewatering Plan

The Contractor shall submit a Dewatering Plan for beneficial on-site reuse of material excavated from below MHW (“dredge material”) from within the 20-foot cut back of the existing bulkhead or as required prior to trucking to the staging area or off-site material and as shown on the Contract Drawings.

D. Shoring and Bracing Plan

If the Contractor selects to use shoring and bracing, submit the support of excavation plan to the Project Engineer for review at least 10 working days prior to commencement of construction. The support of excavation system shall be prepared by a Professional Engineer, registered in the Commonwealth of Massachusetts.

#### 1.4 DEFINITIONS

A. SOURCE shall mean those areas from which any material brought to the site is derived. All material brought to the site shall be certified in writing as clean and free from environmental contaminants. The sources and test results shall meet with the approval of the Project Engineer before any material is delivered to the project.

B. EXISTING MATERIAL shall mean existing fill material on site.

SUITABLE DREDGE MATERIALS, for reuse on-site, shall generally consist of predominantly granular (sand, gravel, silt, and rock) material generally free of organic material, peat, dredge debris, organic silt, and other objectionable material. Dredged material is defined as material removed below MHW from within 20-feet from behind the existing bulkhead and as shown on the Contract Drawings and which are free of objectionable material, are considered suitable dredge material, provided they meet the specified gradations. Cobbles and boulders to be removed are also considered suitable dredge materials, provided they are processed to meet the specified gradations. Suitable dredge materials

may be reused on-site as compacted or densified fill.

- C. UNSUITABLE MATERIALS shall mean Organic Silt or Inorganic Silt as well as dredge debris, trash, organic material, peat, and other objectionable material.
- D. ORGANIC MATERIAL shall mean fibrous mats of roots, decaying vegetation, organic silt, peat, timber piles, planks, wharf or fendering, garbage and sanitary wastes.
- E. UNSUITABLE CONSTRUCTION DEBRIS shall mean on-site organic debris such as wood, stumps, organic material, roofing debris, or other miscellaneous debris that is unsuitable for compaction when mixed with granular material.
- F. TRENCH EXCAVATION shall consist of the excavation of all pipelines, and other minor structures including but not limited to trench drains, underground infiltration chambers, catch basins, field inlets, manholes, oil / water separators, electrical conduit, fuel lines, and drop inlets.
- I. UNSTABLE MATERIAL shall mean debris, frozen materials, topsoil, organic silts, quicksand, and such other soft or loose material which does not remain in position when cut for excavations or which does not have sufficient bearing strength to support the loads placed upon it.
- J. UNSUITABLE MATERIAL shall mean organic material, peat, organic silt, or combinations thereof, all having unsuitable bearing properties and/or all materials of whatever description that are too loose or saturated for use as backfill to provide satisfactory bearing capacity.
- K. TOPSOIL shall mean the surface layer of soil and shall be free from refuse or any material toxic to plant growth. Topsoil shall also be free from subsoil, woody vegetation, stumps, roots, brush, stones, clay lumps, or similar objects larger than 2 inches in greatest dimension except in lawn areas where maximum size shall be 1 inch. The soluble salt contents of the soil shall be between 750 to 1,500 parts per million (ppm) as determined by a conductivity measurement. The soil shall be considered acceptable if the conductivity measurement is between 0.5 and 1.0 millimhos/ centimeter for a 1:2 soil/water ratio. Topsoil shall be free from invasive plant species. Topsoil shall meet the following requirements unless otherwise specifically stated in the plans or proposal.
  - 1. The pH of the material shall be between 5.5 and 7.0.
  - 2. The organic content shall be not less than 3% nor more than 20%.
- L. EARTH shall mean all excavated material not classified as loose rock or solid rock.

- M. COMMON EARTH shall mean sand, loam, clay, silt, gravel, topsoil, or similar materials free from debris, frozen materials and containing some rock fragments, stones, pebbles and lumps not exceeding 2 inches in their largest dimension.
- N. SAND shall mean clean, hard, strong, durable, inert and uncoated grains, free from injurious amounts of dust, lumps, soft flaky particles, shale, alkali, organic matter, loam or other deleterious substances.
- O. GRANULAR BACKFILL (Structural Fill) shall consist of sandy gravel or gravelly sand, free of organic material, loam, trash, snow, ice, frozen soil or other deleterious materials, and well graded within the following limits\*:

<u>Sieve</u>	<u>% Passing</u>
6 inch	100
3/4" inch	95-100
No. 4	45- 55
No. 10	10-15
No. 40	0-2
No.200	0-2

*\*Granular Backfill samples are to be provided to the Project Engineer prior to construction.*

- P. WASHED GRAVEL shall mean gravel conforming to A.S.T.M. C-33 size 57.
- Q. CRUSHED STONE shall meet the definition provided by MassDOT Standard Specification for Highways and Bridges Division III Section M2.01.0.
- R. CRUSHER RUN shall consist of the residual material resulting from the crushing of clean, washed crushed stone, but in no cases shall contain organics or other deleterious materials.
- S. UNCLASSIFIED EXCAVATION shall consist of the excavation and disposal of all materials of any description, encountered in the course of construction unless otherwise specified in the contract.
- T. REVETMENT STONE shall be excavated from within the footprint of the existing revetment to be demolished and reused onsite to repair existing revetment to remain as required.

#### 1.5 RELATED WORK SPECIFIED ELSEWHERE

- A. Additional requirements relative to handling, treatment, reuse and disposal of material are specified in Section 028100 TRANSPORTATION AND DISPOSAL.

- B. Additional requirements relative to handling, placement and compaction of backfill materials are specified in Section 051200 STRUCTURAL STEEL & 316216.13 STEEL PIPE PILES.
- C. Additional requirements relative to handling, placement and compaction of backfill fill materials related to utilities are specified in Section 312333 EXCAVATION, TRENCHING, AND BACKFILLING FOR UTILITY SYSTEMS, Section 330500 COMMON WORK RESULTS FOR UTILITIES, 331000 WATER UTILITIES, Section 334000 STORM DRAIN, & Section 337000 ELECTRICAL UTILITIES.
- D. Additional requirements relative to erosion control measures are specified in Section 310519.13 GEOTEXTILE FABRIC & Section 312500 EROSION AND SEDIMENTATION CONTROLS.

#### 1.6 PREPARATION

- A. Examine the site thoroughly and determine the existing conditions and difficulty of work to be performed.
- B. Before commencing earthwork operations, determine that preparatory work has been completed.
- C. Perform field surveys required to accomplish the work.

#### 1.7 DEGREE OF COMPACTION

- A. Expressed as a percentage of the maximum dry density obtained by the test procedure presented in ASTM D1557 Modified Proctor Test.
- B. Abbreviated in this Specification as a percent of laboratory maximum dry density.

#### 1.8 UTILIZATION OF EXCAVATED MATERIALS

- A. Reuse satisfactory material removed from excavations, insofar as practical, in the construction of fills, subgrades and similar purposes.
- B. Dispose of unsatisfactory and excess materials removed from excavations in designated waste disposal or spoil areas.
- C. Do not dispose of any excavated material in such a manner as to be detrimental to the completed work.

#### 1.9 FIELD QUALITY CONTROL

- A. Quality control compaction testing of material placed in-the-dry during construction will be provided by the Contractor. The Project Engineer shall be



notified 48 hours prior to any excavation, fill, backfill, or compaction operations.

1. Permit the Project Engineer to observe all subgrades for each layer of fill or backfill. Additional fill or backfill should not be placed unless the Project Engineer has approved the subgrade and/or previous layer of fill.
  2. When required or requested by the Project Engineer, the Contractor shall provide field elevations of the compacted subgrade or fill layer.
- B. Compacted materials that are below specified density shall be re-compacted at no additional expense to the Owner.
- C. The Contractor shall bear the cost of removal of all unsuitable material placed without approval by the Project Engineer that fail to conform to the specifications.

## PART 2 - PRODUCTS

### 2.1 CRUSHED STONE

- A. CRUSHED STONE shall consist of one or the other of the following material:
1. Durable crushed rock consisting of the granular fragments obtained by breaking and crushing solid or shattered natural rock, and free from a detrimental quantity of thin, flat, elongated\*, or other objectionable pieces.  
 \*Thin or elongated pieces are defined as follows: Thin stones shall be considered to be such stones whose average width exceeds four (4) times their average thickness. Elongated stones shall be considered to be such stones whose average length is in excess four (4) times their average width.
  2. Durable crushed gravel stone obtained by artificial crushing of cobbles, boulders, or field stone with a minimum diameter before crushing of 8 inches.
  3. The crushed stone shall be reasonably free from clay, loam, or deleterious material and not more than 1.0% of satisfactory material passing a No. 200 sieve will be allowed to adhere to the crushed stone.
  4. Crushed stone shall be uniformly blended according to the following grading requirements:

SIEVE SIZE	PERCENT FINER BY WEIGHT	
	3/4 INCH CRUSHED STONE	1-1/2 CRUSHED STONE
1 1/2-Inch	--	100
1 1/4-Inch	--	85-100
1-Inch	100	--
3/4-Inch	90-100	10-40
1/2-Inch	10-50	0-8
3/8-Inch	0-20	--
No. 4	0-5	--
No. 200	<1	<1

- B. All crushed stone referred to on the Construction Drawings shall be 3/4-inch crushed stone unless otherwise specified.
- C. "1-1/2" crushed rock aggregate" referred to in the drawings shall be 1-1/2" crushed stone.

## 2.2 REVETMENT STONE

- A. No revetment stone shall be imported. Revetment stone shall be excavated from within the footprint of the existing revetment to be demolished and reused onsite to repair existing revetment to remain as required. Any/all unused revetment stone shall be hauled by the Contractor to the Town of Orleans DPW yard located at 40 Giddiah Hill Rd, Orleans, MA 02653. Approximate haul distance from site is 5.0 miles round trip.

## 2.3 COMMON FILL

- A. Common fill shall consist of sand, silt, gravel, or similar materials free from trash, topsoil, organic or compressible material, roots and vegetation. Stones, rock, brick, and concrete fragments not exceeding 6 inches in their largest dimension are acceptable provided they are not nested when placed for compaction and can be readily spread and compacted during filling. Common fill may be acceptable for use as backfill at the discretion of the Project Engineer, provided it can be placed and properly compacted.

## 2.4 SAND BEDDING FOR UTILITIES

- A. Sand Bedding shall be free from ice and snow, roots, sod, rubbish and other deleterious or organic material. Sand Fill shall be a well-graded, medium to coarse sand with a maximum diameter of 1/4 inch and less than 10% passing the # 200 sieve by weight. See fuel trenching requirements for backfill and bedding requirement of fuel piping.

# PART 3 - EXECUTION

## 3.1 PREPARATION

- A. Contact all utility companies and property owners which might have installations in the area to determine location of all utilities and structures.
- B. Protect above and below grade utilities which are to remain.
- C. Protect plant life, trees, lawns, and other features remaining as a portion of final landscaping.
- D. Protect benchmarks, existing structures, fences, sidewalks, paving, and curbs from excavation equipment and vehicular traffic.
- E. Implement temporary erosion control measures such as silt fencing, hay bales, sediment traps, etc. as required to minimize the effects of erosion and

sedimentation in excavations. Refer to Section 013550 ENVIRONMENTAL PROTECTION & Section 312500 EROSION AND SEDIMENTATION CONTROLS for additional requirements.

### 3.2 DISPOSAL

- A. Remove all unsuitable and organic materials (as determined by the Project Engineer) from the property and dispose offsite as required by local, State and Federal codes, rules and regulations. Remove existing foundations, demolition debris, abandoned utility piping, slabs, pavements, steel, sheeting, timber, floats, piles, and other debris encountered in areas of construction. Dispose of excess or unsuitable material as part of the Contract price.

### 3.3 DRAINAGE

- A. Direct surface water away from excavations, existing buildings, roadways and construction sites to prevent erosion and undermining of foundations.
- B. Provide diversion ditches, dikes and grading and maintain as required during construction.
- C. Protect excavated slopes and backfill surfaces to prevent erosion and sloughing.
- D. Perform excavation so that the site and the area immediately surrounding the site shall be continually and effectively drained.

### 3.4 DUST SUPPRESSION

- A. Project Engineer shall determine if dust generated at the site is significant enough to require dust suppression.
- B. Dust suppression shall require application of water by Contractor. Contractor shall at all times keep machinery, and a sufficient supply of water onsite to suppress dust generated at the site, as necessary.
- C. Contractor shall suppress dust as necessary throughout construction, and until vegetation or other surface treatments have been established, if necessary.
- D. Uniformly apply water to surface, subgrade or layer of soil material requiring dust suppression.

### 3.5 FILLING AND BACKFILLING IN-THE-DRY OR ABOVE MEAN HIGH WATER

- A. Material placement shall begin after approval of the subgrade by the Project Engineer.
- B. Use satisfactory materials to replace unsatisfactory materials.
- C. Place “Common Fill” or beneficial re-use material as backfill within the limits specified.
- D. Place satisfactory materials in horizontal layers not exceeding 24 inches in loose thickness where self-propelled or towed mechanical compaction equipment is

- used, or 12-inch loose lift thickness when hand-operated compactors are used.
- E. Do not begin backfilling until construction below finish grade has been approved and the excavation is clean of trash and debris.
  - F. Heavily surface compact subgrade in upland area with a minimum of 6 passes of a vibratory roller having a drum weight of at least 10,000 pounds and a dynamic force of at least 20,000 pounds prior to placing fill.
  - G. Subgrade shall be uniform throughout. There shall not be hard spots or soft spots.
  - H. Prevent free water from appearing on surface during or subsequent to compaction operations.
  - I. Soil material too wet to permit compaction to specified density shall be removed and replaced or scarified and air dried.
  - J. Place and compact fill and backfill to indicated finish grade within a tolerance of one foot horizontally and 1 inch vertically.
  - K. Do not place successive layers of earth fill material until the compaction requirements of the previous layer have been satisfied.
  - L. Maintain positive drainage on the surface of unfinished earth fills. Blade the unfinished surfaces smooth to a crown at the conclusion of each day's work.
  - M. Uniformly grade the finished earth fill surfaces such that they are smooth, compacted, and free from irregular surface changes.
  - N. Unless otherwise noted compact fill and backfill material to a minimum of 95 percent of the maximum dry density per ASTM D 1557 Modified Proctor.
  - O. Moisture control:
    - 1. Where subgrade or layer of soil material must be moisture-conditioned before compaction, uniformly apply water to surface of subgrade or layer of soil material as needed to obtain optimum moisture content.
    - 2. Remove and replace, or scarify and air dry, soil material that is too wet to permit compaction to specified density.
  - P. The Contractor shall use extra care when compacting adjacent to walls. Where walls are buried on both sides, backfill and compaction shall proceed on both sides of the wall so that the difference in top of fill level on either side of the wall shall not exceed two feet (2 ft.) at any stage of construction. Where backfill of a buried wall is only on one side, only hand-operated roller or plate compactor shall be used within a lateral distance of five feet (5 ft.) of back of wall.
  - Q. In freezing weather, a layer of fill shall not be left in an uncompacted state at the close of a day's operations. Prior to terminating operations for the day, the final layer of fill, after compaction, shall be rolled with a smooth-wheeled roller to eliminate ridges of soil left by tractors, trucks, and compaction equipment.
  - R. The Contractor shall not place a layer of fill on snow, ice or soil that was permitted to freeze prior to compaction. Removal of these unsatisfactory

materials will be required as directed by the Project Engineer.

3.6 MAINTENANCE

- A. Protect newly graded areas from traffic and erosion and keep free of trash and debris. Repair and reestablish grades in settled, eroded, and rutted areas to specified tolerances.
- B. Where completed compacted areas are disturbed by subsequent construction operations or adverse weather, remove to sound material, reshape, and compact to required density prior to further construction.

3.7 EROSION CONTROL

- A. Protect disturbed areas from erosion.
- B. Install Erosion Control measure as noted on the contract drawing.

3.8 DAMAGE

- A. Any damage resulting from excavation, backfill and compaction shall be repaired by the Contractor to the satisfaction of the Project Engineer and at the Contractor's expense.

END OF SECTION

SECTION 310519.13

GEOTEXTILE FABRIC

PART 1 - GENERAL REQUIREMENTS

1.1 SCOPE OF WORK:

The Work covered by this Section of these Specifications consists of furnishing all plant, labor, supervision, equipment, appliances, and materials and in performing all operations in connection with the installation of geotextile fabric. The primary function of the geotextile is filtration; all in strict accordance with this Section of the Specifications and the applicable drawings, and subject to the terms and conditions of the Contract.

1.2 QUALIFICATIONS

The filter fabric manufacturer shall have successfully manufactured 5,000,000 square feet of filter fabric.

1.3 SUBMITTALS

The Contractor shall provide the following information to the Project Engineer:

- A. Method of Placement Plan.
- B. List of material properties.
- C. Quality control certificate for the filter fabric, upon request.
- D. Certification: The contractor shall provide to the Project Engineer a certificate stating the name of the manufacturer, product name, style number, chemical composition of the filaments or yarns and other pertinent information to fully describe the geotextile. The Certification shall state that the furnished geotextile meets MARV requirements of the specification as evaluated under the Manufacturer's quality control program. The Certification shall be attested to by a person having legal authority to bind the Manufacturer.

PART 2 - PRODUCTS AND MATERIAL SPECIFICATIONS

2.1 MATERIALS

- A. Filter Fabric:
  - 1. Non-woven filter fabric shall be Mirafi 140N or approved equal and shall meet the criteria of Part 2.3 below unless otherwise noted on the Construction Drawings.

2. Woven filter fabric shall be Mirafi Filterweave FW-700 or approved equal and shall meet the criteria of Part 2.3 below unless otherwise noted on the Constructions Drawings.
3. Filter fabric for the infiltration chambers shall be in accordance with the manufacturer's recommendations.

**B. Geotextile:**

1. The geotextile shall be manufactured with fibers consisting of long-chain synthetic polymers composed of at least 95 percent by weight of polyolefins or polyesters. They shall form a stable network such that the filaments or yarns retain their dimensional stability relative to each other, including selvages.
2. Woven slit film geotextile (i.e., geotextile made from yarns of a flat, tape-like character) shall not be allowed.
3. The geotextile shall meet the requirements of Table 1. All numeric values in Table 1 except AOS represent MARV in the weakest principal direction. Values for AOS represent maximum average roll values.
4. Acceptable geotextiles are as follows:
  - a. Non-woven filter fabric shall be Mirafi 140N or approved equal and shall meet the criteria of Part 2.3 below.
  - b. Woven filter fabric shall be Mirafi Filterweave FW-700, or approved equal and shall meet the criteria of Part 2.3 below.
  - c. Filter fabric for the infiltration chambers shall be in accordance with the manufacturer's recommendations.

**TABLE 1 - SUBSURFACE DRAINAGE GEOTEXTILE**

<b>Property</b>	<b>Test Method</b>	<b>Units</b>	<b>Elongation &lt; 50%<sup>1</sup></b>
Grab Tensile Strength	ASTM D 4632	N (lbs)	1100 (247)
Sewn Seam Strength <sup>2</sup>	ASTM D 4632	N (lbs)	990 (222)
Tear Strength <sup>3</sup>	ASTM D 4533	N (lbs)	400 (90)
Puncture Strength	ASTM D 4833	N (lbs)	400 (90)

Burst Strength	ASTM D 3786	kPa (psi)	2700 (391)
Permittivity	ASTM D 4991	sec <sup>-1</sup>	0.2
Apparent Opening Size	ASTM D 4751	mm (U.S. Sieve)	0.25 max (60)
Ultraviolet Stability <sup>4</sup>	ASTM D 4355	%	50

<sup>1</sup> A measured in accordance with ASTM D 4632.

<sup>2</sup> When sewn seams are required.

<sup>3</sup> The required MARV Tear Strength for woven monofilament geotextiles is 250 N (56 lbs.).

<sup>4</sup> After 500 hrs.

C. Quality Control:

1. Use adequate numbers of skilled workmen who are thoroughly trained and experienced in the necessary crafts and who are completely familiar with the specified requirements and the methods needed for proper performance of the Work of this Section and qualified by the Geosynthetic Accreditation Institute (GAI) Laboratory Accreditation Program (LAP) and by the American Association for Laboratory Accreditation (A2LA).
2. The Owner reserves the right of approval of the subcontractor pre-qualified and selected for this portion of the Work by the Contractor. Approval will be based, in part, on documented successful experience in performing work of a similar nature.
3. Manufacturing Quality Control: Testing shall be performed at a laboratory accredited by GAI-LAP and A2LA for tests required for the geotextile, at frequency meeting or exceeding ASTM D 4354.
4. Geotextile properties, other than Sewn Seam Strength, Burst Strength, and Ultraviolet Stability shall be tested by NTPEP to verify conformance with this specification.
5. Sewn Seam Strength shall be verified based on testing of either conformance samples obtained using Procedure A of ASTM D 4354 or based on manufacturer's certifications and testing of quality assurance samples obtained using Procedure B of ASTM D 4354. A lot size for conformance or quality assurance sampling shall be considered to be the shipment quantity of the given product or a truckload of the given product, whichever is smaller.
6. Ultraviolet Stability shall be verified by an independent laboratory on the geotextile or a geotextile of similar construction and yarn type.



D. Product Delivery and Storage:

1. Geotextile labeling, shipment, and storage shall follow ASTM D 4873. Product labels shall clearly show the manufacturer or supplier name, style name, and roll number.
2. Each geotextile roll shall be wrapped with a material that will protect the geotextile from damage due to shipment, water, sunlight, and contaminants.

2.2 MANUFACTURER'S QUALITY CONTROL TESTING

- A. The filter fabric shall be tested by its manufacturer once every 100,000 square feet except for AOS and permittivity, which shall be tested once every 500,000 square feet and UV stability, which shall be per manufacturer historical data.
- B. Any rolls not meeting the requirements of the specification shall be rejected. The manufacturer shall prepare a quality control report to be submitted to the project Project Engineer upon request.

2.3 ADDITIONAL FILTER FABRIC CRITERIA

- A. The filter fabric must be permitted to function properly by allowing relief of hydrostatic pressure; therefore fine soil particles shall not be allowed to clog the filter fabric.
- B. The Contractor shall furnish the Project Engineer, in duplicate, manufacturer's certified test results showing actual test values obtained when the physical properties are tested for compliance with the specifications.
- C. During all periods of shipment and storage, the filter fabric shall be protected from direct sunlight, ultraviolet rays and temperatures greater than 140 degrees Fahrenheit. To the extent possible, the fabric shall be maintained wrapped in its protective covering. The filter fabric shall not be exposed to sunlight, ultraviolet rays until the installation process begins.
- D. Final acceptance of the filtration filter fabric by the Project Engineer shall be dependent upon the filter fabric performance when tested in accordance with ASTM D5101, Standard Test Method for Measuring the Soil-Geotextile System Clogging by the Gradient Ratio test or the Hydraulic Conductivity Ratio test. Soil characteristics such as grain size distribution and plasticity shall be determined for every 200,000 square feet of filter fabric installed or for each source of borrow material used during construction. Significant differences in soil characteristics shall require further performance testing by either the Gradient Ratio or the Hydraulic Conductivity Ratio tests at the discretion of the Project Engineer. The locations for which the material to be tested is extracted shall be approved by the Project Engineer. The Contractor shall provide the site-specific soil and modified proctor curves for the site-soil, at his own expense, to the manufacturer. Also, the contractor shall be responsible for the

performance of the test by a certified independent laboratory experienced in performing such test. The test shall be performed under the actual field soil conditions or as otherwise required by the Project Engineer.

- E. At the time of installation, the filter fabric shall be rejected if it has been removed from its protective cover for over 72 hours or has defects, tears, punctures, flow deterioration, or damage incurred during manufacture, transportation or storage. With the acceptance of the Project Engineer, placing a filter fabric patch over the damaged area prior to placing the mats shall repair a torn or punctured section of fabric. The patch shall be large enough to overlap a minimum of three (3) feet in all directions.
- F. In the event pre-assembled panels of fabric are required, the panels of filter fabric shall be sewn together at the manufacturer or another approved location.

### PART 3 - EXECUTION AND FILTER FABRIC INSTALLATION

#### 3.1 TRANSPORTATION AND ON-SITE STORAGE

The filter fabric rolls shall be wrapped in a plastic cover. The rolls shall be shipped to the job site in a manner not to damage the rolls.

#### 3.2 PREPARATION

Excavation shall be done in accordance with details of the project plans. In all instances excavation shall be done in such a way so as to prevent large voids from occurring. The graded surface shall be smooth and free of debris.

#### 3.3 METHOD OF PLACEMENT

The Contractor shall submit to the Project Engineer a plan describing a suitable method of placement for filter fabric. The subgrade shall be free of foreign and organic material, sharp objects, or debris of any kind, which could potentially damage the filter fabric. On side slopes, the rolls shall be deployed in the general direction of the maximum slope. The deployment equipment shall not damage the underlying subgrade. Filter fabric shall be properly secured. An extra layer of filter fabric may be required at the intersection of any two side slopes to cover the area where the panels are staggered. Contractor shall submit a proposed method for installing and securing filter fabric where it is placed within tidal or sub-tidal locations.

#### 3.4 INSTALLATION

- A. The geotextile shall be placed loosely with no wrinkles or folds, and with no void spaces between the geotextile and the ground surface. Successive sheets of geotextile shall be overlapped a minimum of 12-inches, with the upstream sheet overlapping the downstream sheet.

- B. In trenches equal to or greater than 12-inches in width, after placing the drainage aggregate the geotextile shall be folded over the top of the backfill material in a manner to produce a minimum overlap of 12-inches. In trenches less than 12-inches but greater than 4-inches wide, the overlap shall be equal to the width of the trench. Where the trench is less than 4-inches the geotextile overlap shall be sewn or otherwise bonded. All seams shall be subject to the review of the Project Engineer.
- C. Should the geotextile be damaged during installation or drainage aggregate placement, a geotextile patch shall be placed over the damaged area extending beyond the damaged area a distance of 12-inches, or the specified seam overlap, whichever is greater.
- D. Placement of drainage aggregate should proceed immediately following placement of the geotextile. The geotextile should be covered with a minimum of 12-inches of loosely placed aggregate prior to compaction. If a perforated collector pipe is to be installed in the trench, a bedding layer of drainage aggregate should be placed below the pipe, with the remainder of the aggregate placed to the minimum required construction depth.
- E. The aggregate should be compacted with vibratory equipment to a minimum of 95-percent Standard AASHTO density unless the trench is required for structural support.

### 3.5 FIELD SEAMING

On slopes, the spacing of ties across the roll end shall be 6-inches. The upper filter fabric flaps of the adjacent panels shall be heat-bonded or sewn on all sides in accordance with the project specification.

### 3.6 COVER MATERIAL

The filter fabric shall be covered as soon as possible. The covering operation shall not damage filter fabric. The cover soil material shall be free of foreign and organic material, sharp objects, or debris of any kind, which could potentially damage the filter fabric. No construction equipment or machinery shall operate directly on the filter fabric. The use of lightweight machinery (i.e., generator, etc.) with low ground pressure is allowed.

### 3.7 REPAIRS

All panels shall be inspected for damage. Any damaged area shall be repaired by a patch of the same material extending one foot beyond the edges of the damaged area.

END OF SECTION

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SECTION 312333

EXCAVATION, TRENCHING, AND BACKFILLING FOR UTILITY SYSTEMS

PART 1 - GENERAL

1.1 SECTION INCLUDES:

- A. Excavating trenches for buried utilities.
- B. Backfilling and compaction of trenches.

1.2 RELATED SECTIONS:

- A. Additional requirements for earthwork activities are specified in Section 15606 FACILITY FUEL SYSTEMS, Section 15607 UNDERGROUND STORAGE SYSTEM REMOVAL, Section 16050 REQUIREMENTS FOR ELECTRICAL INSTALLATIONS, Section 16111 CONDUIT SYSTEMS, Section 16450 GROUNDING AND BONDING FOR ELECTRICAL SYSTEMS, Section 310000 EARTHWORK, Section 310519.13 GEOTEXTILE FABRIC, Section 312500 EROSION AND SEDIMENTATION CONTROLS, Section 330500 COMMON WORK RESULTS FOR UTILITIES, Section 331000 WATER UTILITIES, Section 334000 STORM DRAIN, and Section 260000 ELECTRICALWORK.

1.3 CODES AND STANDARDS:

- A. ASTM D422-63(R90) Standard Test Method for Particle-Size Analysis of Soils
- B. ASTM D1557-91 Standard Test Method for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lb/ft (2700 kN-m/m))
- C. ASTM D2922-91 Standard Test Methods for Density of Soil and Rock in Place by Nuclear Methods (Shallow Depth)
- D. ASTM D3017-88 Standard Test Method for Water Content of Soil and Rock in Place by Nuclear Methods (Shallow Depth)

1.4 DEFINITIONS:

- A. Degree of Compaction:
  - 1. Expressed as a percentage of the maximum density obtained by the test procedure presented in ASTM D1557.
  - 2. Abbreviated in this Section as a percent of laboratory maximum density.

1.5 SUBMITTALS:

- A. Refer to other related sections stated above for additional submittal requirements.

#### 1.6 PROTECTION OF EXISTING STRUCTURES AND UTILITIES:

- A. Protect and support existing structures and utilities where adjacent excavation is likely to cause damage or settlement.
- B. Immediately report to Engineer any sewers, drainage, water lines, electric power, gas, telephone conduits or cables, or any other utility lines not indicated on the drawings that are encountered during excavation.

### PART 2 - PRODUCTS

#### 2.1 MATERIALS:

- A. Bedding and backfill material above the installed utility shall meet the requirements specified in the sections under Part 1.2 above.

#### 2.2 PLASTIC MARKING TAPE:

- A. Plastic Marking Tape:
  1. Acid and alkali-resistant polyethylene film.
  2. Provide tape type specifically manufactured for marking and locating underground utilities.
  3. Provide tape with the metallic core encased in a protective jacket or with other means to protect it from corrosion.

### PART 3 - EXECUTION

#### 3.1 EXCAVATION:

- A. General:
  1. Perform work in accordance with OSHA requirements.
  2. Perform excavation of trenches to the lines and grades indicated on drawings.
  3. During excavation, stockpile material satisfactory of backfilling in an orderly manner at a distance no closer than 2-feet.
  4. Provide grading that will prevent surface water from flowing into the excavation.
  5. Remove water accumulating in the excavation as necessary to maintain the stability of the bottom and sides of the excavation.
  6. Place and compact backfill material in accordance with Section 310000 EARTHWORK.
  7. Refer to the requirements specified in the sections under Part 1.2 above for additional information related to excavation, bedding, and backfilling.

- B. Trench Excavation:

1. Trench width and profile below the top of the buried commodity:
    - a. Conform to the buried commodity manufacturer's recommendations.
  2. Where manufacturer recommendations are not available, follow the guidelines on the Project Drawings. Give special attention to trench side slopes that may be adversely affected by weather or moisture content.
- C. Bottom Preparation:
1. Accurately grade the bottoms of trenches to provide uniform bearing and support of the bottom quadrant of each section of the pipe.
  2. Excavate bell holes to the required size at each joint or coupling to eliminate point bearing.
  3. Remove stones of 3-inches or greater in any dimension or as recommended by the pipe or cable manufacturer, whichever is smaller, to avoid point bearing.
- D. Removal of Unyielding Material: Where unyielding material is encountered in the bottom of the trench, remove material 4-inches below the required grade and replace with suitable materials.
- E. Removal of Unsuitable Construction Debris and Unstable Material: Where unsuitable construction debris or unstable material, as specified in Section 310000 EARTHWORK, is encountered in the bottom of the trench, remove material to the directed depth and replace to the proper grade with approved backfill material.

### 3.2 BEDDING AND BACKFILL:

- A. Bedding:
1. Place approved backfill material in 6-inch loose layers and mechanically compact to not less than the 90 percent laboratory maximum density.
  2. Minimum final compacted thickness: Four (4) inches.
- B. Backfill:
1. Place approved backfill material around and to a depth  $\frac{1}{2}$  of the diameter of the pipe or unless otherwise noted on the Construction Drawings.
  2. Spread material uniformly along each side of the pipe in 6-inch loose layers not exceeding 6-inches and compacted to 90 percent laboratory maximum density.

### 3.3 PLASTIC MARKING TAPE:

- A. Install plastic marking tape directly above the top of pipe.

### 3.4 TESTING AND INSPECTION:

- A. Visually inspect pipe joints for displacement or improper fit of the gasket material.
- B. Follow pipe and gasket manufacturer's recommendations for rejection due to non-water tightness of the joint.
- C. Remove and re-install defective sections of the pipe with rejected joints.
- D. The Contractor shall contact the Project Engineer when the pipe bedding is prepared. The Contractor shall conduct testing to determine the relative degree of compaction of trench backfill materials. The Contractor shall conduct soil density tests to determine the relative degree of compaction for pipe bedding and trench backfill materials. Contractor shall re-compact any soil that does not meet the minimum soil density. Soil density testing frequency will, at a minimum, be as follows:
  - 1. One test each 100 linear feet of trench backfill placed and compacted, or
  - 2. One test for each 250 cubic yards of trench backfill placed and compacted
  - 3. Not less than one test for each shift.
  - 4. Additional testing may be conducted at the Project Engineer's discretion.

3.5 PROTECTION FROM EROSION AND CONTROL:

- A. Implement temporary erosion control measures (i.e. silt fencing, hay bale sediment traps, etc.) to minimize the effects of erosion and sedimentation.
- B. Refer to Section 312500 EROSION AND SEDIMENTATION CONTROLS and Section 310519.13 GEOTEXTILE FABRIC for additional information.

END OF SECTION

SECTION 312500

EROSION AND SEDIMENTATION CONTROLS

PART 1 - GENERAL

1.01 DESCRIPTION

- A. The work in this Section includes the work necessary for the installation of any structures and measures for the prevention and control of soil erosion and runoff.
- B. The Contractor shall furnish all material, labor and equipment necessary for the proper installation, maintenance, inspection, monitoring, reporting, and removal (where applicable) of erosion prevention and control measures.

1.02 RELATED SECTIONS

- A. Not Used

1.03 REFERENCES

- A. Refer to Massachusetts Department of Transportation (MassDOT) Standard Specifications for Highways and Bridges (2020), where required.

1.04 REQUIREMENTS

- A. Runoff from all disturbed areas and sediment-laden groundwater encountered during trenching, boring or excavation must be routed through a silt control structure or sediment trapping device prior to discharge from the construction area and prior to entering a receiving stream or other water body.
- B. Acceptable sediment trapping devices include, but are not limited to silt fence, diversion berms and swales, inlet protection, check dams, silt basins, silt traps, stabilized construction entrances, and vegetative cover.
- C. Pump around flow diversions may be used when construction activity is required within a flowing stream, creek, ditch, or piped system.
- D. Stockpiles shall be located away from streams, ponds, swales, and catch basins. Soil stockpiles shall be seeded, mulched and contained through the use of approved perimeter controls.
- E. Temporary stabilized construction entrances must be used at access points where construction traffic will enter onto public roadways or streets. These are used to reduce



silt and mud tracking onto pavement. Construction rock entrances must be kept in good condition and may require cleaning, additional rock, or replacement. Any mud and silt tracked onto public roads must be removed immediately.

- F. The construction schedule adopted by the Contractor will impact the placement and need for specific devices required for the control of erosion and runoff. The Contractor shall develop and implement such additional techniques as may be required to minimize erosion and off-site sedimentation. The location and extent of erosion and sedimentation control devices shall be revised at each phase of construction that results in a change in either the quantity or direction of surface runoff from constructed areas. All deviations from the erosion and sedimentation control provisions shall have the prior written acceptance of the Engineer.
- G. Erosion and sediment controls shall be maintained during construction and then removed at the completion of construction, as required by the Project Engineer.
- H. Land disturbance activities are not authorized to begin until after all required erosion and sediment control permits are obtained. Contractor shall comply with requirements specified in the Contract Documents or as directed by the Project Engineer. Contractor shall also comply with all other laws, rules, regulations, ordinances and requirements concerning soil erosion and sediment control.

#### 1.05 SUBMITTALS

- A. Prior to commencement of work, the Contractor shall submit for approval, product data for perimeter controls, such as hay bales, silt fence, filter sock, coir log, or other sediment and erosion controls, along with a proposed work schedule, sequence of operations, and coordination of other work.
- B. The Contractor is responsible for meeting all the requirements of the relevant NPDES Permit for Construction Activities as described by Environmental Protection Agency (EPA). The Contractor shall determine the applicability of the aforementioned permit to the proposed project and develop a Stormwater Pollution Prevention Plan (SWPPP) based on guidance from EPA if required.
- C. Prior to commencement of work, the Contractor shall submit for approval:
  - 1. Potential erosion and sediment pollution problems and measures to be taken to control those problems.
  - 2. Erosion and sediment control practices to be employed are dependent on their location, size, maintenance requirements and design calculations.
  - 3. The schedule, phasing, and coordination of construction operations and erosion and sediment control practices.

## PART 2 - PRODUCTS

### 2.01 MATERIALS

- A. Materials for use in erosion and sedimentation control devices shall be in accordance with MassDOT's Standard Specifications for Highways and Bridges (2020) unless otherwise instructed by the Engineer.
- B. Acceptable sediment control devices include, but are not limited to, hay bales, silt fence, silt curtain, filter sock, coir log, erosion control blanket, seed and straw, check dams, turbidity curtain, etc. Sediment control devices shall be constructed in accordance with MassDOT's Standard Specifications for Highways and Bridges (2020), unless otherwise instructed by the Engineer. The sediment control methods and materials shall be approved, in writing by the Project Engineer, prior to commencement of work.

## PART 3 - EXECUTION

### 3.01 INSTALLATION AND MAINTENANCE

- A. Erosion and sedimentation control devices shall be established prior to clearing operations in a given area. Erosion and sediment control measures shall be applied to all disturbed areas. In addition, Contractor shall identify all site access, staging and stockpile areas in the field, and apply appropriate erosion and sediment control measures, prior to initiating any land disturbing activities.
- B. All sediment basins, trap embankments and slopes, perimeter dikes, swales and all disturbed slopes steeper than or equal to 3H:1V shall be stabilized with sod or seed and anchored straw mulch, or other approved stabilization measures, as soon as possible, but no later than 7 calendar days after establishment. All areas disturbed outside of the perimeter sediment control system must be minimized. Maintenance shall be performed as necessary to ensure continued stabilization. Requirement for stabilization may be reduced to 3 days for sensitive areas.
- C. The Contractor shall furnish the labor, materials and equipment required for routine maintenance of all erosion and sedimentation control devices. Maintenance shall include but not be limited to:
  - 1. The removal and satisfactory disposal of accumulated sediment from traps or silt barriers.
  - 2. Replacement of filter fabrics used for silt fences and stone used in temporary sediment traps, stone filters, and gravel construction entrances, etc.

### 3.02 INSPECTIONS AND MAINTENANCE

- A. Erosion and sediment control devices shall be inspected daily and within 24 hours after each rainfall event of 1/2 inch or more of precipitation. During inspection, the Contractor shall check for areas where runoff has breached, bypassed, or otherwise

caused the device to fail or compromise its function. If an erosion and sediment control device becomes ineffective due to weathering, decomposition or damage, then the Contractor shall replace the affected section immediately.

- B. Accumulated sediment must be removed when it reaches approximately 1/3 of the height of the silt fence or check dam.
- C. The Contractor shall take immediate action will be taken to correct deficiencies to Best Management Practices (BMP). The Project Engineer reserves the right to stop all construction activities not related to maintaining BMPs until such deficiencies are repaired.
- D. In areas that have been permanently stabilized, inspections and, if necessary, maintenance by Contractor, will occur at least once per month for the duration of the contract or project, whichever is longer.
- E. During inspections the following will be observed and appropriate maintenance procedures taken:
  - 1. The conformance to specifications and current condition of all erosion and sediment control structures.
  - 2. The effectiveness and operational success of all erosion and sediment control measures.
  - 3. The presence of sediments or other pollutants in storm water runoff at all runoff discharge points.
  - 4. If reasonably accessible, the presence of sediments or other pollutants in receiving waters.
  - 5. Evidence of off-site tracking at all locations where vehicles enter or exit the site.

### 3.03 REMOVAL OF TEMPORARY SEDIMENT CONTROL STRUCTURES

- A. At such time that temporary erosion and sediment control structures are no longer required under this item, the Contractor shall notify the Project Engineer of their intent, schedule for the removal of the temporary structures, and obtain the Engineer's approval in writing prior to removal.
- B. Once the Contractor has received written approval from the Project Engineer, the Contractor shall remove the temporary structures and all accumulated sediments.
- C. Final permanent stabilization will include finished grading per plan contours or the Engineer's approval.

\*\*\*END OF SECTION\*\*\*

SECTION 316216

STEEL SHEET PILES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Specifications sections, apply to the work of this section.

1.2 SUMMARY

- A. The work covered by this section of these Specifications consists of furnishing all plant, labor, supervision, equipment, appliances, and materials, and in performing all operations in connection with the installation of steel sheet piles for construction of the replacement bulkhead at the Commercial Wharf, all in strict accordance with this Section of the Specifications and applicable Contract Drawings and subject to the terms and conditions of the Contract.

1.3 QUALITY ASSURANCE

- A. Use adequate numbers of skilled workmen who are thoroughly trained and experienced in the necessary crafts and who are completely familiar with the specified requirements and the methods needed for proper performance of the Work of this Section.
- B. The Owner, through the Project Engineer, reserves the right of approval of the subcontractor pre-qualified and selected for this portion of the Work by the Contractor. Approval will be based, in part, on documented successful experience in performing work of a similar nature.
- C. Driving of additional piles at the Contractor's own expense may be required by the Engineer in the event tolerances are exceeded. Drive individual piles plumb within 2%, and in a manner that the completed wall appears vertical when viewed from any point.
- D. The Project Engineer may elect to observe the shop fabrication of the steel sheet piling. The Contractor shall provide the fabrication schedule and allow access for the Engineer to perform this task.
- E. The Project Engineer reserves the right to take samples from steel sheet pile material at the site for testing in order to verify compliance with the Specifications.

#### 1.4 SUBMITTALS

- A. Submit the pre-qualified list of subcontractors to the Project Engineer for review.
- B. Upon receipt of the Project Engineer's review of the pre-qualified subcontractor, promptly submit sufficient technical data on the equipment necessary to accurately measure and record pile penetration and capacity during the entire driving of each pile.
- C. Submit a detailed Work Plan for review by the Project Engineer that includes the following:
  - 1. Written description of the means and methods necessary to install the steel sheet piles plumb and straight and protect coating.
  - 2. Falsework layout and temporary bracing plan.
  - 3. Layout plan of steel sheet piles including shop drawings and bill of materials. Provide details of all corners and transitions.
  - 4. Shop drawings of all temporary shoring and falsework components including calculations that demonstrate the adequacy of such temporary work.
  - 5. Steel sheet piles shall not be installed until the work plan is reviewed and no exceptions are taken by the Project Engineer.
- D. Submit steel certificates for review by the Project Engineer no later than the time of delivery of materials to the site.
- E. Submit pile driving records including date of final installation, pile top elevation, and pile tip elevation within 24 hours of installation to the Project Engineer.
- F. Submit an As-built survey of pile locations to the Project Engineer.
- G. Submit welder's certificates certifying welders employed on the Work, verifying AWS qualifications within the previous twelve months to the Project Engineer.

#### 1.5 PRODUCT DELIVERY AND STORAGE

The Contractor shall notify the Owner and Project Engineer twenty-four (24) hours in advance of delivery of steel sheet piles. Contractor guarantees that steel sheet piles shall be handled in such a manner as to not induce stresses which will damage the materials and shall be stored in a safe manner within designated areas provided on the site.

### PART 2 - PRODUCTS

#### 2.1 STEEL SECTIONS

- A. Steel Sheet Pile

1. Steel sheet piling shall be as manufactured by Nucor Skyline, ArcelorMittal, JD Fields, or equivalent as accepted by the Project Engineer. Sections shall be as indicated on the Contract Drawings. Steel grade shall be ASTM A572  $f_y = 60$  ksi. Pile length(s) shall be determined by the contractor to minimum tip elevations as shown on the Drawings.
2. Subject to review of the Project Engineer, the Contractor may substitute higher section modulus piles at its option to facilitate driving at no additional cost to the Owner.
3. Steel sheet pile sections shall be shop fabricated by “hot-rolled” process. Steel sheet piles (referred to as “singles”) shall be shop fabricated from a single piece of stock which is formed into the completed unit by the hot rolling process. “Singles” may be shop assembled (into units referred to as “doubles”) after coating and prior to shipping to the site.

B. Welding – Special Conditions

1. Welding will be permitted only where specially fabricated pieces are required as shown on the Drawings, where field welds are scheduled, or where acceptable to the Engineer.
2. Welding shall conform to AWS D1.1 – Steel. Electrodes shall be in accordance with AWS A5.1 or A5.5.

## 2.2 PROTECTIVE COATING

Unless specifically noted on the Drawings, all steel piles shall be shop coated to a minimum of 10 feet below the design dredge depth elevation.

## 2.3 STEEL SHEET PILE PREPARATION

All holes are to be made in the piling prior to applying the epoxy coating detailed in Section 099713, Coating of Steel Waterfront Structures, with the exception of holes to accommodate pipe sleeves for outlets and ground anchors. Field cut holes shall be carefully performed at the required locations in such a manner as to minimize damage to the coating. On completion of the welding of pipe sleeves, all damage to the coating is to be made good in accordance with these Specifications and to the satisfaction of the Engineer.

## PART 3 - EXECUTION

### 3.1 EQUIPMENT

- A. Drive the piles with air, diesel, or vibratory hammers with sufficient energy and energy transfer characteristics to drive the piles to the required toe levels without crippling pile heads.

- B. Piles are to be located by temporary frames. The frames shall be rigidly located such as to keep the piles plumb and to line while being driven. Piles may be continuously or incrementally driven or driven singly or in pairs, as required to maintain the line and level of the completed bulkhead.
- C. Take precautions to avoid contact of coated pile surfaces with components of leads and/or falsework. Install timber rub strips or similar items at contact areas as may be required to reduce the potential for damage of the coating during driving. All damage to the protective coating shall be repaired at the Contractor's expense.
- D. Use suitable cushions or driving heads to avoid damage to the piles, developing proper total driving energy, and directing the energy along the longitudinal center of gravity of the pile.
  - 1. Drive sheet piles to their full penetration without bending, rupturing, or severely damaging the sheet piles.
  - 2. If failure in any of the above respects is encountered, pull the sheet pile, and drive a new pile at no additional cost to the Owner.

### 3.2 PILE DRIVING

- A. Drive the piles straight and true at indicated locations, with deviation from the longitudinal axis of not more than ¼ inch per foot.
- B. Provide the Engineer a complete driving log with the date of the final installation and tip elevation. This log shall be submitted weekly and signed by a representative of the Contractor.
- C. Plug all “lifting eye” holes in steel sheet piling.

### 3.3 OBSTRUCTIONS ENCOUNTERED IN SHEET PILE LOCATIONS

- A. All rocks, timbers, pile stubs, or other obstructions at the ground surface to within 5 feet of the mudline (either above or under water) which interfere with driving of piles shall be removed at no additional cost to the Owner.
- B. In the case of Z-Pile installations an apparent obstruction below the ground surface but above anticipated full depth, which prevents appreciable penetration of a sheet pile, the problematic condition will receive further consideration by the Project Engineer. Depending on the depth and resistance of the obstruction, the Project Engineer will make a decision whether to consider the sheet pile acceptable or order the obstruction removed, or drill a pile pin. The decision may be deferred until the driving of adjacent sheets indicates the obstruction to be isolated or extending over the area of several sheets.

END OF SECTION

SECTION 316216.13

STEEL PIPE PILES

PART 1 - GENERAL

1.1 DESCRIPTION OF WORK

Work included: The work covered by this section of these Specifications consists of furnishing all plant, labor, supervision, equipment, appliances, and materials and in performing all operations in connection with the installation of the steel pipe piles, all in strict accordance with this Section of the Specifications and the applicable Contract Drawings and subject to the terms and conditions of the Contract. The Work includes providing Wave Equation Analyses (WEAP) for each proposed pile hammer and pile type and confirmatory testing of capacity using a Pile Driving Analyzer (PDA).

1.2 QUALITY ASSURANCE

- A. Use adequate numbers of skilled workmen who are thoroughly trained and experienced in the necessary crafts and who are completely familiar with the specified requirements and the methods needed for proper performance of the Work of this Section.
- B. The Owner reserves the right of approval of any Subcontractor pre-qualified and selected for this portion of the Work by the Contractor. Approval will be based, in part, on documented successful experience in performing work of a similar nature.
- C. Driving of additional piles at the Contractor's own expense may be required by the Project Engineer in the event installation tolerances are exceeded.
- D. The Owner and/or Project Engineer may perform shop inspections during the fabrication of the steel piles. The Contractor shall provide necessary detail on his project schedule and keep the Owner and Project Engineer informed as to progress of this work (minimum of one week notice).

1.3 SUBMITTALS

- A. Submit technical data for all pile driving equipment proposed for use and a Wave Equation Analysis (WEAP) for the proposed pile and driving equipment. The Wave Equation shall be used to assess the ability of the proposed driving system to install the pile within the allowable driving stresses.
- B. No later than the time of delivery of materials to the site, submit steel certificates for review.
- C. Submit plan for performing testing using a Pile Driving Analyzer (PDA) including PDA equipment specifications, access to preliminary field PDA results to the Project Engineer during driving, and a formal PDA report with CAPWAP analysis



for each pile tested.

- D. Submit pile driving log for each pile driven with recorded blows per inch for the last one foot of driving and blows per foot for the remainder of the driven length. Log should indicate all pertinent data related to the pile driving activity.
- E. Submit details for shop splices in piles, if used.
- F. Provide a minimum of five (5) days notice to the Project Engineer prior to driving any piles. Notify the Project Engineer of any changes in the schedule.

#### 1.4 PRODUCT DELIVERY AND STORAGE

The Contractor shall notify the Owner and Project Engineer twenty-four (24) hours in advance of delivery of steel piles. Contractor guarantees that steel piles shall be handled in such a manner as to not induce stresses which will damage the materials and shall be stored in a safe manner within designated areas provided at the site.

### PART 2 - PRODUCTS

#### 2.1 STEEL SECTIONS

##### A. Steel Pipe Pile:

The steel pipe pile size and material shall be as specified on the Contract Drawings or equivalent as accepted by the Project Engineer. Steel material shall be ASTM A252, Grade 3 with a minimum  $F_y = 50$  ksi. Pile length shall be as required by the Contract Drawings.

Other acceptable pipe pile materials are API 5LX52, 60, 65, 70, ASTM A572 Gr. 50, 55, 60, 65, ASTM A588, ASTM A690, and ASTM A1018. These last three with 50 ksi steel strength.

Pipe piles shall have a minimum wall thickness as noted on the Contract Drawings.

- B. Welding shall conform to AWS D1.1 Structural Welding Code – Steel.
- C. Protective Coating

Pipe piles shall be shop coated, on outer surfaces only, to a minimum of ten (10) feet below the design dredge depth elevation. Protective coating shall conform to Section 099713 Coating of Steel Waterfront Structures.

#### 2.2 SPLICES

- A. Submit detail drawings of shop and field splices prior to fabrication.
- B. Perform all welding in accordance with the requirements for shield metal arc

welding of AWS D1.1. Submit welding procedure for shop splices and verification of welder certification and qualifications. Make no more than one field splice per 60 feet of pile, unless directed by the Project Engineer. Fabrication drawings must show all shop splices.

- C. Splice sections of pipe with an approved full penetration butt or single bevel-groove weld. Both pipe ends must be square cut and seated to bear. Use an approved jig or alignment device during welding to maintain the required straightness of pipe.
- D. Field splices must be minimized or eliminated if possible. No splices will be allowed in the top 25-feet of pile to eliminate coating vulnerability. For splices made during pile installation, rigid frame pile leads may be used as a jig in a manner approved by the Project Engineer.

### PART 3 - EXECUTION

#### 3.1 EQUIPMENT:

- A. Drive piles with an air, diesel, or hydraulic operated impact hammer with sufficient energy and energy transfer characteristics to drive the piles to the required toe elevations and capacity without damaging the pile head. Use care not to injure piles by over driving as would be indicated by rebound of hammer or staggering of pile. Cut off heads of piles accurately in accordance with the Contract Drawings after completion of driving and acceptance by the Project Engineer.
- B. Rig the pile driver with fixed leads to guide the hammer from highest to lowest points of travel in a manner permitting free vertical movements of the hammer, and with leads laterally braced to assure firm support of the piles during driving.
- C. The pile is to be located by temporary frames containing members of adequate size to guide and stabilize placement of the pile prior to and during driving. The frames shall be rigidly located such as to keep the pile plumb and in correct position while being driven.

#### 3.2 PILE DRIVING

- A. Drive the piles straight and true at indicated locations, with deviation from the longitudinal axis of not more than 1/4-inch per foot.
- B. Locate the piles within 3-inches of the positions indicated on the Contract Drawings.
- C. Continuously drive each pile to reach the capacity and/or full embedded length called for on the Contract Drawings.
  - 1. Lengths shown on the Contract Drawings are considered average values, and the actual lengths may vary when so accepted by the Project Engineer.

2. Drive piles to achieve driving resistance penetration and refusal values as specified and as accepted by the Project Engineer.
- D. Use suitable cushions or driving heads to avoid damage to the piles, developing proper total driving energy, and directing the energy along the longitudinal center of gravity of the pile.
1. Drive piles to their full penetration without bending, rupturing, or severely damaging the piles.
  2. If failure in any of the above respects is encountered, pull the pile, and drive a new pile at no additional cost to the Owner.
  3. If a replacement pile fails to develop full driving resistance, pull the replacement pile, and drive a new pile with larger diameter at no additional cost to the Owner.
- E. Jetting and Pre-drilling
1. Jetting to assist penetration will not be accepted unless authorized by the Project Engineer.
  2. Approved pre-drilling to assist penetration may be used where extreme driving resistance is encountered, or where vibrations from driving may be detrimental to adjacent structures.
  3. Make pre-drilled bores 80% of tip diameter and to 80% of the depth of penetration, reserving the lower phases of penetration solely for driving.
- F. Where piles are pushed up by pressure from driving of adjacent piles, re-drive as required and at no additional cost to the Owner.
- G. Record pile driving information, including date of installation, pile number, pile type and installed length, type of hammer and rated energy, date of installation, blow counts or minutes per driven foot/inch, and final tip elevation.

### 3.3 SAFE LOAD CALCULATION

Calculate ultimate pile capacity using WEAP analysis, PDA testing, and blow count observations. The working load will be the ultimate pile capacity divided by a factor of safety of 2.5.

### 3.4 HANDLING, CUTTING AND FRAMING

Handle piles carefully, without sudden dropping or excessive bending.

### 3.5 LENGTH AND LOAD REQUIREMENTS

Required tip elevations and/or minimum ultimate load capacities are as indicated on the Contract Drawings.

### 3.6 FIELD SPLICES

- A. Field splices shall be performed only when accepted by the Project Engineer.
- B. All field splices shall be visually inspected and tested.
- C. Contractor shall engage an independent testing agency to observe the production piles installation. The testing agency must be qualified according to ASTM E329 for testing indicated. Submit testing agency qualifications to the Engineer for review and acceptance.
- D. Contractor shall employ a testing agency to perform the welding inspections as required by Code.
- E. In addition to visual inspection, 100 percent of the welds must be tested and inspected according to AWS D1.1 and inspection procedures listed below:
  - a. Magnetic Particle Inspection
  - b. Ultrasonic Inspection

### 3.7 OBSTRUCTIONS ENCOUNTERED IN PIPE PILE LOCATIONS

- A. All rocks, timbers, pile stubs, or other obstructions at the ground surface to within 5 feet of the mudline (either above or under water) which interfere with driving of piles shall be removed at no additional cost to the Owner.
- B. In the case of an apparent obstruction below the ground surface but above anticipated full depth, which prevents appreciable penetration of a steel pile, the abnormal condition will receive further consideration by the Project Engineer. Depending on the depth and resistance of the obstruction, the Project Engineer will decide whether to consider the steel pile acceptable or order the obstruction removed. The decision may be deferred until the driving of adjacent piles indicates the obstruction to be isolated or extending over the area of several piles. If necessary, removal of obstructions 5 feet or less below the ground surface shall be performed by the Contractor at no additional cost to the Owner.

**END OF SECTION**

SECTION 316219

TIMBER PILES

PART 1 - GENERAL

1.1 DESCRIPTION OF WORK

Work included: The work covered by this section of these Specifications consists of furnishing all plant, labor, supervision, equipment, appliances, and materials and in performing all operations in connection with the installation of the timber piles, all in strict accordance with this Section of the Specifications and the applicable Contract Drawings and subject to the terms and conditions of the Contract.

1.2 QUALITY ASSURANCE

- A. Use adequate numbers of skilled workmen who are thoroughly trained and experienced in the necessary crafts and who are completely familiar with the specified requirements and the methods needed for proper performance of the Work of this Section.
- B. The Owner reserves the right of approval of the subcontractor pre-qualified by the Contractor and selected for this portion of the Work by the Contractor. Approval will be based, in part, on:
  - 1. Documented successful experience in performing work of a similar nature.
  - 2. Acceptable schedule of unit prices for measurement and payment in event of changes in the work of this section.
- C. Use only piles sufficiently straight that the center line of the pile at any cross section does not vary more than 2 inches from a straight line from the center of the butt to the center of the tip of the pile when the pile is supported plumb, on the tip. Drive piles within 3 inches of design location. Driving of additional piles at the Contractor's own expense may be required by the Owner in the event this tolerance is exceeded. Drive piles plumb within two percent tolerance.

1.3 SUBMITTALS

- A. The Contractor shall submit sufficient technical data on the equipment necessary to accurately measure and record pile penetration and capacity during the entire driving of each pile. Descriptions of pile driving equipment, including hammers, power packs, driving helmets, cap blocks, pile cushions, crane capabilities and driving leads, and extractors shall be submitted for approval at least 15 days prior to commencement of work. Descriptive information includes manufacturer's name, model numbers, and capacity, rated energy, hammer details, cushion material, helmet and templates. The results of the initial wave equation analysis

using GRLWEAP or equivalent performed in selecting pile-driving equipment shall be submitted with descriptions of pile driving equipment. The GRLWEAP or equivalent analysis shall include a drivability analysis, relationship between blow count and capacity, or assessment of energy transferred to the pile and an analysis of driving stresses in the pile during driving for the provide geotechnical information. The pile and driving equipment form shall be used to submit the required data.

- B. No later than the time of delivery of materials to the site, submit certificates as to conformance with the specified species and grade prior to installation of any timber piles.

#### 1.4 PRODUCT DELIVERY AND STORAGE

The Contractor shall notify the Owner and Project Engineer twenty-four hours in advance of delivery of piles.

### PART 2 - PRODUCTS

#### 2.1 TIMBER PILES

- A. Use Greenheart piles in compliance with ASTM-D25 with the following minimum dimensions for all fender, berth, and float piles:

Butt circumference (measured at 3' below butt) per ASTM D25 Table 1

Tip circumference = 25" (measured at top)

Tip diameter = 8" (measured at tip)

Use piles free from defects which may impair strength, durability, or drive ability. Cut from solid, sound line, closed grained trees, free from injurious rings and large unsound knots or decay. Use trees that have a uniform straight taper from butt to tip.

- B. All pier plumb and batter piles shall be southern yellow pine, CCA treated to a density of 2.5 pounds per cubic foot
- C. Trim knots close to the body of the pile.
  - 1. Inspect butts to assure they are cut perpendicular to the longitudinal axis of the pile.
  - 2. Chamfer butt edges.
  - 3. Provide butts with caps, collars, or bands to prevent brooming or splitting from driving pressure.

## PART 3 - EXECUTION

### 3.1 SITE CONDITIONS

Withdraw piles that encounter underground obstructions sufficient to impede pile driving. Redrive as close as possible to original position, subject to review of the Project Engineer. Remove piles which split, broom, break or drive out of line. Drive another pile in its place. Provide and maintain necessary lighting and barriers to adequately assure public safety. Provide adequate safeguards to protect from damage improvements on the work site and on adjacent properties.

### 3.2 EQUIPMENT

- A. Drive piles with a vibratory, air or diesel operated hammer with sufficient energy and energy transfer characteristics to drive the piles to the required capacity and/or minimum tip elevation as shown on the Contract Drawings and without damaging the pile head. Use care not to injure piles by over driving as would be indicated by rebound of hammer or staggering of pile. Cut off heads of piles accurately in accordance with the Contract Documents after completion of driving and after acceptance by the Project Engineer.
- B. Rig the pile driver with hanging or fixed leads to guide the hammer from highest to lowest points of travel in a manner permitting free vertical movement of the hammer, and with the leads laterally braced or cabled to assure firm support of the piles during driving.
- C. It is the intention of this contract that all new piles will be installed using an appropriately sized vibratory and impact pile hammers. The Contractor shall install false work as necessary to ensure that the piles are driven in proper alignment. The Contractor shall select the proposed pile driving equipment as specified using a wave equation analysis program such as GRLWEAP or equivalent and submit descriptions of the proposed equipment for approval. Equipment approval will be based on wave equation analysis and the engineering judgment of the Project Engineer. Stresses predicted by wave equation analysis shall not exceed 3 times the design stress of the timber pile. Final approval of the proposed equipment is subject to the satisfactory completion and approval of pile tests. Changes in the selected pile driving equipment will not be allowed after the equipment has been approved by the project engineer except as directed by the project engineer. No additional contract time will be allowed for Contractor proposed changes in the equipment.

### 3.3 PILE DRIVING

- A. Drive the piles straight and true at indicated locations, with deviation from the longitudinal axis of not more than 1/4 inch per foot or 2%.
- B. Locate the piles within 3 inches of the positions indicated on the Contract

Drawings.

- C. Continuously drive each pile to reach the capacity and/or full embedded length called for on the Contract Drawings.
  - 1. Lengths shown on the Contract Drawings are considered average values, and the actual lengths may vary when so accepted by the Project Engineer.
  - 2. Provide driving resistance penetration and refusal values as accepted by the Project Engineer.
  
- D. Use suitable cushions or driving heads to avoid damage to the piles, developing proper total driving energy, and directing the energy along the longitudinal center of gravity of the pile.
  - 1. Drive piles to their full penetration without bending, rupturing, or severely damaging the piles.
  - 2. If failure in any of the above respects is encountered, pull the pile and drive a new pile at no additional cost to the Owner.
  - 3. If a replacement pile fails to develop full driving resistance, pull the replacement pile, and drive a new pile with larger diameter at no additional cost to the Owner.
  
- E. Jetting and Pre-drilling
  - 1. Jetting to assist penetration will not be permitted unless authorized by the Project Engineer.
  - 2. Pre-drilling will not be permitted unless authorized by the Project Engineer, whereby approved pre-drilling to assist penetration may be used where extreme driving resistance is encountered, or where vibrations from driving may be detrimental to adjacent structures.
  
- F. Where piles are pushed up by pressure from driving of adjacent piles, re-drive as required and at no additional cost to the Owner.
  
- G. The Contractor shall provide the Project Engineer with a complete driving record with the date of final installation and tip elevations. This record shall be submitted weekly and signed by a representative of the Contractor. The Contractor shall keep an accurate set of pile records indicating pile number, pile type and installed length, type of hammer and rated energy, date of installation, final tip elevation, and contractor's representative name and signature.

### 3.4 SAFE LOAD CALCULATION

Calculate "Safe Load" by Project Engineering News Formula as follows:



Formula:  $P = \frac{2WH}{S+C}$  (single acting or drop hammer)

$S+C$

$P = \frac{2E}{S+C}$  (double acting hammer)

$S+C$

Where:  $P$  = Safe Load (pounds)

$W$  = Weight of striking parts (pounds)

$H$  = Height of stroke (feet)

$S$  = Average penetration of pile (inches per  
blow of hammer) for last 5 blows

$C = 0.10$  (single and double acting hammers)

$C = 1.0$  (drop hammer)

$E$  = Rated energy by manufacturer (foot-pounds)

Where appropriate, the term "WH" shall be modified to account for any inclination of the hammer required to drive the battered piles.

### 3.5 HANDLING, CUTTING AND FRAMING

Handle timber piles carefully, without sudden dropping, breaking of outer fibers, bruising or penetrating the surface with tools.

**END OF SECTION**

SECTION 316813

SOIL AND ROCK ANCHORS

PART 1 - GENERAL

1.1 DESCRIPTION OF WORK

Work included: The work covered by this section of these Specifications consists of furnishing all plant, labor, supervision, equipment, appliances, and materials and in performing all operations in connection with the installation of the soil and/or rock anchors, all in strict accordance with this Section of the Specifications and the applicable Contract Drawings and subject to the terms and conditions of the Contract. The Contractor is responsible for furnishing of all design, materials, products, accessories, tools, equipment, services, transportation, labor, supervision, and manufacturing techniques required for design. The Contractor shall select the soil/rock anchor type, size, and installation means and methods, estimate the ground-grout bond value, and determine the required bond length and final soil/rock anchor diameter. The Contractor shall design and install soil/rock anchors that will develop the load capacities indicated on the Contract Drawings. The soil/rock anchor load capacities shall be confirmed by verification and performance/proof load testing as required and must meet the test acceptance criteria specified herein.

1.1.1 Provide the design of the soil/rock anchor system that will be completely the Contractor's responsibility. General design criteria are shown on the Contract Drawings. The materials, design, stressing, load testing, and acceptance must be in accordance with PTI Recommendations for Prestressed Rock and Soil Anchors, and these specifications.

- a. Soil/Rock anchors may be threaded bar or strand type. The Contractor is responsible for the design of the anchor and bearing plate, determining drilling methods, and determining hole diameter and bond length. Submit design computations and data for the soil/rock anchors, bearing plates, and bond zones.
- b. Include computations with drawings, design assumptions, calculations, and other information in sufficient detail to verify the design proposed. The design must be certified by a registered professional engineer in the state of Massachusetts with proven experience in design of soil/rock anchor calculations for the stressing frames.
- c. Acceptance of the design calculations by the Project Engineer will not relieve the Contractor of responsibility for unsatisfactory performance of the installed soil/rock anchors. Furnish all design computations at least 30 calendar days prior to the proposed commencement of drilling. The complete design, including design computations, fabrication and installation drawings and installation plan, must be certified by registered Professional Engineer and must be submitted for approval.

- d. Submit a plan for installing the soil/rock anchors for review and comment. The proposal must describe the sequence for installation and other restrictions as outlined on the Contract Drawings or as specified. Determine the anchor installation procedure as part of the anchor design. Include the installation plan with descriptions of methods and equipment to be used for alignment checking of anchor holes.

#### 1.1.2 Design Load

The Design Load must not exceed 60 percent of the ultimate strength of the prestressing steel. The Lock Off Load must not exceed 70 percent of the ultimate strength of the prestressing steel. The maximum Test Load must not exceed 80 percent of the ultimate strength of the prestressing steel. The designer should include consideration of group effect of closely spaced anchors when determining design load and minimum spacing. Design the bearing plates so that the bending stresses in the plate do not exceed the yield strength of the steel when a load equal to 95 percent of the minimum specified ultimate tensile strength of the prestressing steel is applied and so that the average bearing stress on the structure does not exceed 3500 psi.

#### 1.1.3 Design Schedule

Submit a design schedule for the anchors which includes the following:

- a. Anchor number.
- b. Anchor design load.
- c. Type and size of tendon.
- d. Minimum total anchor length.
- e. Minimum bond length.
- f. Minimum tendon bond length.
- g. Minimum unbonded length.
- h. Details of corrosion protection, including details of anchorage and installation.
- i. Submit the design schedule at least 30 days prior to commencement of work on the anchors covered by the schedule.

### 1.2 SITE CONDITIONS

A sub surface investigation has been conducted at the site and boring data is provided in **Attachment A**. While the soil information is representative of subsurface conditions at

the respective locations, local variations in the characteristics of the subsurface materials may be anticipated. Local variations which may be encountered include, but are not limited to, classification and thickness of rock strata, fractures, and other discontinuities in the rock structure, and variation in the soil classifications. Such variations will not be considered as differing materially within the purview of the contract clauses. The contractor is responsible for verifying the location of all utilities that may be affected by construction or the installation of the anchors.

### 1.3 SUBMITTALS

Contractor shall submit the following in compliance with Section 013000 Submittal Procedures:

Fabricator Qualifications.

Installer Qualifications.

Fabrication and Installation Shop Drawings.

Equipment Data.

Designer Qualifications.

Installation Plan.

Design Computations.

Anchor Design.

Design Schedule.

Prestressing Steel Test Reports.

Cement Grout Mixture Proportions.

Prestressing Steel Certificates.

Cement Certificate.

Bearing Plates Certificate.

Corrosion Inhibiting Compound Certificate.

Driller Logs.

Anchor Records.

### 1.5 DELIVERY, STORAGE, AND HANDLING

Materials must be suitable wrapped, packaged, or covered at the factory or shop to prevent being affected by dirt, water, oil, grease, and rust. Protect materials against abrasion or damage during shipment and handling. Place materials stored at the site above ground on a well-supported platform and covered with plastic or other approved material. Protect material from adjacent construction operations. Grounding of welding leads to prestressing steel will not be permitted. Reject and remove from the site prestressing steel, which is damaged by abrasion, cuts, nicks, heavy corrosions, pitting, excessive heat, welds, or weld splatter. Inspect tendons prior to insertion into anchor holes for damage to corrosion protection. Repair any such damage in a manner recommended by the tendon manufacturer and approved by the Project Engineer. Lifting of pre-grouted tendons must be to manufacturer's recommendations and not cause excessive bending, which can debond the prestressing steel from the surrounding grout.

## PART 2 - PRODUCTS

### 2.1 MATERIALS

#### 2.1.1 Prestressing Steel

Submit certified test reports for each heat or lot of prestressing steel with materials delivered to the site. Submit mill reports and certificates from the manufacturer stating chemical properties, ultimate strengths, yield strengths, modulus of elasticity, and any other physical properties needed for the required computations for the steel type of steel furnished.

##### 2.1.1.1 High Strength Steel Bars

High strength steel bars shall be in compliance with ASTM A722.

##### 2.1.1.2 Epoxy-Coated Steel Bars

Submit written certification for coating material and coated bars with the delivery of bars.

##### 2.1.1.3 Steel Bar

Steel bars shall be in compliance with ASTM 615 Gr. 100.

##### 2.1.1.4 Strand

Steel strand shall be in compliance with ASTM A416, Gr. 270, low relaxation strand.

### 2.2 Manufactured Units

#### 2.2.1 Anchor Head

Anchor head must consist of steel bearing plate with wedge plate and wedges for

strand anchors or steel bearing plate with nut for bar anchors, trumpet, and corrosion protection.

Anchorage devices must be capable of developing 95 percent of the guaranteed ultimate strength of prestressing steel.

#### 2.2.2 Prestressing Steel Couplers

Prestressing steel couplers for bars must be capable of developing 100 percent of the minimum specified ultimate tensile strength of the prestressing steel. Splicing of strand will not be permitted.

#### 2.2.3 Centralizers and Spacers

Fabricate centralizers and spacers from plastic, steel, or other approved material which is non-detrimental to the prestressing steel.

#### 2.2.4 Casing

Casings must be steel pipe or steel tube in compliance with ASTM A53 or ASTM A500. Casing must be the necessary type and size to permit proper drilling of anchor holes and placing of anchors as specified herein and shown on the Contract Drawings.

#### 2.2.5 Anchorage Covers

Fabricate anchorage covers from steel or plastic. The material used must not be subject to attack by cement, corrosion-inhibiting greases, or the environment. If plastic is used, it must not be susceptible to ultraviolet light degradation. Securely attach the cover to the bearing plate. If the cover is to be grease filled, the cover must form a permanent watertight enclosure for the anchorage device.

### 2.3 GROUT

#### 2.3.1 Cement

Cement shall comply with ASTM C150 and be type I or II.

#### 2.3.2 Water

Provide fresh, clean, potable water free from injurious amounts of sewage, oil, acid, alkali, salts, or organic matter.

#### 2.3.3 Aggregates

Fine aggregates for sand-cement grout must conform to ASTM C33. Aggregates must not contain substances which may be deleteriously reactive with alkalis in the cement.

#### 2.3.4 Admixtures

Admixtures which control bleed, improve flowability, reduce water content and retard set may be used in the grout subject to the acceptance of the Project Engineer. Any admixture used must be compatible with the prestressing steel and must be mixed in accordance with the manufacturer's recommendations.

### PART 3 - EXECUTION

#### 3.1 DRILLING HOLES

##### 3.1.1 General

Drill holes at the locations and inclinations shown and the depths and diameter determined by the Contractor to provide the design bond length and capacity indicated on the drawings. The locations of the holes may be changed only as approved by the Project Engineer. Any redesign of the anchored structure due to relocation of anchor holes must be performed by the Contractor and reviewed/accepted by the Project Engineer. Take care while drilling to avoid damage of any kind to the existing structures. Damages of any nature will be evaluated by the Project Engineer and repairs or replacements must be made as required.

##### 3.1.2 Drilling Through Existing Structure

Drill holes through existing structure by core drilling equipment to prevent damage to the surrounding structure. The contractor is advised that foreign material, including metals and other materials remaining from original construction of the existing structure, may be encountered during drilling through existing structures.

##### 3.1.3 Drilling in Soil

Holes in soil may be drilled by rotary drilling, rotary percussive, or vibratory driven casing. Holes in soil must be provided with steel casing where required for support of the surrounding material.

##### 3.1.4 Drilling in Rock

Holes in rock may be drilled by core drilling, rotary drilling, percussion drilling or down-the-hole hammer using equipment suitable for the intended purpose. The drilling method must not cause structural damage to existing structures.

#### 3.2 INSTALLATION OF ANCHORS

##### 3.2.1 General

The Contractor is responsible for each drilled hole until the anchor has been installed, grouted, stressed, and accepted. Holes in rock and casings must be

cleaned by pressurized air and/or water to remove drill cuttings and mud.

### 3.2.2 Placing

All the equipment used in handling and placing the anchors must be such that it does not damage or deteriorate the prestressing steel, corrosion protection, or the anchorages. Each anchor must be inspected prior to insertion into the hole. Any damage to corrosion protection must be repaired prior to insertion or, if determined by the Project Engineer to be not repairable, the anchor must be replaced.

### 3.2.3 Grouting of Soil Anchors

Grout placement within the bond length must proceed such that the hole is filled in a manner to prevent air voids. The soil anchor hole must be progressively filled with grout and maintained completely full, from bottom to top of the bond zone, until the grout has set. Grouting of a soil anchor hole must be performed within 48 hours of the time the hole is drilled. Grouting may be accomplished through the casing pipe, grout tubes, hollow-stem augers or hollow drill rods.

#### Grout Testing

Take two sets of grout cubes for testing compressive strength for each day that anchors are grouted. Each set shall consist of three cubes, one tested at 7 days and two tested at 28 days. The grout cubes shall be made, handled, cured and tested in accordance with ASTM C109, with the exception that the grout should be restrained from expansion by a top plate.

### 3.2.4 Anchorage Installation

The bearing plate and anchor head must be installed perpendicular to the tendon, within 3 degrees, and centered on the tendon without bending of the stressing steel.

## 3.3 STRESSING

### 3.3.1 General Requirements

After the anchor grout has reached sufficient strength, as verified by grout cube break, the anchors must be stressed. Prior to stressing, surfaces upon which the stressing equipment is resting must be clean and the stressing equipment must be aligned as nearly with the center of the hole as possible. An alignment load of 10 percent of the design load must be applied to the anchor prior to setting dial gauges. All stressing must be done in the presence of a representative of the Owner's Project Engineer.

### 3.3.2 Lock-off

After completing of all required tests, the load must be returned to the alignment load and the specified lock-off load must be applied to the anchor. A lift-off test



must be made to verify the load in the anchor tendon before the tendon is locked-off and the stressing equipment is removed. The lift-off reading must be within five percent of the specified lock-off load. If the lift-off reading is not within five percent of the specified lock-off load, the anchorage will be reset, and another lift-off reading must be made. This procedure must be repeated until a satisfactory lift-off reading is obtained.

### 3.4 FIELD QUALITY CONTROL

#### 3.4.1 Performance Test

Performance test must consist of cyclically and incrementally loading and unloading the anchor and must be conducted in accordance with PTI Recommendations for Prestressed Rock and Soil Anchors.

#### Performance Test Steps

Load	Total Movement at load cycle Maximum	Residual Movement at AL after cycle Maximum	Elastic Movement at load cycle Maximum
AL 0.25 DL	dt1		dt1-dr1=de1
AL 0.25 DL 0.5 DL	dt2	dr1	dt2-dr2=de2
AL 0.25 DL 0.5 DL 0.75 DL	dt3	dr2	dt3-dr3=de3
AL 0.25 DL 0.5 DL 0.75 DL 1.0 DL	dt4	dr3	dt4-dr4=de4
AL 0.25 DL 0.5 DL 0.75 DL 1.0 DL 1.2 DL	dt5	dr4	dt5-dr5=de5
AL 0.25 DL 0.5 DL 0.75 DL 1.0 DL		dr5	

1.2 DL 1.33 DL	dt6 test load (zero reading for creep test) dtn final load Hold reading		dt6-dr6=de6
AL Adjust to lock- off load		dr6	

### 3.4.2 Proof Test

Proof test must consist of incrementally loading the anchor and must be conducted in accordance with PTI Recommendations for Prestressed Rock and Soil Anchors.

#### Proof Test Steps

AL
0.25 DL
0.5 DL
0.75 DL
1.0 DL
1.2 DL
1.33 DL (test load/10-minute hold)
AL (optional)
Adjust to lock-off load

## 3.5 ACCEPTANCE

### 3.5.1 General

Acceptance of anchors must be determined by the Project Engineer. The following criteria will be used in determination of the acceptability of each anchor.

#### 3.5.1.1 Creep

Creep movement must not exceed 0.04 inch at maximum test load during the first 10 minutes of the performance or proof test. If the creep movement exceeds this limit, it must not exceed 0.08 inch at the maximum test load at the end of 60 minutes. If the creep movement exceeds 0.08 inch at the maximum test load at the end of 60 minutes, the anchor will be rejected.

**END OF SECTION**

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SECTION 321000

BITUMINOUS CONCRETE PAVING

PART 1 - GENERAL

1.1 DESCRIPTION

This work shall consist of producing and placing hot mix asphalt (HMA) pavement and furnishing and installing parking curb stops and surface striping. The HMA pavement shall consist of an aggregate or asphalt base course and asphalt surface course constructed in conformity with the lines, grades, thickness, and cross sections as shown on the plans and as directed on the prepared or existing base in accordance with these specifications. Work under this section shall cover the milling of existing asphalt, composition, mixing, construction upon the prepared subgrade, and the protection of hot asphalt concrete pavement. Each course shall be constructed to the depth, section, or elevation required by the drawings and shall be rolled, finished, and approved before the placement of the next course.

1.2 RELATED DOCUMENTS

- A. Section 310000 – EARTHWORK
- B. Contract Drawings and general provisions of Contract, including General and Special Conditions and Specification sections, apply to work of this section.
- C. Material and construction standards per Commonwealth of Massachusetts, Department of Public Works, Standard Specifications for Highways and Bridges 1988 Edition, and all amendments or latest version.
- D. MassDOT Subsection 860 Reflectorized Pavement Markings to be utilized by the Contractor for roadway markings as shown on Contract Drawings.

1.3 ALIGNMENT AND GRADE CONTROL

The contractor's surveyor shall establish and control the pavement (aggregate or asphalt base course and asphalt surface course), alignments, grades, elevations, and cross sections as shown on the drawings.

1.4 SUBMITTALS

- A. In accordance with Section 013000 – SUBMITTAL PROCEDURES furnish the following:
  - 1. Data and Test Reports:
    - a. Aggregate Base Course: Sources, gradation, liquid limit, plasticity index, percentage of wear, and other tests required by State Highway Department.

- b. Asphalt Base/Surface Course: Aggregate source, gradation, soundness loss, percentage of wear, and other tests required by State Highway Department.
      - c. Job mix formula.
      - d. SDS (Safety Data Sheets) for all chemicals used on ground.
    - 2. Certifications:
      - a. Asphalt prime and tack coat material certificate of conformance to MassDOT requirements.
      - b. Asphalt cement certificate of conformance to MassDOT requirements.
      - c. Job mix certification: Submit plant mix certification that mix equals or exceeds the MassDOT Specification.
    - 3. Contractor Quality Control Plan.
    - 4. Road Closure & Traffic Management Plan.
  - B. Pavement Markings
    - 1. Method of Placement Plan
    - 2. List of material properties.
    - 3. Quality control certificate for the Pavement Markings, upon request.
  - C. Parking Stops
    - 1. Product data and cut sheet.
- 1.5 GENERAL
- A. The Contractor shall be responsible for notification to “DigSafe” (888-344-7233) at locations where excavation is scheduled.
  - B. The Contractor shall provide police detail for all road work per the Town of Orleans guidelines.
  - C. The Contractor shall provide detour signs as needed for all road work per the Town of Orleans guidelines.
  - D. The Contractor shall schedule and execute reconstruction operations so as to maintain pedestrian access to abutting property, particularly to the commercial and residential establishments.
  - E. All work shall be performed in accordance with the Contract Documents and Massachusetts Department of Transportation Section 450 – Hot Mix Asphalt Pavement.
  - F. The Contractor’s attention is called to the fact that ADA accessible construction shall be in accordance with the provisions of the current Massachusetts Highway Department Standards and ADA Standards. The precise location and dimensions of ADA accessible areas shall be reviewed by the Project Engineer following final determination of profile grades.

- G. Contractor must notify the Project Engineer for pre-inspection of the site 24 hours before placing the bituminous concrete pavement.
- H. HMA shall only be placed on dry, unfrozen surfaces and only when the temperature requirements per MADOT are met. If the temperature requirements are not met at any point throughout the paving shift, HMA placement shall cease, except as determined and directed in writing by the Project Engineer depending upon the necessity and emergency of attendant conditions, and weather conditions.
- I. The Contractor may continue HMA placement when overtaken by sudden rain, but only with material which is in transit from the HMA production facility at the time, and then only when the temperature of the HMA mixture is within the temperature limits specified and when the existing surface on the roadway is free of standing moisture. The Project Engineer is not obligated to accept any material that was not already in transit prior to the onset of rain and the Contractor shall suspend operations for the day when the requirements of this specification cannot be met.
- J. The construction of HMA pavement shall terminate November 15 and shall not be resumed prior to April 1 except as determined and directed in writing by the Project Engineer depending upon the necessity and emergency of attendant conditions, weather conditions, and location of the project. Only in extreme cases will the placement of Surface Courses be permitted between November 15 and April 1. Regardless of any temperature requirements, OGFC mixtures shall not be placed after October 31 or before May 1 without the written permission of the Project Engineer.

Temperature Limitations for HMA Placement

HMA Pavement Course	Lift Thickness (in.)	Min. Air Temperature (d F)	Min. Surface Temperature (d F)
Friction Course	1	50	55
Surface Course	<1 ¾	45	50
Surface Course	>1 ¾	35 (see Note #1)	40
Intermediate Course	All	35 (see Note #1)	40
Base Course	All	35 (see Note #1)	40
Leveling Course	As Specified	45	50
Note 1: When the air temperature falls below 50°F, extra precautions shall be taken in drying the aggregates, controlling the temperatures of the materials, and in placing and compacting the mixtures.			

- K. The Contractor shall supply the Project Engineer with two approved dial type thermometers with a temperature range of -50°F to 500°F and two infrared pistol thermometer for each paving machine in operation on the project. The thermometers will remain the property of the Contractor upon completion of the project. The infrared pistol thermometers shall read in Fahrenheit and conform to the following requirements:
  1. Portable and battery operated
  2. LCD Display to nearest 1°F

3. Temperature operating range of 0°F to 750°F
4. Accuracy of  $\pm 2\%$
5. Repeatability of  $\pm 5^\circ\text{F}$
6. Emissivity preset at 0.95

## 1.6 PROTECTION

During the procedure of the work, the Contractor shall be held entirely responsible for the protection and result of the work and damage to the work that may occur through any cause and shall be repaired by the contractor at his expense.

## 1.7 PROTECTION OF PERSONS AND PROPERTY

- A. Contractors are to erect such structures around the locations as may become necessary to allow pedestrians to travel by the locations and to fence in any danger area or other place adjoining the streets where the work is performed constituting a hazard to persons or property, and to properly light and maintain lights at night around the locations in question.
- B. Contractor must notify the Project Engineer twenty-four(24) hours before starting the project.
- C. Contractor must obtain street obstruction and disturbance permits before work commences.

## 1.8 QUALITY ASSURANCE

- A. The Contractor is responsible for providing an appropriate Quality Control System (QC System) to ensure that all materials and workmanship meet the required quality levels for each specified Quality Characteristic. The Contractor will perform all required Quality Control inspection, sampling, and testing in accordance with these specifications and the Contractor's Quality Control Plan (QC Plan).

## PART 2 - PRODUCTS

### 2.1 MATERIALS

- A. Material standards per Massachusetts Department of Transportation "Standard Specifications for Highways and Bridges", 1988 or the latest subsequent revision.
- B. Aggregates:
  1. Provide aggregates consisting of crushed stone, gravel, sand, or other sound, durable mineral materials processed and blended, and naturally combined.
  2. Sub-base Section – Gravel Borrow Type "B": (MHD M1.03.0): 12"
  3. Compacted Processed Gravel Base Section (MHD M1.03.1): 12"
- C. Asphalts:
  1. Hot Mix Asphalt Binder Course (SBC – 25.0): 2.50"

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2. Hot Mix Asphalt Finish Course (SSC – 9.5): 1.75"

D. Sealer:

1. Provide a sealer consisting of suitable fibrated chemical type asphalt base binders and fillers having a container consistency suitable for troweling after thorough stirring and containing no clay or other deleterious substance.

E. Pavement Markings

1. MassDOT Specification M7.01.03 Liquid Thermoplastic Striping Material, M7.01.05 White ReflectORIZED Traffic Paint or approved equal.
2. The raw materials used in the following specifications for paints and protective coatings shall conform to the specification designed by ASTM, Federal serial number or AASHTO unless specified otherwise in the individual specification. Subsequent amendments to the specifications quoted shall apply to all raw materials and finished products. No "or equal" substitution for any specified material shall be made without written consent of the Project Engineer.

F. Parking Stops

1. Parking stops shall conform to the Town of Orleans standards.
2. Parking stops shall be precast concrete or rubber and be weather resistant and impervious to sunlight and road salt.
3. All parking stops shall be high-viz and/or reflective.
4. Steel Dowels for Installation shall be 3/4" diameter dowels or #4 epoxy coated steel rebar a minimum of 14-inches long.

## 2.2 CONDITION IN THE CONTAINER

Paint and protective coatings shall be homogenous, free of contaminant and of a consistency suitable for use in the capacity for which it is specified. The finished product shall be well ground and the pigment shall be properly dispersed and suspended in the vehicle according to the requirements of the paint or protective coating. The dispersion shall be of such nature that the pigment does not settle badly, does not cake or thicken in the container, and does not become granular, jelled or curdled. Any settlement of pigment in the paint or protective coating shall be a thoroughly wetted soft mushy mass permitting the complete and easy vertical penetration of a paddle. Settled pigment shall be easily dispersed, with a minimum resistance to the sidewise manual motion of the paddle across the bottom of the container, to form a smooth uniform product of the proper consistency. The manufacturer shall include in the paint the necessary additives for control of sagging, pigment settling, leveling, and other qualities of a satisfactory working material. The paint shall possess satisfactory properties in all respects which affect its application and curing.

## 2.3 PACKAGING

- A. The finished paint or protective coating shall be furnished in new 20 liter, round, non-tapered containers no thinner than 0.60 millimeter unless otherwise specified. The containers shall have the lug type crimp lids with ring seals and be equipped with ears

and bails. The containers shall meet U.S. Department of Transportation Hazardous Materials Shipping Regulations. The container must be lined if necessary so as to prevent attack by the paint. The lining must not come off the can as skins.

- B. The following information shall be labeled on each can in a clear legible manner:
1. Name of Manufacturer
  2. Place of Manufacture
  3. Manufacturer's Batch Number
  4. MassDOT Specification Number
  5. Date of Manufacture
  6. Precautions concerning the handling and the application of the paint or protective coating shall be shown on the label.

## 2.4 SAMPLING AND TESTING

- A. Sampling:
1. At least one sample, not less than one liter, shall be taken for each batch or less of each kind of paint to be used. Samples must be taken in clean, dry, airtight, wide mouth metal cans and the sample must fill the can to within 25 millimeters from the top. Each sample forwarded to the Project Engineer shall be accompanied by the name of the manufacturer, the batch number, the specification number and the quantity of paint represented.
  2. Before the Contractor will be permitted to use any paint, the material proposed to be used shall have been sampled, tested and approved.
  3. The manufacturer, as may be required by the Project Engineer, shall permit access to an inspection of his/her paint and all operations involved in the manufacture of these materials, shall permit sampling of raw materials and shall furnish such reasonable facilities as the Project Engineer may require for such inspection.
- B. Testing:
1. Testing of paints may be completed by the Owner's Representative in accordance with the latest methods of Federal Test Method Standard Number 141, ASTM and Methods in use by the MassDOT Research and Materials Section. In addition, the Owner and/or Project Engineer reserves the right to make use of any information or methods of testing to determine the quality of paint and paint materials.
  2. The manufacturer may submit a wet sample of the paint which he/she proposes to furnish. If the color of the wet sample is approved, paints matching the wet sample will, as regards to color, be accepted.
  3. The Contractor shall assume all costs arising from the use of patented materials, equipment, devices or processes used or incorporated in the work and agrees to indemnify and save harmless the Owner or the Project Engineer from all suits at law or action of every nature for or on account of the use of any patented materials, equipment, device or processes.



## PART 3 - EXECUTION

### 3.1 GENERAL

The Asphalt Concrete Paving equipment, weather limitations, job mix formula, mixing, construction methods, compaction, finishing, tolerance, and protection shall conform to the requirements of the appropriate sections of the Commonwealth of Massachusetts, Department of Public Works, Standard Specifications for Highways and Bridges 1988 Edition, and all amendments or latest version, for the type of material specified.

### 3.2 SAWCUTTING

- A. The pavement shall be sawcut through its full depth at all joints between existing and proposed pavements, and at all utility trenches, to provide a uniform, smooth vertical surface. Existing pavements shall be sawcut at the limits of work as shown on the plans and as required by the Project Engineer.
- B. Sawcut edges which become broken, ragged or undermined as a result of the Contractor's operations shall be re-cut prior to the placement of abutting proposed pavement at no additional cost to the Department.
- C. Sawcut surfaces in asphalt pavements shall be sprayed or painted with a uniform, thin coat of asphalt emulsion tack coat immediately before placement of hot mix asphalt against the cut surfaces.

### 3.3 SWEEPING UNDERLYING SURFACE

- A. The Contractor shall provide a mechanical sweeper equipped with a water tank, spray assembly to control dust, a pick-up broom, a dual gutter broom, and a dirt hopper. The sweeper shall be capable of removing millings and loose debris from the underlying surface.
- B. Prior to opening a milled area to traffic, all milled pavement surfaces shall be thoroughly swept in accordance with the applicable milling specification required by the contract to remove all remaining millings and dust. All pavement surfaces shall be swept clean, free of dust, fines, and slurry immediately prior to application of the tack coat. Any new HMA pavement course that has been open to traffic, or that was placed 30 days prior to placement of the subsequent pavement course, shall also be swept immediately prior to application of the tack coat.

### 3.4 MIXING ASPHALTIC CONCRETE MATERIALS

- A. Provide hot plant-mixed asphaltic concrete paving materials.
  - 1. Temperature leaving the plant: 290 degrees F minimum, 320 degrees F maximum.
  - 2. Temperature at time of placing: 280 degrees F minimum.

### 3.5 CONSTRUCTION METHODS

- A. Subgrade
  1. Shape to line and grade and compact with self-propelled rollers.
  2. All depressions that develop under rolling shall be filled with acceptable material and the area re-rolled.
  3. Soft areas shall be removed and filled with acceptable materials and the area re-rolled.
  4. Should the subgrade become rutted or displaced prior to the placing of the subbase, it shall be reworked to bring to line and grade.
  5. Proof-roll the subgrade with maximum 45 tonne (50 ton) gross weight dump truck as directed by Project Engineer. If pumping, pushing, or other movement is observed, rework the area to provide a stable and compacted subgrade.
  
- B. Base Course
  1. Base:
    - a. Spread and compact to the thickness shown on the drawings.
    - b. Rolling shall begin at the sides and continue toward the center and shall continue until there is no movement ahead of the roller.
    - c. After completion of the base rolling there shall be no hauling over the base other than the delivery of material for the top course.
  2. Thickness tolerance: Provide the compacted thicknesses shown on the Contract Drawings within a tolerance of minus 0.0" to plus 0.5".
  3. Smoothness tolerance: Provide the lines and grades shown on the Contract Drawings within a tolerance of 3/16-inch in 10-feet
  4. Moisture content: Use only the amount of moisture needed to achieve the specified compaction.
  
- C. Surface shall be pitched to provide proper drainage.

### 3.6 PLACEMENT OF ASPHALTIC CONCRETE PAVING

- A. Remove all loose materials from the compacted base.
  
- B. Apply the specified prime coat, and tack coat where required, and allow to dry in accordance with the manufacturer's recommendations as approved by Project Engineer.
  
- C. Receipt of asphaltic concrete materials:
  1. Do not accept material unless it is covered with a tarpaulin until unloaded, and unless the material has a temperature of not less than 280 degrees F.
  2. Do not commence placement of asphaltic concrete materials when the atmospheric temperature is below 50 degrees F, not during fog, rain, or other unsuitable conditions.

- D. Spreading:
  - 1. Spread material in a manner that requires the least handling.
  - 2. Where thickness of finished paving will be 4-inch or less, spread in one layer.
  - 3. Avoid overhandling of materials that can cause separation for fines.
  
- E. Rolling:
  - 1. After the material has been spread to the proper depth, roll until the surface is hard, smooth, unyielding, and true to the thickness and elevations shown on the drawings.
  - 2. Roll in at least two directions until no roller marks are visible.
  - 3. Finished paving smoothness tolerance:
  - 4. No depressions which will retain standing water.
  - 5. No deviation greater than 1/8" in 6-feet.

### 3.7 BITUMINOUS CONCRETE DRIVEWAYS

- A. No forms are required.
  
- B. Placing Bituminous Concrete – The Bituminous Concrete driveway surface shall be laid in 2 courses to a depth, after rolling of 4 inches unless otherwise designated on the plans. The Bottom Course shall be 2-½ inches in thickness, and its surface after rolling, shall be 1 ½ inches below and parallel to the proposed grade of the finished surface. The top course shall be 1-½ inches in thickness after rolling.
  
- C. Spreading Mixture – The mixture shall be spread with an approved spreader. In areas not accessible to a spreader, the mix shall be placed as specified for bituminous concrete sidewalks (section 701.62B-1).
  
- D. Rolling – The surface shall be rolled with a self-propelled tandem roller weighing not less than 3 tons nor more than 5 tons, or an approved roller as designated by the Project Engineer.
  
- E. Testing Surface – When tested with a 10-foot straightedge placed parallel to the centerline of the courses, there shall be no deviation from a free surface in excess of ¼ inch.

### 3.8 MILLING EXISTING HMA PAVEMENT

- A. When specified on the plans, existing HMA pavement courses shall be milled and removed from the project by the Contractor.
  
- B. Adjustments to milling depth shall be approved by the Project Engineer and shall be used for consideration of the HMA pavement thickness measurements.

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- C. Each vertical face of the milled pavement that will be abutted by new pavement shall be thoroughly coated with a hot poured joint sealer prior to placing new HMA mixture adjacent to the vertical face.

### 3.9 PATCHING EXISTING PAVEMENT COURSES

- A. Areas of existing HMA pavement courses that are significantly distressed or unsound shall be removed and replaced with patches using new Hot Mix Asphalt. The location and limits of patching will be as identified in the plans or as directed by the Project Engineer.
- B. Each existing pavement course determined to be unsound shall be removed to the full depth of the pavement course within a rectangular area. For each patch location equal to or greater than 50 ft<sup>2</sup> in area (and having a minimum dimension of 4-ft) where the existing pavement courses are removed down to subbase, the subbase shall be compacted by mechanical means to not less than 95% of the maximum dry density of the subbase material as determined by AASHTO T 99 Method C at optimum moisture content. Each edge of the patch area shall be sawcut or otherwise neatly cut by mechanical means to provide a clean and sound vertical face. The vertical face of each edge shall be thoroughly coated with a hot poured joint sealer immediately prior to placing the HMA patching mixture.
- C. Delaminated areas of existing pavement courses resulting from pavement milling shall be cut back neatly by mechanical means to the limits of any unsound material. After removing all unsound material, the underlying pavement surface within the patch limits shall receive a thorough tack coat.
- D. HMA patching mixture shall be the same mixture type as the existing pavement course being patched or as specified on the plans or as directed by the Project Engineer.

### 3.10 HMA JOINTS

- A. The Contractor shall plan the sequence of HMA placement to minimize transverse and longitudinal joints in each pavement course. Paving operations should employ long pulls or tandem pavers, whenever practicable, to reduce the number and length of joints. Finished joint surfaces, including joints in the roadway and bridge joints, shall be uniform and true to the required grade and crossslope without deviations exceeding ¼ in., both transversely and parallel to the joint, when measured with a 10-ft standard straightedge.
- B. Transverse Joints
  1. Where the start or end of a new HMA pavement course meets existing HMA pavement, the existing pavement shall be sawcut to form a transverse butt joint for the full depth of all new pavement courses. The sawcut shall follow a straight line and provide a clean and sound vertical face. Material at any intermediate transverse joint resulting from suspension of placement of a new HMA pavement

course shall also be sawcut and removed to provide a clean vertical face before continuing placement of the pavement course.

2. When traffic is to be carried over any transverse joint before completion of an HMA pavement course, the Contractor shall provide a temporary tapered joint with a maximum 12:1 slope. The HMA mixture forming the taper shall be placed on heavy wrapping paper or other suitable material to serve as a bond breaker. The temporary tapered joint shall be sawcut to reveal the full depth of the pavement course and form a transverse butt joint with a clean vertical face. The temporary tapered joint material shall be completely removed before resuming placement of the HMA pavement course.
3. Prior to the start of HMA placement at each transverse joint, the vertical joint face shall be thoroughly coated with a hot applied pavement joint adhesive meeting the requirements of Mass DOT Section 450.30: General. The asphalt sealer temperature and application rate for each pavement course shall be established in the Contractor's QC Plan and shall follow the Manufacturer's recommendation. No reheating of the joint face shall be permitted. Equipment used to apply the hot applied pavement joint adhesive shall be capable of maintaining the sealer at the established temperature and application rate sufficient to uniformly coat the vertical joint face without runoff or accumulation of the asphalt sealer.

C. Longitudinal Joints

1. All longitudinal joints in HMA Surface Courses shall be located on the roadway centerline or on a lane line or edge line of the traveled way. The longitudinal joints in each pavement course below the Surface Course shall be successively offset from the joint in the Surface Course by no more than 12 in. and no less than 6 in. Joints shall be straight and parallel to the lane line of the roadway.

3.11 STONE BOUND, MANHOLES, SHUT-OFFS, WATERGATES, STOPS, GAS SHUT-OFFS, MANHOLES AND CATCH BASIN FRAMES AND COVERS

- A. All shall be carefully set to the proposed finished grade, with 3-inch of concrete to underside of flange where applicable.
- B. Utility shut-offs must be covered with plastic to prevent concrete from adhering to the covers. The plastic must be removed when the cleanup is performed the following day.

3.12 BOUNDSTONES

Prior to excavation, the Project Engineer will mark approximate locations where records indicate boundstones may exist; the Contractor shall use extra caution when excavating these areas, and uncover the boundstone without damaging or displacing. Should boundstones be found that are damaged or require resetting to grade, the Contractor will notify the Project Engineer, which will notify the Town of Orleans Department of Public Works for direction. Exposed Town boundstones or street line property bounds destroyed, displaced, damaged, or buried by the Contractor, will be replaced by the Project Engineer at the Contractor's expense.

### 3.13 LEVELING COURSES

HMA Leveling Courses shall only be used when specified in the Contract. The HMA mixture used for a Leveling Course shall be as specified in the Contract and shall conform to the relevant materials requirements of this specification.

### 3.14 PREPARATION OF CURBS, EDGING, & UTILITIES

All curbs or edging shall be installed or reset to the line and grade established on the Contract Drawings. The surface elevation of all catch basin frames and grates, manholes, utility valve boxes, or other utility structures located in the pavement shall uniformly match the grade and cross-slope of the final pavement riding surface. Adjustment of all curbs, edging, and utilities shall be completed prior to the placement of the HMA Surface Course. Hand placement of HMA along curbs and edging or around utilities after placement and compaction of the Surface Course shall not be permitted.

### 3.15 APPLICATION OF SEAL COAT

- A. Prepare the surfaces, mix the seal coat material, and apply in accordance with the manufacturer's recommendations as approved by the Project Engineer.
- B. Apply one coat of the specified sealer.
- C. Achieve a finished surface seal which, when dry and thoroughly set, is smooth, tough, resilient, of uniform black color, and free from coarse textured areas, lap marks, ridges, and other surface irregularities.

### 3.16 APPLICATION OF PAVEMENT MARKINGS

- A. Requirements:
  - 1. Lines shall be a minimum of 4-inches wide.
  - 2. Reflective bead shall conform to MHD standard.
  - 3. Material application temperature shall conform to MHD standard.
- B. No thinners shall be used for the above listed pavement marking applications except in accordance with the manufacturer's specifications at the direction of the Owner's Representative.
- C. No paint or pavement marking material shall be heated above the temperature marked on the container.
- D. Markings shall be applied only in seasonable weather and in accordance with good painting practices. The surface shall be dry and free of sand, grease, oil or other foreign substances prior to the application. The Contractor shall prepare the surface to accept the application as part of this item, with no additional compensation. The Project Engineer will make the final determination for all of the foregoing.

- E. Bituminous aggregate surface shall have been in place for 48 hours prior to the applications of pavement markings except preformed permanent plastic pavement markings which can be applied immediately.

### 3.17 APPLICATION OF PARKING STOPS

- A. Parking stops shall be installed in accordance with the Town of Orleans, as well as, the manufacturers recommendations.
- B. Securely attach parking wheel stops into at-grade concrete and at-grade asphalt pavement with not less than two galvanized steel or epoxy coated dowels embedded in holes cast into parking wheel stops. Firmly bond each dowel to parking wheel stop and to pavement.

### 3.18 EQUIPMENT

- A. All equipment used for the application of pavement markings shall be of standard commercial manufacture. All other equipment and devices necessary for the application of the pavement markings shall be as usually required for work of this type and shall be furnished by the Contractor.
- B. The pavement marking equipment shall be operated at the speed and in accordance with other requirements of the manufacturer, unless otherwise directed by the Project Engineer or the Town of Orleans, Department of Public Works.
- C. Truck mounted equipment is approved for the application of pavement markings except in such cases where in the Project Engineer's judgment travel will be unreasonably delayed and/or the quality of the work performed by the machine is unsatisfactory.

### 3.19 LAYOUT OF WORK

A schedule of pavement marking operations shall be furnished by the Contractor for the approval of the Project Engineer prior to the application of any pavement markings. This schedule must be in the office of the Project Engineer seven days prior to the proposed date of application of any pavement markings.

### 1.2 PROTECTION

- A. Protect the asphaltic concrete paved areas from traffic until the sealer is set and cured and does not pick up under foot or wheeled traffic.
- B. Markings shall remain protected until sufficiently dry to bear traffic. Markings shall be protected by traffic cones of not less; than 700 millimeters in height except in the case of markings which cure to a no track condition in 180 seconds or less.

### 1.3 OPENING TO TRAFFIC

No vehicular traffic or loads shall be permitted on the newly completed HMA pavement until adequate stability has been attained and the material has cooled sufficiently to a temperature of 140°F or less as indicated by an infrared thermometer. The Contractor shall clearly outline, in the QC Plan, the specific criteria related to opening new pavement to traffic. The final determination to open the pavement to traffic shall be made by the Project Engineer and the Construction QC Manager.

1.4 FINAL CLEAN UP

Remove all debris, rubbish, and excess material from the work area.

END OF SECTION



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SECTION 330500

COMMON WORK RESULTS FOR UTILITIES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS:

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Specification Sections, apply to this Section.

1.2 RELATED DOCUMENTS:

- A. This Section includes the following:
  1. Piping joining materials.
  2. Transition fittings.
  3. Dielectric fittings.
  4. Sleeves.
  5. Identification devices.
  6. Grout.
  7. Flowable fill.
  8. Piped utility demolition.
  9. Piping system common requirements.
  10. Equipment installation common requirements.
  11. Painting.
  12. Concrete bases.
  13. Metal supports and anchorages

1.3 DEFINITIONS:

- A. Exposed Installations: Exposed to view outdoors or subject to outdoor ambient temperatures and weather conditions.
- B. Concealed Installations: Concealed from view and protected from weather conditions and physical contact by building occupants but subject to outdoor ambient temperatures. Examples include installations within unheated shelters.
- C. PE: Polyethylene plastic.
- D. PVC: Polyvinyl chloride plastic.
- E. CI: Cast Iron.
- F. DI: Ductile Iron.
- G. HDPE: High Density Polyethylene

1.4 SUBMITTALS:

- A. Product Data: For the following:
  - 1. Product Data: For each type of product indicated. Submit manufacturer's product data, installation instructions, use limitations and recommendations for each material used. Provide certifications stating that materials comply with requirements.
  - 2. Dielectric fittings.
  - 3. Identification devices
- B. Welding certificates.
- C. Test Reports: Submit certified reports for tests required.
- D. Maintenance Data: Provide maintenance data and parts list for all water system work.
- E. As-Built Documents: Utility Sub-Contractors shall be responsible for transfer of as built information related to their Work to the Record Contract Drawings. The drafting must be done by experienced draftsmen and match the original Drawings.
- F. Coordination Drawings: Show pipe sizes, locations, and elevations. Show other piping in same trench and clearances from storm drainage system piping. Indicate interface and spatial relationship between manholes, piping, and proximate structures.

1.5 QUALITY ASSURANCE:

- A. Steel Support Welding: Qualify procedures and personnel according to AWS D1.1/D1.1M, "Structural Welding Code - Steel."
- B. Steel Piping Welding: Qualify processes and operators according to ASME Boiler and Pressure Vessel Code: Section IX, "Welding and Brazing Qualifications."
  - 1. Comply with provisions in ASME B31 Series, "Code for Pressure Piping."
  - 2. Certify that each welder has passed AWS qualification tests for welding processes involved and that certification is current.
- C. Comply with ASME A13.1 for lettering size, length of color field, colors, and viewing angles of identification devices.

1.6 DELIVERY, STORAGE, AND HANDLING:

- A. Deliver pipes and tubes with factory-applied end caps. Maintain end caps through shipping, storage, and handling to prevent pipe end damage and to prevent entrance of dirt, debris, and moisture.

- B. Store plastic pipes protected from direct sunlight. Support to prevent sagging and bending.

1.7 COORDINATION:

- A. Coordinate installation of required supporting devices and set sleeves in poured-in-place concrete and other structural components as they are constructed.
- B. Coordinate installation of identifying devices after completing covering and painting if devices are applied to surfaces.
- C. Coordinate size and location of concrete bases. Formwork, reinforcement, and concrete requirements are specified in Section 033000 "Cast-in-Place Concrete", & Section 034533 "Precast Structural Concrete".

PART 2 - PRODUCTS

2.1 PIPING JOINING MATERIALS:

- A. Pipe-Flange Gasket Materials: Suitable for chemical and thermal conditions of piping system contents.
  - 1. ASME B16.21, nonmetallic, flat, asbestos free, 1/8-inch maximum thickness, unless otherwise indicated.
    - a. Full-Face Type: For flat-face, Class 125, cast-iron and cast-bronze flanges.
    - b. Narrow-Face Type: For raised-face, Class 250, cast-iron and steel flanges.
  - 2. AWWA C110, rubber, flat face, 1/8 inch thick, unless otherwise indicated; and full-face or ring type, unless otherwise indicated.
- B. Flange Bolts and Nuts: ASME B18.2.1, carbon steel, unless otherwise indicated.
- C. Plastic, Pipe-Flange Gasket, Bolts, and Nuts: Type and material recommended by piping system manufacturer, unless otherwise indicated.
- D. Welding Filler Metals: Comply with AWS D10.12/D10.12M for welding materials appropriate for wall thickness and chemical analysis of steel pipe being welded
- E. Solvent Cements for Joining Plastic Piping: Pipe-Flange Gasket Materials: Suitable for chemical and thermal conditions of piping system contents.
  - 1. PVC Piping: ASTM D 2564. Include primer according to ASTM F 656.

2.2 TRANSITION FITTINGS:

- A. Transition Fittings, General: Same size as, and with pressure rating at least equal to and with ends compatible with, piping to be joined.
- B. Transition Couplings NPS 1-1/2 and Smaller:

1. Underground Piping: Manufactured piping coupling or specified piping system fitting.
  2. Aboveground Piping: Specified piping system fitting
- C. AWWA Transition Couplings NPS 2 and Larger:
1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
    - a. Cascade Waterworks Mfg. Co.
    - b. Dresser, Inc.; DMD Div.
    - c. Ford Meter Box Company, Inc. (The); Pipe Products Div.
    - d. JCM Industries.
    - e. Smith-Blair, Inc.
    - f. Viking Johnson.
  2. Description: AWWA C219, metal sleeve-type coupling for underground pressure piping.
- D. Plastic-to-Metal Transition Fittings:
1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
    - a. Spears Manufacturing Co.
  2. Description: PVC one-piece fitting with manufacturer's Schedule 80 equivalent dimensions; one end with threaded brass insert, and one solvent-cement-joint or threaded end.
- E. Plastic-to-Metal Transition Unions:
1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
    - a. Colonial Engineering, Inc.
    - b. NIBCO INC.
    - c. Spears Manufacturing Co.
  2. Description: MSS SP-107, PVC four-part union. Include brass or stainless-steel threaded end, solvent-cement-joint or threaded plastic end, rubber O-ring, and union nut.
- F. Flexible Transition Couplings for Underground Nonpressure Drainage Piping
1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
    - a. Cascade Waterworks Mfg. Co.
    - b. Fernco, Inc.
    - c. Mission Rubber Company.
    - d. Plastic Oddities.
  2. Description: ASTM C 1173 with elastomeric sleeve, ends same size as piping to be joined, and corrosion-resistant metal band on each end.

2.3 DIELECTRIC FITTINGS:  
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- A. Dielectric Fittings, General: Assembly of copper alloy and ferrous materials or ferrous material body with separating nonconductive insulating material suitable for system fluid, pressure, and temperature.
  
- B. Dielectric Unions:
  - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
    - a. Capitol Manufacturing Co.
    - b. Central Plastics Company.
    - c. Epco Sales, Inc.
    - d. Hart Industries, International, Inc.
    - e. Watts Water Technologies, Inc.
    - f. Zurn Plumbing Products Group; Wilkins Div.
  
  - 2. Description: Factory fabricated, union, NPS 2 and smaller.
    - a. Pressure Rating: 150 psig minimum at 180 deg F.
    - b. End Connections: Solder-joint copper alloy and threaded ferrous; threaded ferrous.
  
- C. Dielectric Flanges:
  - 1. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
  - 2. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
    - a. Capitol Manufacturing Co.
    - b. Central Plastics Company.
    - c. Epco Sales, Inc.
    - d. Watts Water Technologies, Inc.
  - 3. Description: Factory-fabricated, bolted, companion-flange assembly, NPS 2-1/2 to NPS 4 and larger.
    - a. Pressure Rating: 150 psig minimum.
    - b. End Connections: Solder-joint copper alloy and threaded ferrous; threaded solder-joint copper alloy and threaded ferrous.
  
- D. Dielectric-Flange Kits:
  - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
    - a. Advance Products & Systems, Inc.
    - b. Calpico, Inc.
    - c. Central Plastics Company.
    - d. Pipeline Seal and Insulator, Inc.
  - 2. Description: Nonconducting materials for field assembly of companion flanges, NPS 2-1/2 and larger.
    - a. Pressure Rating: 150 psig minimum.
    - b. Gasket: Neoprene or phenolic.

- c. Bolt Sleeves: Phenolic or polyethylene.
- d. Washers: Phenolic with steel backing washers.

- E. Dielectric Couplings:
  - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
    - a. Calpico, Inc.
    - b. Lochinvar Corporation.
  - 2. Description: Galvanized-steel coupling with inert and noncorrosive, thermoplastic lining, NPS 3 and smaller.
    - a. Pressure Rating: 300 psig at 225 deg F.
    - b. End Connections: Threaded.

#### 2.4 IDENTIFICATION DEVICES:

- A. General: Products specified are for applications referenced in other utilities Sections. If more than single type is specified for listed applications, selection is Installer's option.
- B. Pressure-Sensitive Pipe Markers: Manufacturer's standard preprinted, color-coded, pressure-sensitive-vinyl type with permanent adhesive.
- C. Pipes with OD, Including Insulation, Less Than 6-inches: Full-band pipe markers, extending 360 degrees around pipe at each location.
- D. Pipes with OD, Including Insulation, 6-inches and Larger: Either full-band or strip-type pipe markers, at least three times letter height and of length required for label.
- E. Lettering: Use piping system terms indicated and abbreviate only as necessary for each application length.
  - 1. Arrows: Either integrally with piping system service lettering to accommodate both directions of flow, or as separate unit on each pipe marker to indicate direction of flow.
- F. Valve Tags: Stamped or engraved with 1/4-inch letters for piping system abbreviation and 1/2-inch sequenced numbers. Include 5/32-inch hole for fastener.
  - 1. Material: 0.0375-inch- thick stainless steel.
  - 2. Size: 1-1/2 inches in diameter, unless otherwise indicated.
  - 3. Shape: As indicated for each piping system.
- G. Valve Tag Fasteners: Brass, wire-link or beaded chain; or brass S- hooks.

#### 2.5 GROUT:

- A. Description: ASTM C 1107, Grade B, nonshrink and nonmetallic, dry hydraulic-cement grout.

1. Characteristics: Post hardening, volume adjusting, nonstaining, noncorrosive, nongaseous, and recommended for interior and exterior applications.
2. Design Mix: 5000-psi, 28-day compressive strength unless otherwise noted .
3. Packaging: Premixed and factory packaged.

## 2.6 FLOWABLE FILL:

- A. Description: Low-strength-concrete, flowable-slurry mix.
  1. Cement: ASTM C 150, Type I, portland.
  2. Density: 115- to 145-lb/cu. ft.
  3. Aggregates: ASTM C 33, natural sand, fine and crushed gravel or stone, coarse.
  4. Aggregates: ASTM C 33, natural sand, fine.
  5. Admixture: ASTM C 618, fly-ash mineral.
  6. Water: Comply with ASTM C 94/C 94M.
  7. Strength: 100 to 200 psig.
- B. "Controlled Density Fill" (flowable fill) shall be placed for backfill in all trench cuts where applicable in accordance with the Town of Orleans, Department of Public Works.
- C. All work shall conform to the relevant provisions of Massachusetts Department of Transportation "Standard Specifications for Highways and Bridges", 1988 or the latest subsequent revision.
- D. Controlled Density Material (flowable fill) shall meet the requirements of Subsection M4.08.0.
- E. Contractor is to install ¾" stone to a level one (1) foot above the crown of the pipe. Flowable fill will be placed over the ¾" stone.
- F. Copy of the batch slips are to be submitted to the Project Engineer.

## PART 3 - EXECUTION

### 3.1 OBSERVATION:

- A. All piping shall be observed in place by the Project Engineer prior to backfilling. Any pipe buried without approval of the Project Engineer shall be uncovered by the Contractor for observation at no expense to the Owner.

### 3.2 MATERIALS HANDLING:

- A. Pipe, fittings, and appurtenances shall be inspected before they are lowered into trench. Interior of pipe and joint surfaces shall be thoroughly cleaned and shall be maintained clean. Open end of pipeline shall be securely plugged whenever pipe laying is not in progress.

- B. Pipe and fittings which do not fit together to form a tight joint shall be rejected. Pipe and fittings shall be selected so that there will be as small a deviation as possible at joints so that the interior presents a smooth surface.
- C. Pipe cutting shall be done with sharp tools using methods approved by pipe manufacturer in such a manner that it will not crack the pipe.
- D. Pipeline materials shall be carefully handled. Pipe and fittings shall be unloaded with power equipment or lowered on plank ramp to ground. Pipe and fittings shall not be dropped or dumped.
- E. Pipe shall be lowered into trench using backhoe, loader or other suitable means so as not to damage pipe.

### 3.3 PIPED UTILITY DEMOLITION:

- A. Disconnect, demolish, and remove piped utility systems, equipment, and components indicated to be removed.
  - 1. Piping to Be Removed: Remove portion of piping indicated to be removed and cap or plug remaining piping with same or compatible piping material.
  - 2. Piping to Be Abandoned in Place: Drain piping. Fill abandoned piping with flowable fill, and cap or plug piping with same or compatible piping material.
- B. If pipe, insulation, or equipment to remain is damaged in appearance or is unserviceable, remove damaged or unserviceable portions and replace with new products of equal capacity and quality.

### 3.4 DIELECTRIC FITTING APPLICATIONS:

- A. Wet Piping Systems: Connect piping of dissimilar metals with the following:
  - 1. NPS 2 and Smaller: Dielectric couplings.
  - 2. NPS 10 and NPS 12: Dielectric flange kits.

### 3.5 PIPING INSTALLATION:

- A. Install piping according to the following requirements and utilities Sections specifying piping systems.
- B. Drawing plans, schematics, and diagrams indicate general location and arrangement of piping systems. Indicated locations and arrangements were used to size pipe and calculate friction loss, expansion, pump sizing, and other design considerations. Install piping as indicated unless deviations to layout are approved on the Coordination Drawings.



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- C. Install piping indicated to be exposed and piping in equipment rooms and service areas at right angles or parallel to building walls. Diagonal runs are prohibited unless specifically indicated otherwise.
  - D. Install piping to permit valve servicing.
  - E. Install piping at indicated slopes.
  - F. Install piping free of sags and bends.
  - G. Install fittings for changes in direction and branch connections.
  - H. Select system components with pressure rating equal to or greater than system operating pressure.
  - I. Install sleeves for pipes passing through concrete and masonry walls and concrete floor and roof slabs.
    - 1. Cut sleeves to length for mounting flush with both surfaces.
      - a. Exception: Extend sleeves installed in or other wet areas 2-inches above finished floor level.
    - 2. Install sleeves in new walls and slabs as new walls and slabs are constructed.
      - a. PVC Pipe Sleeves: For pipes smaller than NPS 6.
  - J. Verify final equipment locations for roughing-in.
  - K. Refer to equipment specifications in other Sections for roughing-in requirements.

### 3.6 PIPELINE SEPARATION:

- A. Where an existing pipe crosses a trench at an elevation which conflicts with the proposed grade for the new pipe line, either the grade for the new pipe line shall be changed or the existing pipe shall be moved, as directed. The new pipe line shall have a clearance from all existing lines of not less than 6-inches unless specified or directed otherwise. Pipe shall be installed in accordance with the Town standards. The space between the two pipes shall be solidly filled with compacted crushed stone. During construction, temporary supports shall be provided as required to maintain existing pipe lines in position. Before the trench is refilled, existing pipe lines shall be permanently supported.
- B. New mains are to be installed fourteen (14) feet from property line on the West Side of North and South streets and fourteen (14) feet from property line on the South Side of East and West Streets. All service connections must be installed perpendicular (90 degrees) from water main to property line and will have a minimum of five feet (5') to a maximum of six feet (6') of cover and must not be laid in the same trench with other utilities, i.e. gas, electric, sewer. Water services shall be laid at least ten (10) feet horizontally from any existing or proposed septic system, including all components

comprising said septic system, including but not limited to pipe, tank, pit, and stone. No other public or private utilities shall be placed underground within five-feet (5') horizontally from the water mains or services of the Orleans Water Department.

### 3.7 PIPING JOINT CONSTRUCTION:

- A. Join pipe and fittings according to the following requirements and utilities Sections specifying piping systems.
- B. Ream ends of pipes and tubes and remove burrs. Bevel plain ends of steel pipe.
- C. Remove scale, slag, dirt, and debris from inside and outside of pipe and fittings before assembly.
- D. Threaded Joints: Thread pipe with tapered pipe threads according to ASME B1.20.1. Cut threads full and clean using sharp dies. Ream threaded pipe ends to remove burrs and restore full ID. Join pipe fittings and valves as follows:
  - 1. Apply appropriate tape or thread compound to external pipe threads unless dry seal threading is specified.
  - 2. Damaged Threads: Do not use pipe or pipe fittings with threads that are corroded or damaged. Do not use pipe sections that have cracked or open welds.
- E. Welded Joints: Construct joints according to AWS D10.12/D10.12M, using qualified processes and welding operators according to Part 1 "Quality Assurance" Article.
- F. Flanged Joints: Select appropriate gasket material, size, type, and thickness for service application. Install gasket concentrically positioned. Use suitable lubricants on bolt threads.
- G. Grooved Joints: Assemble joints with grooved-end pipe coupling with coupling housing, gasket, lubricant, and bolts according to coupling and fitting manufacturer's written instructions.
- H. Brazed Joints: Construct joints according to AWS's "Brazing Handbook," "Pipe and Tube" Chapter, using copper-phosphorus brazing filler metal complying with AWS A5.8.
- I. Pressure-Sealed Joints: Assemble joints for plain-end copper tube and mechanical pressure seal fitting with proprietary crimping tool to according to fitting manufacturer's written instructions.
- J. Plastic Piping Solvent-Cemented Joints: Clean and dry joining surfaces. Join pipe and fittings according to the following:
  - 1. Comply with ASTM F 402 for safe-handling practice of cleaners, primers, and solvent cements.

- 2. PVC Pressure Piping: Join schedule number ASTM D 1785, PVC pipe and PVC socket fittings according to ASTM D 2672. Join other- than-schedule-number PVC pipe and socket fittings according to ASTM D 2855.
  - 3. PVC Nonpressure Piping: Join according to ASTM D 2855.
- K. Plastic Pressure Piping Gasketed Joints: Join according to ASTM D 3139.
- L. Plastic Nonpressure Piping Gasketed Joints: Join according to ASTM D 3212.
- M. Plastic Piping Heat-Fusion Joints: Clean and dry joining surfaces by wiping with clean cloth or paper towels. Join according to ASTM D 2657.
- 1. Plain-End PE Pipe and Fittings: Use butt fusion.
- N. Bonded Joints: Prepare pipe ends and fittings, apply adhesive, and join according to pipe manufacturer's written instructions.
- 3.8 PIPING CONNECTIONS:
- A. Make connections according to the following, unless otherwise indicated:
- 1. Install unions, in piping NPS 2 and smaller, adjacent to each valve and at final connection to each piece of equipment.
  - 2. Install flanges, in piping NPS 2-1/2 and larger, adjacent to flanged valves and at final connection to each piece of equipment.
  - 3. Install dielectric fittings at connections of dissimilar metal pipes.
- 3.9 EQUIPMENT INSTALLATION:
- A. Install equipment level and plumb, unless otherwise indicated.
- B. Install equipment to facilitate service, maintenance, and repair or replacement of components. Connect equipment for ease of disconnecting, with minimum interference with other installations. Extend grease fittings to an accessible location.
- C. Install equipment to allow right of way to piping systems installed at required slope.
- 3.10 IDENTIFICATION:
- A. Piping Systems: Install pipe markers on each system. Include arrows showing normal direction of flow.
- 1. Plastic markers, with application systems.
  - 2. Locate pipe markers on exposed piping according to the following:
    - a. Near each valve and control device.
    - b. Near each branch, excluding short takeoffs terminal units. Mark each pipe at branch if flow pattern is not obvious.
    - c. Near locations where pipes pass through walls or floors or enter inaccessible enclosures.

- d. At manholes and similar access points that permit view of concealed piping.
- e. Near points of origination and termination.

- B. Adjusting: Relocate identifying devices that become visually blocked by work of this or other Divisions.

### 3.11 CONCRETE BASES:

- A. Concrete Bases: Anchor equipment to concrete base according to equipment manufacturer's written instructions and according to seismic codes at Project.
  - 1. Construct concrete bases of dimensions indicated, but not less than 4-inches larger in both directions than supported unit.
  - 2. Install dowel rods to connect concrete base to concrete floor. Unless otherwise indicated, install dowel rods on 18-inch centers around the full perimeter of base.
  - 3. Use 3000-psi, 28-day compressive-strength concrete and reinforcement as specified in Section 033000 "Cast-in-Place Concrete."

### 3.12 ERECTION OF METAL SUPPORTS AND ANCHORAGES:

- A. Refer to Section 055013 "Miscellaneous Metal Fabrications" for structural steel.
- B. Cut, fit, and place miscellaneous metal supports accurately in location, alignment, and elevation to support and anchor piped utility materials and equipment.
- C. Field Welding: Comply with AWS D1.1/D1.1M.

### 3.13 GROUTING:

- A. Mix and install grout for equipment base bearing surfaces, pump and other equipment base plates, and anchors.
- B. Clean surfaces that will come into contact with grout.
- C. Provide forms as required for placement of grout.
- D. Avoid air entrapment during placement of grout.
- E. Place grout, completely filling equipment bases.
- F. Place grout on concrete bases and provide smooth bearing surface for equipment.
- G. Place grout around anchors.
- H. Cure placed grout.

END OF SECTION

SECTION 331000

WATER UTILITIES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS:

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Specification Sections, apply to this Section.

1.2 SUMMARY:

- A. This Section includes water-distribution piping and related components for water services.
- B. Utility-furnished products include water meters, gate valves, backflow preventers, bends, expansion tanks, vaults, manifolds, etc. that will be furnished to the site, ready for installation.
- C. The Contractor shall furnish all materials and perform all the work and services necessary for the complete construction of the water distribution system; i.e. installation of all pipes, gates valves, fittings, water services, thrust blocks, etc. including all related work such as excavation, backfilling, compaction, testing and disinfection.
- D. The Contractor shall perform his work in accordance with the plans stamped, signed and dated by a Massachusetts Registered Professional Engineer (Civil), (locations and sizes) approved by the Town of Orleans, Water Department.
- E. All work shall conform to the Town of Orleans rules and regulations as obtained from the Orleans Water Department.

1.3 DEFINITIONS:

- A. HDPE: high-density polyethylene plastic.
- B. PVC: Polyvinyl Chloride Pipe

1.4 ACTION SUBMITTALS:

- A. Product Data: For each type of product indicated. Submit manufacturer's product data, installation instructions, use limitations and recommendations for each material used. Provide certifications stating that materials comply with requirements.

- B. Shop Drawings: Detail precast concrete vault assemblies and indicate dimensions, method of field assembly, and components.
- C. Submit plan for testing to the Project Engineer and Water Department for review at least 10 days before starting the test.
- D. Hydrant Meter Rental Form (for use of water at the site during construction)
- E. Demolition Permits
- F. Thrust Block Design & Drawings

1.5 INFORMATIONAL SUBMITTALS:

- A. Coordination Drawings: For piping and specialties including relation to other services in same area, drawn to scale. Show piping and specialty sizes and valves, meter and specialty locations, and elevations.
- B. Field quality-control test reports.

1.6 CLOSEOUT SUBMITTALS:

- A. Operation and Maintenance Data: For water valves and specialties to include in emergency, operation, and maintenance manuals.
- B. Testing Data & Certifications of proposed utilities.
- C. When contract is completed the Town of Orleans DPW and Water Department shall receive AS BUILT drawings stamped, signed and dated by a Massachusetts Registered Professional Engineer.

1.7 QUALITY ASSURANCE:

- A. Regulatory Requirements:
  - 1. Comply with requirements of utility company supplying water. Include tapping of water mains and backflow prevention.
  - 2. Comply with standards of authorities having jurisdiction for potable-water-service piping, including materials, installation, testing, and disinfection.
- B. Piping materials shall bear label, stamp, or other markings of specified testing agency.
- C. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.
- D. NSF Compliance:

1. Comply with NSF 61 for materials for water-service piping and specialties for domestic water.

1.8 DELIVERY, STORAGE, AND HANDLING:

- A. Preparation for Transport: Prepare valves, including meters and backflow preventer, according to the following:
  1. Ensure that valves are dry and internally protected against rust and corrosion.
  2. Protect valves against damage to threaded ends and flange faces.
  3. Set valves in best position for handling. Set valves closed to prevent rattling.
- B. During Storage: Use precautions for valves, meters and backflow preventer, according to the following:
  1. Do not remove end protectors unless necessary for inspection; then reinstall for storage.
  2. Protect from weather. Store indoors and maintain temperature higher than ambient dew-point temperature. Support off the ground or pavement in watertight enclosures when outdoor storage is necessary.
- C. Handling: Use sling to handle valves, meters and backflow preventer if size requires handling by crane or lift. Rig valves to avoid damage to exposed parts. Do not use hand-wheels or stems as lifting or rigging points.
- D. Deliver piping with factory-applied end caps. Maintain end caps through shipping, storage, and handling to prevent pipe-end damage and to prevent entrance of dirt, debris, and moisture.
- E. Protect stored piping from moisture and dirt. Elevate above grade. Do not exceed structural capacity of floor when storing inside.
- F. Protect flanges, fittings, and specialties from moisture and dirt.

1.9 PROJECT CONDITIONS:

- A. Interruption of Existing Water-Distribution Service: Do not interrupt service to facilities occupied by Owner or others unless permitted under the following conditions and then only after arranging to provide temporary water-distribution service according to requirements indicated:
  1. Notify Construction Manager no fewer than two days in advance of proposed interruption of service.
  2. Do not proceed with interruption of water-distribution service without Construction Manager's written permission.

1.10 COORDINATION:

- A. Coordinate connection to water main with utility company.

- B. The Water Department will inspect water main connections to the Town's distribution system. The Contractor shall furnish all necessary materials and labor needed for such connection. All water work must be done under the supervision of the Water Department inspector. Any work done without, will not be accepted by the Water Department. Work done outside of normal working hours which are Monday thru Friday 7:00 AM to 3:00 PM, excluding holidays, will be charged at inspectors premium rate.
- C. No water supply will be shut off without giving sufficient notice to the consumers and stating the time when the supply will be turned on. Permission to shut off water shall first be obtained from the Water Department, who will shut the water off and turn it on again. Special care shall be taken so as not to damage consumer's appurtenances, if such damages occur, the Contractor shall repair such damages at his own expense.
- D. Water main extensions will be shut off from the towns distribution system at the closest gate valve available. New mains are to be installed fourteen (14) feet from property line on the West Side of North and South streets and fourteen (14) feet from property line on the South Side of East and West Streets. All service connections must be installed perpendicular (90 degrees) from water main to property line and will have a minimum of five feet (5') to a maximum of six feet (6') of cover and must not be laid in the same trench with other utilities, i.e. gas, electric, sewer. If the water service cannot be installed perpendicular from the water main, then detector tape must be used from the main to the building foundation.
- E. Water services shall be laid at least ten (10) feet horizontally from any existing or proposed septic system, including all components comprising said septic system, including but not limited to pipe, tank, pit, and stone. No other public or private utilities shall be placed underground within five feet (5') horizontally from the water mains or services of the Orleans Water Department.
- F. When installing new water services that have no foundations, the Town will require the water service to be installed to the curb stop. Couplings will not be allowed at the property line.
- G. No new water services are allowed on the water transmission mains (any water main greater than or equal to 24-inches in diameter). Waiver of this requirement may be granted following a written request by the applicant at the discretion of the Commissioner or his authorized designee.
- H. All new water services will be kept closed until all testing requirements, are completed. Contractor will test water mains at 250 pounds P.S.I. for 1 (one) hour without any leakage and have water samples tested for bacteria. A written report must be submitted from the company conducting the pressure, and bacteria test.



- I. All lead water service repairs are to be replaced with copper tubing from the main to the meter. There shall be no couplings between the main and curb stop and between curb stop and meter.
- J. Contractors are required to be knowledgeable and use plumber rods, similar to Aqua-Stop, when renewing a service that has an inoperable curb stop. (Appendix pg 57-58). Contractors responsible for curb stop cost if service is already copper.
- K. All services must have tracing wire that has been stripped and connected to the corporation, curb stop, and cellar valve.
- L. The service pipe going through foundations, footings, meter pits, or other concrete structures, shall be sleeved to protect it from rubbing on the concrete surface.

## PART 2 - PRODUCTS

### 2.1 DOMESTIC SERVICE:

- A. All water main and service fittings and appurtenances shall be Lead Free and meet the NSF 372/NSF ANSI 61 regulations.
- B. Pipe shall be wrapped in V-bio poly given the corrosive nature of the soils.
- C. Material:
  - 1. Brass – Mueller or Ford as approved by the Orleans Water Department.
  - 2. Plastic – 200 pound CTS and shall comply with AWWA specifications.
- D. Corporation Taps, Curb Stop, Couplings & Curb Stop Boxes:
  - 1. Service pipe size shall not be less than ¾-in. and shall be soft, annealed seamless copper tubing conforming to ASTM B88, Type K. The name and trademark of the manufacturer shall be along the pipe.
- E. Service Saddles:
  - 1. Bodies: Double Strap Ductile Iron ASTM-A536, CC Outlets;
  - 2. Straps: Carbon Steel ASTM-A108 (61018) Electro-galvanized with di-chromate seal ASTM-B633;
  - 3. Studs: Type 304 - 5/8" Stainless Steel;
  - 4. Nuts: Cold formed semi-finished heavy hex steel A563 Electro-galvanized with di-chromate seal ASTM-B633, or Type 304 Stainless Steel Teflon coated for stainless steel.
  - 5. Washers: Carbon steel ASTM-A108 Electro-galvanized with di-chromate seal ASTM-B633 or Type 304 Stainless Steel for stainless steel;
  - 6. Gaskets: Grade 60 compounded to resist oil, natural gas, acids, alkalies most (aliphatic) hydrocarbons fluids water and many chemicals.
  - 7. Finish: Fusion bonded nylon to a minimum thickness of 12-mls or optional topcoat enamel.

- F. Corporation stop for service connections shall have standard shop threads conforming to AWWA C800 on inlet end and with required joint or coupling for connection to copper pipe, and shall be Muller Style AWWA types H-1500 & H-15008, Red Hed style 438 or equal.
- G. Curb stops shall be Water Works inverted-ground key type, oval or round flow way, tee handle, without drains. Pipe connections shall be suitable for the type of service pipe used. All parts shall be of bronze with female iron-pipe-size connections or compression pattern tube couplings and shall be designed for a hydrostatic test pressure not less than 200 psi. Curb stops shall be Mueller style H-1504-2, Reel Heb Style B415G or equal.
- H. Brass Specification:
1. Material: Material shall be of bronze containing not less than 85% copper; bronze to be known as 85-5-5 metal. Castings to be clean and free from roughness both inside and outside.
  2. Waterway: Shall be full size, orifice is to be round, smooth and free from obstructions.
  3. Washer: Washers shall be of cast bronze containing not less than 85% copper finished on both sides to true faces.
  4. Nuts: Shall be of commercial bronze not less than 89% copper and finished on both sides to true faces.
  5. Plugs: All plugs of corporations and curb stop to be solid (except for waterway) size to and including 1½-inches. The bronze in all plugs shall be of a composition harder than that of the body. The material to be known as ingot # 345 Navy M metal with not less than 87% copper.
  6. Adjusting Nuts: The adjusting nuts shall also come to a true facing against the bottom of bronze washer and proper adjustment shall be made to assure easy turning and freedom from leakage. The adjusting nuts shall be properly locked to the stop plug to avoid change in position in operation of stop.
  7. Stop: The stops shall be subject to a sustained hydraulic pressure of 200 lbs.; tested in both the open and closed position.
  8. All curb stops and corporation must be of compression type. All brass goods must fully conform to specifications and no inferior workmanship or material will be accepted.
  9. Corporation Taps, Curb Stop & Curb Stop Boxes shall conform to the latest revision of the Towns specification.
- I. Adapter Couplings:
1. Adaptor couplings for connecting new copper tubing to existing service connection at a point two (2) feet inside the property line shall be standard straight coupling fittings conforming to AWWA C800 manufactured by Mueller, Red Hed or Dresser Type coupling with epoxy coating and all ductile iron construction or equal. When encountering different pipe materials such as steel, brass, lead etc.

couplings used to connect new to existing services shall electrically isolate the two materials and be comprised of corrosion resistant materials.

- J. Line Fittings:
1. Line Fittings, if required on new or old service line, shall be standard three-part unions conforming to AWWA C800; shall be Mueller, Red Hed or equal.

- K. Curb Stop Box:
1. Service boxes shall be cast iron. Extension services boxes of the required length and having slide type adjustment shall be installed at all service box locations. The boxes shall have housings of sufficient size to completely cover the service curb stop and shall be complete with identifying covers.
  2. Curb stop box shall be a 2½-inch Caldwell Shaft Service Box, complete No. 1 or equal. Top Section to be 26 inches, Bottom Section to be 42-inches or 45-inches, stop box to fit over curb stop in sizes ¾ inches to 2-inches and having inside leg measurements of 4-7/8-inches. Top Section of this No.1 service box must be recessed to receive cover.

## 2.2 PIPE JOINTS:

- A. Solid rubber rings etc. shall be separated from each length of pipe. Ductile iron pipe shall have rubber-gasket push-on joints or rubber-gasket mechanical joints.
- B. Rubber-gasket joints shall conform to AWWA C111 gasket shall be of SBR.
- C. Nitril gaskets shall be utilized due to contamination in the streets.

## 2.3 RESTRAINED JOINTS:

- A. Restrained joints shall be "Locked-Type" joint manufactured by the pipe and fitting manufacture that utilize restraint independent of the joint gasket. Restrained joints shall be suitable for the specified 250 psi test pressure. Mechanical joint retainer glands as manufactured by EBAA Iron Inc. of Texas can be selected for restraining the mechanical joint of ductile iron pipe. Push - on restrained joints as manufactured by the pipe supplier or manufacturer may be used subject to approval of the Commissioner.

## 2.4 SLEEVE TYPE JOINTS:

- A. Sleeve type couplings shall be Dresser 38,138 or equal.

## 2.5 FITTINGS:

- A. Pipe fittings shall be ductile iron with pressure rating of 350 psi for 24-in. and smaller piping and 250 psi for 30-in. and larger piping. Fittings shall meet the requirements of AWWA C110 or AWWA C153 as applicable. Fittings shall have the same pressure

rating as a minimum, of the connecting pipe. All fittings shall conform to the latest revision of the Towns specifications.

- B. Closures shall be made with mechanical joint ductile iron solid sleeves and shall be located in straight runs of pipe at minimum cover outside the limits of restrained joint sections. Location of closures shall be subject to approval of the Water Department.

## 2.6 INTERIOR LININGS:

- A. Ductile iron pipe and fittings shall have the same type of lining; cement mortar lining and asphaltic seal coat in accordance with AWWA C104 double thickness.

## 2.7 GATE VALVES AND VALVE BOXES:

- B. All valves and appurtenances shall be new and in perfect working condition. Valves shall be designed for continuous use with a minimum of maintenance and service required and shall perform the function without exceeding the safe limits for stress, strain or vibration. In no case will used or damaged valves be acceptable. Both workmanship and material shall be of the very best quality and shall be entirely suitable for the service conditions specified.
- C. Gate valves shall be ductile iron Resilient Seat type, designed for 250 psi working pressure and test pressure of 500 psi.
- D. Valves are to have Double O-ring stuffing box and a Non-Rising Stem. The design and machining of the valve shall allow replacement of O-rings without undue leakage, while the valves are fully opened and in service. Anti-friction washers are to be located above and below the thrust collar portion of the stem to reduce friction and provide more effective conversion or operating torques into seating loads.
- E. Valves shall have 2-in. operating nut. Valve shall Open Right. Thin wall ductile iron valves will not be accepted. Resilient seat valves shall meet the most recent version of AWWA standard specification for gate valves in all respects, AWWA C509-87.
- F. All inside and outside cast iron surfaces are to be Epoxy Coated. Epoxy coating 10-mils nominal. Non-toxic and imparts no taste to water and certified to NSF61 (AWWA C550) Standards.
- G. Standard Mechanical Joint ends for cast iron, with end dimensions complying with ANSI/AWWA C11/121.11 Standards.
- H. Gate valves shall be manufactured by: AP Smith, Darling, and Mueller Co. #A2360-20.

## 2.8 BUTTERFLY VALVES:

- A. Shall be in accordance with requirements of AWWA CS04-Class 150-B Standard for butterfly valves, a Cast Iron Body design, with mechanical joint fittings (with Joint accessories), Cast Ni-resist disc, 304 Stainless Steel shafts, shaft locking pins to conform to ASTM A304, Gr.3650H Standards, Bronze thrush bearing, fiberglass reinforced Teflon shaft bearings, with Chevron type packing.
- B. Butterfly valve shall be used in sizes 16-in and greater, shall Open Right, with a 2-in. square operating nut with a maximum water temperature 125° degree (F), Maximum working pressure 150 psi, Test pressure 300 psi, Maximum velocity rating of 16-ft./sec.
- C. Valve body exterior and interior shall have a fusion bonded epoxy coating in accordance with AWWA C-555 Standards.
- D. The valve shall be designed so that during operation, or cycling of the valve, there is no friction or abrasion or rubbing together that could wear away any coating material and expose bare metal.
- E. The interior of the valve body shall be free of pockets or ledges where sediment or debris can collect.
- F. "O" ring seal shall be replaceable with the valve under pressure in the full-open position.
- G. Valve shall be capable of operating through 500 full cycles with zero leakage and without regard to direction of valve discharge or operating pressure.
- H. Shall be manufactured by Mueller Model # B-3200-20 and Muller Line Seal Model # B-3200-20 with Mechanical Joint Ends bolts, glands & rubber gaskets complete with operator.
- I. Any proposed deviation to this specification shall be submitted as a special request, in writing, to the commissioner for review and final approval.

2.9 GATE / SERVICE BOX:

- A. Shall be a heavy-pattern cast iron, three (3) piece, and telescoping type box with dome base suitable for installation on the buried valves. Inside diameter shall be at least a 4 ½ inch barrel length shall be adapted to the depth of cover, with a lap of at least 6-inches when in the most extended position. Cover shall be cast iron with integrally-cast direction - to open arrow. Aluminum or plastic are not acceptable. A means of lateral support for the valve extension shaft shall be provided in the top position of the valve box.

- B. The upper section of each box shall have a top flange of sufficient bearing area to prevent settling. The bottom of the lower section shall enclose the stuffing box and operating nut of the valve and shall be oval.
- C. Shall be manufactured by Buffalo, two (2) piece design, Caldwell No. 10 Gate box - 5 ¼ (Five & one quarter) inch shaft used with 12-inch valves and smaller sliding type: Size - 664, extending from 38-inches to 60-inches, Top Section 26-inches, Bottom Section 36-inches, weight of 110 lbs.
- D. Service Box – 1”, 1-1/2”, and 2” Erie type with minimum 5’ bury with 24” stainless steel rods.
- E. Gate box shall conform to the latest revision of the Towns specification.

## 2.10 WATER METERS:

- A. Manufacturers:
  - 1. Basis-of-Design Product: Subject to compliance with requirements of the Town of Orleans or a comparable product by one of the following:
    - a. AMCO Water Metering Systems.
    - b. Badger Meter, Inc.
    - c. Carlon Meter.
    - d. Hays Fluid Controls; a division of ROMAC Industries Inc.
    - e. McCrometer.
    - f. Mueller Co.; Hersey Meters.
    - g. Neptune Technology Group Inc.
    - h. Sensus Metering Systems.

## 2.11 BACKFLOW PREVENTERS:

- A. Double-Check, Backflow-Prevention Assemblies:
  - 1. Basis-of-Design Product: Subject to compliance with requirements or a comparable product by one of the following:
    - a. Ames Fire & Waterworks; a division of Watts Regulator Co.
    - b. Conbraco Industries, Inc.
    - c. FEBCO; SPX Valves & Controls.
    - d. Flomatic Corporation.
    - e. Watts Water Technologies, Inc.
    - f. Wilkins; a Zurn company.
  - 2. Standard: AWWA C510.
  - 3. Operation: Continuous-pressure applications, unless otherwise indicated.
  - 4. Pressure Loss: 5 psig maximum, through middle 1/3 of flow range.
  - 5. Size: 2-inches.
  - 6. Design Flow Rate: 50 gpm.
  - 7. Selected Unit Flow Range Limits: 0-200 gpm.
  - 8. Pressure Loss at Design Flow Rate: 10 psi for NPS 2 and smaller.

9. Body: Bronze for NPS 2 and smaller.
10. End Connections: Threaded for NPS 2 and smaller.
11. Configuration: Designed for horizontal, straight through flow.
12. Accessories: Ball valves with threaded ends on inlet and outlet of NPS.

B. Backflow Preventer Test Kits:

1. Basis-of-Design Product: Subject to compliance with requirements or a comparable product by one of the following:
  - a. Conbraco Industries, Inc.
  - b. FEBCO; SPX Valves & Controls.
  - c. Flomatic Corporation.
  - d. Watts Water Technologies, Inc.
  - e. Wilkins; a Zurn company.
2. Description: Factory calibrated, with gages, fittings, hoses, and carrying case with test-procedure instructions.

2.12 PRESSURE REDUCING VALVE / EXPANSION TANK:

A. Manufacturers:

1. Basis-of-Design Product: Subject to compliance with requirements of the Town of Orleans or a comparable product by one of the following:
  - a. Apollo – Pressure Reducing Valve
  - b. Amtrol -Therm-X-Trol Tank
  - c. Approved Equal

- B. Size: Compatible with 2-inch PVC piping.

2.13 TRACING WIRE:

- A. Tracing Wire shall be #12 S.W.H.

2.14 PIPING SPECIALTIES:

- A. Transition Fittings: Manufactured fitting or coupling same size as, with pressure rating at least equal to and ends compatible with, piping to be joined.

B. Flexible Connectors:

1. Ferrous-Metal Piping: Stainless-steel hose covered with stainless-steel wire braid; with ASME B1.20.1, threaded steel pipe nipples or ASME B16.5, steel pipe flanges welded to hose.

C. Dielectric Fittings:

1. General Requirements: Assembly of copper alloy and ferrous materials with separating nonconductive insulating material. Include end connections compatible with pipes to be joined.

2.15 CONCRETE THRUST BLOCKS:

- A. Furnish all labor, materials equipment and incidentals required to install concrete thrust blocks for pipe fittings as ordered by the Project Engineer, as shown on the Plans and as specified.

2.16 CONCRETE QUALITY:

- A. Unless otherwise specified or directed, concrete shall be designed for a minimum allowable compressive strength of 3,000 psi at 28 days. Slump shall preferably be between 2-inches and 4-inches and shall not exceed 5-inches. Water shall be kept to a minimum, to obtain the concrete, which is as dense and watertight as possible. The maximum water content shall be 6 gallons per 94 lb. sack and the minimum cement factor shall be 5.7 (94 lb) sacks per cubic yard. The above ratios shall be revised for sacks of cement weighing different from 94 lb per sack.
- B. Ready-mix concrete shall conform to ASTM C94 and the requirements herein, or as otherwise approved by the Project Engineer. If ready-mix concrete is to be used, the manufacturer shall furnish a statement to the Project Engineer for his approval giving the dry proportions to be used with evidence that these will produce concrete of the quality specified.
- C. Concrete shall be mixed until there is a uniform distribution of the material and shall be discharged completely before the mixer is recharged. The mixer shall be rotated at a speed recommended by the mixer manufacturer and mixing shall be continued for at least one and one-half minutes after all the materials are in the mixer. Concrete shall be placed within 1½ hours of the time at which water was first added; otherwise it shall be rejected. Concrete which has been remixed or re-tempered or to which an excess amount of water has been added, shall also be rejected.

PART 3 - EXECUTION

3.1 EARTHWORK:

- A. Refer to Section 310000 "EARTHWORK" and Section 312333 "EXCAVATION, TRENCHING, & BACKFILLING FOR UTILITY SYSTEMS".

3.2 CONTROLLED DENSITY FILL

- A. "Controlled Density Fill" (flowable fill) shall be placed for backfill in all trench cuts where applicable in accordance with the Town of Orleans Department of Public Works and Water Department.
- B. All work shall conform to the relevant provisions of Massachusetts Department of Transportation "Standard Specifications for Highways and Bridges", 1988 or the latest subsequent revision.



- C. Controlled Density Material (flowable fill) shall meet the requirements of Subsection M4.08.0.
- D. Contractor is to install ¾” stone to a level one (1) foot above the crown of the pipe. Flowable fill will be placed over the ¾” stone.
- E. Copy of the batch slips are to be submitted to the Project Engineer.

### 3.3 EXCAVATION AND BACKFILLING:

- A. Scope of Work:
  - 1. The contractor shall furnish all labor, materials, equipment and incidentals necessary to perform all trenching for pipelines and appurtenances, including drainage, filling, backfilling, disposal of surplus material and restoration of trench surfaces and easements.
  - 2. Excavation shall extend to the width and depth shown on the Plans or as specified and shall provide suitable room for installing pipe, structures and appurtenances.
  - 3. Furnish and place all sheeting, bracing, and supports and shall remove from the excavation all materials which the Water Department may deem unsuitable for backfilling. The bottom of the excavation shall be firm, dry and in all respects, acceptable. If conditions warrant, deposit gravel for excavation below grade, directly on the bottom of the trench immediately after excavation has reached the proper depth and before the bottom of the trench has become softened or disturbed by any cause whatever. The length of the open trench shall be related closely to the rate of pipe laying. All excavation shall be made in open trenches.
  - 4. Contractors installing by-pass piping must have a minimum trench width of one (1) foot.
  - 5. All excavation, trenching and sheeting, bracing, etc. shall comply with the requirements of OSHA excavation safety standards (29 CFR Part 1926.560 Subpart P) and the State requirements. Where conflict between OSHA regulations exists, the more stringent requirement shall apply.
- B. Trench Excavation:
  - 1. Trench excavation shall include material of every description and of whatever substance encountered, except rock and boulders. Pavement shall be cut with a saw, wheel or pneumatic chisel along straight lines before excavating. Contractor is responsible for removing existing reinforced sub-base if encountered.
  - 2. Strip and stockpile topsoil from grassed areas crossed by trenches. At the contractor's option, topsoil may be otherwise disposed of and replaced, when required, with approved topsoil of equal quality.
  - 3. While excavation and backfilling is in progress, traffic shall be maintained, or in instances when traffic cannot be maintained a police detail will be required at the contractor expense. Care must be taken not to damage water pipes, drains, sewers gas mains, electric & cable TV conduits, or other structures encountered on the lines of the work. In case of damage to any structures, the structures owner and the Water Department shall be immediately notified by the Contractor, so proper

steps may be taken to repair the damage, at the expense of the Contractor, any and all damage. All utilities and other property shall be protected.

4. Trenches shall be excavated to the depth indicated on the Plans or to allow for a minimum of five (5) feet and no more than six (6) feet cover over the top of the pipe. In open cut excavations, the trench width at the top of the pipe shall be no wider than the outside diameter of the pipe, plus 1.5-feet, or in widths sufficient for laying the pipe, bracing and for pumping and drainage facilities. The bottom of the excavation shall be firm and dry and in all respects acceptable to the Inspector. The trench above the top of the pipe shall have sufficient slope so that the banks will not slide. Sheeting of trenches will be at the contractor's discretion and may be required by applicable governmental laws and regulations.
5. Excavation and dewatering shall be accomplished by methods, which preserve the undisturbed state of sub-grade soils. The trench may be excavated by machinery to, or just below the designated sub-grade. Provide that material remaining in the bottom of the trench is no more than slightly disturbed. Sub-grade soils, which become soft, loose, "quick", or otherwise unsatisfactory as a result of inadequate excavation, dewatering or other construction methods shall be removed and replaced by screened gravel fill as required by the Water Department at the Contractor's expense.
6. Clay and organic silt soils are particular to disturbance due to construction operations. When excavation is to end in such soils, use a smooth-edge bucket to excavate the last one-foot of depth.

C. Bedding:

1. Pipe shall be bedded to its side centerline in compacted granular material. Granular materials are defined per the AASHTO Soil Classification System (ASTM D3282) or the Unified Soil Classification System (ASTM D2487), with the exception that gravel bedding/backfill adjacent to the pipe is limited to 2" maximum particle size per ANSI/AWWA C600. Compacted granular or select material shall be used to top of pipe. Loose soil or select material is defined as "native soil excavated from the trench, free of rocks, foreign materials, and frozen earth." Approximately 90 percent shall pass Standard Proctor, AASHTO T-99 "Standard Method of Test for the Moisture Density Relations of Soils Using a 5.5 lb (2.5 kg) Rammer and a 12-in. (305 mm) Drop." Available from the American Association of State Highway and Transportation Officials, 444 N. Capital St. N.W., Washington, DC 20001. The clean earth shall be hand shoveled and properly tamped beneath the pipe so that the pipe shall have a continuous and even bearing. The trench may be excavated by machinery to the normal depth of the pipe provided that the material remaining in the bottom of the trench is no more than slightly disturbed.
2. Where pipe is to be laid directly on the trench bottom, final excavation at the bottom of the trench shall be performed manually, providing a flat-bottom true to grade upon undisturbed material. Bell holes shall be made as required.

D. Disposal of Materials:

1. Excavated materials shall be stacked without excessive surcharge on the trench bank or obstructing free access to gate valves. Inconvenience to traffic and abutters shall be avoided as much as possible. Excavated material shall be segregated for use in backfilling as specified below.
2. It is expressly understood that no excavated material shall be removed from the site of the work or disposed of, except as directed by the Project Engineer. When the Project Engineer has approved removal of surplus materials, dispose of such surplus in approved designated areas.
3. Should conditions make it impracticable or unsafe to stack material adjacent to the trench, the material shall be hauled and stored at a location provided. When required, it shall be re-hauled and used in backfilling the trench.

E. Sheeting and Bracing:

1. Contractor shall furnish, put in place and maintain sheeting and bracing required by Federal, State or local safety requirements to support the sides of the excavation and prevent loss of ground which could endanger personnel, damage or delay the work or endanger adjacent structures. If the Project Engineer/Contractor is of the opinion that at any point sufficient or proper supports have not been provided, he/she may order additional supports placed at the expense of the Contractor. Compliance with such order shall not relieve the Contractor from his or her responsibility for the sufficiency of such supports. Care shall be taken to prevent voids outside of the sheeting, but if voids are formed they shall be immediately filled and rammed.
2. When movable trench bracing such as boxes, movable sheeting, shoring or plates are used to support the sides of the trench, care shall be taken in placing and moving the boxes or supporting bracing to prevent movement of the pipe, or disturbance of the pipe bedding and the screened gravel backfill.
3. When installing flexible pipe (PCV, DI, etc.) trench boxes, movable sheeting, shoring or plates shall not be allowed to extend below mid-diameter of the pipe. As trench boxes, movable sheeting, shoring or plates are moved, screen gravel shall be placed to fill any voids created and the screened gravel and backfill shall be recompact to provide uniform side support for the pipe. Sheeting driven below mid-diameter of any pipe shall remain in place from the driven elevation to at least 1-foot above the top of the pipe.
4. All sheeting and bracing shall be carefully removed in such a manner as not to endanger the construction or other structures, utilities, or property, whether public or private. All voids left after withdrawal of the sheeting shall be immediately refilled with sand by ramming with tools especially adapted to that purpose, by watering or otherwise as directed.

F. Test Pits:

1. Excavation of test pits may be required for the purpose of locating underground utilities or structures as an aid in establishing the precise location of new work.
2. Test pits shall be backfilled as soon as the desired information has been obtained. The backfilled surface shall be maintained in a satisfactory condition for travel until resurfaced as specified.

G. Excavation Below Grade and Backfill:

1. Whenever the nature of unstable material encountered or the groundwater conditions trench drainage shall be complete and effective. If the Contractor excavates below grade through error or for the Contractor's own convenience, or through failure to properly dewater the trench, or disturbs the sub grade before dewatering is sufficiently complete, he may be directed by the Project Engineer to excavate below grade as set forth in the following paragraph, in which case the work of excavating below grade and furnishing and placing the refill shall be performed at his own expense.
2. If the material at the level of the trench bottom consists of fine sand, sand and silt or soft earth which may work into the screened gravel notwithstanding effective drainage, the sub-grade material shall be removed to the extent directed and the excavation refilled with 6-in. layer of course sand, or a mixture graded from course sand to the fine pea stone, as approved by the Project Engineer, to form a filter layer preserving the voids in the gravel bed of the pipe. The Project Engineer prior to placement shall approve the composition and gradation of gravel. Screen gravel shall then be placed in 6-in. layers thoroughly compacted up to the normal grade of the pipe. If directed by the Project Engineer, bank-run gravel shall be used for refill of the excavation below grade. Geotextile filter fabric may be substituted for filter layer if approved by the Project Engineer. Filter fabric shall be Mirafi 140N, Supac equivalent, or equal.

H. Backfilling:

1. As soon as practicable after the pipe has been laid, jointed, and inspected, backfilling shall begin and thereafter be prosecuted expeditiously. Bedding gravel, as specified for the type of pipe installed, backfill shall be deposited by hand evenly on both sides to the centerline of the pipe and tamped with suitable tools, then filled in by hand up to 1-foot over the pipe before backfilling with a machine. All materials for backfilling shall be suitable and free from organic substances, large stones and frost. No stone weighing over fifty (50) lbs. shall be backfilled anywhere into the trench. Stones larger than 3-inches in diameter shall not be closer than 6-inches to the pipe. Fill shall not be dropped into the trench in a manner to endanger the pipe. The water into the new mains shall not be turned on until fill material is placed to the proper grade over the pipelines and around fittings.
2. An impervious dam or bulkhead cut-off of clay or other impervious material shall be constructed in the trench as directed; to interrupt the unnatural flow of groundwater after construction is completed. The dam shall be effectively keyed into the trench bottom and sidewalls. Provide at least one clay or other impervious material dam in the pipe bedding between each manhole where directed or every 300-feet, whichever is less.
3. Where the pipes are laid cross-country, the remainder of the trench shall be filled with common fill material in layers not to exceed 3-feet and mounded 6-inches above the existing grade or as directed. Where a loam or gravel surface exists prior to cross country excavations, it shall be removed, conserved and replaced to

the full original depth as part of the work under the pipe items. In some areas it may be necessary to remove excess material during the clean-up process, so that the ground may be restored to its original level and condition.

4. Where the pipes are laid in street, the remainder of the trench up to a depth of 1-foot below the bottom of the specified permanent paving shall be backfilled with common fill material in layers not to exceed 1-foot and thoroughly compacted. The sub-base layer for paving shall be bank-run gravel thoroughly compacted in 6 inch layers.
5. To prevent longitudinal cracking of the pipe, dumping backfill material into the trench and then spreading will not be permitted until material or screened gravel has been placed to a level 1-foot over the pipe.
6. Backfill shall be brought up evenly on all sides. Each layer of backfill material shall be thoroughly compacted by rolling, tamping, or vibrating with mechanical compacting equipment or hand tamping, to 92 percent compaction. If rolling is employed, it shall be used of a suitable roller or tractor, being careful to compact the fill throughout the full width of the trench.
7. Water jetting or puddling may be used unless the refill contains too great a proportion of clay or loam to permit satisfactory drying. Water jetting shall consist of using a suitable length of pipe at least 1¼ inch in diameter fitted with quick acting valve and sufficient hose to connect to a hydrant or pump having adequate pressure and capacity. The full depth of backfill shall be thoroughly inundated by thrusting the pipe into the fill at frequent intervals with the valve open until all slumping ceases. Where backfill is compacted by puddling it shall be done by depositing it in water. Water for jetting or puddling may be obtained from owner hydrants where possible. The owner of the hydrant may furnish water if reasonable care is exercised in its use and when approved by the Water Department. If water restrictions are in force, obtain water elsewhere, or compact the backfill by other approved methods.
8. Where other methods are not practicable, compaction shall be by use of hand or pneumatic ramming with tools weighing at least 20 lbs. The material being deposited shall be spread and compacted in layers not over 6 in thick. If necessary, sprinkling shall be employed in conjunction with rolling or ramming.
9. Backfill around structures shall be selected common fill material, may be compacted by puddling where approved by the Project Engineer. All Backfill shall be compacted, especially under and over pipes connected to the structures.
10. While puddling is underway and afterwards, until the puddle areas have sufficiently hardened, the Contractor must protect the trench and the public by suitable barriers, lights, etc. Refer to Section 312333, Excavation, Trenching, & Backfilling , for methods of repairing and patching trenches.

### 3.4 PIPE INSTALLATION & APPURTENANTS:

#### A. Scope of Work:

1. Contractor to furnish all labor, materials, equipment and incidentals required install disinfect and test ductile iron pipe, fittings, for distribution system piping. Piping shall be located substantially on drawings. The Water Department reserves

the right to make such modifications in locations as may be found desirable to avoid interference between pipes or for other reasons.

B. Installing Pipe and Fittings:

1. Care shall be taken in loading, transporting and unloading to prevent damage to the pipe or coatings. Pipe and fittings shall not be dropped. All pipe and fittings shall be examined before laying and no piece shall be installed which is found to be defective. Damaged to the pipe coating shall be repaired per manufacturer's recommendations.
2. Water-Main Connection: Tap water main according to requirements of water utility company and of size and in location indicated.
3. If any defective pipe is discovered after it is laid, it shall be removed and replaced with a sound pipe in a satisfactory manner. All pipe and fittings shall be thoroughly cleaned before laying, shall be kept clean until they are used in the work and when installed or laid, shall conform to the lines and grades required.
4. Blocking will not be permitted.
5. All pipes shall be sound and clean before laying. The contractor shall remove, by pumping or other means, any water accumulated in the trench during the pipe laying period and keep the trench dry until the joints are properly connected. When pipe laying is not in progress, open ends of the pipe shall be closed by a watertight plug or other approved means. Sufficient backfill shall be placed to prevent flotation. Any pipe lengths, which have floated, shall be removed from the trench and relayed to the satisfaction of the inspector. The deflection at joints shall not exceed 75 percent of allowable deflection recommended by manufacturer.
6. Fittings shall be provided where required, in crossing utilities, which may be encountered upon opening the trench. Solid sleeve closures shall be installed at locations approved by the Project Engineer.
7. The pipe interior shall be maintained dry and broom clean throughout the construction period. When cutting pipe is required cutting shall be done by machine, leaving a smooth cut at right angles to the axis of the pipe. Cut ends of pipe to be used with a bell shall be beveled to conform to the manufactured spigot end. Cement lining shall be undamaged. Field cut ends shall be sealed with approved epoxy in accordance with manufacturer's instructions.
8. Cutting of restrained joint pipe will not be allowed, unless approved at specific joints in conjunction with the use of restrainer glands by EBAA Iron of field adaptable restrained joints.
9. Wedges supplied with the pipe shall be used according to the manufacturer's recommendation to effect electrical continuity.
10. Sewer line and water main separation shall conform to guidelines in TR-16, Guides for the Design of Wastewater Treatment Works, 2011 Edition. Sewers shall be kept remote from public water supply wells or other potable water supply sources and structures. Wherever possible, sewers shall be laid at a minimum of at least 10 feet, horizontally, from any existing or proposed water main. Should local conditions prevent a latera separation of 10-feet, a sewer may be laid closer than 10-feet to a water main if it is laid in a separate trench and the elevation of the crown is at least 18-inches below the invert of the water main.

11. Whenever sewers must cross under water mains, the sewer shall be laid at such an elevation that the crown of the sewer is at least 18-inches below the invert of the water main. When the elevation of the sewer cannot be varied to meet this requirement, the water main shall be relocated to provide this separation or constructed with mechanical joint type pipe for a distance of 10-feet on each side of the sewer. One full length of water main shall be centered over the sewer so that both joints will be as far from the sewer as possible.
12. When it is impossible to obtain horizontal and/or vertical separation as stipulated above, both the water main and sewer shall be constructed of mechanical joint cement lined ductile iron pipe or equivalent that is watertight and structurally sound. Both pipes should be pressure tested to 150 psi to ensure that they are watertight.

C. Thrust Blocks:

1. The contractor shall be responsible to supply and install concrete thrust blocks at all bends and tees as shown on standard detail plans the concrete shall be composed of one part Portland cement, two parts sand and four parts coarse aggregate. The concrete shall be mixed and placed in a manner satisfactory to the Project Engineer and Town Inspector. In placing the concrete, care shall be taken not to disturb the alignment of the pipes around or adjacent to the concrete being placed.
2. Concrete encasements shall be placed as shown and as directed by the Plans. Backfill shall not be placed on the concrete until permitted by the Water Department.
3. The backs of the thrust blocks anchors shall be placed against undisturbed earth. The sides of thrust blocks shall be formed. The Minimum bearing area shall be as called out on the Plans, or as determined by the Project Engineer. Felt roofing paper shall be placed to protect pipe joints, fittings, and valve drain ports. Concrete shall not be placed over bolts or nuts, or to prevent the removal of the joints.

D. Jointing:

1. Push-on joints shall be made in accordance with manufacturer's instructions and AWWA C600 Standards. Pipe shall be laid with bell ends looking ahead. A rubber gasket shall be inserted in the groove of the pipe. The joint surfaces shall be cleaned and lubricated and the plain end of the pipe shall be aligned with the bell of the pipe to which it is to be joined and pushed home.
2. Mechanical joints shall be assembled in strict accordance with the manufacturer's instructions and AWWA C600 Standard. Pipe shall be laid with bell ends looking ahead. To assemble the joints in the field; thoroughly clean and lubricate the joint surfaces and rubber gasket. Bolts shall be tightened to the specified torques. Under no condition shall extension wrenches or pipe over handle of ordinary ratchet wrench be used to secure greater leverage.
3. Bolts in mechanical or restrained joints shall be tightened alternately and evenly. Restrained joints shall be installed according to pipe manufacturer's instructions.

4. All blow-offs, outlets, valve, fittings, and other appurtenances required shall be set and jointed as indicated on the Drawings in accordance with the manufacturer's instructions.
- E. Gate Valves and Boxes:
1. Buried valves shall be cleaned manually operated before installation. Buried valves and valve shall be set with the stem vertically (plumb), aligned in the center of the valve box. Valves shall be set on a firm foundation and supported by tamping pipe bedding material under the sides of the valve and shall be connected with short lengths of pipe when needed.
- F. Valve Box:
1. The valve box shall be supported during backfilling and material in vertical alignment with the top flush with finish grade. The valve box shall be set so as not to transmit traffic loads to the valves. Before Backfilling, all exposed portion of any bolts shall be coated with two coats of bituminous paint.
- G. Domestic Services:
1. Services from the main to the property line shall be set perpendicular (90 degrees) to the water main. Shall have a minimum of 5-feet cover and shall not be laid in the same trench with gas, electric or sewer. If the water service cannot be installed perpendicular from the water main then detector tape must be used from the main to the building foundation. The water service cannot be under any structure from the curb stop to the mechanical room. The area where the water service enters through the foundation shall be 3-feet away from the main circuit breaker panel. Meter stops, meter connection and blanks will be furnished, but not installed, by the Water Department. Requests for meters to be set and water turned on shall be made to the Water Department least 48 hours in advance. Water service numbers will be required before turning on the water service. Well water residents conveying from septic to sewer will be required to have a Town water meter installed for billing purposes. When laterals are reconnected to existing services, a Reconnection Fee is required prior to work commencing.
- H. Corporation Stops:
1. Corporation stops shall be installed for connecting all services to the new water mains. Keep a record of the locations of all corporation stops installed and shall indicate on the record those corporation stops that have not been connected to service piping. A copy of this record shall be given to the Water Foreman at the completion of the work. Copper tubing, curb stops and necessary adapters shall be used to make connections between new corporation stops and new and existing service piping.
  2. The tapping machine shall be rigidly fastened to the pipe as near the horizontal diameter as possible. The length of travel of the tap should be so established that when the stop is inserted and tightened with a 14-inch wrench, not more than one to three threads would be exposed on the outside.



3. When a wet tapping machine is used, the corporation cock shall be inserted with the machine while it is still in place. Stops shall be tightened only sufficiently to give water tightness and care must be constantly exercised not to over tighten them.

I. Straight Couplings:

1. Install straight couplings to existing water mains of the sizes required in the locations designed by the Project Engineer. Utilize the manufacturer's recommended installation procedures while performing the work. Care shall be taken to ensure a watertight connection.
2. Couplings shall have a protective wrapping of "Denso" material by DENSO Inc. of Texas or approved equal. Where Denso material is used, the joint shall be packed up with "Densyl mastic" to give an even contour for wrapping with "Densopol" tape. A 1.5mm thick coating of "Denso" paste shall be applied followed by 100mm or more wide "Densopol" tape wound spirally around the joint with at least 50 percent overlap.

J. Curb Stops:

1. Shall be installed 1.5-feet from the curb line or pavement limit. Install the curb stops and boxes in a workman like manner as described herein.

K. Curb Boxes:

1. Shall be set true vertical position and if they are within the limits of the roadway or within limits where the plowing of snow will take place in the winter, top of the boxes shall be set about 1/2-inch below the top of the finished grade. In locations where these boxes are not likely to be disturbed, the tops shall be set flush with the adjoining ground.

L. Copper Tubing:

1. Care shall be exercised in the placing and laying of copper tubing to be sure that the pipe does not have kinks or sharp bends and to assure against it being in contact with sharp stones or ledge which would cause damage to the pipe. At least 6-in. of selected fill shall be placed adjacent to and above the pipe and no stones shall be placed over the pipe until the depth of backfill above the latter is in excess of 1-foot.

M. Lead Service Renewals:

1. When lead services are replaced or repaired, Contractor shall provide all residents connected to service with Lead Education letter from Water Department. Contractor shall notify Water Department when lead services are replaced or repaired and confirm delivery of letter to residents.

3.5 WATER MAIN FILLING AND TESTING:

- A. After installation, the pipe shall be tested for compliance as specified herein. Furnishing all necessary equipment and labor for the pressure test and leakage test on

the pipeline'(s). Submit plan for testing to the Water Department for review at least 10 days before starting the test.

- B. Testing shall be conducted in accordance with AWWA C600 standard. Pressure pipelines shall be subject to a hydrostatic pressure of 250 psig or 1.5 times the working pressure at the highest point along the test segment. This test pressure shall be maintained for a minimum of 1 hours. The leakage rate shall not exceed those indicated in AWWA C600 Standard. Provide suitable restrained bulkheads as required to complete the hydrostatic test specified.
- C. All valves and valve boxes shall be properly located and installed and operable prior to testing. Bulkheads shall be provided with a sufficient number of outlets for filling and draining the line and for venting air.
- D. Hydrostatic pressure and leakage tests shall conform to Section 4 of AWWA C600 Standard. Furnish gauges, meters, pressure pumps, and other equipment needed to fill the line slowly and perform the required hydrostatic tests.
- E. The Water Department will provide a source of supply from the existing treated water distribution system for Contractor's use in filling the lines. An air break shall be maintained at all times between the distribution system and the Contractor's equipment to prevent cross connection.
- F. The line shall be slowly filled with water (so not to disturb existing lines) from the low end if possible; expelling air from the taps at the beginning and end of the line. The line shall be shut down and left filled for 24 hours.
- G. Testing:
  - 1. After the line is filled and all air has been expelled and the valves segregating the portion of the system to be tested are secure closed, pressure is applied by pump water into the isolated section until 250 psig is obtained. The pressure should be maintained for not less than one (1) hours. If the line does not have any leakage, then it will maintain the test pressure for the specified time.
  - 2. Specified test pressure shall be maintained in the pipe for the entire test period by means of a pump furnished by the Contractor. Provide accurate means for measuring the quantity of water to maintain this pressure. The amount of water required is a measure of leakage.
  - 3. The duration of the pressure test shall not be less than one (1) hours. The leakage test shall be a separate test following the pressure test and shall not be less than two (2) hour duration. All leaks evident at the surface shall be repaired and leakage eliminated regardless of the total leakage as shown by test.
  - 4. If the pressure drops, the test pressure must be maintained by pumping from calibrated (marked) containers to hold the test pressure for the length of the test period to determine the amount of leakage. If the rate of leakage is greater than that is allowed in the following table, it shall be understood that the test has failed and appropriate repairs should be made before the test is again conducted.

5. Water lines that fail to meet the test standard shall be repaired and retested as necessary until test requirements are complied with. Defective materials, pipe, valves and accessories shall be removed and replaced.
6. The general procedure for chlorination shall be first to flush all dirty or discolored water from the lines and then introduce chlorine in approved dosages through a tap at one end, while water is being withdrawn at the other end of the line. The disinfectant shall be mixed with water in proper proportions to provide a minimum of 50 ppm throughout the main. The chlorine solution shall remain in the pipeline for 24 hours.

H. Water Main Disinfection:

1. The Water Department shall be notified at least 48 hours prior to chlorination, and shall witness the procedure. If no one from the Water Department is available, the procedure shall be rescheduled to accommodate the Water Department.
2. Before being placed in service, all new water pipelines shall be chlorinated using the continuous feed method specified in AWWA C651. The procedure shall be approved by the Water Department.
3. The location of the chlorination and sampling points shall be taken in intervals of approximately 200 feet; and from the end of the line to assure safe water to all consumers on the line. The locations are to be determined in the field by the Contractor and the Water Department. The Contractor shall install the chlorination and sampling taps and shall uncover and backfill the taps as required.

**Table II**  
**Chlorine Dosage per 100 Feet of Pipe**

Pipe Size	100% Chlorine /lb.	1% chlorine solution /gal.
4in	.013	.16
6in	.030	.36
8in	.054	.65
10in	.085	1.02
12in	.120	1.44
16in	.217	2.60

4. Solutions of 1% chlorine may be prepared with sodium hypochlorite or calcium hypochlorite. The latter solution requires 1 pound (lb.) of calcium hypochlorite in 8 gallons of water.
5. Following the 24 hour chlorination period, a minimum residual of 10 ppm shall be present. All treated water shall be slowly (so as not to disturb the existing lines) flushed from the lines at their extremities, residual reading shall be taken at the taps until or the chlorine residual is no higher than that generally prevailing in the system, or the residual has dropped to minimum of 0.3 ppm and replaced with water from the distribution system. The main will be kept isolated from the system.

6. All treated water flushed from the lines shall be disposed of by discharging into the nearest sanitary sewer or by approved means. No discharge to any storm drain or natural watercourse will be allowed.
7. 24 hours after flushing is completed, a sample shall be taken of the water that has stood in the isolated main. A chlorine residual test will be measured prior to the collection of a sample. If the residual measures less than 0.10 mg/l, then a heterotrophic plate count (48 hour test) will be performed in addition to the coli form bacteria.
8. Bacteriological sampling and analysis shall be collected in a sterile bottle treated with sodium thiosulfate in accordance with procedures of Standard Methods for the Examination of Water and Wastewater 18th edition. A sample of the replacement water may then be made by the Water Department in full accordance with AWWA C651.
9. A copy of the test report shall be given to the Contractor and the Water Department foreman. If the chlorination test fails the Contractor will be required to re-chlorinate, if necessary and the line shall not be placed in service until the requirements of the Commonwealth of Massachusetts are met.
10. Special disinfecting procedures shall be used in connection to existing mains and where the method outlined above is not practical.

3.6 JOINING MATERIALS:

- A. Refer to Section 330500 "COMMON WORK RESULTS FOR UTILITIES" for commonly used joining materials.

3.7 PIPING APPLICATIONS:

- A. General: Use pipe, fittings, and joining methods for piping systems according to the following applications.
- B. Transition couplings and special fittings with pressure ratings at least equal to piping pressure rating may be used, unless otherwise indicated.
- C. Do not use flanges or unions for underground piping.
- D. Flanges, unions, grooved-end-pipe couplings, and special fittings may be used, instead of joints indicated, on aboveground piping and piping utility trench.
- E. Underground water-service piping NPS 4 to NPS 8 shall be any of the following:
  1. Ductile-iron, mechanical-joint pipe; ductile-iron, mechanical- joint fittings; and mechanical grooved-end pipe; ductile-iron- pipe appurtenances; and grooved joints.
- F. Water Meter Box Water-Service shall be same as underground potable water-service piping.

3.8 ANCHORAGE INSTALLATION:

- A. Anchorage, General: Install water-distribution piping with restrained joints. Anchorages and restrained-joint types that may be used include the following:
  - 1. Concrete thrust blocks.
  - 2. Locking mechanical joints.
  - 3. Set-screw mechanical retainer glands.
  - 4. Bolted flanged joints.
- B. Install anchorages for tees, plugs and caps, bends, crosses, valves, branches, meters, backflow preventer, expansion tanks, and reducing valves. Include anchorages for the following piping systems:
  - 1. Gasketed-Joint, Ductile-Iron, Water-Service Piping: According to AWWA C600.
- C. Apply full coat of asphalt or other acceptable corrosion-resistant material to surfaces of installed ferrous anchorage devices.

3.9 WATER METER INSTALLATION:

- A. Install water meters, piping, and specialties according to utility company's written instructions.
- B. Water Meters: Install detector-type water meters in meter vault according to AWWA M6. Include shutoff valves on water meter inlets and outlets and full-size valved bypass around meters. Support meters, valves, and piping on brick or concrete piers.

3.10 BACKFLOW PREVENTER INSTALLATION:

- A. Install backflow preventers of type, size, and capacity indicated. Include valves and test cocks. Install according to the manufacturer's recommendations.
- B. Do not install bypass piping around backflow preventers.
- C. Support NPS 2-1/2 and larger backflow preventers, valves, and piping by Clevis type pipe supports.

3.11 CONCRETE VAULT INSTALLATION:

- A. Install precast concrete vaults according to ASTM C 891.

3.12 CONNECTIONS:

- A. See Section 330500 "Common Work Results for Utilities" for piping connections to valves and equipment.

- B. Connect water-distribution piping to existing water service. Use tapping sleeve, coupler, or elastomeric sleeve.

3.13 FIELD QUALITY CONTROL:

- A. Piping Tests: Conduct piping tests before joints are covered and after concrete thrust blocks have hardened sufficiently. Fill pipeline 24 hours before testing and apply test pressure to stabilize system. Use only potable water.
- B. Hydrostatic Tests: Test at not less than one-and-one-half times working pressure for two hours.
  - 1. Increase pressure in 50-psig increments and inspect each joint between increments. Hold at test pressure for 1 hour; decrease to 0 psig. Slowly increase again to test pressure and hold for 1 more hour. Maximum allowable leakage is 2 quarts per hour per 100 joints. Remake leaking joints with new materials and repeat test until leakage is within allowed limits.
- C. Prepare reports of testing activities.

3.14 IDENTIFICATION:

- A. Install continuous underground detectable warning tape during backfilling of trench for underground water-distribution piping. Locate below finished grade, directly over piping.

3.15 CLEANING:

- A. Clean and disinfect water-distribution piping as follows:
  - 1. Purge new water-distribution piping systems and parts of existing systems that have been altered, extended, or repaired before use.
  - 2. Use purging and disinfecting procedure prescribed by authorities having jurisdiction or, if method is not prescribed by authorities having jurisdiction, use procedure described in NFPA 24 for flushing of piping. Flush piping system with clean, potable water until dirty water does not appear at points of outlet.
  - 3. Use purging and disinfecting procedure prescribed by authorities having jurisdiction or, if method is not prescribed by authorities having jurisdiction, use procedure described in AWWA C651 or do as follows:
    - a. Fill system or part of system with water/chlorine solution containing at least 50 ppm of chlorine; isolate and allow to stand for 24 hours.
    - b. Drain system or part of system of previous solution and refill with water/chlorine solution containing at least 200 ppm of chlorine; isolate and allow to stand for 3 hours.
    - c. After standing time, flush system with clean, potable water until no chlorine remains in water coming from system.
    - d. Submit water samples in sterile bottles to authorities having jurisdiction. Repeat procedure if biological examination shows evidence of contamination.

- B. Prepare reports of purging and disinfecting activities.

END OF SECTION

SECTION 334000

STORM DRAIN

PART 1 - GENERAL

1.1 GENERAL PROVISIONS:

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Specification Sections, apply to this section.

1.2 DESCRIPTION OF WORK:

- A. The work includes labor, materials, equipment and services required for completion of the work under this Section; all as shown on the drawings and as specified herein.
- B. This section covers material requirements, installation, field performance and acceptance of high-density polyethylene plastic, trench drain, catch basins, manholes, oil / water separators, infiltration chambers, frames, grates and covers for the stormwater drainage systems as shown on the Contract Plans.

1.3 SUMMARY:

- A. Section Includes:
  - 1. Pipe and fittings.
  - 2. Non-pressure transition couplings.
  - 3. Underground Infiltration Chambers.
  - 4. Manholes.
  - 5. Catch basins.
  - 6. Oil / Water Separators.
  - 7. Trench drain.
  - 8. Pipe outlets.

1.4 RELATED DOCUMENTS:

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Specification Sections, apply to this Section.
- B. Section 024100: Demolition
- C. Section 310000: Earthwork
- D. Section 312333: Excavation, Trenching, & Backfilling for Utility Systems
- E. Section 310519.13: Geotextile Fabric



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F. Section 330500: Common Work Results for Utilities

1.5 SUBMITTALS:

- A. Product Data: For each type of product indicated. Submit manufacturer's product data, installation instructions, use limitations and recommendations for each material used. Provide certifications stating that materials comply with requirements.
- B. Shop Drawings: Provide large scale Shop Drawings for all parts of the Work. Provide plans, elevations, and details of piping materials, sizes, locations, inverts, cleanouts, and accessory items. Provide detailed drawings of underground structures, connections, manholes, catch basins, oil/water separators, trench drain, and infiltration chambers. Clearly show spatial relationship between drainage system and nearby utilities and structures.
- C. Test Reports: Submit certified reports for tests required.
- D. Maintenance Data: Provide maintenance data and parts list for all water system work.
- E. As-Built Documents: Utility Sub-Contractors shall be responsible for transfer of as built information related to their Work to the Record Contract Drawings. The drafting must be done by experienced draftsmen and match the original Drawings.
- F. Coordination Drawings: Show pipe sizes, locations, and elevations. Show other piping in same trench and clearances from storm drainage system piping. Indicate interface and spatial relationship between manholes, piping, and proximate structures.
- G. Field quality-control reports

1.6 QUALITY ASSURANCE:

- A. Codes and Standards: Perform work strictly as required by rules, regulations, standards, codes, ordinances, and laws of local, state, and federal governments, and other authorities that have legal jurisdiction over the site. Materials and equipment shall be manufactured, installed, and tested as specified by the appropriate utility agency and in latest editions of applicable publications, and standards.
- B. Material and equipment shall be listed by Underwriters' Laboratories (UL), and approved by ASME, AWWA, ANSI, and ASTM for intended service.
- C. Manufacturers: Firms regularly engaged in manufacture of system materials of types and sizes required, whose products have been in satisfactory use in similar service for not less than 5 years.
- D. Installer: A firm with at least 2 years of successful installation experience on systems required for this project.

- E. Most recent editions of applicable Specifications and publications of the following organizations form part of Contract Documents:
  - 1. American National Standards Institute (ANSI).
  - 2. American Society of Mechanical Engineers (ASME).
  - 3. American Society for Testing and Materials (ASTM).
  - 4. American Water Works Association (AWWA).
  - 5. National Fire Protection Association.
  - 6. ASTM A185: Steel Welded Wire Reinforcement, Plain for Concrete.

1.7 DELIVERY, STORAGE, AND HANDLING:

- A. Protect pipe, pipe fittings, and seals from dirt and damage.
- B. Handle manholes according to manufacturer's written rigging instructions.
- C. Handle catch basins according to manufacturer's written rigging instructions.
- D. Handle oil/water separators according to manufacturer's written rigging instructions.
- E. Handle infiltration chambers according to manufacturer's written rigging instructions.
- F. Handle trench drain according to manufacturer's written rigging instructions.

1.8 PROJECT CONDITIONS:

- A. Interruption of Existing Storm Drainage Service: Do not interrupt service to facilities occupied by Owner or others unless permitted under the following conditions and then only after arranging to provide temporary service according to requirements indicated:
  - 1. Notify Construction Manager no fewer than two days in advance of proposed interruption of service.
  - 2. Do not proceed with interruption of service without Owners Representative written permission.

1.9 MODIFICATIONS IN LAYOUT:

- A. Check Contract Drawings as well as Shop Drawings of all subcontractors. Verify and coordinate spaces in which Work of this Section will be installed.
- B. Make reasonable modifications in layout and components needed to prevent conflict with work of other trades and to coordinate according to Paragraphs A above. Systems shall be run in a rectilinear fashion.
- C. Where conflicts or potential conflicts exist and engineering guidance is desired, submit sketch of proposed resolution to Project Engineer for review and approval.

PART 2 - PRODUCTS

2.1 PIPE, PIPE FITTINGS, VALVES AND SPECIALTIES:

- A. The Materials section summarizes the Town's standardized components to be used. All materials shall conform to the latest version of the MassDOT Standard Specifications, as amended, and policies and technical guidance in DEP's Stormwater Management Standards and the Massachusetts Stormwater Handbook. Material and construction standards per Commonwealth of Massachusetts, Department of Public Works, Standard Specifications for Highways and Bridges 1988 Edition, and all amendments or latest version.
- B. Piping Materials: Provide pipe and tube of type, joint type, grade, size and weight (wall thickness or Class) indicated for each service.
1. Polyvinyl Chloride Pipe (PVC) shall conform to ASTM Standard D 1784 and D3034-SDR 35.
    - a. The pipe and fittings shall be homogeneous throughout and free from visible cracks, holes, foreign inclusion or other injurious defects. The pipe shall be as uniform as commercially practical in color, opacity, density and other physical properties.
    - b. All fittings and accessories shall have dimensions as recommended by the manufacturer and have bell and/or spigot configurations compatible with that of the pipe.
    - c. Pipe shall pass impact resistance test in accordance with ASTM D 2444 and minimum pipe stiffness test at 5% deflection in accordance with ASTM D2412.
    - d. The normal length of twelve (12) inch size and smaller shall be twelve and one-half (12 1/2) feet and fifteen (15) inch size shall be no longer than twenty (20) feet.
    - e. Pipe and fittings shall be manufactured in the United States of America and shall be accompanied by the manufacturers certificate of compliance, in addition to meeting the performance tests specified hereinafter.
  2. The type of pipe allowable for conductor or perimeter drains shall be a minimum of four (4) inches in diameter and limited to:
    - a. Cast Iron Pipe, not less than Class 24, conforming to ASA A21-8.
    - b. Ductile Iron Pipe, not less than Class 50.
    - c. Polyvinyl Chloride Pipe (PVC) conforming to ASTM Standard D 1784 and D3034-SDR 35.
- C. High Density Polyethylene (HDPE) Pipe - The pipe shall conform to MassDOT Section M5.03.10. Pipe shall be smooth interior wall and corrugated exterior wall, and be water-tight. Pipe shall be minimum 12-inch diameter. Ends shall be bell-and-spigot unless approved by the DPW for the specific application. Pipe shall comply with the requirements for test methods, dimensions and markings found in AASHTO Designations M252 and M294. Pipe shall support an HS-20 live load with a maximum deflection of 5% of the minimum pipe diameter. Pipe and fittings shall be made from

virgin polyethylene compounds which conform to the applicable current edition of the AASHTO Material Specifications for cell classification as defined and described in ASTM D3350. Nominal sizes of 12- -inch shall be either AASHTO Type 'S' or Type 'D'.

- D. Pipe/Tube Fittings: Provide factory-fabricated fittings of type, materials, grade, class and pressure rating indicated for each service and pipe size. Provide sizes and types matching pipe, tube, and valve or equipment connection in each case. Where not otherwise indicated, comply with governing regulations and industry standards for selections, and with pipe manufacturer's recommendations where applicable. All elbows shall be of the long radius type except where space restrictions do not allow.
- E. Gaskets for Flanged Joints: ANSI B16.21; full-faced for cast-iron flanges; raised-face for steel flanges, unless otherwise indicated. Gasket material shall be as determined by the installer to comply with installation requirements. Gaskets shall be asbestos-free.
- F. Bolts and Washers: Bolts shall extend a minimum two full thread widths beyond the nut. Provide flat steel washers under bolt head and nuts.

## 2.2 PE PIPE AND FITTINGS:

- A. Corrugated PE Drainage Pipe and Fittings NPS 3 to NPS 10: AASHTO M 252M, Type S, with smooth waterway for coupling joints.
  - 1. Silt tight Couplings: PE sleeve with ASTM D 1056, Type 2, Class A, Grade 2 gasket material that mates with tube and fittings.
  - 2. Soil tight Couplings: AASHTO M 252M, corrugated, matching tube and fittings.
- B. Corrugated PE Pipe and Fittings NPS 12 to NPS 60: AASHTO M 294M, Type S, with smooth waterway for coupling joints.
  - 1. Silt tight Couplings: PE sleeve with ASTM D 1056, Type 2, Class A, Grade 2 gasket material that mates with pipe and fittings.
  - 2. Soil tight Couplings: AASHTO M 294M, corrugated, matching pipe and fittings.

## 2.3 NONPRESSURE TRANSITION COUPLINGS:

- A. Comply with ASTM C 1173, elastomeric, sleeve-type, reducing or transition coupling, for joining underground nonpressure piping. Include ends of same sizes as piping to be joined, and corrosion- resistant-metal tension band and tightening mechanism on each end.
- B. Sleeve Materials:
  - 1. For Dissimilar Pipes: ASTM D 5926, PVC or other material compatible with pipe materials being joined.

- C. Unshielded, Flexible Couplings:
  - 1. Basis-of-Design Product: Subject to compliance with requirements of the Town of Orleans or comparable product by one of the following:
    - a. Dallas Specialty & Mfg. Co.
    - b. Fernco Inc.
    - c. Logan Clay Pipe.
    - d. Mission Rubber Company; a division of MCP Industries, Inc.
    - e. NDS Inc.
    - f. Plastic Oddities; a division of Diverse Corporate Technologies, Inc.
  - 2. Description: Elastomeric sleeve with stainless-steel shear ring and corrosion-resistant-metal tension band and tightening mechanism on each end.
- D. Shielded, Flexible Couplings:
  - 1. Basis-of-Design Product: Subject to compliance with requirements of the Town of Orleans or comparable product by one of the following:
    - a. Cascade Waterworks Mfg.
    - b. Dallas Specialty & Mfg. Co.
    - c. Mission Rubber Company; a division of MCP Industries, Inc.
  - 2. Description: ASTM C 1460, elastomeric or rubber sleeve with full-length, corrosion-resistant outer shield and corrosion-resistant-metal tension band and tightening mechanism on each end.
- E. Ring-Type, Flexible Couplings:
  - 1. Basis-of-Design Product: Subject to compliance with requirements of the Town of Orleans or comparable product by one of the following:
    - a. Fernco Inc.
    - b. Logan Clay Pipe.
    - c. Mission Rubber Company; a division of MCP Industries, Inc.
  - 2. Description Elastomeric compression seal with dimensions to fit inside bell of larger pipe and for spigot of smaller pipe to fit inside ring.

#### 2.4 STRUCTURES:

- A. Bricks shall conform to ASTM C-32, Grade MA.
- B. Radial concrete blocks shall be not less than eight (8) inches in length and of such shape that the joints can be effectively sealed and bonded with mortar. They shall conform to ASTM C-139.
- C. Precast concrete rings shall conform to ASTM C-14.
- D. Concrete for headwalls, footings, and other structures shall have a minimum compressive strength of twenty five hundred (2,500) psi at twenty-eight (28) days.
- E. Reinforcing steel shall conform to ASTM A-305 for bar reinforcement and ASTM A-185 for wire mesh.

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- F. Mortar for masonry work and pipe joints shall consist of one (1) part Portland cement and two (2) parts sand. Portland cement shall conform to ASTM C-150, type ii. Sand shall conform to ASTM C-144. The mortar shall be used within thirty (30) minutes from the time that the ingredients are mixed with water. Water shall be clean and free from impurities.

2.5 MANHOLES:

- A. Precast Manholes shall be constructed of reinforced precast concrete monolithic base section, barrel section and dome section meeting the latest applicable requirements of ASTM C478 I and AASHTO M 199, or latest revision thereto. Special manholes shall also meet the requirements of MassDOT Standard Specifications, section M4.02.14, Precast Units. After curing a minimum of 14 days, the outside surface of the tapered or cone section of precast cement concrete drainage structures shall be dried and cleaned. Tongue and groove sections between barrel sections shall be mortared or use butyl rubber sealants. Live load design shall be H-20 loading. A 24-inch opening will be cast in the top section to accept a standard cast iron frame and cover.
- B. Standard Precast Concrete Manholes:
1. Description: ASTM C 478, precast, reinforced concrete, of depth indicated, with provision for sealant joints.
  2. Diameter: 48 inches minimum.
  3. Ballast: Increase thickness of precast concrete sections or add concrete to base section as required to prevent flotation.
  4. Base Section: 6-inch minimum thickness for floor slab and 6-inch minimum thickness for walls and base riser section, and separate base slab or base section with integral floor.
  5. Riser Sections: 6-inch minimum thickness, and lengths to provide depth indicated.
  6. Top Section: Eccentric-cone type unless concentric-cone or flat- slab-top type and top of cone of size that matches grade rings.
  7. Joint Sealant: ASTM C 990, bitumen or AASHTO Specification M-198 butyl rubber.
  8. Resilient Pipe Connectors: ASTM C 923, cast or fitted into manhole walls, for each pipe connection.
  9. Steps: 1/2-inch steel aluminum, wide enough to allow worker to place both feet on one step and designed to prevent lateral slippage off step. Cast or anchor steps into sidewalls at 12-inch intervals. Omit steps if total depth from floor of manhole to finished grade is less than 60 inches.
  10. Grade Rings: Reinforced-concrete rings, 6 to 9-inch total thickness, to match diameter of manhole frame and cover, and height as required to adjust manhole frame and cover to indicated elevation and slope.
  11. Reinforcing steel welded wire fabric conforms to the latest ASTM A185 specification.
  12. Reinforcing steel deformed bars shall conform to the latest ASTM A615 specification.
  13. Concrete compressive 28-day strength shall be 4,000 psi.

C. Manhole Frame and Covers:

1. Description: Meeting Town of Orleans Standard.
2. Size: 24 inch diameter minimum unless otherwise indicated.
3. Material: ASTM A 536, Grade 60-40-18 ductile iron unless otherwise indicated.
4. Cast Iron shall meet requirements of ASTM A888 "Grey Cast Iron, Cast Iron Class 20." All castings shall be clean and without blow holes, sand holes or defects of any kind. Cast iron frames and covers shall be clean of all rust, dirt, and scale, and while free and clean shall be given a full coat of coal tar pitch varnish applied hot. Manhole frames and covers shall be at least Class 25 conforming to ASTM A48 "Standard Specification for Gray Iron Castings." Manhole frame shall have a clear opening of 24 inches and be a minimum of 8 inches in height. The surface of the cover shall have a diamond pattern with the words "DRAIN" cast thereon for drainage manholes, as manufactured by East Jordan Iron Works (formerly LeBaron Foundry Co.) (EJIW) 2110Z/2111A, or approved equal.

2.6 CATCH BASINS:

- A. Catch Basins - Precast Catch Basins shall conform to ASTM C478 and AASHTO M 199, or latest revision thereto. Live load design shall be H-20 loading. Catch basins which are limited by height shall be installed with a flat top slab, designed for H-20 loading and cast iron frame cast in place. Direct inlet catch basins shall conform to D-4.1.
- B. Standard Precast Concrete Catch Basins:
1. Description: ASTM C 478, precast, reinforced concrete, of depth indicated, with provision for sealant joints.
  2. Base Section: 6-inch minimum thickness for floor slab and 6-inch minimum thickness for walls and base riser section, and separate base slab or base section with integral floor.
  3. Riser Sections: 6-inch minimum thickness, 48-inch diameter, and lengths to provide depth indicated.
  4. Top Section: Eccentric-cone type unless concentric-cone or flat- slab-top type is indicated. Top of cone of size that matches grade rings.
  5. Joint Sealant: ASTM C 990, bitumen or butyl rubber.
  6. Grade Rings: Include two or three reinforced-concrete rings, of 6- to 9-inch total thickness, that match 24-inch- diameter frame and grate.
  7. Steps: Aluminum, wide enough to allow worker to place both feet on one step and designed to prevent lateral slippage off step. Cast or anchor steps into sidewalls at 12- to 16-inch intervals. Omit steps if total depth from floor of catch basin to finished grade is less than 60 inches.
  8. Pipe Connectors: ASTM C 923, resilient, of size required, for each pipe connecting to base section.
- C. Frames and Grates:
1. Description: Town of Orleans standards.

2. Size: 24 by 24 inches minimum unless otherwise indicated.
3. Catch basin grates located at low points shall be 24-inch square grate, East Jordan Iron Works (formerly LeBaron Foundry Co.), LF248-2-4F. Single or dual catch basin grate shall consist of a 24-inch square grate LeBaron Foundry Co. L24SG1-000 or approved equal with an 8-inch heavy duty frame (MassDOT Standard). Frames shall be set upon a full bed of mortar, and mortar shall be brought up alongside of frame to provide a water-tight joint.

D. Catch Basin Hoods:

1. Catch basin hoods shall be used in off-roadway operations such as parking lots and service areas to minimize the entry of oil, gasoline, and debris into drainage pipes. Catch basin hoods shall also be used in urbanized roadways where drainage is contained by vertical curbs and sidewalks are adjacent to the roadway (increasing the likelihood of litter). Catch basin hoods shall protrude no more than 12 inches beyond the end of pipe into the structure. Acceptable hoods are Ground Water Rescue Inc. Eliminator, Best Management Practices Inc. Snout® or equal approved by the Project Engineer.

## 2.7 OIL / WATER SEPARATOR:

A. Standard Precast Oil/Water Separator:

1. Description: ASTM C 478, precast, reinforced concrete, of depth indicated, with provision for sealant joints.
2. Diameter: 48 inches minimum.
3. Base Section: 6-inch minimum thickness for floor slab and 5-inch minimum thickness for walls and base riser section, and separate base slab or base section with integral floor.
4. Riser Sections: 5-inch minimum thickness, and lengths to provide depth indicated.
5. Top Section: Eccentric-cone type unless concentric-cone or flat- slab-top type is indicated. Top of cone of size that matches grade rings.
6. Joint Sealant: ASTM C 990, bitumen or butyl rubber.
7. Grade Rings: Include two or three reinforced-concrete rings, of 6- to 9-inch total thickness, that match 24-inch- diameter frame and grate.
8. Steps: Aluminum, wide enough to allow worker to place both feet on one step and designed to prevent lateral slippage off step. Cast or anchor steps into sidewalls at 12- to 16-inch intervals. Omit steps if total depth from floor of catch basin to finished grade is less than 60 inches.
9. Pipe Connectors: ASTM C 923, resilient, of size required, for each pipe connecting to base section.

B. Frames and Grates:

1. Description: Town of Orleans standards.
2. Size: 24 inch diameter minimum unless otherwise indicated.
3. Cast Iron shall meet requirements of ASTM A888 "Grey Cast Iron, Cast Iron Class 20." All castings shall be clean and without blow holes, sand holes or defects of any kind. Cast iron frames and covers shall be clean of all rust, dirt, and



scale, and while free and clean shall be given a full coat of coal tar pitch varnish applied hot. Manhole frames and covers shall be at least Class 25 conforming to ASTM A48 "Standard Specification for Gray Iron Castings." Manhole frame shall have a clear opening of 24 inches and be a minimum of 8 inches in height. The surface of the cover shall have a diamond pattern with the words "DRAIN" cast thereon for drainage manholes, as manufactured by East Jordan Iron Works (formerly LeBaron Foundry Co.) (EJIW) 2110Z/2111A, or approved equal.

2.8 TRENCH DRAIN:

- A. Trench drain shall be Zurn Z88-HDG or Approved Equal.
- B. Galvanized Carbon Steel Frame Assembly conforms to ASTM A36 and Galvanizing conforms to ASTM A123. Ductile Iron conforms to ASTM A536-84, Grade 80-55-06. Galvanized Ductile Iron grate is rated class C per the DIN EN1433 top load classifications.
- C. Channels shall be 8' long, 12" wide, and have a 9-1/4" wide throat.
- D. Modular channel sections shall be made of High Density Polyethylene (HDPE), have interlocking ends, and radiused bottom.
- E. Grate shall be H-20 load rated with mechanical lockdown device.

2.9 INFILTRATION CHAMBER:

- A. Underground Infiltration Chambers shall be manufactured by Cultec, Contech, or Approved Equal.
- B. Standard Underground Infiltration Chambers:
  - 1. The chamber shall be open-bottomed.
  - 2. The chamber shall be joined using an interlocking overlapping rib method. Connections must be fully shouldered overlapping ribs, having no separate couplings or separate end walls.
  - 3. The chamber shall be designed and manufactured to meet the material and structural requirements of AASHTO H-20 highway live loads.

2.10 REINFORCING MATERIALS:

- A. Reinforcing Bars: ASTM A 615, Grade 60, deformed, epoxy coated.
- B. Supports for Reinforcement: Bolsters, chairs, spacers and other devices for spacing supporting, and fastening reinforcing bars and welded wire fabric in place. Use wire bar type supports complying with CRSI specifications.

2.11 CONCRETE MATERIALS:

- A. Portland Cement: ASTM C150, Type V, air entrained.
- B. Use one brand of cement throughout the project, unless otherwise acceptable to Owner.

- C. Normal Weight Aggregates: ASTM C33 and as herein specified. Provide aggregates from a single source for exposed concrete.
- D. For exterior exposed surfaces, do not use fine or coarse aggregates containing spalling causing deleterious substances.
- E. Water: Drinkable.
- F. Reinforcing Bars: ASTM A 615, Grade 60, deformed, epoxy coated.
- G. Supports for Reinforcement: Bolsters, chairs, spacers and other devices for spacing supporting, and fastening reinforcing bars and welded wire fabric in place. Use wire bar type supports complying with CRSI specifications.

2.12 EXCAVATION:

- A. Excavation: The Contractor shall excavate whatever material encountered to the depths shown on the drawings. In open cut excavation, the trench width at the top of the pipe shall be no wider than the outside diameter of the pipe, plus one and one-half (1 ½) feet, unless permission is granted by the inspector. The trench above the top of the pipe shall have sufficient slope so that the banks will not slide. Sheeting of trenches will be at the Contractor's discretion and as may be required by applicable governmental laws and regulations.
- B. Excavation for manholes, catch basins, oil/water separators, infiltration chambers or other structures shall be sufficient to leave at least twelve (12) inches in the clear between their outer surfaces and the embankment or timber which may be used to hold and protect the banks. Any over-depth excavation below the footings of such structures shall be filled with concrete as directed by the Project Engineer and will be at the Contractor's expense.
- C. Care must be taken not to damage water pipes, storm drains, sanitary sewers, gas mains, electric conduits, or other structures encountered on the lines of the work. In case of damage to any structures, the Owner of the structures and Department of Public Works shall be notified immediately by the Contractor so that the proper steps may be taken to repair, at the expense of the Contractor, any and all damage done.
- D. Subdrains: The drain trench shall be excavated to the depth designated on the plans or, if directed, to a stratum of impervious material. Where no structure is to be placed at the ends of the subdrain pipe, the trench shall be excavated a distance of 3-ft beyond the end of the pipe. The excavation shall proceed in advance of the actual drain construction only to the extent the Project Engineer directs. The width of the trench for pipe of more than 12-in. in diameter shall be 1-ft greater than the nominal diameter of the pipe. The width of the trench for pipe 12-in. or less in diameter shall be 2-ft.

Where rock is encountered in the excavation, no part of any rock remaining in the trench shall come within 6-in. of any portion of the pipe.

2.13 BEDDING:

- A. Pipe Bedding stone shall conform to Mass Highway Specification M2.01.1.
- B. For drain mains, trenches shall be shaped to give the pipe a continuous and even bearing. Where the bottom of the trench has been taken out to a greater depth than above specified, it shall be refilled with earth, properly compacted and shaped. The Contractor shall undercut unsuitable material and replace it with suitable material.
- C. For drain services, when indicated by the Project Engineer, bedding shall be comprised of a six (6) inch layer of peastone, three quarter (3/4) inch crushed stone, for proper support and protection from settling.
- D. Manholes, catch basins, and leaching basins shall be laid in any of the following materials, as specified hereafter or as approved by the Project Engineer.
  - 1. Angular crushed stone or rock, dense or open graded with little or no fines (¼ inch to 1½ inches in size).
  - 2. AASHTO classifications A1 and A3: Clean, coarse grained materials, such as gravel, coarse sands and gravel/sand mixtures (1 ½ inches maximum in size).
  - 3. AASHTO classifications A-2-4 and A-2-5: Coarse grained materials with fines including silty or clayey gravels or sands. Gravel or sand must comprise more than 50 percent of Class III materials (1 ½ inches maximum size).
  - 4. Approved material shall be sifted to remove rocks larger than 3 inches.

2.14 BACKFILL:

- A. For drain mains, all materials for backfilling the trench shall be suitable and free from organic substances, large stones and frost. No stones weighing over fifty (50) pounds shall be backfilled anywhere into the pipe trench.
- B. For drain services, when indicated by the Project Engineer, the pipe shall be completely encased in an envelope of peastone, three quarter (3/4) inch crushed stone, approximately six (6) inches on each side and twelve (12) inches on the top. Stones larger than three (3) inches in diameter shall not be closer than twelve (12) inches to the pipe. Over that, materials for backfilling the trench shall be suitable and free from organic substances, large stones and frost. No stone weighing over fifty (50) pounds shall be backfilled anywhere into the trench.
- C. Compaction shall be either by puddling or by mechanical means as approved by the Commissioner. If compaction by the puddling method is desired, the Contractor shall obtain permission from the Department of Public Infrastructure, who will install a hydrant meter. Charges for water used, shall be made by the Water Department. Care must be taken to prevent excessive run-off or silt infiltration into the pipes or below

the discharge end, any materials so deposited must be removed by the Contractor at no cost to the Town. While puddling is underway and afterwards, until puddled areas have sufficiently hardened, the Contractor must protect the trench and the public by suitable barriers, lights, etc.

- D. Subdrains: The pipe shall be laid on a 2-in. bed of crushed stone and the space about, above, and in the 3-ft beyond the ends of the pipe shall be filled with 0.5-in. or 0.75-in. crushed stone. The Contractor shall be responsible for keeping the backfill material clean and free of objectionable material from a line 1-in. below the flow line of the pipe to the top of the trench.

### PART 3 - EXECUTION

#### 3.1 INSPECTION AND GENERAL REQUIREMENTS:

- A. Inspect materials before installation and remove defective materials from the site immediately.
- B. All materials will be subject to periodic inspection for compliance with approved methods of manufacture. Material samples will be obtained by the Owner for laboratory testing to determine compliance with the Contract Specifications. In addition, material test certificates shall be required. Such inspection of manufacturing plants, material testing and certificates shall provide the basis for acceptance of materials.

#### 3.2 EARTHWORK:

- A. Excavation, trenching, and backfilling are specified in Section 310000 "Earthwork" and Section 312333 "Excavation, Trenching, & Backfilling for Utility Systems".

#### 3.3 PIPING INSTALLATION:

- A. General Locations and Arrangements: Drawing plans and details indicate general location and arrangement of underground storm drainage piping. Location and arrangement of piping layout take into account design considerations. Install piping as indicated, to extent practical. Where specific installation is not indicated, follow piping manufacturer's written instructions.
- B. All pipe before being lowered into the trench shall be clean and free from defects. The Contractor shall remove, by pumping or other means, any water accumulated in the trench during the pipe laying period and keep the trench dry until the joints are properly connected.
- C. Installation of HDPE pipe shall be in accordance with either AASHTO Section 30 or ASTM D2321 and as recommended by the manufacturer.

- D. Because HDPE pipe will float in standing water, a dry trench shall be provided prior to laying the pipe.
- E. Watertight joints shall be used. Pipe shall be watertight according to the ASTM D3212. The joint design shall be bell-and-spigot with an elastomeric rubber gasket meeting ASTM F477 or equal approved by the Project Engineer.
- F. Where the clearance is less than 1-foot below the pavement, provide a design method to maintain the integrity of the pipe and right of way.
- G. The pipe shall be laid with bell ends upstream, beginning at the lower end of the pipeline. The pipeline shall be laid to the grades and alignment indicated on the drawings. During construction, precautions are required to protect downstream structures from excess sediment washout e.g. straw wattle, hay bales, silt fence, etc.
- H. Install piping beginning at low point, true to grades and alignment indicated with unbroken continuity of invert. Place bell ends of piping facing upstream. Install gaskets, seals, sleeves, and couplings according to manufacturer's written instructions for use of lubricants, cements, and other installation requirements.
- I. Install manholes for changes in direction unless fittings are indicated. Use fittings for branch connections unless direct tap into existing sewer is indicated.
- J. Install proper size increasers, reducers, and couplings where different sizes or materials of pipes and fittings are connected. Reducing size of piping in direction of flow is prohibited.
- K. When installing pipe under streets or other obstructions that cannot be disturbed, use pipe-jacking process of microtunneling.
- L. Install gravity-flow, nonpressure drainage piping according to the following:
  - 1. Install piping pitched down in direction of flow.
  - 2. Install piping with 36-inch minimum cover.
- M. The Contractor shall stake the proposed trench every 50-feet or less from structure to structure. Field conditions may require exceptions as to the distance between stakes. Stakes will be marked with stationing on the pipeline side of the stake parallel to the installation, offset distance on the side opposite the pipe line and depth of cut marked on the side facing the open trench. This information shall be transferred to transverse batter boards every 50-feet with line and grade clearly marked and target set, all as directed by the Project Engineer.
  - 1. The Contractor, at his option, may perform pipe layout using the laser beam method. When site conditions preclude the use of traditional survey methods, the Contractor shall use the laser beam method.
  - 2. 'Grade', for purpose of this Section shall be defined as the designed invert elevation of all pipelines

- N. Trenches shall be excavated in accordance with the applicable requirements.
- O. Pipe bedding shall conform to one of the classes specified.
- P. The pipe layout shall begin at the downstream end of the pipeline. Bell or groove ends of the rigid pipe and outside circumferential laps of flexible pipe shall be facing upstream. Flexible pipe shall be placed with longitudinal laps or seams at the sides.
  - 1. When elliptical pipe with circular reinforcement or circular pipe with elliptical reinforcement is used, the pipe shall be installed in a position such that the manufacturer's marks designating 'top' and 'bottom' of the pipe shall not be more than 5-degrees from the vertical plane through the longitudinal axis of the pipe.
- Q. A minimum of 12-inch approved bedding material compacted to a 90% proctor in an area not less than the base area but preferably 6-inches beyond the outside of radius of the manhole base. The area under incoming and outgoing pipes shall be treated in the same manner to prevent shearing of pipes. Local ground conditions may require additional bedding thickness as per the Owner's recommendations.
- R. Pipe shall be constructed continuously, from downstream to upstream, except when otherwise noted on the Contract Plans. Bedding material shall be placed in accordance with these specifications and all applicable standard details to provide uniform and continuous support. The Contractor shall ensure that all reinforced concrete pipes are kept clean and free from gravel, dirt and debris during and after installation. Precautions shall be taken by the Contractor to eliminate soil and debris from being washed into the pipe prior to the completion of the system.
- S. After the pipe is installed, the trench shall be backfilled with material in accordance with the applicable requirements of these Specifications. When the top of the pipe is exposed above the top of the trench, embankment material shall be placed and compacted for a distance on each side of the pipe equal to at least twice the horizontal inside diameter of the pipe or 12-feet, whichever is less, and to a minimum of 3-feet above the pipe. Construction traffic over the pipe shall not be allowed until 3-feet of compacted backfill is in place over the pipe. Above this elevation, embankment shall be placed and compacted in accordance with these Specifications.
- T. When the Project Engineer determines that the material at the bottom of trenches is unsuitable for the support of drainage pipes, additional excavation shall be authorized. Unsuitable material shall be removed to a depth no to exceed 3-feet, or as determined by the Project Engineer. When the unsuitable material has been removed, the bottom of the excavation shall be leveled and refilled with the appropriate class of bedding.
- U. Class B bedding shall be placed in 8-inch lifts and compacted to 90 percent of the maximum dry density in accordance with these specifications. The final compacted lift in the replacement operation shall be graded to the original design elevation of the bottom of the trenches.

- V. If the bottom of any trench has been excavated below the grade indicated on the Plans or as directed by the Project Engineer, it shall be brought back to grade by refilling with a well compacted bedding of a type selected by the Project Engineer.
- W. Drainage structures shall be constructed at the locations indicated on the Plans. If obstructions are encountered at these locations that cannot be conveniently removed, the Project Engineer will direct that said structures be constructed at either slightly revised or alternate locations.
1. Excavation for drainage structures shall be performed in accordance with the applicable requirements of these Specifications. Excavation shall be made to the required horizontal cross section, as directed by the Project Engineer, and shall be carried to a sufficient depth to accommodate the concrete bases and/or bedding of the various drainage structures. The bottom of the excavation shall be graded and thoroughly tamped prior to placement of concrete bases.
  2. Replacement of Unsuitable Material. When the Project Engineer determines that the material at the bottom of excavations is unsuitable for the support of drainage structures, additional excavations to remove said material shall be ordered. When the unsuitable material has been removed, the bottom of the excavation shall be hand compacted and refilled with appropriate material as approved by the Project Engineer.
  3. Concrete brick will not be allowed as a construction material for drainage structures. Concrete masonry block will only be allowed for vertical riser portions of structures and will not be allowed in the corbelling portions. Clay brick shall be used for corbelling up the bottom of metal frames.
  4. If called for on the Plans for use in wet areas, a precise concrete sump section shall be utilized for standard 4-foot round catch basins.
  5. After construction of drainage structures has proceeded to their respective full heights, the excavation shall be backfilled and compacted in accordance with these Specifications.
  6. If the bottom of any drainage structure excavation has been carried below grade indicated on the Plans, or as directed by the Project Engineer, it shall be brought back to grade by filling with appropriate material as approved by the Project Engineer.
  7. Upon completion of construction, each drainage structure shall be cleaned of any accumulation of silt, earth, debris or foreign matter of whatever kind, and shall be maintained in such condition until final acceptance of the work
- X. Pre-cast Concrete Construction:
1. Testing and Inspection. Pre-cast concrete drainage structures shall be inspected both at the point of manufacture and at the project site. Any such units exhibiting defects or damage that can't be corrected to the complete satisfaction of the Project Engineer shall be removed and replaced by the Contactor at no additional cost to the Owner.

### 3.4 SUBDRAINS:

- A. Before any pipe is installed filter fabric shall be placed along the sides and bottom of the trench. The overlap between any adjoining pieces of fabric shall be at least 2 ft. Perforated subdrain pipe shall be laid with the perforations facing up.
- B. Protection of Inlets and Open Outlets Inlets and open outlets of subdrains shall be covered with a #23 gauge galvanized wire screen of 1/4 in. mesh satisfactorily fastened to the pipe.

### 3.5 JOINTS:

- A. HDPE Pipe:
  - 1. Watertight joints shall be used. Pipe shall be watertight according to the ASTM D3212. The joint design shall be bell-and-spigot with an elastomeric rubber gasket meeting ASTM F477 or equal approved by the Project Engineer.
- B. All joints between the frame, grade rings, dome, barrels and base shall be set in place with non-shrink mortar. Inside the manhole, all joints where the sealing material is not flush with the inside wall shall be grouted with non-shrink mortar and finished by hand/wet-brushed.
- C. Polyvinyl Chloride Pipe:
  - 1. Joints shall be bell and spigot. The bell shall consist of an integral wall section with a solid cross section rubber ring factory-assembled, securely locked in place to prevent displacement. Joints shall conform to ASTM Standard D 3212.

### 3.6 STRUCTURES:

- A. Contractor shall excavate to a depth of 12 inches below the bottom of and all around the proposed manhole or catch basin base, compact and fine grade and install crushed stone as a sub-base material as shown in the Contract Drawings. Pipes shall extend no more than 3 inches inside the interior wall and all openings around pipe entrances and lift holes shall be thoroughly grouted with non-shrink grout prior to back filling. Compaction process shall be the same manner as compaction around pipe.
- B. Brick and concrete blocks shall be clean and thoroughly wetted before laying. All joints shall be completely filled with mortar and struck to a smooth finish. Brick shall be laid in stretcher courses with every sixth course laid radially. The outside of brick and concrete block and concrete block structures, and the inside, if required by the Project Engineer, shall be plastered and troweled smooth with five eights (5/8) inch of mortar.
- C. The bottom section of pre-cast manholes shall be jointed to the concrete footing with mortar, and successive sections shall be jointed together with mortar. The joint space shall be completely filled with mortar and finished smooth on the inside and outside.



A tapered section four feet in height shall be placed on top of the uppermost straight section as shown on the typical detail.

- D. Frame castings for oil/water separators, catch basins, and manholes shall be set in full mortar beds true to the lines and grades. The tops of frames and covers shall be set 1/8 inch below finish grade pavement in the street. Final grade locations for installations outside of the paved roadway shall be as approved by the Project Engineer.
- E. Adjustments of existing water gates that disturb the Bituminous Concrete Binder surface, will need to have nine (9) inches of concrete placed around the structure. Town of Orleans DPW will make the final determination. See Mass DPW Specifications-March 1977, Concrete Collars Detail 202.9.0.
- F. Grade adjustments shall be made using either precast grade rings/risers or clay/shale bricks.
- G. No backfilling of the structure in the excavation shall take place unless approved by the Engineer.
- H. When ground water is encountered in manholes, ¾-inch to 1-inch washed stone shall be placed around structure to a distance of at least half-way up the barrel of the highest pipe.

### 3.7 MANHOLE INSTALLATION:

- A. General: Install manholes, complete with appurtenances and accessories indicated.
- B. Install precast concrete manhole sections with sealants according to ASTM C 891.
- C. Where specific manhole construction is not indicated, follow manhole manufacturer's written instructions.
- D. Set tops 3-inches above finished grade unless otherwise indicated.

### 3.8 CATCH BASIN INSTALLATION:

- A. Construct catch basins to sizes and shapes indicated.
- B. Set frames and grates to elevations indicated.

### 3.9 OIL/WATER SEPARATOR INSTALLATION:

- A. Construct oil/water separators to sizes and shapes indicated.
- B. Set frames and grates to elevations indicated.

3.10 TRENCH DRAIN INSTALLATION:

- A. Construct trench drains to sizes and shapes indicated.
- B. Set frames and grates to elevations indicated.

3.11 UNDERGROUND INFILTRATION CHAMBER INSTALLATION:

- A. Infiltration chambers shall be constructed and installed in accordance with the manufacturer's specifications.
- B. Construct underground infiltration chambers where indicated to their required size and shape.
- C. Set stone and chambers to elevations indicated.

3.12 CLOSING ABANDONED STORM DRAINAGE SYSTEMS:

- A. Abandoned Piping: Close open ends of abandoned underground piping indicated to remain in place. Include closures strong enough to withstand hydrostatic and earth pressures that may result after ends of abandoned piping have been closed. Use either procedure below:
  - 1. Close open ends of piping with at least 8-inch- thick, brick masonry bulkheads.
  - 2. Close open ends of piping with threaded metal caps, plastic plugs, or other acceptable methods suitable for size and type of material being closed. Do not use wood plugs.
- B. Abandoned Manholes and Structures: Excavate around manholes and structures as required and use one procedure below:
  - 1. Remove manhole or structure and close open ends of remaining piping.
- C. Backfill to grade according to Section 310000 "Earthwork."

3.13 IDENTIFICATION:

- A. Materials and their installation are specified in Section 310000 "Earthwork." Arrange for installation of green warning tape directly over piping and at outside edge of underground structures.
  - 1. Use detectable warning tape over nonferrous piping and over edges of underground structures

3.14 FIELD QUALITY CONTROL:

- A. Inspect interior of piping to determine whether line displacement or other damage has occurred. Inspect after approximately 24-inches of backfill is in place, and again at completion of Project.

1. Submit separate reports for each system inspection.
  2. Defects requiring correction include the following:
    - a. Alignment: Less than full diameter of inside of pipe is visible between structures.
    - b. Deflection: Flexible piping with deflection that prevents passage of ball or cylinder of size not less than 92.5 percent of piping diameter.
    - c. Damage: Crushed, broken, cracked, or otherwise damaged piping.
    - d. Infiltration: Water leakage into piping.
    - e. Exfiltration: Water leakage from or around piping.
  3. Replace defective piping using new materials, and repeat inspections until defects are within allowances specified.
  4. Reinspect and repeat procedure until results are satisfactory.
- B. Test new piping systems, and parts of existing systems that have been altered, extended, or repaired, for leaks and defects.
1. Do not enclose, cover, or put into service before inspection and approval.
  2. Test completed piping systems according to requirements of authorities having jurisdiction.
  3. Schedule tests and inspections by authorities having jurisdiction with at least 24 hours' advance notice.
  4. Submit separate report for each test.
  5. Gravity-Flow Storm Drainage Piping: Test according to requirements of authorities having jurisdiction, UNI-B-6, and the following:
    - a. Exception: Piping with soil tight joints unless required by authorities having jurisdiction.
    - b. Option: Test plastic piping according to ASTM F 1417.
    - c. Option: Test concrete piping according to ASTM C 924.
- 3.15 CLEANING:
- A. Clean interior of piping of dirt and superfluous materials flush with potable water.

END OF SECTION

SECTION 355113.23

TIMBER FLOATING DOCK SYSTEM

PART 1 - GENERAL

1.1 DESCRIPTION

The Work covered by this Section of these Specifications consists of furnishing all plant, labor, supervision, equipment, appliances, and materials and in performing all operations in connection with the complete pre-engineered timber floating dock system all in strict accordance with this Section of the Specifications and the applicable Contract Drawings and subject to the terms and conditions of the Contract.

1.2 QUALITY ASSURANCE

- A. Use adequate number of workmen who are thoroughly trained and experienced in the necessary crafts and who are completely familiar with the specified requirements and the methods needed for proper performance of the work in this Section.
- B. The Owner reserves the right of approval of any Subcontractor pre-qualified and selected for this portion of the Work by the Contractor. Approval will be based, in part, on:
  - 1. Documented successful experience in performing work of a similar nature for a minimum of ten years.
  - 2. Acceptable schedule of unit prices for measurement and payment in event of changes in the Work of this Section.
- C. Comply with the requirements of the following applicable standards:
  - 1. National Forest Products Association (NFPA) "National Design Specifications for Wood Construction".
  - 2. Southern Pine Inspection Bureau Inspection Rules.
  - 3. West Coast Lumber Inspection Bureau: Grading and Dressing Rules for Lumber.
  - 4. American Wood Preservers' Associations Standards C1, C2, C18 and P5.
  - 5. American Institute of Steel Construction.
  - 6. American Society for Testing Materials:

- a. A36 Specifications for structural steel
  - b. A123 Specifications for zinc coatings on iron and steel products
  - c. A153 Specifications for zinc coatings on iron and steel hardware
7. Aluminum Association “Specifications for Aluminum Structures”.

### 1.3 SUBMITTALS

- A. A general layout drawing of the proposed floating structures giving all dimensions, clearances, and anchorage locations.
- B. Detailed fabrication drawings showing details of dock units to be supplied.
- C. Calculations showing all applied loads, connector loads, flotation loads. Calculations for gangways shall be stamped with the seal of a qualified professional engineer, licensed in the State of Connecticut.
- D. No later than the time of delivery of materials to the site, submit certificates as to conformance with the specified species and grade prior to installation of any timber or hardware.

### 1.4 PRODUCT DELIVERY AND STORAGE

- A. The Contractor shall notify the Owner and Project Engineer twenty-four hours in advance of delivery of materials.
- B. Store off the ground in a manner to prevent damage and to permit easy access for inspection.

## PART 2 - PRODUCTS

### 2.1 GENERAL

The floating dock system and access ramps shall be manufactured by Meeco Sullivan – The Marina Company, 3 Chancellor Ln, Warwick, NY (845) 986-7377, or an equivalent accepted by the Project Engineer.

### 2.2 DESIGN AND LOAD CONDITIONS

- A. Vertical Loads -
  - 1. Dead loads shall consist of the entire weight of the floating structure, including utilities, ramps, dock boxes and other accessories and appurtenances.

2. Deck surface and structural frame live load shall be equal to 50 psf applied to the full surface area of the deck.
3. Bridges, ramps, and gangways shall be designed for a uniform applied live load of 100 psf. Allowable deflection shall be  $L/180$  where "L" is the length of the gangway in inches. Handrails for bridges, ramps, and gangways shall be designed to resist a uniform applied horizontal load of 50 pounds per linear foot applied at the top of the rail and a 200-pound load applied in any direction and at any point along the handrail. Handrails shall be 42 inches in height from the finished deck surface and shall contain a mid-rail halfway between the top rail and the deck surface.
4. Flotation shall be designed to support the dead load plus 30 psf live load applied to the full area of the deck surface with minimum bottom clearance of 27".
5. Freeboard under dead load conditions only shall equal 18" +/- 1". Freeboard under combined dead load and 30 lbs. per square foot uniformly distributed live load shall not be less than 8".
6. Concentrated live load: 400 lbs. At any one point on the deck shall not tilt the dock more than six degrees from horizontal.

B. Horizontal Loads

1. A uniform horizontal wind loading from any direction shall be calculated at 15 psf on all projected surfaces, assuming 100% boat occupancy. Craft profile heights shall be determined from Figure 3-15, page 219, ASCE Report NO. 50, Planning and Design Guidelines for Small Craft Harbors, Third Edition. Full wind load is to be applied to all unshielded dock and boat profiles and 10% of the wind load is to be applied to each shielded boat profile.
2. A horizontal load due to impact on a finger dock shall be the result of the largest berthed craft normally using the adjacent slip striking the end of the finger dock 10 degrees ( $10^\circ$ ) off center line. For purposes of calculations, the weight of the craft shall be 12 times the finger length squared ( $12L$ ). The craft shall be considered moving at a speed of 3 fps.
3. Berthing load: 100 plf, horizontal.
4. Mooring load: 400 lb line pull acting in any direction at a 45-degree angle from the horizontal.

C. Ice: Structures are to be designed to withstand the forces of non-moving ice.

- D. Waves: Structures and systems shall be designed to withstand storm conditions of up to 3-foot waves on a periodic, but not continual basis.

## 2.3 FLOATING DOCKS

### A. Wood Framing

1. All structural beams, bracing and supports to be Southern Yellow Pine, grade #1 or better exterior, and grade #2 or better interior, in accordance with the rules of the West Coast Bureau of Timber Grade and Inspection for Southern Yellow Pine.
2. All decking to be Southern Yellow Pine, Grade #1 or better. MCA treated to 0.31 pcf.
3. All other lumber to be pressure treated to 0.6 pcf retention with chromated copper arsenate (CCA). Treatment shall be full length under pressure by the empty-cell or full-cell process in accordance with AWPA Standards C1 and C18.
4. All lumber to be kiln dried after treatment.
5. All lumber shall be sound, well-seasoned, and straight grained, free from shakes and large or loose knots and shall have no defects which will impair its strength or durability for the purpose intended.
6. All lumber to be surfaced four sides.

### A. Flotation

1. Shell shall be high strength, high density, polyethylene such as Phillips 66 Company Marlex HXM 50100 or equivalent accepted by the Owner.
2. Core shall be expanded polystyrene, factory pre-molded to ensure complete expansion to minimum of 1.0 pcf density.
3. Flotation Performance: Flotation units shall be designed to maintain the desired buoyancy, min. bottom clearance, and freeboard even if punctured or cracked. Flotation attachment to structural frame shall be positively attached by means of through bolt and nut. Flotation unit and frame to act as one integral section.

### C. Steel Components

All structural steel connectors, brackets, pile guides and miscellaneous parts to be fabricated from ASTM A 36 grade steel.

D. Bolts, Nuts and Washers

All bolts, nuts and washers shall be fabricated according to ASTM A 307 and shall be of sufficient size, shape, and length for their intended use.

E. Finish of Steel and Bolts

All structural steel, all bolts, nuts, and washers shall be hot dipped galvanized in accordance with ASTM A 123. A minimum coating of 2 ounces per square foot shall be applied.

F. Deck

All deck shall be Southern Yellow Pine, grade #1, #1 Dense, or dense select structural surfaced four sides and shall conform to Southern Yellow Pine Inspection Bureau rules. All lumber and deck shall be pressure treated with CCA to 0.6 pcf minimum. No opening in the deck surface shall exceed 1/4" in width.

G. Cleats

All cleats shall be 10" malleable cast iron, conforming to ASTM A 47, hot dipped galvanized after fabrication. Cleats shall be fastened to interior steel angle with 2-3/8" diameter recessed through bolts. Total 8 per float segment equally spaced.

H. Dock Bumper

1. Dock bumper shall be non-marring white extruded vinyl 3" wide minimum. Dock bumper shall meet or exceed the following:

Durometer Hardness - 89

Specific Gravity - 1.368

Brittleness Temperature - -20F

(ASTM 746052T)

2. Dock bumper shall be fastened to dock frame with stainless steel staples minimum 15/16" crown and 3/4" leg.

I. Pile Guides

1. Pile guides shall be fabricated from hot dipped galvanized steel as specified above.
2. Low friction blocks for pile contact areas shall be fabricated from UHMW polyethylene.



3. Pile guides shall be removable to allow the floating docks to be disconnected from the anchor piles for seasonal and maintenance purposes. See pile guide drawing detail for more information.

## 2.4 GANGWAYS

- A. Metal for aluminum structures shall be 6061-T6 aluminum alloy. Metal for decking and handrails shall be 6063-T6 aluminum alloy. Both 6061-T6 and 6063-T6 shall be extruded in accordance with the requirements of applicable sections of Federal Specifications QQ-A-200. Extruded pipe for handrails and structures shall be 1-1/2" diameter minimum pipe.
- B. Decking shall be extruded aluminum slats, embossed to provide a non-slip surface, and shall not exceed nine (9) inches in width with not more than 3/8-inch air space between adjacent slats. The legs of each decking slat shall be welded to the side members and to any longitudinal members with a minimum of 1-1/4 inches of weld per leg. The decking slats shall be placed transversely on the gangway or dock.
- C. Rollers shall be fabricated from UHMW polyethylene with black ultraviolet inhibitor added. Manufacture to provide 5' x 5' min. wearing pad under gangway rollers.
- D. Gangway fasteners shall be of Type 304 stainless steel.
- E. Handrails are required along each side of each gangway. Removable handrails shall be mounted within sleeves fastened to the gangway, secured with stainless steel bolts.
- F. Gangways shall have a detachable hinge mount for securing the gangway to a wall or fixed structure. Hinge mount extrusions shall be welded to the frame of the gangway with a continuous fillet weld unless otherwise shown on the Contract Drawings. Non-hinged deck module connectors shall be shown on the Contract Drawings.
- G. Any installation of dissimilar materials shall be properly insulated to avoid contact of dissimilar metals and to minimize or eliminate corrosion in a marine environment.

## PART 3 - EXECUTION

### 3.1 FLOATING DOCKS

- A. Floating docks are to be carefully installed in the arrangement shown on the accepted general layout drawing.
- B. Floating dock sections may be sub-assembled off site prior to shipping, provided

all necessary care is maintained during transport, rigging, hoisting, handling, and deployment of the materials as required to avoid damage.

- C. Any damage to floating dock materials will be either repaired to the Owner and Project Engineer's satisfaction or replaced, all at no additional cost to the Owner.

### 3.2 GANGWAYS

Gangways shall be securely fastened to certain fixed structures as shown on the plans. Utilities running on the gangway shall be installed so as not to interfere with the access area of the gangway or to be damaged during normal operation.

**END OF SECTION**

SECTION 412200

JIB CRANE

PART 1 - GENERAL

1.1 SUMMARY

- A. Scope of work includes but is not limited to engineering design, furnishing, and installing the following: Contract Drawings and general provisions of Contract, including General and Special Conditions and Specifications sections, apply to work of this section as follows:
1. Provide all engineering design, labor, materials, equipment and supervision necessary to manufacture and install a 1-ton Jib Crane.
  2. Jib Crane Series
  3. Jib Crane Base Plate and Hardware/Anchorage. Including bolt torque capacity.
  4. Rotation Stops, Appurtenances, Motor, Wiring, etc.
  5. Foundation is "By Others" and is excluded from the Jib Crane manufacturer's scope of work.
- B. Related work specified elsewhere includes, but is not necessarily limited to, the following:
1. Installation of precast concrete. SECTION 034533 PRECAST STRUCTURAL CONCRETE.
  2. Installation of steel piles. SECTION 316216.13 STEEL PIPE PILES.
  3. Cast-in-place concrete and reinforcing under SECTION 033000 CAST-IN-PLACE CONCRETE.

1.2 REFERENCES:

- A. The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the test by the basic designation only.
1. American Institute of Steel Construction (AISC): Manual of Steel Construction
  2. American Society for Testing and Materials (ASTM)
  3. American Welding Society (AWS) D1.1: Structural Welding Code
  4. American Welding Society (AWS): Certified Shop

1.3 SUBMITTALS:

- A. Provide the following information in accordance with Section 013000, "Submittal Procedures."
- B. Producer's certification that supplied materials meet requirements of applicable specifications.
- C. Design Loads: Submit design lateral, uplift forces and overturning moments to Project Engineer, as applicable. Specify if design forces provided are working (unfactored) or ultimate (factored).
- D. Shop drawings, which outline crane configuration, dimensions, bolt template, construction, rotation stops, motor details, wiring details, and installation details.
- E. Qualifications: Jib Crane manufacturer shall have a minimum of five (5) years' experience producing similar equipment.
- F. ISO 9001 Compliance Certification
- G. Manufacturer's Installation Instructions
- H. Manufacturer's Warranty
  - 1. Included on manufacturer's standard form and outlines the agreement to repair or replace assemblies and components that fail in materials and/or execution within warranty period from date of substantial completion.
  - 2. Warranty covers defects in equipment material and workmanship of manual systems and equipment for ten (10) years or 20 thousand (20,000) hours, commencing on the date of shipment to the first retail purchaser. This warranty extends to non-wearable parts only, with the exception of the wheels supplied on manually operated workstation end trucks and hoist trolleys.
  - 3. Warranty covers two (2) years for paint and finishes for non-aluminum components.
  - 4. Warranty covers one (1) year for motorized systems and equipment.
  - 5. Jib Crane manufacturer will not be responsible for design of jib crane foundation support. Warranty for jib crane will include the jib crane structure, base plate, rotation stops, motor, wiring, and anchorage. Foundation will be "by Others."
- I. Jib Crane Operation and Maintenance (O&M) Manual

1.4 QUALITY ASSURANCE

- A. Verify Jib Crane dimensions for each application to ensure that each system is completely operational over the intended range.

- B. Crane manufacturer shall be registered ISO 9001 compliant with an independent certification agency approved by the International Organization for Standardization.
- C. Installer's Qualification: A company that is acceptable to the crane manufacturer and with five years of experience assembling and installing cranes for multiple applications. Installer should be able to:
  - 1. Perform welding using certified welders in accordance with AWS D1.1.
  - 2. Bolt connections in accordance with torque tightening procedures specified in AISC Manual, Part 5.
  - 3. Clearly label crane with maximum rated capacity with label visible from floor level and loading position.
  - 4. Perform OSHA Load Test Certification.

## 1.5 CONDITIONS/DELIVERY, STORAGE, AND HANDLING

- A. Delivery, Storage, and Handling
  - 1. Store products in manufacturer's packaging until ready for installation.
  - 2. Store and dispose of solvent-based materials in accordance with requirements of local authorities.

## PART 2 - PRODUCTS

### 2.1 JIB CRANE

- A. Design Factor: Design Jib Crane for an ultimate design factor greater than or equal to 3:1 for all components, including the base and lifting winch, if applicable.
  - 1. Crane shall be designed to withstand the following:
    - a. Crane and hoist dead load.
    - b. Live load capacity equal to net rated hook load.
    - c. Inertia forces from crane and load movement.
- B. Lift Capacity: Jib Crane shall have a lift capacity of 1-ton.
- C. Mast: Mast shall be freestanding with a clear height of the mast shall be 16'-0", measured from the bottom of the base plate to the bottom of the boom.
- D. Boom: Total boom length shall be 12'-0", measured from the centerline of the mast to the end of the boom. Distance from the face of the stop to the end of the boom shall be 11'-6".

- E. Rotation: Jib Crane shall have 180-degree rotation; boom will not drift when at rest.
- F. Rotation Stops: Shall be field mounted welded or bolted as approved by the Project Engineer.
- G. Deflection: Deflection when loaded to the maximum capacity at the furthest pick point shall be limited to a deflection of approximately L/150.
- H. Anchor Bolts: Shall be 1-inch diameter J-Bolts to the length recommended by the manufacturer.

## 2.2 JIB CRANE AND BASE FINISH

- A. Materials: Jib Crane boom, mast and base shall be fabrication from steel meeting ASTM Standards.
- B. Finish: Jib Crane boom, mast and base shall be hot-dipped galvanized in accordance with ASTM Standards.

## 2.3 JIB CRANE HOIST

- A. Hoisting Winch shall be Bison Single Phase - 1 Ton electrical chain hoist HH-B10 or approved equal, with 30' lifting chain, trolley, cable and leads included. Winch shall be suitable for outdoor use. The winch shall be mounted on an aluminum plate and shall be supplied with lift handles for installing; details of installation shall be submitted in advance for approval by the Project Engineer. Controller shall have min. 20' cord length.

## PART 3 - EXECUTION

### 3.1 INSTALLATION

- A. Install Jib Crane complete with all necessary hardware, wiring, motor, and appurtenances, according to approved Shop Drawings, manufacture's written instructions, and as specified.

### 3.2 FIELD QUALITY CONTROL

- A. Inspection
  - 1. Verify all bolts are tightened to torque values specified in manual and lock washers are fully compressed.
- B. Field Test
  - 1. Ensure crane operates properly (movement is smooth and consistent).

2. Verify motorized operation and controls function properly.
3. Make adjustments as needed and correct inadequacies.

C. Acceptance Test

1. After the system has been installed, OSHA requires an acceptance test before operating and after any modifications. An authorized dealer or installer should perform acceptance tests.

3.3 MAINTENANCE

- A. To keep a jib crane in good operating order, engineers recommend establishing a schedule of inspection and lubrication. All parts should be inspected, all loose parts adjusted, and worn parts replaced at once.
- B. During the first month after a new installation, a weekly inspection should be performed. All nuts, bolts, and screws should be checked for tightness. All end stops, cotter pins, and hoist trolleys should be checked for abnormal wear or breakage.
- C. After the first month, a complete inspection of all fasteners and connections should be performed monthly. Heavier conditions of use will require more frequent inspections.
- D. Operators should conduct a visual inspection of the system before each use.

END OF SECTION

## FUEL SYSTEM



**SECTION 15606  
FACILITY FUEL SYSTEMS**

**PART 1 – GENERAL:**

**1.1 DESCRIPTION:**

- A. Storage tank, piping, and accessories located underground or aboveground as shown on contract drawings. Refer to contract drawings for type of fuel and for tank capacity.
- B. Tank fluid level monitoring and alarm systems.
- C. Leak detection system for tanks and underground piping.
- D. Fuel oil quality maintenance system (water and particulate removal).

**1.2 RELATED WORK:**

Blank

**1.3 QUALITY ASSURANCE:**

- A. Approval by Contracting Officer is required of products or services of proposed manufacturers, suppliers and installers, and will be based on Contractor's certification that:
  - 1. Manufacturers regularly and currently manufacture tanks, tank and piping accessories, tank fluid level monitoring and leak detection systems, fuel quality management systems.
  - 2. Manufacturers of steel tanks participate in the Quality Assurance Program of the Steel Tank Institute (STI).
  - 3. The design and size of each item of equipment provided for this project is of current production and has been in satisfactory operation on at least three installations for approximately three years. Current models of fluid level and leak detection systems with less than three years service experience are acceptable if similar previous models from the same manufacturer have at least three years service experience.
- B. Apply and install materials, equipment and specialties in accordance with manufacturer's written instructions. Conflicts between the manufacturer's instructions and the contract drawings and specifications shall be referred to the Engineer for resolution. Provide PDFs of installation instructions to the Engineer two weeks prior to commencing installation of any item.
- C. All equipment shall be free from defects that would adversely affect the performance, maintainability and appearance of individual components or overall assembly.

- D. Tanks, Secondary Containment Systems for Piping, Plastic Piping and Containment Systems, Tank Level Monitoring Systems, Leak Detection Systems, Fuel Quality Management Systems, Cathodic Protection Systems: Authorized manufacturers representatives shall provide on-site training of installers and supervision of the installation and testing of the equipment and systems to assure conformance to written instructions of manufacturers.
- E. Tank and piping installation contractor shall be certified as acceptable by local and state pollution control authorities.
- F. Entire installation shall conform to requirements of local and state pollution control authorities.
- G. Pipe Welding: Conform to requirements of ASME B31.1. Welders shall show evidence of qualification. Welders shall utilize a stamp to identify their work. Unqualified personnel will be rejected.
- H. Assembly of Glass Fiber Reinforced Plastic Piping: Installation personnel shall have been trained, tested and certified under a procedure approved by the manufacturer of the piping. Proof of certification, in writing, shall be provided to the ENGINEER.
- I. Where specified codes or standards conflict, consult the ENGINEER.
- J. Label of Conformance (definition): Labels of accredited testing laboratories showing conformance to the standards specified.
- K. Equipment and materials installed shall be compatible in all respects with other items being furnished and with existing items so that the result will be a safe, complete and fully operational system which conforms to contract requirements and in which no item is subject to conditions beyond its design capabilities.

#### **1.4 SUBMITTALS:**

- A. Submit in accordance with Section 013300, SUBMITTALS - SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES. Submission of manufacturer data sheets and shop drawings the match the model numbers on the drawings shall be deemed as acceptable, on condition that Engineer has provided submittal approval.
- B. Aboveground Steel Tanks:
  - 1. Drawings of tanks, supports, ladders, platforms, heating coils, tank manholes, emergency relief vents and all accessories. Include overall dimensions and dimensional locations and sizes of pipe connections, and access openings.
  - 2. Recommended tank support locations.

3. Weight of entire tank assembly, empty and flooded.
4. Design and construction of primary tanks, insulation, secondary containment, supports, pipe connections, platforms.
5. Application and performance data on coatings from manufacturer of coatings.
6. Data certifying tanks are designed for surcharge loads of platforms shown.
7. Certification of compliance with specified standards.
8. Certification that steel tank manufacturer participates in Steel Tank Institute (STI) Quality Assurance Program.
9. Design, construction, performance, dimensions of emergency relief vents.

#### REQUIREMENTS FOR NON-STRUCTURAL COMPONENTS.

##### C. Fuel Piping:

1. ASTM and UL compliance.
2. Grade, class or type, schedule number.
3. Manufacturer.

##### D. Pipe Fittings, Unions, Flanges:

1. ASTM and UL compliance.
2. ASTM standards number.
3. Catalog cuts.
4. Pressure and temperature rating.

##### E. Foot Valves, Check Valves, Overfill Prevention Valves:

1. Catalog cuts showing design and construction.
2. Pressure and temperature ratings.
3. Pressure loss and flow rate data.
4. Materials of construction.
5. Accessories.

##### F. Secondary Containment System for Fuel Piping:

1. Sizes, materials, construction of containment system including end seals, sumps, coatings and pipe supports.
2. Layout of system.
3. Installation instructions.
4. Design of cathodic protection system (steel casing).

##### G. Leak Detection System:

1. Drawings, description and performance data on sensors, control units.

2. Description of operation.
  3. Layout of system.
  4. Installation and operating instructions.
  5. Data on interconnecting wiring systems to be furnished.
- H. Tank Fluid Level Monitoring Instrumentation System:
1. Drawings showing instruments and in-tank sensing units, with dimensions.
  2. Design and construction of all elements of system.
  3. Installation instructions.
- I. Tank and Piping Accessories: Design, construction, and dimensions of vent caps, fill boxes, fill caps, spill containers and other accessories.
- J. Fuel Quality Maintenance System:
1. Drawings and description of all components and arrangement of system.
  2. Design and performance of pumps, filters.
  3. Catalog data and operation of control system.
  4. Installation instructions.

#### **1.5 DELIVERY, STORAGE AND HANDLING:**

- A. Protection of Equipment:
1. Equipment and material placed on the job site shall remain in the custody of the Contractor until phased acceptance, whether or not the Owner has reimbursed the Contractor for the equipment and material. The Contractor is solely responsible for the protection of such equipment and material against any damage.
  2. Place damaged equipment in first class, new operating condition; or, replace same as determined and directed by the ENGINEER. Such repair or replacement shall be at no additional cost to the Owner.
  3. Protect new equipment and piping systems against entry of foreign matter on the inside. Clean both inside and outside before painting or placing equipment in operation.
  4. Existing equipment and piping being worked on by the Contractor shall be under the custody and responsibility of the Contractor and shall be protected as required for new work.
  5. Protect plastic piping and tanks from ultraviolet light (sunlight).
- B. Cleanliness of Equipment and Piping:

1. Exercise care in storage and handling of equipment and piping material to be incorporated in the work. Remove debris arising from cutting, threading and welding of piping.
2. Piping systems shall be flushed, blown or pigged as necessary to provide clean systems.
3. Clean interior of all tanks prior to delivery for beneficial use by the Owner.
4. Contractor shall be fully responsible for all costs, damages and delay arising from failure to provide clean systems and equipment.

**1.6 APPLICABLE PUBLICATIONS:**

- A. The publications listed below form a part of this specification to the extent referenced. The publications are referenced in the text by basic designation only.
- B. Federal Specifications (Fed. Spec.):
- A-A-60005 ..... Frames, Covers, Grating, Steps, Sump and Catch Basin, Manhole
- C. ASTM International (ASTM):
- A36/A36M ..... Carbon Structural Steel
  - A53/A53M ..... Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless
  - A106/A106M..... Seamless Carbon Steel Pipe for High Temperature Service
  - A126..... Gray Iron Castings for Valves, Flanges and Pipe Fittings
  - A234/A234M..... Piping Fittings of Wrought Carbon Steel and Alloy Steel for Moderate and High Temperature Service
  - B62..... Composition Bronze or Ounce Metal Castings
  - D2996-01 ..... Filament-Wound "Fiberglass" (Glass-Fiber-Reinforced-Thermosetting-Resin) Pipe
- D. American Society of Mechanical Engineers (ASME):
- B16.5..... Pipe Flanges and Flanged Fittings (NPS ½-24).
  - B16.11..... Forged Fittings, Socket-Welding and Threaded
  - B31.1..... Code for Pressure Piping, Power Piping with Current Amendments
- E. National Electrical Manufacturers Association (NEMA):
- 250 ..... Enclosures for Electrical Equipment (1000 Volts Maximum)

F. National Fire Protection Association (NFPA):

- 30 ..... Flammable and Combustible Liquids Code
- 3A..... Code for Motor Fuel Dispensing Facilities and Repair  
Garages
- 70 ..... National Electrical Code

G. Underwriters Laboratories Inc. (UL):

- 58 ..... Steel Underground Tanks for Flammable and Combustible  
Liquids
- 142 ..... Steel Aboveground Tanks for Flammable and Combustible  
Liquids
- 971 ..... Non-Metallic Underground Piping for Flammable Liquids
- 1316 ..... Glass-Fiber-Reinforced Plastic Underground Storage  
Tanks for Petroleum Products
- 1746 ..... External Corrosion Protection System for Steel  
Underground Storage Tanks
- 2085 ..... Protected Above-ground Tanks for Flammable and  
Combustible Liquids

H. Steel Tank Institute (STI):

- F001 ..... Standard for Fire Resistant Tanks
- F841 ..... Dual Wall Underground Steel Storage Tanks
- F894 ..... ACT-100 Specification for External Corrosion Protection of  
FRP Composite Steel Underground Storage Tanks
- F911 ..... Standard for Diked Aboveground Storage Tank System
- F941 ..... Standard for Fireguard Thermally Insulated Aboveground  
Storage Tanks
- F961 ..... ACT-100-U Specification for External Corrosion Protection  
of Composite Steel Underground Storage Tanks
- P3..... STI-P3 Specification and Manual for External Corrosion  
Protection of Underground Steel Storage Tanks
- R891 ..... Recommended Practice for Hold Down Strap Isolation

I. NACE International (Corrosion Engineers) (NACE):

- RP0169 ..... Control of External Corrosion on Underground or  
Submerged Metallic Piping Systems

NACE 3/SSPC-SP6 ..... Commercial Blast Cleaning

NACE 4/SSPC-SP7 ..... Brush-off Blast Cleaning

J. California Air Review Board (CARB):

Carb Executive Order VR-401-E..... OPW Phase I Enhanced Vapor Recovery (EVR) System For Aboveground Storage Tanks (AST)

Carb Executive Order VR-402-D..... Morrison Phase I Enhanced Vapor Recovery (EVR) System For Aboveground Storage Tanks (AST)

**1.7 PERMITS:**

Contractor shall obtain and complete all tank permit and registration forms required by local authorities.

**PART - 2 PRODUCTS:**

**2.1 ABOVEGROUND STEEL TANKS:**

- A. Type: As shown on drawings. Factory fabricated all welded steel, horizontal cylindrical configuration, atmospheric pressure, internal and external corrosion protection as specified. In addition to specified requirements, tanks shall be fabricated in accordance with Steel Tank Institute (STI) design standards by manufacturer that participates in STI Quality Assurance Program.
- B. Construction:
  - 1. ASTM A36 steel, conform to UL 2085. Inner and outer tanks of double wall tanks shall both conform. Provide label of conformance.
  - 2. Conform to NFPA 30 or 30A as applicable.
  - 3. Double-wall, Fire Protective, conforming to UL 2085. Provide label of conformance.
  - 4. Design tanks for saddle supports furnished by tank manufacturer.
  - 5. Leaks and abrasions are not permitted. Maximum permissible out-of-roundness of cylindrical shells is one percent of the diameter.
  - 6. Provide lifting lugs for rigging tanks.
  - 7. Make provisions for leak detectors to be installed at lowest part of interstitial space between walls of double-wall tanks.

- C. Factory Cleaning: Clean interior and exterior of tanks and steel dikes (if furnished).  
Remove mill scale, dirt, rust, oil, welding debris, loose coatings and coatings incompatible with fuel stored or protective coating.
- D. Factory Coating: As shown on drawings.
- E. Pipe Connections to Tanks:
  - 1. Conform to UL 2085.
  - 2. Provide and coordinate tank connection quantities, sizes and types with requirements of tank level gage unit; sounding rod; vent, fill, supply and return pipes; and other pipes as shown.
- H. Tank Manholes: Provide quantity shown. Bolted cover type, gasketed.
- I. Wear (Striker) Plates: Provide 12 inch square, 0.25 inch thick steel plates welded to tank bottom directly under the sounding opening, the fuel return discharge, and the fill discharge.
- J. Lifting Lugs: Provide for rigging tanks.
- K. Emergency Relief Vents for Fire Exposure: Venting capacity shall conform to NFPA 30 or 30A as applicable. Standard product of a manufacturer, designed to automatically open at tank pressure of 16 oz./sq in. Aluminum construction with Teflon seating surface. Provide separate vents for primary and secondary tanks. Manufacturer: OPW or equal.
- L. Provide fittings for grounding per NFPA 70.

## **2.2 TANK AND PIPING ACCESSORIES:**

- A. Fill Boxes:
  - 1. As shown on drawings. Spill-container type enclosing a fill cap assembly with camlock hose connector with closure coordinated with fittings used by fuel supplier.
  - 2. Watertight assembly, stainless steel, quick-opening, watertight sealable cover, with capacity as shown. Integral drain valve.
  - 3. Fill cap shall be lockable, tight-fill design with provision for padlock on the top of the cap. Fill cap shall screw onto threaded adapter that can be removed without removing fill box. Entire assembly shall seal tight with no leakage during filling and when cap is in place.
  - 4. Provide special tools necessary for opening fill boxes and fill caps.
  - 5. Protect spill container from traffic as shown.



C. Furnish gauging chart, gallons versus inches depth.

**2.3 PIPING, VALVES, FITTINGS:**

- A. Piping: Steel, seamless or electric resistance welded (ERW), ASTM A53 Grade B or ASTM A106 Grade B, Schedule 40. Pressure relief piping shall be schedule 40, socket welded.
- B. Joints: Socket or butt-welded. Threaded joints not permitted except at valves, unions and tank connections.
- C. Fittings:
  - 1. Butt-welded joints: Steel, ASTM A234, Grade B, ASME B16.9, same schedule as adjoining pipe.
  - 2. Socket-welded joints: Forged steel, ASME B16.11, 13 700 kPa (2000 psi) class.
- D. Unions: Malleable iron, 2050 kPa (300 psi) class.
- E. Companion flanges: Flanges and bolting, ASME B16.5.
- F. Welding flanges: Weld neck, ASME B16.5, forged steel ASTM A105, 1025 kPa (150 psi).
- G. The contractor will air test all piping systems to 50 PSI or 150% of the working pressure of the pipe as determined by the Engineer.

**2.4 TANK FLUID LEVEL MONITOR AND ALARM SYSTEMS:**

- A. Follow manufacturer's instructions and applicable specifications.
- C. High Fluid Level Alarm System:
  - 1. High level monitoring and alarm system separate from existing re-used inventory monitoring system.High level alarm actuation adjustable 90 percent of tank capacity.
- D. Locate all indicators, selector switches, alarms on face of wall-mounted NEMA 250, Type 4 panel.
- E. Remote Alarm Annunciator:
  - 1. Visual and audible high level alarms above tank fill box locations. Locate in NEMA 250 Type 4X weatherproof exterior wall mounted panels.
  - 2. Alarm shall include flashing red light with 180 degree visibility for each tank and 95 dB horn. Provide alarm silence control.
  - 3. Provide identification sign: "WHEN ALARM SOUNDS - FUEL TANK FILLED TO CAPACITY - DO NOT OVERFILL".

### **PART 3 - EXECUTION**

#### **3.1 INSTALLATION AND TESTING, ABOVEGROUND TANKS:**

- A. Conform to NFPA 30 or 30A as applicable.
- B. After tanks are installed, test steel tanks with water. Test interstitial area between steel tank walls with air at pressure recommended by tank manufacturer. Tests shall be witnessed by the Engineer.
- C. Provide electrical grounding in accordance with NFPA 70.

#### **3.2 INSTALLATION, TANK FLUID LEVEL INDICATOR AND ALARM SYSTEM:**

- A. Wiring shall conform to NFPA-70.
- B. Locate level indicator and alarm panel 5 feet above the floor on inside wall of boiler room, unless shown otherwise.
- C. Locate remote high level alarm on exterior wall in view of tank fill point, 8 feet above grade.

--- E N D ---

SECTION 15607

UNDERGROUND STORAGE SYSTEM REMOVAL

PART 1 - GENERAL

I. DESCRIPTION

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This section specifies activities associated with the removal of underground storage tanks, and all associated piping and equipment including proper disposal of all debris resulting from such activities as shown on the drawings.

II. PERMITS, NOTIFICATIONS, AND REGULATIONS

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- A. In addition to these specifications, the removal of underground and aboveground storage tanks and the associated systems will be performed to the standards set by applicable federal, state, and local laws, regulations or ordinances in such form as they may exist at the time of the work under the contract, specifically, but not limited to, OSHA, NFPA, DEP, EPA regulations, and API and PEI recommended practices.
- B. This specification in no way intends to cite or reiterate all provisions therein or elsewhere. The Contractor is responsible to know, understand, and abide by all such regulations and common practices. The Owner, during the execution of this contract, may enforce at his discretion provisions contained in these references.
- C. It is the responsibility of the Contractor to make, in proper and timely fashion, all necessary notifications to relevant federal, state, and local governing agencies and obtain and comply with the provisions of all permits and submittals required under those auspices.

III. APPLICABLE PUBLICATIONS:

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- A. The publications listed below form a part of this specification to the extent referenced. The publications are referenced in the text by the basic designation only.
- B. American Petroleum Institute (API):
  - 1604.....Closure of Underground Petroleum Storage Tanks
- C. American Society of Testing Materials (ASTM):
  - E1739 .....Guide to Risk-Based Corrective Action (RBCA) Applied at  
Petroleum Release Sites
  - E1912 .....Guide for Accelerated Site Characterization for Confirmed  
or Suspected Petroleum Releases
  - E1943 .....Guide for Remediation of Ground water by Natural  
Attenuation at Petroleum Release Sites

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C. National Fire Protection Agency (NFPA):

- 30-08 .....Flammable and Liquid Combustible Code
- 70B .....Recommended Practice for Electrical Equipment  
Maintenance
- 326.....Standard for Safeguarding of Tanks and Containers for  
Entry, Cleaning, or Repair
- 329.....Recommended Practice for Handling Release of  
Flammable Liquids and Gases

PART 2 - EXECUTION

I. TANK AND PIPING REMOVAL

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This scope of work is to be performed at a minimum by the Contractor. All work will be performed in accordance with API Publication Nos. 1604 and 2015.

- A. Empty and remove all applicable underground storage tanks, piping, and equipment.
- B. Remove all product from piping in an appropriate manner to insure that no spillage occurs during disassembly.
- C. Excavate and remove all piping and equipment associated with the underground tanks and dispensing systems within the specified limits.
- D. The Contractor is responsible for handling and disposing any regulated or contaminated stormwater, groundwater, soil, or any other material that is generated as a result Contractor failure to protect the work from said elements unless said material is approved to be disposed of by alternate means by the Owner or his representative.
- E. The Owner reserves the right to retain in its possession any equipment deemed salvageable for reuse.
- F. Stockpiled soils resulting from tank preparation will be secured with poly sheeting and stored on-site in a location directed by the Owner.
- G. The Contractor should verify that the actual content of each tank matches the identified product.
- H. All tanks must be cleaned in place, all sludge removed, and interior of tanks brought to a condition in which flammable vapors will not be generated.
- I. Roads in the vicinity of the tanks must be barricaded when flammable vapors may be released.
- J. Where the threat of flammable vapors exists, all sources of ignition, including smoking, welding, electrical or internal combustion engines should be eliminated from the work area. Vacuum trucks and associated equipment used for the work should be placed well away from the work area until the tanks are determined to be vapor free. All equipment used in the work area must be explosion proof in accordance with NFPA 70B, Class I, Division I, Group D guidelines.

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- K. Equipment appropriate for handling, storage, and transport of flammable liquids will be used. All hazardous wastes will be properly manifested in accordance with state regulations.
  - L. Where explosive vapors are likely to be encountered, the work area will be continually tested for explosive vapor concentrations. Work shall cease and corrective actions shall be immediately taken when ambient conditions exceed 10% of the L.E.L.
  - M. The Contractor will supply the equipment and materials to safely stockpile all soils in accordance with applicable regulations.
  - N. Upon removal, the tank becomes the property of the Contractor. The tank shall be inerted and promptly transported to a licensed disposal facility the day of the removal.
  - O. All federal, state, and local protocols will be followed during all tank removal activities. All appropriate permits shall be signed before the tank is transported to the licensed tank facility.
  - P. Provide Owner with documentation that tank was scrapped in accordance with applicable laws and regulations.

## II. CONFINED SPACE ENTRY

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- A. The Contractor must adhere to OSHA confined space entry requirements, including breathing apparatus, personal protective gear, and stand-by personnel requirements during tank removal activities.
- B. All workers must present 40 hour OSHA course certification to the Owner.

## III. CONTAMINATED SOIL MANAGEMENT

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- A. The contractor will segregate and stockpile soils at the direction of the Owner or Owner's Representative. All soils must meet DEP criteria for cover and containment. The Contractor will allow the Owner/Consultant to sample and classify the stockpiled soils.
- B. Soils will be stockpiled in a location on-site remote from the construction location as directed by the Owner.
- C. All product, sludge, and other debris generated from Contractor activities will be removed from the site. Hazardous wastes as defined by Massachusetts Regulations 310 CMR 30.00 must be transported and manifested by a licensed waste hauler.
- D. The Contractor will coordinate with and assist the Owner in sampling the excavation sidewalls and stockpiled soils prior to backfill.

**END OF SECTION**

## SECTION 16050

### REQUIREMENTS FOR ELECTRICAL INSTALLATIONS

#### **PART 1 - GENERAL**

##### **1.1 DESCRIPTION**

- A. This section applies to all applicable sections.
- B. Furnish and install electrical wiring, systems, equipment and accessories in accordance with the specifications and drawings.
- C. Electrical service entrance equipment (arrangements for temporary and permanent connections to the utility's system) shall conform to the utility's requirements. Coordinate fuses, circuit breakers and relays with the utility's system, and obtain utility approval for sizes and settings of these devices.
- D. Wiring ampacities specified or shown on the drawings are based on copper conductors, with the conduit and raceways accordingly sized. Aluminum conductors are prohibited.

##### **1.2 MINIMUM REQUIREMENTS**

- A. References to the Massachusetts Building Code, National Electrical Code (NEC), Underwriters Laboratories, Inc. (UL) and National Fire Protection Association (NFPA) are minimum installation requirement standards.
- B. Drawings and other specification sections shall govern in those instances where requirements are greater than those specified in the above standards.

##### **1.3 TEST STANDARDS**

- A. All materials and equipment shall be listed, labeled or certified by a nationally recognized testing laboratory to meet Underwriters Laboratories, Inc., standards where test standards have been established. Equipment and materials which are not covered by UL Standards will be accepted provided equipment and material is listed, labeled, certified or otherwise determined to meet safety requirements of a nationally recognized testing laboratory. Equipment of a class which no nationally recognized testing laboratory accepts, certifies, lists, labels, or determines to be safe, will be considered if inspected or tested in accordance with national industrial standards, such as NEMA, or ANSI. Evidence of compliance shall include certified test reports and definitive shop drawings.
- B. Definitions:
  - 1. Listed; Equipment, materials, or services included in a list published by an organization that is acceptable to the authority having jurisdiction and concerned

- with evaluation of products or services, that maintains periodic inspection of production or listed equipment or materials or periodic evaluation of services, and whose listing states that the equipment, material, or services either meets appropriate designated standards or has been tested and found suitable for a specified purpose.
2. Labeled; Equipment or materials to which has been attached a label, symbol, or other identifying mark of an organization that is acceptable to the authority having jurisdiction and concerned with product evaluation, that maintains periodic inspection of production of labeled equipment or materials, and by whose labeling the manufacturer indicates compliance with appropriate standards or performance in a specified manner.
  3. Certified; equipment or product which:
    - a. Has been tested and found by a nationally recognized testing laboratory to meet nationally recognized standards or to be safe for use in a specified manner.
    - b. Production of equipment or product is periodically inspected by a nationally recognized testing laboratory.
    - c. Bears a label, tag, or other record of certification.
  4. Nationally recognized testing laboratory; laboratory which is approved, in accordance with OSHA regulations, by the Secretary of Labor.

#### **1.4 QUALIFICATIONS (PRODUCTS AND SERVICES)**

- A. Manufacturers Qualifications: The manufacturer shall regularly and presently produce, as one of the manufacturer's principal products, the equipment and material specified for this project, and shall have manufactured the item for at least three years.
- B. Product Qualification:
  1. Manufacturer's product shall have been in satisfactory operation, on three installations of similar size and type as this project, for approximately three years.
  2. The Owner reserves the right to require the Contractor to submit a list of installations where the products have been in operation before approval.

#### **1.5 APPLICABLE PUBLICATIONS**

Applicable publications listed in all sections are the latest issue, unless otherwise noted.

#### **1.6 MANUFACTURED PRODUCTS**

- A. Materials and equipment furnished shall be of current production by manufacturers regularly engaged in the manufacture of such items, for which replacement parts shall

be available.

- B. When more than one unit of the same class or type of equipment is required, such units shall be the product of a single manufacturer.
- C. Equipment Assemblies and Components:
  - 1. Components of an assembled unit need not be products of the same manufacturer.
  - 2. Manufacturers of equipment assemblies, which include components made by others, shall assume complete responsibility for the final assembled unit.
  - 3. Components shall be compatible with each other and with the total assembly for the intended service.
  - 4. Constituent parts which are similar shall be the product of a single manufacturer.
- D. Factory wiring shall be identified on the equipment being furnished and on all wiring diagrams.
- E. When Factory Testing Is Specified:
  - 1. The Owner shall have the option of witnessing factory tests. The contractor shall notify the VA through the Engineer a minimum of 15 working days prior to the manufacturers making the factory tests.
  - 2. PDFs of certified test reports containing all test data shall be furnished to the Engineer prior to final inspection and not more than 90 days after completion of the tests.
  - 3. When equipment fails to meet factory test and re-inspection is required, the contractor shall be liable for all additional expenses, including expenses of the Owner.

## **1.7 EQUIPMENT REQUIREMENTS**

Where variations from the contract requirements are requested in accordance with the applicable specifications, the connecting work and related components shall include, but not be limited to additions or changes to branch circuits, circuit protective devices, conduits, wire, feeders, controls, panels and installation methods.

## **1.8 EQUIPMENT PROTECTION**

- A. Equipment and materials shall be protected during shipment and storage against physical damage, vermin, dirt, corrosive substances, fumes, moisture, cold and rain.
  - 1. Store equipment indoors in clean dry space with uniform temperature to prevent condensation. Equipment shall include but not be limited to switchgear, switchboards, panelboards, transformers, motor control centers, motor controllers,



- uninterruptible power systems, enclosures, controllers, circuit protective devices, cables, wire, light fixtures, electronic equipment, and accessories.
2. During installation, equipment shall be protected against entry of foreign matter; and be vacuum-cleaned both inside and outside before testing and operating.  
Compressed air shall not be used to clean equipment. Remove loose packing and flammable materials from inside equipment.
  3. Damaged equipment shall be, as determined by the Engineer, placed in first class operating condition or be returned to the source of supply for repair or replacement.
  4. Painted surfaces shall be protected with factory installed removable heavy kraft paper, sheet vinyl or equal.
  5. Damaged paint on equipment and materials shall be refinished with the same quality of paint and workmanship as used by the manufacturer so repaired areas are not obvious.

#### **1.9 WORK PERFORMANCE**

- A. All electrical work must comply with the requirements of NFPA 70 (NEC), NFPA 70B, NFPA 70E, OSHA Part 1910 subpart J, OSHA Part 1910 subpart S and OSHA Part 1910 subpart K in addition to other references required by contract.
- B. Job site safety and worker safety is the responsibility of the contractor.
- C. Electrical work shall be accomplished with all affected circuits or equipment de-energized. When an electrical outage cannot be accomplished in this manner for the required work, the following requirements are mandatory:
  1. Electricians must use full protective equipment (i.e., certified and tested insulating material to cover exposed energized electrical components, certified and tested insulated tools, etc.) while working on energized systems in accordance with NFPA 70E.
  2. Electricians must wear personal protective equipment while working on energized systems in accordance with NFPA 70E.
  3. Before initiating any work, a job specific work plan must be developed by the contractor with a peer review conducted and documented by the Engineer and Medical Center staff. The work plan must include procedures to be used on and near the live electrical equipment, barriers to be installed, safety equipment to be used and exit pathways.

4. Work on energized circuits or equipment cannot begin until prior written approval is obtained from the Engineer.
- D. New work shall be installed and connected to existing work neatly, safely and professionally. Disturbed or damaged work shall be replaced or repaired to its prior conditions.
- E. Coordinate location of equipment and conduit with other trades to minimize interferences.

#### **1.10 EQUIPMENT INSTALLATION AND REQUIREMENTS**

- A. Equipment location shall be as close as practical to locations shown on the drawings.
- B. Working spaces shall not be less than specified in the NEC for all voltages specified.
- C. Inaccessible Equipment:
  1. Where the Owner determines that the Contractor has installed equipment not conveniently accessible for operation and maintenance, the equipment shall be removed and reinstalled as directed at no additional cost to the Owner.
  2. "Conveniently accessible" is defined as being capable of being reached quickly for operation, maintenance, or inspections without the use of ladders, or without climbing or crawling under or over obstacles such as, but not limited to, motors, pumps, belt guards, transformers, piping, ductwork, conduit and raceways.

#### **1.11 EQUIPMENT IDENTIFICATION**

- A. In addition to the requirements of the NEC, install an identification sign which clearly indicates information required for use and maintenance of items such as panelboards, cabinets, motor controllers (starters), safety switches, separately enclosed circuit breakers, individual breakers and controllers in switchboards, switchgear and motor control assemblies, control devices and other significant equipment.
- B. Nameplates for Normal Power System equipment shall be laminated black phenolic resin with a white core with engraved lettering. Nameplates for Essential Electrical System (EES) equipment, as defined in the NEC, shall be laminated red phenolic resin with a white core with engraved lettering. Lettering shall be a minimum of 1/2 inch [12mm] high. Nameplates shall indicate equipment designation, rated bus amperage, voltage, number of phases, number of wires, and type of EES power branch as applicable. Secure nameplates with screws.

## 1.12 SUBMITTALS

- A. Submit in accordance with-Section 01300, SUBMITTAL PROCEDURES.
- B. The Owner's approval shall be obtained for all equipment and material before delivery to the job site. Delivery, storage or installation of equipment or material which has not had prior approval will not be permitted at the job site.
- C. All submittals shall include adequate descriptive literature, catalog cuts, shop drawings and other data necessary for the Owner to ascertain that the proposed equipment and materials comply with specification requirements. Catalog cuts submitted for approval shall be legible and clearly identify equipment being submitted.
- D. Submittals for individual systems and equipment assemblies which consist of more than one item or component shall be made for the system or assembly as a whole. Partial submittals will not be considered for approval.
  1. Submittals shall be marked to show specification reference including the section and paragraph numbers.
  2. Submit each section separately.
- E. The submittals shall include the following:
  1. Information that confirms compliance with contract requirements. Include the manufacturer's name, model or catalog numbers, catalog information, technical data sheets, shop drawings, pictures, nameplate data and test reports as required.
  2. Elementary and interconnection wiring diagrams for communication and signal systems, control systems and equipment assemblies. All terminal points and wiring shall be identified on wiring diagrams.
  3. Parts list which shall include those replacement parts recommended by the equipment manufacturer.
- F. Manuals:
  1. Maintenance and Operation Manuals: Submit as required for systems and equipment specified in the technical sections. Furnish PDFs or an approved equivalent. Furnish one complete manual as specified in the technical section but in no case later than prior to performance of systems or equipment test, and furnish the remaining manuals prior to contract completion.
  2. Inscribe the following identification on the cover: the words "MAINTENANCE AND OPERATION MANUAL," the name and location of the system, equipment, building, name of Contractor, and contract number. Include in the manual the

- names, addresses, and telephone numbers of each subcontractor installing the system or equipment and the local representatives for the system or equipment.
3. Provide a "Table of Contents" and assemble the manual to conform to the table of contents, with tab sheets placed before instructions covering the subject. The instructions shall be legible and easily read, with large sheets of drawings folded in.
  4. The manuals shall include:
    - a. Internal and interconnecting wiring and control diagrams with data to explain detailed operation and control of the equipment.
    - b. A control sequence describing start-up, operation, and shutdown.
    - c. Description of the function of each principal item of equipment.
    - d. Installation instructions.
    - e. Safety precautions for operation and maintenance.
    - f. Diagrams and illustrations.
    - g. Periodic maintenance and testing procedures and frequencies, including replacement parts numbers and replacement frequencies.
    - h. Performance data.
    - i. Pictorial "exploded" parts list with part numbers. Emphasis shall be placed on the use of special tools and instruments. The list shall indicate sources of supply, recommended spare parts, and name of servicing organization.
    - j. List of factory approved or qualified permanent servicing organizations for equipment repair and periodic testing and maintenance, including addresses and factory certification qualifications.
- G. Approvals will be based on complete submission of manuals together with shop drawings.

### **1.13 SINGULAR NUMBER**

Where any device or part of equipment is referred to in these specifications in the singular number (e.g., "the switch"), this reference shall be deemed to apply to as many such devices as are required to complete the installation as shown on the drawings.

### **1.14 TRAINING**

- A. Training shall be provided for the particular equipment or system as required in each associated specification.
- B. A training schedule shall be developed and submitted by the contractor and approved by the Engineer at least 30 days prior to the planned training.

--- E N D ---

**SECTION 16111**  
**CONDUIT SYSTEMS**

**PART 1 - GENERAL**

**1.1 DESCRIPTION**

- A. This section specifies the furnishing, installation, and connection of conduit, fittings, and boxes to form complete, coordinated, grounded raceway systems. Raceways are required for all wiring unless shown or specified otherwise.
- B. Definitions: The term conduit, as used in this specification, shall mean any or all of the raceway types specified.

**1.2 RELATED WORK**

- A. General electrical requirements and items that is common to more than one section: Section 16050, BASIC METHODS AND REQUIREMENTS (ELECTRICAL)
- B. Requirements for personnel safety and to provide a low impedance path for possible ground fault currents: Section 16450, GROUNDING AND BONDING FOR ELECTRICAL SYSTEMS.

**1.3 SUBMITTALS**

In accordance with Section 013300, SUBMITTALS - SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES, furnish the following:

- A. Shop Drawings:
  - 1. Size and location of main feeders;
  - 2. Size and location of panels and pull boxes
  - 3. Layout of required conduit penetrations through structural elements.
  - 4. The specific item proposed and its area of application shall be identified on the catalog cuts.
- B. Certification: Prior to final inspection, deliver to the Engineer PDFs of the certification that the material is in accordance with the drawings and specifications and has been properly installed.

**1.4 APPLICABLE PUBLICATIONS**

- A. Publications listed below (including amendments, addenda, revisions, supplements and errata) form a part of this specification to the extent referenced. Publications are referenced in the text by the basic designation only.
- B. National Fire Protection Association (NFPA):
  - 70-05 ..... National Electrical Code (NEC)

C. Underwriters Laboratories, Inc. (UL):

- 1-03..... Flexible Metal Conduit
- 5-01..... Surface Metal Raceway and Fittings
- 6-03..... Rigid Metal Conduit
- 50-03 ..... Enclosures for Electrical Equipment
- 360-03 ..... Liquid-Tight Flexible Steel Conduit
- 467-01 ..... Grounding and Bonding Equipment
- 514A-01..... Metallic Outlet Boxes
- 514B-02..... Fittings for Cable and Conduit
- 514C-05 ..... Nonmetallic Outlet Boxes, Flush-Device Boxes and Covers
- 651-02..... Schedule 40 and 80 Rigid PVC Conduit
- 651A-03..... Type EB and A Rigid PVC Conduit and HDPE Conduit
- 797-03..... Electrical Metallic Tubing
- 1242-00..... Intermediate Metal Conduit

D. National Electrical Manufacturers Association (NEMA):

- TC-3-04 ..... PVC Fittings for Use with Rigid PVC Conduit and Tubing
- FB1-03 ..... Fittings, Cast Metal Boxes and Conduit Bodies for Conduit,  
Electrical Metallic Tubing and Cable

**PART 2 - PRODUCTS**

**2.1 MATERIAL**

- A. Conduit Size: In accordance with the NEC, but not less than 3/4-inch) unless otherwise shown. Where permitted by the NEC, 3/4-inch flexible conduit may be used for tap connections to recessed lighting fixtures.
- B. Conduit:
  - 1. Rigid galvanized steel: Shall Conform to UL 6, ANSI C80.1.
  - 2. Rigid aluminum: Shall Conform to UL 6A, ANSI C80.5.
  - 3. Rigid intermediate steel conduit (IMC): Shall Conform to UL 1242, ANSI C80.6.
  - 4. Electrical metallic tubing (EMT): Shall Conform to UL 797, ANSI C80.3. Maximum size not to exceed 4-inch and shall be permitted only with cable rated 600 volts or less.
  - 5. Flexible galvanized steel conduit: Shall Conform to UL 1.
  - 6. Liquid-tight flexible metal conduit: Shall Conform to UL 360.
  - 7. Direct burial plastic conduit: Shall conform to UL 651 and UL 651A, heavy wall PVC or high density polyethylene (PE).

8. Surface metal raceway: Shall Conform to UL 5.

C. Conduit Fittings:

1. Rigid steel and IMC conduit fittings:

- a. Fittings shall meet the requirements of UL 514B and ANSI/ NEMA FB1.
- a. Standard threaded couplings, locknuts, bushings, and elbows: Only steel or malleable iron materials are acceptable. Integral retractable type IMC couplings are also acceptable.
- b. Locknuts: Bonding type with sharp edges for digging into the metal wall of an enclosure.
- c. Bushings: Metallic insulating type, consisting of an insulating insert molded or locked into the metallic body of the fitting. Bushings made entirely of metal or nonmetallic material are not permitted.
- d. Erickson (union-type) and set screw type couplings: Approved for use in concrete are permitted for use to complete a conduit run where conduit is installed in concrete. Use set screws of case hardened steel with hex head and cup point to firmly seat in conduit wall for positive ground. Tightening of set screws with pliers is prohibited.
- e. Sealing fittings: Threaded cast iron type. Use continuous drain type sealing fittings to prevent passage of water vapor. In concealed work, install fittings in flush steel boxes with blank cover plates having the same finishes as that of other electrical plates in the room.

2. Rigid aluminum conduit fittings:

- a. Standard threaded couplings, locknuts, bushings, and elbows: Malleable iron, steel or aluminum alloy materials; Zinc or cadmium plate iron or steel fittings. Aluminum fittings containing more than 0.4 percent copper are prohibited.
- b. Locknuts and bushings: As specified for rigid steel and IMC conduit.
- c. Set screw fittings: Not permitted for use with aluminum conduit.

3. Electrical metallic tubing fittings:

- a. Fittings shall meet the requirements of UL 514B and ANSI/ NEMA FB1.
- b. Only steel or malleable iron materials are acceptable.
- c. Couplings and connectors: Concrete tight and rain tight, with connectors having insulated throats. Use gland and ring compression type couplings and connectors for conduit sizes 2 inches and smaller. Use set screw type couplings



with four set screws each for conduit sizes over 2 inches. Use set screws of case-hardened steel with hex head and cup point to firmly seat in wall of conduit for positive grounding.

- d. Indent type connectors or couplings are prohibited.
  - e. Die-cast or pressure-cast zinc-alloy fittings or fittings made of "pot metal" are prohibited.
4. Flexible steel conduit fittings:
- a. Conform to UL 514B. Only steel or malleable iron materials are acceptable.
  - b. Clamp type, with insulated throat.
5. Liquid-tight flexible metal conduit fittings:
- a. Fittings shall meet the requirements of UL 514B and ANSI/ NEMA FB1.
  - b. Only steel or malleable iron materials are acceptable.
  - c. Fittings must incorporate a threaded grounding cone, a steel or plastic compression ring, and a gland for tightening. Connectors shall have insulated throats.
6. Direct burial plastic conduit fittings:
- a. Fittings shall meet the requirements of UL 514C and NEMA TC3.
  - b. As recommended by the conduit manufacturer.
7. Surface metal raceway fittings: As recommended by the raceway manufacturer.
8. Expansion and deflection couplings:
- a. Conform to UL 467 and UL 514B.
  - b. Accommodate, 0.75-inch deflection, expansion, or contraction in any direction, and allow 30 degree angular deflections.
  - c. Include internal flexible metal braid sized to guarantee conduit ground continuity and fault currents in accordance with UL 467, and the NEC code tables for ground conductors.
  - d. Jacket: Flexible, corrosion-resistant, watertight, moisture and heat resistant molded rubber material with stainless steel jacket clamps.
- D. Conduit Supports:
- 1. Parts and hardware: Zinc-coat or provide equivalent corrosion protection.
  - 2. Individual Conduit Hangers: Designed for the purpose, having a pre-assembled closure bolt and nut, and provisions for receiving a hanger rod.
  - 3. Multiple conduit (trapeze) hangers: Not less than 1-1/2 by 1-1/2 inch, 12 gage steel,

- cold formed, lipped channels; with not less than 3/8-inch diameter steel hanger rods.
4. Solid Masonry and Concrete Anchors: Self-drilling expansion shields, or machine bolt expansion.
- E. Outlet, Junction, and Pull Boxes:
1. UL-50 and UL-514A.
  2. Cast metal where required by the NEC or shown, and equipped with rustproof boxes.
  3. Sheet metal boxes: Galvanized steel, except where otherwise shown.
  4. Flush mounted wall or ceiling boxes shall be installed with raised covers so that front face of raised cover is flush with the wall. Surface mounted wall or ceiling boxes shall be installed with surface style flat or raised covers.
- F. Wireways: Equip with hinged covers, except where removable covers are shown.
- G. Warning Tape: Standard, 4-Mil polyethylene 3 inches wide yellow tape red black letters, and imprinted with "CAUTION BURIED ELECTRIC LINE BELOW".

## **PART 3 - EXECUTION**

### **3.1 PENETRATIONS**

- A. Cutting or Holes:
1. Locate holes in advance where they are proposed in the structural sections such as ribs or beams. Obtain the approval of the Engineer prior to drilling through structural sections.
  2. Cut holes through concrete and masonry in new and existing structures with a diamond core drill or concrete saw. Pneumatic hammer, impact electric, hand or manual hammer type drills are not allowed, except where permitted by the Engineer as required by limited working space.
- B. Fire Stop: Where conduits, wireways, and other electrical raceways pass through fire partitions, fire walls, smoke partitions, or floors, install a fire stop that provides an effective barrier against the spread of fire, smoke and gases as specified in Section 07 84 00, FIRESTOPPING, with rock wool fiber or silicone foam sealant only. Completely fill and seal clearances between raceways and openings with the fire stop material.
- C. Waterproofing: At floor, exterior wall, and roof conduit penetrations, completely seal clearances around the conduit and make watertight.

### **3.2 INSTALLATION, GENERAL**

- A. In accordance with UL, NEC, as shown, and as hereinafter specified.
- B. Essential (Emergency) raceway systems shall be entirely independent of other raceway systems, except where specifically "accepted" by NEC Article 517.

C. Install conduit as follows:

1. In complete runs before pulling in cables or wires.
2. Flattened, dented, or deformed conduit is not permitted. Remove and replace the damaged conduits with new undamaged material.
3. Assure conduit installation does not encroach into the ceiling height head room, walkways, or doorways.
4. Cut square with a hacksaw, ream, remove burrs, and draw up tight.
5. Mechanically and electrically continuous.
6. Independently support conduit at 8'0" on center. Do not use other supports i.e., (suspended ceilings, suspended ceiling supporting members, lighting fixtures, conduits, mechanical piping, or mechanical ducts).
7. Support within 1 foot of changes of direction, and within 1 foot of each enclosure to which connected.
8. Close ends of empty conduit with plugs or caps at the rough-in stage to prevent entry of debris, until wires are pulled in.
9. Conduit installations under fume and vent hoods are prohibited.
10. Secure conduits to cabinets, junction boxes, pull boxes and outlet boxes with bonding type locknuts. For rigid and IMC conduit installations, provide a locknut on the inside of the enclosure, made up wrench tight. Do not make conduit connections to junction box covers.
11. Do not use aluminum conduits in wet locations.
12. Unless otherwise indicated on the drawings or specified herein, all conduits shall be installed concealed within finished walls, floors and ceilings.

D. Conduit Bends:

1. Make bends with standard conduit bending machines.
2. Conduit hickey may be used for slight offsets, and for straightening stubbed out conduits.
3. Bending of conduits with a pipe tee or vice is prohibited.

E. Layout and Homeruns:

1. Install conduit with wiring, including homeruns to minimize distance and interference with other operations or utilities.

### **3.3 CONCEALED WORK INSTALLATION**

A. In Concrete:

1. Conduit: Rigid steel, IMC or EMT. Do not install EMT in concrete slabs that are in

- contact with soil, gravel or vapor barriers.
2. Align and run conduit in direct lines.
  3. Install conduit through concrete beams only when the following occurs:
    - a. Where shown on the structural drawings.
    - b. As approved by the Engineer prior to construction, and after submittal of drawing showing location, size, and position of each penetration.
  4. Installation of conduit in concrete that is less than 3 inches thick is prohibited.
    - a. Conduit outside diameter larger than 1/3 of the slab thickness is prohibited.
    - b. Space between conduits in slabs: Approximately six conduit diameters apart, except one conduit diameter at conduit crossings.
    - c. Install conduits approximately in the center of the slab so that there will be a minimum of 3/4-inch of concrete around the conduits.
  5. Make couplings and connections watertight. Use thread compounds that are UL approved conductive type to insure low resistance ground continuity through the conduits. Tightening set screws with pliers is prohibited.
- B. Furred or Suspended Ceilings and in Walls:
1. Conduit for conductors above 600 volts:
    - a. Rigid steel or rigid aluminum.
    - b. Aluminum conduit mixed indiscriminately with other types in the same system is prohibited.
  2. Conduit for conductors 600 volts and below:
    - a. Rigid steel, IMC, rigid aluminum, or EMT. Different type conduits mixed indiscriminately in the same system is prohibited.
  3. Align and run conduit parallel or perpendicular to the building lines.
  4. Connect recessed lighting fixtures to conduit runs with maximum 6 feet of flexible metal conduit extending from a junction box to the fixture.
  5. Tightening set screws with pliers is prohibited.

### **3.4 EXPOSED WORK INSTALLATION**

- A. Unless otherwise indicated on the drawings, exposed conduit is only permitted in mechanical and electrical rooms.
- B. Conduit for conductors above 600 volts:
  1. Rigid steel or rigid aluminum.
  2. Aluminum conduit mixed indiscriminately with other types in the same system is

- prohibited.
- C. Conduit for Conductors 600 volts and below:
    - 1. Rigid steel, IMC, rigid aluminum, or EMT. Different type of conduits mixed indiscriminately in the system is prohibited.
  - D. Align and run conduit parallel or perpendicular to the building lines.
  - E. Install horizontal runs close to the ceiling or beams and secure with conduit straps.
  - F. Support horizontal or vertical runs at not over 8-foot intervals.
  - G. Surface metal raceways: Use only where shown.
  - H. Painting:

### **3.5 DIRECT BURIAL INSTALLATION**

- A. Exterior routing of Lighting Systems and Other Branch circuits (600 Volt and Less, and 5 feet from the buildings):
  - 1. Conduit: Thick wall PVC or high density PE, unless otherwise shown.
  - 2. Mark conduit at uniform intervals to show the kind of material, direct burial type, and the UL approval label.
  - 3. Install conduit fittings and terminations as recommended by the conduit manufacturer.
  - 4. Tops of conduits shall be as follows unless otherwise shown:
    - a. Not less than 24 inches below finished grade.
    - b. Not less than 30 inches below road and other paved surfaces.
  - 5. Work with extreme care near existing ducts, conduits, cables, and other utilities to avoid damaging them.
  - 6. Excavation for conduit bedding and back-filling of trenches:
    - a. Cut the trenches neatly and uniformly.
    - b. Do not kink the conduits.
  - 7. Seal conduits, including spare conduits, at building entrances and at outdoor terminations for equipment with a suitable compound that prevents the entrance of moisture and gases.
  - 8. Where metal conduit is shown, install threaded heavy wall rigid steel galvanized conduit or type A20 rigid steel galvanized conduit coated with 20 mil bonded PVC, or rigid steel or IMC, PVC coated or standard coated with bituminous asphaltic compound.
  - 9. Warning tape shall be continuously placed 12 inches above conduits or electric lines.

### **3.6 HAZARDOUS LOCATIONS**

- A. Use rigid steel conduit only, notwithstanding requirements otherwise specified in this or other sections of these specifications.
- B. Install UL approved sealing fittings, that prevent passage of explosive vapors, in hazardous areas equipped with explosive proof lighting fixtures, switches, and receptacles, as required by the NEC.

### **3.7 WET OR DAMP LOCATIONS**

- A. Unless otherwise shown, use conduits of rigid steel or IMC.
- B. Provide sealing fittings, to prevent passage of water vapor, where conduits pass from warm to cold locations, i.e., (refrigerated spaces, constant temperature rooms, air conditioned spaces building exterior walls, roofs) or similar spaces.
- C. Unless otherwise shown, use rigid steel or IMC conduit within 5 feet of the exterior and below concrete building slabs in contact with soil, gravel, or vapor barriers. Conduit shall include an outer factory coating of 20 mil bonded PVC or field coat with asphaltum before installation. After installation, completely coat damaged areas of coating.

### **3.8 MOTORS AND VIBRATING EQUIPMENT**

- A. Use flexible metal conduit for connections to motors and other electrical equipment subject to movement, vibration, misalignment, cramped quarters, or noise transmission.
- B. Provide liquid-tight flexible metal conduit for installation in exterior locations, moisture or humidity laden atmosphere, corrosive atmosphere, water or spray wash-down operations, inside (air stream) of HVAC units, and locations subject to seepage or dripping of oil, grease or water. Provide a green ground wire with flexible metal conduit.

### **3.9 EXPANSION JOINTS**

- A. Conduits 3 inches and larger, that are secured to the building structure on opposite sides of a building expansion joint, require expansion and deflection couplings. Install the couplings in accordance with the manufacturer's recommendations.
- B. Provide conduits smaller than 3 inches with junction boxes on both sides of the expansion joint. Connect conduits to junction boxes with sufficient slack of flexible conduit to produce 5 inch vertical drop midway between the ends. Flexible conduit shall have a copper green ground bonding jumper installed. In lieu of this flexible conduit, expansion and deflection couplings as specified above for 15 inches and larger conduits are acceptable.
- C. Install expansion and deflection couplings where shown.

### **3.10 CONDUIT SUPPORTS, INSTALLATION**

- A. Safe working load shall not exceed 1/4 of proof test load of fastening devices.
- B. Use pipe straps or individual conduit hangers for supporting individual conduits.  
Maximum distance between supports is 8 feet on center.
- C. Support multiple conduit runs with trapeze hangers. Use trapeze hangers that are designed to support a load equal to or greater than the sum of the weights of the conduits, wires, hanger itself, and 200 pounds. Attach each conduit with U-bolts or other approved fasteners.
- D. Support conduit independently of junction boxes, pull boxes, fixtures, suspended ceiling T-bars, angle supports, and similar items.
- E. Fasteners and Supports in Solid Masonry and Concrete:
  - 1. New Construction: Use steel or malleable iron concrete inserts set in place prior to placing the concrete.
  - 2. Existing Construction:
    - a. Steel expansion anchors not less than 1/4 inch bolt size and not less than 1-1/8 inch embedment.
    - b. Power set fasteners not less than 1/4 inch diameter with depth of penetration not less than 3 inches.
    - c. Use vibration and shock resistant anchors and fasteners for attaching to concrete ceilings.
- F. Hollow Masonry: Toggle bolts are permitted.
- G. Bolts supported only by plaster or gypsum wallboard are not acceptable.
- H. Metal Structures: Use machine screw fasteners or other devices specifically designed and approved for the application.
- I. Attachment by wood plugs, rawl plug, plastic, lead or soft metal anchors, or wood blocking and bolts supported only by plaster is prohibited.
- J. Chain, wire, or perforated strap shall not be used to support or fasten conduit.
- K. Spring steel type supports or fasteners are prohibited for all uses except: Horizontal and vertical supports/fasteners within walls.
- L. Vertical Supports: Vertical conduit runs shall have riser clamps and supports in accordance with the NEC and as shown. Provide supports for cable and wire with fittings that include internal wedges and retaining collars.

### **3.11 BOX INSTALLATION**

- A. Boxes for Concealed Conduits:

1. Flush mounted.
  2. Provide raised covers for boxes to suit the wall or ceiling, construction and finish.
- B. In addition to boxes shown, install additional boxes where needed to prevent damage to cables and wires during pulling in operations.
- C. Remove only knockouts as required and plug unused openings. Use threaded plugs for cast metal boxes and snap-in metal covers for sheet metal boxes.
- D. Outlet boxes in the same wall mounted back-to-back are prohibited. A minimum 24-inch, center-to-center lateral spacing shall be maintained between boxes.)
- E. Minimum size of outlet boxes for ground fault interrupter (GFI) receptacles is 4-inches square by 2-1/8 inches deep, with device covers for the wall material and thickness involved.
- F. Stencil or install phenolic nameplates on covers of the boxes identified on riser diagrams; for example "SIG-FA JB No. 1".
- G. On all Branch Circuit junction box covers, identify the circuits with black marker.

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## SECTION 16127

### CABLES, LOW-VOLTAGE (600 VOLTS AND BELOW)

#### PART 1 - GENERAL

##### 1.1 DESCRIPTION

This section specifies the furnishing, installation, and connection of the low voltage power and lighting wiring.

##### 1.2 RELATED WORK

- A. Excavation and backfill for cables that are installed in conduit: Drawings and Specification.
- B. General electrical requirements that are common to more than one section.
- D. Conduits for cables and wiring: Section 16111, CONDUIT SYSTEMS.
- E. Requirements for personnel safety and to provide a low impedance path for possible ground fault currents: Section 16450, GROUNDING AND BONDING FOR ELECTRICAL SYSTEMS.

##### 1.3 SUBMITTALS

- A. In accordance with plans and specifications, furnish Manufacturer's Literature and Data: Showing each cable type and rating.

##### 1.4 APPLICABLE PUBLICATIONS

- A. Publications listed below (including amendments, addenda, revisions, supplements and errata) form a part of this specification to the extent referenced. Publications are reference in the text by the basic designation only.
- B. American Society of Testing Material (ASTM):
  - D2301-04 ..... Standard Specification for Vinyl Chloride Plastic Pressure Sensitive Electrical Insulating Tape
- C. Federal Specifications (Fed. Spec.):
  - A-A-59544-00 ..... Cable and Wire, Electrical (Power, Fixed Installation)
- C. National Fire Protection Association (NFPA):
  - 70-05 ..... National Electrical Code (NEC)
- D. Underwriters Laboratories, Inc. (UL):
  - 44-02..... Thermoset-Insulated Wires and Cables
  - 83-03 ..... Thermoplastic-Insulated Wires and Cables
  - 467-01 ..... Electrical Grounding and Bonding Equipment

486A-01.....	Wire Connectors and Soldering Lugs for Use with Copper Conductors
486C-02 .....	Splicing Wire Connectors
486D-02 .....	Insulated Wire Connector Systems for Underground Use or in Damp or Wet Locations
486E-00.....	Equipment Wiring Terminals for Use with Aluminum and/or Copper Conductors
493-01 .....	Thermoplastic-Insulated Underground Feeder and Branch Circuit Cable
514B-02.....	Fittings for Cable and Conduit
1479-03 .....	Fire Tests of Through-Penetration Fire Stops

## **PART 2 - PRODUCTS**

### **2.1 CABLE AND WIRE (POWER, SIGNAL, AND LIGHTING)**

- A. Cable and Wire shall be in accordance with Fed. Spec. A-A-59544, except as hereinafter specified.
- B. Single Conductor:
  - 1. Shall be annealed copper.
  - 2. Shall be stranded for sizes No. 8 AWG and larger, solid for sizes No. 10 AWG and smaller.
  - 3. Shall be minimum size No. 12 AWG, except where smaller sizes are allowed herein.
- C. Insulation:
  - 1. THW, XHHW, or dual rated THHN-THWN shall be in accordance with UL 44, and 83.
  - 2. Direct burial: UF or USE shall be in accordance with UL 493.
  - 3. Isolated power system wiring: Type XHHW with a dielectric constant of 3.5 or less.
- D. Color Code:
  - 1. Secondary service, feeder and branch circuit conductors shall be color coded as follows:

208/120 volt	Phase	480/277 volt
Black	A	Brown
Red	B	Orange
Blue	C	Yellow
White	Neutral	Gray *
* or white with colored (other than green) tracer.		

- a. The lighting circuit “switch legs” and 3-way switch “traveling wires” shall have color coding unique and distinct (i.e. pink and purple) from the color coding indicated above. The unique color codes shall be solid and in accordance with the NEC.
2. Use solid color compound or solid color coating for No. 12 AWG and No. 10 AWG branch circuit conductors and neutral sizes.
3. Phase conductors No. 8 AWG and larger shall be color-coded using one of the following methods:
  - a. Solid color compound or solid color coating.
  - b. Stripes, bands, or hash marks of color specified above.
  - c. Color as specified using ¾-inch wide tape. Apply tape in half overlapping turns for a minimum of 3 inches for terminal points, and in junction boxes, pull boxes, troughs, manholes, and handholes. Apply the last two laps of tape with no tension to prevent possible unwinding. Where cable markings are covered by tape, apply tags to cable stating size and insulation type.
4. For modifications and additions to existing wiring systems, color coding shall conform to the existing wiring system.
5. Color code for isolated power system wiring shall be in accordance with the NEC.

## 2.2 SPLICES AND JOINTS

- A. In accordance with UL 486A, C, D, E and NEC.
- B. Branch circuits (No. 10 AWG and smaller):
  1. Connectors: Solderless, screw-on, reusable pressure cable type, 600 volt, 105 degree C with integral insulation, approved for copper and aluminum conductors.
  2. The integral insulator shall have a skirt to completely cover the stripped wires.

3. The number, size, and combination of conductors, as listed on the manufacturers packaging shall be strictly complied with.

C. Feeder Circuits:

1. Connectors shall be indent, hex screw, or bolt clamp-type of high conductivity and corrosion-resistant material.
2. Field installed compression connectors for cable sizes 250 kcmil and larger shall have not less than two clamping elements or compression indents per wire.
3. Insulate splices and joints with materials approved for the particular use, location, voltage, and temperature. Insulate with not less than that of the conductor level that is being joined.
4. Plastic electrical insulating tape: ASTM D2304 shall apply, flame retardant, cold and weather resistant.

## **2.3 CONTROL WIRING**

- A. Unless otherwise specified in other sections of these specifications, control wiring shall be as specified for power and lighting wiring, except the minimum size shall be not less than No. 14 AWG.
- B. Control wiring shall be large enough so that the voltage drop under inrush conditions does not adversely affect operation of the controls.

## **2.4 WIRE LUBRICATING COMPOUND**

- A. Suitable for the wire insulation and conduit it is used with, and shall not harden or become adhesive.
- B. Shall not be used on wire for isolated type electrical power systems.

## **2.5 FIREPROOFING TAPE**

- A. The tape shall consist of a flexible, conformable fabric of organic composition coated one side with flame-retardant elastomer.
- B. The tape shall be self-extinguishing and shall not support combustion. It shall be arc-proof and fireproof.
- C. The tape shall not deteriorate when subjected to water, gases, salt water, sewage, or fungus and be resistant to sunlight and ultraviolet light.
- D. The finished application shall withstand a 200-ampere arc for not less than 30 seconds.
- E. Securing tape: Glass cloth electrical tape not less than 7 mils thick, ¾-inch wide.

## **2.6 WARNING TAPE**

- A. The tape shall be standard, 3-inch wide, 4-Mil polyethylene, detectable type.

- B. The tape shall be red with black letters indicating "CAUTION BURIED ELECTRIC LINE BELOW".

### **PART 3 - EXECUTION**

#### **3.1 INSTALLATION, GENERAL**

- A. Install in accordance with the NEC, and as specified.
- B. Install all wiring in raceway systems, except where direct burial or HCF Type AC cables are used.
- C. Splice cables and wires only in outlet boxes, junction boxes, pull boxes, manholes, or handholes.
- D. Wires of different systems (i.e. 120V, 277V) shall not be installed in the same conduit or junction box system.
- E. Install cable supports for all vertical feeders in accordance with the NEC. Provide split wedge type which firmly clamps each individual cable and tightens due to cable weight.
- F. For panelboards, cabinets, wireways, switches, and equipment assemblies, neatly form, train, and tie the cables in individual circuits.
- G. Seal cable and wire entering a building from underground, between the wire and conduit where the cable exits the conduit, with a non-hardening approved compound.
- H. Wire Pulling:
  - 1. Provide installation equipment that will prevent the cutting or abrasion of insulation during pulling of cables.
  - 2. Use ropes made of nonmetallic material for pulling feeders.
  - 3. Attach pulling lines for feeders by means of either woven basket grips or pulling eyes attached directly to the conductors, as approved by the Engineer.
  - 4. Pull in multiple cables together in a single conduit.
- I. No more than (3) single-phase branch circuits shall be installed in any one conduit.
- J. The wires shall be derated in accordance with NEC Article 310. Neutral wires, under conditions defined by the NEC, shall be considered current-carrying conductors.

#### **3.2 INSTALLATION IN MANHOLES**

- A. Install and support cables in manholes on the steel racks with porcelain or equal insulators. Train the cables around the manhole walls, but do not bend to a radius less than six times the overall cable diameter.
- B. Fireproofing:

1. Install fireproofing where low voltage cables are installed in the same manholes with high voltage cables; also cover the low voltage cables with arc proof and fireproof tape.
2. Use tape of the same type as used for the high voltage cables, and apply the tape in a single layer, one-half lapped or as recommended by the manufacturer. Install the tape with the coated side towards the cable and extend it not less than one inch into each duct.
3. Secure the tape in place by a random wrap of glass cloth tape.

### **3.3 SPLICE INSTALLATION**

- A. Splices and terminations shall be mechanically and electrically secure.
- B. Where the Owner determines that unsatisfactory splices or terminations have been installed, remove the devices and install approved devices at no additional cost to the Owner.

### **3.5 CONTROL AND SIGNAL WIRING INSTALLATION**

- A. Unless otherwise specified in other sections, install wiring and connect to equipment/devices to perform the required functions as shown and specified.
- B. Except where otherwise required, install a separate power supply circuit for each system so that malfunctions in any system will not affect other systems.
- C. Where separate power supply circuits are not shown, connect the systems to the nearest panelboards of suitable voltages, which are intended to supply such systems and have suitable spare circuit breakers or space for installation.
- D. Install a red warning indicator on the handle of the branch circuit breaker for the power supply circuit for each system to prevent accidental de-energizing of the systems.
- E. System voltages shall be 120 volts or lower where shown on the drawings or as required by the NEC.

### **3.6 CONTROL AND SIGNAL SYSTEM IDENTIFICATION**

- A. Install a permanent wire marker on each wire at each termination.
- B. Identifying numbers and letters on the wire markers shall correspond to those on the wiring diagrams used for installing the systems.
- C. Wire markers shall retain their markings after cleaning.
- D. In each manhole and handhole, install embossed brass tags to identify the system served and function.

### **3.7 FEEDER IDENTIFICATION**

- A. In each interior pull box and junction box, install metal tags on each circuit cables and wires to clearly designate their circuit identification and voltage.
- B. In each manhole and handhole, provide tags of the embossed brass type, showing the cable type and voltage rating. Attach the tags to the cables with slip-free plastic cable lacing units.

### **3.8 DIRECT BURIAL CABLE INSTALLATION**

- A. Tops of the cables:
  - 1. Below the finished grade: Minimum 24 inches unless greater depth is shown.
  - 2. Below road and other pavement surfaces: In conduit as specified, minimum 30 inches unless greater depth is shown.
  - 3. Do not install them under railroad tracks.
- B. Under road and paved surfaces: Install cables in concrete encased galvanized steel rigid conduits. Size as shown on plans, but not less than two inch trade size with bushings at each end of each conduit run. Provide size/quantity of conduits required to accommodate cables plus one spare.
- C. Work with extreme care near existing ducts, conduits, cables and other utilities to prevent any damage.
- D. Cut the trenches neatly and uniformly:
  - 2. Place a 3-inch layer of sand in the trenches before installing the cables.
  - 3. Place a 3-inch layer of sand over the installed cables.
  - 4. Install continuous horizontal, 1 inch by 8 inch preservative impregnated wood planking 3-inches above the cables before backfilling.
- E. Provide horizontal slack in the cables for contraction during cold weather.
- F. Install the cables in continuous lengths. Splices within cable runs will not be accepted.
- G. Connections and terminations shall be submersible type designed for the cables being installed.
- H. Warning tape shall be continuously placed 12 inches above the buried cables.

### **3.9 EXISTING WIRING**

Unless specifically indicated on the plans, existing wiring shall not be reused for the new installation. Only wiring that conforms to the specifications and applicable codes may be reused. If existing wiring does not meet these requirements, existing wiring may not be reused and new wires shall be installed.

### **3.10 FIELD TESTING**

- A. Feeders and branch circuits shall have their insulation tested after installation and before connection to utilization devices such as fixtures, motors, or appliances.
- B. Tests shall be performed by megger and conductors shall test free from short-circuits and grounds.
- C. Test conductor phase-to-phase and phase-to-ground.
- D. The Contractor shall furnish the instruments, materials, and labor for these tests.

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## SECTION 16140

### WIRING DEVICES

#### PART 1 - GENERAL

##### 1.1 DESCRIPTION

This section specifies the furnishing, installation and connection of wiring devices.

##### 1.2 RELATED WORK

- A. Section 16050, BASIC METHODS AND REQUIREMENTS (ELECTRICAL): General electrical requirements that are common to more than one section.
- B. Section 16111, CONDUIT SYSTEMS: Conduits and outlets boxes.
- C. Section 16127, CABLES, LOW-VOLTAGE (600 VOLTS AND BELOW): Cables and wiring.
- D. Section 16450, GROUNDING AND BONDING FOR ELECTRICAL SYSTEMS: Requirements for personnel safety and to provide a low impedance path to ground for possible ground fault currents.

##### 1.3 SUBMITTALS

- A. Shop Drawings:
  - 1. Sufficient information, clearly presented, shall be included to determine compliance with drawings and specifications.
  - 2. Include electrical ratings, dimensions, mounting details, construction materials, grade and termination information.
- B. Manuals: Two weeks prior to final inspection, deliver PDFs of the following to the Engineer: Technical data sheets and information for ordering replacement units.
- C. Certifications: Two weeks prior to final inspection, submit PDFs of the following to the Engineer: Certification by the Contractor that the devices comply with the drawings and specifications, and have been properly installed, aligned, and tested.

##### 1.5 APPLICABLE PUBLICATIONS

- A. Publications listed below (including amendments, addenda, revisions, supplements and errata) form a part of this specification to the extent referenced. Publications are referenced in the text by basic designation only.
- B. National Fire Protection Association (NFPA):
  - 70 ..... National Electrical Code (NEC)
- C. National Electrical Manufacturers Association (NEMA):
  - WD 1 ..... General Color Requirements for Wiring Devices

WD 6 ..... Wiring Devices – Dimensional Requirements

D. Underwriter’s Laboratories, Inc. (UL):

5..... Surface Metal Raceways and Fittings

20 ..... General-Use Snap Switches

231 ..... Power Outlets

467 ..... Grounding and Bonding Equipment

498 ..... Attachment Plugs and Receptacles

943 ..... Ground-Fault Circuit-Interrupters

**PART 2 - PRODUCTS**

**2.1 RECEPTACLES**

A. General: All receptacles shall be listed by Underwriters Laboratories, Inc., and conform to NEMA WD 6.

1. Mounting straps shall be plated steel, with break-off plaster ears and shall include a self-grounding feature. Terminal screws shall be brass, brass plated or a copper alloy metal.
2. Receptacles shall have provisions for back wiring with separate metal clamp type terminals (four min.) and side wiring from four captively held binding screws.

B. Duplex Receptacles: Single phase, 20 ampere, 120 volts, 2-pole, 3-wire, and conform to the NEMA 5-20R configuration in NEMA WD 6. The duplex type shall have break-off feature for two-circuit operation. The ungrounded pole of each receptacle shall be provided with a separate terminal.

1. Bodies shall be ivory in color.
2. Switched duplex receptacles shall be wired so that only the top receptacle is switched. The remaining receptacle shall be unswitched.
3. Duplex Receptacles on Emergency Circuit:
  - a. In rooms without emergency powered general lighting, the emergency receptacles shall be of the self-illuminated type.
4. Ground Fault Interrupter Duplex Receptacles: Shall be an integral unit, suitable for mounting in a standard outlet box.
  - a. Ground fault interrupter shall be consist of a differential current transformer, solid state sensing circuitry and a circuit interrupter switch. Device shall have nominal sensitivity to ground leakage current of five milliamperes and shall function to interrupt the current supply for any value of ground leakage current above five milliamperes (+ or – 1 milliamp) on the load side of the device. Device shall have a minimum nominal tripping time of 1/30th of a second.

- b. Ground Fault Interrupter Duplex Receptacles shall be the same as ground fault interrupter receptacles.
- 5. Safety Type Duplex Receptacles:
  - a. Bodies shall be gray in color.
    - 1) Shall permit current to flow only while a standard plug is in the proper position in the receptacle.
    - 2) Screws exposed while the wall plates are in place shall be the tamperproof type.
- 6. Duplex Receptacles (not hospital grade): Shall be the same as hospital grade duplex receptacles except for the "hospital grade" listing and as follows.
  - a. Bodies shall be brown phenolic compound supported by a plated steel mounting strap having plaster ears.
- C. Receptacles; 20, 30 and 50 ampere, 250 volts: Shall be complete with appropriate cord grip plug. Devices shall meet UL 231.
- D. Weatherproof Receptacles: Shall consist of a duplex receptacle, mounted in box with a gasketed, weatherproof, cast metal cover plate and cap over each receptacle opening. The cap shall be permanently attached to the cover plate by a spring-hinged flap. The weatherproof integrity shall not be affected when heavy duty specification or hospital grade attachment plug caps are inserted. Cover plates on outlet boxes mounted flush in the wall shall be gasketed to the wall in a watertight manner.
- E. TVSS Receptacles. Shall comply with NEMA WD 1, NEMA WD 6, UL 498, and UL 1449, with integral TVSS in line to ground, line to neutral, and neutral to ground.
  - 1. TVSS Components: Multiple metal-oxide varistors; with a nominal clamp-level rating of 400 volts and minimum single transient pulse energy dissipation of 240 J, according to IEEE C62.41.2 and IEEE C62.45.
  - 2. Active TVSS Indication: Visual and audible, with light visible in face of device to indicate device is "active" or "no longer in service."

## **2.2 TOGGLE SWITCHES**

- A. Toggle Switches: Shall be totally enclosed tumbler type with bodies of phenolic compound. Toggle handles shall be ivory in color unless otherwise specified. The rocker type switch is not acceptable and will not be approved.
  - 1. Switches installed in hazardous areas shall be explosion proof type in accordance with the NEC and as shown on the drawings.

2. Shall be single unit toggle, butt contact, quiet AC type, heavy-duty general-purpose use with an integral self grounding mounting strap with break-off plaster ears and provisions for back wiring with separate metal wiring clamps and side wiring with captively held binding screws.
3. Ratings:
  - a. 120 volt circuits: 20 amperes at 120-277 volts AC.
  - b. 277 volt circuits: 20 amperes at 120-277 volts AC.

## **PART 3 - EXECUTION**

### **3.1 INSTALLATION**

- A. Installation shall be in accordance with the NEC and as shown as on the drawings.
- B. Ground terminal of each receptacle shall be bonded to the outlet box with an approved green bonding jumper, and also connected to the green equipment grounding conductor.
- C. Outlet boxes for light and dimmer switches shall be mounted on the strike side of doors.
- D. Provide barriers in multigang outlet boxes to separate systems of different voltages, Normal Power and Emergency Power systems, and in compliance with the NEC.
- E. Coordinate with other work, including painting, electrical boxes and wiring installations, as necessary to interface installation of wiring devices with other work. Coordinate the electrical work with the work of other trades to ensure that wiring device flush outlets are positioned with box openings aligned with the face of the surrounding finish material. Pay special attention to installations in cabinet work, and in connection with laboratory equipment.
- F. Exact field locations of floors, walls, partitions, doors, windows, and equipment may vary from locations shown on the drawings. Prior to locating sleeves, boxes and chases for roughing-in of conduit and equipment, the Contractor shall coordinate exact field location of the above items with other trades. In addition, check for exact direction of door swings so that local switches are properly located on the strike side.
- G. Install wall switches 48 inches above floor, OFF position down.
- H. Install wall dimmers 48 inches above floor; derate ganged dimmers as instructed by manufacturer; do not use common neutral.
- I. Install convenience receptacles 18 inches above floor, and 6 inches above counter backsplash or workbenches. Install specific-use receptacles at heights shown on the drawings.
- J. Label device plates with a permanent adhesive label listing panel and circuit feeding the wiring device.

- K. Test wiring devices for damaged conductors, high circuit resistance, poor connections, inadequate fault current path, defective devices, or similar problems using a portable receptacle tester. Correct circuit conditions, remove malfunctioning units and replace with new, and retest as specified above.
- L. Test GFCI devices for tripping values specified in UL 1436 and UL 943.

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## **SECTION 16160**

### **PANELBOARDS**

#### **PART 1 - GENERAL**

##### **1.1 DESCRIPTION**

This section specifies the furnishing, installation and connection of panelboards.

##### **1.2 RELATED WORK**

- A. Section 16050, BASIC METHODS AND REQUIREMENTS (ELECTRICAL): General electrical requirements that are common to more than one section.
- B. Section 16111, CONDUIT SYSTEMS: Conduits and outlets boxes.
- C. Section 16127, CABLES, LOW-VOLTAGE (600 VOLTS AND BELOW): Cables and wiring.
- D. Section 16450, GROUNDING AND BONDING FOR ELECTRICAL SYSTEMS: Requirements for personnel safety and to provide a low impedance path for possible ground fault currents.

##### **1.3 SUBMITTALS**

- A. Shop Drawings:
  - 1. Sufficient information, clearly presented, shall be included to determine compliance with drawings and specifications.
  - 2. Include electrical ratings, dimensions, mounting details, materials, wiring diagrams accessories and weights of equipment. Complete nameplate data including manufacturer's name and catalog number.

##### **1.4 APPLICABLE PUBLICATIONS**

Publications listed below (including amendments, addenda, revisions, supplements and errata) form a part of this specification to the extent referenced. Publications are referenced in the text by the basic designation only.

- A. National Electrical Manufacturers Association (NEMA):
  - PB-1-2006 ..... Panelboards
  - AB-1-2002 ..... Molded Case Circuit Breakers, Molded Case Switches and  
Circuit Breaker Enclosures
- B. National Fire Protection Association (NFPA):
  - 70-2005 ..... National Electrical Code (NEC)
  - 70E-2004..... Standard for Electrical Life Safety in the Workplace

- C. Underwriters Laboratories, Inc. (UL):
  - 50-2003 ..... Enclosures for Electrical Equipment
  - 67-2003 ..... Panel boards
  - 489-2006 ..... Molded Case Circuit Breakers and Circuit Breaker Enclosures

## **PART 2 - PRODUCTS**

### **2.1 PANELBOARDS**

- A. Panelboards shall be in accordance with UL, NEMA, NEC, and as shown on the drawings.
- B. Panelboards shall be standard manufactured products. All components of the panelboards shall be the product and assembly of the same manufacturer. All similar units of all panelboards to be of the same manufacturer.
- C. All panelboards shall be hinged “door in door” type with:
  - 1. Interior hinged door with hand operated latch or latches as required to provide access to circuit breaker operating handles only, not to energized ports.
  - 2. Outer hinged door shall be securely mounted to the panelboard box with factory bolts, screws, clips or other fasteners requiring a tool for entry, hand operated latches are not acceptable.
  - 3. Push inner and outer doors shall open left to right.
- D. All panelboards shall be completely factory assembled with molded case circuit breakers. Include one-piece removable, inner dead front cover independent of the panelboard cover.
- E. Panelboards shall have main breaker or main lugs, bus size, voltage, phase, top or bottom feed, and flush or surface mounting as scheduled on the drawings.
- F. Panelboards shall conform to NEMA PB-1, NEMA AB-1 and UL 67 and have the following features:
  - 1. Nonreduced size copper or aluminum bus bars, complete with current ratings as shown on the panel schedules connection straps bolted together and rigidly supported on molded insulators.
  - 2. Bus bar connections to the branch circuit breakers shall be the “distributed phase” or “phase sequence” type. Single-phase, three-wire panelboard busing shall be such that when any two adjacent single-pole breakers are connected to opposite phases, two-pole breakers can be installed in any location. Three-phase, four-wire busing shall be such that when any three adjacent single-pole breakers are individually

- connected to each of the three different phases, two-or three-pole breakers can be installed at any location. Current-carrying parts of the bus assembly shall be plated. Mains ratings shall be as shown.
3. Mechanical lugs furnished with panelboards shall be cast, stamped or machined metal alloys of sizes suitable for the conductors indicated to be connected thereto.
  4. Grounding bus bar equipped with screws or lugs for the connection of grounding wires.
  5. Buses braced for the available short circuit current, but not less than 22,000 amperes symmetrical for 120/208 volt and 120/240 volt panelboards, and 14,000 amperes symmetrical for 277/480-volt panelboards.
  6. Branch circuit panels shall have buses fabricated for bolt-on type circuit breakers.
  7. Protective devices shall be designed so that they can be easily replaced.
  8. Where designated on panel schedule "spaces", include all necessary bussing, device support and connections. Provide blank cover for each space.
  9. In two section panelboards, the main bus in each section shall be full size. The first section shall be furnished with subfeed lugs on the line side of main lugs only, or through-feed lugs for main breaker type panels, and with cable connections to the second section. Panelboard sections with tapped bus or crossover bus are not acceptable.
  10. Series rated panelboards are not permitted.

## **2.2 CABINETS AND TRIMS**

### **A. Cabinets:**

1. Provide galvanized steel cabinets to house panelboards. Cabinets for outdoor panels shall be factory primed and suitably treated with a corrosion-resisting paint finish meeting UL 50 and UL 67.
2. Cabinet enclosure shall not have ventilating openings.
3. Cabinets for panelboards may be of one-piece formed steel or of formed sheet steel with end and side panels welded, riveted, or bolted as required.

## **2.3 MOLDED CASE CIRCUIT BREAKERS FOR PANELBOARDS**

- A. Breakers shall be UL 489 listed and labeled, in accordance with the NEC, as shown on the drawings, and as specified.
- B. Circuit breakers in panelboards shall be bolt on type on phase busbar or branch circuit bar.
  1. Molded case circuit breakers for lighting and appliance branch circuit panelboards



shall have minimum interrupting rating as indicated but not less than:

- a. 120/208 Volt Panelboard: 22,000 amperes symmetrical.
  - b. 120/240 Volt Panelboard: 22,000 amperes symmetrical.
  - c. 277/480 Volt Panelboard: 14,000 amperes symmetrical.
2. Molded case circuit breakers shall have automatic, trip free, non-adjustable, inverse time, and instantaneous magnetic trips for 100-ampere frame or less. Magnetic trip shall be adjustable from 3X to 10X for breakers with 600 ampere frames and higher.
    - C. Breaker features shall be as follows:
      3. A rugged, integral housing of molded insulating material.
      4. Silver alloy contacts.
      5. Arc quenchers and phase barriers for each pole.
      6. Quick-make, quick-break, operating mechanisms.
      7. A trip element for each pole, thermal magnetic type with long time delay and instantaneous characteristics, a common trip bar for all poles and a single operator.
      8. Electrically and mechanically trip free.
      9. An operating handle which indicates ON, TRIPPED, and OFF positions.
        - a. Line connections shall be bolted.
        - b. Interrupting rating shall not be less than the maximum short circuit current available at the line terminals//as indicated on the drawings, //as shown on the electrical system protective device study as required in Section 26 05 71, ELECTRICAL SYSTEM PROTECTIVE DEVICE STUDY //.
      10. An overload on one pole of a multipole breaker shall automatically cause all the poles of the breaker to open.
      11. Shunt trips shall be provided where indicated
        - For circuit breakers being added to existing panelboards, coordinate the breaker type with existing panelboards. Modify the panel directory.

## **2.4 SEPARATELY ENCLOSED MOLDED CASE CIRCUIT BREAKERS**

- A. Where separately enclosed molded case circuit breakers are shown on the drawings, provide circuit breakers in accordance with the applicable requirements of those specified for panelboards.
- B. Enclosures are to be of the NEMA types shown on the drawings. Where the types are not shown, they are to be the NEMA type most suitable for the environmental conditions where the breakers are being installed.

## **PART 3 - EXECUTION**

### **3.1 INSTALLATION**

- A. Installation shall be in accordance with the Manufacturer's instructions, the NEC, as shown on the drawings, and as specified.
- B. Locate panelboards so that the present and future conduits can be conveniently connected. Coordinate the sizes of cabinets with designated closet space.
- C. Install a typewritten schedule of circuits in each panelboard after being submitted to and approved by the Engineer. Schedules, after approval, shall be typed on the panel directory cards and installed in the appropriate panelboards, incorporating all applicable contract changes pertaining to that schedule. Include the room numbers and items served on the cards.
- D. Mount the panelboard fully aligned and such that the maximum height of the top circuit breaker above finished floor shall not exceed 78 inches. For panelboards that are too high, mount panelboard so that the bottom of the cabinets will not be less than 6 inches above the finished floor.
- E. For panelboards located in areas accessible to the public, paint the exposed surfaces of the trims, doors, and boxes with finishes to match surrounding surfaces after the panelboards have been installed.
- F. Directory-card information shall be typewritten to indicate outlets, lights, devices, and equipment controlled and final room numbers served by each circuit and shall be mounted in holders behind protective covering.
- H. Where new panels are to be installed in existing backboxes, backboxes shall have rust and scale removed from inside. Paint inside of backboxes with rust preventive paint before the new panel interior is installed. Provide new trim and doors for these panels. Covers shall fit tight to the box with no gaps between the cover and the box.
- I. Provide ARC flash identification per NFPA 70E.

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**SECTION 16170**  
**DISCONNECT SWITCHES**

**PART 1 - GENERAL**

**1.1 DESCRIPTION**

This section specifies the furnishing, installation and connection of low voltage disconnect switches.

**1.2 RELATED WORK**

- A. Section 16050, BASIC METHODS AND REQUIREMENTS (ELECTRICAL): General electrical requirements that are common to more than one section.
- B. Section 16111, CONDUIT SYSTEMS: Conduits and outlets boxes.
- C. Section 16127, CABLES, LOW-VOLTAGE (600 VOLTS AND BELOW): Cables and wiring.
- D. SECTION 16450, GROUNDING AND BONDING FOR ELECTRICAL SYSTEMS

**1.3 SUBMITTALS**

- A. Shop Drawings:
  - 1. Include sufficient information, clearly presented to determine compliance with drawings and specifications.
  - 2. Include electrical ratings, dimensions, mounting details, materials, enclosure types, fuse type and class.
  - 3. Show the specific switch and fuse proposed for each specific piece of equipment or circuit.
- B. Manuals:
  - 1. Provide complete maintenance and operating manuals for disconnect switches, including technical data sheets, wiring diagrams, and information for ordering replacement parts. Deliver three copies to the Engineer two weeks prior to final inspection.
  - 2. Identify terminals on wiring diagrams to facilitate maintenance and operation.
  - 3. Wiring diagrams shall indicate internal wiring and any interlocking.

**1.4 APPLICABLE PUBLICATIONS**

- A. Publications listed below (including amendments, addenda, revisions, supplements and errata) form a part of this specification to the extent referenced. Publications are referenced in the text by the basic designation only.
- B. National Electrical Manufacturers Association (NEMA):

KS I-01 ..... Enclosed and Miscellaneous Distribution Equipment  
Switches (600 Volts Maximum)

C. National Fire Protection Association (NFPA):

70-05 ..... National Electrical Code (NEC)

D. Underwriters Laboratories, Inc. (UL):

98-98..... Enclosed and Dead-Front Switches

198C-89 ..... High-Interrupting-Capacity Fuses, Current Limiting Types

198E-94..... Class R Fuses

977-99 ..... Fused Power-Circuit Devices

**PART 2 - PRODUCTS**

**2.1 LOW VOLTAGE FUSIBLE SWITCHES RATED 600 AMPERES AND LESS**

- A. Shall be quick-make, quick-break type in accordance with UL 98, NEMA KS 1 and NEC.
- B. Shall have a minimum duty rating, NEMA classification General Duty (GD) for 240 volts and NEMA classification Heavy Duty (HD) for 277/480 volts.
- C. Shall be horsepower rated.
- D. Shall have the following features:
  - 1. Switch mechanism shall be the quick-make, quick-break type.
  - 2. Copper blades, visible in the OFF position.
  - 3. An arc chute for each pole.
  - 4. External operating handle shall indicate ON and OFF position and shall have lock-open padlocking provisions.
  - 5. Mechanical interlock shall permit opening of the door only when the switch is in the OFF position, defeatable by a special tool to permit inspection.
  - 6. Fuse holders for the sizes and types of fuses specified.
  - 7. Solid neutral for each switch being installed in a circuit which includes a neutral conductor.
  - 8. Ground Lugs: One for each ground conductor.
  - 9. Enclosures:
    - a. Shall be the NEMA types shown on the drawings for the switches.
    - b. Where the types of switch enclosures are not shown, they shall be the NEMA types which are most suitable for the environmental conditions where the switches are being installed. Unless otherwise indicated on the plans, all outdoor switches shall be NEMA 3R.

- c. Shall be finished with manufacturer's standard gray baked enamel paint over pretreated steel (for the type of enclosure required).

## **2.2 LOW VOLTAGE UNFUSED SWITCHES RATED 600 AMPERES AND LESS**

Shall be the same as Low Voltage Fusible Switches Rated 600 Amperes and Less, but no fuses.

## **2.3 LOW VOLTAGE FUSIBLE SWITCHES RATED OVER 600 AMPERES TO 1200 AMPERES**

Shall be the same as Low Voltage Fusible Switches Rated 600 Amperes and Less, except for the minimum duty rating which shall be NEMA classification Heavy Duty (HD). These switches shall also be horsepower rated.

## **2.5 IDENTIFICATION SIGNS**

- A. Install nameplate identification signs on each disconnect switch to identify the equipment controlled.
- B. Nameplates shall be laminated black phenolic resin with a white core, with engraved lettering, a minimum of 6 mm (1/4-inch) high. Secure nameplates with screws.

## **PART 3 - EXECUTION**

### **3.1 INSTALLATION**

- A. Install disconnect switches in accordance with the NEC and as shown on the drawings.
- B. Fusible disconnect switches shall be furnished complete with fuses.

### **3.2 SPARE PARTS**

Two weeks prior to the final inspection, furnish one complete set of spare fuses for each fusible disconnect switch installed on the project. Deliver the spare fuses to the Engineer.

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## SECTION 16450

### GROUNDING AND BONDING FOR ELECTRICAL SYSTEMS

#### PART 1 - GENERAL

##### 1.1 DESCRIPTION

- A. This section specifies general grounding and bonding requirements of electrical equipment operations and aboveground storage tank, canopy, and foundation steel, and to provide a low impedance path for possible ground fault currents.
- B. "Grounding electrode system" refers to all electrodes required by NEC, as well as including made, supplementary, lightning protection system grounding electrodes.
- C. The terms "connect" and "bond" are used interchangeably in this specification and have the same meaning.

##### 1.2 RELATED WORK

##### 1.3 SUBMITTALS

- A. Shop Drawings:
  - 1. Sufficient information, clearly presented, shall be included to determine compliance with drawings and specifications.
  - 2. Include the location of system grounding electrode connections and the routing of aboveground and underground grounding electrode conductors.
- B. Test Reports: Provide certified test reports of ground resistance.

##### 1.4 APPLICABLE PUBLICATIONS

Publications listed below (including amendments, addenda, revisions, supplements, and errata) form a part of this specification to the extent referenced. Publications are referenced in the text by the basic designation only.

- A. American Society for Testing and Materials (ASTM):
  - B1-2001..... Standard Specification for Hard-Drawn Copper Wire
  - B8-2004..... Standard Specification for Concentric-Lay-Stranded  
Copper Conductors, Hard, Medium-Hard, or Soft
- B. Institute of Electrical and Electronics Engineers, Inc. (IEEE):
  - 81-1983 ..... IEEE Guide for Measuring Earth Resistivity, Ground  
Impedance, and Earth Surface Potentials of a Ground  
System
- C. National Fire Protection Association (NFPA):

70-2005..... National Electrical Code (NEC)

99-2005 ..... Health Care Facilities

D. Underwriters Laboratories, Inc. (UL):

44-2005 ..... Thermoset-Insulated Wires and Cables

83-2003 ..... Thermoplastic-Insulated Wires and Cables

467-2004 ..... Grounding and Bonding Equipment

486A-486B-2003 ..... Wire Connectors

## **PART 2 - PRODUCTS**

### **2.1 GROUNDING AND BONDING CONDUCTORS**

- A. Equipment grounding conductors shall be UL 83 insulated stranded copper, except that sizes 6 mm<sup>2</sup> (10 AWG) and smaller shall be solid copper. Insulation color shall be continuous green for all equipment grounding conductors, except that wire sizes 25 mm<sup>2</sup> (4 AWG) and larger shall be permitted to be identified per NEC.
- B. Bonding conductors shall be ASTM B8 bare stranded copper, except that sizes 6 mm<sup>2</sup> (10 AWG) and smaller shall be ASTM B1 solid bare copper wire.
- C. Isolated Power System: Type XHHW-2 insulation with a dielectric constant of 3.5 or less.
- D. Electrical System Grounding: Conductor sizes shall not be less than what is shown on the drawings and not less than required by the NEC, whichever is greater.

### **2.2 GROUND RODS**

- A. Copper, 1/2-inch diameter by 8 feet long, conforming to UL 467.
- B. Quantity of rods as shown on drawings.

### **2.3 SPLICES AND TERMINATION COMPONENTS**

Components shall meet or exceed UL 467 and be clearly marked with the manufacturer, catalog number, and permitted conductor size(s).

### **2.4 GROUND CONNECTIONS**

- A. Below Grade: Exothermic-welded type connectors.
- B. Above Grade:
  - 1. Bonding Jumpers: compression type connectors, using zinc-plated fasteners and external tooth lockwashers.
  - 2. Ground Busbars: Two-hole compression type lugs using tin-plated copper or copper alloy bolts and nuts.
  - 3. Rack and Cabinet Ground Bars: one-hole compression-type lugs using zinc-plated or copper alloy fasteners.

## **2.5 ABOVEGROUND STORAGE TANK GROUNDING**

- A. Bond tank, piping, canopy, and foundation steel reinforcement to grounding rod as shown on drawing.
- B. Use No. 2, bare stranded wire.
- C. Cad weld, use copper wire clamp, or other method acceptable to the Engineer.

## **2.5 EQUIPMENT RACK AND CABINET GROUND BARS**

Provide solid copper ground bars designed for mounting on the framework of open or cabinet-enclosed equipment racks with minimum dimensions of 3/8 inch x 3/4 inch.

## **2.6 GROUND TERMINAL BLOCKS**

At any equipment mounting location (e.g. backboards and hinged cover enclosures) where rack-type ground bars cannot be mounted, provide screw lug-type terminal blocks.

## **2.7 SPLICE CASE GROUND ACCESSORIES**

Splice case grounding and bonding accessories shall be supplied by the splice case manufacturer when available. Otherwise, use 16 mm<sup>2</sup> (6 AWG) insulated ground wire with shield bonding connectors.

## **PART 3 - EXECUTION**

### **3.1 GENERAL**

- A. Ground in accordance with the NEC, as shown on drawings, and as hereinafter specified.
- B. System Grounding:
  - 1. Secondary service neutrals: Ground at the supply side of the secondary disconnecting means and at the related transformers.
  - 2. Separately derived systems (transformers downstream from the service entrance): Ground the secondary neutral.
  - 3. Isolation transformers and isolated power systems shall not be system grounded.
- C. Equipment Grounding: Metallic structures (including ductwork and building steel), enclosures, raceways, junction boxes, outlet boxes, cabinets, machine frames, and other conductive items in close proximity with electrical circuits shall be bonded and grounded.

### **3.2 INACCESSIBLE GROUNDING CONNECTIONS**

Make grounding connections, which are buried or otherwise normally inaccessible (except connections for which periodic testing access is required) by exothermic weld.



### 3.3 SECONDARY EQUIPMENT AND CIRCUITS

- A. Main Bonding Jumper: Bond the secondary service neutral to the ground bus in the service equipment.
- B. Metallic Piping, Building Steel, and Supplemental Electrode(s):
  - 1. Provide a grounding electrode conductor sized per NEC between the service equipment ground bus and all metallic water and gas pipe systems, building steel, and supplemental or made electrodes. Jumper insulating joints in the metallic piping. All connections to electrodes shall be made with fittings that conform to UL 467.
  - 2. Provide a supplemental ground electrode and bond to the grounding electrode system.
- C. Service Disconnect (Separate Individual Enclosure): Provide a ground bar bolted to the enclosure with lugs for connecting the various grounding conductors.
- D. Switchgear, Switchboards, Unit Substations, and Motor Control Centers:
  - 1. Connect the various feeder equipment grounding conductors to the ground bus in the enclosure with suitable pressure connectors.
  - 2. For service entrance equipment, connect the grounding electrode conductor to the ground bus.
  - 3. Connect metallic conduits, which terminate without mechanical connection to the housing, by grounding bushings and grounding conductor to the equipment ground bus.
- E. Transformers:
  - 1. Exterior: Exterior transformers supplying interior service equipment shall have the neutral grounded at the transformer secondary. Provide a grounding electrode at the transformer.
  - 2. Separately derived systems (transformers downstream from service equipment): Ground the secondary neutral at the transformer. Provide a grounding electrode conductor from the transformer to // the nearest component of the grounding electrode system // // the ground bar at the service equipment //.
- F. Conduit Systems:
  - 1. Ground all metallic conduit systems. All metallic conduit systems shall contain an equipment grounding conductor.
  - 2. Non-metallic conduit systems shall contain an equipment grounding conductor, except that non-metallic feeder conduits which carry a grounded conductor from

- exterior transformers to interior or building-mounted service entrance equipment need not contain an equipment grounding conductor.
3. Conduit containing only a grounding conductor, and which is provided for mechanical protection of the conductor, shall be bonded to that conductor at the entrance and exit from the conduit.
- G. Feeders and Branch Circuits: Install equipment grounding conductors with all feeders and power and lighting branch circuits.
- H. Boxes, Cabinets, Enclosures, and Panelboards:
1. Bond the equipment grounding conductor to each pullbox, junction box, outlet box, device box, cabinets, and other enclosures through which the conductor passes (except for special grounding systems for intensive care units and other critical units shown).
  2. Provide lugs in each box and enclosure for equipment grounding conductor termination.
  3. Provide ground bars in panelboards, bolted to the housing, with sufficient lugs to terminate the equipment grounding conductors.
- I. Motors and Starters: Provide lugs in motor terminal box and starter housing or motor control center compartment to terminate equipment grounding conductors.
- J. Receptacles shall not be grounded through their mounting screws. Ground with a jumper from the receptacle green ground terminal to the device box ground screw and the branch circuit equipment grounding conductor.
- K. Ground lighting fixtures to the equipment grounding conductor of the wiring system when the green ground is provided; otherwise, ground the fixtures through the conduit systems. Fixtures connected with flexible conduit shall have a green ground wire included with the power wires from the fixture through the flexible conduit to the first outlet box.
- L. Fixed electrical appliances and equipment shall be provided with a ground lug for termination of the equipment grounding conductor.
- M. Raised Floors: Provide bonding of all raised floor components.
- N. Panelboard Bonding: The equipment grounding terminal buses of the normal and essential branch circuit panelboards serving the same individual patient vicinity shall be bonded together with an insulated continuous copper conductor not less than 16 mm<sup>2</sup> (10 AWG). These conductors shall be installed in rigid metal conduit.

### **3.4 CORROSION INHIBITORS**

When making ground and ground bonding connections, apply a corrosion inhibitor to all contact surfaces. Use corrosion inhibitor appropriate for protecting a connection between the metals used.

### **3.5 CONDUCTIVE PIPING**

- A. Bond all conductive piping systems, interior and exterior, to the building to the grounding electrode system. Bonding connections shall be made as close as practical to the equipment ground bus.
- B. In operating rooms and at intensive care and coronary care type beds, bond the gases and suction piping, at the outlets, directly to the room or patient ground bus.

### **3.6 WIREWAY GROUNDING**

- A. Ground and Bond Metallic Wireway Systems as follows:
  - 1. Bond the metallic structures of wireway to provide 100 percent electrical continuity throughout the wireway system by connecting a 16 mm<sup>2</sup> (6 AWG) bonding jumper at all intermediate metallic enclosures and across all section junctions.
  - 2. Install insulated 16 mm<sup>2</sup> (6 AWG) bonding jumpers between the wireway system bonded as required in paragraph 1 above, and the closest building ground at each end and approximately every 16 meters (50 feet).
  - 3. Use insulated 16 mm<sup>2</sup> (6 AWG) bonding jumpers to ground or bond metallic wireway at each end at all intermediate metallic enclosures and cross all section junctions.
  - 4. Use insulated 16 mm<sup>2</sup> (6 AWG) bonding jumpers to ground cable tray to column-mounted building ground plates (pads) at each end and approximately every 15 meters.

### **3.7 GROUND RESISTANCE**

- A. Grounding system resistance to ground shall not exceed 5 ohms. Make necessary modifications or additions to the grounding electrode system for compliance without additional cost to the Government. Final tests shall assure that this requirement is met.
- B. Resistance of the grounding electrode system shall be measured using a four-terminal fall-of-potential method as defined in IEEE 81. Ground resistance measurements shall be made before the electrical distribution system is energized and shall be made in normally dry conditions not less than 48 hours after the last rainfall. Resistance measurements of separate grounding electrode systems shall be made before the systems are bonded together below grade. The combined resistance of separate

systems may be used to meet the required resistance, but the specified number of electrodes must still be provided.

- C. Services at power company interface points shall comply with the power company ground resistance requirements.
- D. Below-grade connections shall be visually inspected by the Resident Engineer prior to backfilling. The Contractor shall notify the Resident Engineer 24 hours before the connections are ready for inspection.

### **3.8 GROUND ROD INSTALLATION**

- A. Drive each rod vertically in the earth, not less than 7.75 feet in depth.
- B. Where permanently concealed ground connections are required, make the connections by the exothermic process to form solid metal joints. Make accessible ground connections with mechanical pressure type ground connectors.

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**ELECTRICAL**

SECTION 260000  
ELECTRICAL WORK

PART 1-GENERAL

**1.01** SUMMARY

- A. The work under this Section shall consist of the furnishing and installation of all the necessary electrical equipment for the new electrical service, pier & float power and lighting systems, marina power pedestals, conduit, boxes, fittings, wireways, cables, etc. necessary for a complete operating electrical system.
- B. All work performed under this Section shall be as specified herein, as shown on the Plans and as directed by the Project Engineer. The Project Engineer shall have the final decision regarding all disputes on materials and workmanship.
- C. All underground installations, including any required wiring, must be complete before the finish of the field is complete. All excavations required for the installation of conduit, pull boxes and electrical equipment shall be completed prior to the completion of the equipment installation.

**1.02** RELATED DOCUMENTS

- A. Drawings and general provisions of Contract including General & Supplementary Conditions and Specification Sections, apply to work of this section.

**1.03** DESCRIPTION OF WORK

- A. Work to be Performed: The scope of work consists of the installation of all materials to be furnished under this Section, and without limiting the generality thereof, includes:
  - 1. New Electric Service
  - 2. Electrical Conduit
  - 3. Electrical Manholes & Handholes
  - 4. Feeder and Branch Circuit Wiring
  - 5. Marina Power Pedestals
  - 6. Lighting
  - 7. Grounding
  - 8. Panelboards

9. Pull boxes
10. Ground Rods
11. Junction and Pull Boxes
12. Electrical Equipment Enclosures
13. Wiring Devices, Receptacles / Switches

Reference to Drawings: Work to be done under this Section is shown on the electrical Drawings and specified herein.

Related Work: The following is not included in this Section and is to be performed under the designated section:

1. SECTION 02200 - EARTHWORK: Excavation and backfill, trenching.

#### **1.04 SUBMITTALS**

- A. Samples of all materials, along with the certified engineering data and written notification that the proposed materials meet these Specifications must be furnished. Upon approval of the samples and test data, delivery of the proposed materials will be made and no changes or modifications, with the exception of minor changes not affecting operation or appearance will be allowed.
- B. In the event that a modification or change to the approved materials, or the development of new material to replace approved materials is announced by the supplier, written notification must be given to the Project Engineer. An option to accept delivery of the modified or new material or continued delivery of the approved material must be given. In no case shall the delivery of the new or modified material result in any additional expense to the Contract.
- C. Shop Drawings shall be submitted for approval to the Project Engineer for the following materials:

- Electrical Enclosure
- Panelboard and Circuit Breakers Conduit
- Wire and Cable
- Conduit
- Ground Rods and Grounding Equipment
- Junction and Pull Boxes
- Marina Shore Power
- Lighting Fixtures and Poles

Receptacles Aluminum

- D. A written full one-year complete replacement guarantee against defects in materials and workmanship for a period of one year from date of final acceptance of this Contract shall be furnished with all material. Defects in any material shall be replaced at the expense of the Contractor.

**1.05**    QUALITY ASSURANCE

- A. The Contractor shall comply with the regulations of all authorities having jurisdiction over electrical work, shall arrange for all inspections that may be required by the Town of Nantucket, MA, shall obtain all permits and certificates at his own expense, and shall deliver to the Project Engineer certificates of acceptance of work.
- B. The Contractor shall comply with all standards and regulations of all utilities involved governing all materials and methods of construction. All work, materials and construction methods shall be in accordance with all utilities involved, except as otherwise specified herein.
- C. Trade names and catalog numbers mentioned on the Drawing, or in these Specifications, are used for the purpose of furnishing a brief description of the material. Similar materials will be accepted if, in the opinion of the Project Engineer, they are equal in quality and operation to those specifically mentioned. Only materials approved by the National Board of Fire Underwriters, and so labeled, will be considered for approval for the services indicated.
- D. All material must have the name or trademark of the manufacturer stamped thereon, where such identification is customary. All electrical equipment shall be designed, manufactured, tested and rated in accordance with the latest applicable standards of the National Electric Manufacturers Association (NEMA), the American Institute of Electrical Engineers (AIEE), American National Standards Institute (ANSI), and the American Society for Testing and Materials (ASTM).

**1.07**    ACCEPTANCE

- A. All systems shall be complete-in-place to the satisfaction of the Project Engineer (complete systems must be totally operational) prior to the final acceptance of this work. Payment for any unit does not constitute final acceptance of that unit. The Contractor shall familiarize himself with the requirements for testing and final acceptance of completed underground utilities and power and lighting systems as called for in the Contract Specifications, under the appropriate items.



- B. The Contractor is responsible for all equipment until final acceptance of the Contract and for all damage from any cause whatsoever.
- C. The Contractor shall anticipate the problems inherent in coordination of his work with required issuance of work orders to all utilities involved, and the subsequent scheduling by the utilities.
- D. It should be noted that the Electrical drawings are schematic and the Contractor shall coordinate actual locations of equipment with the Project Engineer.
- E. No payments will be made for relocation's required because of improper installation by the Contractor.

**1.08 NAMEPLATES**

- A. The Contractor shall furnish and install on the panelboards a typed directory in factory installed frame protected with plastic.

**1.09 CODES, STANDARDS AND REFERENCES**

- A. All materials and workmanship shall comply with all applicable Codes, specifications, Local and State Ordinances, Industry Standards and Utility Company regulations, latest editions.
- B. In case of difference between building codes, State Laws, Local Ordinances, Industry Standards and Utility Company regulations and the Contract Documents, the Contractor, where such conflict exists shall promptly notify the Project Engineer in writing of any such difference.
- C. In case of conflict between the Contract Documents and the requirements of any Code or Authorities having jurisdiction, the most stringent requirements of the aforementioned shall govern.
- D. Should the Contractor perform any work that does not comply with the requirements of the applicable Building Codes, State Laws, Local Ordinances, Industry Standards and Utility Company regulations, he shall bear all costs arising in correcting the deficiencies, as approved by the Project Engineer.
- E. Applicable Codes and Standards shall include all State Laws, Local Ordinances, Industry and Utility Company regulations, and the applicable requirements of the following accepted Codes and Standards, without limiting the number, as follows:
- F. Building Codes:

1. Massachusetts Electrical Code
2. Occupational Safety and Health Standards
3. National Fire Protection Association
4. Massachusetts State Building Code
5. Americans with Disabilities Act

G. In these Specifications, references made to the following Industry Standards and Code bodies are intended to indicate the latest volume or publication of the Standard. All equipment, materials and details of installation shall comply with the requirements and latest revisions of the following bodies, as applicable:

1. ANSI            American National Standards Institute
2. ASTM           American Society of Testing Materials
3. UL               Underwriters' Laboratories
4. NEMA            National Electrical Manufacturers Association
5. FM                Factory Mutual
6. MEC             Mass Electrical Code
7. ADA             Americans with Disabilities Act

H. The Contractor for work under his Contract shall give all necessary notices, obtain all permits, pay all taxes, fees and other costs in connection with his work; file for necessary approvals with the jurisdiction under which the work is to be performed. The Contractor shall obtain all required Certificates of Inspection for his respective work and deliver same to the Project Engineer before request for acceptance of his portion of work is made and before final payment.

#### **1.10    GUARANTEE**

- A. Attention is directed to provisions regarding guarantees and warranties for work under each Trade.
- B. Manufacturers shall provide their standard guarantees for work under the Electrical Trade. However, such guarantees shall be in addition to and not in lieu of all other liabilities which the manufacturer and/or Contractor may have by law or by other provisions of the Contract Documents.
- C. All materials, equipment and workmanship furnished by the Electrical Trade shall carry the standard warranty against all defects in material and workmanship. Any fault due to defective or improper material, equipment, workmanship or design which may develop, shall be made good, forthwith, by and at the expense of the responsible Trade under which the work was provided, including all other damage done to areas, materials and other systems resulting

from this failure.

- D. The Contractor shall guarantee that all elements of the systems which are to be provided under his Contract, are of sufficient capacity to meet the specified performance requirements as set forth herein or as indicates on the drawings.
- E. Upon receipt of notice from the Owner of failure of any part of the systems or equipment during the guarantee period, the affected part or parts shall be replaced by the Contractor.
- F. The Contractor shall furnish, before the final payment is made, a written guarantee covering the above requirements.

### **1.11 THE CONTRACTOR**

- A. The Contractor shall visit the site and make his bids from his own site examinations and estimates and shall not hold the Project Engineer, the Owner or his agents or employees responsible for, or bound by, any schedule, estimate or of any plan thereof.
- B. The Contractor shall faithfully execute his work according to the terms and conditions of the Contract and Specifications, and shall take all responsibility for and bear all losses resulting to him in the execution of his work.
- C. The Contractor shall be responsible for the location and performance of work provided under his Contract as indicated on the Contract Documents. All parties employed directly or indirectly by this Contractor shall perform their work according to all the conditions as set forth in these specifications.
- D. The Contractor shall furnish all materials and perform all work in accordance with these specifications, and any supplementary documents provided by the Project Engineer. The work shall include everything shown on the drawings and/or required by the specifications as interpreted by the Project Engineer. All work and materials furnished and installed shall be new and of the best quality and workmanship. The Contractor shall cooperate with the Project Engineer so that no error or discrepancy in the Contract Documents shall cause defective materials to be used or poor workmanship to be performed.

### **1.12 COORDINATION OF WORK**

- A. The Contractor shall compare his respective drawings and specifications with those for other trades and report any discrepancies between them to the Project Engineer and obtain from the Project Engineer written instructions for any changes necessary in the electrical work. All work shall be installed in cooperation with other trades installing interrelated work. Before installation,

all trades shall make proper provisions to avoid interference in a manner approved by the Project Engineer. All changes required in the work of the trades caused by their neglect shall be performed by them as herein before specified.

- B. Locations of conduit and equipment shall be adjusted to accommodate the work with interference anticipated and encountered. The Contractor shall determine the exact routing and location of the systems prior to fabrication or installation.
- C. The Contract Drawings are diagrammatic only intending to show general runs and locations of conduit, equipment, terminals and specialties and not necessarily showing all required offsets, details and accessories and equipment to be connected. All work shall be accurately laid out to avoid conflicts and to obtain a neat and workmanlike installation which will afford maximum accessibility for operation, maintenance and headroom. In case of conflict between conduit sizes shown on plans, details or diagrams, the larger conduit size shall be included under the Contract where such discrepancy occurs.
- D. The Contractor is responsible for all coordination with the local utility National Grid, for the permitting, installation and energization of the new electrical service.

### **1.13 GIVING INFORMATION**

- A. The Contractor shall keep himself fully informed as to the shape, size and position of all openings required for his apparatus and shall give information to the other Contractors sufficiently in advance of the work so that all openings may be built in advance.

### **1.14 FAILURE**

- A. The Contractor shall obtain detailed information from the manufacturer of apparatus which he is to furnish and/or install indicating the proper method of installing and connecting same.
- B. The Contractor shall obtain detailed information from the manufacturer of apparatus which he is to furnish and/or install indicating the proper method of installing and connecting same. The Contractor shall also obtain all pertinent information from the General Contractor and other Contractors which may be necessary to facilitate his work and the completion of the whole project.

### **1.15 DRAWINGS, INFORMATION AND INTERPRETATION OF SAME**

- A. The Project Engineer shall interpret the specifications and the detailed developments and the drawings thereof. The Project Engineer's interpretation shall be final and binding.

- B. The Project Engineer shall interpret the specifications and the detailed developments and the drawings thereof. The Engineers interpretation shall be final and binding.

#### **1.16 CONCRETE WORK**

- A. All concrete and masonry equipment bases and pads, curbs, chases, pockets and openings (except core-drilling) required for the proper installation of the work under this Contract, will be provided by the General Contractor using dimensions, templates, bolts, anchors, as shown on the drawings, or as required or recommended by the equipment manufacturers.
- B. Anchor bolts, sleeves, inserts and supports that may be required shall be furnished and installed by the Contractor for the items to be supported. Any expense resulting from the improper location or installation of anchor bolts, sleeves, inserts and supports provided under this Section shall be paid for by the Contractor.

#### **1.17 USE OF PREMISES**

- A. The Contractor shall confine his apparatus, storage of materials and construction to the limits directed by the Project Engineer and he shall not encumber the premises with his materials.
- B. In storing materials within areas (structure or ground) or when used as a shop the Contractor shall consult with the Project Engineer and will restrict his storage to space designated for such purposes. The Contractor will be held responsible for repairs, patching or cleaning arising from any unauthorized use of premises.
- C. Notwithstanding any approvals or instructions which must be obtained by the Contractor from the Project Engineer in connection with use of premises, the responsibility for the safe working conditions at the site shall remain that of the Contractor and the Project Engineer or Owner shall not be deemed to have any responsibility or liability in connection therewith.
- D. For additional requirements see also the requirements set forth in the General Requirements.

#### **1.18 PROTECTION**

- A. Materials, conduit shall be properly protected and all conduit openings shall be temporarily closed so as to prevent obstruction and damage as described herein before. Post notice prohibiting the use of all systems provided under the Contract

prior to completion of work and acceptance of all systems by the Owner except otherwise instructed by the Project Engineer or herein before specified. Contractor shall take precautions to protect his materials from damage and theft.

- B. The Contractor shall furnish, place and maintain proper safety guards for the prevention of accidents that might be caused by the workmanship, materials, equipment or electrical systems provided by the Electrical Trade.

#### **1.19 EQUIPMENT AND MATERIALS**

- A. Equipment and materials shall be delivered to the site and stored in original sealed containers, suitably sheltered from the elements, but readily accessible for inspection by the Project Engineer until installed. All items subject to moisture damage shall be stored in dry, heated spaces.
- B. Equipment shall be tightly covered and protected against dirt, water, and chemical or mechanical injury and theft. At the completion of the work, equipment and materials shall be cleaned, polished thoroughly and turned over to the Owner in a condition satisfactory to the Project Engineer. Damage or defects developing before acceptance of the work shall be made good at the respective Contractor's expense as herein before specified.
- C. The Contractor shall make necessary field measurements to ascertain space requirements, for equipment and connections to be provided under his Trade and shall furnish and install such sizes and shapes of equipment to allow for the final installation to conform to the drawings and the intent of the specifications.
- D. Manufacturer's directions shall be followed completely in the delivery, storage, protection and installation of all equipment. Notify the Project Engineer in writing of any conflict between any requirements of the Contract Documents and the manufacturer's directions and shall obtain the Project Engineer's written instructions before proceeding with the work. Should the Contractor perform any work that does not comply with the manufacturer's directions or the written instructions issued by the Project Engineer, he shall bear all costs arising in correcting any deficiencies that should arise.
- E. The Contractor shall furnish and install all equipment, accessories, connections and incidental items necessary to fully complete the work under his contract for use, occupancy and operation by the Owner.
- F. Where equipment of the acceptable manufacturers require different arrangement or connections from those shown, it shall be the responsibility of the Contractor to install the equipment to operate properly and in harmony with the original intent of the drawings and specifications. When directed by the Project Engineer, the Contractor proposing substitutions shall submit drawings showing

the proposed installation. If the proposed installation is approved, the Contractor shall make all necessary changes in all affected related work provided by other Trades, including location of roughing-in connections by other trades and supports. All changes shall be made at no increase in the Contract amount or additional cost to the Owner.

- G. All equipment and materials required for installation under these specifications shall be new and without blemish or defect. Equipment and materials shall be products which will meet with the acceptance of the Authorities having jurisdiction over the work and as specified herein before. Where such acceptance is contingent upon having the products listed or labeled by FM or UL or other testing laboratory, the products shall be so listed or labeled. Where no specific indication as to the type or quality of material or equipment is indicated, a first class standard article shall be provided.
- H. All equipment of one type (such as wiring devices, panelboards) shall be the products of one manufacturer.

#### **1.20 DAMAGE TO OTHER WORK**

- A. The Contractor shall be held responsible and shall pay for all damages caused by his work to the new and existing building structures, and new and existing equipment, conduit, systems and all work and finishes installed under this Contract in the existing building. Repair of such damage shall be done by the Contractor at his own expense, to Project Engineer's satisfaction.

#### **1.21 CORRECTION OF WORK**

- A. The Contractor shall promptly correct all work provided under his Contract and rejected by the Project Engineer as defective or as failing to conform to the Contract Documents whether observed before or after completion of work and whether or not fabricated, installed or completed. The Contractor responsible for defective work shall bear all costs of correcting such rejected work to Project Engineer's satisfaction.

#### **1.22 TOUCH-UP PAINTING**

- A. All equipment and conduit systems shall be thoroughly cleaned of rust, splatters and other foreign matter of discoloration leaving every part of all systems in an acceptable prime condition. The Contractor for the work under his Contract shall refinish and restore to the original condition all equipment which have sustained damage to the manufacturer's prime and finish coats of Paint and/or enamel.

#### **1.23 IDENTIFICATION OF MATERIALS**

- A. All equipment used in the Electrical Systems shall have a permanently attached nameplate identifying the manufacturer, service, size, serial number or model number, etc. The nameplates shall be kept clean and readable at all times.

#### **1.24 SCOPE OF ELECTRICAL WORK**

- A. The work to be done under this contract generally includes, but is not limited to the following:
1. Provide new electrical service to project site. Service to be 400A, 120/240V, 1-phase, 3-wire from existing Eversource utility pole in new conduit system.
  2. Provide new electrical service equipment in NEMA 4X electrical service cabinet with service disconnect, main electrical panelboard, utility meter socket (Class 320 1-phase) and associated and required equipment. Provide astronomical timeclock for lighting contactor for pole and wall mount fixture lighting.
  3. Provide additional accessories inside of new Electrical Room, including duplex GFCI receptacles, etc.
  4. Provide all necessary grounding, including two (2) ground rods at electrical foundation and required ground rods at meter socket. Provide grounding for new service per latest edition of NEC Article 250.
  5. Provide underground conduit and electrical service cable for all equipment shown on Contract Drawings.
  6. Provide electrical handholes and manholes as shown on Contract Drawings.
  7. Provide empty conduits for future undergrounding of electrical services to two (2) building on site as shown.
  8. Provide light poles (aluminum) with LED fixtures in locations as shown on Contract Drawings. Provide foundations as shown on Structural Drawings. Provide photocells at each light pole.
  9. Provide 50A/240V/1P wall mounted shore power receptacle in locations as shown on Contract Drawings. Provide home run feeder from main panelboard to each shore power fixture.
  10. Provide wall mounted light fixtures in locations as shown on Contract Drawings. Provide 1" conduit and junction boxes to connect each fixture and power from time clock and contractor in service cabinet.
  11. Provide branch feeder to Fuel Island / Dispenser in location as shown.



12. Provide branch feeder to Pump Out station in location as shown.

13. Provide branch feeder to flag pole up light in location as shown.

14. Provide branch feeder to Offload Hoist in location as shown.

## PART 2 PRODUCTS

### 2.01 CONDUIT

- A. Underground conduits of the sizes shown on the plans shall be schedule 40 PVC construction with standard wall thickness. The conduit must be free from defects and foreign matter. All bends, fittings, and clamps shall be new and free from defects. Bends of all conduit must be made using a standard type commercial bending device.
- B. Electric service pole riser conduit shall be GRC conduit.
- C. Rigid Metallic Conduit: UL6 and ANSI C80.1.
- D. Flexible Metallic Conduit: UL1. Liquidtight flexible metal conduit shall be used in wet locations.
- E. Polyvinyl Chloride (PVC) Conduit, electrical, gray, Schedule 40 or Schedule 80 as specified, meeting the requirements of UL 651 and NEMA TC-2. If concrete encasement is required, a minimum of 3,000 psi concrete shall be used. All conduits placed under roadways, and subject to vehicular traffic, shall be concrete-encased Schedule 40 (or Schedule 80 as approved).
- F. Minimum size of conduit shall be 3/4". Unless indicated on Drawings, conduit sizes can be sized in accordance with National Electric Code (NEC). Conduit bends shall not have kinks or flats, and shall not be less than standard radii.
- G. Rigid Galvanized Steel (RGS) conduit shall be used for all power, control signal, and instrumentation wiring, except where noted. Conduit shall be fully threaded at both ends and each length shall be furnished with one threaded coupling. All 90 degree conduit sweeps shall be RGS.
- H. Conduits shall be made electrically continuous at coupling and connections to boxes and cabinets by means of joining fasteners or copper bond wires. Conduit shall be connected to grounded structural steel or the ground network. After assembly all conduit locknuts, all EMT coupling fittings, and all bond wire screws shall be set up tight before installation of wiring. Insulated metallic bushings shall be used on all conduits entering panel cabinets, pull-

boxes, and wiring gutters, except on branch lighting circuits.

- I. Expansion fittings shall be provided on all conduits as required by the National Electrical Code, and as required by local and state codes. This includes, but is not limited to, vertical conduit risers coming from below-grade.

## **2.02 POWER PEDESTALS**

Furnish and install 1-phase, 120/208/240 volt Sea technology Dockhead II Power Pedestals in accordance with the applicable requirements of the Massachusetts Electrical Code and as shown in the drawings. Each pedestal shall have a polycarbonate housing with UV resistant paint coat and the following features.

- A. The Marina Shore Power shall include the 2 x 30A (120/240V) receptacles with breakers, 1 x 20A 120V GFCI receptacle with breaker, and LED light with clear front.
- B. Provide NEC required disconnects per NEC 555.36(C).
- C. Provide Marina Guard ground fault or equal ground fault protection in electrical cabinet
- D. Warranty: The manufacturer of the pedestal shall warrant the pedestals and all components for a period of five years from the date the units were shipped to the job site.

## **2.03 JUNCTION & PULL BOXES**

- A. Contractor shall furnish and install junction and pull boxes as indicated on the drawings and where required by the latest edition of the Mass Electrical Code.

## **2.04 PANELBOARDS**

- A. Furnish and install the panelboard for lighting, and power as indicated and as scheduled on the drawings.
- B. Panelboards shall be of hinged front ('door in door') type, dead front construction with thermal magnetic circuit breakers and shall conform to the requirements of NEMA and MEC. All panelboards shall be UL approved and labeled.
- C. Panelboards shall consist of circuit breakers, code gauge steel cabinet or backbox, bus assembly, trim with code gauge galvanized steel doors. Gutter space shall be a minimum of 4" on all sides.

- D. Panelboards shall consist of circuit breakers, stainless steel, NEMA 4X cabinets.
- E. Circuit breakers shall be of the quick-make, quick- break trip free thermal magnetic type with characteristics as scheduled. Automatic tripping shall be clearly indicated by the operating handle assuming a mid-position between ON and OFF. Two and three pole breakers shall have common trip. All circuit breakers shall be bolt-on type.
- F. The panelboards shall be provided with solid neutrals. In addition, grounding bus with lugs shall be provided on the panelboards meeting UL and NEMA standards. Other special features shall be provided as required and as indicated. All bus work shall be copper.
- G. Two milled type keys shall be provided with the panel and all panel locks shall be keyed alike.
- H. Bus arrangements shall be sequence phased such that adjacent single pole breakers shall be connected to opposite phases in such a manner, such that any two or three pole breakers could be installed anywhere in the panelboards.
- I. Panelboards shall be manufactured by Square "D" Siemens, Cutler Hammer or equal.

## 2.05 FEEDER AND BRANCH CIRCUIT CONDUCTORS

- A. All feeder, branch circuit, remote control, signal circuit and interlock wiring shall be manufactured of copper, rated 600 volts unless noted otherwise.
- B. Minimum size wire for branch circuit and power wiring shall be #10 AWG.
- C. All exterior wiring in conduit shall be Type XHHW-2
- D. All wiring shall conform to the Mass Electrical Code for construction and use.
- E. Conductors for power, lighting, grounding, and control *below grade* (and in wet locations) shall be No. 2 AWG and larger, NEC type XHHW (or XHHW-2), meeting the requirements of NEMA WC7 and ICEA S-66-524.
- F. All conductors shall be annealed copper, 98% conductivity, Class B stranded, except conductors used for power and lighting circuits No. 10 AWG and smaller which may be solid. All conductors should be rated for 600 volts or less, with a thermal rating of 90° C.
- G. The outside covering of all wiring for power, lighting, grounding, and control uses shall be color coded to identify polarity as follows:

	208Y/120 V. 3 Phase	240D/120 V 3 Phase	480Y/277 V 3 Phase
Phase A	Black	Black	Brown
Phase B	Red	Red	Orange
Phase C	Blue	Orange	Yellow
Neutral	White	White	Gray
Ground	Green	Green	Green

**2.06 SOLDERLESS LUGS AND CONNECTORS**

- A. All lugs for feeder conductors and connectors for branch circuit joints shall be of the solderless type suitable for copper wire.

**2.07 WIRING DEVICES**

- A. Furnish and install wiring devices, and specification grade, complete with all accessories as indicated on the drawings and as specified hereunder. All wiring devices shall be the product of a single manufacturer except where specifically stated otherwise.
- B. Duplex receptacles with ground fault interrupter characteristics shall be installed in exterior outlets. All wet areas shall be ground fault type whether indicated on the drawings or not. Ground fault receptacles shall be nylon manufactured by Bryant Cat. No. 5362-IGI or equal.
- C. Switches shall be weatherproof specification grade, 20 A, 125 V, Bryant or equal

**2.08 GROUNDING**

- A. Provide grounding for all electrical equipment and devices in accordance with the applicable requirements of the Mass Electrical Code and as indicated on the drawings.
- B. Bonding jumpers shall be installed at all locations required by MEC.
- C. A green grounding conductor of proper size shall be installed and connected with the feeder circuit conductors to all panelboards, light fixtures, etc. Connections to the equipment may be bolted or screwed using corrosion resisting bolts, screws. A green grounding conductor shall be installed in all branch and feeder circuits.
- D. All below ground grade connections shall be made by Cadweld welding process.

- F. Grounding electrodes shall be driven, without bending or causing any damage to the rods.

## **2.09      WARNING TAPE**

- A.      Warning tape shall be six (6) inches wide, polyethylene not less than 3.5 mil thick with a minimum strength of 1,500 psi. Install 8 inches below final grade. Tape shall be red for electric conduit, and red or yellow for communication conduit. Tape shall have black lettering on two lines as indicated below:
- B.      For Electric conduit:  

CAUTION    CAUTION    CAUTION  
BURIED ELECTRIC LINE    BELOW

## **2.10      ELECTRICAL ENCLOSURE**

- A.      Provide one (1) outdoor NEMA 4XR stainless steel, to contain 120/240V panelboard, time clock, lighting timeclock receptacles, etc.
- B.      Contractor to size cabinet to coordinate with sizes of panelboard and equipment to be installed within cabinets. Dimensions shown are typical and are for reference only. Cabinet to include all equipment shown or implied and all equipment shall be installed inside of cabinet without physical conflicts and per NEC. Cabinet to be sized for all necessary conduits, whether active, spare or future as listed on panelboard schedules.
- C.      Cabinets to be manufactured from 11 gauge minimum stainless steel with 12 gauge steel panel, mounted inside. Cabinets to have integral keyed locking mechanism, keyed alike, with provision for pad-lock. Cabinets shall be ventilated type and factory painted black powder-coat. Cabinets to have door hold-open latches.

## **2.11      IN GROUND FLAG POLE LIGHTING**

- A.      Furnish and Install in-ground up-lighting for flag pole, in locations as shown on contract drawings, per manufacturer's instructions. Lights to be 70 watt, metal-halide. Lights to be controlled from astronomical time clock in electrical cabinet. Provide 1P/20A circuit for flag pole lighting.
- B.      Manufacturer: Greenlee RDS, with rock guard, and tamper-proof hardware or approved equal.
- C.      Furnish and install 120V, SPST astronomical time clock for flag pole lights in the electrical cabinet.

## **2.12      WALL MOUNT LIGHTING**

- A. Furnish and Install wall mount lighting, in locations as shown on contract drawings, per manufacturer's instructions. Lights to be 175 watt, metal-halide. Lights to be controlled from astronomical time clock in electrical cabinet. Provide 1P/20A circuit for flag pole lighting.
- B. Manufacturer: Lithonia TWH-175M-TB-SCWA-LPI or approved equal.
- C. Furnish and install 120V, SPST astronomical time clock for lights in the electrical cabinet.

### **2.13 DECORATIVE POLE LIGHTING**

- A. Provide outdoor ornamental lighting fixtures, poles, equipment and luminaire components where shown as specified on Drawings, wired and assembled. Provide approved brackets, foundations, and other devices as necessary and as required.
- B. Poles and Lighting Fixtures shall be 14' tall, aluminum poles, 4" diameter. Fixtures to be 60W LED, 240V. Fixture and pole type to be submitted and approved by Owner.
- C. Lighting Fixtures shall be 240 volt single-phase, 60W LED, energy saving, high efficiency, high power factor, permanently installed fixtures. Fixture shall be suitable for wet / outdoor locations and meet the requirements of UL 595. Poles shall be 14 feet high, 4 inch diameter, extruded cast aluminum. Provide fixtures with provisions for twist-lock photocontrol receptacle, and provide photocontrol.

## **PART 3 EXECUTION**

### **3.01 INSTALLATION - GENERAL**

- A. All work shall be installed in a neat and workmanlike manner and shall be done in accordance with all local and state codes.

### **3.02 INSTALLATION OF PANELBOARDS, PEDESTALS, ETC.**

- A. Unless otherwise indicated controllers, pedestals, panelboards, etc., shall be mounted and adequately supported and independent of the connecting raceways.

### **3.03 INSTALLATION OF RACEWAYS**

- A. Where conduits enter or leave junction boxes, etc., a standard locknut shall be used on the outside and inside (where required) of the box. All conduits shall be properly grouped and run parallel.

**3.04**    **INSTALLATION OF BOXES**

- A.    All boxes shall be rigidly mounted and shall be equipped with suitable screw fastened covers. Open knockouts or holes in boxes shall be plugged with suitable blanking devices.
- B.    Mounting hangers, clamps, etc., for electrical equipment shall be as specified.

**3.05**    **INSTALLATION OF CONDUCTORS**

- A.    All wiring shall be installed and supported in accordance with the requirements of the Mass Electrical Code
- B.    Splices, taps and lugs shall be electrically and mechanically secure and solderless lugs and connectors shall be used. Lugs shall be used for conductors sizes No. 8 AWG and larger. All lugs shall be of the proper size and in no case shall strands be cut from a conductor in order to fit the conductor into a lug.

**3.06**    **INSTALLATION OF LIGHT POLES, BASES AND FIXTURES**

- A.    Install exterior lighting as shown on Contract Drawings.
- B.    Ensure conduits are properly exposed and terminated in pole base. Install number, size and type of conduits as indicated on Contract Drawings, with smooth bushing on end of conduit penetrating through or under pole base.
- C.    Backfill over-excavated areas with suitable backfill materials generated in the work and approved. Top of pole foundation to be 2” above final grade. Compact backfill every 12 inches.
- D.    Ensure that PVC conduits are properly terminated within pole base.
- E.    Install arm and light fixture on light pole. Install 2/C #12AWG THWN with ground from fixture down to base of light pole for final connections.
- F.    Ground all light poles in accordance with requirements of Groton Utilities and City of Groton Wire Inspector. Furnish and install a single ground rod at each light pole location. Furnish and install #4 Awg bare copper ground wire from ground rod to light pole base in 3/4” conduit. Leave a minimum of 12” of spare wire above top of conduit in light pole base.
- G.    Test wiring and connections for continuity and grounds before fixtures are connected; demonstrate insulation resistance by megger test as required at not less than 500 volts. Insulation resistance between conductors and grounds for secondary distribution systems shall meet National Electrical Code (NEC) requirements.

- H. Test lighting fixtures with specified lamps in place for 100 hours. Replace lamps that fail within 90 days after acceptance by Owner at no extra cost to Owner (no exceptions).

### **3.07 BRANCH CIRCUITS**

- A. The branch circuit wiring shall be installed as indicated on the drawings.
- B. The number and size of conductors in each run of conduit is indicated on the drawings and where there is a conflict between the number wires indicated and the actual number required, the actual number and size shall be installed.
- C. All branch circuits shall be connected to breakers at the Contractor's discretion. The balancing of all loads shall be the Contractor's responsibility.

### **3.08 EQUIPMENT CONNECTIONS**

- A. All equipment shown on the drawings shall be connected under this section.
- B. Before connecting any piece of equipment, check the nameplate rating against the information shown on the drawings and call to the attention of the Project Engineer any discrepancies.
- C. The Contractor shall carefully study all equipment manufacturer's wiring diagrams and make corrections accordingly.

### **3.09 IDENTIFICATION OF EQUIPMENT**

- A. Identification shall be provided for all electrical equipment. The electrical system Identification shall clearly describe the equipment connected. Method of Identification shall be by laminated nameplate made of bakelite or similar material engraved letters at least 1 1/4" high and secured to the equipment by screws. A list of nameplates shall be submitted to the Project Engineer for approval prior to fabrication.
- B. Panelboard directory cards shall be typewritten to indicate areas and/or devices served by each circuit.

### **3.10 TESTS**

- A. This Section of the Specifications shall include the making of the necessary tests referred to herein in the presence of the Project Engineer to show that the particular system or equipment has been properly installed and is in good operating condition, as hereinafter specified. The Project Engineer shall be



notified two (2) weeks in advance of the date for all tests so that he may be present to witness the tests.

- B. Complete test and inspection records shall be made and incorporated into a report for each piece of equipment tested. All readings, taken shall be recorded. Test reports shall be submitted to the Project Engineer for approval.
- C. Furnish necessary meters, instruments, temporary wiring and labor to perform all required tests and adjustments of equipment and wiring installed and/or connected under this Contract, including electrical equipment furnished by others, to determine proper polarity, phasing, freedom from ground and shorts and operation of equipment. All measuring instruments shall be properly calibrated.
- D. All materials and manner of installation shall be in strict accordance with the applicable requirements of state and local authorities, the utility company and the codes of National Board of Fire Underwriters.
- E. Wherever any of the aforementioned codes, laws, etc., require that any work be tested or approved, the Contractor shall provide proper facilities for access and for inspection, all at his own expense.
- F. Wiring
  - 1. System and equipment grounds shall be checked for proper value of resistance using the Megger ground tester in accordance with manufacturer's standard instructions.
  - 2. The Contractor shall correct or replace any nominal current-carrying circuit which is defective or grounded and he shall also correct all other troubles encountered by these tests. All defects whether through faulty workmanship or material furnished shall be corrected under this Section at the Contractor's expense.
- G. Branch Circuits:
  - 1. The branch circuit wiring shall be installed as indicated on the drawings. No major changes in wiring shall be made without the approval of the Project Engineer in writing.
  - 2. Number associated with each branch circuit outlet identifies the branch circuit to which the device served by the outlet is to be connected. The circuit number indicated is only for reference and guidance to this Contractor and is not intended to limit the panelboard circuitry. All branch circuits shall be connected to breakers at Subcontractor's discretion, in accordance with

circuit requirements. The balancing of all loads shall be this Contractor's responsibility.

3.11 FINAL INSPECTION

- A. When the work on this project has been completed and is ready for final inspection, such inspection will be made. At this time, the Contractor for the work of this SECTION shall demonstrate that the requirements of these specifications have been met. Written results for all tests shall be submitted to the Project Engineer.

3.12 DEMOLITION

- A. When the new service work on this project has been installed and energized, the Contractor shall demolish the existing service (if required) and restore any disturbed areas.

PART 4 MEASUREMENT AND PAYMENT

4.01 MEASUREMENT AND PAYMENT

- A. Payment for Electrical Work shall be measured per lump sum. Price shall include the full compensation for all Contractor's support, preparation, equipment, tools, labor, survey, supervision, materials and incidentals to performing work specified in this section, in accordance with these specifications, and as described by the Project Engineer.

4.02 PAYMENT ITEMS

Payment shall be at the bid unit price of the following items:

<u>Item No.</u>	<u>Description</u>	<u>Unit</u>
260000-1	Electrical Work	Lump Sum

End of Section

**ATTACHMENTS**

**PERMITS**

**ORDER OF CONDITIONS**

Town of Orleans

MA; MADEP File# SE54-2594

Date Issued: 09/20/2022



Massachusetts Department of Environmental Protection  
Bureau of Resource Protection - Wetlands

**WPA Form 5 – Order of Conditions**

Massachusetts Wetlands Protection Act M.G.L. c. 131, §40

Provided by MassDEP:  
054-2594

MassDEP File #

eDEP Transaction #  
Orleans

City/Town

**A. General Information**

Please note:  
this form has  
been modified  
with added  
space to  
accommodate  
the Registry of  
Deeds  
Requirements

**Important:**  
When filling  
out forms on  
the  
computer,  
use only the  
tab key to  
move your  
cursor - do  
not use the  
return key.



1. From: Orleans  
Conservation Commission

2. This issuance is for  
(check one): a.  Order of Conditions b.  Amended Order of Conditions

3. To: Applicant:  
TOM DALEY  
a. First Name b. Last Name  
TOWN OF ORLEANS  
c. Organization  
19 SCHOOL RD  
d. Mailing Address  
ORLEANS MA 02653  
e. City/Town f. State g. Zip Code

4. Property Owner (if different from applicant):  
a. First Name b. Last Name  
TOWN OF ORLEANS  
c. Organization  
19 SCHOOL RD  
d. Mailing Address  
ORLEANS MA 02653  
e. City/Town f. State g. Zip Code

5. Project Location:  
113 ROCK HARBOR RD Orleans  
a. Street Address b. City/Town  
8 1  
c. Assessors Map/Plat Number d. Parcel/Lot Number  
Latitude and Longitude, if known: 1063587.6477965 2755671.3277036  
d. Latitude e. Longitude

**WPA Form 5 – Order of Conditions**

Massachusetts Wetlands Protection Act M.G.L. c. 131, §40

Provided by MassDEP:  
054-2594

MassDEP File #

eDEP Transaction #  
Orleans

City/Town

**A. General Information (cont.)**

6. Property recorded at the Registry of Deeds for (attach additional information if more than one parcel):  
Barnstable

a. County  
1334

b. Certificate Number (if registered land)  
415

c. Book

d. Page

7. Dates: Aug 19, 2022 Sep 20, 2022 Sep 26, 2022

a. Date Notice of Intent Filed

b. Date Public Hearing Closed

c. Date of Issuance

8. Final Approved Plans and Other Documents (attach additional plan or document references as needed):

SEE ATTACHED PAGE 2A

a. Plan Title

b. Prepared By

c. Signed and Stamped by

d. Final Revision Date

e. Scale

f. Additional Plan or Document Title

g. Date

**B. Findings**

1. Findings pursuant to the Massachusetts Wetlands Protection Act:

Following the review of the above-referenced Notice of Intent and based on the information provided in this application and presented at the public hearing, this Commission finds that the areas in which work is proposed is significant to the following interests of the Wetlands Protection Act (the Act). Check all that apply:

- |   |  |   |
|---|--|---|
| <input checked="" type="checkbox"/> a. Public Water Supply  | <input checked="" type="checkbox"/> b. Land Containing Shellfish | <input checked="" type="checkbox"/> c. Prevention of Pollution        |
| <input checked="" type="checkbox"/> d. Private Water Supply | <input checked="" type="checkbox"/> e. Fisheries                 | <input checked="" type="checkbox"/> f. Protection of Wildlife Habitat |
| <input checked="" type="checkbox"/> g. Groundwater Supply   | <input checked="" type="checkbox"/> h. Storm Damage Prevention   | <input checked="" type="checkbox"/> i. Flood Control                  |

2. This Commission hereby finds the project, as proposed, is: (check one of the following boxes)

Approved subject to:

- a. the following conditions which are necessary in accordance with the performance standards set forth in the wetlands regulations. This Commission orders that all work shall be performed in accordance with the Notice of Intent referenced above, the following General Conditions, and any other special conditions attached to this Order. To the extent that the following conditions modify or differ from the plans, specifications, or other proposals submitted with the Notice of Intent, these conditions shall control.

**ADDITIONAL DOCUMENTS**

1. Notice of Intent Application Packet, Rock Harbor Commercial Wharf Facility Improvements by Foth Infrastructure & Environment, LLC. Aug 19, 2022
2. Existing Conditions Plan by Foth Infrastructure & Environment, LLC Aug 19, 2022
3. Proposed Site Plan by Foth Infrastructure & Environment, LLC Aug 19, 2022
4. Proposed Drainage Plan by Foth Infrastructure & Environment, LLC Aug 19, 2022
5. Proposed Sections (Sheet 1 & 2) by Foth Infrastructure & Environment, LLC Aug 19, 2022
6. Proposed Wharf Elevation (Sheet 1 & 2) by Foth Infrastructure & Environment, LLC Aug 19, 2022
7. Letter from the MA Division of Marine Fisheries Aug 30, 2022
8. Letter from the MA Division of Marine Fisheries Sep 19, 2022



**WPA Form 5 – Order of Conditions**

Massachusetts Wetlands Protection Act M.G.L. c. 131, §40

Provided by MassDEP:  
054-2594

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**B. Findings (cont.)**

Denied because:

b. the proposed work cannot be conditioned to meet the performance standards set forth in the wetland regulations. Therefore, work on this project may not go forward unless and until a new Notice of Intent is submitted which provides measures which are adequate to protect the interests of the Act, and a final Order of Conditions is issued. A description of the performance standards which the proposed work cannot meet is attached to this Order.

c. the information submitted by the applicant is not sufficient to describe the site, the work, or the effect of the work on the interests identified in the Wetlands Protection Act. Therefore, work on this project may not go forward unless and until a revised Notice of Intent is submitted which provides sufficient information and includes measures which are adequate to protect the Act's interests, and a final Order of Conditions is issued. A description of the specific information which is lacking and why it is necessary is attached to this Order as per 310 CMR 10.05(6)(c)

3. Buffer Zone Impacts: Shortest distance between limit of project disturbance and the wetland resource area specified in 310 CMR 10.02(1) <1'  
a. linear feet

**Inland Resource Area Impacts: Check all that apply below. (For Approvals Only)**

Resource Area	Proposed Alteration	Permitted Alteration	Proposed Replacement	Permitted Replacement
<input type="checkbox"/> 4. Bank	a. linear feet	b. linear feet	c. linear feet	d. linear feet
<input type="checkbox"/> 5. Bordering Vegetated Wetland	a. square feet	b. square feet	c. square feet	d. square feet
<input type="checkbox"/> 6. Land Under Waterbodies and Waterways	a. square feet e. c/y dredged	b. square feet f. c/y dredged	c. square feet	d. square feet
<input type="checkbox"/> 7. Bordering Land Subject to Flooding	a. square feet	b. square feet	c. square feet	d. square feet
Cubic Feet Flood Storage	e. cubic feet	f. cubic feet	g. cubic feet	h. cubic feet
<input type="checkbox"/> 8. Isolated Land Subject to Flooding	a. square feet	b. square feet		
Cubic Feet Flood Storage	c. cubic feet	d. cubic feet	e. cubic feet	f. cubic feet
<input type="checkbox"/> 9. Riverfront Area	a. total sq. feet	b. total sq. feet		
Sq ft within 100 ft	c. square feet	d. square feet	e. square feet	f. square feet
Sq ft between 100-200 ft	g. square feet	h. square feet	i. square feet	j. square feet

**WPA Form 5 – Order of Conditions**

**B. Findings (cont.)**

Coastal Resource Area Impacts: Check all that apply below. (For Approvals Only)

	Proposed Alteration	Permitted Alteration	Proposed Replacement	Permitted Replacement
<input type="checkbox"/> 10. Designated Port Areas	Indicate size under Land Under the Ocean, below			
<input checked="" type="checkbox"/> 11. Land Under the Ocean	3,330 (net resto.) 0 c. c/y dredged	3,330 (net resto.) 0 d. c/y dredged		
<input type="checkbox"/> 12. Barrier Beaches	Indicate size under Coastal Beaches and/or Coastal Dunes below			
<input checked="" type="checkbox"/> 13. Coastal Beaches	492 (net resto.)	492 (net resto.)	cu yd c. nourishment	cu yd d. nourishment
<input type="checkbox"/> 14. Coastal Dunes	a. square feet	b. square feet	cu yd c. nourishment	cu yd d. nourishment
<input type="checkbox"/> 15. Coastal Banks	a. linear feet	b. linear feet		
<input type="checkbox"/> 16. Rocky Intertidal Shores	a. square feet	b. square feet		
<input checked="" type="checkbox"/> 17. Salt Marshes	3.2 (net resto.) + 49 (less shading)	3.2, 49 (net resto.)	3.2 (net resto.)	3.2 (net resto.) d. square feet
<input type="checkbox"/> 18. Land Under Salt Ponds	a. square feet	b. square feet		
<input checked="" type="checkbox"/> 19. Land Containing Shellfish	c. c/y dredged 284 a. square feet	d. c/y dredged 284 b. square feet	c. square feet	d. square feet
<input type="checkbox"/> 20. Fish Runs	Indicate size under Coastal Banks, Inland Bank, Land Under the Ocean, and/or inland Land Under Waterbodies and Waterways, above			
<input checked="" type="checkbox"/> 21. Land Subject to Coastal Storm Flowage	a. c/y dredged 4,572 a. square feet	b. c/y dredged 4,527 b. square feet		
<input type="checkbox"/> 22. Riverfront Area	a. total sq. feet	b. total sq. feet		
Sq ft within 100ft	c. square feet	d. square feet	e. square feet	f. square feet
Sq ft between 100-200 ft	g. square feet	h. square feet	i. square feet	j. square feet

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**B. Findings (cont.)**

\* #23. If the project is for the purpose of restoring or enhancing a wetland resource area in addition to the square footage that has been entered in Section B.5.c (BVW) or B.17.c (Salt Marsh) above, please enter the additional amount here.

23. Restoration/Enhancement \*:

\_\_\_\_\_ a. square feet of BVW

\_\_\_\_\_ b. square feet of salt marsh

24. Stream Crossing(s):

\_\_\_\_\_ a. number of new stream crossings

\_\_\_\_\_ b. number of replacement stream crossings

**C. General Conditions Under Massachusetts Wetlands Protection Act**

The following conditions are only applicable to Approved projects.

1. Failure to comply with all conditions stated herein, and with all related statutes and other regulatory measures, shall be deemed cause to revoke or modify this Order.
2. The Order does not grant any property rights or any exclusive privileges; it does not authorize any injury to private property or invasion of private rights.
3. This Order does not relieve the permittee or any other person of the necessity of complying with all other applicable federal, state, or local statutes, ordinances, bylaws, or regulations.
4. The work authorized hereunder shall be completed within three years from the date of this Order unless either of the following apply:
  - a. The work is a maintenance dredging project as provided for in the Act; or
  - b. The time for completion has been extended to a specified date more than three years, but less than five years, from the date of issuance. If this Order is intended to be valid for more than three years, the extension date and the special circumstances warranting the extended time period are set forth as a special condition in this Order.
  - c. If the work is for a Test Project, this Order of Conditions shall be valid for no more than one year.
5. This Order may be extended by the issuing authority for one or more periods of up to three years each upon application to the issuing authority at least 30 days prior to the expiration date of the Order. An Order of Conditions for a Test Project may be extended for one additional year only upon written application by the applicant, subject to the provisions of 310 CMR 10.05(11)(f).
6. If this Order constitutes an Amended Order of Conditions, this Amended Order of Conditions does not extend the issuance date of the original Final Order of Conditions and the Order will expire on Sep 26, 2025 unless extended in writing by the Department.
7. Any fill used in connection with this project shall be clean fill. Any fill shall contain no trash, refuse, rubbish, or debris, including but not limited to lumber, bricks, plaster, wire, lath, paper, cardboard, pipe, tires, ashes, refrigerators, motor vehicles, or parts of any of the foregoing.

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**C. General Conditions Under Massachusetts Wetlands Protection Act**

8. This Order is not final until all administrative appeal periods from this Order have elapsed, or if such an appeal has been taken, until all proceedings before the Department have been completed.
9. No work shall be undertaken until the Order has become final and then has been recorded in the Registry of Deeds or the Land Court for the district in which the land is located, within the chain of title of the affected property. In the case of recorded land, the Final Order shall also be noted in the Registry's Grantor Index under the name of the owner of the land upon which the proposed work is to be done. In the case of the registered land, the Final Order shall also be noted on the Land Court Certificate of Title of the owner of the land upon which the proposed work is done. The recording information shall be submitted to the Conservation Commission on the form at the end of this Order, which form must be stamped by the Registry of Deeds, prior to the commencement of work.
10. A sign shall be displayed at the site not less than two square feet or more than three square feet in size bearing the words,  

"Massachusetts Department of Environmental Protection" [or, "MassDEP"]  
"File Number 054-2594 "
11. Where the Department of Environmental Protection is requested to issue a Superseding Order, the Conservation Commission shall be a party to all agency proceedings and hearings before MassDEP.
12. Upon completion of the work described herein, the applicant shall submit a Request for Certificate of Compliance (WPA Form 8A) to the Conservation Commission.
13. The work shall conform to the plans and special conditions referenced in this order.
14. Any change to the plans identified in Condition #13 above shall require the applicant to inquire of the Conservation Commission in writing whether the change is significant enough to require the filing of a new Notice of Intent.
15. The Agent or members of the Conservation Commission and the Department of Environmental Protection shall have the right to enter and inspect the area subject to this Order at reasonable hours to evaluate compliance with the conditions stated in this Order, and may require the submittal of any data deemed necessary by the Conservation Commission or Department for that evaluation.
16. This Order of Conditions shall apply to any successor in interest or successor in control of the property subject to this Order and to any contractor or other person performing work conditioned by this Order.

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**C. General Conditions Under Massachusetts Wetlands Protection Act (cont.)**

17. Prior to the start of work, and if the project involves work adjacent to a Bordering Vegetated Wetland, the boundary of the wetland in the vicinity of the proposed work area shall be marked by wooden stakes or flagging. Once in place, the wetland boundary markers shall be maintained until a Certificate of Compliance has been issued by the Conservation Commission.

18. All sedimentation barriers shall be maintained in good repair until all disturbed areas have been fully stabilized with vegetation or other means. At no time shall sediments be deposited in a wetland or water body. During construction, the applicant or his/her designee shall inspect the erosion controls on a daily basis and shall remove accumulated sediments as needed. The applicant shall immediately control any erosion problems that occur at the site and shall also immediately notify the Conservation Commission, which reserves the right to require additional erosion and/or damage prevention controls it may deem necessary. Sedimentation barriers shall serve as the limit of work unless another limit of work line has been approved by this Order.

19. The work associated with this Order (the "Project")

(1) is subject to the Massachusetts Stormwater Standards

(2) is NOT subject to the Massachusetts Stormwater Standards

**If the work is subject to the Stormwater Standards, then the project is subject to the following conditions:**

a) All work, including site preparation, land disturbance, construction and redevelopment, shall be implemented in accordance with the construction period pollution prevention and erosion and sedimentation control plan and, if applicable, the Stormwater Pollution Prevention Plan required by the National Pollution Discharge Elimination System Construction General Permit as required by Stormwater Condition 8. Construction period erosion, sedimentation and pollution control measures and best management practices (BMPs) shall remain in place until the site is fully stabilized.

b) No stormwater runoff may be discharged to the post-construction stormwater BMPs unless and until a Registered Professional Engineer provides a Certification that:

*i.* all construction period BMPs have been removed or will be removed by a date certain specified in the Certification. For any construction period BMPs intended to be converted to post construction operation for stormwater attenuation, recharge, and/or treatment, the conversion is allowed by the MassDEP Stormwater Handbook BMP specifications and that the BMP has been properly cleaned or prepared for post construction operation, including removal of all construction period sediment trapped in inlet and outlet control structures;

*ii.* as-built final construction BMP plans are included, signed and stamped by a Registered Professional Engineer, certifying the site is fully stabilized;

*iii.* any illicit discharges to the stormwater management system have been removed, as per the requirements of Stormwater Standard 10;

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**C. General Conditions Under Massachusetts Wetlands Protection Act (cont.)**

*iv.* all post-construction stormwater BMPs are installed in accordance with the plans (including all planting plans) approved by the issuing authority, and have been inspected to ensure that they are not damaged and that they are in proper working condition;

*v.* any vegetation associated with post-construction BMPs is suitably established to withstand erosion.

*c)* The landowner is responsible for BMP maintenance until the issuing authority is notified that another party has legally assumed responsibility for BMP maintenance. Prior to requesting a Certificate of Compliance, or Partial Certificate of Compliance, the responsible party (defined in General Condition 18(e)) shall execute and submit to the issuing authority an Operation and Maintenance Compliance Statement ("O&M Statement") for the Stormwater BMPs identifying the party responsible for implementing the stormwater BMP Operation and Maintenance Plan ("O&M Plan") and certifying the following:

*i.)* the O&M Plan is complete and will be implemented upon receipt of the Certificate of Compliance, and

*ii.)* the future responsible parties shall be notified in writing of their ongoing legal responsibility to operate and maintain the stormwater management BMPs and implement the Stormwater Pollution Prevention Plan.

*d)* Post-construction pollution prevention and source control shall be implemented in accordance with the long-term pollution prevention plan section of the approved Stormwater Report and, if applicable, the Stormwater Pollution Prevention Plan required by the National Pollution Discharge Elimination System Multi-Sector General Permit.

*e)* Unless and until another party accepts responsibility, the landowner, or owner of any drainage easement, assumes responsibility for maintaining each BMP. To overcome this presumption, the landowner of the property must submit to the issuing authority a legally binding agreement of record, acceptable to the issuing authority, evidencing that another entity has accepted responsibility for maintaining the BMP, and that the proposed responsible party shall be treated as a permittee for purposes of implementing the requirements of Conditions 18(f) through 18(k) with respect to that BMP. Any failure of the proposed responsible party to implement the requirements of Conditions 18(f) through 18(k) with respect to that BMP shall be a violation of the Order of Conditions or Certificate of Compliance. In the case of stormwater BMPs that are serving more than one lot, the legally binding agreement shall also identify the lots that will be serviced by the stormwater BMPs. A plan and easement deed that grants the responsible party access to perform the required operation and maintenance must be submitted along with the legally binding agreement.

*f)* The responsible party shall operate and maintain all stormwater BMPs in accordance with the design plans, the O&M Plan, and the requirements of the Massachusetts Stormwater Handbook.

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**C. General Conditions Under Massachusetts Wetlands Protection Act (cont.)**

- g) The responsible party shall:
1. Maintain an operation and maintenance log for the last three (3) consecutive calendar years of inspections, repairs, maintenance and/or replacement of the stormwater management system or any part thereof, and disposal (for disposal the log shall indicate the type of material and the disposal location);
  2. Make the maintenance log available to MassDEP and the Conservation Commission ("Commission") upon request; and
  3. Allow members and agents of the MassDEP and the Commission to enter and inspect the site to evaluate and ensure that the responsible party is in compliance with the requirements for each BMP established in the O&M Plan approved by the issuing authority.
- h) All sediment or other contaminants removed from stormwater BMPs shall be disposed of in accordance with all applicable federal, state, and local laws and regulations.
- i) Illicit discharges to the stormwater management system as defined in 310 CMR 10.04 are prohibited.
- j) The stormwater management system approved in the Order of Conditions shall not be changed without the prior written approval of the issuing authority.
- k) Areas designated as qualifying pervious areas for the purpose of the Low Impact Site Design Credit (as defined in the MassDEP Stormwater Handbook, Volume 3, Chapter 1, Low Impact Development Site Design Credits) shall not be altered without the prior written approval of the issuing authority.
- l) Access for maintenance, repair, and/or replacement of BMPs shall not be withheld. Any fencing constructed around stormwater BMPs shall include access gates and shall be at least six inches above grade to allow for wildlife passage.

Special Conditions (if you need more space for additional conditions, please attach a text document):

**This Order is subject to the Standard Conditions on all Orders dated 11/1/18 and the completion of the Acknowledgment of Contractor Form. This Order is also subject to the attached Special Conditions.**

20. For Test Projects subject to 310 CMR 10.05(11), the applicant shall also implement the monitoring plan and the restoration plan submitted with the Notice of Intent. If the conservation commission or Department determines that the Test Project threatens the public health, safety or the environment, the applicant shall implement the removal plan submitted with the Notice of Intent or modify the project as directed by the conservation commission or the Department.

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### D. Findings Under Municipal Wetlands Bylaw or Ordinance

1. Is a municipal wetlands bylaw or ordinance applicable?  Yes  No
2. The Town of Orleans hereby finds (check one that applies):  
Conservation Commission

- a. that the proposed work cannot be conditioned to meet the standards set forth in a municipal ordinance or bylaw, specifically:

1. Municipal Ordinance or Bylaw

2. Citation

Therefore, work on this project may not go forward unless and until a revised Notice of Intent is submitted which provides measures which are adequate to meet these standards, and a final Order of Conditions is issued.

- b. that the following additional conditions are necessary to comply with a municipal ordinance or bylaw:

Orleans Wetlands Bylaw/Regulations

Ch 160/196A

1. Municipal Ordinance or Bylaw

2. Citation

3. The Commission orders that all work shall be performed in accordance with the following conditions and with the Notice of Intent referenced above. To the extent that the following conditions modify or differ from the plans, specifications, or other proposals submitted with the Notice of Intent, the conditions shall control.

The special conditions relating to municipal ordinance or bylaw are as follows (if you need more space for additional conditions, attach a text document):

**This Order is subject to the Standard Conditions on all Orders dated 11/1/18 and the completion of the Acknowledgment of Contractor Form: This Order is also subject to the attached Special Conditions.**





**Massachusetts Department of Environmental Protection**  
 Bureau of Resource Protection - Wetlands  
**WPA Form 5 – Order of Conditions**  
 Massachusetts Wetlands Protection Act M.G.L. c. 131, §40

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**E. Signatures**

This Order is valid for three years, unless otherwise specified as a special condition pursuant to General Conditions #4, from the date of issuance.

9/26/22  
 1. Date of Issuance

Please indicate the number of members who will sign this form.

6  
 2. Number of Signers

This Order must be signed by a majority of the Conservation Commission.

The Order must be mailed by certified mail (return receipt requested) or hand delivered to the applicant. A copy also must be mailed or hand delivered at the same time to the appropriate Department of Environmental Protection Regional Office, if not filing electronically, and the property owner, if different from applicant.

Signatures:

[Signature]  
[Signature]  
J. Ward

[Signature]  
[Signature]  
[Signature]

by hand delivery on

by certified mail, return receipt requested, on

Date

Date 9/26/22

**F. Appeals**

The applicant, the owner, any person aggrieved by this Order, any owner of land abutting the land subject to this Order, or any ten residents of the city or town in which such land is located, are hereby notified of their right to request the appropriate MassDEP Regional Office to issue a Superseding Order of Conditions. The request must be made by certified mail or hand delivery to the Department, with the appropriate filing fee and a completed Request for Departmental Action Fee Transmittal Form, as provided in 310 CMR 10.03(7) within ten business days from the date of issuance of this Order. A copy of the request shall at the same time be sent by certified mail or hand delivery to the Conservation Commission and to the applicant, if he/she is not the appellant.

Any appellants seeking to appeal the Department's Superseding Order associated with this appeal will be required to demonstrate prior participation in the review of this project. Previous participation in the permit proceeding means the submission of written information to the Conservation Commission prior to the close of the public hearing, requesting a Superseding Order, or providing written information to the Department prior to issuance of a Superseding Order.

The request shall state clearly and concisely the objections to the Order which is being appealed and how the Order does not contribute to the protection of the interests identified in the Massachusetts Wetlands Protection Act (M.G.L. c. 131, § 40), and is inconsistent with the wetlands regulations (310 CMR 10.00). To the extent that the Order is based on a municipal ordinance or bylaw, and not on the Massachusetts Wetlands Protection Act or regulations, the Department has no appellate jurisdiction.



Massachusetts Department of Environmental Protection  
 Bureau of Resource Protection - Wetlands  
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**G. Recording Information**

Prior to commencement of work, this Order of Conditions must be recorded in the Registry of Deeds or the Land Court for the district in which the land is located, within the chain of title of the affected property. In the case of recorded land, the Final Order shall also be noted in the Registry's Grantor Index under the name of the owner of the land subject to the Order. In the case of registered land, this Order shall also be noted on the Land Court Certificate of Title of the owner of the land subject to the Order of Conditions. The recording information on this page shall be submitted to the Conservation Commission listed below.

Orleans

Conservation Commission

Detach on dotted line, have stamped by the Registry of Deeds and submit to the Conservation Commission.

To:

Orleans

Conservation Commission

Please be advised that the Order of Conditions for the Project at:

113 ROCK HARBOR RD

054-2594

Project Location

MassDEP File Number

Has been recorded at the Registry of Deeds of:

Barnstable

County

Book

Page

for: TOWN OF ORLEANS  
 Property Owner

and has been noted in the chain of title of the affected property in:

Book

Page

In accordance with the Order of Conditions issued on:

Date

If recorded land, the instrument number identifying this transaction is:

Instrument Number

If registered land, the document number identifying this transaction is:

Document Number

Signature of Applicant

**SPECIAL CONDITIONS:**

1. A construction protocol shall be required from the contractor prior to commencement of work. The protocol shall include but not be limited to, the methodology for removal of materials associated with the bulkhead retreat, protection of the existing underground fuel tanks, and dewatering protocol.
2. A Pre-Construction meeting shall take place before any work under this Order can proceed. The Conservation Agent, applicant, and applicant's contractor, at a minimum shall be required to be in attendance to review and understand planned work protocols before work begins.
3. No silt producing work shall occur between Feb 1 and June 30 of any calendar year without adequate containment structures approved by the MA Division of Marine Fisheries and Conservation Commission.
4. Existing underground fuel tanks shall be drained dry prior to construction.

**FINDINGS AND STANDARD CONDITIONS ON ALL ORDERS, AS APPLICABLE**  
In accordance with M.G.L. Chapter 131, Section 40 and the Orleans Wetlands Protection Bylaw, Ch160

DEP #: 054-2594

Applicant: TOM DALEY

The Commission finds that, the Applicant, through the Public Hearing, has presented to the Commission clear and convincing evidence and was able to demonstrate that all State and Local Wetland Interests will be protected, the Commission hereby approves the project with the issuance of this Order and all of its protective Conditions.

**1. Preface:** Failure to comply with all conditions of this Order of Conditions may result in the following: Stop Work Order, Fines, or the inability to obtain a Certificate of Compliance.

**2. Recording:** No work shall be undertaken until the Order has been recorded in compliance with General Condition #9 (page 6) of this Order and proof of such recording has been submitted to this Commission.

**3. Acknowledgement of Contractor:** No work may proceed until the Commission is provided with an executed Acknowledgement of Contractor form proving that these Orders have been reviewed and received by such Contractor and that the Contractor understands the Order and all Conditions. The Contractor shall furnish any sub-contractor with a copy of this Order. The approved Contractor must monitor their work throughout the project to ensure its success and establishment. If he/she is unable to continue with the project, the new contractor must meet with the Conservation Commission or their Administrator for approval before commencing work under the Order.

**4. Other Permits:** No work may proceed until the Applicant has received all other permits required by law, (i.e. building permit, Board of Health, Planning Board, Board of Appeals, Army Corps of Engineers, etc.)

**5. Appeals:** No work shall be undertaken until all administrative appeal periods from this Order have elapsed or, if such an appeal has been filed, until all appeal proceedings have been completed.

**6. Transfer of Ownership:** If the Applicant transfers the interests authorized herein by conveyance of realty, the deed shall reference this Order and the terms and Conditions specified herein, and this Order shall be recorded along with the deed.

**7. Term:** *This Order is valid for three (3) years.* Application for an Extension must be submitted, *in writing, thirty (30) days prior to the date of its expiration.*

**8. Certificate of Compliance:** *Upon completion of the work permitted by this Order, or the expiration of this Order, a Certificate of Compliance shall be requested from the Commission in writing.* Where a project has been completed in accordance with plans stamped by a professional engineer, architect, or other qualified professional, a written statement by such professional certifying compliance with the plans and Orders, shall accompany the request for the Certificate of Compliance. Please note the request should accompany the appropriate completed DEP form and Town of Orleans fee.

**9. Approved Plans:** *A copy of this Order of Conditions and all approved plans shall be kept on site at all times during construction.* All contractors and sub-contractors retained during construction must be provided with a copy of this Order and subsequent plans by the Applicant and should be prepared to produce the Order along with approved plans and supporting documents, upon request of the Conservation Commission. *No deviations from the plans are allowed herein without prior Commission approval.* All notes on the approved plans herein are adopted as additional conditions of this Order unless otherwise stated, except that where the Commission's Orders are more restrictive, they shall apply.

**10. DEP Signage:** A visible sign shall be displayed at the site, not less than two (2) square feet or more than three (3) square feet in size bearing the words "Massachusetts Department of Environmental Protection SE 54-" or "MA DEP SE 54-". Said sign is to remain in place until a Certificate of Compliance has been issued.

**11. Silt Fence:** If need is determined by the Commission, a continuous, securely staked fabric sedimentation barrier or other erosion control measures shall be installed along the Limit of Work and/or the access route as shown on the approved plan. *Five (5) days prior to construction, notice shall be given to the Conservation office that all sedimentation controls or other markings required by these Orders are in place and ready for inspection by the Conservation Administrator.* Properly installed sedimentation controls shall remain in place and be maintained throughout construction until the site is stabilized with vegetation and its removal has been permitted by the Commission or its Administrator. Additional erosion control measures may be required during construction activity, if needed, at the Commission or its Administrator's discretion.

**12. Limit of Work:** The Limit of Work as shown on the plan shall be clearly marked by stakes or by installation of a sedimentation barrier/silt fence, and be inspected and approved by the Commission or its Administrator prior to commencement of construction, and shall remain in place and in good order until all disturbed areas have been revegetated. *No work shall take place within the buffer zone or resource area outside the Limit of Work as marked on the plan without further approval by the Commission or its Administrator.*

**13. Excavated Materials:** All excess excavated materials shall be stockpiled per approved plan and as far from the resource area as possible. Excess materials shall be removed from the site upon completion of grading/construction. In no event shall excavated materials or additional materials brought on the site be stock piled less than 25' from the edge of a wetland or resource area unless approved by the Commission for special purposes.

**14. Fertilizer Use:** No fertilizer is permitted within 100' of a Resource Area per Town of Orleans General By-Law Chapter 103. If lawn and/or shrub fertilizers are used, in accordance with the exemptions allowed under Chapter 103, extreme care must be exercised to avoid contamination into the wetlands or groundwater.

**15. Roof Runoff:** Gutters and downspouts to drywells, or stone trenches at the roof drip line, are to be utilized to contain roof runoff. Drywell capacity should be able to accommodate a 2" rainfall in a 24-hour period. The size and location of the drywells shall be identified on the plan.

**16. Vegetation Mitigation:** All areas disturbed during construction are to be revegetated with suitable native plant materials according to the approved plans. Revegetation shall commence immediately upon completion of construction, unless otherwise addressed by an approved land management or landscape plan, and is to be completed by the beginning of the first growing season following completion of construction. Planting plans must be completed as part of this Order. Plants will be placed to ensure good coverage for the type and size of plant. More plants may be required than are shown on the planting plan and plants installed will be maintained and replaced until they have survived. Said vegetation and plants shall be successfully established, through multiple growing seasons, before a Certificate of Compliance can be granted.

**17. Right of Entry:** The Conservation Commission and/or its Administrator shall have the right of entry, during the period of the open Order, to inspect the property to determine and evaluate compliance with the provisions of this Order.

**18. Violations:** Failure to comply with any Conditions set forth herein shall be deemed a violation and good cause, after notice and an opportunity to be heard, to revoke or modify this Order, to impose fines of up to \$300 per day per violation, to impose a stop work Order, or to require mitigation or such other measures as are legally justified. *Owners, contractors, and sub-contractors will be liable for any violation of these Orders.*

*In issuing these Orders, the Commission has relied on the information and data provided by the Applicant. If, subsequent to the issuance of this Order, such information and data prove to be false, incomplete, or inaccurate, this Order may be modified or revoked in whole or in part and the Commission may institute appropriate legal proceedings.*



## Town of Orleans Conservation Commission

Town Hall  
19 School Road  
Orleans, Massachusetts 02653-3699  
t: (508) 240-3700 ext 2425  
f: (508) 240-3388

APPLICANT: TOM DALEY

DEP #: 054-2594

### **Attn: Homeowner and Engineer:**

The Standard Conditions on all Orders issued by the Conservation Commission make it clear that no deviations from the approved Plan are to be permitted without prior Commission approval and that a silt fence on the limit of work must remain securely staked and in **good condition** throughout the project. Failure to comply with these conditions will subject the homeowner and contractors to fines of \$300 per day.

The purpose of this notice is to make sure that you, any subsequent owners, all engineers and all contractors are made aware of these conditions. The property owner will bear the ultimate responsibility for compliance, so please be sure that any deviations from approved Plans are brought to the attention of the Conservation Commission before any work commences.

Accordingly, your contractor(s) should read the statement below and return a signed copy of this notice to the Orleans Conservation Commission at the address shown above before any work on this project is undertaken.

### **Acknowledgment of Contractor(s):**

I have read the attached Order of Conditions and noted Standard Condition #6, "No deviations from the Plan approved herein or from these Orders are permitted without prior Commission approval" and #9, "A continuous securely staked fabric sedimentation barrier or other erosion control measures shall be installed along this work limit or the access route as shown on the Plan."

Signed: \_\_\_\_\_

Name: \_\_\_\_\_

Address: \_\_\_\_\_

Phone #: \_\_\_\_\_

Date: \_\_\_\_\_

**ORDER OF CONDITIONS**

Town of Orleans, MA

MADEP File# SE54-2618

Date Issued: 08/15/2023



Massachusetts Department of Environmental Protection  
 Bureau of Resource Protection - Wetlands  
**WPA Form 5 – Order of Conditions**  
 Massachusetts Wetlands Protection Act M.G.L. c. 131, §40

Provided by MassDEP:  
 54-2618  
 MassDEP File #  
 eDEP Transaction #  
 Orleans  
 City/Town

**A. General Information**

**Please note:**  
 this form has been modified with added space to accommodate the Registry of Deeds Requirements

**Important:**  
 When filling out forms on the computer, use only the tab key to move your cursor - do not use the return key.



1. From: Orleans  
 Conservation Commission

2. This issuance is for (check one):  
 a.  Order of Conditions b.  Amended Order of Conditions

3. To: Applicant:  
 TOM DALEY  
 a. First Name b. Last Name  
 TOWN OF ORLEANS  
 c. Organization  
 d. Mailing Address  
 e. City/Town f. State g. Zip Code

4. Property Owner (if different from applicant):  
 a. First Name b. Last Name  
 TOWN OF ORLEANS  
 c. Organization  
 19 SCHOOL RD  
 d. Mailing Address  
 ORLEANS MA 02653  
 e. City/Town f. State g. Zip Code

5. Project Location:  
 113 ROCK HARBOR RD Orleans  
 a. Street Address b. City/Town  
 8 1  
 c. Assessors Map/Plat Number d. Parcel/Lot Number  
 Latitude and Longitude, if known:  
 d. Latitude e. Longitude





**ADDITIONAL DOCUMENTS**

1. EXISTING CONDITIONS SITE PLAN BY FOTH INFRASTRUCTURE & ENVIRONMENT, LLC Jul 25, 2023
2. PROPOSED ABOVEGROUND FUEL TANK SITE PLAN BY FOTH INFRASTRUCTURE & ENVIRONMENT, LLC Jul 25, 2023
3. PROPOSED GRADING SITE PLAN AND DETAILS BY FOTH INFRASTRUCTURE & ENVIRONMENT, LLC Jul 01, 2023
4. ROCK HARBOR COMMERCIAL WHARF FUEL TANK REPLACEMENT BY FOTH INFRASTRUCTURE & ENVIRONMENT, LLC Jul 25, 2023





Massachusetts Department of Environmental Protection  
 Bureau of Resource Protection - Wetlands  
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**B. Findings (cont.)**

Coastal Resource Area Impacts: Check all that apply below. (For Approvals Only)

	Proposed Alteration	Permitted Alteration	Proposed Replacement	Permitted Replacement
<input type="checkbox"/> 10. Designated Port Areas	Indicate size under Land Under the Ocean, below			
<input type="checkbox"/> 11. Land Under the Ocean	_____	_____		
	a. square feet	b. square feet		
	_____	_____		
	c. c/y dredged	d. c/y dredged		
<input type="checkbox"/> 12. Barrier Beaches	Indicate size under Coastal Beaches and/or Coastal Dunes below			
<input type="checkbox"/> 13. Coastal Beaches	_____	_____	cu yd	cu yd
	a. square feet	b. square feet	c. nourishment	d. nourishment
<input type="checkbox"/> 14. Coastal Dunes	_____	_____	cu yd	cu yd
	a. square feet	b. square feet	c. nourishment	d. nourishment
<input type="checkbox"/> 15. Coastal Banks	_____	_____		
	a. linear feet	b. linear feet		
<input type="checkbox"/> 16. Rocky Intertidal Shores	_____	_____		
	a. square feet	b. square feet		
<input checked="" type="checkbox"/> 17. Salt Marshes	380 (Ch. 160)	380 (Ch. 160)	1,390 (Ch. 160)	1,390 (Ch. 160)
<input type="checkbox"/> 18. Land Under Salt Ponds	_____	_____		
	a. square feet	b. square feet		
	_____	_____		
	c. c/y dredged	d. c/y dredged		
<input type="checkbox"/> 19. Land Containing Shellfish	_____	_____	_____	_____
	a. square feet	b. square feet	c. square feet	d. square feet
<input type="checkbox"/> 20. Fish Runs	Indicate size under Coastal Banks, Inland Bank, Land Under the Ocean, and/or inland Land Under Waterbodies and Waterways, above			
	_____	_____		
	a. c/y dredged	b. c/y dredged		
<input checked="" type="checkbox"/> 21. Land Subject to Coastal Storm Flowage	828 perm; 1,392 temp	828 perm; 1,392 temp		
<input type="checkbox"/> 22. Riverfront Area	_____	_____		
	a. total sq. feet	b. total sq. feet		
Sq ft within 100ft	_____	_____	_____	_____
	c. square feet	d. square feet	e. square feet	f. square feet
Sq ft between 100-200 ft	_____	_____	_____	_____
	g. square feet	h. square feet	i. square feet	j. square feet





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**C. General Conditions Under Massachusetts Wetlands Protection Act**

8. This Order is not final until all administrative appeal periods from this Order have elapsed, or if such an appeal has been taken, until all proceedings before the Department have been completed.
9. No work shall be undertaken until the Order has become final and then has been recorded in the Registry of Deeds or the Land Court for the district in which the land is located, within the chain of title of the affected property. In the case of recorded land, the Final Order shall also be noted in the Registry's Grantor Index under the name of the owner of the land upon which the proposed work is to be done. In the case of the registered land, the Final Order shall also be noted on the Land Court Certificate of Title of the owner of the land upon which the proposed work is done. The recording information shall be submitted to the Conservation Commission on the form at the end of this Order, which form must be stamped by the Registry of Deeds, prior to the commencement of work.
10. A sign shall be displayed at the site not less than two square feet or more than three square feet in size bearing the words,  

"Massachusetts Department of Environmental Protection" [or, "MassDEP"]  
"File Number 54-2618"
11. Where the Department of Environmental Protection is requested to issue a Superseding Order, the Conservation Commission shall be a party to all agency proceedings and hearings before MassDEP.
12. Upon completion of the work described herein, the applicant shall submit a Request for Certificate of Compliance (WPA Form 8A) to the Conservation Commission.
13. The work shall conform to the plans and special conditions referenced in this order.
14. Any change to the plans identified in Condition #13 above shall require the applicant to inquire of the Conservation Commission in writing whether the change is significant enough to require the filing of a new Notice of Intent.
15. The Agent or members of the Conservation Commission and the Department of Environmental Protection shall have the right to enter and inspect the area subject to this Order at reasonable hours to evaluate compliance with the conditions stated in this Order, and may require the submittal of any data deemed necessary by the Conservation Commission or Department for that evaluation.
16. This Order of Conditions shall apply to any successor in interest or successor in control of the property subject to this Order and to any contractor or other person performing work conditioned by this Order.



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**C. General Conditions Under Massachusetts Wetlands Protection Act (cont.)**

17. Prior to the start of work, and if the project involves work adjacent to a Bordering Vegetated Wetland, the boundary of the wetland in the vicinity of the proposed work area shall be marked by wooden stakes or flagging. Once in place, the wetland boundary markers shall be maintained until a Certificate of Compliance has been issued by the Conservation Commission.
18. All sedimentation barriers shall be maintained in good repair until all disturbed areas have been fully stabilized with vegetation or other means. At no time shall sediments be deposited in a wetland or water body. During construction, the applicant or his/her designee shall inspect the erosion controls on a daily basis and shall remove accumulated sediments as needed. The applicant shall immediately control any erosion problems that occur at the site and shall also immediately notify the Conservation Commission, which reserves the right to require additional erosion and/or damage prevention controls it may deem necessary. Sedimentation barriers shall serve as the limit of work unless another limit of work line has been approved by this Order.

19. The work associated with this Order (the "Project")

- (1) is subject to the Massachusetts Stormwater Standards
- (2) is NOT subject to the Massachusetts Stormwater Standards

**If the work is subject to the Stormwater Standards, then the project is subject to the following conditions:**

- a) All work, including site preparation, land disturbance, construction and redevelopment, shall be implemented in accordance with the construction period pollution prevention and erosion and sedimentation control plan and, if applicable, the Stormwater Pollution Prevention Plan required by the National Pollution Discharge Elimination System Construction General Permit as required by Stormwater Condition 8. Construction period erosion, sedimentation and pollution control measures and best management practices (BMPs) shall remain in place until the site is fully stabilized.
- b) No stormwater runoff may be discharged to the post-construction stormwater BMPs unless and until a Registered Professional Engineer provides a Certification that:
- i.* all construction period BMPs have been removed or will be removed by a date certain specified in the Certification. For any construction period BMPs intended to be converted to post construction operation for stormwater attenuation, recharge, and/or treatment, the conversion is allowed by the MassDEP Stormwater Handbook BMP specifications and that the BMP has been properly cleaned or prepared for post construction operation, including removal of all construction period sediment trapped in inlet and outlet control structures;
  - ii.* as-built final construction BMP plans are included, signed and stamped by a Registered Professional Engineer, certifying the site is fully stabilized;
  - iii.* any illicit discharges to the stormwater management system have been removed, as per the requirements of Stormwater Standard 10;



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**C. General Conditions Under Massachusetts Wetlands Protection Act (cont.)**

- iv. all post-construction stormwater BMPs are installed in accordance with the plans (including all planting plans) approved by the issuing authority, and have been inspected to ensure that they are not damaged and that they are in proper working condition;
- v. any vegetation associated with post-construction BMPs is suitably established to withstand erosion.
- c) The landowner is responsible for BMP maintenance until the issuing authority is notified that another party has legally assumed responsibility for BMP maintenance. Prior to requesting a Certificate of Compliance, or Partial Certificate of Compliance, the responsible party (defined in General Condition 18(e)) shall execute and submit to the issuing authority an Operation and Maintenance Compliance Statement ("O&M Statement") for the Stormwater BMPs identifying the party responsible for implementing the stormwater BMP Operation and Maintenance Plan ("O&M Plan") and certifying the following:
- i.) the O&M Plan is complete and will be implemented upon receipt of the Certificate of Compliance, and
  - ii.) the future responsible parties shall be notified in writing of their ongoing legal responsibility to operate and maintain the stormwater management BMPs and implement the Stormwater Pollution Prevention Plan.
- d) Post-construction pollution prevention and source control shall be implemented in accordance with the long-term pollution prevention plan section of the approved Stormwater Report and, if applicable, the Stormwater Pollution Prevention Plan required by the National Pollution Discharge Elimination System Multi-Sector General Permit.
- e) Unless and until another party accepts responsibility, the landowner, or owner of any drainage easement, assumes responsibility for maintaining each BMP. To overcome this presumption, the landowner of the property must submit to the issuing authority a legally binding agreement of record, acceptable to the issuing authority, evidencing that another entity has accepted responsibility for maintaining the BMP, and that the proposed responsible party shall be treated as a permittee for purposes of implementing the requirements of Conditions 18(f) through 18(k) with respect to that BMP. Any failure of the proposed responsible party to implement the requirements of Conditions 18(f) through 18(k) with respect to that BMP shall be a violation of the Order of Conditions or Certificate of Compliance. In the case of stormwater BMPs that are serving more than one lot, the legally binding agreement shall also identify the lots that will be serviced by the stormwater BMPs. A plan and easement deed that grants the responsible party access to perform the required operation and maintenance must be submitted along with the legally binding agreement.
- f) The responsible party shall operate and maintain all stormwater BMPs in accordance with the design plans, the O&M Plan, and the requirements of the Massachusetts Stormwater Handbook.





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**C. General Conditions Under Massachusetts Wetlands Protection Act (cont.)**

- g) The responsible party shall:
1. Maintain an operation and maintenance log for the last three (3) consecutive calendar years of inspections, repairs, maintenance and/or replacement of the stormwater management system or any part thereof, and disposal (for disposal the log shall indicate the type of material and the disposal location);
  2. Make the maintenance log available to MassDEP and the Conservation Commission ("Commission") upon request; and
  3. Allow members and agents of the MassDEP and the Commission to enter and inspect the site to evaluate and ensure that the responsible party is in compliance with the requirements for each BMP established in the O&M Plan approved by the issuing authority.
- h) All sediment or other contaminants removed from stormwater BMPs shall be disposed of in accordance with all applicable federal, state, and local laws and regulations.
- i) Illicit discharges to the stormwater management system as defined in 310 CMR 10.04 are prohibited.
- j) The stormwater management system approved in the Order of Conditions shall not be changed without the prior written approval of the issuing authority.
- k) Areas designated as qualifying pervious areas for the purpose of the Low Impact Site Design Credit (as defined in the MassDEP Stormwater Handbook, Volume 3, Chapter 1, Low Impact Development Site Design Credits) shall not be altered without the prior written approval of the issuing authority.
- l) Access for maintenance, repair, and/or replacement of BMPs shall not be withheld. Any fencing constructed around stormwater BMPs shall include access gates and shall be at least six inches above grade to allow for wildlife passage.

Special Conditions (if you need more space for additional conditions, please attach a text document):

**This Order is subject to the Standard Conditions on all Orders dated 11/1/18 and the completion of the Acknowledgment of Contractor Form. This Order is also subject to the attached Special Condition:**

20. For Test Projects subject to 310 CMR 10.05(11), the applicant shall also implement the monitoring plan and the restoration plan submitted with the Notice of Intent. If the conservation commission or Department determines that the Test Project threatens the public health, safety or the environment, the applicant shall implement the removal plan submitted with the Notice of Intent or modify the project as directed by the conservation commission or the Department.



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**D. Findings Under Municipal Wetlands Bylaw or Ordinance**

1. Is a municipal wetlands bylaw or ordinance applicable?  Yes  No
2. The Town of Orleans hereby finds (check one that applies):

Conservation Commission  
 a. that the proposed work cannot be conditioned to meet the standards set forth in a municipal ordinance or bylaw, specifically:

1. Municipal Ordinance or Bylaw \_\_\_\_\_ 2. Citation \_\_\_\_\_

Therefore, work on this project may not go forward unless and until a revised Notice of Intent is submitted which provides measures which are adequate to meet these standards, and a final Order of Conditions is issued.

b. that the following additional conditions are necessary to comply with a municipal ordinance or bylaw:

Orleans Wetlands Bylaw/Regulations \_\_\_\_\_ Ch 160/196A

1. Municipal Ordinance or Bylaw \_\_\_\_\_ 2. Citation \_\_\_\_\_

3. The Commission orders that all work shall be performed in accordance with the following conditions and with the Notice of Intent referenced above. To the extent that the following conditions modify or differ from the plans, specifications, or other proposals submitted with the Notice of Intent, the conditions shall control.
- The special conditions relating to municipal ordinance or bylaw are as follows (if you need more space for additional conditions, attach a text document):

**This Order is subject to the Standard Conditions on all Orders dated 11/1/18 and the completion of the Acknowledgment of Contractor Form: This Order is also subject to the attached Special Condition:**



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**E. Signatures**

This Order is valid for three years, unless otherwise specified as a special condition pursuant to General Conditions #4, from the date of issuance.

8/16/23  
 1. Date of Issuance

Please indicate the number of members who will sign this form.  
 This Order must be signed by a majority of the Conservation Commission.

7  
 2. Number of Signers

The Order must be mailed by certified mail (return receipt requested) or hand delivered to the applicant. A copy also must be mailed or hand delivered at the same time to the appropriate Department of Environmental Protection Regional Office, if not filing electronically, and the property owner, if different from applicant.

Signatures:

[Signature]  
[Signature]  
[Signature]  
[Signature]

[Signature]  
[Signature]  
[Signature]

by hand delivery on

by certified mail, return receipt requested, on

Date

Date

**F. Appeals**

The applicant, the owner, any person aggrieved by this Order, any owner of land abutting the land subject to this Order, or any ten residents of the city or town in which such land is located, are hereby notified of their right to request the appropriate MassDEP Regional Office to issue a Superseding Order of Conditions. The request must be made by certified mail or hand delivery to the Department, with the appropriate filing fee and a completed Request for Departmental Action Fee Transmittal Form, as provided in 310 CMR 10.03(7) within ten business days from the date of issuance of this Order. A copy of the request shall at the same time be sent by certified mail or hand delivery to the Conservation Commission and to the applicant, if he/she is not the appellant.

Any appellants seeking to appeal the Department's Superseding Order associated with this appeal will be required to demonstrate prior participation in the review of this project. Previous participation in the permit proceeding means the submission of written information to the Conservation Commission prior to the close of the public hearing, requesting a Superseding Order, or providing written information to the Department prior to issuance of a Superseding Order.

The request shall state clearly and concisely the objections to the Order which is being appealed and how the Order does not contribute to the protection of the interests identified in the Massachusetts Wetlands Protection Act (M.G.L. c. 131, § 40), and is inconsistent with the wetlands regulations (310 CMR 10.00). To the extent that the Order is based on a municipal ordinance or bylaw, and not on the Massachusetts Wetlands Protection Act or regulations, the Department has no appellate jurisdiction.



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**G. Recording Information**

Prior to commencement of work, this Order of Conditions must be recorded in the Registry of Deeds or the Land Court for the district in which the land is located, within the chain of title of the affected property. In the case of recorded land, the Final Order shall also be noted in the Registry's Grantor Index under the name of the owner of the land subject to the Order. In the case of registered land, this Order shall also be noted on the Land Court Certificate of Title of the owner of the land subject to the Order of Conditions. The recording information on this page shall be submitted to the Conservation Commission listed below.

Orleans

Conservation Commission

Detach on dotted line, have stamped by the Registry of Deeds and submit to the Conservation Commission.

To:

Orleans

Conservation Commission

Please be advised that the Order of Conditions for the Project at:

113 ROCK HARBOR RD

Project Location

54-2618

MassDEP File Number

Has been recorded at the Registry of Deeds of:

Barnstable

County

Book

Page

for: TOWN OF ORLEANS  
 Property Owner

and has been noted in the chain of title of the affected property in:

Book

Page

In accordance with the Order of Conditions issued on:

Date

If recorded land, the instrument number identifying this transaction is:

Instrument Number

If registered land, the document number identifying this transaction is:

Document Number

Signature of Applicant

**SPECIAL CONDITIONS:**

1. Before the commencement of the mitigation work, the applicant shall submit a planting and restoration plan, and work protocol for the mitigation area that includes a property line delineator and plant schedule to the Orleans Conservation Commission for review and approval.

**FINDINGS AND STANDARD CONDITIONS ON ALL ORDERS, AS APPLICABLE**  
In accordance with M.G.L. Chapter 131, Section 40 and the Orleans Wetlands Protection Bylaw, Ch160

DEP #: 54-2618

Applicant: TOM DALEY

The Commission finds that, the Applicant, through the Public Hearing, has presented to the Commission clear and convincing evidence and was able to demonstrate that all State and Local Wetland Interests will be protected, the Commission hereby approves the project with the issuance of this Order and all of its protective Conditions.

**1. Preface:** Failure to comply with all conditions of this Order of Conditions may result in the following: Stop Work Order, Fines, or the inability to obtain a Certificate of Compliance.

**2. Recording:** No work shall be undertaken until the Order has been recorded in compliance with General Condition #9 (page 6) of this Order and proof of such recording has been submitted to this Commission.

**3. Acknowledgement of Contractor:** No work may proceed until the Commission is provided with an executed Acknowledgement of Contractor form proving that these Orders have been reviewed and received by such Contractor and that the Contractor understands the Order and all Conditions. The Contractor shall furnish any sub-contractor with a copy of this Order. The approved Contractor must monitor their work throughout the project to ensure its success and establishment. If he/she is unable to continue with the project, the new contractor must meet with the Conservation Commission or their Administrator for approval before commencing work under the Order.

**4. Other Permits:** No work may proceed until the Applicant has received all other permits required by law, (i.e. building permit, Board of Health, Planning Board, Board of Appeals, Army Corps of Engineers, etc.)

**5. Appeals:** No work shall be undertaken until all administrative appeal periods from this Order have elapsed or, if such an appeal has been filed, until all appeal proceedings have been completed.

**6. Transfer of Ownership:** If the Applicant transfers the interests authorized herein by conveyance of realty, the deed shall reference this Order and the terms and Conditions specified herein, and this Order shall be recorded along with the deed.

**7. Term:** *This Order is valid for three (3) years.* Application for an Extension must be submitted, *in writing, thirty (30) days prior to the date of its expiration.*

**8. Certificate of Compliance:** *Upon completion of the work permitted by this Order, or the expiration of this Order, a Certificate of Compliance shall be requested from the Commission in writing.* Where a project has been completed in accordance with plans stamped by a professional engineer, architect, or other qualified professional, a written statement by such professional certifying compliance with the plans and Orders, shall accompany the request for the Certificate of Compliance. Please note the request should accompany the appropriate completed DEP form and Town of Orleans fee.

**9. Approved Plans:** *A copy of this Order of Conditions and all approved plans shall be kept on site at all times during construction.* All contractors and sub-contractors retained during construction must be provided with a copy of this Order and subsequent plans by the Applicant and should be prepared to produce the Order along with approved plans and supporting documents, upon request of the Conservation Commission. *No deviations from the plans are allowed herein without prior Commission approval.* All notes on the approved plans herein are adopted as additional conditions of this Order unless otherwise stated, except that where the Commission's Orders are more restrictive, they shall apply.

**10. DEP Signage:** A visible sign shall be displayed at the site, not less than two (2) square feet or more than three (3) square feet in size bearing the words "Massachusetts Department of Environmental Protection SE 54-" or "MA DEP SE 54-". Said sign is to remain in place until a Certificate of Compliance has been issued.

**11. Silt Fence:** If need is determined by the Commission, a continuous, securely staked fabric sedimentation barrier or other erosion control measures shall be installed along the Limit of Work and/or the access route as shown on the approved plan. *Five (5) days prior to construction, notice shall be given to the Conservation office that all sedimentation controls or other markings required by these Orders are in place and ready for inspection by the Conservation Administrator.* Properly installed sedimentation controls shall remain in place and be maintained throughout construction until the site is stabilized with vegetation and its removal has been permitted by the Commission or its Administrator. Additional erosion control measures may be required during construction activity, if needed, at the Commission or its Administrator's discretion.

**12. Limit of Work:** The Limit of Work as shown on the plan shall be clearly marked by stakes or by installation of a sedimentation barrier/silt fence, and be inspected and approved by the Commission or its Administrator prior to commencement of construction, and shall remain in place and in good order until all disturbed areas have been revegetated. *No work shall take place within the buffer zone or resource area outside the Limit of Work as marked on the plan without further approval by the Commission or its Administrator.*

**13. Excavated Materials:** All excess excavated materials shall be stockpiled per approved plan and as far from the resource area as possible. Excess materials shall be removed from the site upon completion of grading/construction. In no event shall excavated materials or additional materials brought on the site be stock piled less than 25' from the edge of a wetland or resource area unless approved by the Commission for special purposes.

**14. Fertilizer Use:** No fertilizer is permitted within 100' of a Resource Area per Town of Orleans General By-Law Chapter 103. If lawn and/or shrub fertilizers are used, in accordance with the exemptions allowed under Chapter 103, extreme care must be exercised to avoid contamination into the wetlands or groundwater.

**15. Roof Runoff:** Gutters and downspouts to drywells, or stone trenches at the roof drip line, are to be utilized to contain roof runoff. Drywell capacity should be able to accommodate a 2" rainfall in a 24-hour period. The size and location of the drywells shall be identified on the plan.

**16. Vegetation Mitigation:** All areas disturbed during construction are to be revegetated with suitable native plant materials according to the approved plans. Revegetation shall commence immediately upon completion of construction, unless otherwise addressed by an approved land management or landscape plan, and is to be completed by the beginning of the first growing season following completion of construction. Planting plans must be completed as part of this Order. Plants will be placed to ensure good coverage for the type and size of plant. More plants may be required than are shown on the planting plan and plants installed will be maintained and replaced until they have survived. Said vegetation and plants shall be successfully established, through multiple growing seasons, before a Certificate of Compliance can be granted.

**17. Right of Entry:** The Conservation Commission and/or its Administrator shall have the right of entry, during the period of the open Order, to inspect the property to determine and evaluate compliance with the provisions of this Order.

**18. Violations:** Failure to comply with any Conditions set forth herein shall be deemed a violation and good cause, after notice and an opportunity to be heard, to revoke or modify this Order, to impose fines of up to \$300 per day per violation, to impose a stop work Order, or to require mitigation or such other measures as are legally justified. *Owners, contractors, and sub-contractors will be liable for any violation of these Orders.*

*In issuing these Orders, the Commission has relied on the information and data provided by the Applicant. If, subsequent to the issuance of this Order, such information and data prove to be false, incomplete, or inaccurate, this Order may be modified or revoked in whole or in part and the Commission may institute appropriate legal proceedings.*



## Town of Orleans Conservation Commission

Town Hall  
19 School Road  
Orleans, Massachusetts 02653-3699  
t: (508) 240-3700 ext 2425  
f: (508) 240-3388

APPLICANT: TOM DALEY

DEP #: 54-2618

**Attn: Homeowner and Engineer:**

The Standard Conditions on all Orders issued by the Conservation Commission make it clear that no deviations from the approved Plan are to be permitted without prior Commission approval and that a silt fence on the limit of work must remain securely staked and in **good condition** throughout the project. Failure to comply with these conditions will subject the homeowner and contractors to fines of \$300 per day.

The purpose of this notice is to make sure that you, any subsequent owners, all engineers and all contractors are made aware of these conditions. The property owner will bear the ultimate responsibility for compliance, so please be sure that any deviations from approved Plans are brought to the attention of the Conservation Commission before any work commences.

Accordingly, your contractor(s) should read the statement below and return a signed copy of this notice to the Orleans Conservation Commission at the address shown above before any work on this project is undertaken.

**Acknowledgment of Contractor(s):**

I have read the attached Order of Conditions and noted Standard Condition #6, "No deviations from the Plan approved herein or from these Orders are permitted without prior Commission approval" and #9, "A continuous securely staked fabric sedimentation barrier or other erosion control measures shall be installed along this work limit or the access route as shown on the Plan."

Signed: \_\_\_\_\_

Name: \_\_\_\_\_

Address: \_\_\_\_\_

Phone #: \_\_\_\_\_

Date: \_\_\_\_\_



**MADEP 401 WATER QUALITY CERTIFICATION**

#WW08-0018-APP

Date Issued: 06/09/2023



Commonwealth of Massachusetts  
Executive Office of Energy & Environmental Affairs

## Department of Environmental Protection

100 Cambridge Street Suite 900 Boston, MA 02114 • 617-292-5500

Maura T. Healey  
Governor

Kimberley Driscoll  
Lieutenant Governor

Rebecca L. Tepper  
Secretary

Bonnie Heiple  
Commissioner

June 9, 2023

Tom Daley  
Public Works & Natural Resources  
Town of Orleans  
19 School Road  
Orleans, MA 02653

401 WQC Application #  
22-WW08-0018-APP  
MassDEP File # 054-2594  
ACOE Project No. NAE-2022-02268

RE: Application for: BRP WW 08 - 401 WATER QUALITY CERTIFICATION FOR  
DREDGING - MINOR PROJECT

AT: Rock Harbor Commercial Wharf Improvement Project, Rock Harbor, Orleans  
Islands Coastal Drainage Area

Dear Mr. Daley:

The Department of Environmental Protection (“MassDEP”) has reviewed your application for a 401 Water Quality Certification for Minor Dredging, as referenced above and is basing its certification upon an evaluation of the information contained in the application which is relevant to water quality considerations. In accordance with the provisions of Section 401 of the Federal Clean Water Act (33 U.S.C. § 1251 *et seq.*), M.G.L. c. 21, §§ 26-53, and 314 CMR 9.00, MassDEP has determined there is reasonable assurance the project or activity, as conditioned herein, will be conducted in a manner which will not violate applicable water quality standards (314 CMR 4.00) and other appropriate requirements of state law.

The waters of the Rock Harbor, which is part of the Islands Coastal Drainage Area is designated in the Massachusetts Surface Water Quality Standards as SA. These waters are designated as an “excellent habitat for fish, other aquatic life and wildlife, and for primary and secondary contact recreation”. Anti-degradation provisions of these Standards require that “existing uses and the level of water quality necessary to protect the existing uses shall be maintained and protected.”

The above-referenced project involves the dredging of approximately 3000 cubic yards of

Rock Harbor Commercial Wharf Improvement Project  
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sediment from the Commercial Wharf Facility, which is located within Rock Harbor, which connects to Cape Cod Bay to the west. Dredging is being conducted for the reconstruction of a new facility which addresses current aging infrastructure limitations/concerns as well as improving safety and modernizing commercial operations within Rock Harbor. It is anticipated that the sediment will be removed mechanically using an excavator or crane, either barge-mounted or land-based.

The dredged sediment material will either be beneficially reused on-site as backfill material, or beneficially reused as fill at the following upland locations:

- Reuse/placement at an upland site, including but not limited to:
  - 131A Great Western Road, LLC located at 131A Great Western Road located in South Dennis, MA
  - Cape Sand and Recycling located at 1515 Freemans Way in Brewster, MA
- Reuse/placement at a MA COMM-15-01 regulated facility including Marilyn's Landing in Bridgewater, MA and O'Donnell Sand & Gravel Pit in Kingston, MA
- Reuse as daily cover/disposal at a MA regulated landfill facility

Sediment Chemistry Results: The sediment sample analytical results were compared Reportable Concentration ("RC") S-1 criteria of the Massachusetts Contingency Plan ("MCP"). Results of the sediment samples analyzed indicated the presence of metals, Polynuclear Aromatic Hydrocarbons (PAHs), Extractable Petroleum Hydrocarbons (EPH) and Total Petroleum Hydrocarbons (TPH) in low concentrations in some of the samples; however, all were below the RCS-1 criteria.

Public Notice: The Permit Application public notice was published in The Cape Codder Newspaper on November 25, 2022. No comments were received by MassDEP during the 21-day public comment period pursuant to 314 CMR 9.05(3)(e), which ended on December 16, 2022.

Section 61 Findings: Pursuant to M.G.L. Chapter 30, Sections 61 to 62H inclusive [the Massachusetts Environmental Policy Act ("MEPA")], the project, as referenced in the Water Quality Certification Application, #22-WW08-0018-APP, was required to file an Environmental Notification Form (ENF). The Town of Orleans (the Proponent) filed the ENF for construction of the project under EEA #16403. The ENF was noticed in the Environmental Monitor on July 9, 2021. In the Certificate of the Secretary of Energy and Environmental Affairs on the Environmental Notification Form, issued on August 9, 2021, the Secretary of Energy and Environmental Affairs (the Secretary) finds that "The ENF has adequately described and analyzed the project and its alternatives, and assessed its potential environmental impacts and mitigation measures. Based on review of the ENF and comments received on it, and in consultation with State Agencies, I have determined that an EIR is not required."

Rock Harbor Commercial Wharf Improvement Project  
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**Therefore, based on information currently in the record, MassDEP grants a 401 WQC for this project subject to the following conditions to maintain or attain water quality, to minimize any damage to the environment that may result from the project, and to ensure compliance with appropriate provisions of state law. MassDEP certifies that there is reasonable assurance the project or activity, as conditioned herein, will be conducted in a manner which will not violate applicable water quality standards (314 CMR 4.00) and other appropriate requirements of state law.**

1. Pursuant to 314 CMR 9.01(3), the Contractor shall take all steps necessary to assure that the proposed activities will be conducted in a manner that will avoid violations of the anti-degradation provisions of the Massachusetts Surface Water Quality Standards that protect all waters, including wetlands (314 CMR 4.00). This condition is necessary to assure that any discharge from the project complies with the Massachusetts Surface Water Quality Standards, as provided in 314 CMR 9.00, to protect the public health and restore and maintain the chemical, physical, and biological integrity of the water resources of the Commonwealth.
2. Prior to the start of work, or for any portion of the work thereafter, MassDEP shall be notified of any change(s) in the proposed project or plans that may affect waters or wetlands. MassDEP will determine whether the change(s) requires a revision to this Certification. This condition, pursuant to 314 CMR 9.07(1) and 314 CMR 9.09(2), is necessary to protect the public health and restore and maintain the chemical, physical, and biological integrity of the water resources of the Commonwealth.
3. As provided by 314 CMR 9.09(1), dredging in accordance with this Certification may begin following the 21-day appeal period and once all other permits have been received. This condition is necessary to protect the public health and restore and maintain the chemical, physical, and biological integrity of the water resources of the Commonwealth.
4. Pursuant to 314 CMR 9.05(1), all work shall be performed in accordance with the following documents and plans. This condition is necessary as these documents outline how the execution of the project will meet the criteria of 314 CMR 9.07 and thereby protecting water quality and preventing degradation to wetlands and waters.
  - Application for Permit, Application # 22-WW08-0018-APP, dated November 11, 2022, with attachments.
  - Plans entitled
    - "Plan Accompanying the Petition of: the Town of Orleans, Massachusetts, to Reconstruct, Expand and Maintain Commercial Wharf Facility in Rock Harbor,

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113 Rock Harbor Road, Town of Orleans, Massachusetts, Barnstable County, Massachusetts,” consisting of 18 sheets, various scales, dated November 11, 2022, prepared by Foth Infrastructure & Environment, LLC.

- “Conceptual Site Plan (Summer), Sheet Number C-101, and “Conceptual Site Plan (Winter), Sheet Number C-101a, Rock Harbor Commercial Wharf Improvements, Town of Orleans Department of Public Works, dated August 19, 2022, prepared by Foth Infrastructure & Environment, LLC.
- “Temporary Sediment Containment and Dewatering Concepts Rock Harbor Commercial Wharf Improvement Project, Town of Orleans, Sections A and B, prepared by Foth Infrastructure & Environment, LLC.

MassDEP shall be notified if there are modifications and or deletions of work as specified in the plans. Depending on the nature and the scope of any change, approval by the Department may be required.

- Letters from Amanda Davis, MA Division of Marine Fisheries (“DMF”), to the Orleans Conservation Commission, dated August 30, 2022, and September 19, 2022.
  - Certificate of the Secretary of Energy and Environmental Affairs on the Environmental Notification Form, from Kathleen Theoharides, Executive Office of Energy and Environmental Affairs, dated August 9, 2021.
5. As provided by 314 CMR 9.05(4), the Department shall be notified, attention Kenneth Alepidis (kenneth.alepidis@mass.gov), one week prior to the start of in-water work so that Department staff may inspect the work for compliance with the terms and conditions of this Certification. This condition is necessary to ensure that construction practices are implemented in such a manner as to prevent degradation to wetlands and waters of the Commonwealth.
  6. Pursuant to 314 CMR 9.05(4), the applicant and its contractor shall allow agents of the Department to enter the project sites to verify compliance with the conditions of this Certification. This condition is necessary to ensure that construction practices are implemented in such a manner as to prevent degradation to wetlands and waters of the Commonwealth.
  7. Pursuant to 314 CMR 9.09(1), the term of the 401 WQC remains in effect for the same duration as the federal permit that requires it. This condition is necessary to ensure that construction practices are implemented in such a manner as to prevent degradation to wetlands and waters of the Commonwealth.

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8. In order to protect the sensitive life stages of winter flounder, the time-of-year (TOY) restriction for dredging is summarized below. This condition is necessary to protect water quality by ensuring that the project proponent is using planning and construction practices that will maintain the aquatic resource functions and values.
- All in-water, silt-producing work should occur outside of a time of year restriction period of February 1st – June 30th of any year. This TOY period would protect sensitive life history phases for winter flounder during the dredging process.

Work may be possible within this time of year restriction period if adequate containment structures are installed outside of the TOY period.

9. In accordance with 314 CMR 9.07(1) and 314 CMR 9.07(3), Best Management Practices (BMPs) such as a silt curtain shall be deployed surrounding the dredge area to minimize turbidity. At a minimum, the silt curtain shall be bottom-weighted to minimize the degree of lifting/flailing or billowing and shall be of suitable material /grade appropriate based on the velocity of the current at the site. Intermediate vertical floats or other means shall be placed on the silt curtain to lift the bottom of the silt curtain at low tide so that the bottom edges of the curtain remain close to the mudline at low tide but do not rake the sediment in areas subject to tidal influence.
10. In accordance with 314 CMR 9.07(1), no later than 21 days prior to commencement of dredging activity, a dredged material dewatering plan shall be submitted to MassDEP for review and approval. At a minimum, the dewatering plan shall include but not be limited to the type of containment, method of dewatering (i.e. mechanical or by gravity), method of collecting the dewatered effluent and method of disposal. Any approved discharge of water shall be controlled so that no scouring shall occur.
11. Pursuant to 314 CMR 9.07(1), 314CMR 9.07(5), 9.07(9), and 314 CMR 9.07(13)(b) the Applicant or Contractor will be required to provide the dredge material disposal or reuse location to the Department prior to disposal. The estimated volume to be stored, prior to transport to the disposal location, shall be reported to and approved by MassDEP. For disposal or reuse as daily cover material in upland licensed facility, MassDEP shall be notified in writing of the name and location of the facility accepting the dredged material. If the licensed facility is located out of state, documentation shall be provided to MassDEP that the dredged material disposal/reuse has been approved and will be accepted by the receiving state in accordance with 314 CMR 9.07(13)(b). The dredged material shall not be transported to the facility without concurrence of MassDEP.
12. In accordance with 314 CMR 9.07(5), a Dredged Material Tracking Form (DMTF) or Material Shipping Record (MSR) shall be used to track the dredged material to the chosen upland facility. A fully executed copy of the DMTF or MSR shall be provided to MassDEP within 30 days of final shipment to the reused location or facility.

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13. In accordance with 314 CMR 9.07(5), Best Management Practices shall be implemented during transportation of the dredged material to the licensed receiving facility. At a minimum, when transported upon public roadways, all dredged material shall have no free liquid as determined by the Paint Filter Test or other suitably analogous methodology acceptable to MassDEP, and a tarpaulin or other means shall be used to cover the dredged material during transport.
14. Pursuant to 314 CMR 9.06, disposal of any volume of dredged material at any location in tidal waters is not authorized by this 401 Water Quality Certification and would require a request for amendment that would be subject to approval by MassDEP and the Massachusetts Coastal Zone Management office. This condition is necessary to prevent any pollution of tidal water resources by discharge of dredged material.
15. In accordance with 314 CMR 9.07(9), within 21 days of the effective date of this Certification, the applicant shall submit to the Department for review and approval the following information regarding location of final placement and use of dredged material. This condition is necessary to ensure proper disposal of the dredged material within the bounds of approval. It is necessary to protect both public health and water quality.
  - a. a United States Geological Survey Topographic Map showing the location of the property;
  - b. a site plan showing the reuse location of the dredged material at the proposed reuse location;
  - c. a statement of certification signed by the applicant and the owner of the property in which the dredged material is proposed for reuse that the reuse material complies with the provisions of 314 CMR 9.07(9)(b)6.d. and any other applicable local permitting or requirements.
  - d. documentation of written notification of the proposal to the Town Board of Health.
16. Best Management Practices shall be employed by the Contractor to protect coastal resource areas located adjacent to the proposed land-based temporary sediment containment and dewatering area. Sediment stockpiles shall be constructed in accordance with project plans and covered with wind tear resistance tarpaulin or similar material at all times, and properly labeled. Inspection of the sediment containment and dewatering location shall be conducted weekly and after all storm events. Any observed deficiency shall be corrected or repaired in a timely manner. The land-based temporary sediment containment and dewatering area shall be enclosed within a line of staked silt fence or hay bales to prevent erosion or siltation into adjacent coastal resource areas.
17. All equipment/machinery shall be stored above the mean high tide line (MHTL) and outside any wetland resource areas when not in use. Pursuant to 314 CMR

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9.06(6)(a)8., this condition is necessary to avoid and minimize adverse construction impacts to wetlands and waters of the Commonwealth.

18. Pursuant to 314 CMR 9.06(6)(a)8., storing, servicing, or cleaning of equipment, including but not limited to fueling, changing, adding or applying lubricants or hydraulic fluids, or washing/rinsing of trucks or equipment, shall be performed outside wetland resource areas. This condition ensures that no hazardous materials from equipment are inadvertently discharged into the water resource area in which construction is occurring, which would otherwise degrade water quality.
19. Pursuant to 314 CMR 9.06(6)(a)8., during the project period, there shall be no discharge or spillage of fuel, oil or other pollutants, including sediments, onto any part of the site. The applicant shall take all reasonable precautions to prevent the release of pollutants by ignorance, accident or vandalism. This condition is necessary to ensure that construction practices are implemented in such a manner as to prevent degradation to wetlands and waters.
20. The applicant, or its contractor, shall make every feasible effort to complete the project within the permitted timeframe. Should the applicant, or their contractor, fail to complete the project and wish to request an amendment to the Certification for incursion into the no-dredge period, the written request shall be received by the Department by January 15th. The following information shall be included in the request:
  - a. project location and transmittal number,
  - b. the date on which dredging started,
  - c. the number of days and hours per day the dredge operated,
  - d. expected daily average production rate and the actual daily average production rate,
  - e. an explanation of why the project failed to remain on schedule,
  - f. an account of efforts made to get the project back on schedule,
  - g. a plan depicting the areas that remain to be dredged,
  - h. the number of cubic yards that remain to be dredged,
  - i. an accurate estimate of the number of days required to complete the project,
  - j. an evaluation of the impact of continued dredging on the species of concern,
  - k. a description of any efforts that will be made to minimize the impacts of the project on the species of concern, and a realistic assessment of any societal/financial effects of a denial of permission to continue dredging.

This condition is necessary to protect water quality because it ensures that the project proponent is using planning and construction practices that will maintain the integrity of the site hydrology and maintain the aquatic resource functions and values.



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21. In accordance with 314 CMR 9.09(1) and 314 CMR 9.06(6)(a)8., no later than four weeks after issuance of this water quality certification, the applicant shall submit a notification procedure outlining the reporting process to MassDEP for incidents relating to dredging activities that impact surrounding resource areas and habitats including, but not limited to, observed dead or distressed fish or other aquatic organisms, observed oily sheen on the surface of the water, a sediment spill, a turbidity plume beyond the deployed BMPs, and a barge or equipment accident/spill. If at any time during implementation of the project such an incident occurs, the applicant shall immediately notify MassDEP and all site related activities impacting the water shall cease until the source of the problem is identified and adequate mitigating measures are deployed to the satisfaction of MassDEP.
22. Dredge vessel and/or barge overflow is prohibited both at the dredge site and within waters of the Commonwealth. Pursuant to 314 CMR 9.07(1)(c), this condition is necessary to ensure that the dredged material management shall be conducted in a manner that ensures the protection of human health, public safety, public welfare and the environment.
23. The dredge vessel and/or barge shall not be allowed to ground. Pursuant to 314 CMR 9.07(1), this condition is necessary to ensure that potential adverse effects to land under ocean are avoided.
24. Upon completion of the project, remnants of project debris such as dewatering structures, silt booms, and turbidity curtains shall be removed and disposed of appropriately at an offsite facility.
25. Pursuant to 314 CMR 9.07(1), within 30 days of the completion of the dredging, a bathymetric survey of the site, depicting post-dredge conditions shall be conducted. At a minimum, the survey shall include an overlay of the dredge footprint (i.e., top of slope) with sufficient coordinates in the Massachusetts State Plane (e.g. longitude and latitude) to clearly delineate the dredge footprint. The survey shall be sent within five working days after its completion to the Department and a copy shall be sent to the Massachusetts Coastal Zone Management office, attention: Robert Boeri. This condition is necessary to ensure that construction practices are implemented in such a manner as to prevent degradation to wetlands and waters.

Failure to comply with this 401 WQC is grounds for enforcement, including civil and criminal penalties, under M.G.L. c. 21, § 42, 314 CMR 9.00, M.G.L. c. 21A, § 16, 310 CMR 5.00, or other possible actions/penalties as authorized by the General Laws of the Commonwealth.

This 401 WQC does not relieve the applicant of the obligation to comply with other appropriate state or federal statutes or regulations. Any changes made to the project as described in the previously submitted Permit Application or supplemental documents

Rock Harbor Commercial Wharf Improvement Project  
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will require further notification to and, if an amendment is required, approval by MassDEP.

**NOTICE OF APPEAL RIGHTS**

Certain persons shall have a right to request an adjudicatory hearing concerning 401 WQCs by MassDEP when an application is required:

- a. the applicant or property owner;
- b. any person aggrieved by the decision who has submitted written comments during the public comment period;
- c. any ten persons of the Commonwealth pursuant to M.G.L. c. 30A where a group member has submitted written comments during the public comment period; or
- d. any governmental body or private organization with a mandate to protect the environment, which has submitted written comments during the public comment period.

Any person aggrieved, any ten (10) persons of the Commonwealth, or a governmental body or private organization with a mandate to protect the environment may appeal without having submitted written comments during the public comment period only when the claim is based on new substantive issues arising from material changes to the scope or impact of the activity and not apparent at the time of public notice. To request an adjudicatory hearing pursuant to M.G.L. c. 30A, § 10, a Notice of Claim must be made in writing, provided that the request is made by certified mail or hand delivery to MassDEP, with the appropriate filing fee specified within 310 CMR 4.10 along with a DEP Fee Transmittal Form within twenty-one 21 days from the date of issuance of this Certificate.

Case Administrator  
Massachusetts Department of Environmental Protection  
Office of Appeals and Dispute Resolution  
100 Cambridge Street, Suite 900  
Boston, MA 02114

A copy of the request shall at the same time be sent by certified mail or hand delivery to the issuing office of the Wetlands Program at:

Department of Environmental Protection  
100 Cambridge Street, Suite 900  
Boston, MA 02114

A Notice of Claim for Adjudicatory Hearing shall comply with MassDEP's Rules for Adjudicatory Proceedings, 310 CMR 1.01(6), and shall contain the following information pursuant to 314 CMR 9.10(3):

Rock Harbor Commercial Wharf Improvement Project  
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- a. the Permit Authorization Number;
- b. the complete name of the applicant and address of the project;
- c. the complete name, address, and fax and telephone numbers of the party filing the request, and, if represented by counsel or other representative, the name, fax and telephone numbers, and address of the attorney;
- d. if claiming to be a party aggrieved, the specific facts that demonstrate that the party satisfies the definition of "aggrieved person" found at 314 CMR 9.02;
- e. a clear and concise statement that an adjudicatory hearing is being requested;
- f. a clear and concise statement of (1) the facts which are grounds for the proceedings, (2) the objections to this Certificate, including specifically the manner in which it is alleged to be inconsistent with the MassDEP's Water Quality Regulations, 314 CMR 9.00, and (3) the relief sought through the adjudicatory hearing, including specifically the changes desired in the final written 401 WQC; and
- g. a statement that a copy of the request has been sent by certified mail or hand delivery to the applicant, the owner (if different from the applicant), the conservation commission of the city or town where the activity will occur, the Department of Conservation and Recreation (when the certificate concerns projects in Areas of Critical Environmental Concern), the public or private water supplier where the project is located (when the certificate concerns projects in Outstanding Resource Waters), and any other entity with responsibility for the resource where the project is located.

The hearing request along with a DEP Fee Transmittal Form and a valid check or money order payable to the Commonwealth of Massachusetts in the amount of one hundred dollars (\$100) must be mailed to:

Commonwealth of Massachusetts  
Department of Environmental Protection  
Commonwealth Master Lockbox  
PO Box 4062  
Boston, MA 02211

The request will be dismissed if the filing fee is not paid, unless the appellant is exempt or granted a waiver. The filing fee is not required if the appellant is a city or town (or municipal agency), county, or district of the Commonwealth of Massachusetts, or a municipal housing authority. MassDEP may waive the adjudicatory hearing filing fee pursuant to 310 CMR 4.06(2) for a person who shows that paying the fee will create an undue financial hardship. A person seeking a waiver must file an affidavit setting forth the facts believed to support the claim of undue financial hardship together with the hearing request as provided above.


Failure to comply with this certification is grounds for enforcement, including civil and criminal penalties, under MGL c.21 §42, 314 CMR 9.00, MGL c. 21A §16, 310 CMR

Rock Harbor Commercial Wharf Improvement Project  
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5.00, or other possible actions/penalties as authorized by the General Laws of the Commonwealth.

Should you have any questions relative to this 401 WQC, please contact Kenneth Alepidis at [kenneth.alepidis@mass.gov](mailto:kenneth.alepidis@mass.gov).

Sincerely,



Lisa Rhodes  
Wetlands Program Chief

ecc: John Jannell, Orleans Conservation Commission, Orleans Town Hall, 19 School Road, Orleans, MA 02653  
Adam Hart, Foth Infrastructure & Environment LLC, 432 Arnold Street, New Bedford, MA 02740  
Dan Gilmore, Brendan Mullaney, MassDEP Southeast Regional Office, 20 Riverside Drive, Lakeville, MA 02347  
Cally Harper, Chapter 91 Reviewer, MassDEP Southeast Regional Office, 20 Riverside Drive, Lakeville, MA 02347  
Paul Maniccia, Army Corps of Engineers Contact Name, Department of the Army, New England District, Corps of Engineers, 696 Virginia Road, Concord, MA 01742-2751  
Amanda Davis, Division of Marine Fisheries, 836 S. Rodney French Boulevard, New Bedford, MA 02744  
Robert Boeri, Office of Coastal Zone 251 Causeway Street, Suite 800, Boston, MA 02114

attachments: Communication for Non-English Speaking Parties document  
Plans of Record



**Communication for Non-English-Speaking Parties**

*This document is important and should be translated immediately.*

If you need this document translated, please contact MassDEP's Director of EJ at the telephone number listed below.

**Español Spanish**

Este documento es importante y debe ser traducido de inmediato. Si necesita este documento traducido, comuníquese con la Directora de Diversidad de MassDEP al número de teléfono que aparece más abajo.

**Português Portuguese**

Este é um documento importante e deve ser traduzido imediatamente. Se precisar de uma tradução deste documento, entre em contato com o Diretor de Diversidade da MassDEP nos números de telefone listados abaixo.

**繁體中文 Chinese Traditional**

本文件非常重要，應立即翻譯。如果您需要翻譯這份文件，請用下面列出的電話號碼聯絡 MassDEP 多元化負責人。

**简体中文 Chinese Simplified**

本文件非常重要，應立即翻譯。如果您需要翻譯這份文件，請用下面列出的電話號碼與 MassDEP 的多元化主任聯繫。

**Ayisyen Kreyòl Haitian Creole**

Dokiman sa-a se yon bagay enpòtan epi yo ta dwe tradwi l imedyatman. Si ou bezwen dokimar sa a tradwi, tanpri kontakte Direktè Divèsite MassDEP la nan nimewo telefòn endike anba.

**Việt Vietnamese**

Tài liệu này rất quan trọng và cần được dịch ngay lập tức. Nếu quý vị cần dịch tài liệu này, xin liên lạc với Giám đốc Đa dạng của MassDEP theo các số điện thoại ghi dưới đây.

**ប្រទេសកម្ពុជា Khmer/Cambodian**

ឯកសារនេះគឺសំខាន់ហើយត្រូវបានបកប្រែភ្លាមៗ ប្រសិនបើអ្នកត្រូវការឱ្យគេបកប្រែឯកសារនេះ សូមទាក់ទងមកនាយកដ្ឋានពិព័រណ៍កម្ពុជារបស់ MassDEP តាមលេខទូរស័ព្ទខាងក្រោម។

**kriolu Kabuverdianu Cape Verdean**

*Kel dokumentu li é inportáti y debe ser traduzidu imidiatamenti. Se bu meste di kel dokumentu traduzidu, pur favor kontakta Diretor di Diversidádi di MassDEP na numeru abaxu indikadu.*



Contact **Deneen Simpson** 857-406-0738  
Massachusetts Department of Environmental Protection  
100 Cambridge Street 9<sup>th</sup> Floor Boston, MA 02114  
TTY# MassRelay Service 1-800-439-2370 • <https://www.mass.gov/environmental-justice>  
(Version revised 4.21.2023) 310 CMR 1.03(5)(a)

Rock Harbor Commercial Wharf Improvement Project  
401 WQC 22-WW08-0018-APP

### Русский Russian

Это важный документ, и он должен быть безотлагательно переведен. Если вам нужен перевод данного документа, пожалуйста, свяжитесь с директором по вопросам многообразия (Diversity Director) компании MassDEP по указанному ниже телефону.

### العربية Arabic

هذه الوثيقة مهمة ويجب ترجمتها على الفور. إذا كنت بحاجة إلى هذه الوثيقة مترجمة، يرجى الاتصال بمدير التنوع PMassDE على أرقام الهواتف المدرجة أدناه.

### 한국어 Korean

이 문서는 중요하고 즉시 번역해야 합니다. 이 문서의 번역이 필요하시다면, 아래의 전화 번호로 MassDEP의 다양성 담당 이사에 문의하시기 바랍니다.

### հայերէն Armenian

Այս փաստաթուղթը կարևոր է և պետք է անմիջապես թարգմանվի:  
Եթե Ձեզ անհրաժեշտ է այս փաստաթուղթը թարգմանել, դիմեք MassDEP-ի բազմազանության տնօրենին ստորև նշված հեռախոսահամարով:

### فارسی Farsi Persian

این سند مهم است و باید فوراً ترجمه شود.  
اگر به ترجمه این سند نیاز دارید، لطفاً با مدیر بخش تنوع نژادی MassDEP به شماره تلفن ذکر شده در زیر تماس بگیرید.

### Français French

Ce document est important et devrait être traduit immédiatement. Si vous avez besoin de ce document traduit, veuillez communiquer avec le directeur de la diversité MassDEP aux numéros de téléphone indiqués ci-dessous.

### Deutsch German

Dieses Dokument ist wichtig und sollte sofort übersetzt werden. Sofern Sie eine Übersetzung dieses Dokuments benötigen, wenden Sie sich bitte an den Diversity Director MassDEP unter der unten aufgeführten Telefonnummer.

### Ελληνική Greek

Το παρόν έγγραφο είναι σημαντικό και θα πρέπει να μεταφραστεί αμέσως. Αν χρειάζεστε μετάφραση του παρόντος εγγράφου, παρακαλούμε επικοινωνήστε με τον Διευθυντή Διαφορετικότητας του MassDEP στους αριθμούς τηλεφώνου που αναγράφονται παρακάτω.

### Italiano Italian

Comunicazione per parti che non parlano inglese. Questo documento è importante e dovrebbe essere tradotto immediatamente. Se avete bisogno di questo documento tradotto, potete contattare il Direttore di Diversità di MassDEP al numero di telefono elencato di seguito.

### Język Polski Polish

Dokument ten jest ważny i powinien zostać natychmiast przetłumaczony. Jeśli potrzebujesz przetłumaczonej wersji dokumentu, prosimy o kontakt z dyrektorem ds. różnorodności MassDEP pod jednym z numerów telefonu wymienionych poniżej.

### हिन्दी Hindi

यह दस्तावेज महत्वपूर्ण है और इसका तुरंत अनुवाद किया जाना चाहिए. यदि आपको इस दस्तावेज़ का अनुवाद करने की आवश्यकता है, तो कृपया नीचे सूचीबद्ध टेलीफोन नंबरों पर मासडेपस डाइवर्सिटी के निदेशक से संपर्क करें.

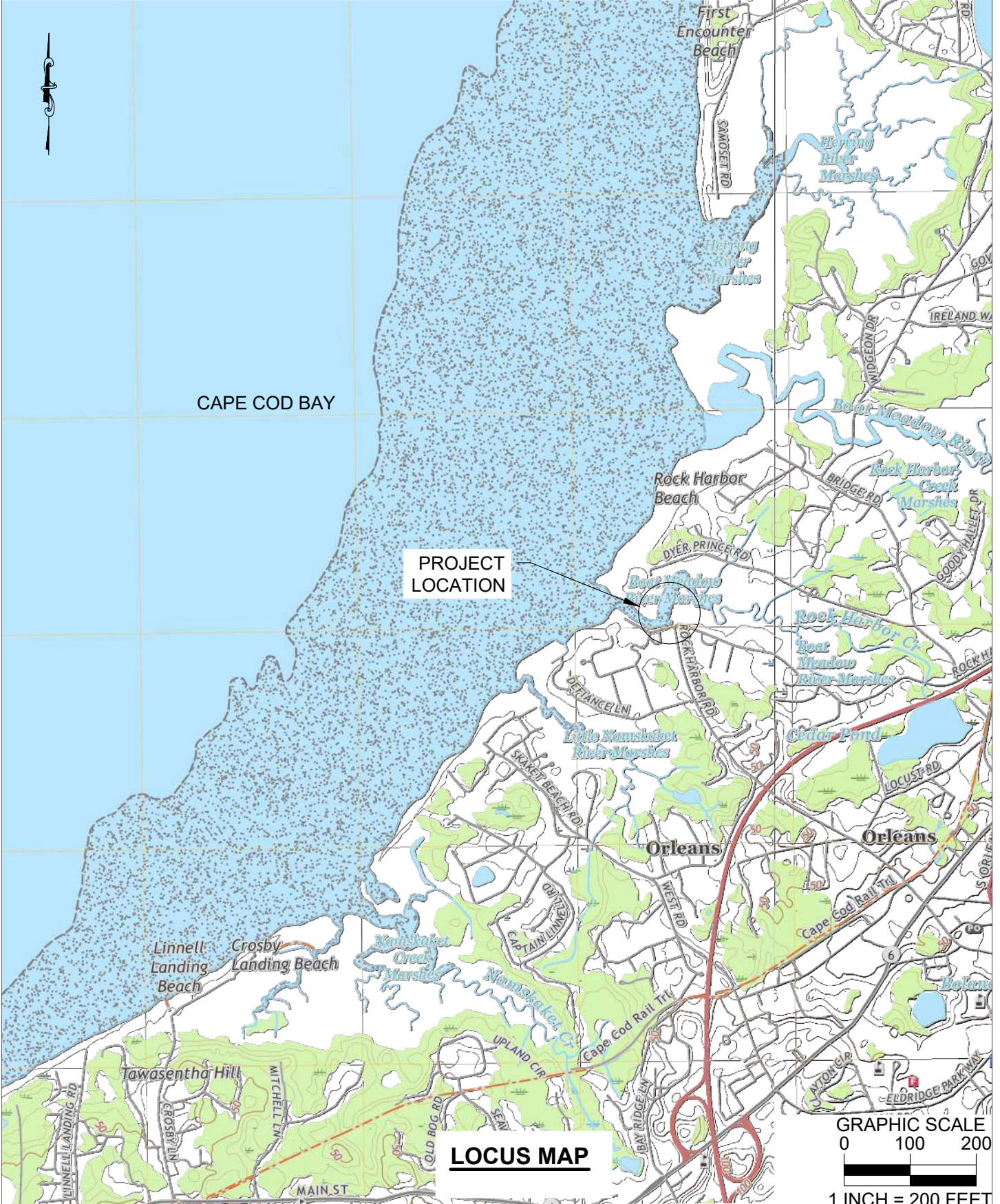
Contact Deneen Simpson 857-406-0738

Massachusetts Department of Environmental Protection

100 Cambridge Street 9<sup>th</sup> Floor Boston, MA 02114

TTY# MassRelay Service 1-800-439-2370 • <https://www.mass.gov/environmental-justice>

(Version revised 4.21.2023) 310 CMR 1.03(5)(a)



SHEET 1 OF 18

DATE: NOVEMBER 11, 2022

(SEE SHEET 17 FOR PROJECT NOTES, LEGEND & DATUM INFORMATION)

PLAN ACCOMPANYING THE PETITION OF:  
 THE TOWN OF ORLEANS, MASSACHUSETTS  
 TO RECONSTRUCT, EXPAND AND MAINTAIN  
 COMMERCIAL WHARF FACILITY IN ROCK HARBOR  
 113 ROCK HARBOR ROAD  
 TOWN OF ORLEANS, MASSACHUSETTS  
 BARNSTABLE COUNTY, MASSACHUSETTS

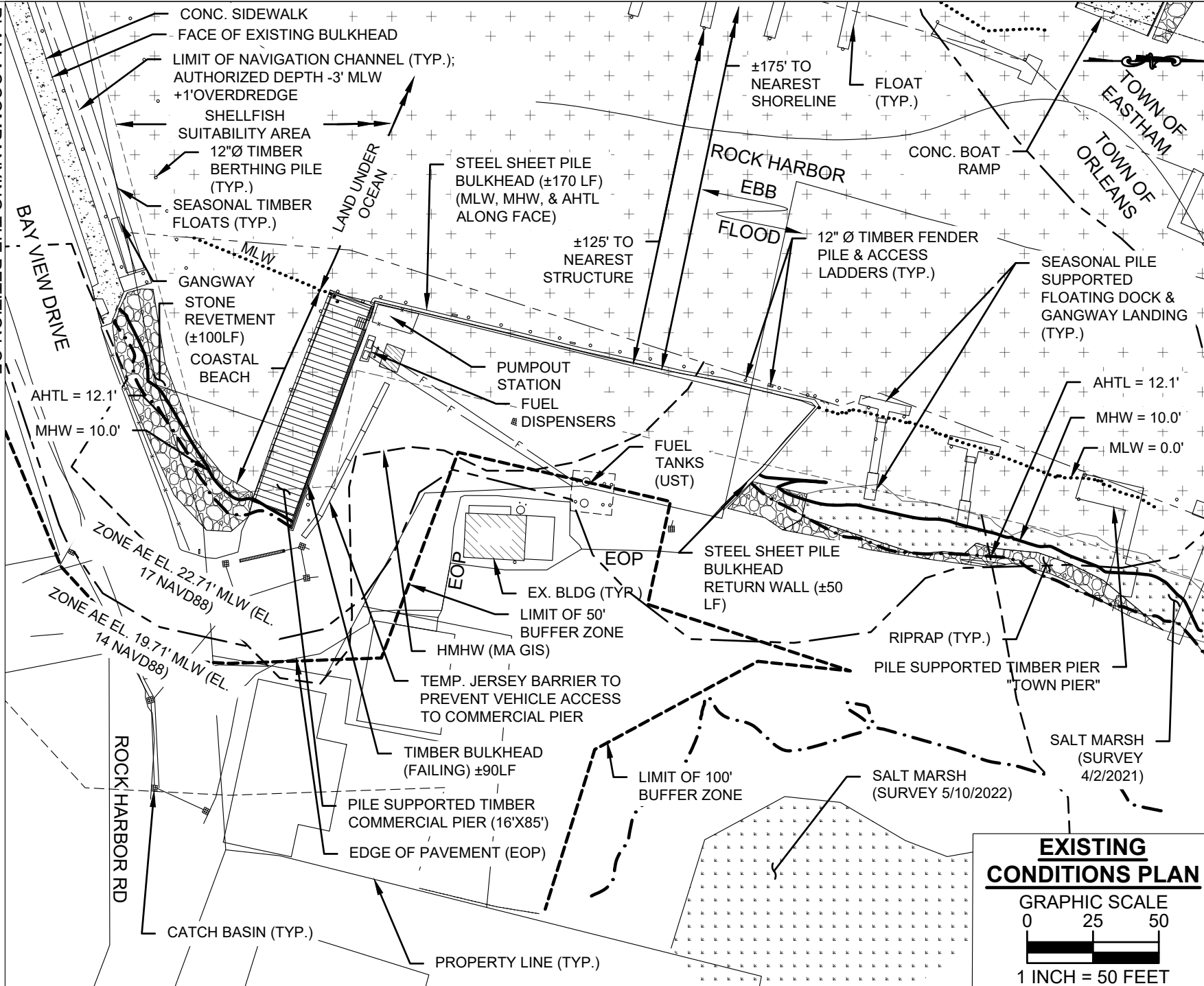


TO RECONSTRUCT, EXPAND AND MAINTAIN  
 COMMERCIAL WHARF FACILITY IN ROCK HARBOR  
 113 ROCK HARBOR ROAD  
 TOWN OF ORLEANS, MASSACHUSETTS  
 BARNSTABLE COUNTY, MASSACHUSETTS

PLAN ACCOMPANYING THE PETITION OF:  
 THE TOWN OF ORLEANS, MASSACHUSETTS

SHEET 2 OF 18

DATE: NOVEMBER 11, 2022

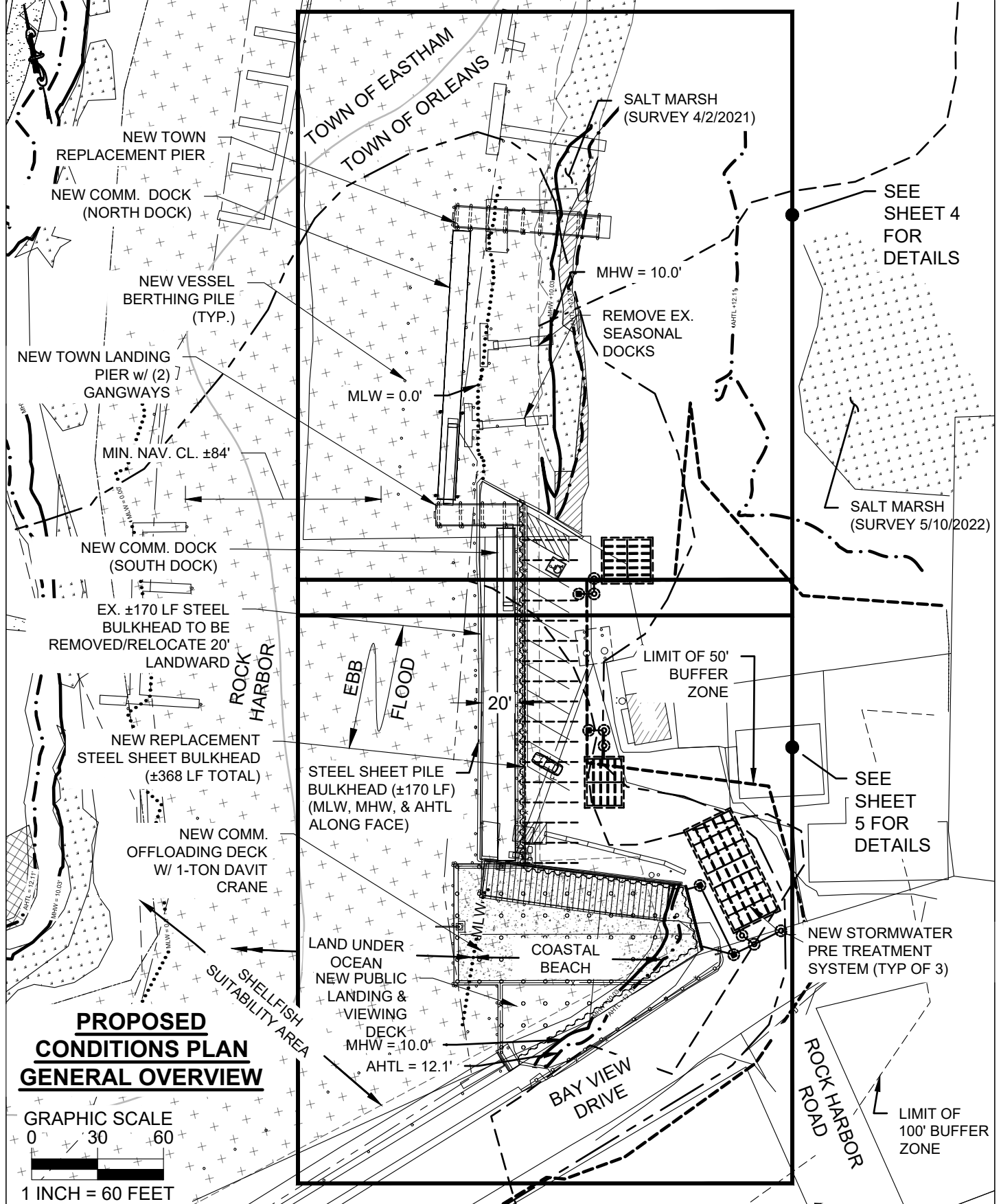


**EXISTING CONDITIONS PLAN**

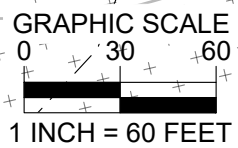
GRAPHIC SCALE  
 0 25 50  
 1 INCH = 50 FEET







**PROPOSED  
CONDITIONS PLAN  
GENERAL OVERVIEW**



PLAN ACCOMPANYING THE PETITION OF:  
THE TOWN OF ORLEANS, MASSACHUSETTS

SHEET 3 OF 18

DATE: NOVEMBER 11, 2022

TO RECONSTRUCT, EXPAND AND MAINTAIN  
COMMERCIAL WHARF FACILITY IN ROCK HARBOR  
113 ROCK HARBOR ROAD  
TOWN OF ORLEANS, MASSACHUSETTS  
  
BARNSTABLE COUNTY, MASSACHUSETTS

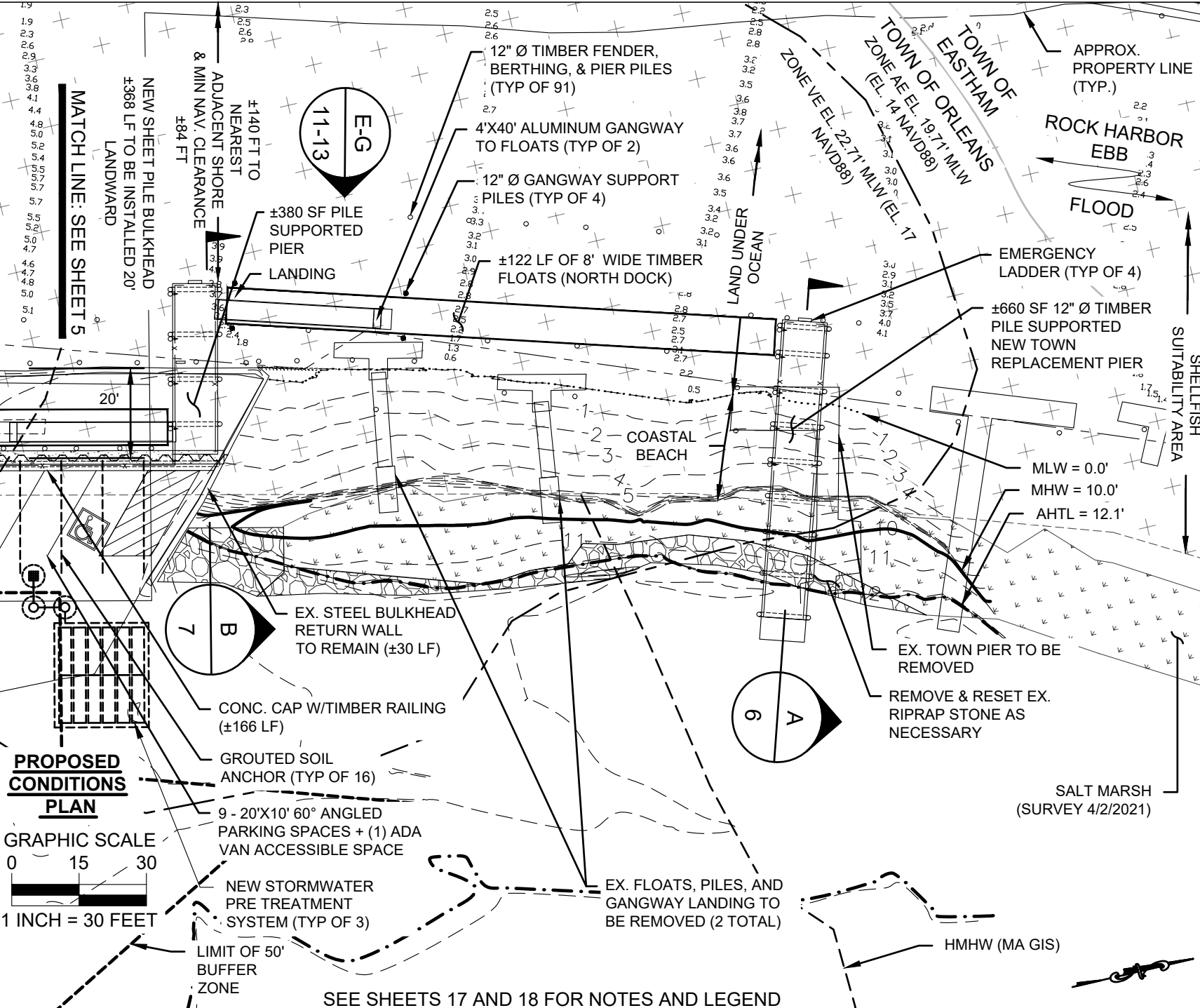


TO RECONSTRUCT, EXPAND AND MAINTAIN  
 COMMERCIAL WHARF FACILITY IN ROCK HARBOR  
 113 ROCK HARBOR ROAD  
 TOWN OF ORLEANS, MASSACHUSETTS  
 BARNSTABLE COUNTY, MASSACHUSETTS

PLAN ACCOMPANYING THE PETITION OF:  
 THE TOWN OF ORLEANS, MASSACHUSETTS

SHEET 4 OF 18

DATE: NOVEMBER 11, 2022



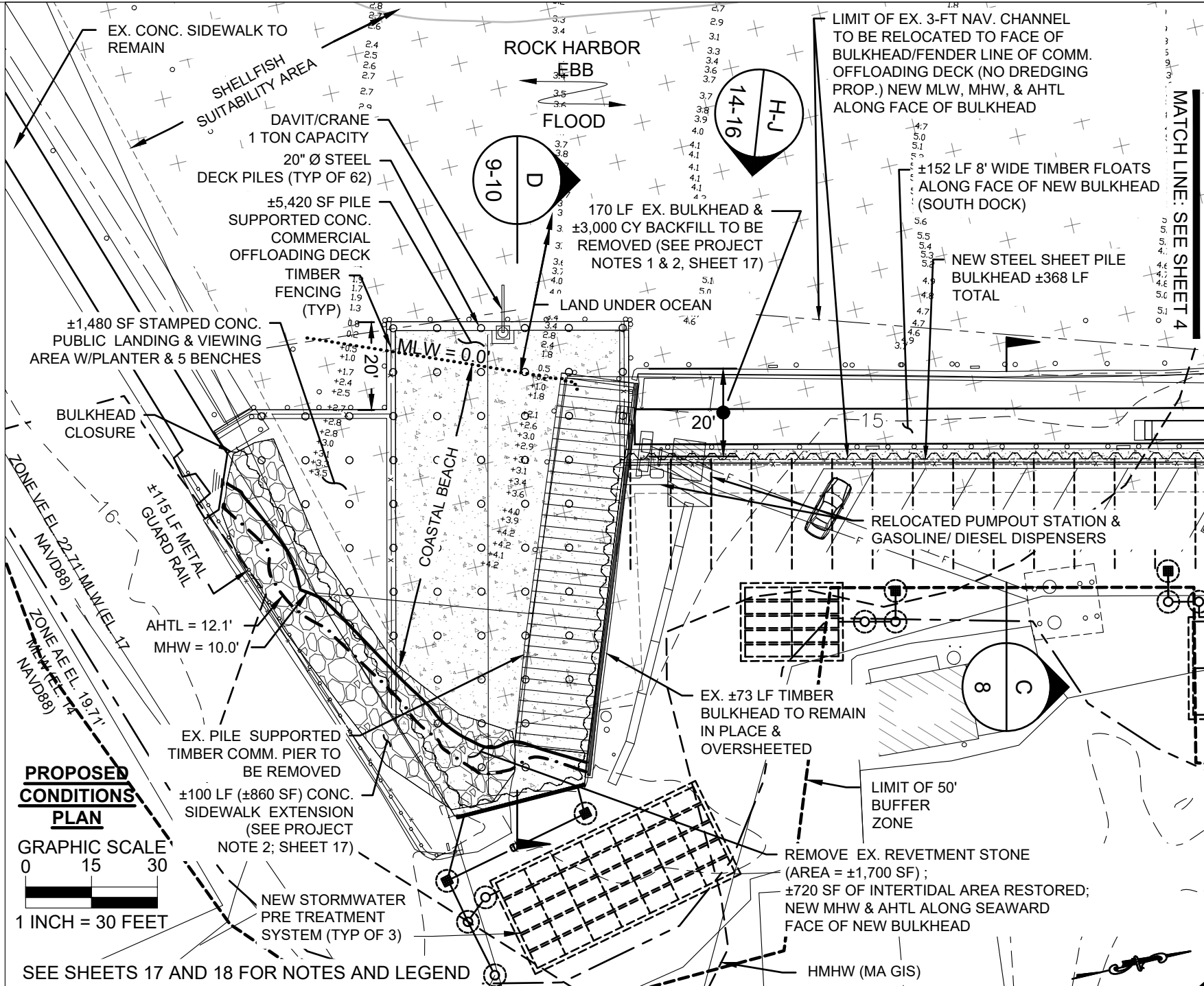
SEE SHEETS 17 AND 18 FOR NOTES AND LEGEND



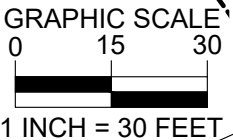
PLAN ACCOMPANYING THE PETITION OF:  
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 TO RECONSTRUCT, EXPAND AND MAINTAIN  
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SHEET 5 OF 18

DATE: NOVEMBER 11, 2022



**PROPOSED  
 CONDITIONS  
 PLAN**



SEE SHEETS 17 AND 18 FOR NOTES AND LEGEND

MATCH LINE: SEE SHEET 4

EX. CONC. SIDEWALK TO REMAIN

SHELLFISH SUITABILITY AREA

DAVIT/CRANE  
 1 TON CAPACITY  
 20" Ø STEEL  
 DECK PILES (TYP OF 62)

±5,420 SF PILE SUPPORTED CONC. COMMERCIAL OFFLOADING DECK

TIMBER FENCING (TYP)

±1,480 SF STAMPED CONC. PUBLIC LANDING & VIEWING AREA W/PLANTER & 5 BENCHES

BULKHEAD CLOSURE

±15 LF METAL GUARD RAIL

AHTL = 12.1'  
 MHW = 10.0'

EX. PILE SUPPORTED TIMBER COMM. PIER TO BE REMOVED

±100 LF (±860 SF) CONC. SIDEWALK EXTENSION (SEE PROJECT NOTE 2; SHEET 17)

NEW STORMWATER PRE TREATMENT SYSTEM (TYP OF 3)

ROCK HARBOR  
 EBB  
 FLOOD

170 LF EX. BULKHEAD & ±3,000 CY BACKFILL TO BE REMOVED (SEE PROJECT NOTES 1 & 2, SHEET 17)

LAND UNDER OCEAN

±152 LF 8' WIDE TIMBER FLOATS ALONG FACE OF NEW BULKHEAD (SOUTH DOCK)

NEW STEEL SHEET PILE BULKHEAD ±368 LF TOTAL

RELOCATED PUMPOUT STATION & GASOLINE/ DIESEL DISPENSERS

EX. ±73 LF TIMBER BULKHEAD TO REMAIN IN PLACE & OVERSHEETED

LIMIT OF 50' BUFFER ZONE

REMOVE EX. REVEMENT STONE (AREA = ±1,700 SF); ±720 SF OF INTERTIDAL AREA RESTORED; NEW MHW & AHTL ALONG SEAWARD FACE OF NEW BULKHEAD

HMHWS (MA GIS)

LIMIT OF EX. 3-FT NAV. CHANNEL TO BE RELOCATED TO FACE OF BULKHEAD/FENDER LINE OF COMM. OFFLOADING DECK (NO DREDGING PROP.) NEW MLW, MHW, & AHTL ALONG FACE OF BULKHEAD

MLW = 0.0'

COASTAL BEACH

EX. CONC. SIDEWALK TO REMAIN

DAVIT/CRANE  
 1 TON CAPACITY  
 20" Ø STEEL  
 DECK PILES (TYP OF 62)

±5,420 SF PILE SUPPORTED CONC. COMMERCIAL OFFLOADING DECK

TIMBER FENCING (TYP)

±1,480 SF STAMPED CONC. PUBLIC LANDING & VIEWING AREA W/PLANTER & 5 BENCHES

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LIMIT OF EX. 3-FT NAV. CHANNEL TO BE RELOCATED TO FACE OF BULKHEAD/FENDER LINE OF COMM. OFFLOADING DECK (NO DREDGING PROP.) NEW MLW, MHW, & AHTL ALONG FACE OF BULKHEAD

MLW = 0.0'

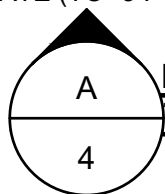
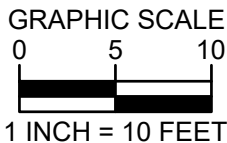
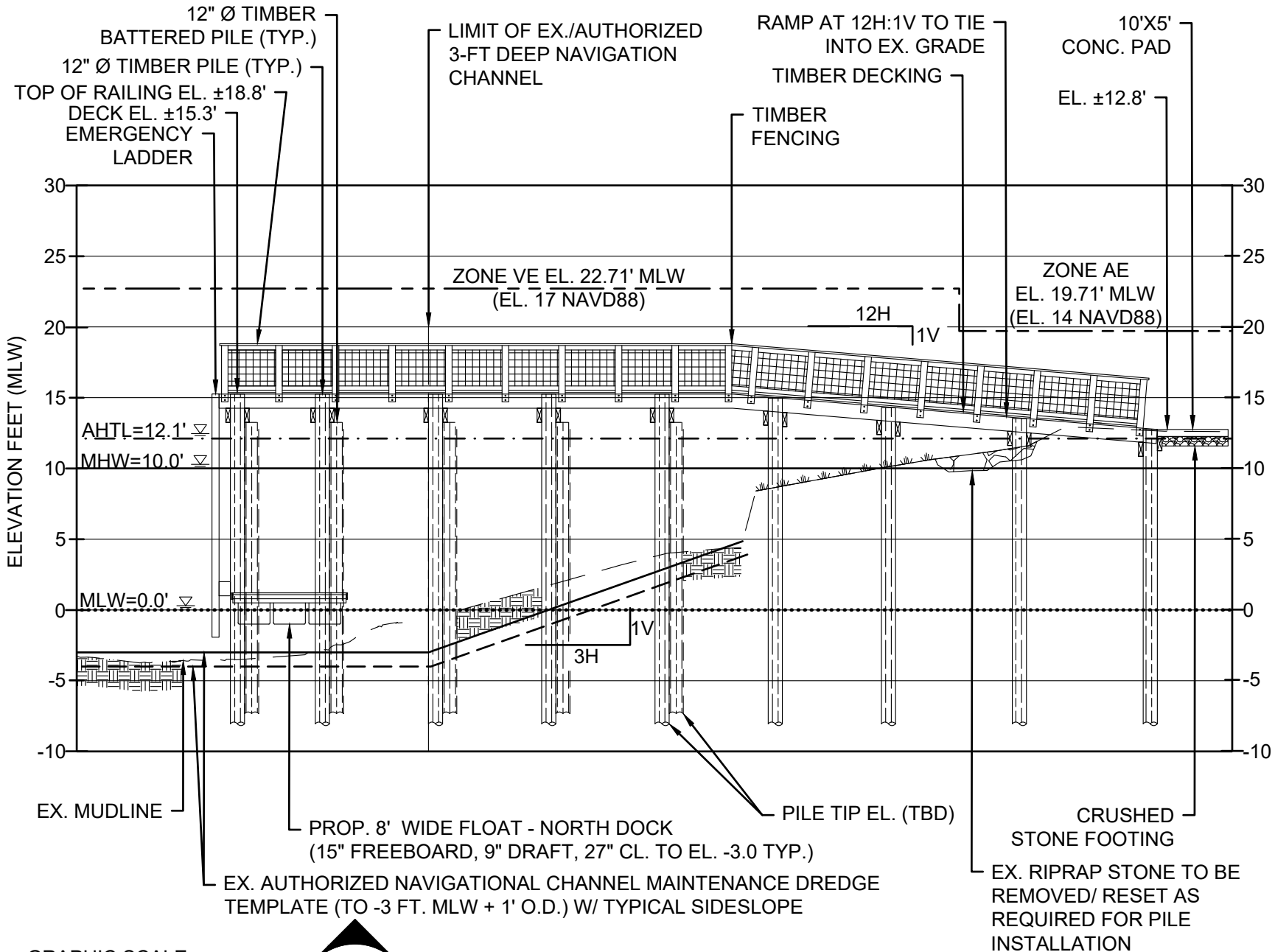
COASTAL BEACH

TO RECONSTRUCT, EXPAND AND MAINTAIN  
 COMMERCIAL WHARF FACILITY IN ROCK HARBOR  
 113 ROCK HARBOR ROAD  
 TOWN OF ORLEANS, MASSACHUSETTS  
 BARNSTABLE COUNTY, MASSACHUSETTS

PLAN ACCOMPANYING THE PETITION OF:  
 THE TOWN OF ORLEANS, MASSACHUSETTS

SHEET 6 OF 18

DATE: NOVEMBER 11, 2022



**PROPOSED TYP. SECTION - PILE SUPPORTED  
 TOWN PIER (10' W X 66' L)**

SCALE: 1" = 10'

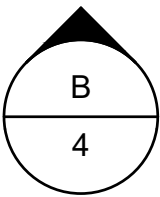
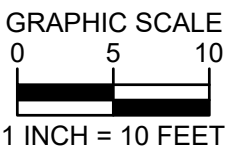
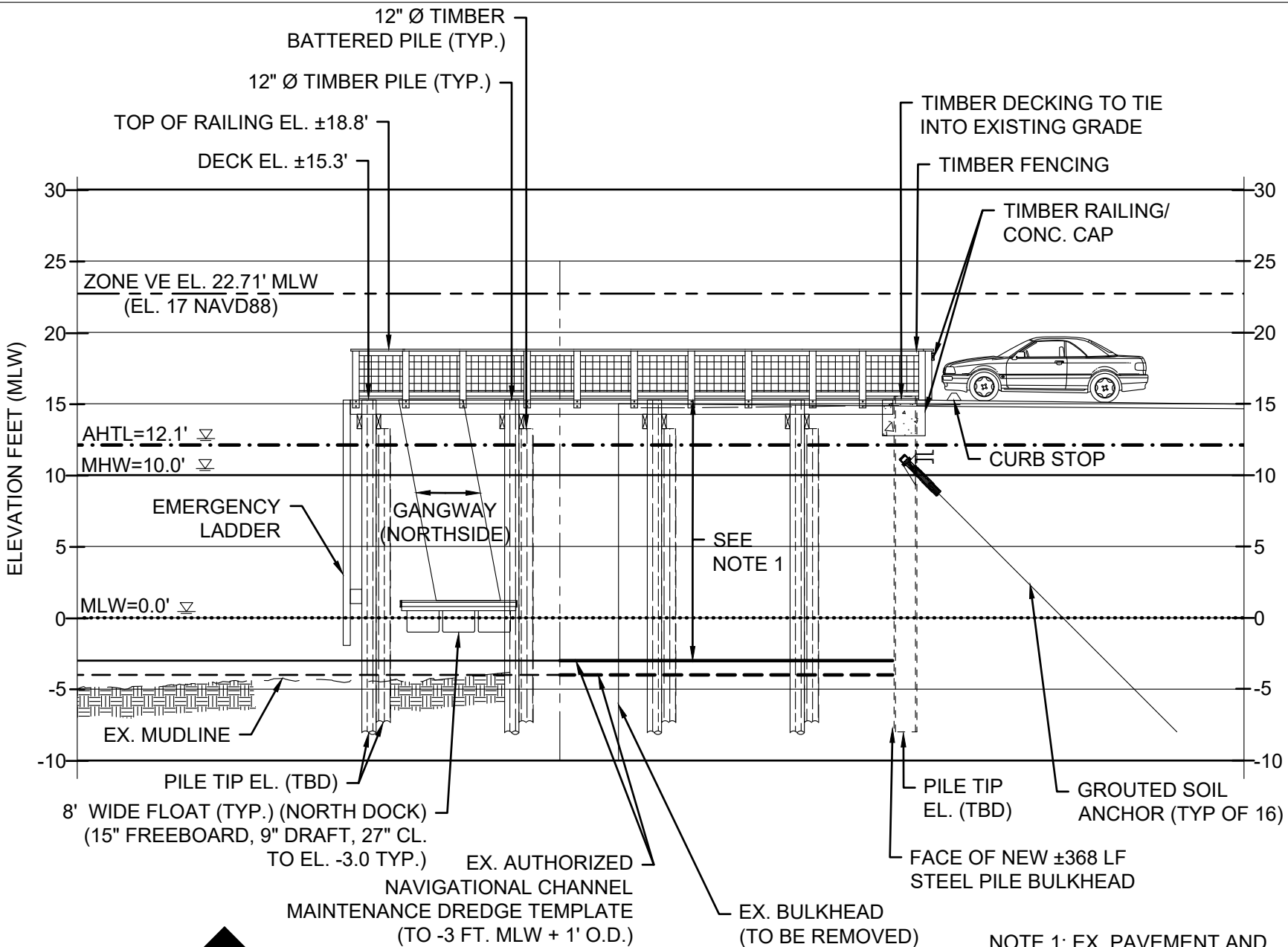


TO RECONSTRUCT, EXPAND AND MAINTAIN  
 COMMERCIAL WHARF FACILITY IN ROCK HARBOR  
 113 ROCK HARBOR ROAD  
 TOWN OF ORLEANS, MASSACHUSETTS  
 BARNSTABLE COUNTY, MASSACHUSETTS

PLAN ACCOMPANYING THE PETITION OF:  
 THE TOWN OF ORLEANS, MASSACHUSETTS

SHEET 7 OF 18

DATE: NOVEMBER 11, 2022



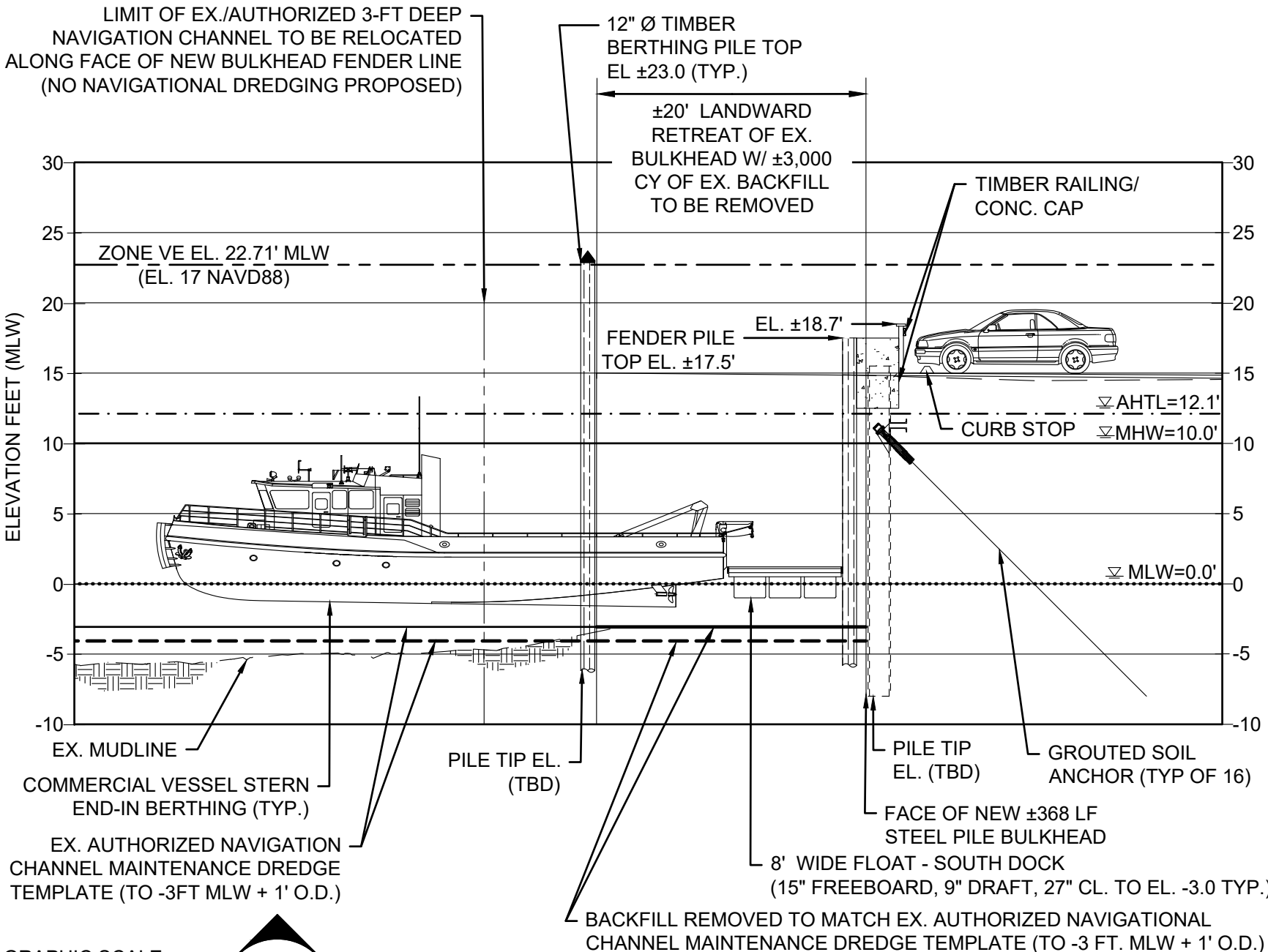
**PROPOSED TYP. SECTION PILE SUPPORTED  
 COMMERCIAL LANDING PIER (10' W X 38' L)**

SCALE: 1" = 10'

**NOTE 1:** EX. PAVEMENT AND BACKFILL TO BE REMOVED TO EL. -3.0 MLW + 1' O.D. TO MATCH AUTHORIZED MAINT. DEPTH OF CHANNEL

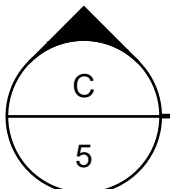
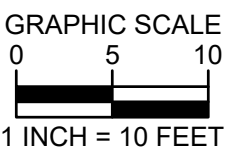


PLAN ACCOMPANYING THE PETITION OF:  
 THE TOWN OF ORLEANS, MASSACHUSETTS  
 TO RECONSTRUCT, EXPAND AND MAINTAIN  
 COMMERCIAL WHARF FACILITY IN ROCK HARBOR  
 113 ROCK HARBOR ROAD  
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 BARNSTABLE COUNTY, MASSACHUSETTS



SHEET 8 OF 18

DATE: NOVEMBER 11, 2022



**PROPOSED TYP. SECTION - COMMERCIAL BERTH (SOUTH DOCK)**

SCALE: 1" = 10'

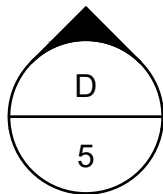
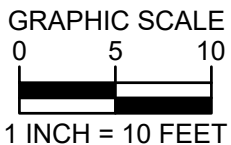
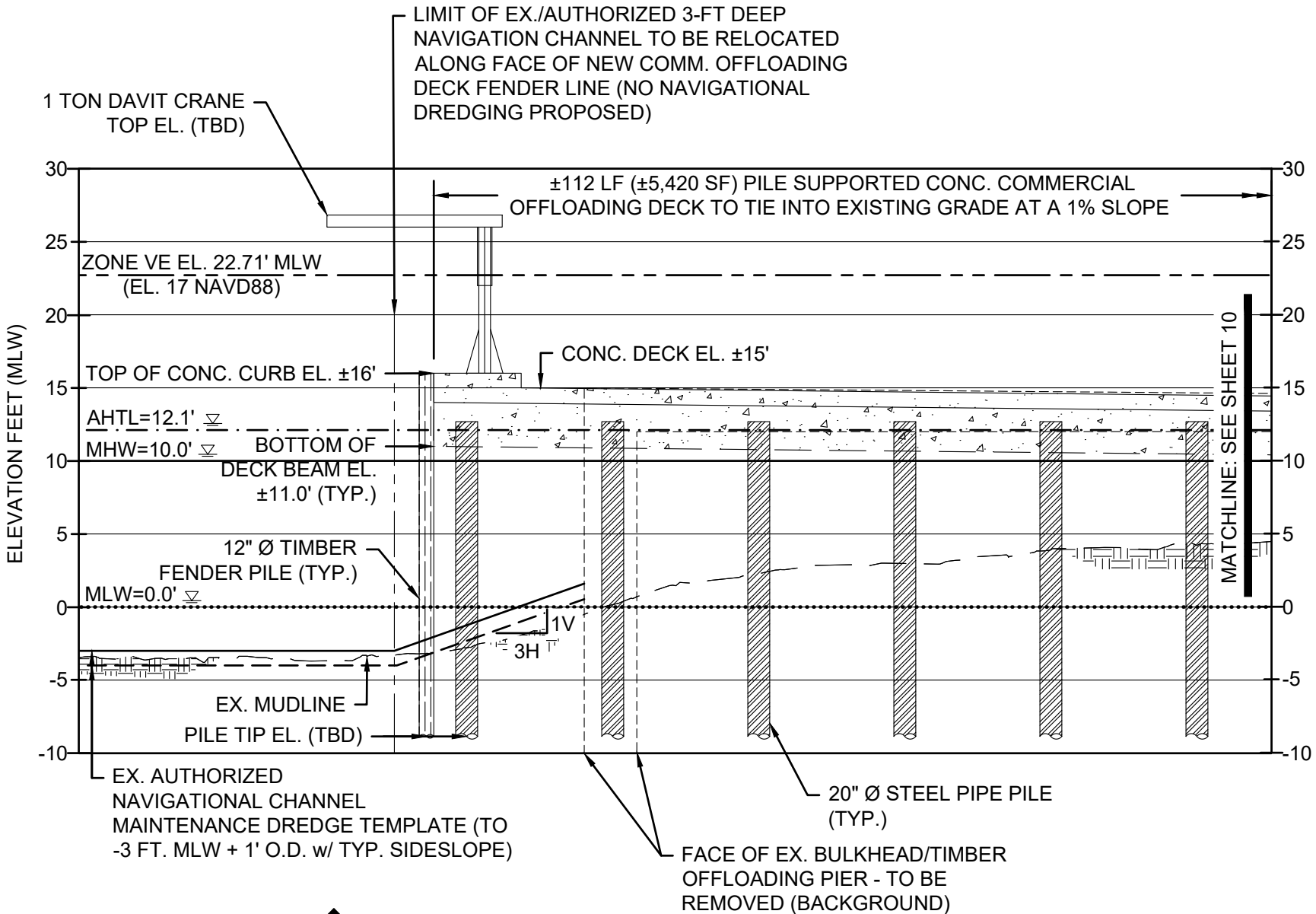


TO RECONSTRUCT, EXPAND AND MAINTAIN  
 COMMERCIAL WHARF FACILITY IN ROCK HARBOR  
 113 ROCK HARBOR ROAD  
 TOWN OF ORLEANS, MASSACHUSETTS  
 BARNSTABLE COUNTY, MASSACHUSETTS

PLAN ACCOMPANYING THE PETITION OF:  
 THE TOWN OF ORLEANS, MASSACHUSETTS

SHEET 9 OF 18

DATE: NOVEMBER 11, 2022



**PROPOSED TYP. SECTION - PILE SUPPORTED CONCRETE  
 COMMERCIAL OFFLOADING DECK**

SCALE: 1" = 10'

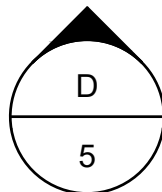
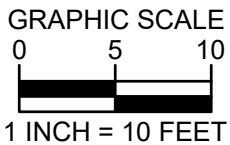
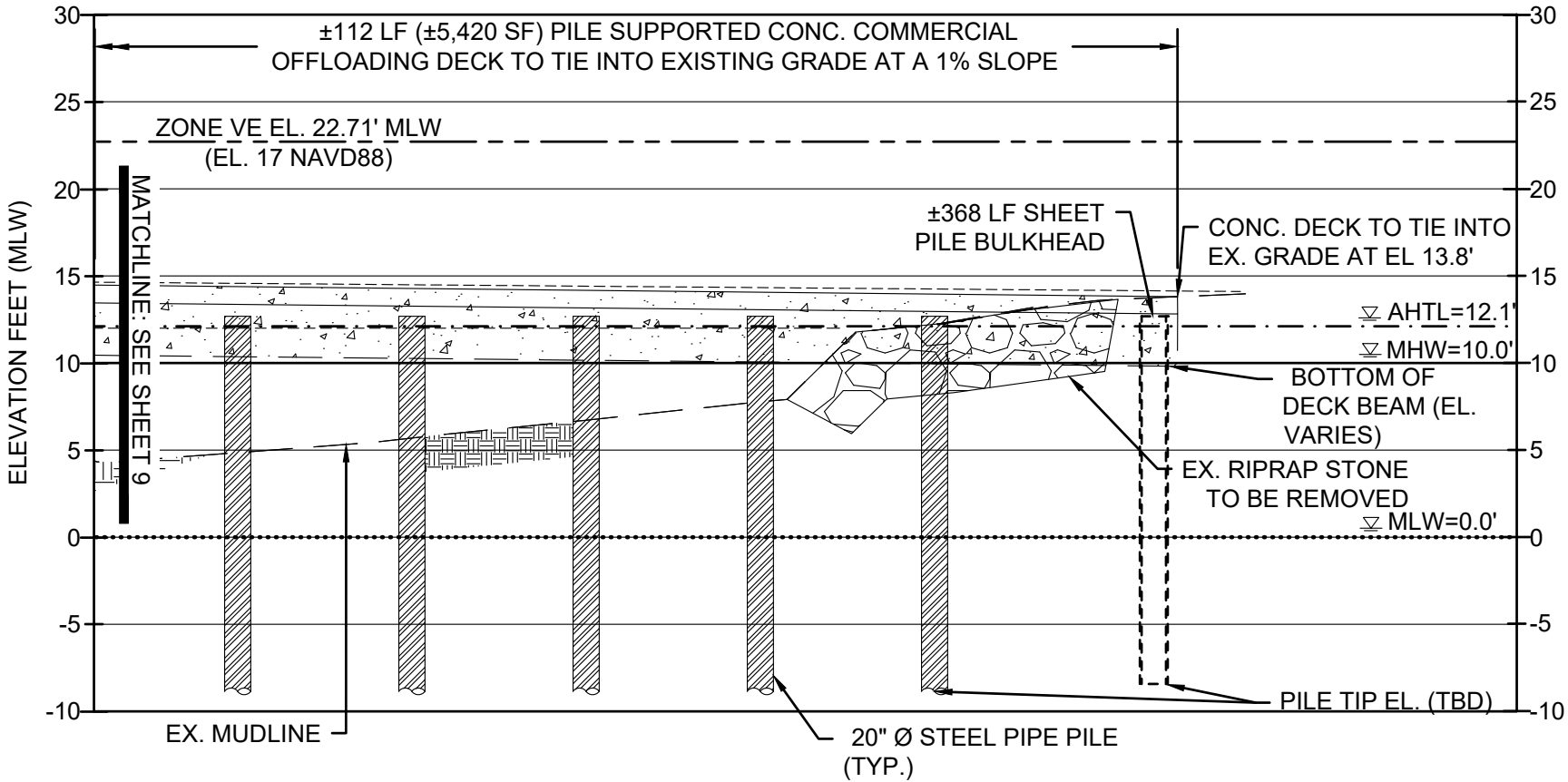


TO RECONSTRUCT, EXPAND AND MAINTAIN  
 COMMERCIAL WHARF FACILITY IN ROCK HARBOR  
 113 ROCK HARBOR ROAD  
 TOWN OF ORLEANS, MASSACHUSETTS  
 BARNSTABLE COUNTY, MASSACHUSETTS

PLAN ACCOMPANYING THE PETITION OF:  
 THE TOWN OF ORLEANS, MASSACHUSETTS

SHEET 10 OF 18

DATE: NOVEMBER 11, 2022



**PROPOSED TYPICAL SECTION - PILE SUPPORTED CONCRETE  
 COMMERCIAL OFFLOADING DECK (CONT'D)**

SCALE: 1" = 10'



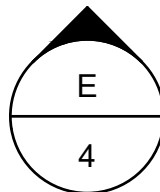
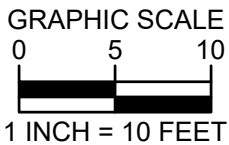
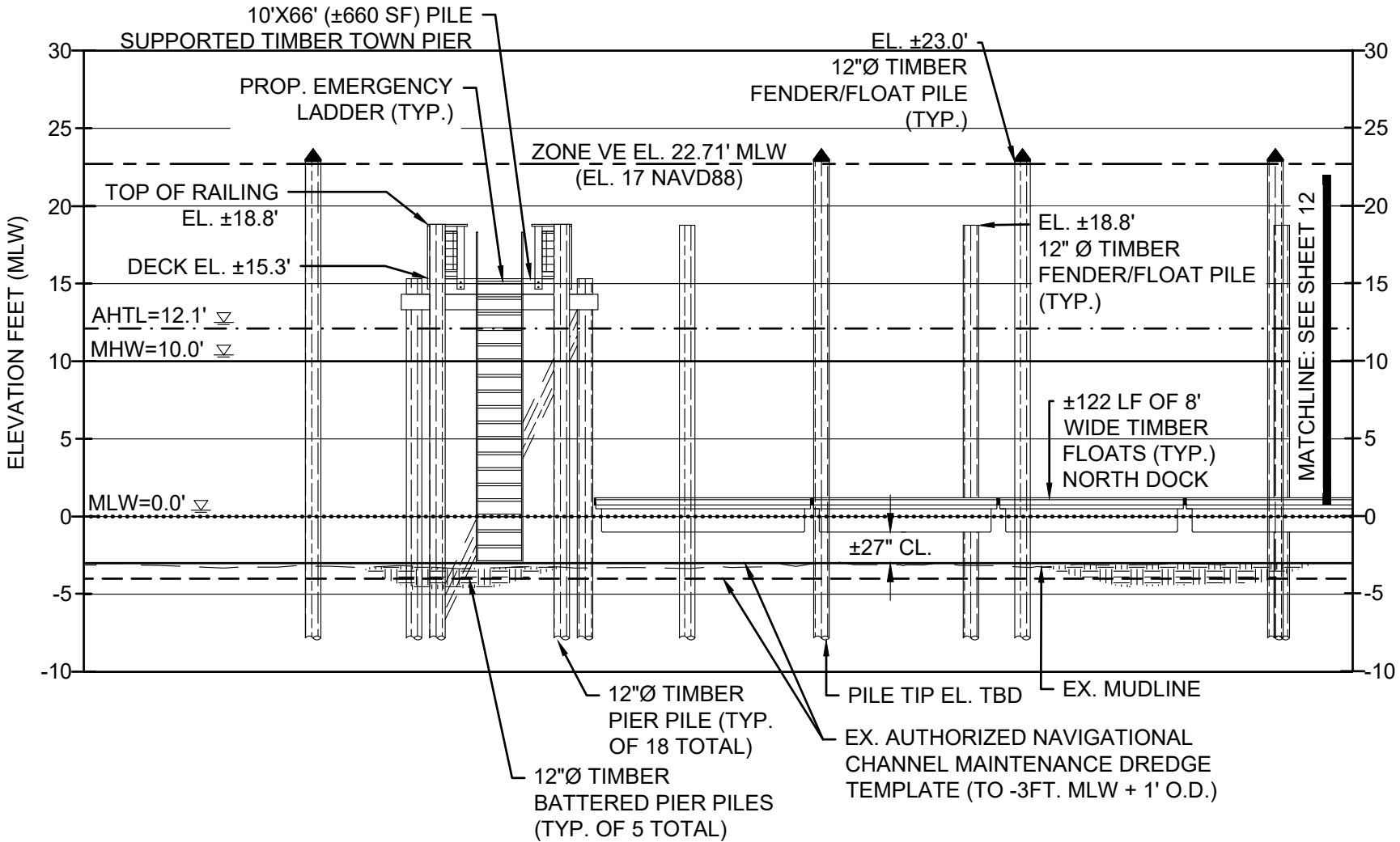


TO RECONSTRUCT, EXPAND AND MAINTAIN  
 COMMERCIAL WHARF FACILITY IN ROCK HARBOR  
 113 ROCK HARBOR ROAD  
 TOWN OF ORLEANS, MASSACHUSETTS  
 BARNSTABLE COUNTY, MASSACHUSETTS

PLAN ACCOMPANYING THE PETITION OF:  
 THE TOWN OF ORLEANS, MASSACHUSETTS

SHEET 11 OF 18

DATE: NOVEMBER 11, 2022



**PROPOSED ELEVATION VIEW**

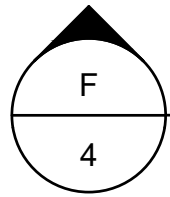
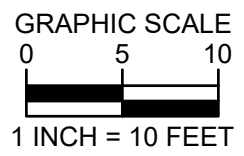
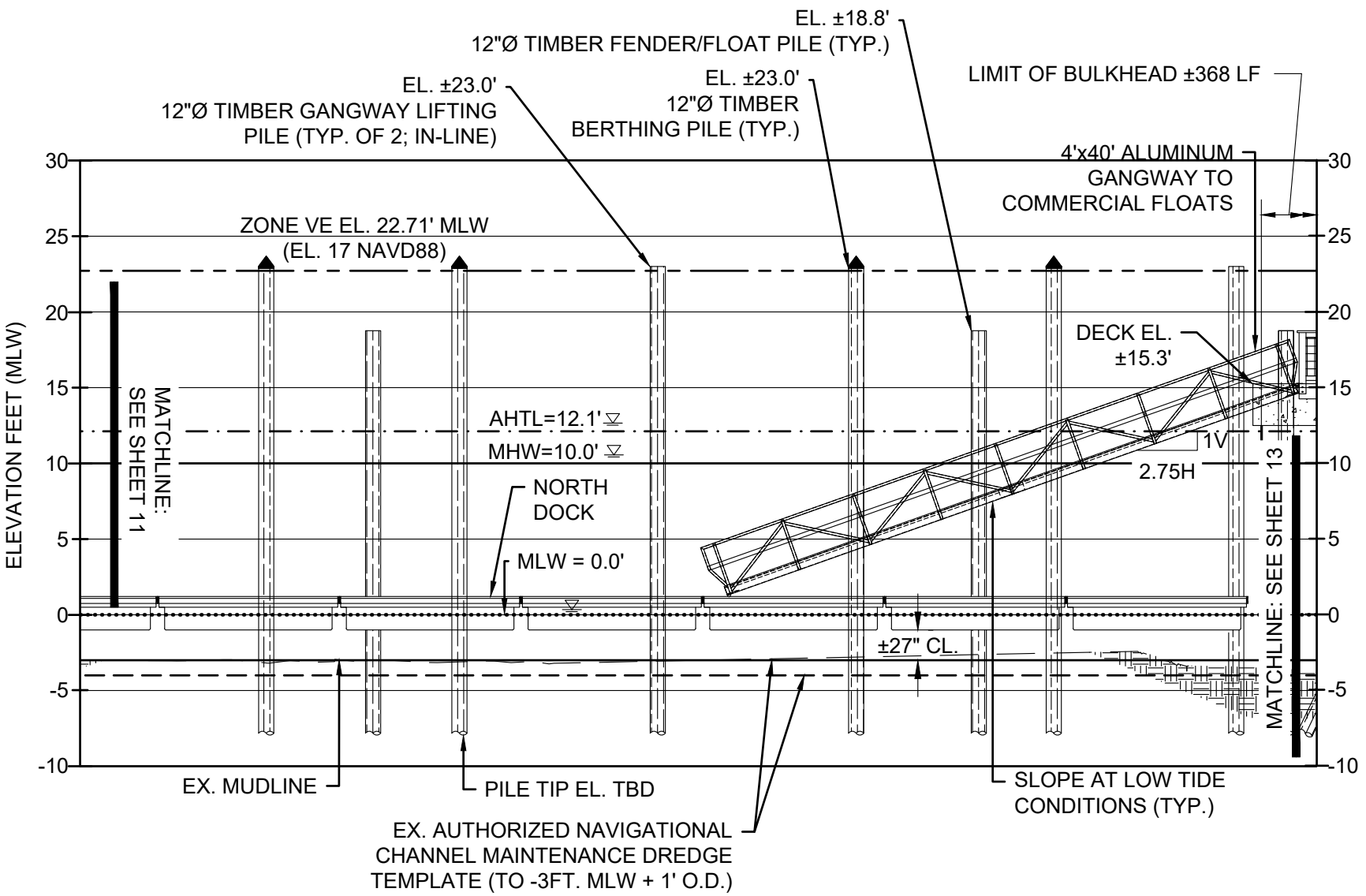
SCALE: 1" = 10'



PLAN ACCOMPANYING THE PETITION OF:  
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 TO RECONSTRUCT, EXPAND AND MAINTAIN  
 COMMERCIAL WHARF FACILITY IN ROCK HARBOR  
 113 ROCK HARBOR ROAD  
 TOWN OF ORLEANS, MASSACHUSETTS  
 BARNSTABLE COUNTY, MASSACHUSETTS

SHEET 12 OF 18

DATE: NOVEMBER 11, 2022

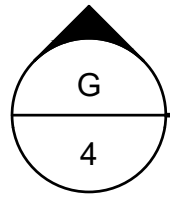
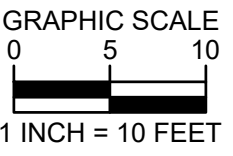
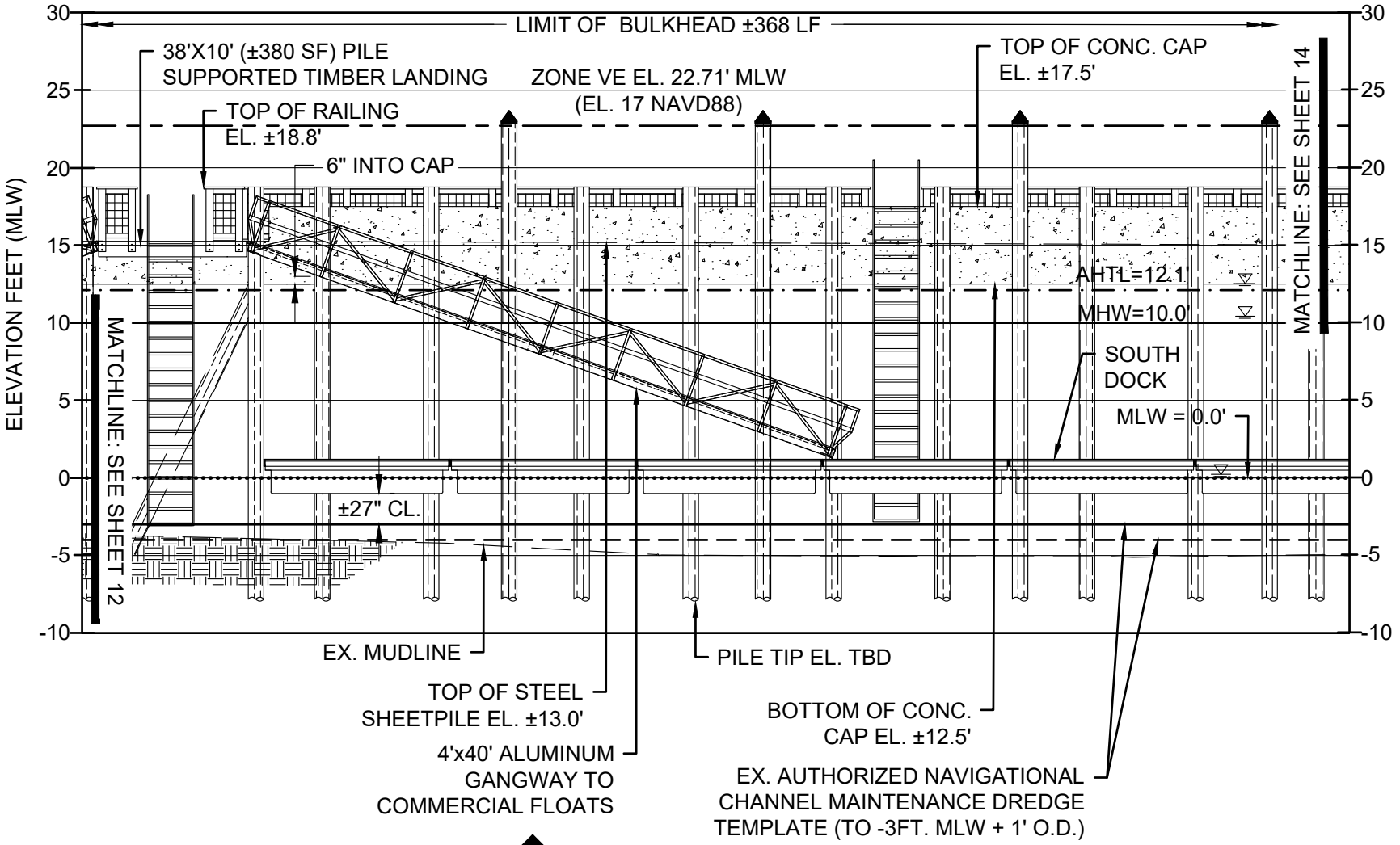


**PROPOSED ELEVATION VIEW (CONT'D)**  
 SCALE: 1" = 10'



PLAN ACCOMPANYING THE PETITION OF:  
 THE TOWN OF ORLEANS, MASSACHUSETTS  
 TO RECONSTRUCT, EXPAND AND MAINTAIN  
 COMMERCIAL WHARF FACILITY IN ROCK HARBOR  
 113 ROCK HARBOR ROAD  
 TOWN OF ORLEANS, MASSACHUSETTS  
 BARNSTABLE COUNTY, MASSACHUSETTS

SHEET 13 OF 18  
 DATE: NOVEMBER 11, 2022



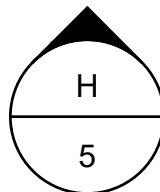
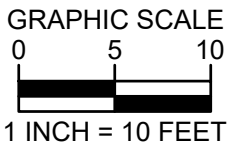
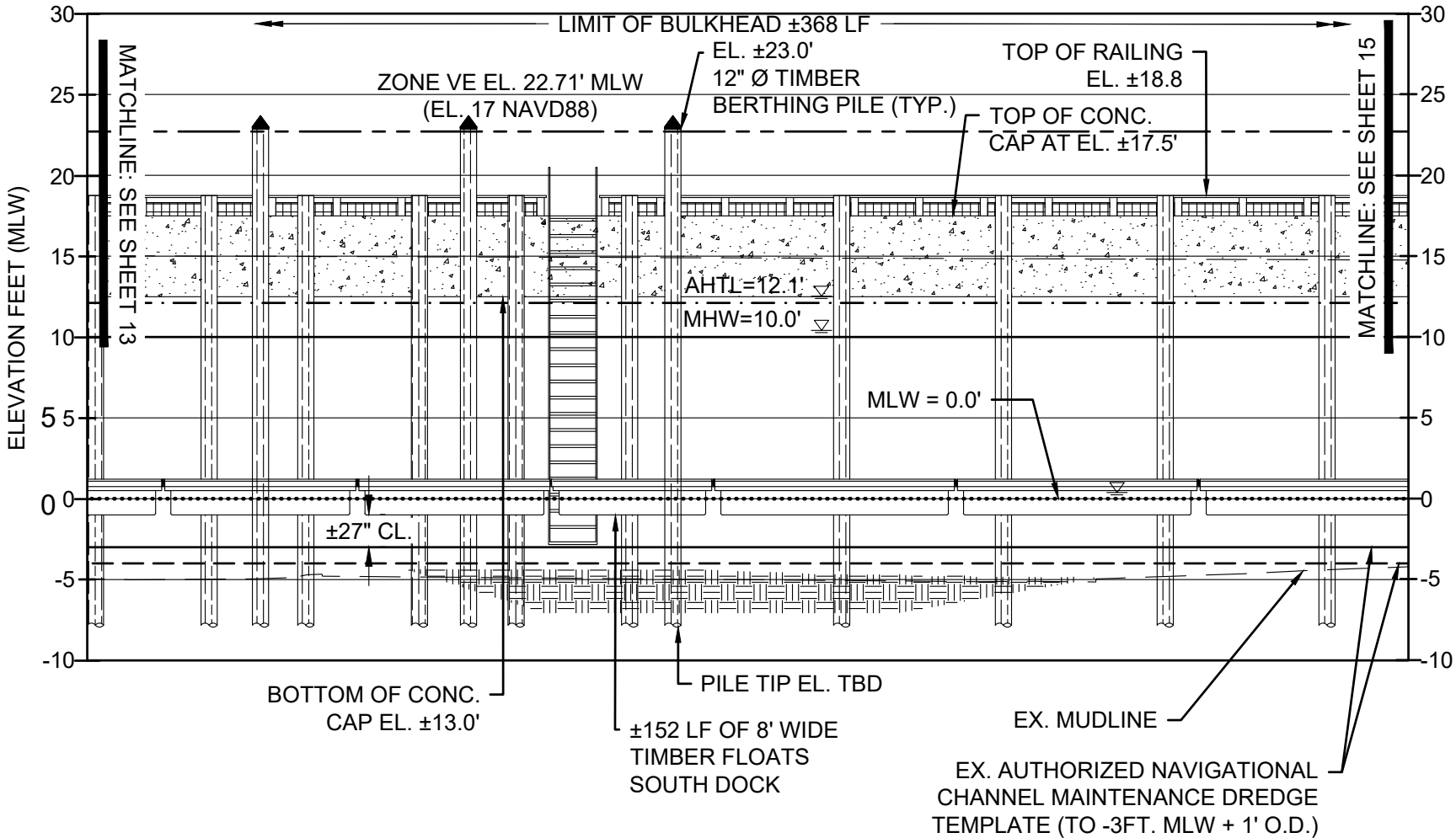
**PROPOSED ELEVATION VIEW (CONT'D)**  
 SCALE: 1" = 10'

TO RECONSTRUCT, EXPAND AND MAINTAIN  
 COMMERCIAL WHARF FACILITY IN ROCK HARBOR  
 113 ROCK HARBOR ROAD  
 TOWN OF ORLEANS, MASSACHUSETTS  
 BARNSTABLE COUNTY, MASSACHUSETTS

PLAN ACCOMPANYING THE PETITION OF:  
 THE TOWN OF ORLEANS, MASSACHUSETTS

SHEET 14 OF 18

DATE: NOVEMBER 11, 2022

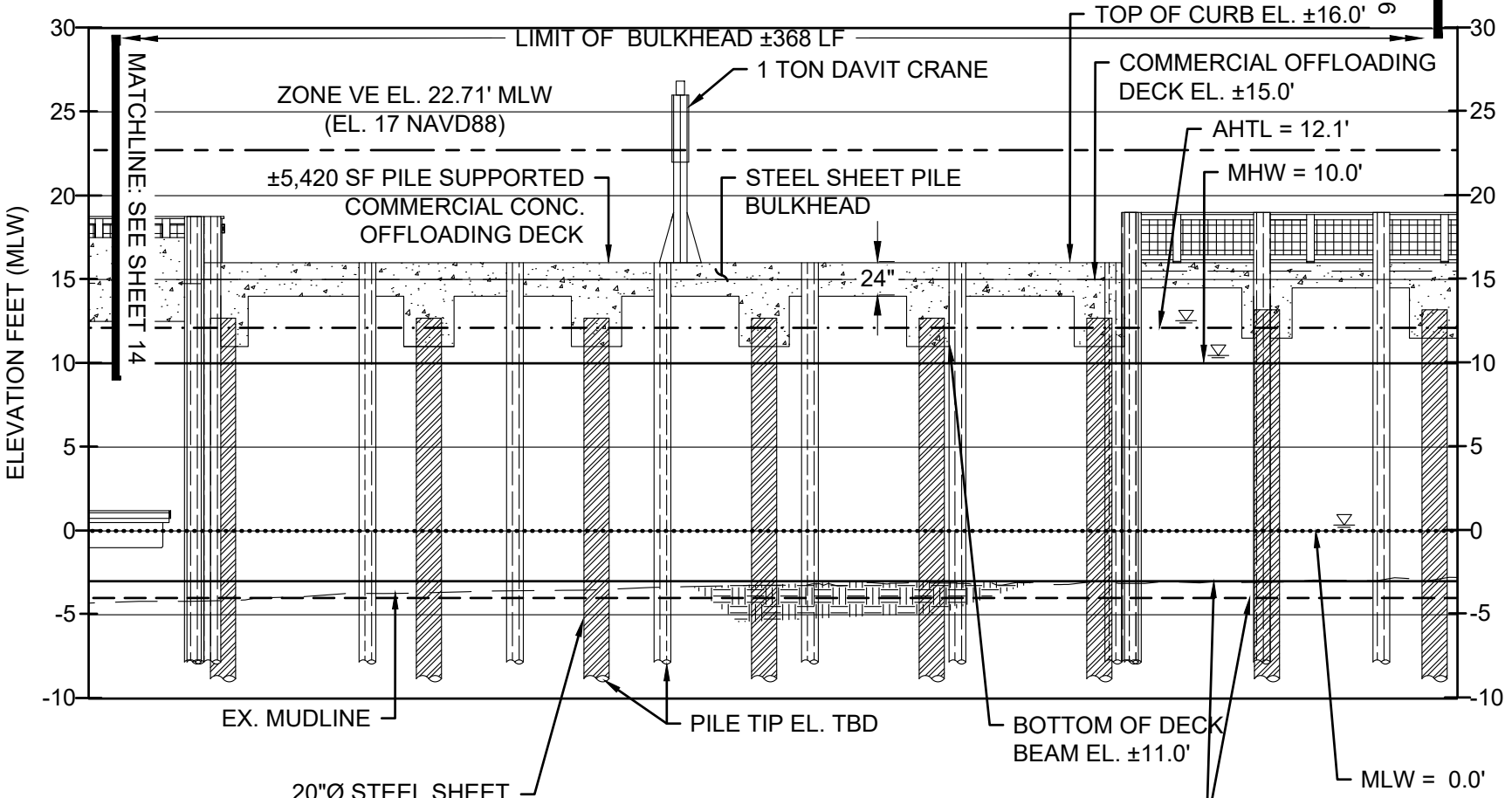


**PROPOSED ELEVATION VIEW (CONT'D)**

SCALE: 1" = 10'



MATCHLINE:  
SEE SHEET 16

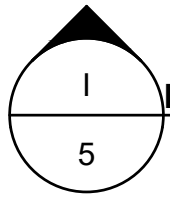
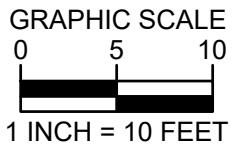


PLAN ACCOMPANYING THE PETITION OF:  
THE TOWN OF ORLEANS, MASSACHUSETTS

TO RECONSTRUCT, EXPAND AND MAINTAIN  
COMMERCIAL WHARF FACILITY IN ROCK HARBOR  
113 ROCK HARBOR ROAD  
TOWN OF ORLEANS, MASSACHUSETTS  
BARNSTABLE COUNTY, MASSACHUSETTS

SHEET 15 OF 18

DATE: NOVEMBER 11, 2022



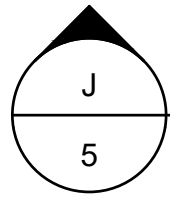
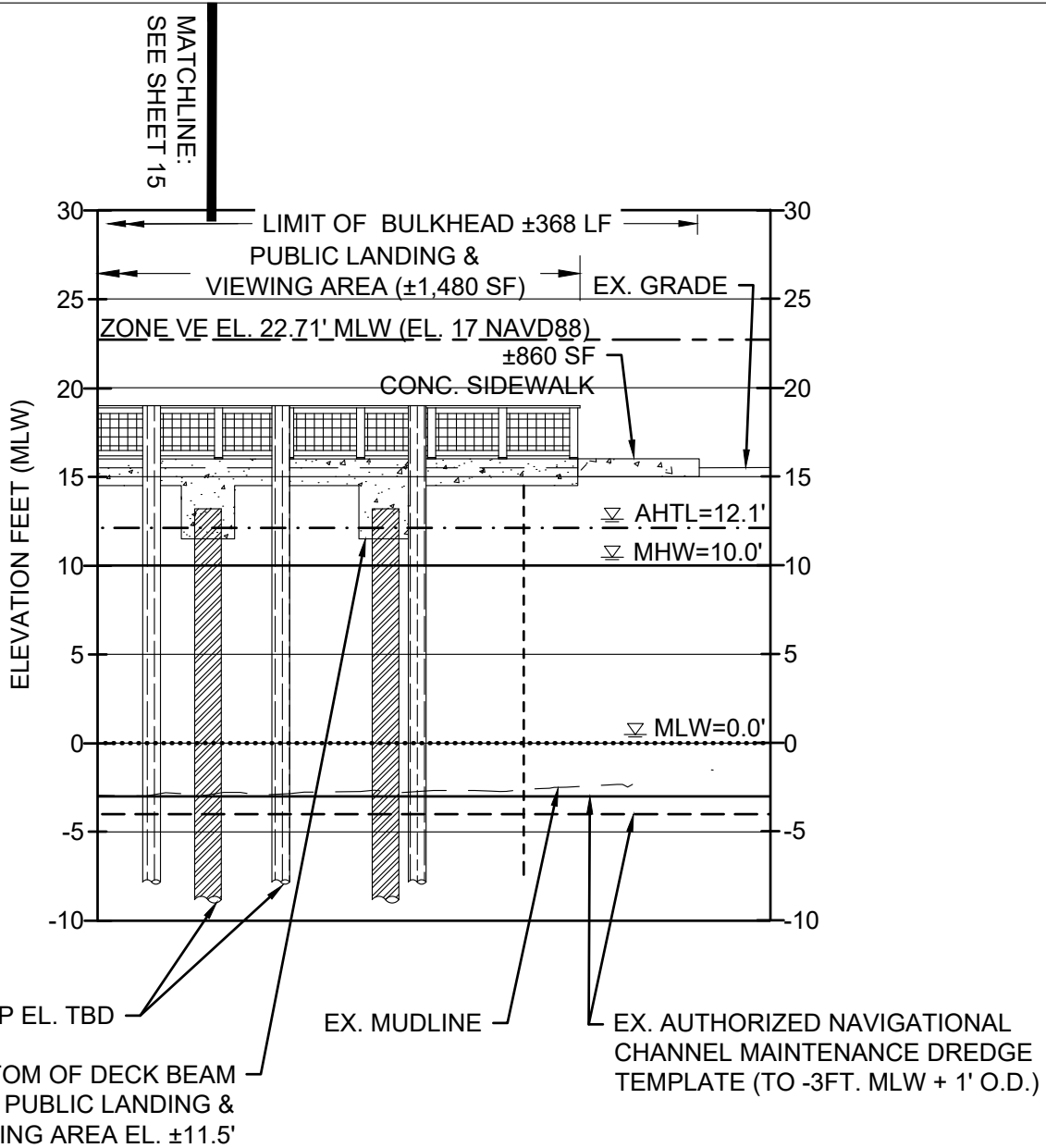
**PROPOSED ELEVATION VIEW (CONT'D)**  
SCALE: 1" = 10'



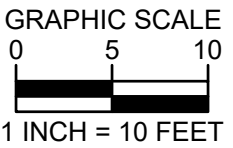
PLAN ACCOMPANYING THE PETITION OF:  
 THE TOWN OF ORLEANS, MASSACHUSETTS  
 TO RECONSTRUCT, EXPAND AND MAINTAIN  
 COMMERCIAL WHARF FACILITY IN ROCK HARBOR  
 113 ROCK HARBOR ROAD  
 TOWN OF ORLEANS, MASSACHUSETTS  
 BARNSTABLE COUNTY, MASSACHUSETTS

SHEET 16 OF 18

DATE: NOVEMBER 11, 2022



**PROPOSED ELEVATION VIEW (CONT'D)**  
 SCALE: 1" = 10'



**PROJECT NOTES:**

1. ±20' PROP. LANDWARD RETREAT OF EX. BULKHEAD WITH REMOVAL OF ±3,000 CY OF EX. BACKFILL TO BE RE-USED ONSITE AND/OR DISPOSED AT A SUITABLE UPLAND FACILITY; ±3,400 SF TO BE RESTORED TO LAND UNDER OCEAN AND MATCH BOTTOM DEPTH EL. OF EX./ AUTHORIZED NAVIGATIONAL CHANNEL DEPTH -3 FT MLW +1' O.D. ALONG FACE OF NEW BULKHEAD FENDER LINE.
2. DREDGING/EXCAVATION AND FILL ACTIVITIES ARE PROPOSED AS FOLLOWS:

<b>SUMMARY OF PROPOSED EXCAVATION/DREDGING &amp; FILLING ACTIVITIES</b>				
LOCATION	ACTIVITY	AREA (SF)	VOLUME (CY)	NOTES
NEW REPLACEMENT BULKHEAD WITH 20FT LANDWARD RETREAT; REMOVAL OF ±3,000 TOTAL CY OF EXISTING BACKFILL/HISTORIC DREDGE MAT'L FROM EX. GRADE EL 16.0' TO EL. -3.0' + 1' O.D to EL. -4.0' MLW (TO MATCH EX. NAVIGATION CHANNEL MAINT. DEPTH)	EXCAVATION (EX. GRADE TO MHW EL. 10')	±3,400	±620	TO BE BENEFICIALLY REUSED ON-SITE AND/OR DISPOSED AT SUITABLE UPLAND LOCATION BY CONTRACTOR AS AUTHORIZED BY MADEP
	DREDGING (MHW EL. 10' TO -4.0')		±2,380	
EX. (FAILED) TIMBER BULKHEAD TO REMAIN IN-PLACE AND OVERSHEETED BY PROP. NEW BULKHEAD	FILL (BELOW AHL EL. 12.1)	±210	±46	GRANULAR BACKFILL TO BE FILLED PLACED WITHIN ANNULAR SPACE (±18") BETWEEN EXISTING TIMBER AND NEW STEEL BULKHEADS
NEW 100-FT SIDEWALK EXTENSION	FILL (BELOW AHL EL. 12.1)	±236	±42	ALL NEW FILL MATERIAL CONSISTING OF GRANULAR SUB-BASE AND CONCRETE TO PLACED WITHIN EXISTING STONE REVETMENT FOOTPRINT

**LEGEND**

PROPERTY LINE (MA GIS)	
HISTORIC MEAN HIGH WATER (HMHW)	
FEMA FLOOD ZONE (MA GIS)	
MEAN LOW WATER (MLW)	
MEAN HIGH WATER (MHW)	
ANUAL HIGH TIDE LINE (AHTL)	
SALT MARSH (SURVEY)	
LIMIT OF NAVIGATIONAL CHANNEL	
FUEL LINE	
SHELLFISH SUITABILITY AREA (MA GIS)	

**DATUM OFFSETS (IN FEET)**

MLW	AHTL	NAVD88
12.1	AHTL	6.4
10.5	MHHW	4.8
10.0	MHW	4.3
5.7	NAVD88	0.0
0.0	MLW	5.7
-0.3	MLLW	-6.0

**DATUM SHIFT INFORMATION FROM NOAA STATION #8443970 EPOCH 1983-2001 TIDAL DATA AND VDATUM V4.1.2**

**PROJECT NOTES**

PROJECT DATUM IS BASED UPON MEAN LOW WATER (MLW).

PLAN ACCOMPANYING THE PETITION OF:  
THE TOWN OF ORLEANS, MASSACHUSETTS

SHEET 17 OF 18

DATE: NOVEMBER 11, 2022

TO RECONSTRUCT, EXPAND AND MAINTAIN  
COMMERCIAL WHARF FACILITY IN ROCK HARBOR  
113 ROCK HARBOR ROAD  
TOWN OF ORLEANS, MASSACHUSETTS  
  
BARNSTABLE COUNTY, MASSACHUSETTS



**GENERAL NOTES:**

1. RESULTS OF HYDROGRAPHIC & TOPOGRAPHIC SURVEY BY FOTH INFRASTRUCTURE & ENVIRONMENT, LLC. (FOTH) ON 10/24/2019 (HYDRO) , 10/25/2019, 4/2/2021, & 5/10/2022 (TOPO).
2. ELEVATIONS AND SOUNDINGS ARE IN FEET AND TENTHS, AND REFER TO THE MLW DATUM.
3. DATUM CONVERSIONS SHOWN WAS CALCULATED USING VDATUM 4.1.2 AT THE PROJECT SITE (LAT: -70.00566, LONG: 41.80346)
4. COORDINATES ARE BASED ON NAD83 MASSACHUSETTS MAINLAND STATE PLANE GRID SYSTEM.
5. PROJECT BENCHMARK IS DISK LOCATED AT ROUTE 6 ROTARY STAMPED "424 G" PUBLISHED EL. +18.94' MLW (+13.23' NAVD88).
6. SITE BENCHMARK IS DRILLHOLE IN CONC. SIDEWALK EL. +15.52' MLW (+9.81 NAVD88) (HELD)
7. RTK CORRECTIONS: RTK CORRECTIONS FOR THIS SURVEY PROVIDED BY KEYNET - VRS.
8. BENCHMARK / RTK TIDES: TIDES ARE RECORDED USING RTK TIDES IN HYPACK. ELEVATIONS FROM ELLIPSOID TO ORTHOMETRIC NAVD88 USE GEOID 12A.
9. PROJECT SITE IS IN FEMA ZONE VE 17 AND ZONE AE 14 NAVD88 IN ACCORDANCE TO FEMA FIRM #25001C0417J, EFFECTIVE DATE JULY 16, 2014.
10. PROPERTY LINES AND HISTORIC MEAN HIGH WATER REPRESENT THE LATEST FROM THE DATABASE INFORMATION BASED ON MA GIS AS OF MARCH 31, 2021.
11. THE INFORMATION DEPICTED ON THIS PLAN REPRESENTS THE RESULTS OF SURVEYS ON THE DATES SHOWN, AND CAN ONLY BE CONSIDERED AS INDICATING THE GENERAL CONDITIONS AT THAT TIME. INTERPOLATED INFORMATION FROM BETWEEN SOUNDING RUNS IS NOT GURANTEED. SHOALS, OBSTRUCTIONS OR OTHER DIFFERING CONDITIONS MAY EXIST BETWEEN THESE RUNS. CONSULT WITH FOTH INFRASTRUCTURE & ENVIRONMENT, LLC FOR MORE DETAILED INFORMATION.
12. POSSESSION AND USE OF THE MATERIAL CONTAINED ON THESE DRAWINGS IS GRANTED ONLY IN CONNECTION WITH ITS USE AS IT RELATES TO THE TITLED PROJECT, ANY OTHER USE, REPRODUCTION OR DISCLOSURE OF THE INFORMATION CONTAINED HEREON IS EXPRESSLY PROHIBITED WITHOUT THE WRITTEN CONSENT OF FOTH.

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**GENERAL NOTES**

PLAN ACCOMPANYING THE PETITION OF:  
THE TOWN OF ORLEANS, MASSACHUSETTS

TO RECONSTRUCT, EXPAND AND MAINTAIN  
COMMERCIAL WHARF FACILITY IN ROCK HARBOR  
113 ROCK HARBOR ROAD  
TOWN OF ORLEANS, MASSACHUSETTS

BARNSTABLE COUNTY, MASSACHUSETTS

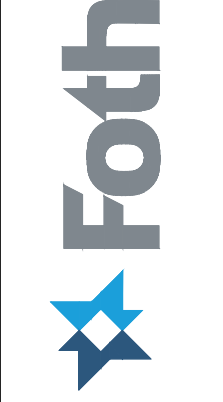
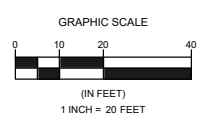
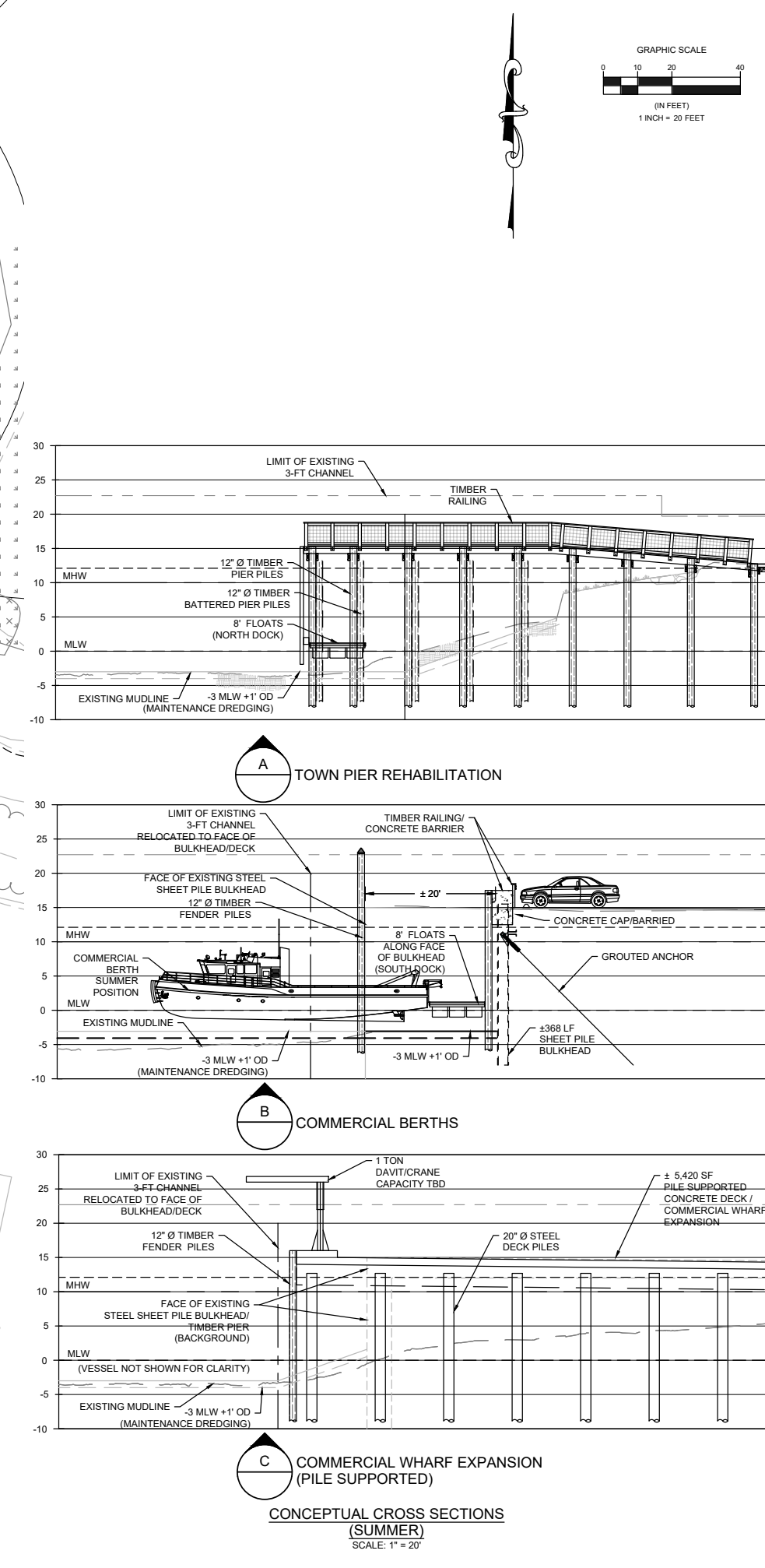
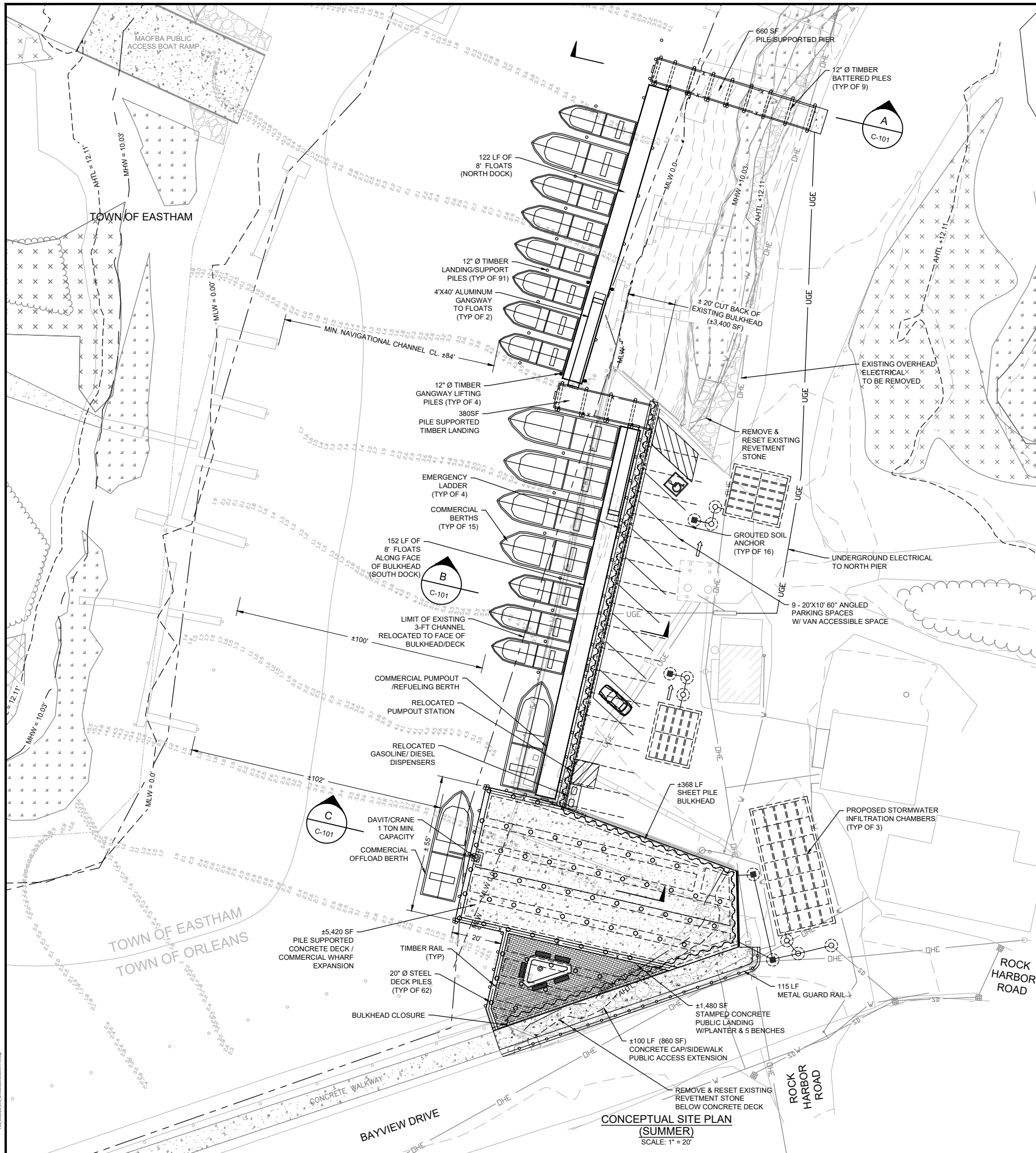
SHEET 18 OF 18

DATE: NOVEMBER 11, 2022





DRAFT - NOT FOR CONSTRUCTION



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**ROCK HARBOR  
COMMERCIAL WHARF  
IMPROVEMENTS**  
TOWN OF ORLEANS  
DEPARTMENT OF PUBLIC WORKS

REVISIONS		DESCRIPTION	DATE	BY
NO.	DATE	DESCRIPTION	BY	DATE
1	08/19/22	NOTICE OF INTENT SUBMITTAL	PSR	

DATE OF PREPARATION	
BY	DATE

**CONCEPTUAL  
SITE PLAN  
(SUMMER)**

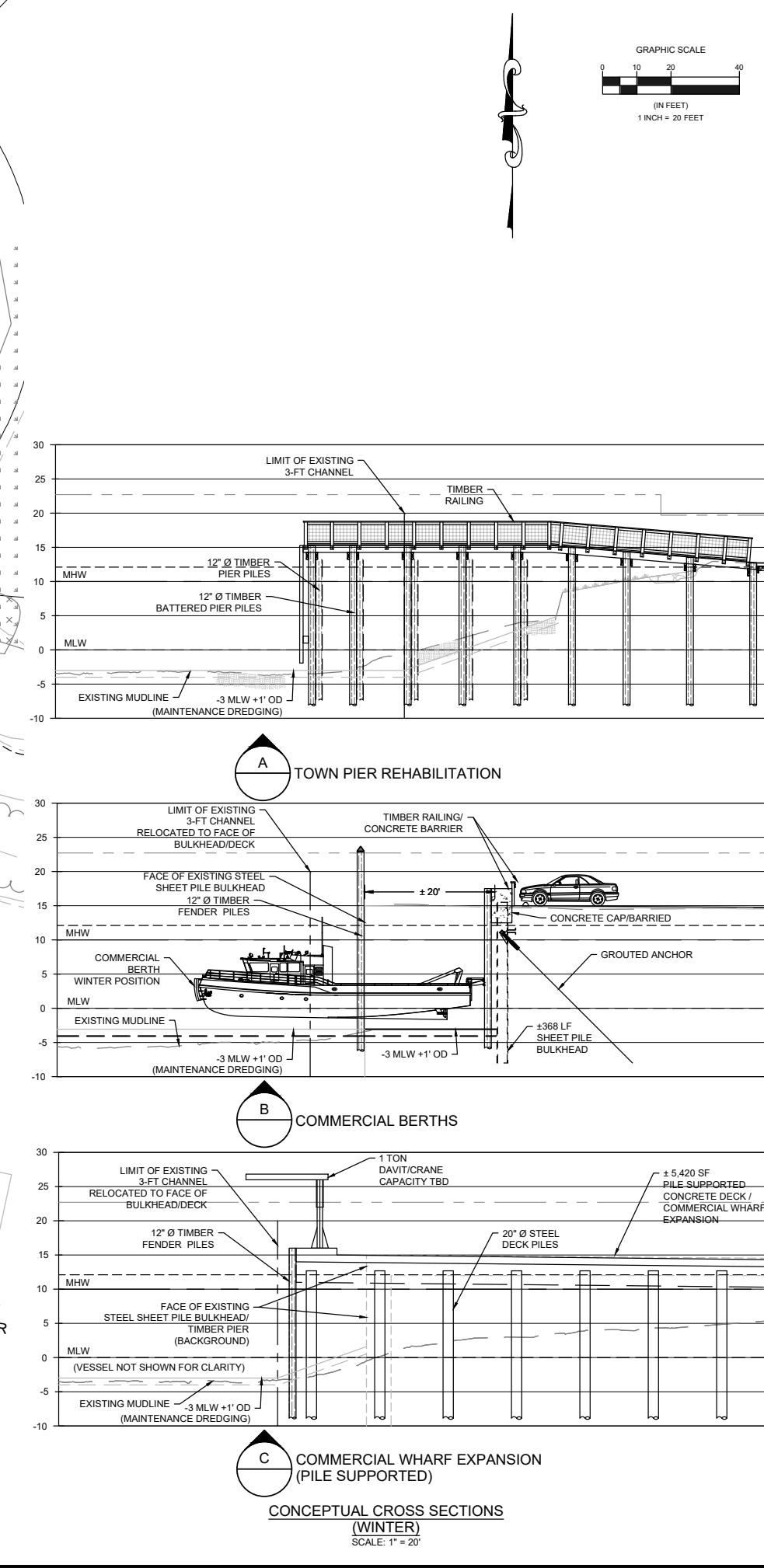
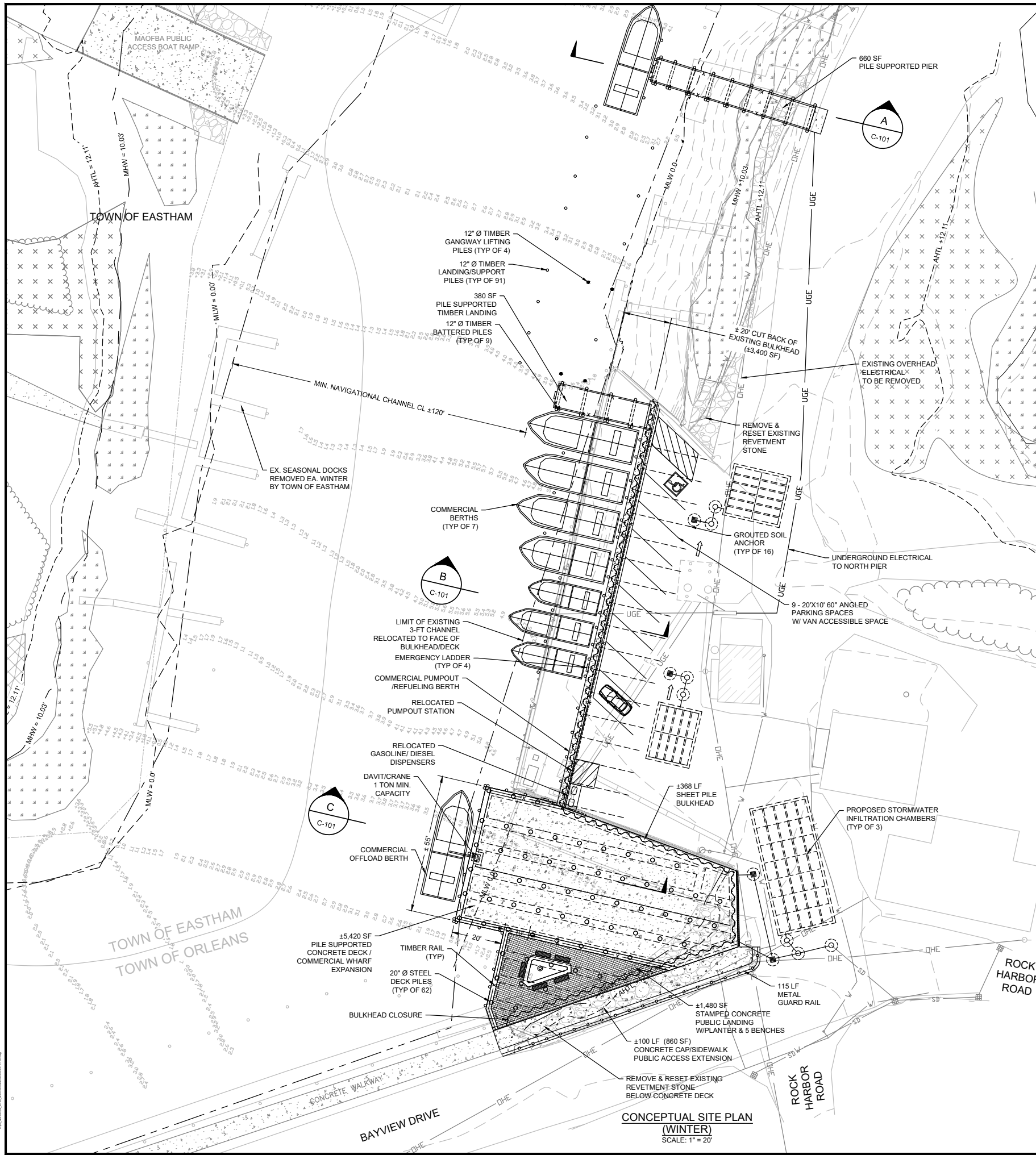
SURVEYED	
DRAWN	
DESIGNED	
CHECKED	

PROJECT NO: 190004.100  
SHEET NUMBER  
**C-101**

CONCEPTUAL SITE PLAN (SUMMER) SCALE: 1" = 20'

CONCEPTUAL CROSS SECTIONS (SUMMER) SCALE: 1" = 20'

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**ROCK HARBOR  
COMMERCIAL WHARF  
IMPROVEMENTS**  
**TOWN OF ORLEANS  
DEPARTMENT OF PUBLIC WORKS**

REVISIONS		DESCRIPTION		NOTICE OF INTENT SUBMITTAL	
NO.	DATE	BY	DATE	BY	DATE
1	08/19/22	PSR			

DATE OF PREPARATION	
BY	DATE

**CONCEPTUAL  
SITE PLAN  
(WINTER)**

PROJECT NO: 190004.100  
SHEET NUMBER  
**C-101a**

**MADEP CHAPTER 91 WATERWAYS**

License #WW01-0000211

Date Issued: 07/24/2023



Commonwealth of Massachusetts  
Executive Office of Energy & Environmental Affairs

## Department of Environmental Protection

Southeast Regional Office • 20 Riverside Drive, Lakeville MA 02347 • 508-946-2700

Maura T. Healey  
Governor

Kimberley Driscoll  
Lieutenant Governor

Rebecca L. Tepper  
Secretary

Bonnie Heiple  
Commissioner

**JUL 24 2023**

Town of Orleans  
c/o Foth Infrastructure & Environment, LLC  
Attn: Christine Player  
15 Creek Road  
Marion, MA 02738

**RE: ISSUANCE OF CHAPTER 91 WATERWAYS LICENSE**  
**Waterways License Application No. 22-WW01-0148-APP, License No. WW01-0000211**  
**Town of Orleans, Rock Harbor, 113 Rock Harbor Road, Orleans**

Dear Sir or Madam,

The Department of Environmental Protection hereby issues the above-referenced Waterways License, enclosed, authorizing you to perform certain activities pursuant to M.G.L. c. 91, the Public Waterfront Act and its regulations 310 CMR 9.00. Any change in use or alteration of any structure or fill not authorized by this license may render this license void.

This License is not final until all administrative appeal periods from this License have elapsed, or if such an appeal has been taken, until all proceedings before the Department have been completed. The appeal period is for twenty-one (21) days. No work shall be undertaken until the License has become final and has been recorded in the Registry of Deeds or the Land Court for the district in which the land is located, within the chain of title of the affected property

### **RECORDING OF THE LICENSE**

This License must be recorded at the Registry of Deeds or, if registered land, with the Land Registration Office within sixty (60) days from the date of license issuance. In the case of recorded land, the License shall also be noted in the Registry's Grantor Index under the name of the owner of the land upon which the project is located. In the case of the registered land, the License shall be noted on the Land Court Certificate of Title of the owner of the land upon which the project is located. **Failure to record this license within sixty (60) days of the date of issuance will render this license void pursuant to 310 CMR 9.18.**

Upon recording the License and Plan, you must notify the Department by accessing your Authorization record at <https://eplace.eea.mass.gov/citizenaccess> and entering the recording information. Instructions for entering recording information may be found at: <https://www.mass.gov/doc/eplace-waterways-recording-information-amendment/download>. Failure to notify the Department of the recording of this License is a violation of 310 CMR 9.00.

**REQUEST CERTIFICATE OF COMPLIANCE**

Pursuant to 310 CMR 9.19, once the proposed project is completed you must file a Request for a Certificate of Compliance form, BRP WW05, within sixty (60) days of completion but in no event later than five (5) years from the License's issuance date. The license for any project for which such a request is not filed and certificate issued may be revoked pursuant to 310 CMR 9.26.

**NOTICE OF APPEAL RIGHTS**

**Who has the right to appeal?**

The following persons shall have the right to an adjudicatory hearing concerning this decision by the Department to grant or deny a license or permit, in accordance with 310 CMR 9.17(1): (a) an applicant who has demonstrated property rights in the lands in question, or which is a public agency; (b) any person aggrieved by the decision of the Department to grant a license or permit who has submitted written comments within the public comment period; (c) ten (10) residents of the Commonwealth who, pursuant to M.G.L. c. 30A, § 10A, have submitted comments within the public comment period with at least 5 of the 10 residents residing in the municipality(s) in which the license or permitted activity is located. The appeal shall clearly and specifically state the facts and grounds for the appeal and the relief sought, and each appealing resident shall file an affidavit stating the intent to be part of the group and to be represented by its authorized representative; (d) the municipal official in the affected municipality who has submitted written comments within the public comment period; and (e) CZM, for any project identified in 310 CMR 9.13(2) (a) for CZM participation or, in an Ocean Sanctuary, if it has filed a notice of participation within the public comment period.

**How can I request an adjudicatory hearing?**

A person requesting an adjudicatory hearing must submit a "Notice of Claim" to the Department, with a copy of the MassDEP Transmittal Form and including the detail specified below, within twenty-one (21) days of the date of issuance of this decision. The MassDEP Fee Transmittal Form is available at the following website: <https://www.mass.gov/doc/adjudicatory-hearing-fee-transmittal-form/download>. The Notice of Claim must be made in writing and sent by certified mail or hand delivery to:

MassDEP Office of Appeals and Dispute Resolution  
Case Administrator  
100 Cambridge Street, Suite 900  
Boston, MA 02114

A copy of the complete Notice of Claim must be sent at the same time by certified mail or hand delivery to: (1) the applicant, (2) the municipal official of the city or town where the project is located, and (3) the issuing office of the MassDEP, which in this case is located at:

MassDEP Waterways Regulation Program  
20 Riverside Drive  
Lakeville, MA 02347

The MassDEP Fee Transmittal Form and a valid check payable to the Commonwealth of Massachusetts in the amount of one hundred dollars (\$100) must be mailed to:

**Waterways License Application No. 22-WW01-0148-APP, License No. WW01-0000211  
Town of Orleans, Rock Harbor, 113 Rock Harbor Road, Orleans**

Mass. Department of Environmental Protection  
Commonwealth Master Lockbox  
P.O. Box 4062  
Boston, Massachusetts 02211

What information must be included in the hearing request?

Pursuant to 310 CMR 9.17(3), any Notice of Claim requesting an adjudicatory hearing must include the following information:

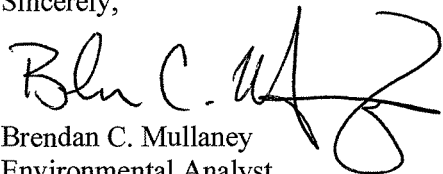
- (a) the MassDEP Waterways Application File Number;
- (b) the complete name, address, fax number and telephone number of the applicant;
- (c) the address of the project;
- (d) the complete name, address, fax number, and telephone number of the party filing the request and, if represented by counsel, the name, address, fax number, and phone number of the attorney;
- (e) if claiming to be a person aggrieved, the specific facts that demonstrate that the party satisfies the definition of "aggrieved person" found in 310 CMR 9.02;
- (f) a clear statement that a formal adjudicatory hearing is being requested;
- (g) a clear statement of the facts which are the grounds for the proceedings, the specific objections to the MassDEP's written decision, and the relief sought through the adjudicatory hearing, including specifically the changes desired in the final written decision; and
- (h) a statement that a copy of the request has been sent to: the applicant and the municipal official of the city or town where the project is located.

Dismissal of request

The request for appeal will be dismissed if the filing fee is not paid, unless the appellant is exempt or is granted a waiver. The filing fee is not required if the appellant is a city or town (or municipal agency), county, or district of the Commonwealth of Massachusetts, or a municipal housing authority. The Department may waive the adjudicatory hearing filing fee pursuant to 310 CMR 4.06(2) for a person who shows that paying the fee will create an undue financial hardship. A person seeking a waiver must file an affidavit setting forth the facts believed to support the claim of undue financial hardship together with the hearing request as provided above.

Please feel free to contact Cally Harper of the Wetlands and Waterways Program, (508) 946-2815 or [cally.harper@mass.gov](mailto:cally.harper@mass.gov), if you have any questions pertaining to the Chapter 91 License.

Sincerely,



Brendan C. Mullaney  
Environmental Analyst  
Wetlands and Waterways Program

cc: w/enc. Daniel J. Padien, Waterways Program Chief, DEP Boston  
Office of Coastal Zone Management  
Orleans Harbormaster  
Orleans Conservation Commission  
Tom Daley, Town of Orleans

# The Commonwealth of Massachusetts



No. WW01-0000211

**Whereas, Town of Orleans**

of -- Orleans -- in the County of -- Barnstable -- and Commonwealth aforesaid, has applied to the Department of Environmental Protection for license to -- construct and maintain piers, ramps, floats, and piles, an offloading deck with a crane, a public viewing platform, remove an existing stone revetment, an existing timber commercial pier and seasonal piers, ramps and floats, reconstruct and maintain a steel bulkhead landward of its existing location, and perform improvement dredging --

and has submitted plans of the same; and whereas due notice of said application, ~~and of the time and place fixed for a hearing thereon~~, has been given, as required by law, to the -- Board of Selectmen -- of the -- Town of Orleans. --

NOW, said Department, having heard all parties desiring to be heard, and having fully considered said application, hereby, subject to the approval of the Governor, authorizes and licenses the said

-- Town of Orleans --, subject to the provisions of the ninety-first chapter of the General Laws, and of all laws which are or may be in force applicable thereto, to -- -- construct and maintain piers, ramps, floats, and piles, an offloading deck with a crane, a public viewing platform, remove an existing stone revetment, an existing timber commercial pier and seasonal piers, ramps and floats, reconstruct and maintain a steel bulkhead landward of its existing location, and perform improvement dredging --

in and over the waters of -- Rock Harbor -- at -- 113 Rock Harbor Road -- in the -- Town of Orleans -- and in accordance with the locations shown and details indicated on the accompanying DEP License Plan No. WW01-0000211 (19 sheets).

The structures hereby authorized shall be limited to the following use(s): to provide public recreational/commercial boating facility as defined in 310 CMR 9.02, public access to waterfront open space for passive recreational purposes and shoreline stabilization for the protection of existing and proposed structures.

This license is issued for an unlimited term in accordance with 310 CMR 9.15(1)(c).

Existing structures and fill previously authorized under Massachusetts Department of Public Works License Nos. 1394, 1932 and Contract Nos. 1867, 2140, and 2717, Department of Environmental Quality Engineering License No. 362, Department of Environmental Protection License No's. 7262 and 7318 shall be maintained in accordance with the terms and conditions of said licenses and plans.

Special Waterways Conditions:

1. In accordance with any license condition, easement, or other public right of lateral passage that exists in the area of the subject property lying between the high and low water marks, the Licensee shall allow the public in the exercise of such rights to pass freely over, under or around all structures within such intertidal area. Nothing in this condition shall be construed as preventing the Licensee from excluding the public from portions of said structure(s) or property not intended for lateral passage.
2. In partial compensation for use of structures on tidelands of the Commonwealth, which interferes with the rights of the public to use such lands, the Licensee shall allow the public to pass on foot, for any purpose and from dawn to dusk, within the area of the subject property lying seaward of the high water mark. This condition shall not be construed to prevent the Licensee from taking reasonable measures to discourage unlawful activities by users of the area(s) intended for public passage, including but not limited to trespassing on the adjacent private areas and deposit of refuse of any kind or nature in the water or on the shore. Further, the exercise by the public of free on-foot passage in accordance with this condition shall be considered a permitted use to which the limited liability provisions of M.G.L. c.21, s.17c apply.
3. Any berth authorized herein shall be assigned in a fair and equitable manner to the public patrons of said facility, via waiting list or other appropriate, unbiased means. The Licensee may assign any berth authorized herein based upon vessel characteristics.
4. Any contract or other agreement for the exclusive use of berths authorized herein shall have a maximum term of one (1) year and may be renewable upon expiration on an annual basis.
5. Any berth authorized herein shall be made available for transient use during periods of vacancy in excess of 24 hours.
6. The Licensee shall impose no limitations on the hours or availability of the public access provisions described in Special Waterways License Conditions 1 and 2, except as indicated therein.
7. The use of unencapsulated polystyrene as part of any permanent or temporary component of the structures and/or fill authorized herein is prohibited.
8. All exterior pedestrian facilities on the project site shall be open to the general public, except where access restrictions are necessary in order to avoid significant interference with the operation of the facility or to maintain security at the pier, ramps and floats and other dock facilities.



SPECIAL WATERWAYS CONDITIONS: (continued)

9. The Licensee may adopt reasonable rules governing the publicly accessible areas of the site, subject to review and written approval by the Department, as are necessary for the protection of public health and safety and private property, and to ensure public use and enjoyment.

10. The Licensee shall provide a sewage disposal system for the pump-out of sanitation devices on recreational and commercial boating vessels. This system shall be available for the use by marina patrons, transient boaters and general public boaters for no charge or for a fee sufficient only to cover the cost of the operating and maintaining said system. Signage indicating the availability of the pump-out system shall be clearly visible to all marina patrons and other boaters. The marina shall actively promote the use of this system by marina patrons and other boaters.

11. All work authorized herein shall be completed within five (5) years of the date of license issuance. Said construction period may be extended by the Department for one or more one year periods without public notice, provided that the Applicant submits to the Department, thirty (30) days prior to the expiration of said construction period, a written request to extend the period and provides an adequate justification for said extension.

12. Within sixty (60) days of completion of the licensed project, the Licensee shall request, in writing, that the Department issue a Certificate of Compliance in accordance with 310 CMR 9.19. The request shall be accompanied by a certification by a registered professional engineer licensed in the Commonwealth that the project was completed in accordance with the License.

Special Dredge Conditions:

1. Dredging shall be performed by mechanical methods.
2. Dredging shall be to a maximum of 3.0 feet below the MLW datum with an allowable 1-foot over dredge. The volume of dredge material shall not exceed 3,000 cubic yards during any dredge event.
3. The Licensee shall comply with all conditions of the 401 Water Quality Certification, 22-WW08-0018-APP associated with this project issued on 6/9/23.
4. All in-water activities shall be prohibited from February 1<sup>st</sup> to June 30<sup>th</sup> of any year to protect the sensitive life stages of the winter flounder spawning and development. Work may be possible within this time of year (TOY) restriction period if adequate containment structures are installed outside the TOY period.
5. Dredge material shall be dewatered on-site and if suitable, beneficially reused on site above MHW and/or transported to an approved upland site or Massachusetts landfill for beneficial reuse or disposal.
6. Improvement dredging may be performed for a period of ten (10) years subsequent to the date of issuance of this license.
7. After completion of the work authorized, the Licensee shall furnish to the Department a suitable plan showing the depths at mean low water over the area dredged within 90 days of completion of dredging.

Duplicate of said plan, number WW01-0000211 is on file in the office of said Department, and original of said plan accompanies this License, and is to be referred to as a part hereof.

## STANDARD WATERWAYS LICENSE CONDITIONS

1. Acceptance of this Waterways License shall constitute an agreement by the Licensee to conform with all terms and conditions stated herein.
  2. This License is granted upon the express condition that any and all other applicable authorizations necessitated due to the provisions hereof shall be secured by the Licensee prior to the commencement of any activity or use authorized pursuant to this License.
  3. Any change in use or any substantial structural alteration of any structure or fill authorized herein shall require the issuance by the Department of a new Waterways License in accordance with the provisions and procedures established in Chapter 91 of the Massachusetts General Laws. Any unauthorized substantial change in use or unauthorized substantial structural alteration of any structure or fill authorized herein shall render this Waterways License void.
  4. This Waterways License shall be revocable by the Department for noncompliance with the terms and conditions set forth herein. This license may be revoked after the Department has given written notice of the alleged noncompliance to the Licensee and those persons who have filed a written request for such notice with the Department and afforded them a reasonable opportunity to correct said noncompliance. Failure to correct said noncompliance after the issuance of a written notice by the Department shall render this Waterways License void and the Commonwealth may proceed to remove or cause removal of any structure or fill authorized herein at the expense of the Licensee, its successors and assigns as an unauthorized and unlawful structure and/or fill.
  5. The structures and/or fill authorized herein shall be maintained in good repair and in accordance with the terms and conditions stated herein and the details indicated on the accompanying license plans.
  6. Nothing in this Waterways License shall be construed as authorizing encroachment in, on or over property not owned or controlled by the Licensee, except with the written consent of the owner or owners thereof.
  7. This Waterways License is granted subject to all applicable Federal, State, County, and Municipal laws, ordinances and regulations including but not limited to a valid final Order of Conditions issued pursuant to the Wetlands Protection Act, G.L. Chapter 131, s.40.
  8. This Waterways License is granted upon the express condition that the use of the structures and/or fill authorized hereby shall be in strict conformance with all applicable requirements and authorizations of the MassDEP.
  9. This License authorizes structure(s) and/or fill on:
    - Private Tidelands. In accordance with the public easement that exists by law on private tidelands, the licensee shall allow the public to use and to pass freely upon the area of the subject property lying between the high and low water marks, for the purposes of fishing, fowling, navigation, and the natural derivatives thereof.
    - Commonwealth Tidelands. The Licensee shall not restrict the public's right to use and to pass freely, for any lawful purpose, upon lands lying seaward of the low water mark. Said lands are held in trust by the Commonwealth for the benefit of the public.
    - a Great Pond of the Commonwealth. The Licensee shall not restrict the public's right to use and to pass freely upon lands lying seaward of the high water mark for any lawful purpose.
    - Navigable River and Streams. The Licensee shall not restrict the public's right to use and to pass freely, for any lawful purpose, in the waterway.
- No restriction on the exercise of these public rights shall be imposed unless otherwise expressly provided in this license.
10. Unless otherwise expressly provided by this license, the licensee shall not limit the hours of availability of any areas of the subject property designated for public passage, nor place any gates, fences, or other structures on such areas in a manner that would impede or discourage the free flow of pedestrian movement thereon.

The amount of tide-water displaced by the work hereby authorized has been ascertained by said Department, and compensation thereof has been made by the said -- Town of Orleans -- by paying into the Treasury of the Commonwealth -- zero dollars and zero cents (\$ 0.00) -- for each cubic yard so displaced, being the amount hereby assessed by said Department.

Nothing in this License shall be so construed as to impair the legal rights of any person.

This License shall be void unless the same and the accompanying plan are recorded within 60 days from the date hereof, in the Registry of Deeds for the County of Barnstable.

IN WITNESS WHEREAS, said Department of Environmental Protection have hereunto set their hands this 24<sup>th</sup> day of July in the year two thousand twenty-three.

for Program Chief Blair C. [Signature]

Department of Environmental Protection

Commissioner [Signature]

THE COMMONWEALTH OF MASSACHUSETTS

This license is approved in consideration of the payment into the treasury of the Commonwealth by-the said -- Town of Orleans --

of the further sum of -- zero dollars and zero cents (\$0.00) --

the amount determined by the Governor as a just and equitable charge for rights and privileges hereby granted in the land of the Commonwealth.

BOSTON,

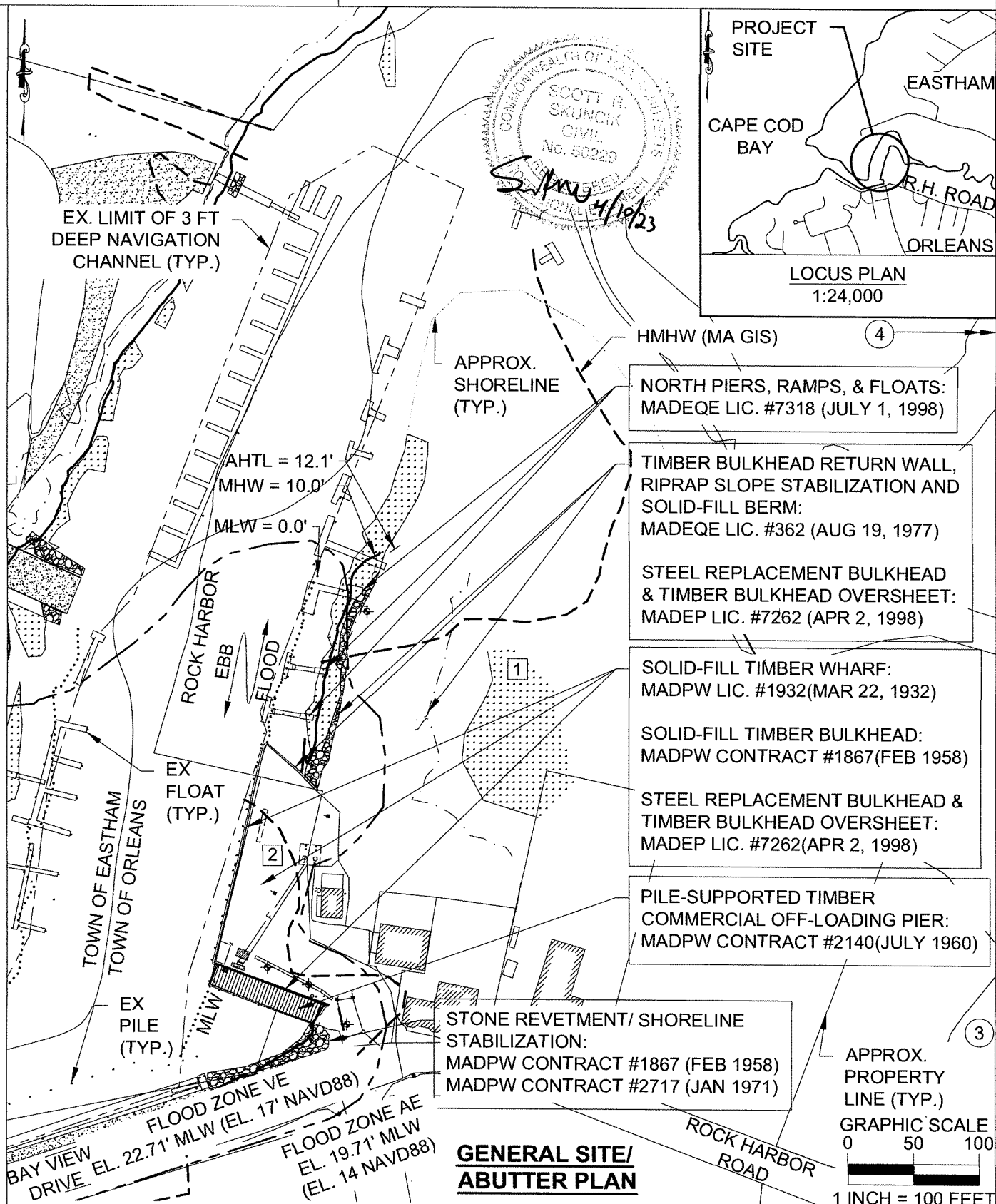
Approved by the Governor.

[Signature]  
Governor

GENERAL LAW 36 SECTION 13-A

I CERTIFY THAT THIS PLAN CONFORMS WITH THE RULES AND REGULATIONS OF THE REGISTERS OF DEEDS.

*Scott P Skunck 4/10/23*



**GENERAL SITE/  
ABUTTER PLAN**

SHEET 1 OF 19

DATE: AUGUST 26, 2022

(SEE SHEET 2 FOR PROPERTY OWNERS/ABUTTERS LIST, LEGEND & DATUM INFORMATION)

PLAN ACCOMPANYING THE PETITION OF:  
THE TOWN OF ORLEANS, MASSACHUSETTS  
TO RECONSTRUCT, EXPAND AND MAINTAIN  
COMMERCIAL WHARF FACILITY IN ROCK HARBOR  
113 ROCK HARBOR ROAD  
TOWN OF ORLEANS, MASSACHUSETTS  
BARNSTABLE COUNTY, MASSACHUSETTS

LICENSE PLAN NO. WW01-0000211

Approved by Department of Environmental Protection of  
Massachusetts

JUL 24 2023

*Blair C. Skunck*  
*Skunck*



GENERAL LAW 36 SECTION 13-A

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*Scott R Skunick* 4/10/23

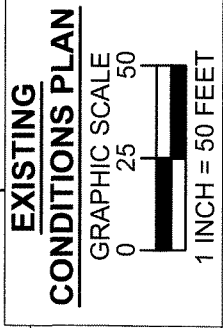
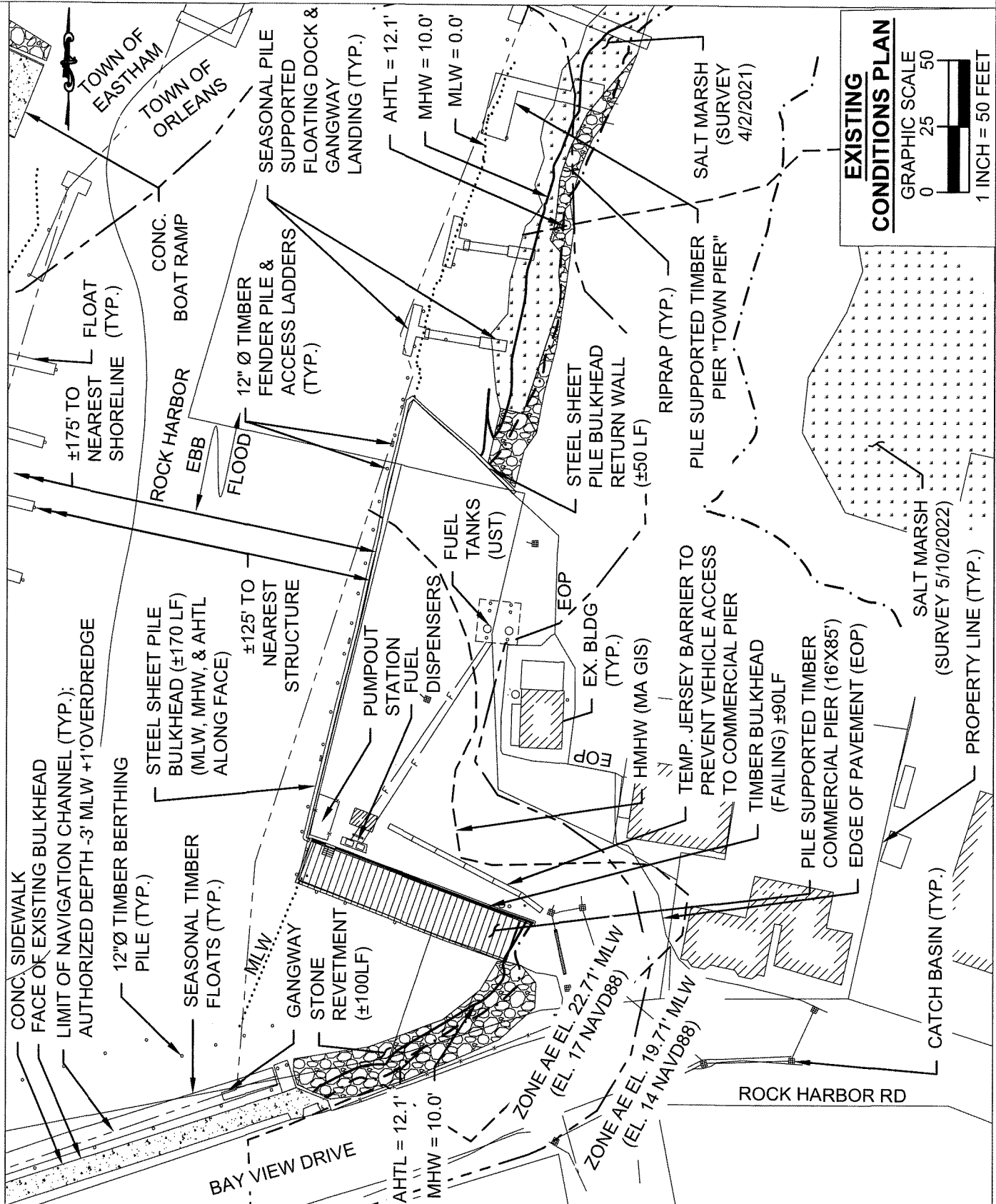
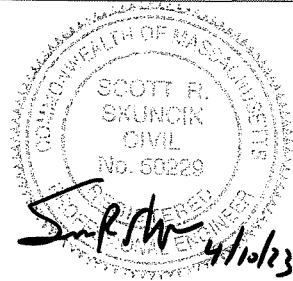
LICENSE PLAN NO. WW01-0000211  
Approved by Department of Environmental Protection

Date: JUL 24 2023

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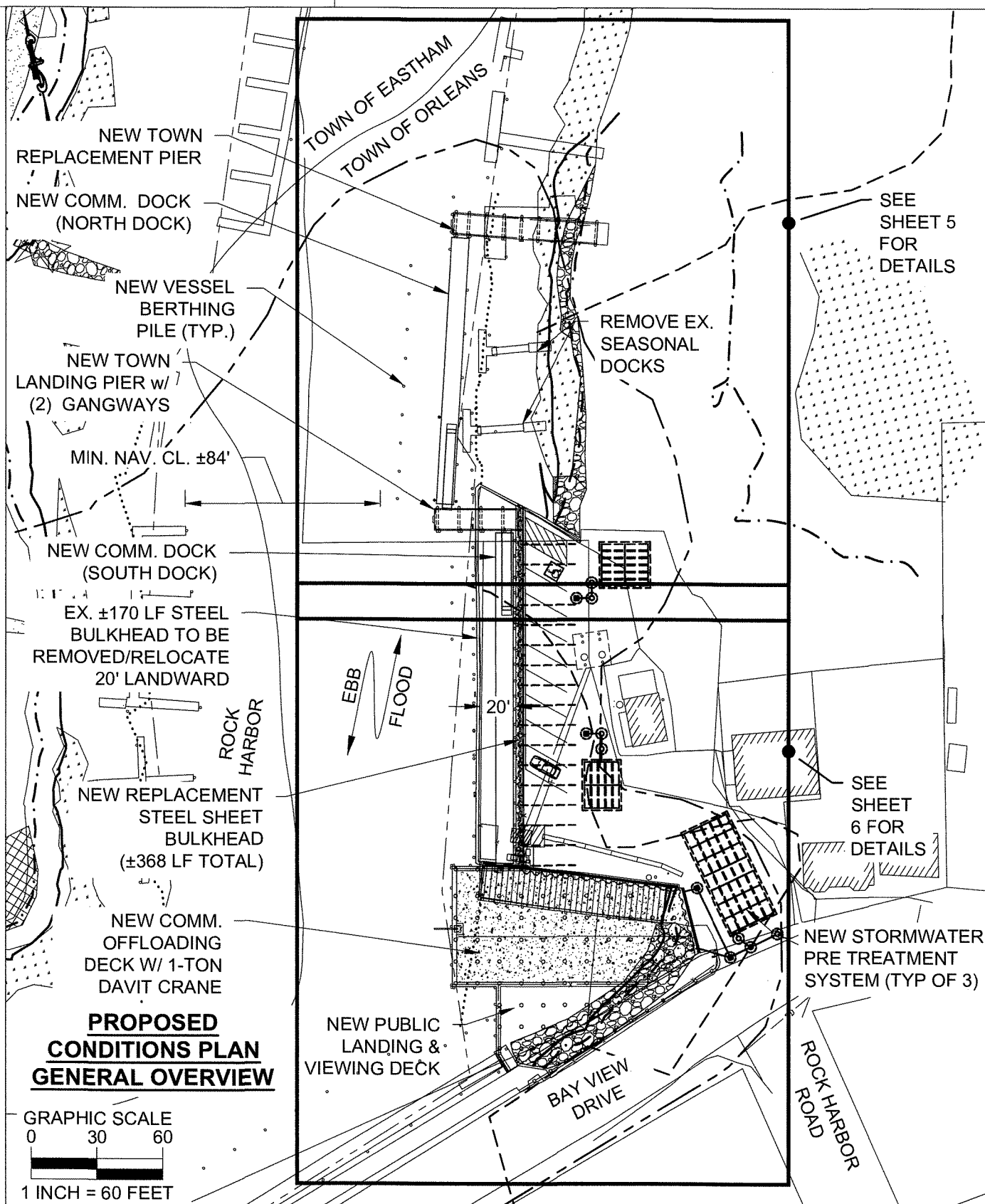


EXISTING  
CONDITIONS PLAN

GENERAL LAW 36 SECTION 13-A

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*Scott & Shur 4/10/23*



**PROPOSED  
CONDITIONS PLAN  
GENERAL OVERVIEW**

GRAPHIC SCALE  
0 30 60  
1 INCH = 60 FEET

LICENSE PLAN NO. JW01-0000211  
Approved by Department of Environmental Protection  
Date: JUL 24 2023

PLAN ACCOMPANYING THE PETITION OF:  
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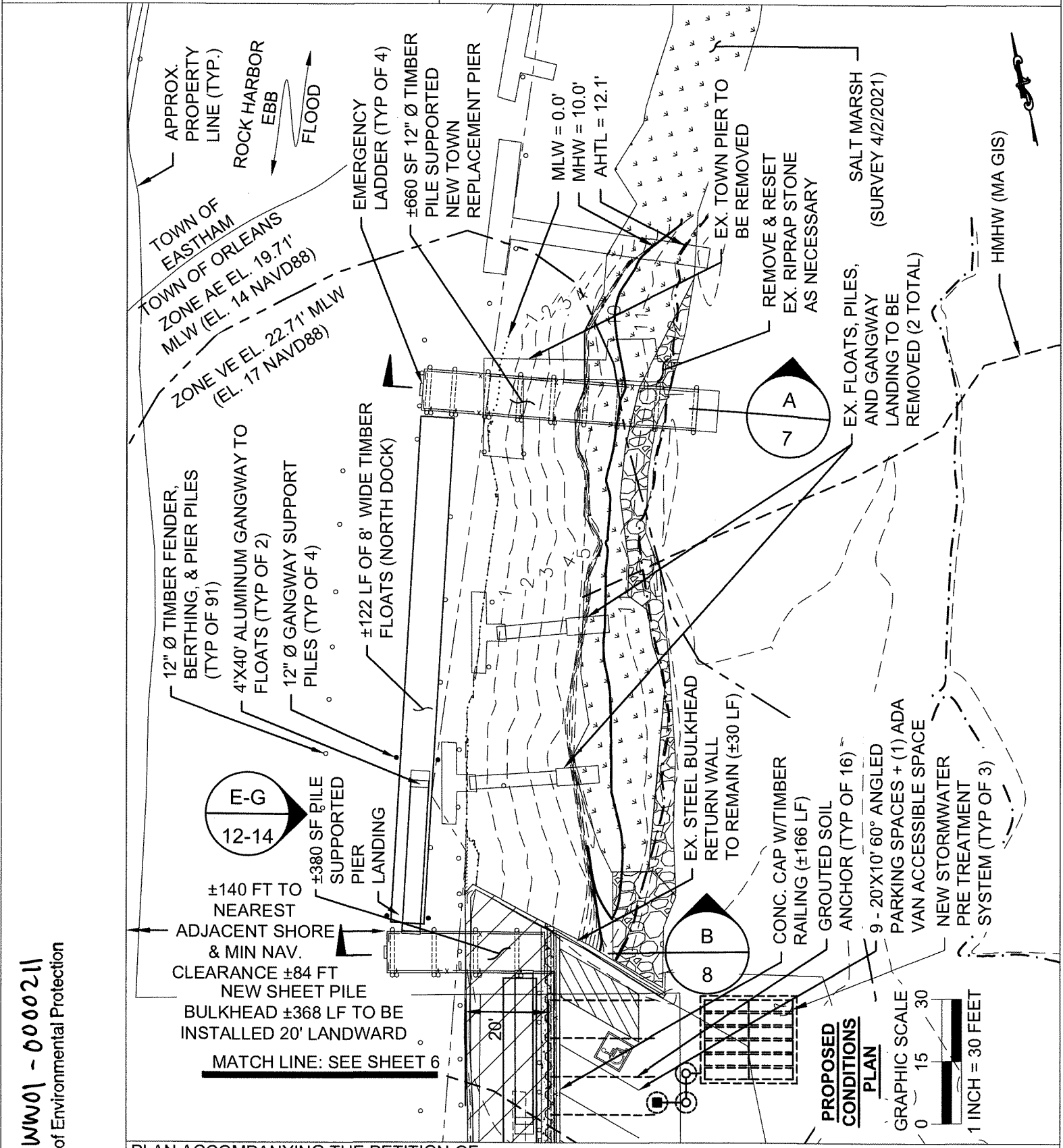
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GENERAL LAW 36 SECTION 13-A

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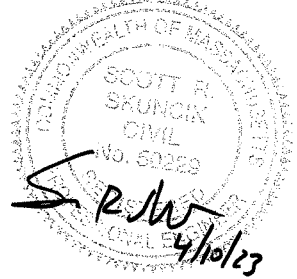
*Scott R Skunick* 4/10/23



LICENSE PLAN NO. **WW01 - 0000211**  
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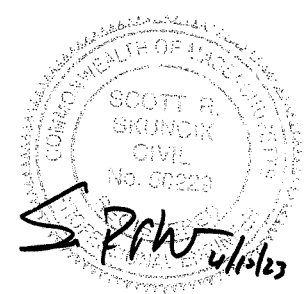


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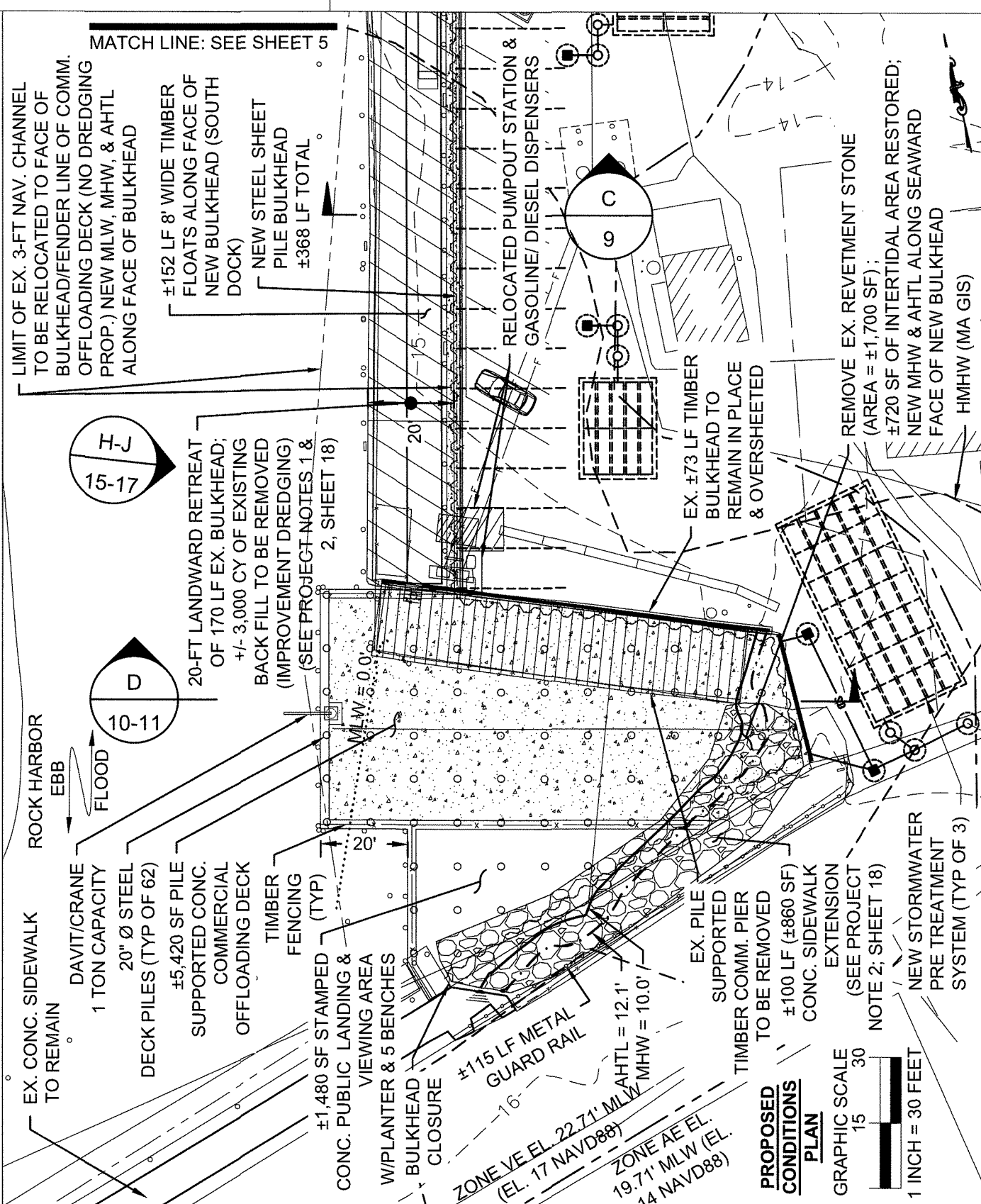
BARNSTABLE COUNTY, MASSACHUSETTS



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*Scott R Skundick 4/10/23*

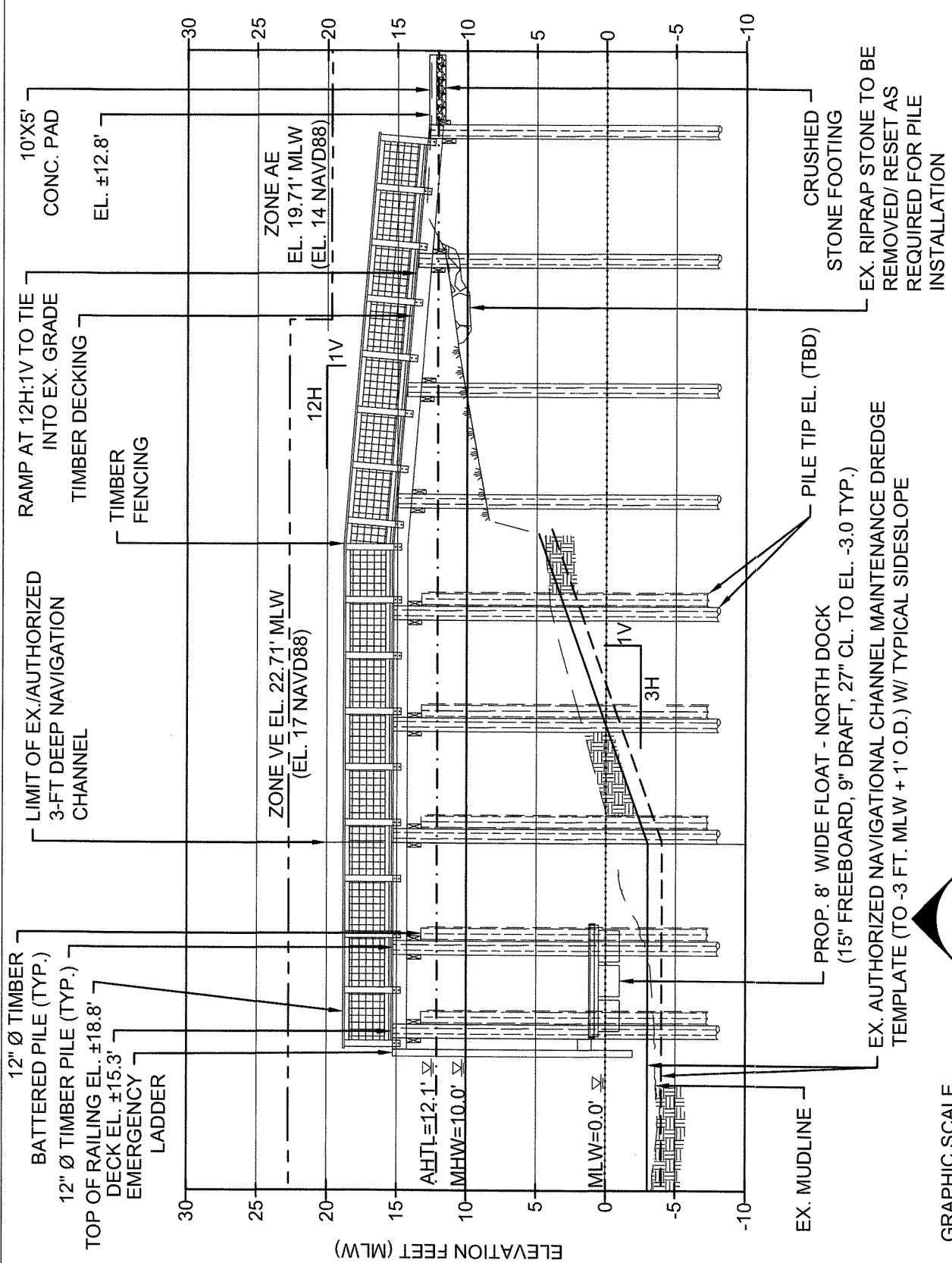


LICENSE PLAN NO. WW61-0000211  
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GENERAL LAW 36 SECTION 13-A

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*SA RSW 4/10/23*

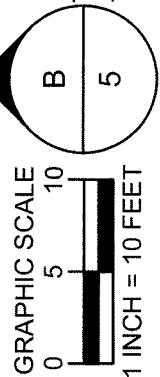
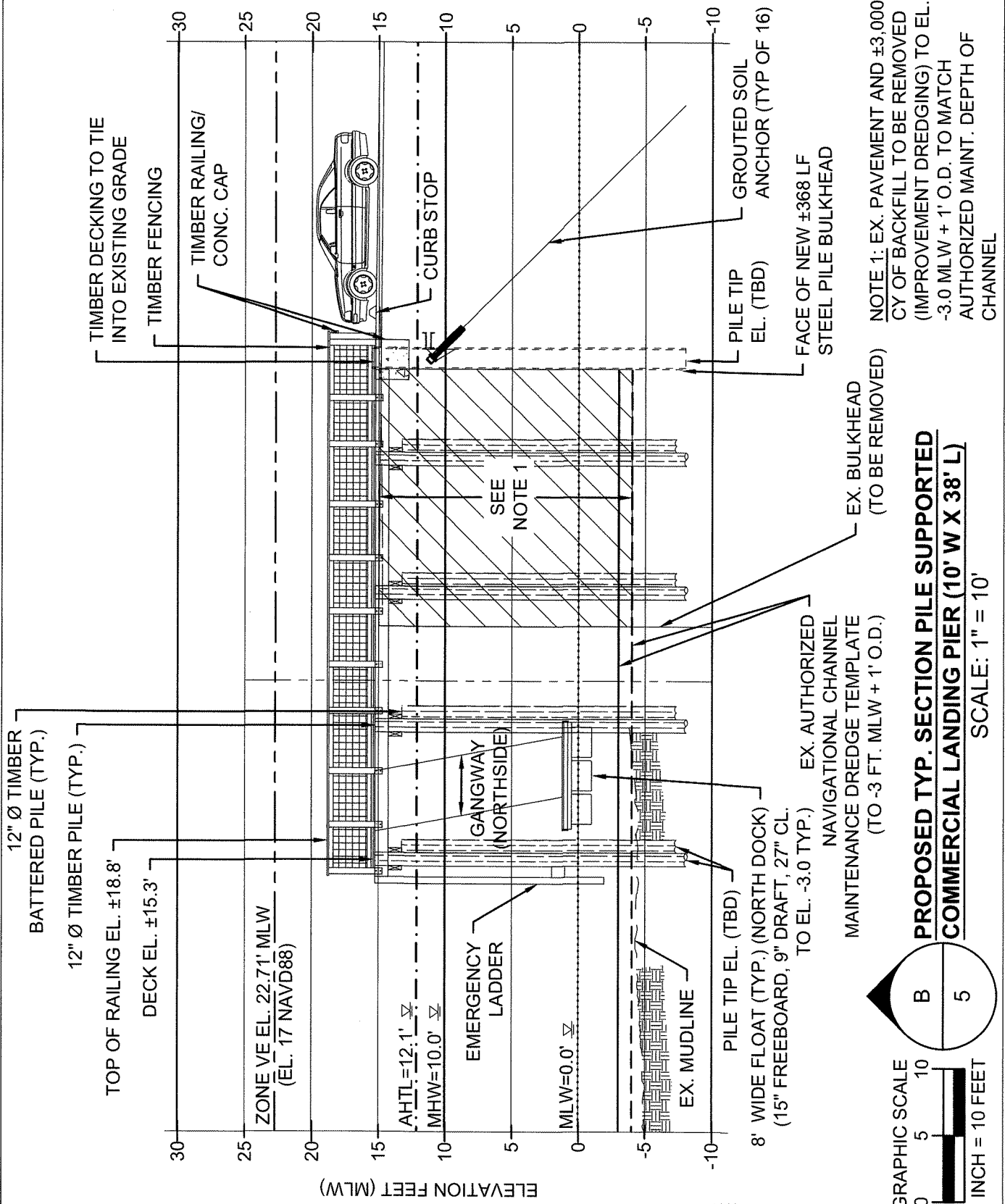


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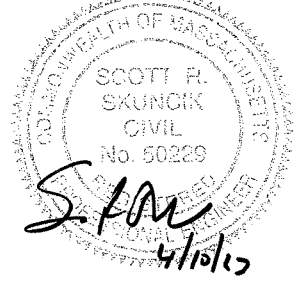
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BARNSTABLE COUNTY, MASSACHUSETTS



PROPOSED TYP. SECTION PILE SUPPORTED  
 COMMERCIAL LANDING PIER (10' W X 38' L)  
 SCALE: 1" = 10'



GENERAL LAW 36 SECTION 13-A

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*Scott R Skunck 4/10/23*

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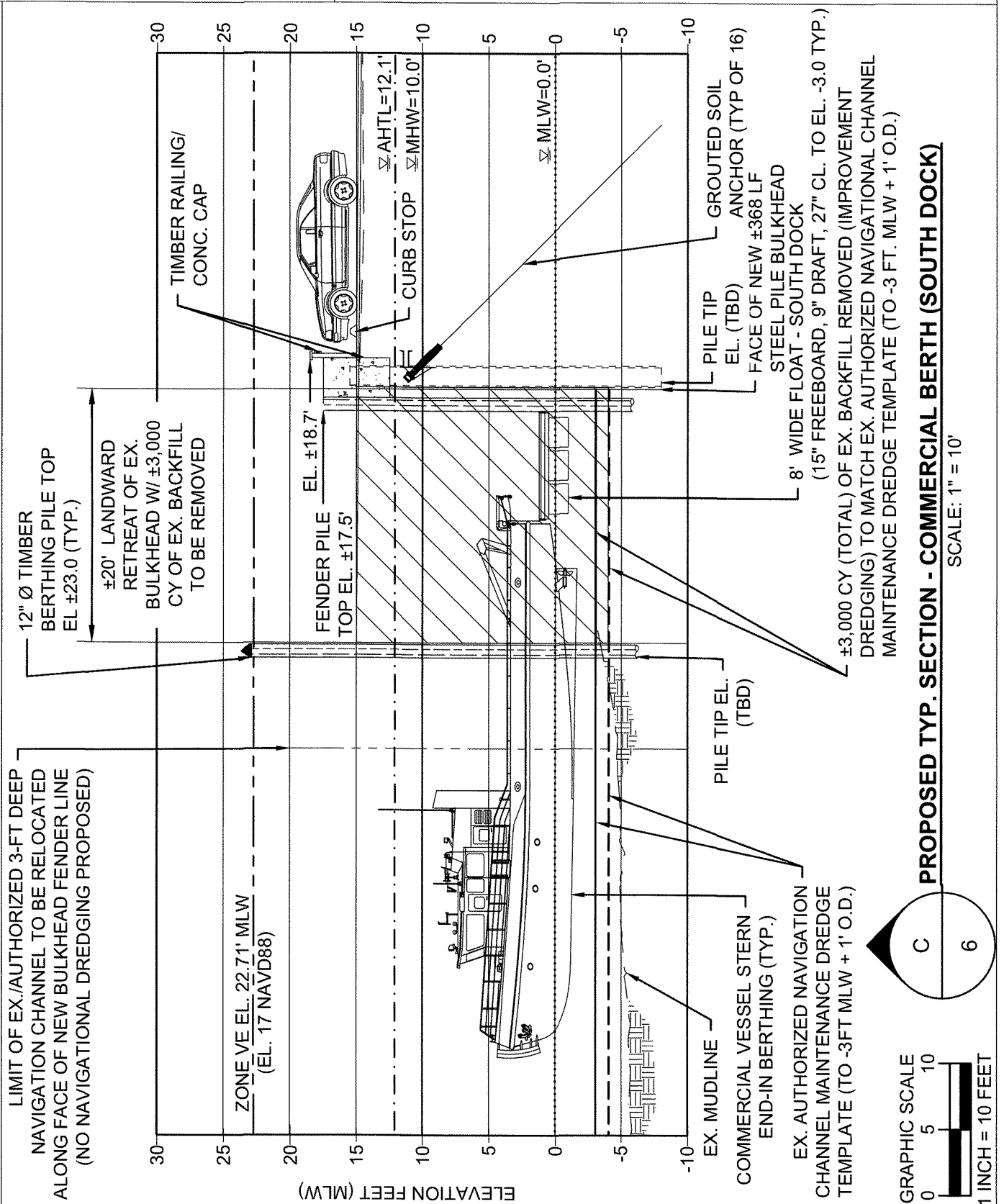
BARNSTABLE COUNTY, MASSACHUSETTS



GENERAL LAW 36 SECTION 13-A

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*Scott R Skirnoch 4/10/23*



LICENSE PLAN NO. **WW01-0000211**

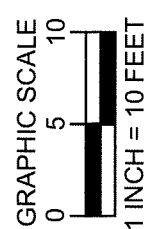
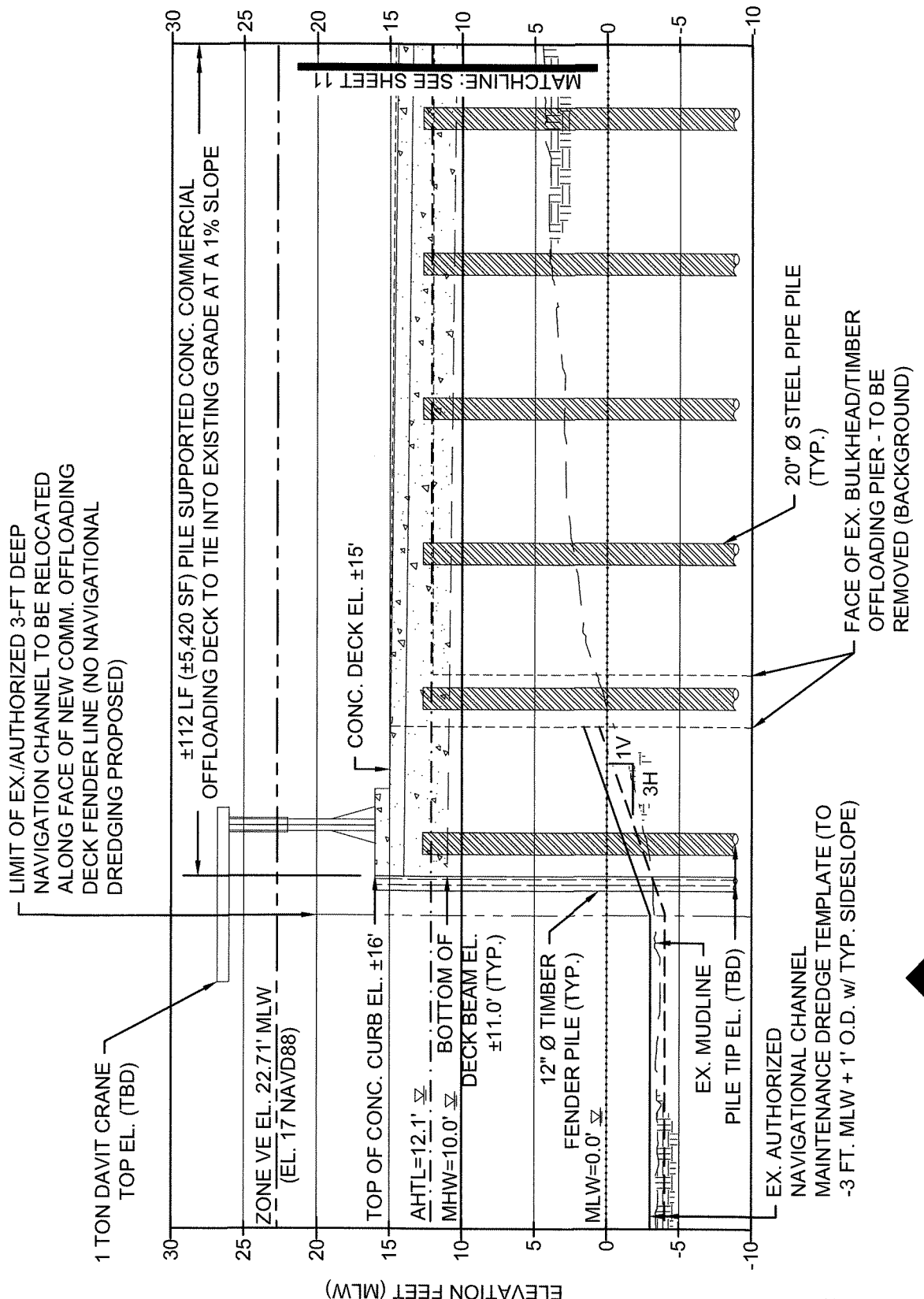
Approved by Department of Environmental Protection

Date: **JUL 24 2023**

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BARNSTABLE COUNTY, MASSACHUSETTS



**PROPOSED TYP. SECTION - PILE SUPPORTED CONCRETE COMMERCIAL OFFLOADING DECK**  
SCALE: 1" = 10'

GENERAL LAW 36 SECTION 13-A

I CERTIFY THAT THIS PLAN CONFORMS WITH THE RULES AND REGULATIONS OF THE REGISTERS OF DEEDS.

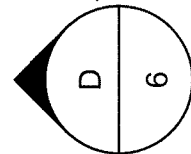
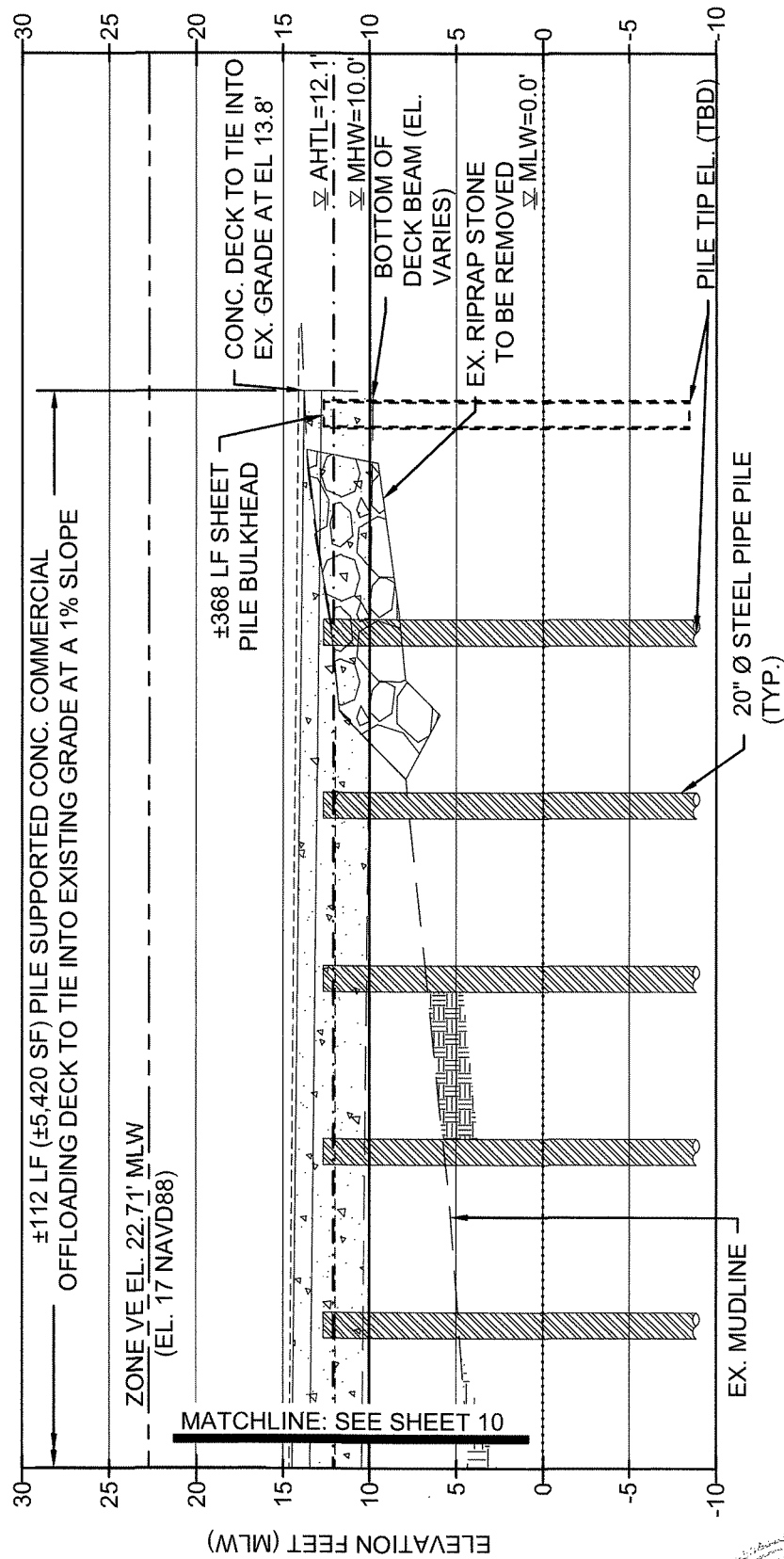
*Scott R Skunciak 4/10/23*

LICENSE PLAN NO. **WV61-0000211**  
 Approved by Department of Environmental Protection  
 Date: **JUL 24 2023**

PLAN ACCOMPANYING THE PETITION OF:  
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BARNSTABLE COUNTY, MASSACHUSETTS



**PROPOSED TYPICAL SECTION - PILE SUPPORTED CONCRETE  
 COMMERCIAL OFFLOADING DECK (CONT'D)**  
 SCALE: 1" = 10'

GENERAL LAW 36 SECTION 13-A

I CERTIFY THAT THIS PLAN CONFORMS WITH THE RULES  
 AND REGULATIONS OF THE REGISTERS OF DEEDS.

*Scott R. Skunok* 4/10/23

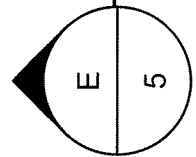
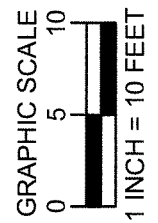
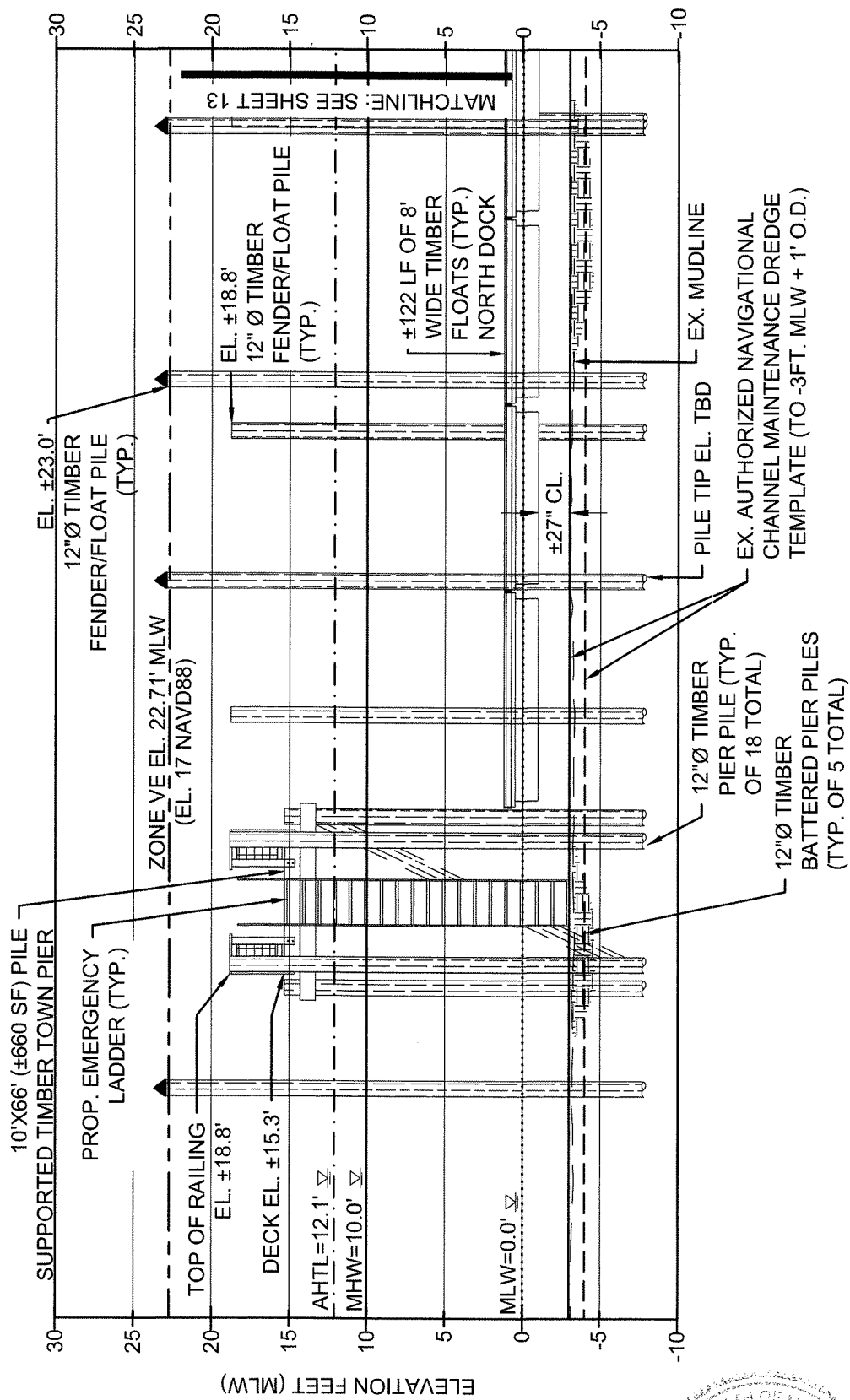


LICENSE PLAN NO. **WJW01-0000211**  
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PLAN ACCOMPANYING THE PETITION OF:  
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BARNSTABLE COUNTY, MASSACHUSETTS

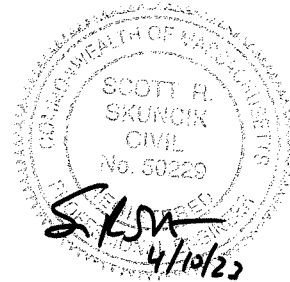


**PROPOSED ELEVATION VIEW**  
 SCALE: 1" = 10'

GENERAL LAW 36 SECTION 13-A

I CERTIFY THAT THIS PLAN CONFORMS WITH THE RULES  
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*S. P. SW 4/10/23*

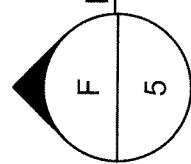
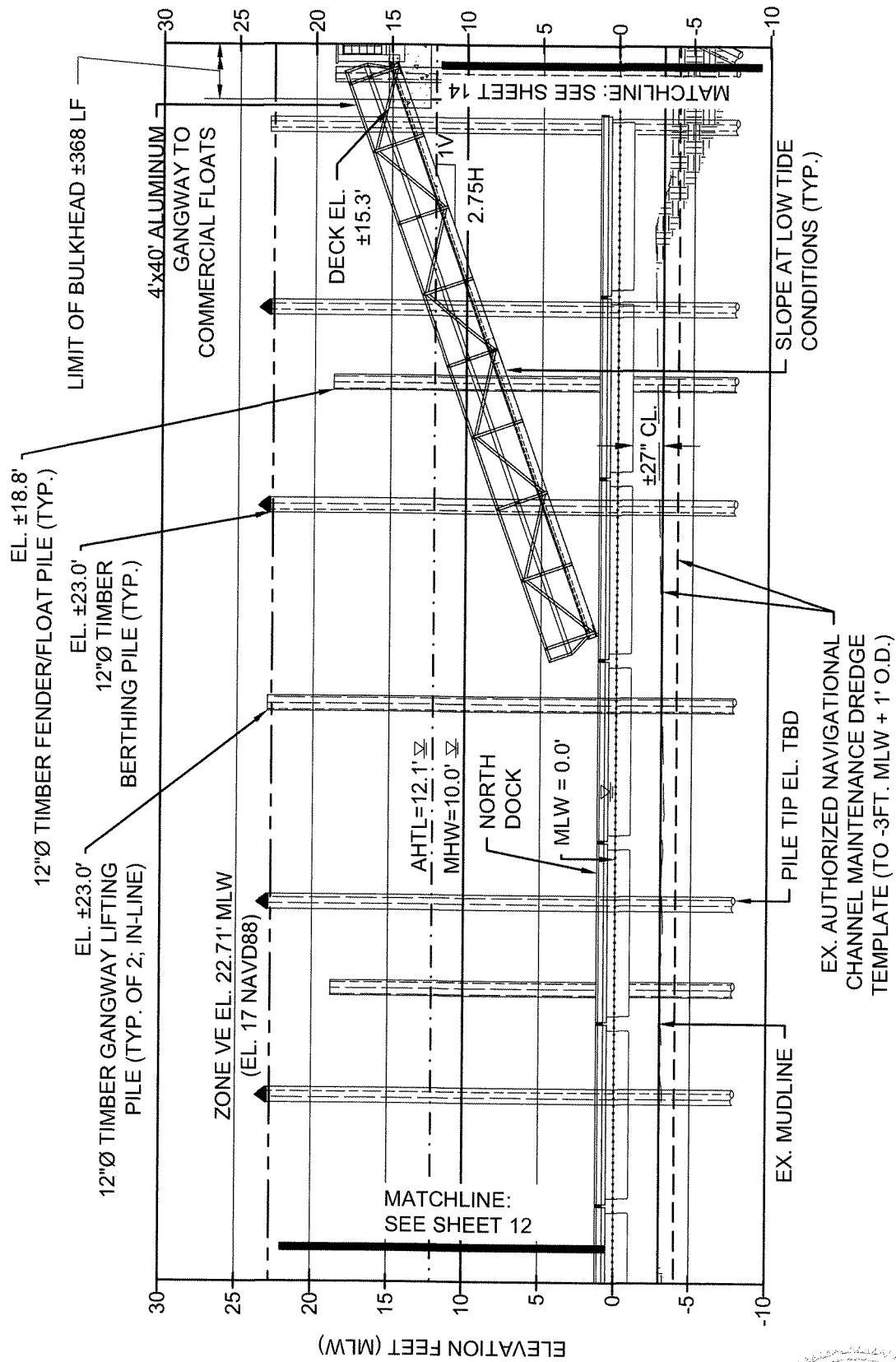


LICENSE PLAN NO. **WW01-0000 Z11**  
 Approved by Department of Environmental Protection  
 Date: **JUL 24 2023**

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BARNSTABLE COUNTY, MASSACHUSETTS



**PROPOSED ELEVATION VIEW (CONT'D)**  
 SCALE: 1" = 10'

GENERAL LAW 36 SECTION 13-A

I CERTIFY THAT THIS PLAN CONFORMS WITH THE RULES  
 AND REGULATIONS OF THE REGISTERS OF DEEDS.

*Scott R Skunk* 4/10/23





LICENSE PLAN NO. W W 01-0000 Z11  
 Approved by Department of Environmental Protection  
 Date JUL 24 2023

PLAN ACCOMPANYING THE PETITION OF:  
 THE TOWN OF ORLEANS, MASSACHUSETTS

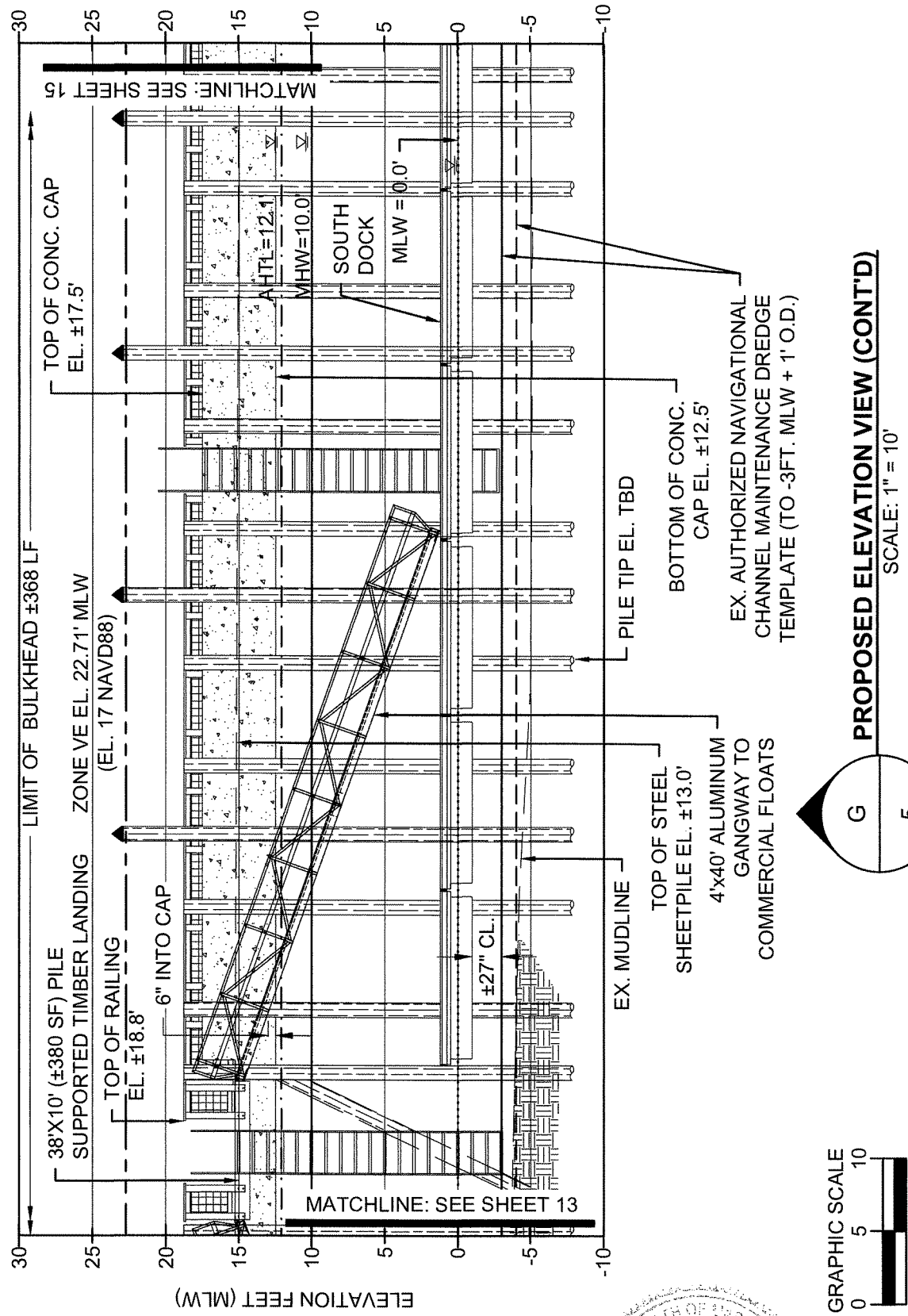
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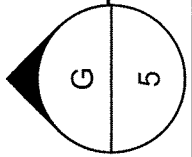
GENERAL LAW 36 SECTION 13-A

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*Sc R Sw 4/10/23*



**PROPOSED ELEVATION VIEW (CONT'D)**  
 SCALE: 1" = 10'

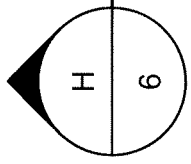
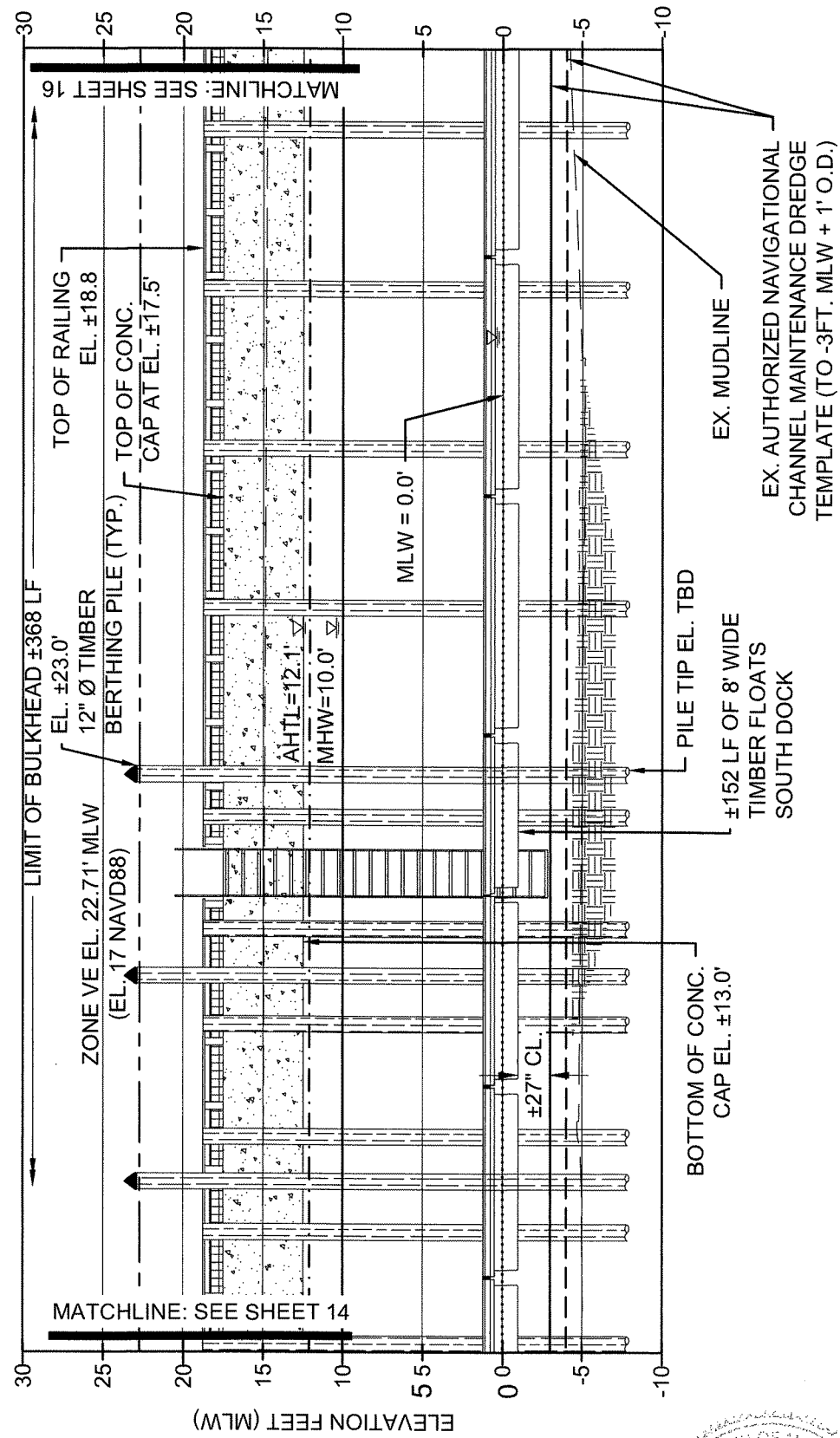


LICENSE PLAN NO. **WJW01-0000211**  
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**PROPOSED ELEVATION VIEW (CONT'D)**  
 SCALE: 1" = 10'

GENERAL LAW 36 SECTION 13-A

I CERTIFY THAT THIS PLAN CONFORMS WITH THE RULES  
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*S. R. W. 4/10/23*



LICENSE PLAN NO. **00001-0000211**  
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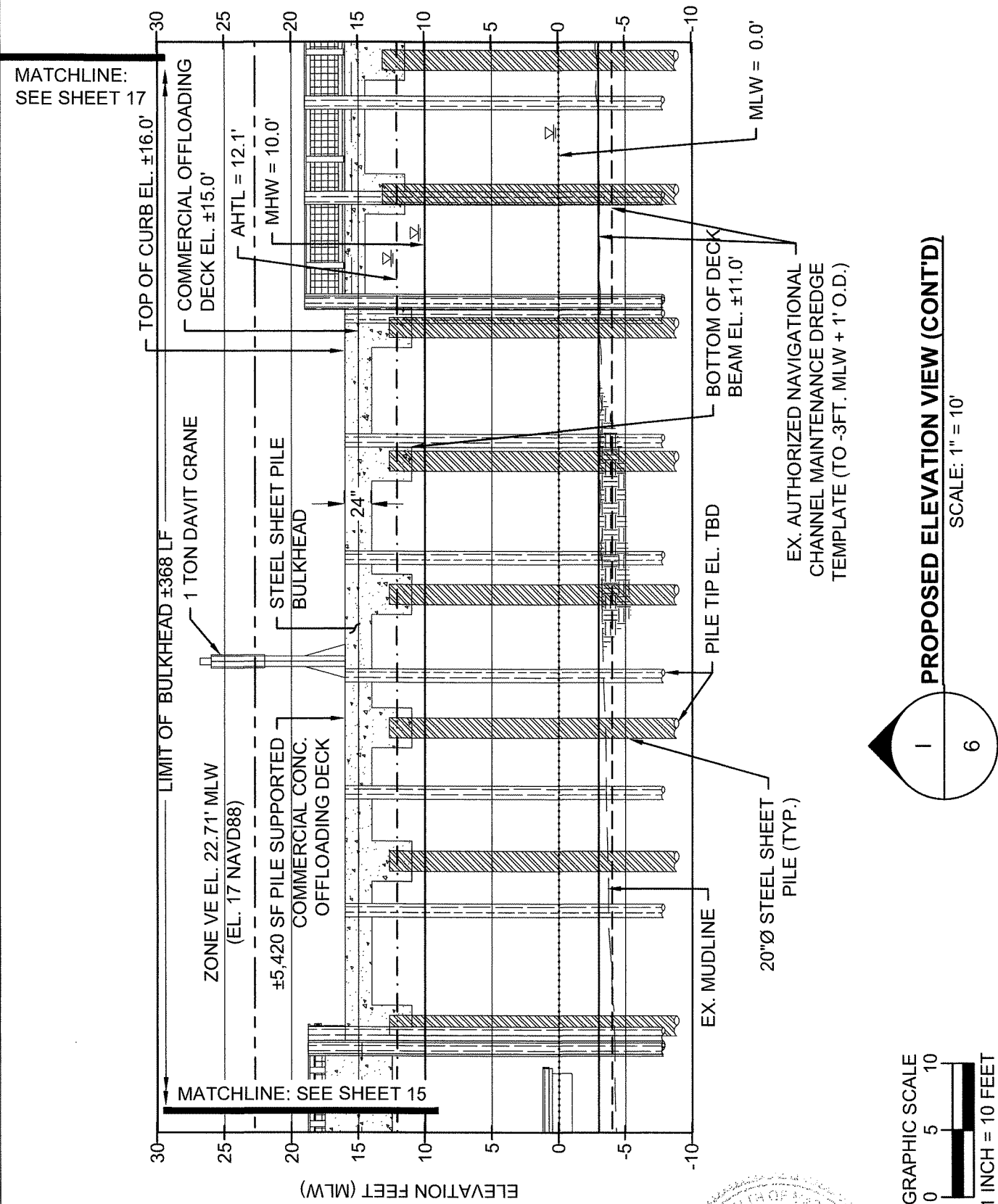
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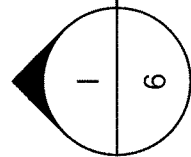
GENERAL LAW 36 SECTION 13-A

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*Scott R. Skundik 4/10/23*



GRAPHIC SCALE  
 0 5 10  
 1 INCH = 10 FEET



PROPOSED ELEVATION VIEW (CONT'D)

SCALE: 1" = 10'

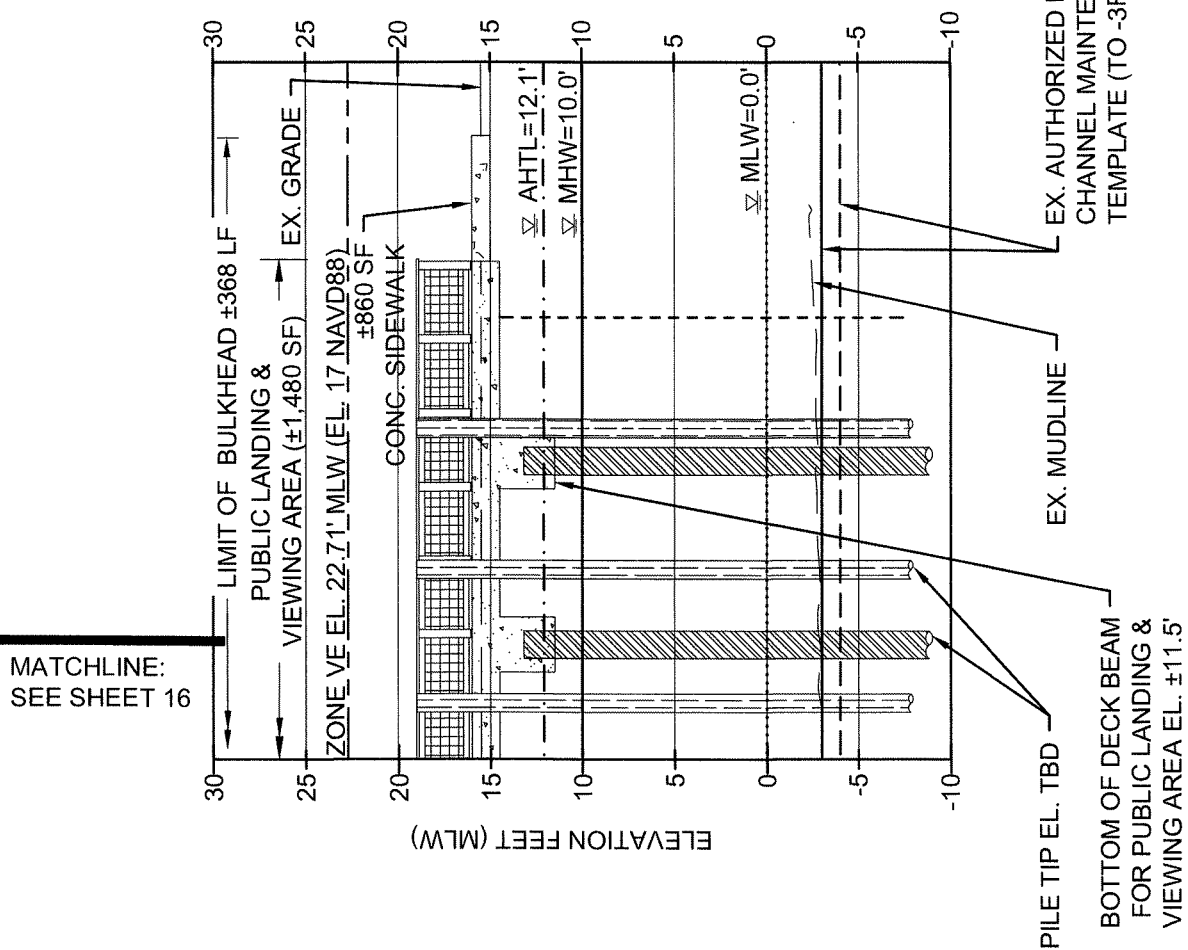
EX. AUTHORIZED NAVIGATIONAL  
 CHANNEL MAINTENANCE DREDGE  
 TEMPLATE (TO -3FT. MLW + 1' O.D.)

SCOTT R. SKUNDIK  
 CIVIL  
 No. 50220  
*Scott R. Skundik 4/10/23*

GENERAL LAW 36 SECTION 13-A

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*S P SW 4/10/23*



**PROPOSED ELEVATION VIEW (CONT'D)**  
SCALE: 1" = 10'

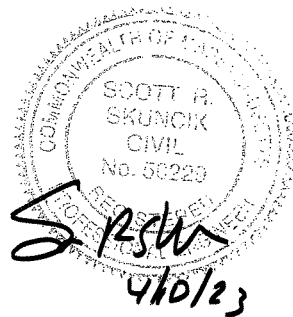


LICENSE PLAN NO. **WW01-0000211**  
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*SFW 4/10/23*

**PROJECT NOTES:**

- ±20' PROP. LANDWARD RETREAT OF EX. BULKHEAD WITH REMOVAL OF ±3,000 CY OF EX. BACKFILL TO BE RE-USED ONSITE AND/OR DISPOSED AT A SUITABLE UPLAND FACILITY; ±3,400 SF TO BE RESTORED TO LAND UNDER OCEAN AND MATCH BOTTOM DEPTH EL. OF EX./ AUTHORIZED NAVIGATIONAL CHANNEL DEPTH -3 FT MLW +1' O.D. ALONG FACE OF NEW BULKHEAD FENDER LINE.
- DREDGING/EXCAVATION AND FILL ACTIVITIES ARE PROPOSED AS FOLLOWS:

**SUMMARY OF PROPOSED EXCAVATION/DREDGING & FILLING ACTIVITIES**

LOCATION	ACTIVITY	AREA (SF)	VOLUME (CY)	NOTES
NEW REPLACEMENT BULKHEAD WITH 20FT LANDWARD RETREAT; REMOVAL OF ±3,000 TOTAL CY OF EXISTING BACKFILL/HISTORIC DREDGE MAT'L FROM EX. GRADE EL 16.0' TO EL. -3.0' + 1' O.D to EL. -4.0' MLW (TO MATCH EX. NAVIGATION CHANNEL MAINT. DEPTH)	EXCAVATION (EX. GRADE TO MHW EL. 10')	±3,400	±620	TO BE BENEFICIALLY REUSED ON-SITE AND/OR DISPOSED AT SUITABLE UPLAND LOCATION BY CONTRACTOR AS AUTHORIZED BY MADEP
	IMPROVEMENT DREDGING (MHW EL. 10.0' TO -4.0')		±2,380	
EX. (FAILED) TIMBER BULKHEAD TO REMAIN IN-PLACE AND OVERSHEETED BY PROP. NEW BULKHEAD	FILL (BELOW MHW EL. 10.0)	±210	±38	GRANULAR BACKFILL TO BE FILLED PLACED WITHIN ANNULAR SPACE (±18") BETWEEN EXISTING TIMBER AND NEW STEEL BULKHEADS
NEW 100-FT SIDEWALK EXTENSION	FILL (BELOW MHW EL. 10.0)	±185	±35	ALL NEW FILL MATERIAL CONSISTING OF GRANULAR SUB-BASE AND CONCRETE TO PLACED WITHIN EXISTING STONE REVETMENT FOOTPRINT

LICENSE PLAN NO. *WW01-0000211*  
Approved by Department of Environmental Protection  
Date: *JUL 24 2023*



**PROJECT NOTES**

PLAN ACCOMPANYING THE PETITION OF:  
THE TOWN OF ORLEANS, MASSACHUSETTS

TO RECONSTRUCT, EXPAND AND MAINTAIN  
COMMERCIAL WHARF FACILITY IN ROCK HARBOR  
113 ROCK HARBOR ROAD  
TOWN OF ORLEANS, MASSACHUSETTS

BARNSTABLE COUNTY, MASSACHUSETTS

GENERAL LAW 36 SECTION 13-A

I CERTIFY THAT THIS PLAN CONFORMS WITH THE RULES  
AND REGULATIONS OF THE REGISTERS OF DEEDS.

Scott R. Skunick 4/10/23

GENERAL NOTES:

1. RESULTS OF HYDROGRAPHIC & TOPOGRAPHIC SURVEY BY FOTH INFRASTRUCTURE & ENVIRONMENT, LLC. (FOTH) ON 10/24/2019 (HYDRO) , 10/25/2019, 4/2/2021, & 5/10/2022 (TOPO).
2. ELEVATIONS AND SOUNDINGS ARE IN FEET AND TENTHS, AND REFER TO THE MLW DATUM.
3. DATUM CONVERSIONS SHOWN WAS CALCULATED USING VDATUM 4.1.2 AT THE PROJECT SITE (LAT: -70.00566, LONG: 41.80346)
4. COORDINATES ARE BASED ON NAD83 MASSACHUSETTS MAINLAND STATE PLANE GRID SYSTEM.
5. PROJECT BENCHMARK IS DISK LOCATED AT ROUTE 6 ROTARY STAMPED "424 G" PUBLISHED EL. +18.94' MLW (+13.23' NAVD88).
6. SITE BENCHMARK IS DRILLHOLE IN CONC. SIDEWALK EL. +15.52' MLW (+9.81 NAVD88) (HELD)
7. RTK CORRECTIONS: RTK CORRECTIONS FOR THIS SURVEY PROVIDED BY KEYNET - VRS.
8. BENCHMARK / RTK TIDES: TIDES ARE RECORDED USING RTK TIDES IN HYPACK. ELEVATIONS FROM ELLIPSOID TO ORTHOMETRIC NAVD88 USE GEOID 12A.
9. PROJECT SITE IS IN FEMA ZONE VE 17 AND ZONE AE 14 NAVD88 IN ACCORDANCE TO FEMA FIRM #25001C0417J, EFFECTIVE DATE JULY 16, 2014.
10. PROPERTY LINES AND HISTORIC MEAN HIGH WATER REPRESENT THE LATEST FROM THE DATABASE INFORMATION BASED ON MA GIS AS OF MARCH 31, 2021.
11. THE INFORMATION DEPICTED ON THIS PLAN REPRESENTS THE RESULTS OF SURVEYS ON THE DATES SHOWN, AND CAN ONLY BE CONSIDERED AS INDICATING THE GENERAL CONDITIONS AT THAT TIME. INTERPOLATED INFORMATION FROM BETWEEN SOUNDING RUNS IS NOT GURANTEED. SHOALS, OBSTRUCTIONS OR OTHER DIFFERING CONDITIONS MAY EXIST BETWEEN THESE RUNS. CONSULT WITH FOTH INFRASTRUCTURE & ENVIRONMENT, LLC FOR MORE DETAILED INFORMATION.
12. POSSESSION AND USE OF THE MATERIAL CONTAINED ON THESE DRAWINGS IS GRANTED ONLY IN CONNECTION WITH ITS USE AS IT RELATES TO THE TITLED PROJECT, ANY OTHER USE, REPRODUCTION OR DISCLOSURE OF THE INFORMATION CONTAINED HEREON IS EXPRESSLY PROHIBITED WITHOUT THE WRITTEN CONSENT OF FOTH.

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LICENSE PLAN NO. ww01-0000211  
Approved by Department of Environmental Protection  
Date: JUL 24 2023



GENERAL NOTES

PLAN ACCOMPANYING THE PETITION OF:  
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TO RECONSTRUCT, EXPAND AND MAINTAIN  
COMMERCIAL WHARF FACILITY IN ROCK HARBOR  
113 ROCK HARBOR ROAD  
TOWN OF ORLEANS, MASSACHUSETTS

BARNSTABLE COUNTY, MASSACHUSETTS

TOWN OF ORLEANS  
ROCK HARBOR COMMERCIAL WHARF IMPROVEMENT PROJECT  
113 ROCK HARBOR ROAD, ORLEANS MA

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**US ARMY CORPS OF ENGINEERS**

Permit NAE-2022-02268

Date Issued: 07/17/2023



**DEPARTMENT OF THE ARMY**  
**US ARMY CORPS OF ENGINEERS**  
**NEW ENGLAND DISTRICT**  
**696 VIRGINIA ROAD**  
**CONCORD MA 01742-2751**

July 17, 2023

Regulatory Division  
File Number: NAE-2022-02268

Tom Daley  
Town of Orleans  
19 School Road  
Orleans, MA 02653  
Sent by email: [tdaley@town.orleans.ma.us](mailto:tdaley@town.orleans.ma.us)

Dear Mr. Daley:

The U.S. Army Corps of Engineers (USACE) has reviewed your application for Commercial Wharf Improvement. Project will consist of a 20-ft landward retreat of the existing commercial wharf to create new water space. The project removes approximately 5100 square feet of fill as well as approximately 2128 square feet of structures. The new bulkhead will be constructed from 80 – 55” steel sheet piles. This project also calls for the placement of approximately 1030 square feet of fill for shoreline stabilization and the construction and placement of approximately 10,132 square feet of structures waterward of the high tide line. Approximately 6,900 square feet of this structure will be a new pile supported wharf. This wharf will be supported by approximately 100 - 12” timber piles and approximately 62 – 20” steel piles. The remaining 3,232 square feet will consist of a new town pier measuring approximately 660 square feet, a landing pier measuring approximately 380 square feet and a floating configuration of docks measuring approximately 2,192 square feet. The structure will result in approximately 4,604 square feet of new permanent impact waterward of the High Tide Line. This project is located in Rock Harbor at 113 Rock Harbor Road, Orleans, Massachusetts. The work is shown on the enclosed plans titled “PLAN ACCOMPANYING THE PETITION OF: THE TOWN OF ORLEANS, MASSACHUSETTS TO RECONSTRUCT, EXPAND AND MAINTAIN COMMERCIAL WHARF FACILITY IN ROCK HARBOR,” on 18 sheets, and dated “SEPTEMBER 16, 2022.”

Based on the information that you have provided, we verify that the activity is authorized under General Permit # 04 of the enclosed June 2, 2023, federal permit known as the Massachusetts General Permits (GPs). The GPs are also available at <https://www.nae.usace.army.mil/Missions/Regulatory/State-General-Permits/Massachusetts-General-Permit>.

Please review the enclosed GPs carefully, in particular the general conditions beginning on page 35, and ensure that you and all personnel performing work authorized by the GPs are fully aware of and comply with its terms and conditions. A copy of the GPs and this verification letter shall be available at the work site as required by General



Condition 17. You must perform this work in compliance with the following special condition(s):

1. A “soft start” is required to allow animals an opportunity to leave the project vicinity before sound pressure levels increase. In addition to using a soft start at the beginning of the workday for pile driving, one must also be used at any time following cessation of pile driving for a period of 30 minutes or longer.
  - a. For impact pile driving: Pile driving will commence with an initial set of three strikes by the hammer at 40% energy, followed by a one-minute wait period, then two subsequent 3-strike sets at 40% energy, with one-minute waiting periods, before initiating continuous impact driving.
  - b. For vibratory pile installation: Pile driving will be initiated for 15 seconds at reduced energy followed by a one-minute waiting period. This sequence of 15 seconds of reduced energy driving, one-minute waiting period will be repeated two additional times, followed immediately by pile-driving at full rate and energy.
2. No in water turbidity producing work authorized herein shall be conducted during the time of year (TOY) restriction of **February 1** to **June 30** in order to minimize adverse impacts to Winter Flounder (*Pseudopleuronectes americanus*).
3. Work should not produce sedimentation in tidal saltmarsh, a special aquatic site. This may be achieved by using appropriate soil erosion and turbidity controls, maintaining 25 ft. setbacks from saltmarsh when possible, and/or performing turbidity-causing work during low tides.
4. A conditioned Water Quality Certification (WQC) has been issued by the Massachusetts Department of Environmental Protection for your project and is attached. You must comply with the conditions specified in the WQC.
5. You must complete and return the enclosed Compliance Certification within one month following the completion of the authorized work.

This authorization expires on June 1, 2028. You must commence or have under contract to commence the work authorized herein by June 1, 2028, and complete the work by June 1, 2029. If not, you must contact this office to determine the need for further authorization and we recommend you contact us *before* the work authorized herein expires. Please contact us immediately if you change the plans or construction methods for work within our jurisdiction as we must approve any changes before you undertake them. Performing work within our jurisdiction that is not specifically authorized by this determination or failing to comply with the special condition(s)

provided above or all the terms and conditions of the GPs may subject you to the enforcement provisions of our regulations.

This authorization does not obviate the need to obtain other federal, state, or local authorizations required by law. Applicants are responsible for applying for and obtaining any other approvals.

Your project is located within, or may affect resources within, the coastal zone. The Massachusetts Office of Coastal Zone Management (CZM) has already determined that no further Federal Consistency Review is required.

We continually strive to improve our customer service. To better serve you, we would appreciate your completing our Customer Service Survey located at <https://regulatory.ops.usace.army.mil/customer-service-survey>.

Please contact Keith Goulet of my staff at (978) 318-8296 or [keith.a.goulet@usace.army.mil](mailto:keith.a.goulet@usace.army.mil) if you have any questions.

Sincerely,

*Paul Maniccia*

Paul M. Maniccia  
Chief, Permits & Enforcement Branch  
Regulatory Division

Enclosures

cc:

Christine Player, AGENT, [Christine.player@foth.com](mailto:Christine.player@foth.com)

Ed Reiner, U.S. EPA, Region 1, Boston, MA, [reiner.ed@epa.gov](mailto:reiner.ed@epa.gov)

Sabrina Pereira, NMFS, Gloucester, MA; [sabrina.pereira@noaa.gov](mailto:sabrina.pereira@noaa.gov)

David Simmons, USFWS, New England Field Office, Concord, NH;

[david\\_simmons@fws.gov](mailto:david_simmons@fws.gov)

Robert Boeri, Coastal Zone Management, Boston, MA, [robert.boeri@mass.gov](mailto:robert.boeri@mass.gov)

Maissoun Reda, Chief, DEP SERO, Wetlands and Waterways, Lakeville, MA;

[maissoun.reda@mass.gov](mailto:maissoun.reda@mass.gov) (DEP File No. **XXXX**)

David Wong, MassDEP, [david.w.wong@mass.gov](mailto:david.w.wong@mass.gov)

MassDEP-WRP, Boston, MA; [dep.waterways@mass.gov](mailto:dep.waterways@mass.gov), (DEP File No. **XXXX**)

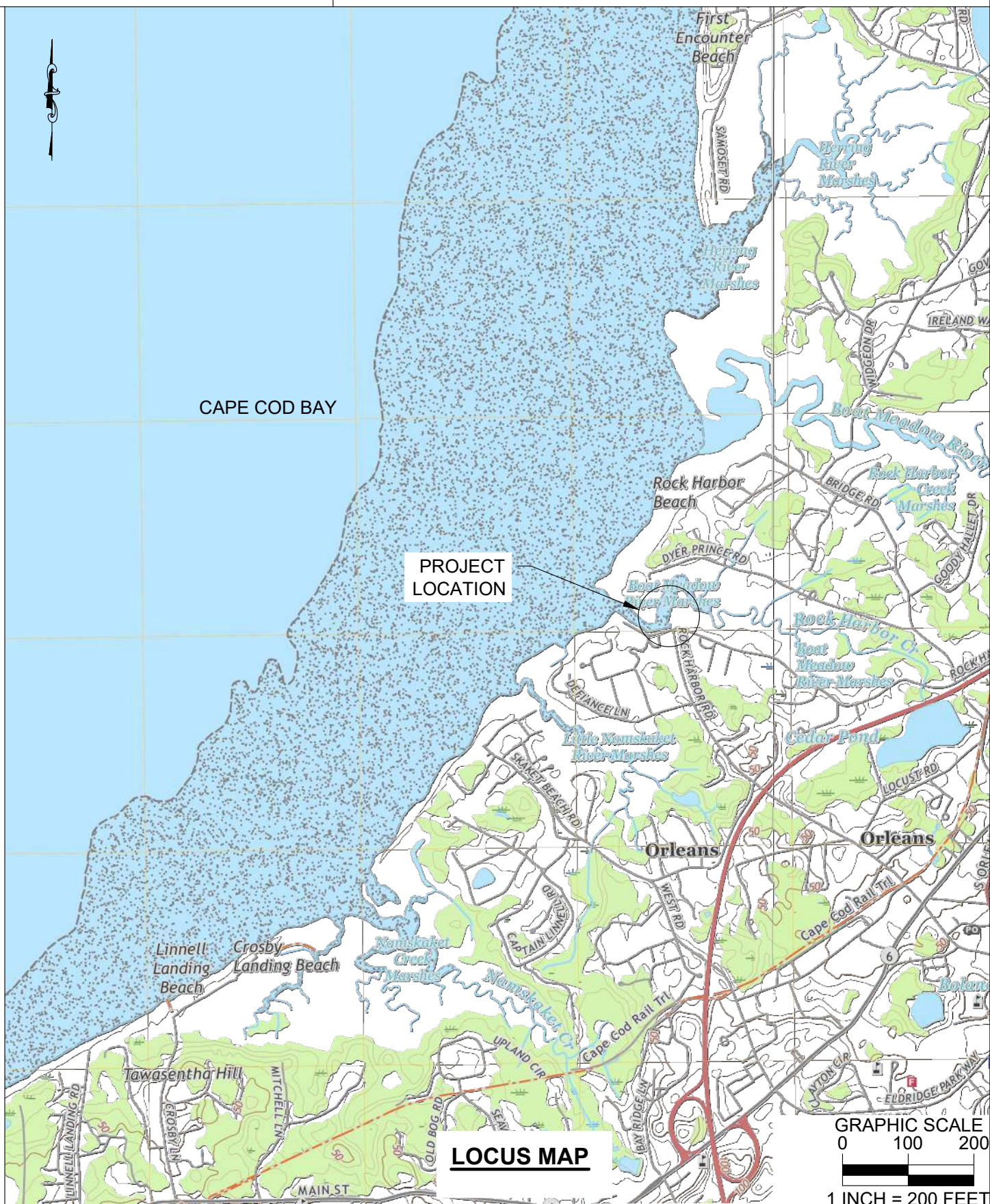
David Robinson, MA Board of Underwater Archaeological Resources (BUAR);

[david.s.robinson@mass.gov](mailto:david.s.robinson@mass.gov)

Conservation Commission, [mbates@town.orleans.ma.us](mailto:mbates@town.orleans.ma.us)

GENERAL LAW 36 SECTION 13-A

I CERTIFY THAT THIS PLAN CONFORMS WITH THE RULES AND REGULATIONS OF THE REGISTERS OF DEEDS.



(SEE SHEET 17 FOR PROJECT NOTES, LEGEND & DATUM INFORMATION)

PLAN ACCOMPANYING THE PETITION OF:  
THE TOWN OF ORLEANS, MASSACHUSETTS  
TO RECONSTRUCT, EXPAND AND MAINTAIN  
COMMERCIAL WHARF FACILITY IN ROCK HARBOR  
113 ROCK HARBOR ROAD  
TOWN OF ORLEANS, MASSACHUSETTS  
BARNSTABLE COUNTY, MASSACHUSETTS

SHEET 1 OF 18

DATE: SEPTEMBER 16, 2022

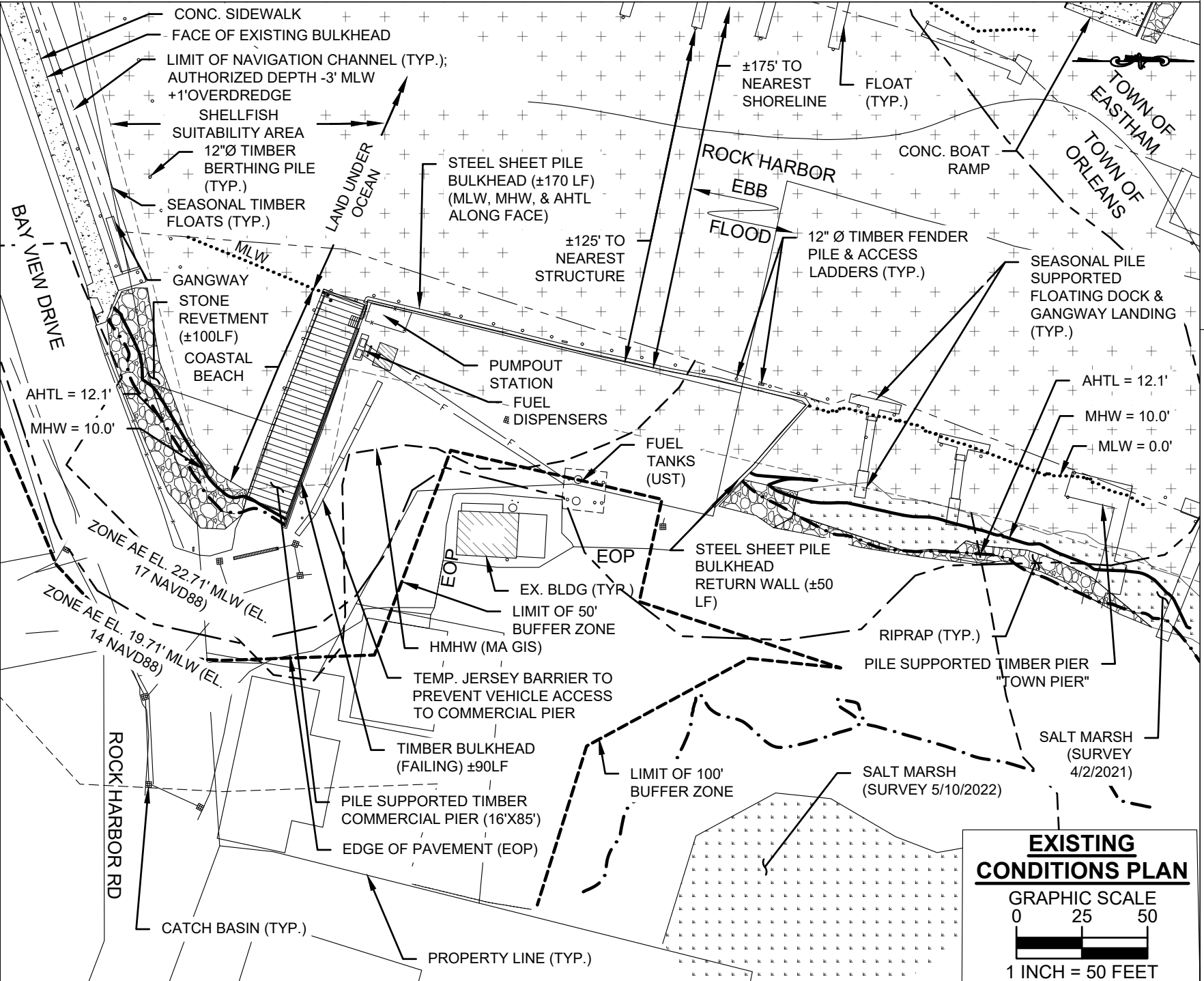


TO RECONSTRUCT, EXPAND AND MAINTAIN  
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 113 ROCK HARBOR ROAD  
 TOWN OF ORLEANS, MASSACHUSETTS  
 BARNSTABLE COUNTY, MASSACHUSETTS

PLAN ACCOMPANYING THE PETITION OF:  
 THE TOWN OF ORLEANS, MASSACHUSETTS

SHEET 2 OF 18

DATE: SEPTEMBER 16, 2022



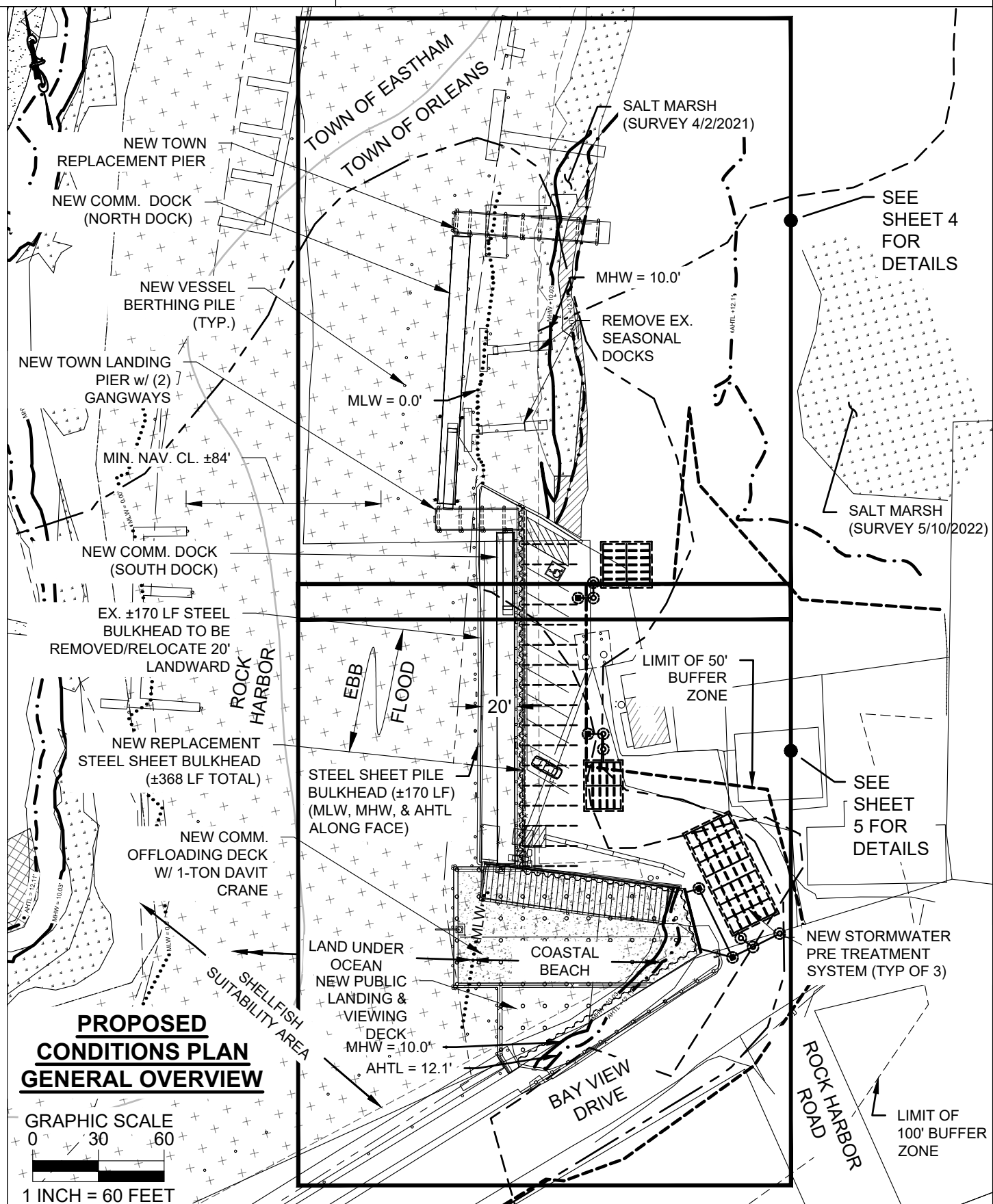
**EXISTING  
 CONDITIONS PLAN**

GRAPHIC SCALE  
 0 25 50  
 1 INCH = 50 FEET

GENERAL LAW 36 SECTION 13-A  
 I CERTIFY THAT THIS PLAN CONFORMS WITH THE RULES  
 AND REGULATIONS OF THE REGISTERS OF DEEDS.

GENERAL LAW 36 SECTION 13-A

I CERTIFY THAT THIS PLAN CONFORMS WITH THE RULES AND REGULATIONS OF THE REGISTERS OF DEEDS.



**PROPOSED  
CONDITIONS PLAN  
GENERAL OVERVIEW**

GRAPHIC SCALE  
0 30 60  
1 INCH = 60 FEET

PLAN ACCOMPANYING THE PETITION OF:  
THE TOWN OF ORLEANS, MASSACHUSETTS

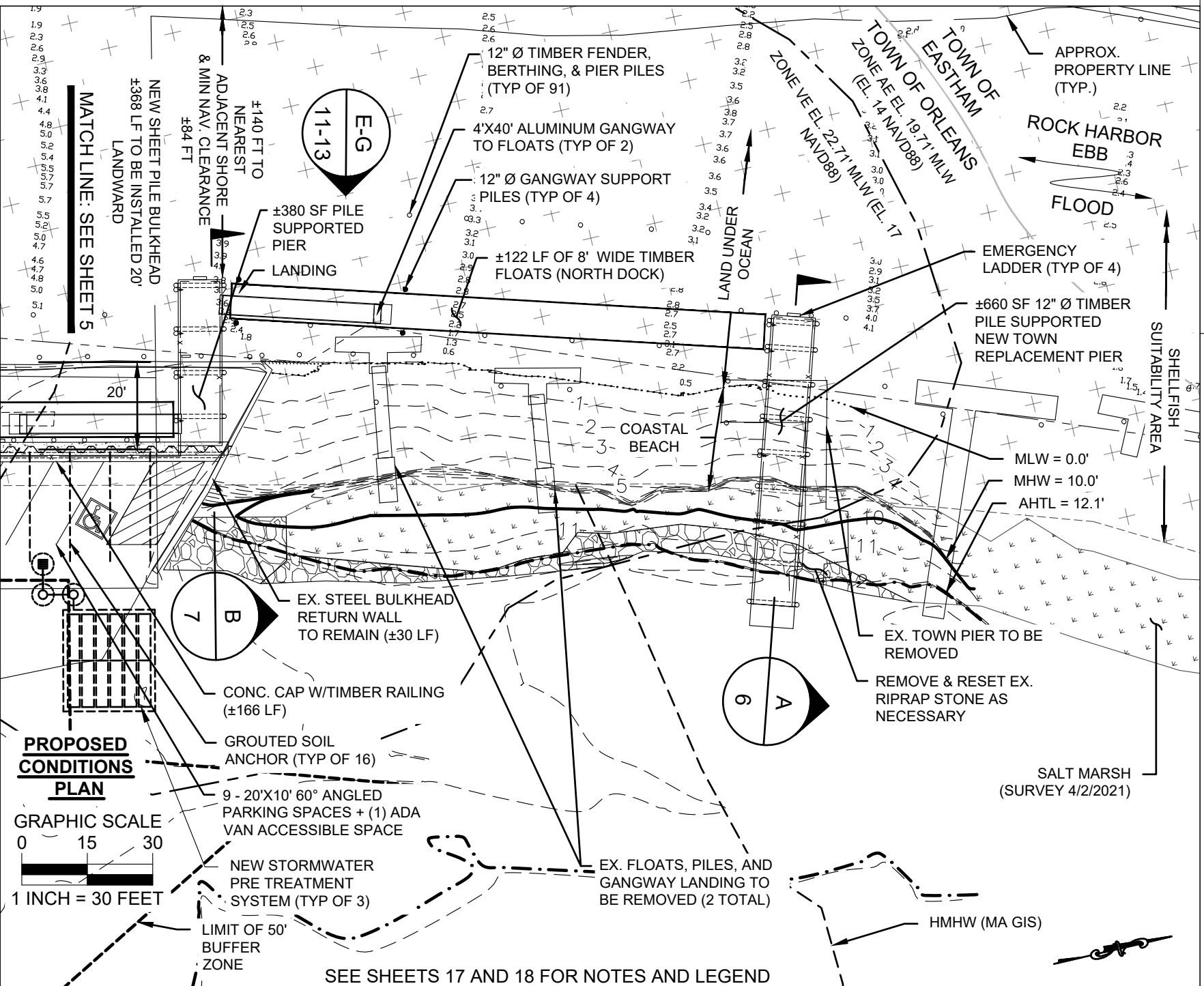
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113 ROCK HARBOR ROAD  
TOWN OF ORLEANS, MASSACHUSETTS  
BARNSTABLE COUNTY, MASSACHUSETTS

SHEET 3 OF 18

DATE: SEPTEMBER 16, 2022

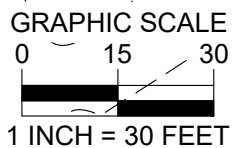


GENERAL LAW 36 SECTION 13-A  
 I CERTIFY THAT THIS PLAN CONFORMS WITH THE RULES  
 AND REGULATIONS OF THE REGISTERS OF DEEDS.



SEE SHEETS 17 AND 18 FOR NOTES AND LEGEND

**PROPOSED  
 CONDITIONS  
 PLAN**



SHEET 4 OF 18

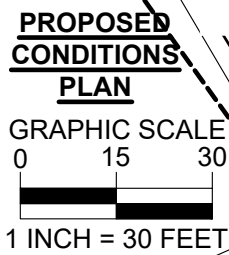
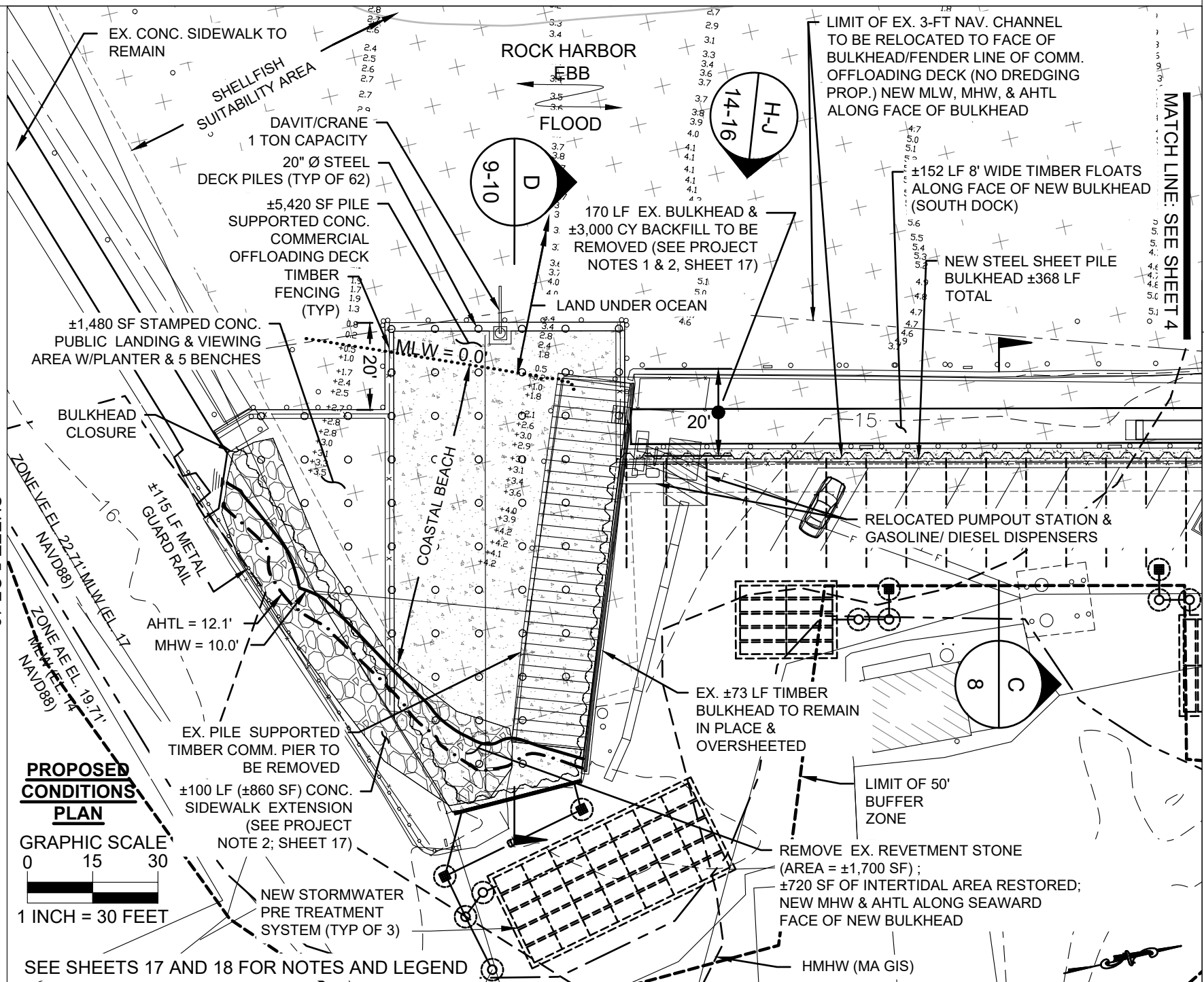
DATE: SEPTEMBER 16, 2022

PLAN ACCOMPANYING THE PETITION OF:  
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TO RECONSTRUCT, EXPAND AND MAINTAIN  
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GENERAL LAW 36 SECTION 13-A  
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SHEET 5 OF 18

DATE: SEPTEMBER 16, 2022

PLAN ACCOMPANYING THE PETITION OF:  
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TO RECONSTRUCT, EXPAND AND MAINTAIN  
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 113 ROCK HARBOR ROAD  
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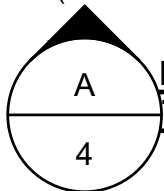
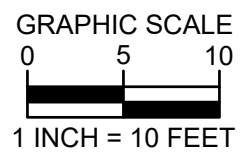
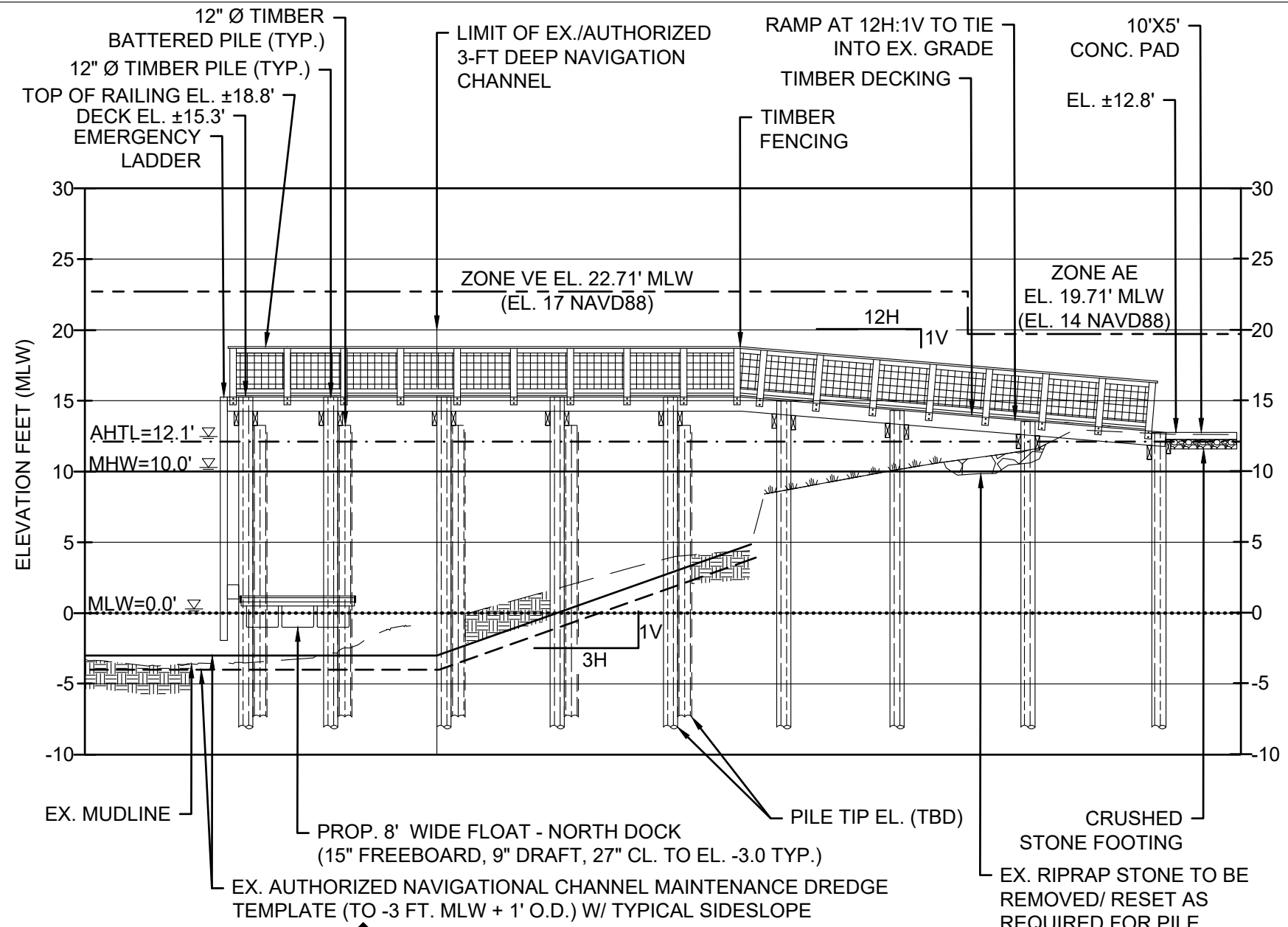
MATCH LINE: SEE SHEET 4

TO RECONSTRUCT, EXPAND AND MAINTAIN  
 COMMERCIAL WHARF FACILITY IN ROCK HARBOR  
 113 ROCK HARBOR ROAD  
 TOWN OF ORLEANS, MASSACHUSETTS  
 BARNSTABLE COUNTY, MASSACHUSETTS

PLAN ACCOMPANYING THE PETITION OF:  
 THE TOWN OF ORLEANS, MASSACHUSETTS

SHEET 6 OF 18

DATE: SEPTEMBER 16, 2022



**PROPOSED TYP. SECTION - PILE SUPPORTED  
 TOWN PIER (10' W X 66' L)**

SCALE: 1" = 10'

GENERAL LAW 36 SECTION 13-A  
 I CERTIFY THAT THIS PLAN CONFORMS WITH THE RULES  
 AND REGULATIONS OF THE REGISTERS OF DEEDS.

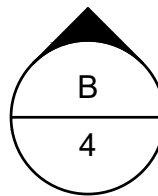
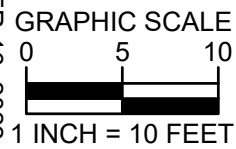
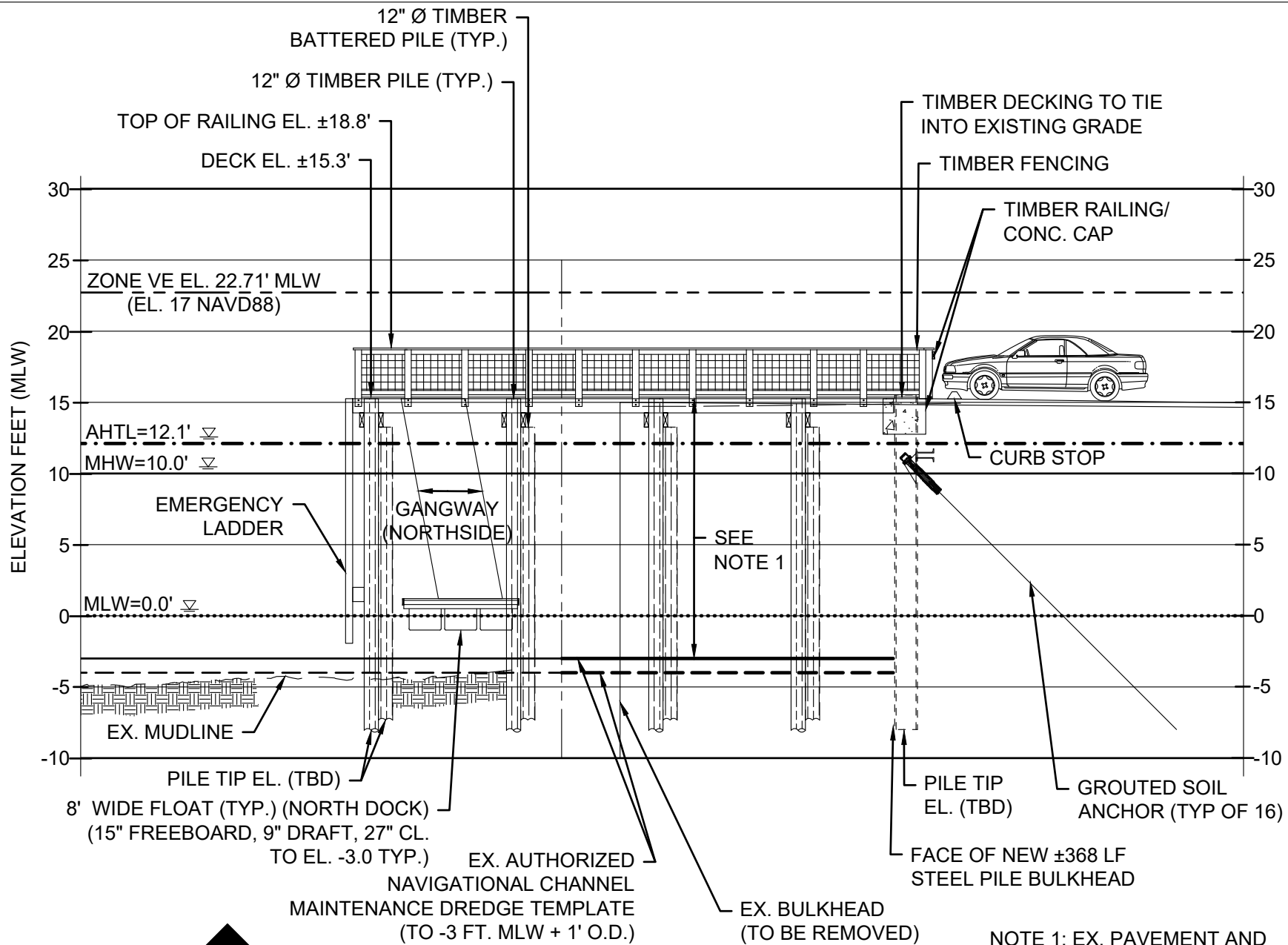




PLAN ACCOMPANYING THE PETITION OF:  
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 TO RECONSTRUCT, EXPAND AND MAINTAIN  
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 BARNSTABLE COUNTY, MASSACHUSETTS

SHEET 7 OF 18

DATE: SEPTEMBER 16, 2022



**PROPOSED TYP. SECTION PILE SUPPORTED  
 COMMERCIAL LANDING PIER (10' W X 38' L)**  
 SCALE: 1" = 10'

NOTE 1: EX. PAVEMENT AND BACKFILL TO BE REMOVED TO EL. -3.0 MLW + 1' O.D. TO MATCH AUTHORIZED MAINT. DEPTH OF CHANNEL

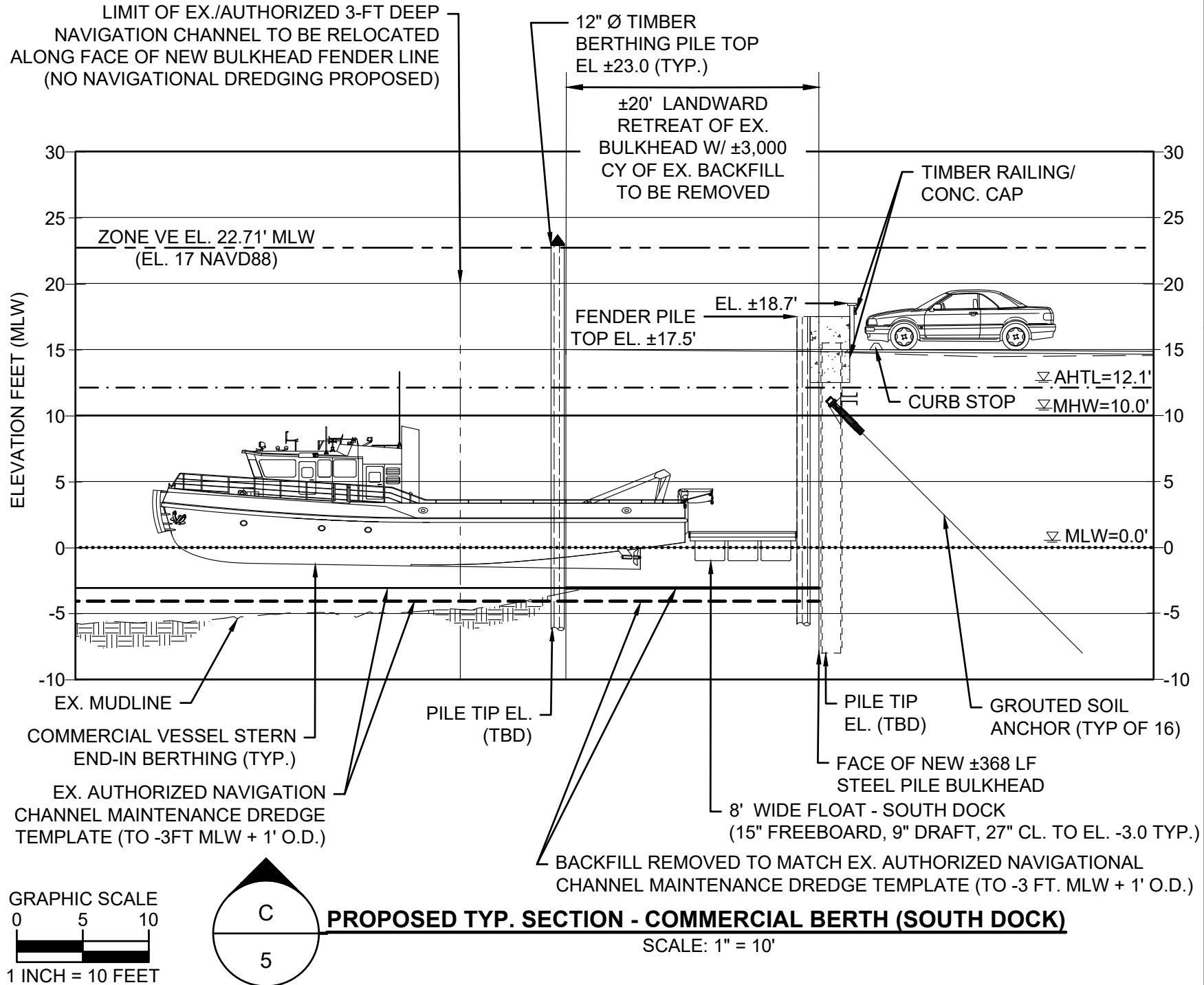
GENERAL LAW 36 SECTION 13-A  
 I CERTIFY THAT THIS PLAN CONFORMS WITH THE RULES  
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PLAN ACCOMPANYING THE PETITION OF:  
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SHEET 8 OF 18

DATE: SEPTEMBER 16, 2022

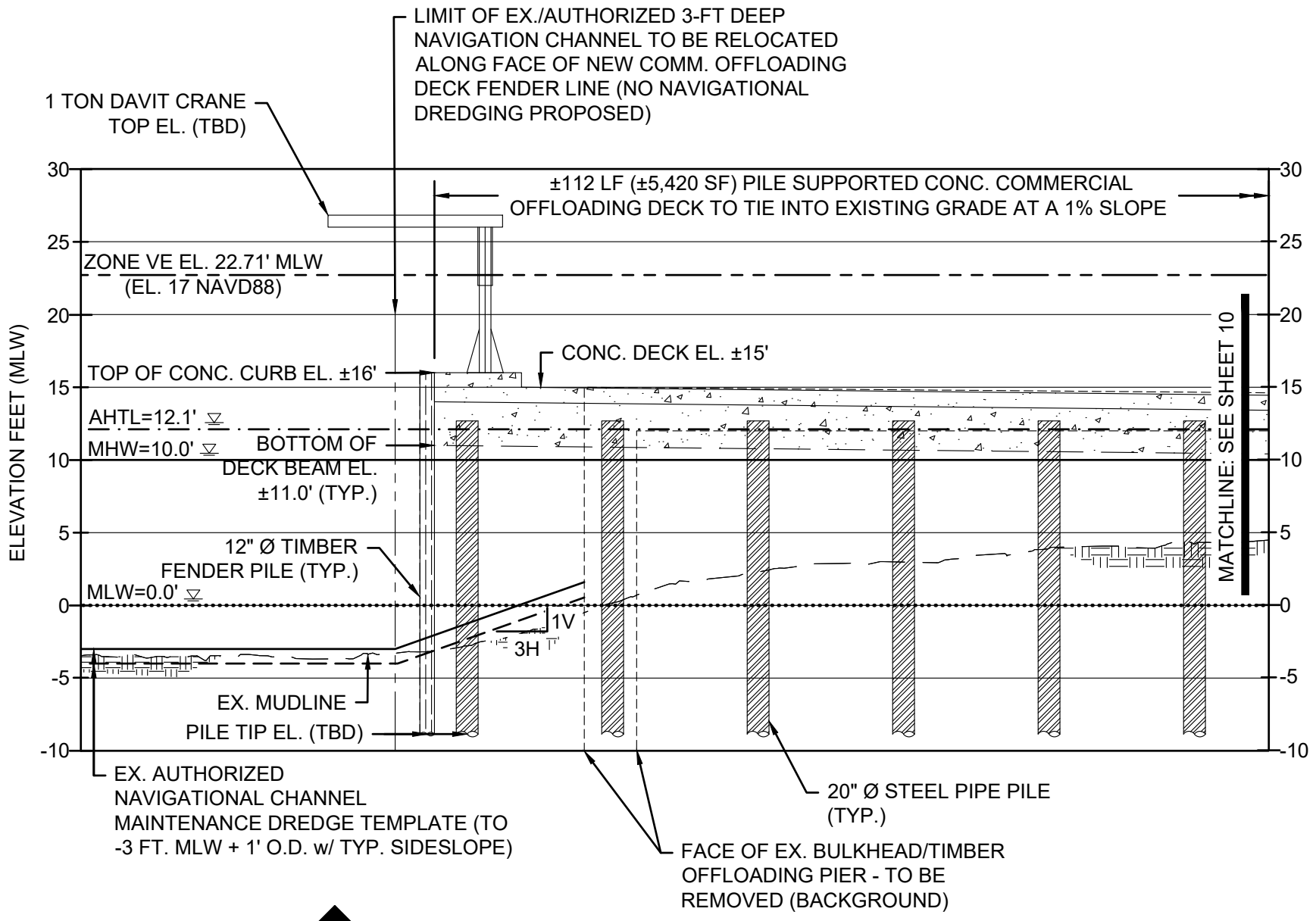


**PROPOSED TYP. SECTION - COMMERCIAL BERTH (SOUTH DOCK)**

SCALE: 1" = 10'

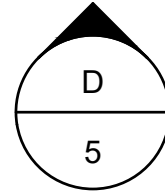
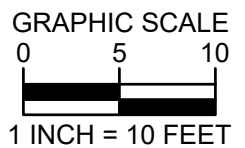
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PLAN ACCOMPANYING THE PETITION OF:  
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 BARNSTABLE COUNTY, MASSACHUSETTS



SHEET 9 OF 18

DATE: SEPTEMBER 16, 2022



**PROPOSED TYP. SECTION - PILE SUPPORTED CONCRETE  
 COMMERCIAL OFFLOADING DECK**

SCALE: 1" = 10'

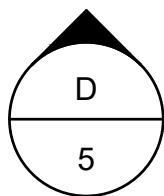
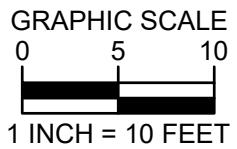
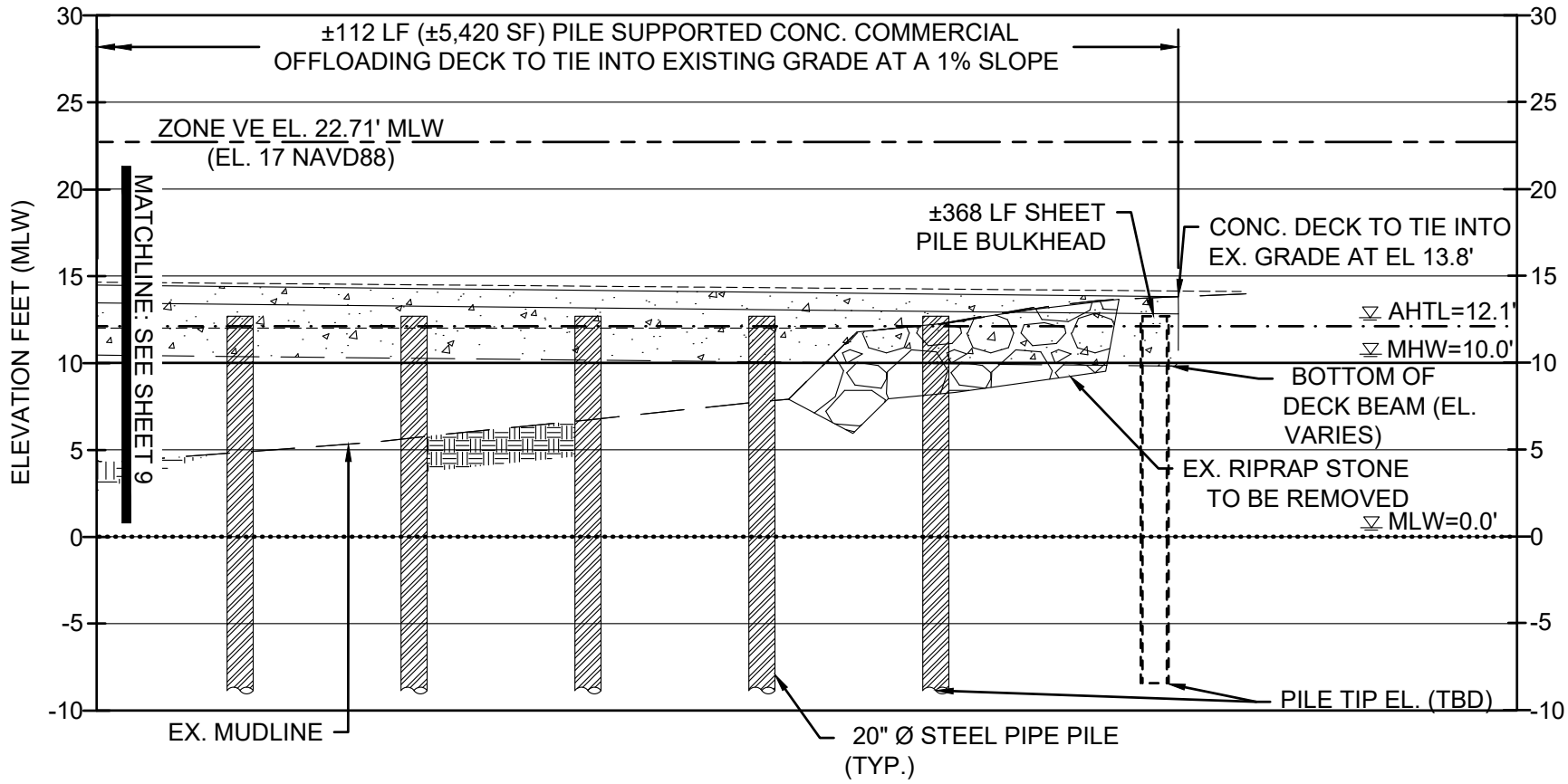
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 BARNSTABLE COUNTY, MASSACHUSETTS

SHEET 10 OF 18

DATE: SEPTEMBER 16, 2022



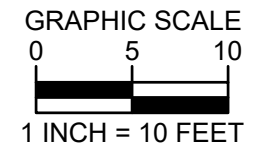
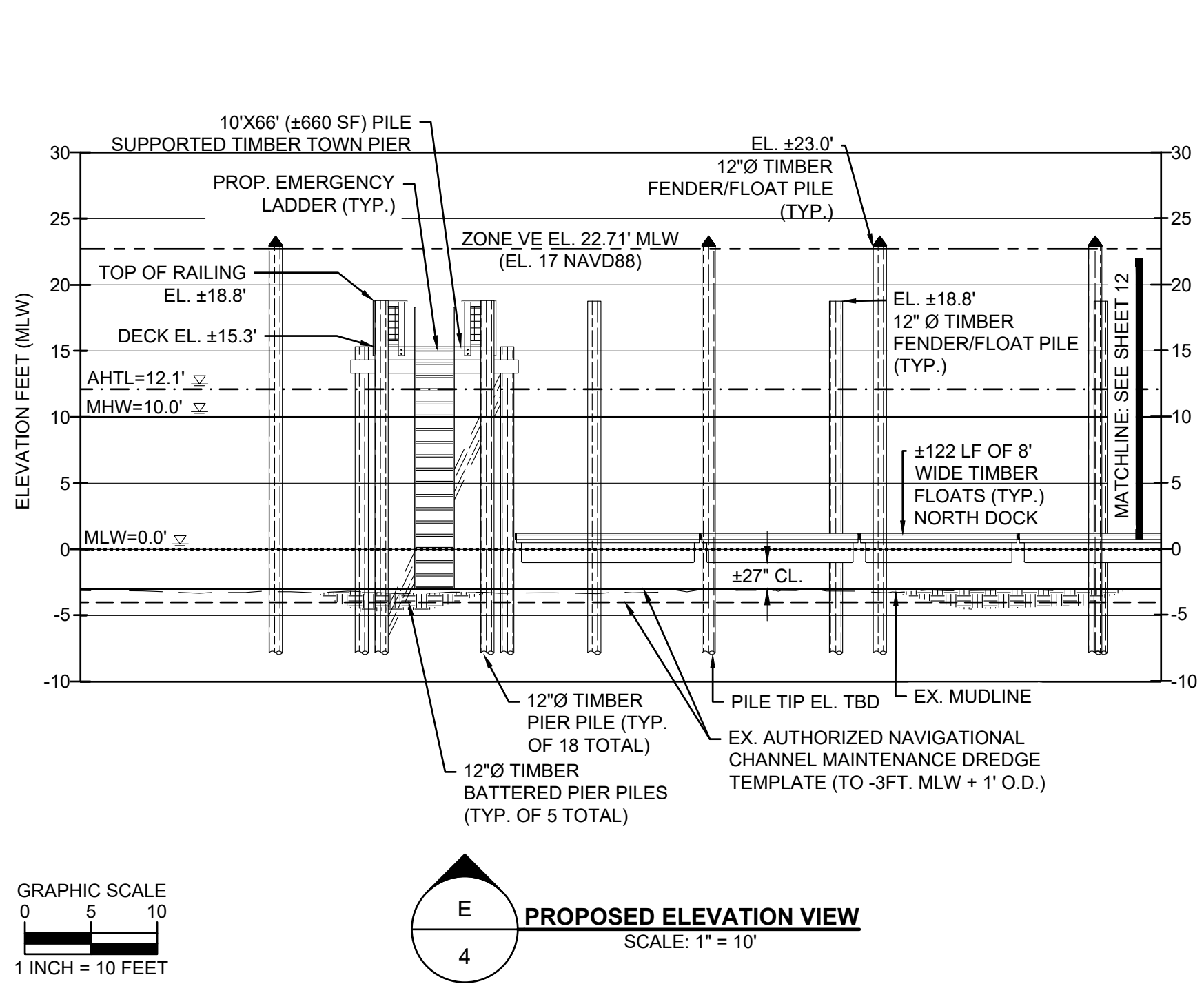
**PROPOSED TYPICAL SECTION - PILE SUPPORTED CONCRETE  
 COMMERCIAL OFFLOADING DECK (CONT'D)**

SCALE: 1" = 10'

GENERAL LAW 36 SECTION 13-A  
 I CERTIFY THAT THIS PLAN CONFORMS WITH THE RULES  
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PLAN ACCOMPANYING THE PETITION OF:  
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 TOWN OF ORLEANS, MASSACHUSETTS  
 BARNSTABLE COUNTY, MASSACHUSETTS



**PROPOSED ELEVATION VIEW**  
 SCALE: 1" = 10'



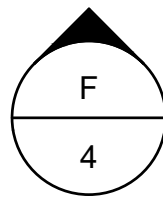
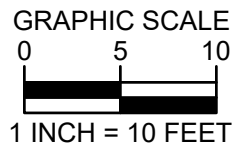
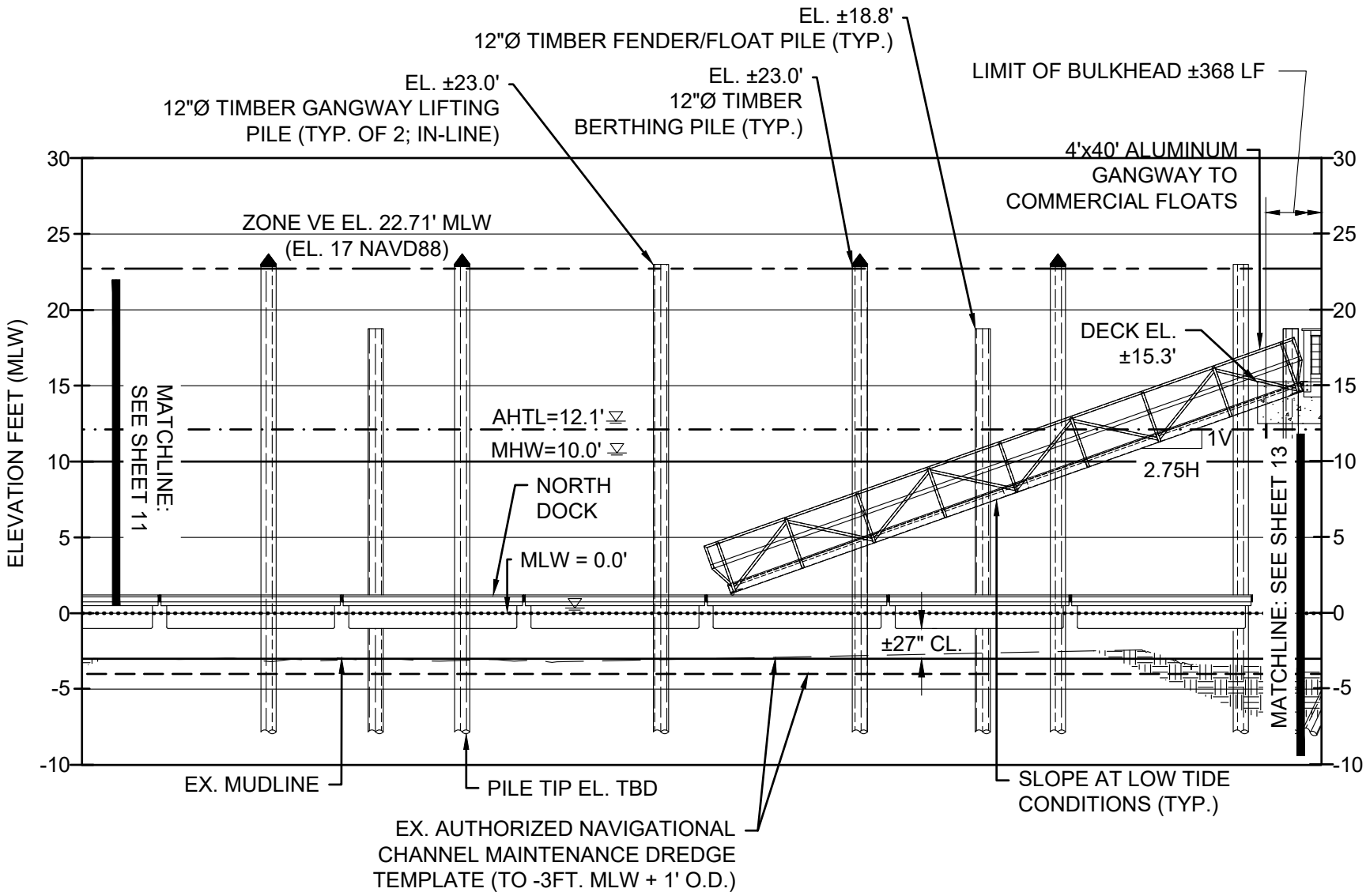
SHEET 11 OF 18  
 DATE: SEPTEMBER 16, 2022

GENERAL LAW 36 SECTION 13-A  
 I CERTIFY THAT THIS PLAN CONFORMS WITH THE RULES  
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PLAN ACCOMPANYING THE PETITION OF:  
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 TOWN OF ORLEANS, MASSACHUSETTS  
 BARNSTABLE COUNTY, MASSACHUSETTS

SHEET 12 OF 18

DATE: SEPTEMBER 16, 2022

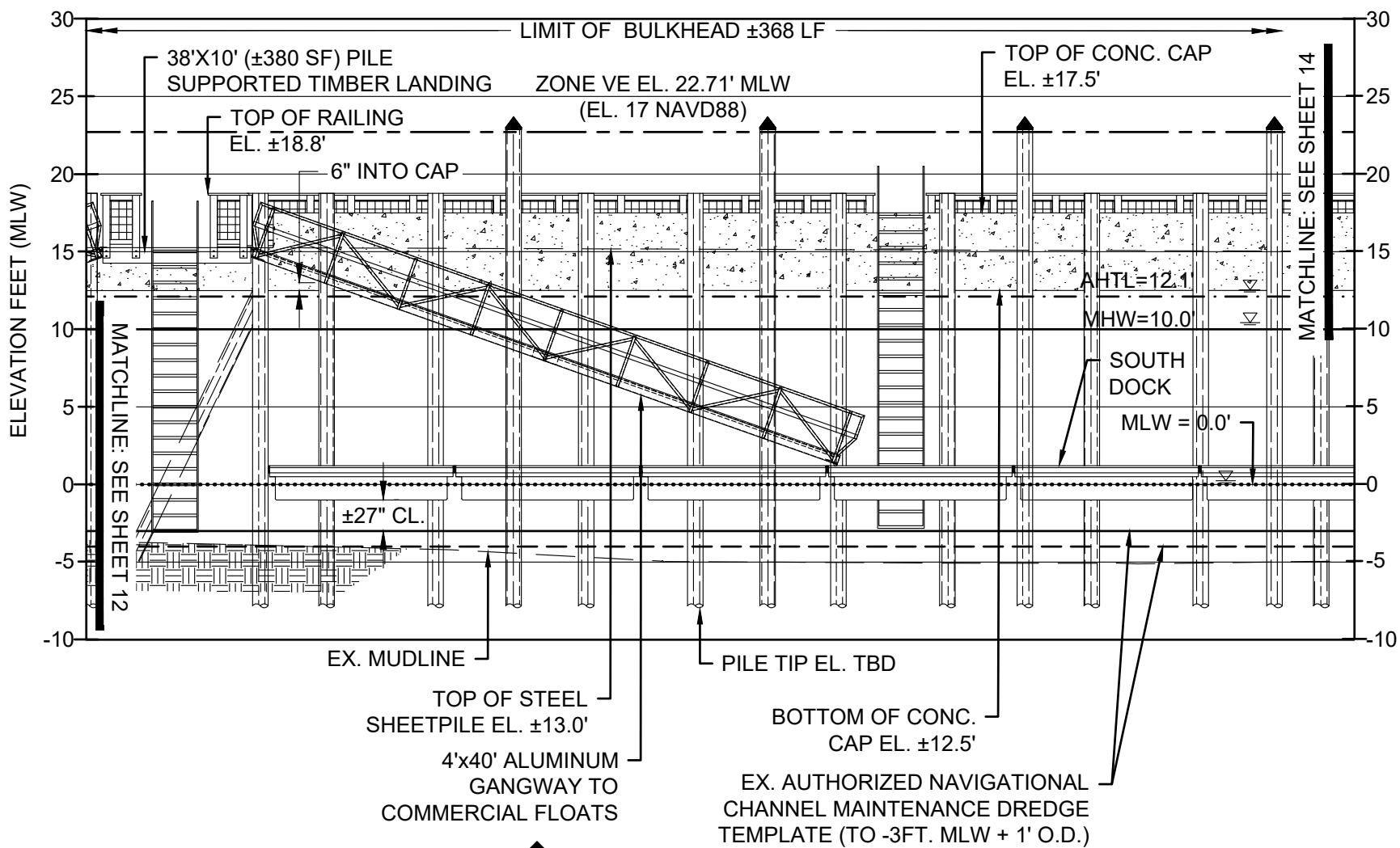


**PROPOSED ELEVATION VIEW (CONT'D)**

SCALE: 1" = 10'

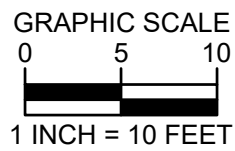
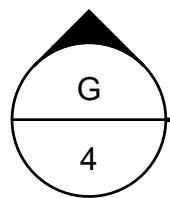
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GENERAL LAW 36 SECTION 13-A  
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 AND REGULATIONS OF THE REGISTERS OF DEEDS.



**PROPOSED ELEVATION VIEW (CONT'D)**

SCALE: 1" = 10'



SHEET 13 OF 18

DATE: SEPTEMBER 16, 2022

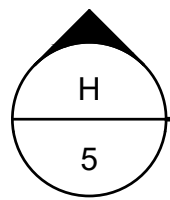
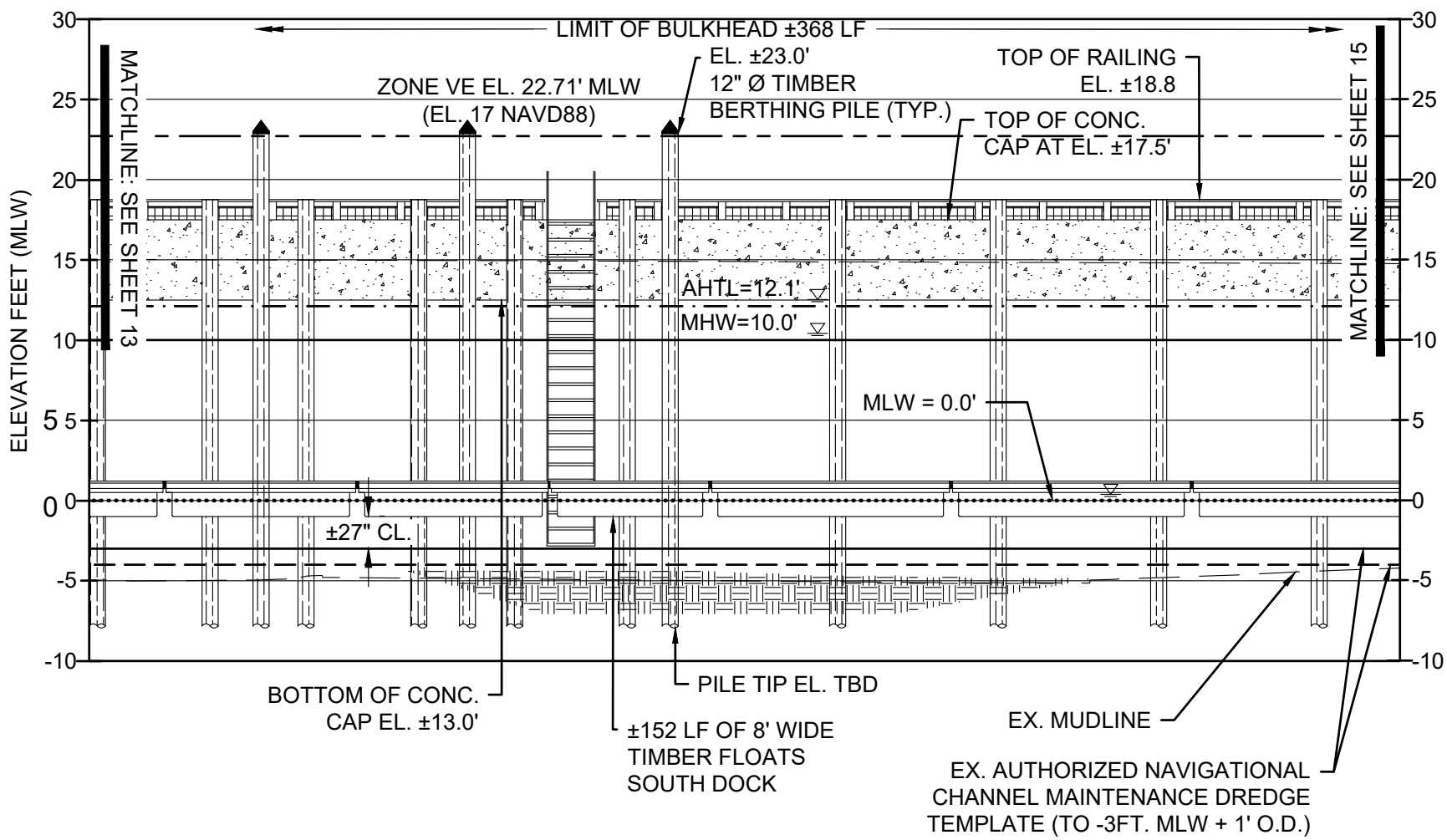
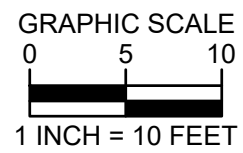
PLAN ACCOMPANYING THE PETITION OF:  
 THE TOWN OF ORLEANS, MASSACHUSETTS  
 TO RECONSTRUCT, EXPAND AND MAINTAIN  
 COMMERCIAL WHARF FACILITY IN ROCK HARBOR  
 113 ROCK HARBOR ROAD  
 TOWN OF ORLEANS, MASSACHUSETTS  
 BARNSTABLE COUNTY, MASSACHUSETTS



PLAN ACCOMPANYING THE PETITION OF:  
 THE TOWN OF ORLEANS, MASSACHUSETTS  
 TO RECONSTRUCT, EXPAND AND MAINTAIN  
 COMMERCIAL WHARF FACILITY IN ROCK HARBOR  
 113 ROCK HARBOR ROAD  
 TOWN OF ORLEANS, MASSACHUSETTS  
 BARNSTABLE COUNTY, MASSACHUSETTS

SHEET 14 OF 18

DATE: SEPTEMBER 16, 2022



**PROPOSED ELEVATION VIEW (CONT'D)**

SCALE: 1" = 10'

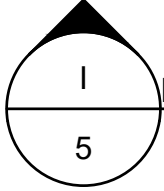
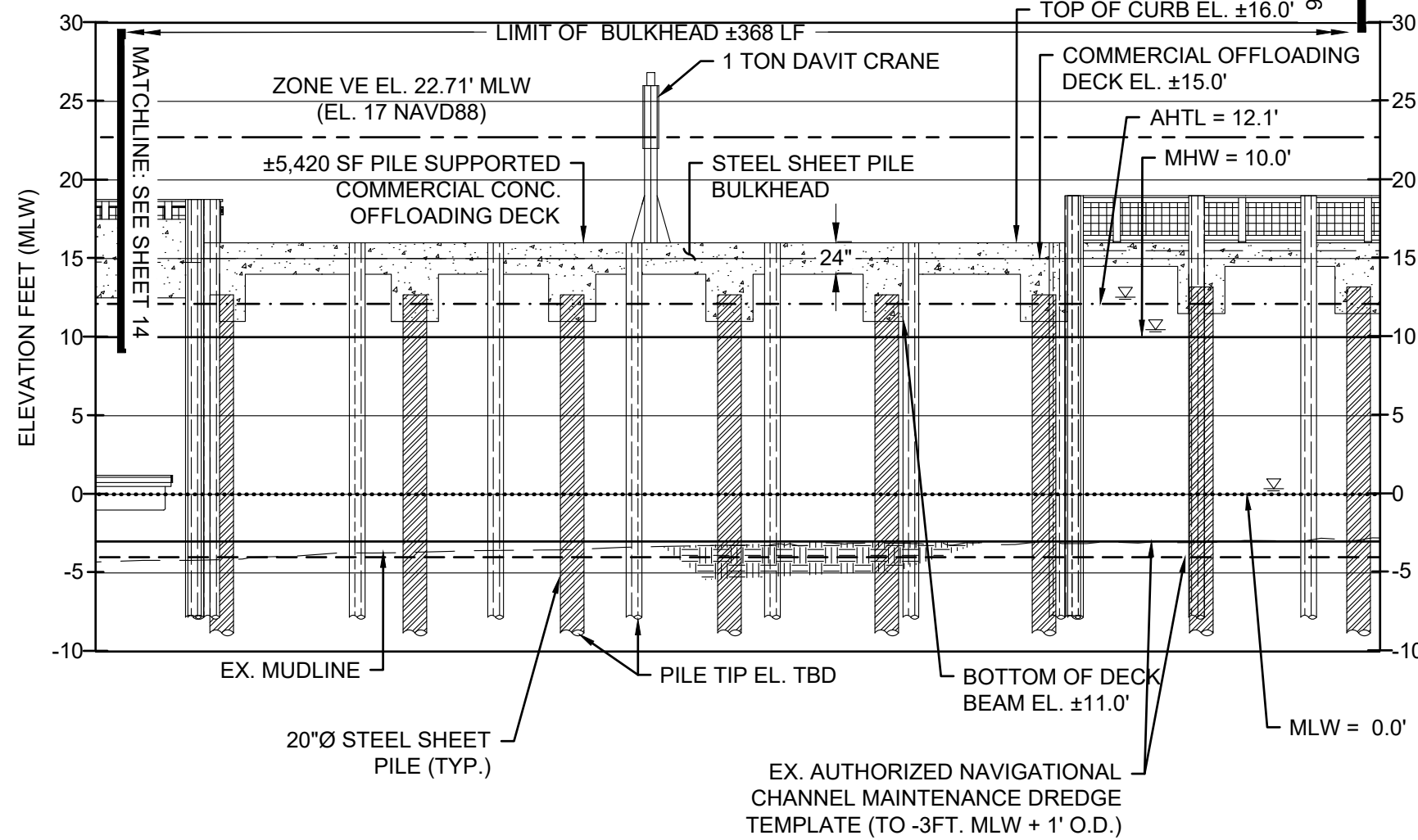
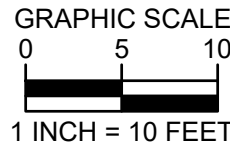
GENERAL LAW 36 SECTION 13-A  
 I CERTIFY THAT THIS PLAN CONFORMS WITH THE RULES  
 AND REGULATIONS OF THE REGISTERS OF DEEDS.



PLAN ACCOMPANYING THE PETITION OF:  
 THE TOWN OF ORLEANS, MASSACHUSETTS  
 TO RECONSTRUCT, EXPAND AND MAINTAIN  
 COMMERCIAL WHARF FACILITY IN ROCK HARBOR  
 113 ROCK HARBOR ROAD  
 TOWN OF ORLEANS, MASSACHUSETTS  
 BARNSTABLE COUNTY, MASSACHUSETTS

SHEET 15 OF 18

DATE: SEPTEMBER 16, 2022



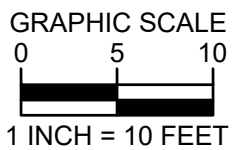
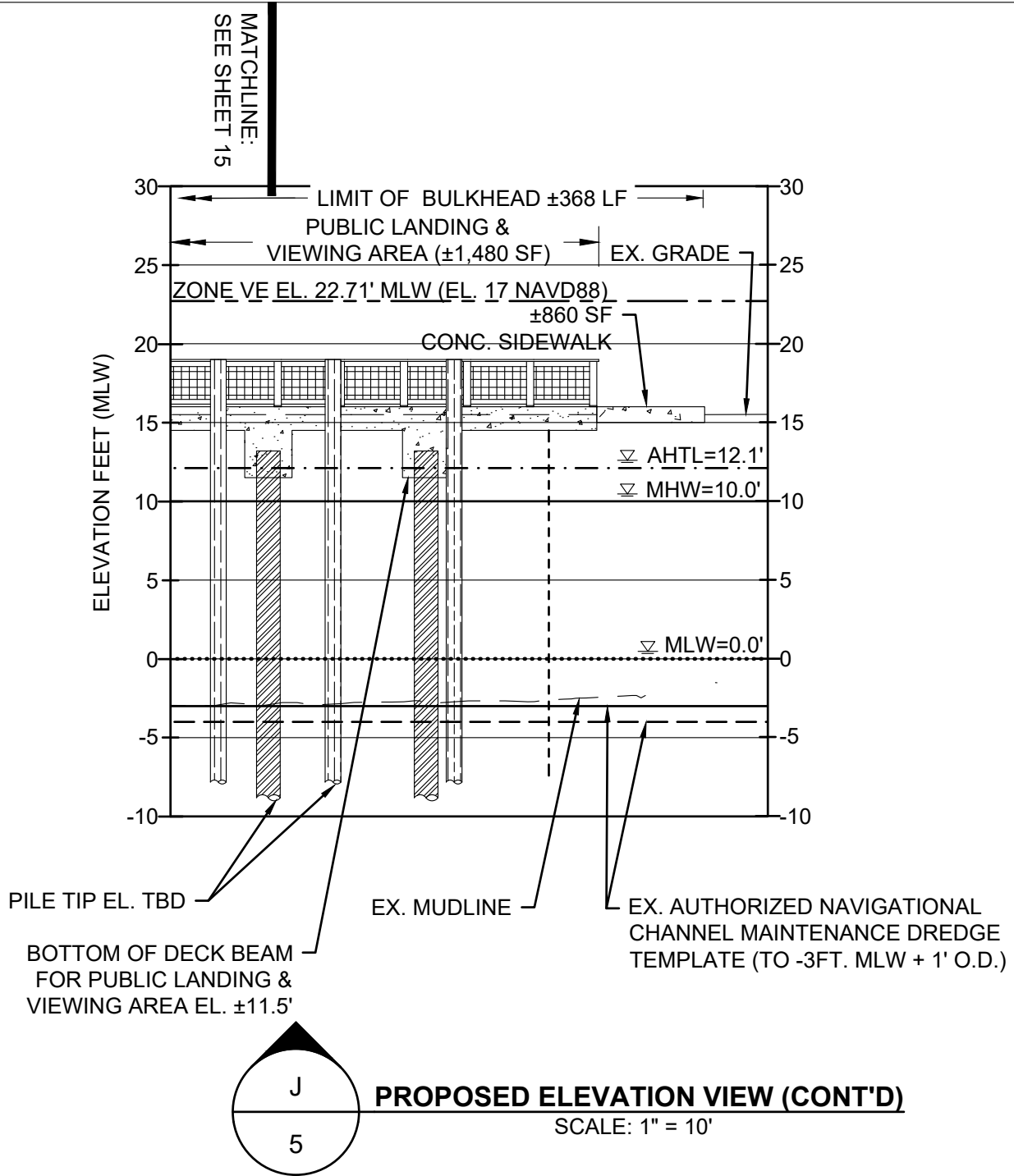
**PROPOSED ELEVATION VIEW (CONT'D)**  
 SCALE: 1" = 10'

MATCHLINE:  
 SEE SHEET 16

MATCHLINE:  
 SEE SHEET 14

GENERAL LAW 36 SECTION 13-A  
 I CERTIFY THAT THIS PLAN CONFORMS WITH THE RULES  
 AND REGULATIONS OF THE REGISTERS OF DEEDS.

GENERAL LAW 36 SECTION 13-A  
 I CERTIFY THAT THIS PLAN CONFORMS WITH THE RULES  
 AND REGULATIONS OF THE REGISTERS OF DEEDS.



SHEET 16 OF 18

DATE: SEPTEMBER 16, 2022

PLAN ACCOMPANYING THE PETITION OF:  
 THE TOWN OF ORLEANS, MASSACHUSETTS  
 TO RECONSTRUCT, EXPAND AND MAINTAIN  
 COMMERCIAL WHARF FACILITY IN ROCK HARBOR  
 113 ROCK HARBOR ROAD  
 TOWN OF ORLEANS, MASSACHUSETTS  
 BARNSTABLE COUNTY, MASSACHUSETTS





GENERAL LAW 36 SECTION 13-A

I CERTIFY THAT THIS PLAN CONFORMS WITH THE RULES AND REGULATIONS OF THE REGISTERS OF DEEDS.

GENERAL NOTES:

1. RESULTS OF HYDROGRAPHIC & TOPOGRAPHIC SURVEY BY FOTH INFRASTRUCTURE & ENVIRONMENT, LLC. (FOTH) ON 10/24/2019 (HYDRO) , 10/25/2019, 4/2/2021, & 5/10/2022 (TOPO).
2. ELEVATIONS AND SOUNDINGS ARE IN FEET AND TENTHS, AND REFER TO THE MLW DATUM.
3. DATUM CONVERSIONS SHOWN WAS CALCULATED USING VDATUM 4.1.2 AT THE PROJECT SITE (LAT: -70.00566, LONG: 41.80346)
4. COORDINATES ARE BASED ON NAD83 MASSACHUSETTS MAINLAND STATE PLANE GRID SYSTEM.
5. PROJECT BENCHMARK IS DISK LOCATED AT ROUTE 6 ROTARY STAMPED "424 G" PUBLISHED EL. +18.94' MLW (+13.23' NAVD88).
6. SITE BENCHMARK IS DRILLHOLE IN CONC. SIDEWALK EL. +15.52' MLW (+9.81 NAVD88) (HELD)
7. RTK CORRECTIONS: RTK CORRECTIONS FOR THIS SURVEY PROVIDED BY KEYNET - VRS.
8. BENCHMARK / RTK TIDES: TIDES ARE RECORDED USING RTK TIDES IN HYPACK. ELEVATIONS FROM ELLIPSOID TO ORTHOMETRIC NAVD88 USE GEOID 12A.
9. PROJECT SITE IS IN FEMA ZONE VE 17 AND ZONE AE 14 NAVD88 IN ACCORDANCE TO FEMA FIRM #25001C0417J, EFFECTIVE DATE JULY 16, 2014.
10. PROPERTY LINES AND HISTORIC MEAN HIGH WATER REPRESENT THE LATEST FROM THE DATABASE INFORMATION BASED ON MA GIS AS OF MARCH 31, 2021.
11. THE INFORMATION DEPICTED ON THIS PLAN REPRESENTS THE RESULTS OF SURVEYS ON THE DATES SHOWN, AND CAN ONLY BE CONSIDERED AS INDICATING THE GENERAL CONDITIONS AT THAT TIME. INTERPOLATED INFORMATION FROM BETWEEN SOUNDING RUNS IS NOT GURANTEED. SHOALS, OBSTRUCTIONS OR OTHER DIFFERING CONDITIONS MAY EXIST BETWEEN THESE RUNS. CONSULT WITH FOTH INFRASTRUCTURE & ENVIRONMENT, LLC FOR MORE DETAILED INFORMATION.
12. POSSESSION AND USE OF THE MATERIAL CONTAINED ON THESE DRAWINGS IS GRANTED ONLY IN CONNECTION WITH ITS USE AS IT RELATES TO THE TITLED PROJECT, ANY OTHER USE, REPRODUCTION OR DISCLOSURE OF THE INFORMATION CONTAINED HEREON IS EXPRESSLY PROHIBITED WITHOUT THE WRITTEN CONSENT OF FOTH.

© COPYRIGHT 2022, FOTH INFRASTRUCTURE & ENVIRONMENT, LLC.

**GENERAL NOTES**

PLAN ACCOMPANYING THE PETITION OF:  
THE TOWN OF ORLEANS, MASSACHUSETTS

TO RECONSTRUCT, EXPAND AND MAINTAIN  
COMMERCIAL WHARF FACILITY IN ROCK HARBOR  
113 ROCK HARBOR ROAD  
TOWN OF ORLEANS, MASSACHUSETTS

BARNSTABLE COUNTY, MASSACHUSETTS

SHEET 18 OF 18

DATE: SEPTEMBER 16, 2022





**US Army Corps  
of Engineers**  
New England District

**COMPLIANCE CERTIFICATION FORM**  
(Minimum Notice: Permittee must sign and return notification  
within one month of the completion of work.)

**Permit Number:** NAE-2022-02268 \_\_\_\_\_

**Project Manager:** Keith Goulet \_\_\_\_\_

**Name of Permittee:** Town of Orleans \_\_\_\_\_

**Permit Issuance Date:** July 12, 2023 \_\_\_\_\_

Please sign this certification and return it to our office upon completion of the activity and any mitigation required by the permit. You must submit this after the mitigation is complete, but not the mitigation monitoring, which requires separate submittals.

\*\*\*\*\*  
\* E-MAIL TO: [cenae-r@usace.army.mil](mailto:cenae-r@usace.army.mil); or \*  
\* \* \* \* \*  
\* MAIL TO: Permits and Enforcement Branch A \*  
\* U.S. Army Corps of Engineers, New England District \*  
\* Regulatory Division \*  
\* 696 Virginia Road \*  
\* Concord, Massachusetts 01742-2751 \*  
\*\*\*\*\*

Please note that your permitted activity is subject to a compliance inspection by an U.S. Army Corps of Engineers representative. If you fail to comply with this permit you are subject to permit suspension, modification, or revocation.

**I hereby certify that the work authorized by the above referenced permit was completed in accordance with the terms and conditions of the above referenced permit, and any required mitigation was completed in accordance with the permit conditions.**

\_\_\_\_\_  
Signature of Permittee

\_\_\_\_\_  
Date

\_\_\_\_\_  
Printed Name

\_\_\_\_\_  
Date of Work Completion

( ) \_\_\_\_\_  
Telephone Number

( ) \_\_\_\_\_  
Telephone Number

**CERTIFICATE OF APPROPRIATENESS**

Old Kings Highway District Commission

Approved: 02/01/2024

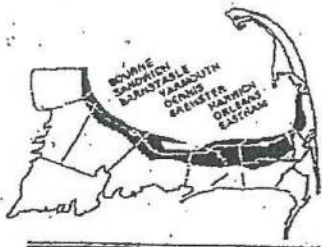
Application to

Old King's Highway Regional Historic District Committee  
in the Town of Orleans for a

TOWN OF ORLEANS

JAN 10

CERTIFICATE OF APPROPRIATENESS



Application is hereby made, in triplicate, for the issuance of a Certificate of Appropriateness under Section 6 of Chapter 470. Acts and Resolves of Massachusetts, 1973, for proposed work as described below and on plans, drawings or photographs accompanying this application for:

BUILDING DEPT

CHECK CATEGORIES THAT APPLY:

- 1. Exterior Building Construction:  New Building  Addition  Alteration (Relocate & Replace In-kind)
  - Indicate type of building:  House  Garage  Commercial  Other Pre-fabricated Shed
  - 2. Exterior Painting:
  - 3. Signs or Billboards:  New Sign  Existing Sign  Repainting existing sign
  - 4. Structure:  Fence  Wall  Flagpole  Other Commercial Hoist
- (Please read other side for explanation and requirements)

TYPE OR PRINT LEGIBLY

Date 01/11/2024

ADDRESS OR PROPOSED WORK Commercial Wharf Facility  
113 Rock Harbor Road

ASSESSORS MAP NO. Map 8

OWNER Town of Orleans, MA

ASSESSORS LOT NO. Parcels 1 and 7

HOME ADDRESS Town of Orleans 19 School Road Orleans MA 02653

TEL. NO. \_\_\_\_\_

FULL NAMES AND ADDRESSES OF ABUTTING OWNERS. Include name of adjacent property owners across any public street or way. (Attach additional sheet if necessary).

See Exhibit A

AGENT OR CONTRACTOR Foth Infrastructure & Environment, LLC  
c/o Christine Player, Project Manager

TEL. NO. 508-762-0766

ADDRESS 15 Creek Road Marion, MA 02738 EMAIL: Christine.Player@Foth.com

DETAILED DESCRIPTION OF PROPOSED WORK: Give all particulars of work to be done (see No. 8, other side), including materials to be used, if specifications do not accompany plans. In the case of signs, give locations of existing signs and proposed locations of new signs. (Attach additional sheet, if necessary).

Signed Christine M. Player  
Owner-Contractor-Agent

APPROVED

Space below line for Committee use.

Received by H.D.C.

Date FEB 01 2024

Time Old King's Highway  
Regional Historic District Orleans  
By \_\_\_\_\_

The Certificate is hereby Approved Date 2/1/2024  
John P. [Signature] [Signature] [Signature]

Approved   
Disapproved

IMPORTANT: If Certificate is approved, approval is subject to the 10 day appeal period provided in the Act.

**ATTACHMENT A**

**BORING DATA**





# Foth

Boring	Rock Harbor - LB1
Page	1 of 1
Date	19-Dec-19
Weather	Sunny, 20 degrees, NW 15-25
Project Name	Orleans Rock Harbor, Community Pier Rehab
Job No	
Driller	Hardiman, Tom JR, Tony
Logged By	M. Campagnone, PE (MA)

Depth feet	Elev. feet	Type & No.	Sample			Pen. inch	Rec. inch	Graphic Log	Soil & Rock Descriptions
			Blows per 6"	Uncorr (Corr) Blows					
0'	9.5 NAVD88	S-1		17		24"	15"		Surface- 2" Asphalt, 6" Road Subbase (Fill)
			15 9 8 7						S1 - Medium dense, brown, fine sand, moist, trace silt <i>Spin 3" auger casing tip to 5'</i>
5'	5'	S-2		1		24"	20"		S2 - Very loose, brown, fine to medium sand, moist, trace silt, trace gravel <i>Spin 3" auger casing tip to 10'</i>
			1 0 1 1						
10'	-1'	S-3		3		24"	6"		S3 - Very loose, brown, fine to medium sand, moist, trace silt, trace gravel <i>Spin 3" auger casing tip to 15'</i>
			1 1 2 5						
15'	-6'	S-4		7		24"	24"		S4 - 0"-12" Loose, black/grey, medium to fine sand, wet, trace silt, trace gravel 12"-24" Loose, brown, fine to medium sand, wet, trace silt, trace gravel <i>Spin 3" auger casing tip to 20'</i>
			3 3 4 4						
20'	-11'	S-5		Ref		24"	8"		S5 - Medium dense, brown, fine to coarse sand, wet, trace silt, trace gravel - refused due to spoon jammed in casing <i>Spin 3" auger casing tip to 25'</i> <i>Start adding water to casing</i>
			5 50/3" Ref						
25'	-16'	S-6		19		24"	10"		S6 - Medium dense, grey, fine to very fine sand, wet trace silt (SP) <i>Spin 3" auger casing tip to 30'</i>
			5 9 10 12						
30'	-21'	S-7		49		24"	14"		S7 - 0"-12" Stiff, grey, silt, wet (BAGGED SAMPLE) 12"-14" Medium dense, brown, medium sand, wet <i>Spin 3" auger casing tip to 35'</i>
			10 20 29 42						
35'	-26'	S-8		Ref		5"	0"		S8 - Trace of grey silt in tip <i>Spin 3" auger casing tip to 40'</i>
			100/5" Ref						
40'	-31'	S-9		36		24"	16"		S9 - Dense, brown, very fine to medium sand, wet, trace silt Pockets of very fine dense sand <i>Spin 3" auger casing tip to 45'</i>
			13 16 20 26						
45'	-36'	S-10		45		24"	12"		S10 - Dense, brown, medium to fine sand, wet, trace silt <i>Spin 3" auger casing tip to 50'</i>
			10 19 26 28						
50'	-41'	S-11		45		24"	12"		S11 - Dense, brown, medium to fine sand, wet, trace silt 1" gravel stuck in tip <b>END HOLE</b>
			12 19 26 30						
55'	-46'								
60'	-51'								
65'	-56'								
70'	-61'								
75'	-66'								
80'	-71'								
85'	-76'								

Notes: Hole near fuel pumps, 10' off face of bulkhead  
 Drill and wash w/SPT and sampling 5' intervals.  
 SPT done with 2" split spoon sampler and safety hammer with cathead, CME 55 rig

Name (Density, Color, Classification), Moisture, Secondary grain Size, (USC Group Symbol)

Key: Fines Content: trace (tr) = <5%, little (lt) = 6-15%, few = 16-30%, some (sm) = 31-49%  
 Cohesiveless Soil Density (blows/ft): very loose (vl) = 0-4, loose (l) = 5-10, medium dense (md) = 11-29, dense (d) = 30-49, very dense (vd) = 50+  
 Cohesive Soil Consistency (blows/ft): very soft (vs) <2, soft (s) = 3 - 4, medium (f) = 5-8, stiff (st) = 9-15, very stiff (vst) = 16-30, hard (h) >30  
 Color: br = brown, gy = grey, gn = green, yl = yellow, ol = olive, og = orange, bl = black



# Foth

Boring	Rock Harbor - LB2
Page	1 of 1
Date	20-Dec-19
Weather	Overcast, 20-25 degrees, NE 10-15
Project Name	Orleans Rock Harbor, Community Pier Rehab
Job No	
Driller	Hardiman, Tom JR, Tony
Logged By	M. Campagnone, PE (MA)

Depth feet	Elev. feet	Type & No.	Sample				Pen. inch	Rec. inch	Graphic Log	Soil & Rock Descriptions
			Blows per 6"	Uncorr (Corr) Blows						
0'	9.4 NAVD88	S-1	5	24	24"	10"			Surface- 3" Asphalt, 6" Road Subbase (Fill)	
			14						S1 - Medium dense, brown, medium to fine sand, moist, trace silt, trace gravel	
			10						Spin 3" auger casing tip to 5'	
			8							
5'	4'	S-2	2	3	24"	6"			S2 - Very loose, brown, fine to medium sand, moist, trace silt, trace gravel	
			2							
			2							
			1						Spin 3" auger casing tip to 10'	
			3							
10'	-1'	S-3	1	2	24"	13"			S3 - Very loose, brown, fine to medium sand, wet, trace silt	
			1							
			1						Spin 3" auger casing tip to 15'	
			2							
15'	-6'	S-4	2	3	24"	2"			S4 - Very loose, brown, fine to medium sand, wet, trace silt, trace gravel	
			1							
			2						Spin 3" auger casing tip to 20'	
			2							
			5							
20'	-11'	S-5	3	13	24"	15"			S5 - Medium dense, brown, fine to medium sand, wet, trace silt, trace gravel	
			5							
			8						Spin 3" auger casing tip to 25'	
			8							
25'	-16'	S-6	11	48	22"	12"			S6 - Dense, brown, medium to fine sand, wet, trace silt, trace gravel	
			18							
			30						Spin 3" auger casing tip to 30'	
			50/2"							
30'	-21'	S-7	15	23	21"	20"			S7 - Medium dense, grey, fine to medium sand, wet, trace silt, trace gravel	
			10						Pockets of very fine, very dense, silty sand	
			13							
			50/3"						Spin 3" auger casing tip to 35'	
35'	-26'	S-8	12	48	24"	20"			S8 - Dense, grey, fine to medium sand, wet, trace silt, trace gravel	
			22							
			26						Spin 3" auger casing tip to 40'	
			28							
40'	-31'	S-9	12	48	24"	12"			S9 - Dense, grey, fine to medium sand, wet trace silt, trace gravel	
			20							
			28						Spin 3" auger casing tip to 45'	
			31							
45'	-36'	S-10	23	80	23"	12"			S10 - Very dense, grey, fine sand, wet, trace silt, trace gravel	
			31						Pockets of very fine, very dense, silty sand	
			49							
			100/5"						Spin 3" auger casing tip to 50'	
50'	-41'	S-11	10	34	24"	0"			S11 - No recovery	
			16						Took wash sample,	
			18						<b>END HOLE</b>	
			23							
55'	-46'									
60'	-51'									
65'	-56'									
70'	-61'									
75'	-66'									
80'	-71'									
85'	-76'									

Notes: Hole near mid point of bulkhead, 10' off face of bulkhead  
 Drill and wash w/SPT and sampling 5' intervals.  
 SPT done with 2" split spoon sampler and safety hammer with cathead, CME 55 rig

Name (Density, Color, Classification), Moisture, Secondary grain Size, (USC Group Symbol)

Key: Fines Content: trace (tr) = <5%, little (lt) = 6-15%, few = 16-30%, some (sm) = 31-49%  
 Cohesiveness Soil Density (blows/ft): very loose (vl) = 0-4, loose (l) = 5-10, medium dense (md) = 11-29, dense (d) = 30-49, very dense (vd) = 50+  
 Cohesive Soil Consistency (blows/ft): very soft (vs) <2, soft (s) = 3 - 4, medium (f) = 5-8, stiff (st) = 9-15, very stiff (vs) = 16-30, hard (h) >30  
 Color: br = brown, gy = grey, gn = green, yl = yellow, ol = olive, og = orange, bl = black



# Foth

Boring	Rock Harbor - LB4
Page	1 of 1
Date	23-Dec-19
Weather	Sunny, 30-40 degrees, light wind
Project Name	Orleans Rock Harbor, Community Pier Rehab
Job No	
Driller	Hardiman, Tom JR, Tony
Logged By	M. Campagnone, PE (MA)

Depth feet	Elev. feet	Type & No.	Sample				Graphic Log	Soil & Rock Descriptions
			Blows per 6"	Uncorr (Corr) Blows	Pen. inch	Rec. inch		
0'	8.9 NAVD88	S-1	21 12 12 10	24	24"	10"	Surface- 3" Asphalt, 3" Road Subbase, trace shell (Fill) S1 - Medium dense, brown, fine to medium sand, moist, trace silt, trace gravel <i>Spin 3" casing tip to 5'</i>	
5'	4'	S-2	11 7 5 3	12	24"	4"	S2 - Medium dense, brown, fine to medium sand, wet, trace silt, trace shell <i>Spin 3" casing tip to 10'</i>	
10'	-1'	S-3	7 7 5 6	12	24"	10"	S3 - Medium dense, brown, fine to medium sand, wet, trace silt, trace gravel Pockets coarse sand <i>Spin 3" casing tip to 15'</i>	
15'	-6'	S-4	10 5 7 6	12	24"	12"	S4 - 0"-6" Medium dense, brown, fine to medium sand, wet, trace silt 6"-12" Stiff, grey, silt/clay, moist (Pocket penetrometer 0.75, no shoe) <i>Spin 3" casing tip to 20'</i> <i>Clay layer extends to ±18'</i>	
20'	-11'	S-5	2 4 7 7	11	24"	15"	S5 - Medium dense, grey, fine sand, wet, trace silt <i>Spin 3" casing tip to 25'</i>	
25'	-16'	S-6	9 13 15 14	28	24"	0"	S6 - No Recovery <i>Spin 3" casing tip to 30'</i>	
30'	-21'	S-7	7 8 12 23	20	24"	8"	S7 - Medium dense, brown, medium to fine sand, wet, trace silt <i>Spin 3" casing tip to 35'</i>	
35'	-26'	S-8	7 11 11 16	22	24"	10"	S8 - Medium dense, grey, very fine silty sand, wet, little silt (Took bagged sample) <i>Spin 3" casing tip to 40'</i>	
40'	-31'	S-9	8 11 10 14	21	24"	10"	S9 - Medium dense, grey, very fine silty sand, wet, little silt (Took bagged sample) <i>Spin 3" casing tip to 45'</i>	
45'	-36'	S-10	19 35 41 31	76	24"	13"	S10 - Very dense, grey, medium to fine sand, wet, trace silt, trace gravel <i>Spin 3" casing tip to 50'</i>	
50'	-41'	S-11	8 19 46/5"	Ref	17"	12"	S11 - Very dense, grey, medium to fine sand, wet, trace silt, trace gravel <b>END HOLE</b>	
55'	-46'							
60'	-51'							
65'	-56'							
70'	-61'							
75'	-66'							
80'	-71'							
85'	-76'							

Notes: Hole near sidewalk on road  
 Drill and wash w/SPT and sampling 5' intervals.  
 SPT done with 2" split spoon sampler and safety hammer with cathead, CME 55 rig  
 Name (Density, Color, Classification), Moisture, Secondary grain Size, (USC Group Symbol)

Key: Fines Content: trace (tr) = <5%, little (lt) = 6-15%, few = 16-30%, some (sm) = 31-49%  
 Cohesiveness Soil Density (blows/ft): very loose (vl) = 0-4, loose (l) = 5-10, medium dense (md) = 11-29, dense (d) = 30-49, very dense (vd) = 50+  
 Cohesive Soil Consistency (blows/ft): very soft (vs) <2, soft (s) = 3 - 4, medium (f) = 5-8, stiff (st) = 9-15, very stiff (vst) = 16-30, hard (h) >30  
 Color: br = brown, gy = grey, gn = green, yl = yellow, ol = olive, og = orange, bl = black



# Foth

Boring	Rock Harbor - LB3
Page	1 of 1
Date	23-Dec-19
Weather	Sunny, 30-40 degrees, light wind
Project Name	Orleans Rock Harbor, Community Pier Rehab
Job No	
Driller	Hardiman, Tom JR, Tony
Logged By	M. Campagnone, PE (MA)

Depth feet	Elev. feet	Type & No.	Sample				Pen. inch	Rec. inch	Graphic Log	Soil & Rock Descriptions
			Blows per 6"	Uncorr (Corr) Blows						
0'	8.4	S-1				24"	11"		Surface- 3" Asphalt	
			50						S1 - Dense, brown, medium to fine sand, moist, trace silt, trace gravel	
			12						Spin 3" casing tip to 5'	
			22							
			19							
5'	3'	S-2		25		24"	8"		S2 - Medium dense, brown, fine to coarse sand, moist, trace silt, trace gravel	
			10							
			12						Spin 3" casing tip to 10'	
			13							
			12							
10'	-2'	S-3		26		24"	1"		S3 - Stiff, brown, clay with sand	
			5							
			12						Spin 3" casing tip to 15'	
			14						Clay layer extends to ±18'	
			13							
15'	-7'	S-4		10		24"	16"		S4 - Loose, brown, fine to medium sand, wet, few silt, trace gravel	
			6							
			5						Spin 3" casing tip to 20'	
			5							
			6							
20'	-12'	S-5		25		24"	10"		S5 - Medium dense, fine to medium sand, wet, trace silt, trace gravel	
			9							
			12						Spin 3" casing tip to 25'	
			13							
			12							
25'	-17'	S-6		38		24"	12"		S6 - Dense, grey, very fine sand, wet, trace silt, pockets medium sand	
			20							
			19						Spin 3" casing tip to 30'	
			19						Clay layer extends to ±18'	
			31							
30'	-22'	S-7		27		24"	15"		S7 - Medium dense, brown, very fine sand, wet, few silt	
			10							
			10						Spin 3" casing tip to 35'	
			17							
			22							
35'	-27'	S-8		53		24"	12"		S8 - Very dense, brown, fine sand, wet, trace silt	
			15							
			24						Spin 3" casing tip to 40'	
			29						Passed firm material 37"-39"	
			28							
40'	-32'	S-9		28		24"	14"		S9 - 0"-6" Medium dense, brown, very fine sand, wet, few silt	
			9						6"-14" Medium dense, grey, fine to coarse sand, wet, trace silt	
			14						Spin 3" casing tip to 45'	
			14							
			16							
45'	-37'	S-10		8		24"	6"		S10 - Loose, grey, medium sand, wet trace silt, trace gravel	
			4							
			5						Spin 3" casing tip to 50'	
			3							
			4							
50'	-42'	S-11		34		24"	12"		S11 - Dense, grey, medium to fine sand, wet, trace silt	
			12							
			13							
			21						END HOLE	
			31							
55'	-47'									
60'	-52'									
65'	-57'									
70'	-62'									
75'	-67'									
80'	-72'									
85'	-77'									

Notes: Hole near intersection of parking and street.  
 Drill and wash w/SPT and sampling 5' intervals.  
 SPT done with 2" split spoon sampler and safety hammer with cathead, CME 55 rig

Name (Density, Color, Classification), Moisture, Secondary grain Size, (USC Group Symbol)

Key: Fines Content: trace (tr) = <5%, little (lt) = 6-15%, few = 16-30%, some (sm) = 31-49%  
 Cohesiveness Soil Density (blows/ft): very loose (vl) = 0-4, loose (l) = 5-10, medium dense (md) = 11-29, dense (d) = 30-49, very dense (vd) = 50+  
 Cohesive Soil Consistency (blows/ft): very soft (vs) <2, soft (s) = 3 - 4, medium (f) = 5-8, stiff (st) = 9-15, very stiff (vst) = 16-30, hard (h) >30  
 Color: br = brown, gy = grey, gn = green, yl = yellow, ol = olive, og = orange, bl = black



# Foth

Boring	Rock Harbor - LB5
Page	1 of 1
Date	24-Dec-19
Weather	Sunny, 30-40 degrees, north 10-15
Project Name	Orleans Rock Harbor, Community Pier Rehab
Job No	
Driller	Hardiman, Tom JR, Tony
Logged By	M. Campagnone, PE (MA)

Depth feet	Elev. feet	Type & No.	Sample				Pen. inch	Rec. inch	Graphic Log	Soil & Rock Descriptions
			Blows per 6"	Uncorr (Corr) Blows						
0'	7.8	S-1		18	24"	6"			Surface- Gravel drive, shell	
			7						S1 - Medium dense, brown/grey, fine sand, moist, trace silt	
			9						Spin 3" casing tip to 5'	
			12							
5'	3'	S-2		1	24"	4"			S2 - Very soft, grey, organic silt, trace sand, trace shell, organics (peat), strong odor	
			1							
			0							
			1						Spin 3" casing tip to 10'	
			1							
10'	-2'	S-3		9	24"	22"			S3 - 0"-12" Medium, black, organic silt, trace sand, trace shell, organics (peat), strong odor	
			2						12"-22" Medium dense, grey, fine to medium sand, moist, trace silt	
			3							
			6						Spin 3" casing tip to 15'	
			9							
15'	-7'	S-4		10	24"	12"			S4 - Loose, grey, fine to medium sand, wet, trace silt, trace gravel	
			2							
			4							
			6						Spin 3" casing tip to 20'	
			6							
20'	-12'	S-5		15	24"	0"			S5 - No recovery, driller reports gravel ±19'	
			5							
			5							
			10						Spin 3" casing tip to 25'	
			16							
25'	-17'	S-6		13	24"	10"			S6 - Medium dense, grey, medium to fine sand, wet, trace silt, trace gravel	
			6							
			7							
			6						Spin 3" casing tip to 30'	
			7							
30'	-22'	S-7		24	24"	12"			S7 - 0"-6" Medium dense, grey, coarse sand, wet, trace gravel	
			10						6"-12" Medium dense, grey/brown, very fine sand, wet, few silt, trace gravel	
			12							
			12							
			13						Spin 3" casing tip to 35'	
35'	-27'	S-8		16	24"	8"			S8 - Medium dense, grey, fine to medium sand, wet, trace silt, trace gravel	
			10							
			9							
			7						Spin 3" casing tip to 40'	
			11							
40'	-32'	S-9		18	24"	16"			S9 - Medium dense, grey, very fine sand, wet trace silt	
			3							
			7							
			11						Spin 3" casing tip to 45'	
			11							
45'	-37'	S-10		22	24"	16"			S10 - Medium dense, grey, very fine sand, wet, few silt	
			10							
			11							
			11						Spin 3" casing tip to 50'	
			10							
50'	-42'	S-11		24	24"	16"			S11 - Medium dense, grey, fine sand, wet, few silt	
			10							
			13							
			11						END HOLE	
			20							
55'	-47'									
60'	-52'									
65'	-57'									
70'	-62'									
75'	-67'									
80'	-72'									
85'	-77'									

Notes: Hole near pile supported pier, ±100' from parking lot  
 Drill and wash w/SPT and sampling 5' intervals.  
 SPT done with 2" split spoon sampler and safety hammer with cathead, CME 55 rig

Name (Density, Color, Classification), Moisture, Secondary grain Size, (USC Group Symbol)

Key: Fines Content: trace (tr) = <5%, little (lt) = 6-15%, few = 16-30%, some (sm) = 31-49%  
 Cohesiveness Soil Density (blows/ft): very loose (vl) = 0-4, loose (l) = 5-10, medium dense (md) = 11-29, dense (d) = 30-49, very dense (vd) = 50+  
 Cohesive Soil Consistency (blows/ft): very soft (vs) <2, soft (s) = 3 - 4, medium (f) = 5-8, stiff (st) = 9-15, very stiff (vs) = 16-30, hard (h) >30  
 Color: br = brown, gy = grey, gn = green, yl = yellow, ol = olive, og = orange, bl = black



Boring	RH-2023-B1
Page	1 Page
Date	Mar. 16 2023
Weather	52 degrees, sunny, light wind
Groundwater Depth	4' feet
Total Depth of Hole	52' feet
Depth to Cored Rock	NA feet
Project Name	Rock Harbor Commercial Wharf Improvements
Job No	19O004.20
Driller	Hardiman & Assoc. T. Hardiman (III), T.Scaife
Logged By	Muraad Washington (Foth)

Depth Below Surface feet	Elev. +/- 13.9 MLW feet	Sample					Graphic Log	Soil & Rock Descriptions
		Type & No.	Blows per 6"	Uncorr (Corr) Blows	Pen. inch	Rec. inch		
1' to 2'	13.9'	S1	4 5 6 7	11	24"	12"	S1 - Medium dense, brown, fine sand, trace gravel (SP)  <i>Progress 3" Casing tip to 2"</i>	
2' to 4'	11.9'	S2	5 3 4 4	7	24"	14"	S2 - Loose, brown, fine sand, trace gravel (SP)  <i>Progress 3" Casing tip to 4"</i>	
4' to 6'	9.9'	S3	2 4 5 6	9	24"	16"	S3 - Loose, brown, fine to coarse sand (SW)  <i>Progress 3" Casing tip to 6'</i>	
6' to 8'	7.9'	S4	6 5 4 4	9	24"	20"	S4 - Loose, brown, coarse sand (SP)  <i>Progress 3" Casing tip to 8"</i>	
8' to 10'	5.9'	S5	3 8 10 11	18	24"	10"	S5 - Medium dense, brown, fine sand, trace silt (SP)  <i>Progress 3" Casing tip to 10"</i>	
10' to 12'	3.9'	S6	6 9 7 8	16	24"	18"	S6 - Medium dense, brown, fine sand, trace silt (SP)  <i>Progress 3" Casing tip to 12"</i>	
12' to 14'	1.9'	S7	6 9 9 12	18	24"	24"	S7 - Medium dense, brown, fine sand, trace silt (SP)  <i>Progress 3" Casing tip to 14'</i>	
14' to 16'	-.1'	S8	5 5 5 7	10	24"	20"	S8 - Medium dense, brown, fine sand, trace silt (SP)  <i>Start Open Hole</i>	
20' to 22'	-6.1'	S9	5 5 5 8	10	24"	20"	S9 - Medium dense, brown, fine to coarse sand, trace silt (SW)  <i>Open hole</i>	
25' to 27'	-11.1'	S10	5 17 14 10	31	24"	24"	S10 - Dense, brown, fine to coarse sand, trace silt (SW)  <i>Open hole</i>	



Boring	RH-2023-B1
Page	1 Page
Date	Mar. 16 2023
Weather	52 degrees, sunny, light wind
Project Name	Rock Harbor Commercial Wharf Improvements
Job No	19O004.20
Driller	Hardiman & Assoc. T. Hardiman (III), T.Scaife
Logged By	Muraad Washington (Foth)

Groundwater Depth	4'	feet						
Total Depth of Hole	52'	feet						
Depth to Cored Rock	NA	feet						
30' to 32'	-16.1'	S11	9 7 12 16	19	24"	24"	S11 - Medium dense, brown, fine to coarse sand, trace silt (SW)	Open hole
35' to 37'	-21.1'	S12	9 14 19 16	33	24"	16"	S12 - Dense, brown, fine to coarse sand, trace silt (SW)	Open hole
40' to 42'	-26.1'	S13	7 10 12 10	22	24"	18"	S13 - Medium dense, grey, fine sand, trace silt (SP)	Drill hit sand at 43' Open hole
45' to 47'	-31.1'	S14	7 13 9 16	22	24"	0"	S14 - No Recovery	Open hole
50' to 52'	-36.1'	S15	12 24 37 38	61	24"	24"	S15 - Very dense, brown, fine sand, trace silt (SP)	Open hole

Notes: As-built hole location N=2755683.095 E=1063728.535 EL = +/- 13.9 (MLW)  
 \*Auger Casing  
 Holes drilled with from truck rig, 3", safety hammer dropped with cathead, 2 wraps.  
 Name (Density, Color, Classification), Moisture, Secondary grain Size, (USC Group Symbol)

Key: Fines Content: trace (tr) = <5%, little (lt) = 6-15%, few = 16-30%, some (sm) = 31-49%  
 Cohesionless Soil Density (blows/ft): very loose (vl) = 0-4, loose (l) = 5-10, medium dense (md) = 11-29, dense (d) = 30-49, very dense (vd) = 50+  
 Cohesive Soil Consistency (blows/ft): very soft (vs) <2, soft (s) = 3 - 4, medium (f) = 5-8, stiff (st) = 9-15, very stiff (vs) = 16-30, hard (h) >30  
 Color: br = brown, gy = grey, gn = green, yl = yellow, ol = olive, og = orange, bl = black



Boring	RH-2023-B1		
Page	1 Page		
Date	Mar. 16 2023		
Weather	52 degrees,sunny, light wind		
Groundwater Depth	4' feet	Project Name	Rock Harbor Commercial Wharf Improvements
Total Depth of Hole	52' feet	Job No	19O004.20
Depth to Cored Rock	NA feet	Driller	Hardiman & Assoc. T. Hardiman (III), T.Scaife
		Logged By	Muraad Washington (Foth)





Boring	RH-2023-B2
Page	1 Page
Date	22-Aug-23
Weather	Clear, 72 degrees, 9 SW

Groundwater Depth	N/A	feet	Project Name	Rock Harbor Commercial Wharf Improvements - Revised Fuel Dock Location
Total Depth of Hole	52'	feet	Job No	19O004.20
Depth to Cored Rock	N/A	feet	Driller	Hardiman & Assoc. T. Hardiman (III), T. Scaife
			Logged By	Muraad Washington (Foth)

Depth Below Surface feet	Elev. 13.6 MLW feet	Sample					Graphic Log	Soil & Rock Descriptions
		Type & No.	Blows per 6"	Uncorr (Corr) Blows	Pen. inch	Rec. inch		
5' to 7'	8.6'	S1	3 4 2 4	6	24"	10"	S1 - Loose, Brown, Medium Sand, Trace Silt, Wet (SP)  <i>Drive 3" Casing tip to 10'</i>	
10' to 12'	3.6'	S2	8 15 16 11	31	24"	16"	S2 - Dense, Brown, Coarse Sand, Trace Gravel, Wet (SP)  <i>Drive 3" Casing tip to 15'</i>	
15' to 17'	-1.4'	S3	4 8 7 11	15	24"	14"	S3 - Medium Dense, Brown, Fine to Coarse Sand, Trace Silt (SW)  <i>Start Open Hole</i>	
20' to 22'	-6.4'	S4	3 7 6 9	13	24"	20"	S4 - Medium Dense, Brown, Fine Sand, Trace Silt (SP)  <i>Open Hole</i>	
25' to 27'	-11.4'	S5	5 6 10 9	16	24"	14"	S5 - Medium Dense, Brown, Fine Sand (SP)  <i>Open Hole</i>	
30' to 32'	-16.4'	S6	27 19 15 15	34	24"	18"	S6 - Dense, Brown, Fine Sand (SP)  <i>Open Hole</i>	
35' to 37'	-21.4'	S7	18 23 23 26	46	24"	16"	S7 - Dense, Brown, Fine Sand (SP)  <i>Open Hole</i>	
40' to 42'	-26.2'	S8	12 19 16 15	35	24"	14"	S8 - Dense, Brown, Fine Sand, Trace Clay (SP)  <i>Open Hole</i>	
45' to 47'	-31.2'	S9	61 22 11 11	33	24"	18"	S9 - Dense, Brown, Fine Sand, Little Clay (SP)  <i>Open Hole</i>	
50' to 52'	-36.2'	S10	19 33 53 50	86	24"	20"	S10 - Very Dense, Brown, Fine Sand (SP)  <i>Open Hole</i>  <b>END HOLE</b>	



Boring	RH-2023-B2	
Page	1 Page	
Date	22-Aug-23	
Weather	Clear, 72 degrees, 9 SW	
Groundwater Depth	N/A feet	Project Name
Total Depth of Hole	52' feet	Job No
Depth to Cored Rock	N/A feet	Driller
		Logged By

Notes:	As-built hole location N=2755725.703 E=1063636.778 EL = 13.6 (MLW)	
	Hole located in Town Wharf parking lot behind and NE of <i>Youn's Fish Market</i> . Revised tank site location	
	Holes drilled with from truck rig, 3" casing, safety hammer dropped with cathead, 2 wraps. Name (Density, Color, Classification), Moisture, Secondary grain Size, (USC Group Symbol)	

Key: Fines Content: trace (tr) = <5%, little (lt) = 6-15%, few = 16-30%, some (sm) = 31-49%  
 Cohesionless Soil Density (blows/ft): very loose (vl) = 0-4, loose (l) = 5-10, medium dense (md) = 11-29, dense (d) = 30-49, very dense (vd) = 50+  
 Cohesive Soil Consistency (blows/ft): very soft (vs) <2, soft (s) = 3 - 4, medium (f) = 5-8, stiff (st) = 9-15, very stiff (vs) = 16-30, hard (h) >30  
 Color: br = brown, gy = grey, gn = green, yl = yellow, ol = olive, og = orange, bl = black

**ATTACHMENT B**

**CONTRACT DRAWINGS**

**Entitled:**

“ROCK HARBOR COMMERCIAL WHARF IMPROVEMENT PROJECT”  
TOWN OF ORLEANS, MASSACHUSETTS  
DEPARTMENT OF PUBLIC WORKS

Issued for Bid: 03/08/2024  
(57 total sheets, including cover sheet)

**Prepared By:**

Foth Infrastructure & Environment, LLC

**Stamped By:**

Alex I. Mora P.E. & Scott Skuncik, P.E. (Foth)  
Robert P. Coluccio, P.E. (Web Engineering Associates, Inc.)  
David P. Columbo, P.E. (Power Engineers, LLC)

# ROCK HARBOR COMMERCIAL WHARF IMPROVEMENTS

TOWN OF ORLEANS, MASSACHUSETTS

DEPARTMENT OF PUBLIC WORKS

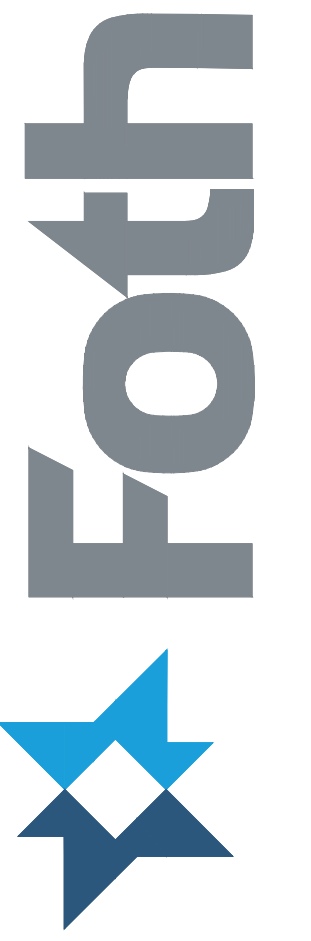
ISSUED FOR BID

MARCH 8, 2024

Prepared by



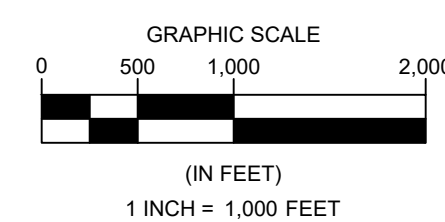
PROJECT NUMBER: 00190004.10



DEPARTMENT OF PUBLIC WORKS  
TOWN OF ORLEANS, MASSACHUSETTS  
ROCK HARBOR COMMERCIAL WHARF IMPROVEMENTS

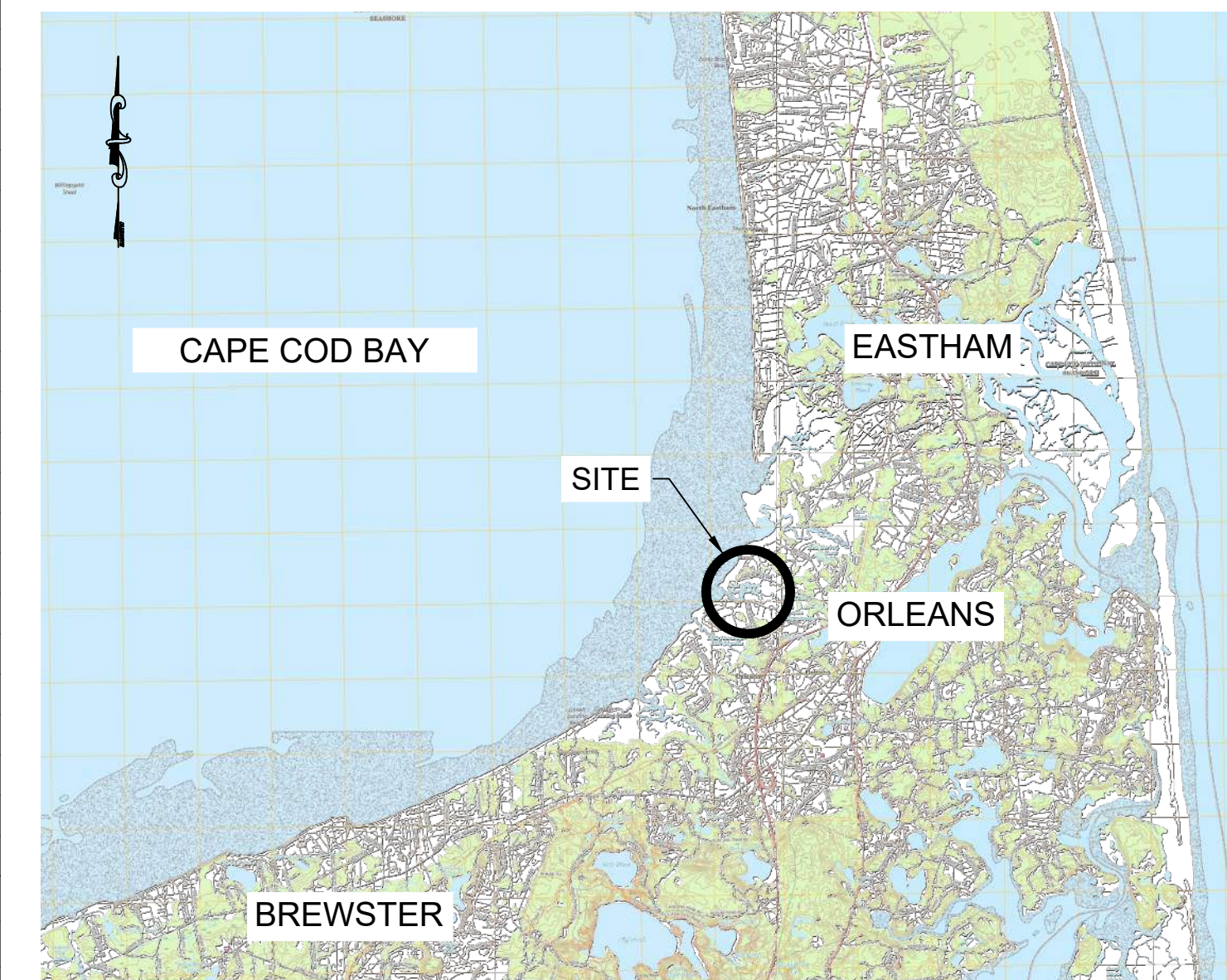


LOCATION MAP  
SCALE: 1"=1000'



DRAWING LIST	
SHEET NUMBER	SHEET TITLE
G-001	COVER SHEET & INDEX
G-002	NOTES
G-003	NOTES, LEGEND AND ABBREVIATIONS
CIVIL	
SHEET NUMBER	SHEET TITLE
V-101	EXISTING CONDITIONS
V-102	EXISTING SECTIONS
C-101	KEY PLAN
C-102	DEMOLITION PLAN 1 OF 2
C-103	DEMOLITION PLAN 2 OF 2
C-104	DEMOLITION SECTIONS
C-201	SITE PLAN 1 OF 2
C-202	SITE PLAN 2 OF 2
C-203	LAYOUT PLAN 1 OF 2
C-204	LAYOUT PLAN 2 OF 2
C-205	UTILITY PLAN 1 OF 2
C-206	UTILITY PLAN 2 OF 2
C-207	GRADING AND DRAINAGE PLAN 1 OF 2
C-208	GRADING AND DRAINAGE PLAN 2 OF 2
C-701	STANDARD CIVIL DETAILS
C-702	DRAINAGE AND WATER SERVICE DETAILS 1 OF 2
C-703	DRAINAGE AND WATER SERVICE DETAILS 2 OF 2
C-704	DRAINAGE DETAILS
C-705	INFILTRATION SYSTEM DETAILS
C-706	WATERLINE VAULT UNIT
C-707	PUMPOUT STATION DETAILS

STRUCTURAL	
SHEET NUMBER	SHEET TITLE
S-101	COMMERCIAL WHARF STRUCTURAL SITE PLAN
S-201	COMMERCIAL WHARF PILE LAYOUT PLAN
S-202	COMMERCIAL WHARF PILE CAP LAYOUT PLAN
S-203	COMMERCIAL WHARF PRECAST PLANKS LAYOUT PLAN
S-204	COMMERCIAL WHARF CIP DECK LAYOUT PLAN
S-205	TOWN PIER PLAN, PROFILE, & SECTION
S-206	COMMERCIAL LANDING PIER PLAN, PROFILE, & SECTION
S-207	TIMBER PIER DETAILS
S-501	SECTION VIEWS 1 OF 4
S-502	SECTION VIEWS 2 OF 4
S-503	SECTION VIEWS 3 OF 4
S-504	SECTION VIEWS 4 OF 4
S-701	STRUCTURAL DETAILS 1 OF 8
S-702	STRUCTURAL DETAILS 2 OF 8
S-703	STRUCTURAL DETAILS 3 OF 8
S-704	STRUCTURAL DETAILS 4 OF 8
S-705	STRUCTURAL DETAILS 5 OF 8
S-706	STRUCTURAL DETAILS 6 OF 8
S-707	STRUCTURAL DETAILS 7 OF 8
S-708	STRUCTURAL DETAILS 8 OF 8
S-709	JIB CRANE DETAILS
S-710	LIGHT POLE BASE DETAILS
FUEL	
SHEET NUMBER	SHEET TITLE
A-1	SITE DETAIL - PROPOSED MODIFICATIONS
M-1	MECHANICAL
M-2	DETAILS
S-1	CONCRETE
E-1	ELECTRICAL SCHEMATIC- POWER, DATA, AND SIGNAL CONDUITS
ELECTRICAL	
SHEET NUMBER	SHEET TITLE
E-001	ELECTRICAL SITE PLAN
E-102	ELECTRICAL LEGEND
E-103	NOTES & SCHEDULES
E-104	ELECTRICAL DETAILS
E-105	ELECTRICAL DETAILS
E-106	ELECTRICAL DETAILS



VICINITY MAP

NO.	BY	DATE	DESCRIPTION

SURVEYED	BY	DATE
MEC/JAH	MEC/JAH	10/24/19 & 3/2/21
DRAWN	BY	DATE
BAM	BAM	12/05/2023
DESIGNED	BY	DATE
SRS	SRS	06/28/2021
CHECKED	BY	DATE
PSR	PSR	12/24/2023

SHEET TITLE:  
**COVER SHEET & INDEX**

ISSUANCE:  
**ISSUED FOR BID**

PROJECT NO: 00190004.10  
SHEET NUMBER

G-001

SURVEY NOTES:

- 1. SURVEYOR: M. COUNT, J. HILL & M. COUNT, H. CHOUINARD
2. VESSEL: CLE OLAF
3. TRANS /FAH.: ODOM CVM, 200 KHZ TRANSDUCER, TRIMBLE RTK W/ KEYNET
4. WEATHER COND: SUNNY, 63 DEGREES, WIND 0-5 KTS & SUNNY, 35 DEGREES, WIND 5-10 KTS
5. DATA REDUCTION: 1' DATA SORT
6. RESULTS OF HYDROGRAPHIC & TOPOGRAPHIC SURVEY BY FOTH INFRASTRUCTURE & ENVIRONMENT, LLC. (FOTH) ON 10/24/2019 (HYDRO), 10/25/2019, 4/2/2021, & 5/10/2022 (TOPO).
7. ELEVATIONS AND SOUNDINGS ARE IN FEET AND TENTHS, AND REFER TO THE MLW DATUM.
8. DATUM CONVERSIONS SHOWN WERE CALCULATED USING VDATUM 4.1.2 AT THE PROJECT SITE (LAT: -.70,00566, LONG: 41.80346)
9. COORDINATES ARE BASED ON NAD83 MASSACHUSETTS MAINLAND STATE PLANE GRID SYSTEM.
10. PROJECT BENCHMARK IS DISK LOCATED AT ROUTE 6 ROTARY STATIONED '424 G' PUBLISHED EL. +13.23 NAVD88 (+18.94' MLW).
11. SITE BENCHMARK IS DRILLHOLE IN CONCRETE SIDEWALK EL. +9.81 NAVD88 (+15.52' MLW) (HELD)
12. RTK CORRECTIONS: RTK CORRECTIONS FOR THIS SURVEY PROVIDED BY KEYNET - VRS.
13. BENCHMARK / RTK TIDES: TIDES ARE RECORDED USING RTK TIDES IN HYPACK. ELEVATIONS FROM ELLIPSOID TO ORTHOMETRIC NAVD88 USE GEOID 12A.
14. PROJECT SITE IS IN FEMA ZONE VE 17 AND ZONE AE 14 NAVD88 IN ACCORDANCE TO FEMA FIRM #25001C0417J, EFFECTIVE DATE JULY 16, 2014.
15. PROPERTY LINES ARE REPRESENTED BY THE LATEST FROM THE DATABASE INFORMATION BASED ON MA GIS AS OF MARCH 31, 2021 AND HAVE NOT BEEN LOCATED BY SURVEY.
16. THE INFORMATION DEPICTED ON THIS PLAN SET REPRESENTS THE RESULTS OF SURVEYS ON THE MATERIALS SHOWN, AND CAN ONLY BE CONSIDERED AS INDICATING THE GENERAL CONDITIONS AT THAT TIME. INTERPOLATED INFORMATION FROM BETWEEN SOUNDING RUNS IS NOT GUARANTEED. SHOALS, OBSTRUCTIONS OR OTHER DIFFERING CONDITIONS MAY EXIST BETWEEN THESE RUNS. CONSULT WITH FOTH ENGINEERING FOR MORE DETAILED INFORMATION.
17. POSSESSION AND USE OF THE MATERIAL CONTAINED ON THESE DRAWINGS IS GRANTED ONLY IN CONNECTION WITH ITS USE AS IT RELATES TO THE TITLED PROJECT, ANY OTHER USE, REPRODUCTION OR DISCLOSURE OF THE INFORMATION CONTAINED HEREON IS EXPRESSLY PROHIBITED WITHOUT THE WRITTEN CONSENT OF FOTH.
18. DIMENSIONS ARE IN FEET AND INCHES OR TENTHS OF A FOOT UNLESS OTHERWISE NOTED.

DESIGN CRITERIA:

- 1. STRUCTURAL WORK SHALL CONFORM TO THE REQUIREMENTS OF THE MASSACHUSETTS BUILDING CODE, NINTH EDITION. WORK SHALL COMPLY WITH FEDERAL, STATE, AND LOCAL PERMITS ISSUED FOR THE PROJECT.
2. THE COMPLETED STRUCTURE HAS BEEN DESIGNED TO WITHSTAND THE FOLLOWING DESIGN LOADS APPLIED IN CONJUNCTION WITH DESIGN DREDGE/MUDLINE ELEVATIONS INDICATED ON THE CONTRACT DRAWINGS:
2.1. GENERAL BUILDING RISK CATEGORY II
2.2. LIVE LOADS: COMMERCIAL WHARF: 640 PSF UNIFORM LOAD
2.3. WIND LOAD: BASIC WIND SPEED 140 MPH
2.4. SNOW LOAD: GROUND SNOW LOAD 50 PSF
2.5. EARTHQUAKE LOAD: SEISMIC IMPORTANCE FACTOR Ie=1.0
2.6. VESSEL LOADS: PILE MOORING LOAD: 1.1 KIP
2.7. ICE LOADS: PILE PULLOUT LOAD: 8 KIP
3. FOUNDATION: REQUIRED SOIL BEARING CAPACITY 1500 PSF
4. CONCRETE: CAST-IN-PLACE CONCRETE fcc=5,000 PSI (UNLESS OTHERWISE NOTED)
5. STEEL: STEEL W AND WT SHAPES ASTM A992
6. TIMBER: TIMBER PILES - FENDER 12" Ø GREENHEART
TIMBER PILES - PIER 12" Ø SOUTHERN YELLOW PINE
TIMBER BRACES 2.5 PCF CCA
TIMBER PILE CAPS 2.5 PCF CCA
TIMBER STRINGERS 0.23 PCF MCA
TIMBER DECKING 0.23 PCF MCA
TIMBER STRINGERS 2.5 PCF CCA
TIMBER BRACES 2.5 PCF CCA
TIMBER PILE CAPS AND STRINGERS 0.23 PCF MCA
TIMBER RAILING 0.23 PCF MCA
TIMBER DECKING 0.23 PCF MCA
TIMBER STRINGERS 2.5 PCF CCA
TIMBER BRACES 2.5 PCF CCA
TIMBER PILE CAPS AND STRINGERS 0.23 PCF MCA
TIMBER RAILING 0.23 PCF MCA
TIMBER DECKING 0.23 PCF MCA

- 7. PILE TIP ELEVATIONS & CAPACITIES
24" Ø x 3/4" STEEL PIPE PILES 275 TON ULTIMATE CAPACITY
GROUND ANCHORS 403.30 KIPS DESIGN LOAD
MIN. TIP EL. = -35.50'
AZ19-700 SHEET PILES MIN. TIP EL. = -28.75'
AZ14-770 SHEET PILES MIN. TIP EL. = -32.50'
12"Ø GREENHEART SOUTH FLOAT PILES MIN. TIP EL. = -31.50'
12"Ø GREENHEART NORTH FLOAT PILES MIN. TIP EL. = -27.00'
12"Ø GREENHEART BERTHING PILES MIN. TIP EL. = -27.00'
12"Ø GREENHEART GANTRY PILES MIN. TIP EL. = -23.70'
12"Ø GREENHEART FENDER PILES 11 TON ULTIMATE CAPACITY
12"Ø CCA PIER PLUMB PILES 6 TON ULTIMATE CAPACITY
12"Ø CCA PIER BATTERED PILES
\* CONTRACTOR SHALL CONFIRM REQUIRED PILE LENGTHS

GENERAL CONDITIONS:

- 1. NO GUARANTEE TO THE ACCURACY OF THE REFERENCE DOCUMENTS IS PROVIDED HEREIN AND THE CONTRACTOR SHALL RELY ON HIS OWN FIELD VERIFICATION FOR ITEMS SO REQUIRED.
2. NOTES HEREIN ARE NOT INTENDED TO REPLACE SPECIFICATIONS. SEE SPECIFICATIONS FOR REQUIREMENTS AND ADDITIONAL INFORMATION.
3. DATA COLLECTED ASSOCIATED WITH THIS PROJECT IS CONTAINED WITH THE DOCUMENT ENTITLED "ROCK HARBOR COMMERCIAL WHARF IMPROVEMENTS" PROVIDED AS AN ATTACHMENT TO THE BID DOCUMENTS.
4. SEE ATTACHMENT "A" IN THE CONTRACT DOCUMENTS FOR GEOTECHNICAL BORING LOG INFORMATION BY FOTH ON DECEMBER 19-23, 2019, RH-2023-B1 TAKEN MARCH 16, 2023, AND RH-2023-B2 TAKEN AUGUST 22, 2023.
5. THE CONTRACTOR IS ADVISED THAT THE DRAWINGS AND SPECIFICATIONS FORM A PART OF THE CONTRACT DOCUMENTS. ALL WORK SHALL BE PERFORMED IN ACCORDANCE WITH THE CONTRACT DOCUMENTS. THE CONTRACTOR SHALL KEEP A COPY OF THE DRAWINGS, SPECIFICATIONS, AND PERMITS ONSITE AT ALL TIMES DURING THE PROJECT.
6. THE CONTRACTOR SHALL VERIFY THE LOCATION OF ALL UNDERGROUND UTILITIES AND SUBMERGED UTILITIES WITHIN THE LIMITS OF THE WORK PRIOR TO COMMENCING ANY EXCAVATION OR GROUND PENETRATING WORK. THE CONTRACTOR SHALL NOTIFY "DIG SAFE" (1-888-344-7223) AT LEAST 3 BUSINESS DAYS PRIOR TO COMMENCEMENT OF THE EXCAVATION OR GROUND PENETRATING ACTIVITY.
7. IT IS THE CONTRACTORS RESPONSIBILITY TO PROVIDE AND MAINTAIN ENVIRONMENTAL CONTROLS AS REQUIRED BY STATE, LOCAL, AND FEDERAL REGULATION AND LAW, AS WELL AS REQUIRED WITHIN EXISTING PERMITS AND APPROVALS.
8. BASE PLAN COMPILED BY FOTH USING AVAILABLE MAGIS DATA.
9. SECTIONS, DETAILS, NOTES, DIMENSIONS AND CONDITIONS ARE APPLICABLE AT ANY OTHER LOCATION WHERE CONDITIONS AND DETAIL ARE SIMILAR BUT ARE NOT SPECIFICALLY NOTED AS SUCH OR ARE NOT SHOWN.
10. THE CONTRACTOR SHALL PERFORM THE WORK IN A MANNER THAT DOES NOT IMPEDE THE OWNER'S OPERATIONS ON SITE OR THE OWNER'S ON-SITE OPERATING EQUIPMENT.
11. THE CONTRACTOR PRIOR TO CONSTRUCTION AND FABRICATION OF CONSTRUCTION MATERIALS SHALL VERIFY EXISTING CONDITIONS AND DIMENSIONS. LENGTHS SHOWN ON THE DRAWINGS ARE CONSIDERED APPROXIMATE, AND THE ACTUAL LENGTHS MAY VARY WHEN SO ACCEPTED BY THE ENGINEER.
12. IF, DURING THE PERFORMANCE OF THE WORK, THE CONTRACTOR FINDS A CONFLICT, ERROR, OR DISCREPANCY IN THE CONTRACT DOCUMENTS, THE CONTRACTOR SHALL SO REPORT TO THE ENGINEER OF RECORD IN WRITING AT ONCE, BEFORE PROCEEDING WITH THE WORK AFFECTED THEREBY. THE CONTRACTOR SHALL OBTAIN A WRITTEN INTERPRETATION OR CLARIFICATION FROM THE ENGINEER OF RECORD. WORK DONE BEFORE THE ENGINEER OF RECORD RENDERS THIS DECISION IS AT THE CONTRACTORS SOLE RISK.
13. THIS WORK SHALL BE PERFORMED IN A GENERAL SEQUENCE DEVELOPED BY THE CONTRACTOR AND SUBMITTED TO THE ENGINEER OF RECORD FOR REVIEW, IN ACCORDANCE WITH THE REQUIREMENTS OF THE CONTRACT. THE CONTRACTOR IS SOLELY RESPONSIBLE FOR THE MEANS AND METHODS OF CONSTRUCTION AND FOR THE SEQUENCES AND PROCEDURES TO BE USED.
14. THE CONTRACTOR SHALL FURNISH AND COORDINATE PLANT, LABOR, SUPERVISION, MATERIALS, EQUIPMENT AND APPLIANCES FOR DEMOLITION AND/OR CONSTRUCTION WORK IN CONNECTION WITH THE DEMOLITION AND/OR CONSTRUCTION OF THE WATERFRONT FACILITIES.
15. THE OWNER HAS SECURED CERTAIN PERMITS REQUIRED BY FEDERAL, AND STATE AUTHORITIES FOR THE PROPOSED ACTIVITIES. IT IS THE RESPONSIBILITY OF THE CONTRACTOR TO PERFORM THE WORK IN ACCORDANCE WITH THE TERMS AND CONDITIONS OF SUCH PERMITS. THIS INCLUDES BUT NOT LIMITED TO, THE CLEAN WATER ACT, THE FEDERAL DEPARTMENT OF LABOR, OCCUPATIONAL SAFETY, HEALTH ACT, 401 WATER QUALITY CERTIFICATION, CHAPTER 91 LICENSE, STATE & LOCAL WETLAND REGULATIONS, AND U.S. ARMY CORP OF ENGINEERS PERMIT. THE CONTRACTOR SHALL POST COPIES OF THE PERMITS AT THE SITE THROUGHOUT THE COURSE OF THE WORK. THE CONTRACTOR IS RESPONSIBLE TO OBTAIN PERMITS ASSOCIATED WITH THE LEGAL DISPOSAL OF CONSTRUCTION DEBRIS. THE CONTRACTOR SHALL SECURE REQUIRED LOCAL AUTHORIZATIONS AND PERMITS.
16. SPECIAL INSPECTION REQUIREMENTS PER LOCAL AND/OR STATE BUILDING CODES SHALL BE FULFILLED AND SHALL BE COORDINATED BY THE OWNER. THE CONTRACTOR SHALL INFORM THE OWNER OF THE RESULTS OF THE SPECIAL INSPECTIONS AS TO WHEN SPECIAL INSPECTIONS ARE TO OCCUR SUCH AS TO NOT DELAY THE SCHEDULE.
17. THE CONTRACTOR SHALL FURNISH MATERIALS FOR INSTALLATION IN THE COMPLETED WORK AS SPECIFIED HEREINAFTER. THE CONTRACTOR SHALL HANDLE THESE MATERIALS AS THEY ARE DELIVERED TO THE SITE OR OFF-SITE WORK AREAS AND SHALL STORE THEM IN A DESIGNATED STORAGE AREA.
18. THE CONTRACTOR WILL INDEMNIFY AND SAVE HARMLESS THE OWNER AND ENGINEER OF RECORD FROM AND AGAINST ALL LOSSES AND ALL CLAIMS, DEMANDS, PAYMENTS, SUITS, ACTIONS, RECOVERIES, AND JUDGMENTS OF EVERY NATURE AND DESCRIPTION BROUGHT OR RECOVERED AGAINST THE OWNER AND ENGINEER OF RECORD BY REASON OF ANY ACT OR OMISSION OF THE CONTRACTOR OR THE CONTRACTOR TO THE CONTRACTOR OR ANY PERSON OR ENTITY, DIRECTLY OR INDIRECTLY EMPLOYED BY THE CONTRACTOR OR ANY SUCH SUBCONTRACTOR, IN THE PERFORMANCE OF ANY WORK FOR, OR THE RENDERING OF ANY SERVICES TO, THE OWNER. THE CONTRACTOR AGREES THAT, AT ITS OWN COST AND EXPENSE, IT SHALL PROCURE AND CONTINUE IN FORCE, INSURANCE COVERAGE AS REQUIRED BY THE OWNER. SUCH INSURANCE SHALL BE WRITTEN BY A COMPANY OR COMPANIES AUTHORIZED TO ENGAGE IN THE BUSINESS OF GENERAL LIABILITY INSURANCE IN THE STATE IN WHICH THE DEMISED PREMISES ARE LOCATED, AND THERE SHALL BE DELIVERED TO THE OWNER WITH THE BID CUSTOMARY CERTIFICATES EVIDENCING SUCH PAID-UP INSURANCE, WHICH CERTIFICATES ARE TO BE ISSUED BY THE INSURANCE COMPANIES. GOOD AND RESPONSIBLE COMPANIES, REASONABLY ACCEPTABLE TO THE OWNER, SHALL WRITE SUCH INSURANCE.
19. THE ENGINEER AND ITS SUB CONSULTANTS SHALL BE ADDED TO THE CONTRACTOR'S GENERAL LIABILITY INSURANCE POLICY AS ADDITIONAL INSURED ON PRIMARY AND CON-CONTRIBUTORY BASIS. SUBMIT CERTIFICATES OF INSURANCE TO THE ENGINEER AS EVIDENCE OF THIS COVERAGE.
20. THE CONTRACTOR SHALL BE SOLELY RESPONSIBLE FOR THE ACCURACY OF LOCATIONS, DIMENSIONS, AND LEVELS AND NO PLEA AS TO INSTRUCTIONS OR ORDER RECEIVED FROM OTHER SOURCES OTHER THAN INFORMATION CONTAINED ON CONTRACT DRAWINGS, SPECIFICATIONS OR IN WRITTEN ORDERS OF THE OWNER OR ENGINEER OF RECORD SHALL JUSTIFY DEPARTURE FROM THE DIMENSIONS AND ELEVATIONS REQUIRED BY THE CONTRACT DRAWINGS. THE CONTRACTOR SHALL MAINTAIN ADEQUATE SURVEY CONTROL AT ALL TIMES TO ESTABLISH AND MAINTAIN ALL LINES AND ELEVATIONS SHOWN ON THE CONTRACT DRAWINGS.
21. THE CONTRACTOR SHALL TAKE HIS OWN MEASUREMENTS AT THE SITE, VERIFYING THE SAME WITH THE CONTRACT DRAWINGS AND EXISTING FACILITIES, AND WILL BE HELD RESPONSIBLE FOR THE PROPER FIT AND ALIGNMENT OF COMPLETED WORK IN POSITION.
22. THE CONTRACTOR SHALL GUARANTEE TO THE OWNER MATERIALS AND WORKMANSHIP AGAINST ORIGINAL DEFECTS, OR AGAINST INJURY FROM PROPER AND USUAL WEAR WHEN USED FOR THE PURPOSE INTENDED, FOR TWELVE (12) MONTHS AFTER DATE OF FINAL PAYMENT CERTIFICATIONS AND SHALL MAINTAIN ITEMS IN PERFECT CONDITION DURING THE PERIOD OF GUARANTEE. DEFECTS APPEARING DURING THE PERIOD OF GUARANTEE SHALL BE MADE GOOD BY THE CONTRACTOR AT HIS EXPENSE UPON DEMAND OF THE OWNER. IT BEING REQUIRED THAT WORK SHALL BE IN PERFECT CONDITION WHEN THE PERIOD OF GUARANTEE SHALL HAVE ELAPSED. IN THE EVENT OF DEFAULT BY THE CONTRACTOR, THE COMPANY SHALL HAVE THE RIGHT TO MAKE GOOD DEFECTS AND BILL THE CONTRACTOR COST PLUS 15% FOR ADMINISTRATION FEES.
24. AT THE CONTRACTOR'S EXPENSE, THE CONTRACTOR'S WORKING AREAS SHALL BE CLEANED ON A DAY-TO-DAY BASIS, WITH RUBBISH REMOVED FROM THE SITE AND WORK AREAS CLEANED AT THE END OF EACH DAY. AT FINAL COMPLETION OF WORK THE CONTRACTOR SHALL LEAVE THE ENTIRE PREMISES, WITHIN THE SITE OF HIS OPERATIONS, CLEAN AND FREE FROM THE RUBBISH RESULTING FROM HIS CONSTRUCTION OPERATIONS.
25. THE CONTRACTOR IS RESPONSIBLE TO PROVIDE AND MAINTAIN UTILITIES AS DEEMED NECESSARY

- 26. THE CONTRACTOR SHALL PROVIDE FIELD ENGINEERING SERVICES REQUIRED FOR PROPER COMPLETION OF THE WORK INCLUDING, BUT NOT NECESSARILY LIMITED TO: ESTABLISHING AND MAINTAINING LINES AND LEVELS; STRUCTURAL DESIGN OF SHORES, FORMS, AND SIMILAR ITEMS PROVIDED BY THE CONTRACTOR AS PART OF HIS MEANS AND METHODS OF CONSTRUCTION.
27. THE CONTRACTOR SHALL PROVIDE AND MAINTAIN AT HIS EXPENSE REQUIRED FIRE PROTECTION SYSTEMS AND DEVICES AS NECESSARY TO SAFELY PERFORM THE WORK IN ACCORDANCE WITH THE APPLICABLE REGULATIONS. IT SHALL BE OPERATIONAL THROUGHOUT THE PERIOD OF CONSTRUCTION.
28. THE OWNER SHALL HAVE THE RIGHT TO WITHHOLD WITHOUT PENALTY PAYMENT DESCRIBED ABOVE, OR SECTIONS REFERENCED HEREIN, FOR COMPLETED WORK SHOULD THE CONTRACTOR FAIL TO MEET OBLIGATIONS OR REQUIREMENTS OF THE CONTRACT. WITHHELD PAYMENT SHALL BE PROMPTLY MADE UPON THE CONTRACTOR'S FULL COMPLIANCE WITH THE CONTRACT.
29. COMPLY WITH LOCAL, STATE, AND FEDERAL REQUIREMENTS FOR PROTECTION OF THE ENVIRONMENT DURING THE WORK. ENSURE THAT PERSONNEL ARE PROPERLY TRAINED AND THAT SUFFICIENT EQUIPMENT AND MATERIALS ARE READILY AVAILABLE FOR USE IF REQUIRED.
30. ABIDE BY STATE AND FEDERAL SPILL REPORTING REQUIREMENTS. NO LATER THAN 21 DAYS FOLLOWING AWARD OF CONTRACT, SUBMIT A COMPREHENSIVE PLAN DESCRIBING THE MEANS AND METHODS TO BE EMPLOYED FOR PROTECTION, CONTAINMENT, AND CLEAN UP.
31. THE OWNER RESERVES THE RIGHT TO CHARGE THE CONTRACTOR FOR ADDITIONAL ENGINEERING SERVICES IF REQUIRED DUE TO THE CONTRACTOR'S ACTIONS OR INACTIONS.
32. THE CONTRACTOR IS SOLELY RESPONSIBLE FOR THE SAFETY OF HIS OPERATIONS, AND SHALL TAKE REASONABLE PRECAUTIONS FOR THE SAFETY OF, AND SHALL PROVIDE REASONABLE PROTECTION TO PREVENT DAMAGE, INJURY, OR LOSS TO PERSONS EMPLOYED BY THE CONTRACTOR IN PERFORMANCE OF THE WORK, AND PERSONS NEARBY THAT MAY BE AFFECTED BY THE CONTRACTOR'S OPERATIONS OR THE WORK, INCLUDING EQUIPMENT AND MATERIALS WHICH WILL BE INCORPORATED IN THE WORK AND OTHER PROPERTIES AND STRUCTURES AT THE SITE, OR ON ADJACENT PROPERTIES.
33. OBSTRUCTIONS ARE DEFINED AS UNFORESEEN OBJECTS, WHICH IMPEDE PROGRESS, OBJECTS, WHICH ARE MADE KNOWN TO THE CONTRACTOR, WILL NOT BE CONSIDERED TO BE OBSTRUCTIONS. NOTIFY THE ENGINEER OF RECORD IMMEDIATELY UPON ENCOUNTERING OBSTRUCTIONS. NO CONSIDERATION WILL BE GIVEN FOR ADDITIONAL COMPENSATION ON THIS ACCOUNT WITHOUT THIS TIMELY NOTIFICATION.
34. SUBSTITUTIONS MAY BE FURNISHED FOR MATERIALS SPECIFIED HEREIN PROVIDED THE CONTRACTOR SECURES ACCEPTANCE FROM THE ENGINEER OF RECORD.

ALUMINUM GANGWAY:

- 1. ALUMINUM RAMP AND ALL INCIDENTAL PARTS INCLUDING FASTENERS AND CONNECTORS SHALL BE MANUFACTURED BY ALUMINODUCK, RANDOLF, NY, OR AN EQUIVALENT ACCEPTED BY THE ENGINEER OF RECORD. THE RAMP SHALL HAVE A MINIMUM CLEAR WALKWAY OF 48 INCHES AND BY 40 FEET IN TOTAL WALKWAY LENGTH.
2. ALL ALUMINUM EXTRUSIONS SHALL BE ALUMINUM ALLOY 6061-T6 EXTRUDED IN ACCORDANCE WITH THE APPLICABLE REQUIREMENTS OF FEDERAL SPECIFICATION QQ-A-200.
3. BOLTS, RODS, NUTS, WASHERS, SCREWS, AND OTHER FASTENERS SHALL BE TYPE 304 STAINLESS STEEL.
4. ROLLERS FOR RAMP SHALL BE UHMW POLYURETHANE WITH BLACK ULTRAVIOLET LIGHT INHIBITOR ADDED, OR AN EQUIVALENT ACCEPTED BY THE ENGINEER OF RECORD.
5. METAL FOR DECKING AND HANDRAILS SHALL BE 6063-T6 ALUMINUM ALLOY. EXTRUDED PIPE FOR HANDRAILS AND STRUCTURES SHALL BE 1-1/2" DIAMETER MINIMUM PIPE.
6. DECKING SHALL BE EXTRUDED ALUMINUM SLATS, EMBOSSED TO PROVIDE A NON-SLIP SURFACE, AND SHALL NOT EXCEED NINE (9) INCHES IN WIDTH WITH NOT MORE THAN 3/8-INCH AIR SPACE BETWEEN ADJACENT SLATS. THE LEGS OF EACH DECKING SLAT SHALL BE WELDED TO THE SIDE MEMBERS AND TO ANY LONGITUDINAL MEMBERS WITH A MINIMUM OF 1-1/4 INCHES OF WELD PER LEG. THE DECKING SLATS SHALL BE PLACED TRANSVERSELY ON THE GANGWAY OR DOCK.
7. HANDRAILS ARE REQUIRED ALONG EACH SIDE OF EACH GANGWAY. REMOVABLE HANDRAILS SHALL BE MOUNTED WITHIN SLEEVES FASTENED TO THE GANGWAY, SECURED WITH STAINLESS STEEL BOLTS.
8. GANGWAYS SHALL HAVE A DETACHABLE HINGE MOUNT FOR SECURING THE GANGWAY TO A WALL OR FIXED STRUCTURE. HINGE MOUNT EXTRUSIONS SHALL BE WELDED TO THE FRAME OF THE GANGWAY WITH A CONTINUOUS FILLET WELD UNLESS OTHERWISE SHOWN ON THE DRAWINGS. NON-HINGED DECK MODULE CONNECTORS SHALL BE SHOWN ON THE DRAWINGS.
9. ANY INSTALLATION OF DISSIMILAR MATERIALS SHALL BE PROPERLY INSULATED TO AVOID CONTACT OF DISSIMILAR METALS AND TO MINIMIZE OR ELIMINATE CORROSION IN A MARINE ENVIRONMENT.
10. GANGWAYS SHALL BE SECURELY FASTENED TO CERTAIN FIXED STRUCTURES. DETAIL SHALL BE DESIGNED BY A PROFESSIONAL ENGINEER REGISTERED IN THE STATE OF MASSACHUSETTS AND BE PROVIDED TO THE OWNERS REPRESENTATIVE FOR APPROVAL. UTILITIES RUNNING ON THE GANGWAY SHALL BE INSTALLED SO AS NOT TO INTERFERE WITH THE ACCESS AREA OF THE GANGWAY OR TO BE DAMAGED DURING NORMAL OPERATION.

BITUMINOUS CONCRETE PAVING:

- 1. BITUMINOUS CONCRETE PAVING SHALL CONFORM TO THE REQUIREMENTS OF THE COMMONWEALTH OF MASSACHUSETTS DEPARTMENT OF TRANSPORTATION STANDARD SPECIFICATION FOR HIGHWAYS AND BRIDGES.
2. ASPHALT MIXTURE SHALL MATCH EXISTING.

CATHODIC PROTECTION:

- 1. ALUMINUM ANODES FOR PASSIVE CATHODIC PROTECTION OF STEEL STRUCTURES IN MARINE ENVIRONMENTS SHALL COMPLY WITH THE REQUIREMENTS OF ASTM B418.
2. ANODES SHALL BE INSTALLED BY AN EXPERIENCED CONTRACTOR, MINIMUM 5 YEARS OF EXPERIENCE, UNDER THE SUPERVISION OF A CORROSION SPECIALIST CERTIFIED BY NACE.
3. CATHODIC PROTECTION SHALL BE TESTED AFTER INSTALLATION. SUBMIT TEST RESULTS IN A REPORT TO THE ENGINEER FOR REVIEW AND ACCEPTANCE.
4. CONTRACTOR SHALL SUBMIT, FOR THE REVIEW OF THE ENGINEER, INSTALLER AND TESTER QUALIFICATIONS, NACE INTERNATIONAL CORROSION CERTIFICATIONS, METHODS, AND PROCEDURES FOR TESTING CORROSION CONTROL SYSTEM, INCLUDING DESCRIPTION OF INSTRUMENTS AND EQUIPMENT TO BE USED.
5. ANODES SHALL BE ROTOMETALS ALUMANODE AH20 (2" X 4" X 24") OR EQUIVALENT ACCEPTED BY THE ENGINEER.
6. ANODES SHALL BE INSTALLED AS SHOWN ON SHEET S-703.

CONCRETE:

- 1. CONCRETE WORK SHALL CONFORM TO THE REQUIREMENTS OF ACI-318 "BUILDING CODE REQUIREMENTS FOR STRUCTURAL CONCRETE", & SECTION 13 OF ACI-320 FOR PRECAST CONCRETE, AS ADOPTED BY THE AMERICAN CONCRETE INSTITUTE.
2. NO WATER SHALL BE ADDED TO THE MIX AT THE JOB SITE.
3. CONCRETE SHALL BE CONTROLLED CONCRETE, MIXED AND PLACED IN THE PRESENCE OF THE APPROVED TESTING AGENCY.
4. STRUCTURAL JOINTS SHOWN ON THE DRAWINGS ARE MANDATORY. ADDITIONAL STRUCTURAL JOINTS AND MODIFICATIONS AS REQUIRED TO EXECUTE THE CONSTRUCTION SHALL BE SUBMITTED TO THE ENGINEER FOR APPROVAL.
5. DO NOT PLACE CONCRETE UNTIL REINFORCEMENT AND EMBEDDED ITEMS HAVE BEEN APPROVED BY THE ENGINEER AND/OR THE APPROVED TESTING AGENCY (IF/WHEN DIRECTED). PROVIDE A MINIMUM OF 24 HOURS NOTIFICATION TO THE ENGINEER.

DEMOLITION NOTES:

- 1. NOTIFY OWNER/OWNER'S PROJECT ENGINEER OF DISCREPANCIES BETWEEN EXISTING CONDITIONS AND DRAWINGS BEFORE PROCEEDING WITH DEMOLITION.
2. LIMITS DEPICTED ON THE CONTRACT PLANS CAN ONLY BE CONSIDERED AS APPROXIMATE FIELD CONDITIONS. IT IS NOT THE INTENT OF THE PLANS TO SHOW THE EXACT LOCATION OR EXTENT OF EXISTING DETERIORATION ON STRUCTURES. THE CONTRACTOR IS TO FULLY APPRISE HIMSELF OR HERSELF OF THE SITE CONDITIONS PRIOR TO START OF WORK.
3. DO NOT BEGIN DEMOLITION UNTIL NOTIFIED TO PROCEED BY THE OWNER OR PROJECT ENGINEER AND ALL REQUIRED PERMITS & PERMISSIONS FROM THE TOWN OF ORLEANS ARE OBTAINED.
4. SELECTIVE DEMOLITION AND DISPOSAL SHALL BE PERFORMED IN ACCORDANCE WITH FEDERAL, STATE, AND LOCAL PERMIT AND BUILDING CODE REQUIREMENTS.
5. THE CONTRACTOR SHALL REMOVE AND DISPOSE OF THOSE STRUCTURES AND DERELICT COMPONENTS AS REQUIRED TO PERFORM THE WORK. THIS WORK INCLUDES BUT IS NOT LIMITED TO TIMBER OR STEEL BULKHEAD, CONCRETE PLATFORMS, TIMBER PILES, CONCRETE AND TIMBER DEBRIS, STEEL DEBRIS, UTILITIES, AND OTHER ITEMS AS INDICATED ON THE DRAWINGS.
6. SELECTIVE DEMOLITION INCLUDES BUT IS NOT LIMITED TO REMOVAL AND REUSE (WHERE POSSIBLE) OF EXISTING MATERIALS, UTILITIES, AND OTHER COMPONENTS ESSENTIAL FOR A COMPLETE PROJECT.
7. ITEMS TO BE REMOVED AND REUSED SHALL BE PLACED IN A STAGING AREA ACCESSIBLE FOR INSPECTION BY THE OWNER.
8. PRIOR TO COMMENCEMENT OF SELECTIVE DEMOLITION, THE CONTRACTOR SHALL SUBMIT A DISPOSAL PLAN FOR ITEMS TO BE DEMOLISHED. DEMOLITION MATERIAL DESIGNATED BY THE OWNER TO BE REMOVED FROM THE SITE SHALL BECOME THE PROPERTY OF THE CONTRACTOR. THE DEBRIS DISPOSAL PLAN SHALL ACKNOWLEDGE THIS OWNERSHIP AND SHALL IDENTIFY THE MEANS AND METHODS AND FINAL DISPOSITION FOR DISPOSAL MATERIALS.

- 9. PRIOR TO COMMENCEMENT OF DEMOLITION, THE CONTRACTOR SHALL CLEARLY MARK THE LIMITS OF THE DEMOLITION FOR REVIEW AND APPROVAL BY THE OWNER.
10. COMPLETELY REMOVE ITEMS DESIGNATED LEAVING SURFACES CLEAN, SOUND, AND READY TO RECEIVE NEW MATERIALS AS SPECIFIED IN THE CONTRACT DOCUMENTS.
11. THE CONTRACTOR SHALL BE SOLELY RESPONSIBLE FOR THE STABILITY OF THE STRUCTURE DURING THE COURSE OF DEMOLITION.
12. THE CONTRACTOR SHALL SUBMIT A DISPOSAL CERTIFICATE TO THE OWNER'S REPRESENTATIVE CERTIFYING LEGAL AND PROPER DISPOSAL.
13. THE CONTRACTOR SHALL TAKE REASONABLE CARE IN REMOVING ELEMENTS SELECTED TO BE DEMOLISHED IN ACCORDANCE WITH THE CONTRACT DOCUMENTS. IF THE CONTRACTOR'S EQUIPMENT OR METHODS RESULT IN DAMAGE TO ADJACENT STRUCTURES OR ELEMENTS TO REMAIN OR CAUSE DEMOLITION BEYOND INDICATED LIMITS OR ACCEPTABLE LIMITS NECESSARY TO COMPLETE SUCCESSFUL REPAIRS, OR RESULTS IN DAMAGE TO OTHER PROPERTY OF THE OWNER, THEN THE PROJECT ENGINEER WILL DIRECT THE CONTRACTOR TO MODIFY DEMOLITION OPERATIONS. SUCH MODIFICATION SHALL BE PERFORMED AT NO ADDITIONAL EXPENSE TO THE OWNER AND/OR FOTH. DEMOLITION BEYOND ACCEPTED LIMITS SHALL BE REPAIRED BY THE CONTRACTOR AT NO ADDITIONAL EXPENSE TO THE OWNER. DAMAGE OR DESTRUCTION BY THE CONTRACTOR TO EXISTING ELEMENTS DESIGNATED TO REMAIN SHALL BE REPAIRED OR REPLACED IN-KIND AT THE DISCRETION OF THE OWNER AT NO ADDITIONAL COST TO THE OWNER AND/OR FOTH.
14. APPLICABLE FOR AREAS WHERE NEW CONCRETE ABUTS EXISTING CONCRETE SURFACES, CONTRACTOR SHALL COMPLETELY REMOVE ALL LOOSE, DELAMINATED AND WEAK CONCRETE, OIL, GREASE, LAITANCE, MARINE GROWTH AND OTHER CONTAMINANTS FROM THE SURFACE IN PREPARATION FOR NEW CONCRETE. PREPARE CONCRETE SURFACE USING ACCEPTABLE MECHANICAL MEANS AND CONCRETE CLEANERS AND DEGREASERS AS NECESSARY TO OBTAIN CLEAN, SOUND AND ROUGH SURFACES. COARSE AGGREGATE SHALL BE EXPOSED AND ALL MARINE GROWTH REMOVED.

EARTHWORK NOTES:

- 1. DO NOT BEGIN BACKFILLING UNTIL CONSTRUCTION BELOW FINISH GRADE HAS BEEN APPROVED AND THE EXCAVATION IS CLEAN OF TRASH AND DEBRIS.
2. HEAVILY SURFACE COMPACT SUBGRADE IN UPLAND AREA WITH A MINIMUM OF 6 PASSES OF A VIBRATORY ROLLER HAVING A DRUM WEIGHT OF AT LEAST 10,000 POUNDS AND A DYNAMIC FORCE OF AT LEAST 20,000 POUNDS PRIOR TO PLACING FILL.
3. PLACE FILL AND BACKFILL TO INDICATED FINISH GRADE WITHIN A TOLERANCE OF ONE FOOT HORIZONTALLY AND 1 INCH VERTICALLY.
4. STRUCTURAL FILL SHALL CONSIST OF BROKEN OR CRUSHED STONE, BANK OR CRUSHED GRAVEL, OR MIXTURES THEREOF. BROKEN OR CRUSHED STONE SHALL CONSIST OF WELL-GRADED, SOUND, TOUGH, DURABLE STONE. BANK OR CRUSHED GRAVEL SHALL CONSIST OF WELL-GRADED, SOUND, TOUGH, DURABLE PARTICLES OF CRUSHED OR UNCRUSHED GRAVEL FREE FROM SOFT, THIN, ELONGATED OR LAMINATED PIECES AND ORGANIC OR OTHER DELETERIOUS SUBSTANCES. STRUCTURAL FILL SHALL WELL GRADED WITH 100% MASS PASSING THE 90 mm (3.5") SQUARE MESH SIEVE. SUBMIT AN INDEPENDENT GRADATION ANALYSIS AND MODIFIED PROCTOR TEST FOR ENGINEER OF RECORD'S REVIEW. INCLUDE A REPRESENTATIVE SAMPLE OF THE FILL MATERIAL WITH THE SUBMITTAL.
5. THE CONTRACTOR SHALL EXCAVATE UNSUITABLE MATERIALS, BACKFILL, COMPACT AND GRADE THE SITE TO THE ELEVATIONS AND LIMITS SHOWN AND AS NEEDED TO MEET THE REQUIREMENTS OF THE CONSTRUCTION.
6. STRUCTURAL FILL SHALL BE PLACED IN LAYERS NOT MORE THAN 8" IN LOOSE DEPTH. DO NOT PLACE FILL MATERIAL ON SURFACES THAT ARE MUDDY, FROZEN OR CONTAINING FROST AND/OR ICE. PLACE FILL MATERIALS EVENLY ADJACENT TO STRUCTURES, TO REQUIRED ELEVATIONS. TAKE CARE TO PREVENT WEDGING ACTION OF BACKFILL AGAINST STRUCTURES BY CARRYING THE MATERIAL UNIFORMLY AROUND THE STRUCTURE TO APPROXIMATELY THE SAME ELEVATION IN EACH LIFT.
7. CONTROL STRUCTURAL FILL COMPACTION DURING CONSTRUCTION TO PROVIDE THE MINIMUM PERCENTAGE OF DENSITY SPECIFIED FOR EACH AREA AS DETERMINED ACCORDING TO ASTM D1557. STRUCTURAL FILL AREAS SHALL NOT FALL BELOW 95% OF ITS DENSITY AT OPTIMUM MOISTURE CONTENT AS DETERMINED BY THE ABOVE TEST.
8. GRADE THE AREAS ADJACENT TO BUILDINGS TO ACHIEVE DRAINAGE AWAY FROM THE STRUCTURES, AND TO PREVENT PONDING.

EROSION AND SEDIMENTATION CONTROL:

- 1. SITE WORK SHALL NOT BE PERFORMED UNTIL SEDIMENT AND EROSION CONTROL DEVICES ARE INSTALLED AND WRITTEN APPROVAL IS SECURED FROM THE TOWN OF ORLEANS AND/OR OWNERS REPRESENTATIVE.
2. EROSION AND SEDIMENTATION CONTROL DEVICES AND PROVISIONS SHALL BE MAINTAINED IN OPERATIONAL CONDITION BY THE CONTRACTOR AND SHALL BE REMOVED AND LEGALLY DISPOSED AT THE COMPLETION OF THE PROJECT.
3. STRAW WATTLES SHALL CONSIST OF BIOROLL FILLED WITH GRAIN STRAW FREE FROM SEED BEARING STALKS AND NOXIOUS GRASSES AND PLANTS.
4. HAY BALES SHALL CONSIST OF FIRM, NEW BALES OF SALT HAY OR SMALL GRAIN STRAW, JUTE TIED, WITH AN AVERAGE DRY WEIGHT OF 10 TO 40 POUNDS PER BALE AND SHALL BE PLACED AS DIRECTED BY THE ENGINEER.
5. SILT FENCE SHALL BE MIRAFI 600X AS MANUFACTURED BY MIRAFI INC., GEOTEX 300ST AS MANUFACTURED BY SYNTHETIC INDUSTRIES, INC., PROPEX 2004 AS MANUFACTURED BY AMOCO FABRICS & FIBERS CO. OR EQUIVALENT.
6. FABRIC FENCE MATERIAL SHALL BE SUPPLIED IN ROLLS WITH APPROVED STAKING ATTACHMENTS FROM AN APPROVED SUPPLIER AND SHALL BE PLACED AS DIRECTED BY THE ENGINEER.
7. ALL SOIL EROSION AND SEDIMENTATION CONTROL MEASURES WILL BE INSPECTED WEEKLY DURING THE CONSTRUCTION PERIOD.
8. STOCKPILING OF MATERIALS IS NOT PERMITTED.
9. WORKING OR PLACING MATERIAL ON EXISTING WETLAND VEGETATION IS PROHIBITED.
10. EROSION PROTECTION FENCE SHALL BE SAFETY ORANGE FABRIC FENCE WITH TEMPORARY SUPPORT POSTS. POSTS MAY BE SUPPORTED ON THE LEDGE ROCK BY MEANS OF SANDBAGS OR OTHER ACCEPTABLE METHOD. THE FENCE IS TO REMAIN IN PLACE AT ALL TIMES WHILE CONSTRUCTION IS UNDERTAKEN.

FLAGPOLE:

- 1. FLAGPOLE SHALL BE A FIBERGLASS REINFORCED COMPOSITE (FRC) NAUTICAL DOUBLE MASTED FLAGPOLE WITH YARDARM/GAFF AS MANUFACTURED BY PLP COMPOSITE TECHNOLOGIES OR APPROVED EQUAL. COLOR SHALL BE STANDARD WHITE AND BASE TO BE PROVIDED PER MANUFACTURER'S RECOMMENDATIONS.
2. FLAGPOLE SHALL HAVE A MINIMUM MOUNTING HEIGHT OF 25-FEET, ALONG WITH A MINIMUM BUTT DIAMETER OF 6-INCHES.
3. LOAD CALCULATIONS SHALL BE BASED ON AASHTO AND NAAMM STANDARDS DESIGNED FOR 150 M.P.H. WINDS, UNFLAGGED WITH A 1.3 GUST FACTOR.
4. FLAGPOLE: FLAGPOLE SHALL BE MOUNTED TO THE CAST-IN-PLACE CONCRETE TOPPING SLAB DECK IN THE LOCATION SHOWN ON THE CONTRACT DRAWINGS. INSTALLATION DETAIL SHOWN ON THE CONTRACT DRAWINGS SHALL BE USED TO SECURE THE ITEMS TO THE DECK SECTION AS REQUIRED, OR WITH THE MANUFACTURERS RECOMMENDATIONS UPON COORDINATION AND APPROVAL WITH THE ENGINEER.

GEOTEXTILE FABRIC:

- 1. GEOTEXTILE FABRIC SHALL BE MIRAFI FILTERWEAVE FW-700 GEOTEXTILE FABRIC OR AN EQUIVALENT ACCEPTED BY THE ENGINEER OF RECORD.
2. INSTALL GEOTEXTILE FABRIC IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS. MAINTAIN MINIMUM 12-INCH LAP AT ADJACENT SECTIONS.
3. PROVIDE ADEQUATE SLACK IN FABRIC DURING INSTALLATION BY PROVIDING CONTINUOUS 12 INCH FOLDS AT 15 FOOT CENTERS PARALLEL TO THE SHORELINE.
4. PROPERLY ANCHOR FABRIC TO PREVENT SLIDING OR TEARING DURING INSTALLATION OF OVERBURDEN MATERIAL.

GROUND ANCHORS:

- 1. GROUND ANCHORS SHALL BE INSTALLED TO A 45 DEGREE INCLINATION WITH RESPECT TO THE HORIZONTAL.
2. THE GROUND ANCHOR DESIGN LOAD IS 403.3 KIPS. THE SPACING OF THE GROUND ANCHOR IS 9.2 FEET +/- UNO.
3. GROUND ANCHORS AND THEIR COMPONENTS SHALL CONFORM TO THE REQUIREMENTS OF THE RECOMMENDATIONS FOR PRESTRESSED ROCK AND SOIL ANCHORS, LATEST EDITION, ADOPTED BY THE POST-TENSIONING INSTITUTE.
4. GROUND ANCHORS AND THEIR COMPONENTS SHALL BE PROTECTED FROM CORROSION. CORROSION PROTECTION SHALL INCLUDE DELIVERY AND STORAGE METHOD OF TENDONS OR BARS, ADEQUATE BOREHOLE DIAMETER, PVC SHEATHING IN FREE LENGTH, TEMPORARY AND PERMANENT LUBRICANTS, PERMANENT SHEATHING OF TENDON, COVER BOX FOR ANCHORAGE HEAD, CORRUGATED PVC PIPE FOR CASING, IF REQUIRED, AND CONSOLIDATION GROUT FOR ANCHOR ZONE.
5. GROUND ANCHOR DESIGN IS BY CONTRACTOR. GROUND ANCHOR ASSEMBLY INCLUDING GROUND ANCHOR, STAND-OFF PLATES, AND CAP PLATES SHALL BE DESIGNED BY A PROFESSIONAL ENGINEER LICENSED IN THE STATE OF MASSACHUSETTS.



DEPARTMENT OF PUBLIC WORKS
TOWN OF ORLEANS, MASSACHUSETTS
ROCK HARBOR COMMERCIAL WHARF IMPROVEMENTS

Table with columns for REVISIONS, DESCRIPTION, DATE, and BY.

DATE OF PREPARATION

Table with columns for SURVEYED, DRAWN, DESIGNED, CHECKED, BY, and DATE.

SHEET TITLE:

ISSUANCE:

ISSUED FOR BID

PROJECT NO: 0019004.10

SHEET NUMBER

G-002

NOTES

ISSUANCE:

ISSUED FOR BID

PROJECT NO: 0019004.10

SHEET NUMBER

G-002

**GUARDRAIL:**

- STANDARD GUARDRAIL AND POST SHALL BE SINGLE FACE, AS SPECIFIED IN MASSACHUSETTS DEPARTMENT OF PUBLIC WORKS, STANDARD SPECIFICATIONS FOR HIGHWAYS AND BRIDGES 1988 EDITION, AND ALL AMENDMENTS; - CONSTRUCTION STANDARDS; SUBSECTION 601 GUARDRAIL AND SECTION E.401.1 - AND E.401.11.0.
- POSTS SHALL CONFORM TO THE REQUIREMENTS OF ASTM A36. GALVANIZING SHALL MEET THE REQUIREMENTS OF M7.10.0. GALVANIZED COATINGS.
- POSTS SHALL BE SET PLUMB, IN HAND OR MECHANICALLY DUG HOLES, OR DRIVEN, THEN BACKFILLED WITH ACCEPTABLE MATERIAL PLACED IN LAYERS AND THOROUGHLY COMPACTED.
- STEEL BEAM RAIL: THE RAIL SHALL BE ERECTED SO AS TO FORM A SMOOTH CONTINUOUS RAIL CONFORMING TO THE REQUIRED LINE AND GRADE. THE RAIL ELEMENTS AND SPLICES SHALL BE PER THE PLANS, ALL BOLTS, EXCEPT WHERE OTHERWISE REQUIRED AT EXPANSION JOINTS, SHALL BE DRAWN TIGHT.
- THE STEEL RAIL ELEMENT, TRANSITION PANELS, TERMINAL SECTIONS AND CONNECTING HARDWARE SHALL CONFORM TO ASHTO M 180, TYPE II, CLASS A GUARDRAIL END TREATMENT; PROPRIETARY END TREATMENT SYSTEMS SHALL BE INSTALLED IN ACCORDANCE WITH THE MANUFACTURERS' SPECIFICATIONS AND RECOMMENDATIONS.
- EACH END OF THE STEEL RAIL FOR EVERY STRETCH OF GUARD SHALL BE FITTED WITH A TERMINAL SECTION AS SHOWN ON THE PLANS.
- ALL STEEL COMPONENTS AND HARDWARE SHALL CONFORM TO M8.07.0: GUARDRAIL. ALL METAL WORK SHALL BE DONE IN THE SHOP.
- THE APPROACH END SHALL HAVE TYPE 3 OBJECT MARKER SHEETING THAT CONFORMS TO THE REQUIREMENTS OF THE MUTCD. THE SHEETING MATERIAL SHALL MEET THE REQUIREMENTS OF M9.30.0: RETROREFLECTIVE SHEETING.

**JIB CRANE:**

- LIFT CAPACITY: JIB CRANE SHALL HAVE A LIFT CAPACITY OF 1-TON.
- MAST: MAST SHALL BE FREESTANDING WITH A CLEAR HEIGHT OF THE MAST SHALL BE 16'-0", MEASURED FROM THE BOTTOM OF THE BASE PLATE TO THE BOTTOM OF THE BOOM.
- BOOM: TOTAL BOOM LENGTH SHALL BE 12'-0", MEASURED FROM THE CENTERLINE OF THE MAST TO THE END OF THE BOOM. DISTANCE FROM THE FACE OF THE STOP TO THE END OF THE BOOM SHALL BE 11'-6".
- ROTATION: JIB CRANE SHALL HAVE 180-DEGREE ROTATION; BOOM WILL NOT DRIFT WHEN AT REST.
- ROTATION STOPS: SHALL BE FIELD MOUNTED WELDED OR BOLTED AS APPROVED BY THE ENGINEER.
- DEFLECTION: DEFLECTION WHEN LOADED TO THE MAXIMUM CAPACITY AT THE FURTHEST PICK POINT SHALL BE LIMITED TO A DEFLECTION OF APPROXIMATELY L/150.
- ANCHOR BOLTS: SHALL BE 1-INCH DIAMETER J-BOLTS TO THE LENGTH RECOMMENDED BY THE MANUFACTURER.
- MATERIALS: JIB CRANE BOOM, MAST AND BASE SHALL BE FABRICATION FROM STEEL MEETING ASTM STANDARDS.
- FINISH: JIB CRANE BOOM, MAST AND BASE SHALL BE HOT-DIPPED GALVANIZED IN ACCORDANCE WITH ASTM STANDARDS.
- PROVIDE ALL ENGINEERING DESIGN, LABOR, MATERIALS, EQUIPMENT AND SUPERVISION NECESSARY TO MANUFACTURE AND INSTALL A 1-TON JIB CRANE.

**NON-SHRINK GROUT:**

- NON-SHRINK GROUT SHALL BE FIVE STAR GROUT, HIGH PERFORMANCE PRECISION GROUT OR EQUIVALENT ACCEPTED BY ENGINEER, CONFORMING TO ASTM C827 AND SHALL HAVE A 28-DAY COMPRESSIVE STRENGTH OF 8000 PSI, AS MANUFACTURED BY FIVE STAR PRODUCTS, INC., FAIRFIELD, CT.

**REINFORCEMENT:**

- REINFORCING STEEL SHALL CONFORM TO THE REQUIREMENTS OF ASTM A615 GRADE 60, OR 75 AS CALLED FOR.
- DETAILING, FABRICATION, AND ERECTION OF REINFORCING STEEL SHALL BE EPOXY COATED AND CONFORM TO THE REQUIREMENTS OF ACI-318 AND ACI-315 DETAILS AND DETAILING OF CONCRETE REINFORCEMENT.
- REINFORCEMENT SHALL CONFORM TO BUILDING CODE REQUIREMENTS FOR STRUCTURAL CONCRETE (ACI 318), ACI DETAILING MANUAL (SP-80), CRSI MANUAL OF STANDARD PRACTICE (MSP) AND THE STRUCTURAL WELDING CODE-REINFORCING STEEL (AWS D1.4); ELECTRODES TO BE E-80.
- PROVIDE SUPPLEMENTAL BARS AND ACCESSORIES AS REQUIRED TO HOLD REINFORCEMENT SECURELY IN POSITION.
- ALL CONTINUOUS REINFORCEMENT SHALL BE EXTENDED AROUND CORNERS AND LAPPED AT NECESSARY SPLICES OR HOOKED AT DISCONTINUOUS ENDS. USE STANDARD HOOKS UNLESS OTHERWISE INDICATED.
- LAPS SHALL BE CLASS B TENSION LAP SPLICES, UNLESS NOTED OTHERWISE.
- REINFORCEMENT SHALL BE CONTINUOUS THROUGH CONSTRUCTION JOINTS. PROVIDE MECHANICAL COUPLERS WHERE REQUIRED CONTINUOUS REINFORCEMENT EXCEEDS AVAILABLE LENGTHS.

**STEEL:**

- STRUCTURAL STEEL SHALL COMPLY WITH THE "STEEL CONSTRUCTION MANUAL" FIFTEENTH EDITION PUBLISHED BY THE AMERICAN INSTITUTE OF STEEL CONSTRUCTION.
- CONNECTIONS SHALL BE DESIGNED AND DETAILED BY THE STEEL FABRICATOR EXCEPT FOR THOSE SPECIFICALLY DETAILED IN THE CONTRACT DOCUMENTS.

**PILES - TIMBER:**

- TIMBER PILES SHALL BE DRIVEN TO A MINIMUM CAPACITY OR MINIMUM EMBEDMENT LENGTH AS INDICATED ON THE CONTRACT DRAWINGS.
- CUT AND DRILLED EXPOSED SURFACES SHALL BE LIBERALLY RECOATED BY BRUSH WITH A FIELD TREATMENT ACCEPTED BY THE ENGINEER OF RECORD.
- TIMBER PILES SHALL HAVE A MINIMUM BUTT DIAMETER OF 12 INCHES, MINIMUM TIP DIAMETER OF 8 INCHES (12-3-8), CLASS B PILE. MATERIAL, TAPER, STRAIGHTNESS, AND ALLOWABLE DEFECTS SHALL CONFORM TO THE REQUIREMENTS OF ASTM D-25.
- TIMBER PILES SHALL BE FREE FROM DEFECTS THAT IMPAIR STRENGTH, DURABILITY OR DRIVABILITY; CUT FROM SOLID, SOUND LINE, CLOSED GRAINED TREES, FREE FROM INJURIOUS RINGS AND LARGE UNSOUND KNOTS OR DECAY. USE TREES THAT HAVE A UNIFORM STRAIGHT TAPER FROM BUTT TO TIP.
- HANDLE TIMBER PILES CAREFULLY, WITHOUT SUDDEN DROPPING, BREAKING OF OUTER FIBERS, BRUISING OR PENETRATING THE SURFACE WITH TOOLS.

**PILE DRIVING:**

- DRIVE PILES WITH AN AIR OR DIESEL OPERATED HAMMER WITH SUFFICIENT ENERGY AND ENERGY TRANSFER CHARACTERISTICS TO DRIVE THE PILES TO THE REQUIRED CAPACITY AND TOE ELEVATIONS WITHOUT DAMAGING THE PILE HEAD. USE CAUTION NOT TO DAMAGE THE PILES BY OVER DRIVING AS WOULD BE INDICATED BY REBOUND OF HAMMER OR STAGGERING OF PILE. CUT OFF HEADS OF PILES ACCURATELY IN ACCORDANCE WITH THE CONTRACT DOCUMENTS AFTER COMPLETION OF DRIVING.
- DRIVE THE PILES STRAIGHT AND TRUE AT INDICATED LOCATIONS, WITH DEVIATION FROM THE LONGITUDINAL AXIS OF NOT MORE THAN 1/4 INCH PER FOOT.
- LOCATE THE PILES WITHIN 3 INCHES OF THE POSITIONS INDICATED ON THE DRAWINGS.
- CONTINUOUSLY DRIVE EACH PILE TO REACH THE CAPACITY AND/OR FULL EMBEDDED LENGTH CALLED FOR ON THE DRAWINGS.
- WITHDRAW PILES THAT ENCOUNTER UNDERGROUND OBSTRUCTIONS SUFFICIENT TO IMPEDE PILE DRIVING. REDRIVE AS CLOSE AS POSSIBLE TO ORIGINAL POSITION, SUBJECT TO REVIEW BY THE ENGINEER AND OWNER. REMOVE PILES WHICH SPLIT, BROOM, BREAK OR DRIVE OUT OF LINE. DRIVE ANOTHER PILE IN ITS PLACE. PROVIDE AND MAINTAIN NECESSARY LIGHTING AND BARRIERS TO ADEQUATELY ASSURE PUBLIC SAFETY. PROVIDE ADEQUATE SAFEGUARDS TO PROTECT FROM DAMAGE IMPROVEMENTS ON THE WORK SITE AND ON ADJACENT PROPERTIES.
- LENGTHS SHOWN ON THE DRAWINGS ARE CONSIDERED AVERAGE VALUES, AND THE ACTUAL LENGTHS MAY VARY WHEN SO ACCEPTED BY THE ENGINEER OF RECORD.
- PROVIDE DRIVING RESISTANCE PENETRATION AND REFUSAL VALUES AS ACCEPTED BY THE ENGINEER OF RECORD.
- ALL SHEET PILES AND PIPE PILES DRIVEN TO REFUSAL IN ROCK TO HAVE HARDENED CUTTING SHOES INSTALLED BEFORE DRIVING.
- USE SUITABLE CUSHIONS OR DRIVING HEADS TO AVOID DAMAGE TO THE PILES. DEVELOPING PROPER TOTAL DRIVING ENERGY, AND DIRECTING THE ENERGY ALONG THE LONGITUDINAL CENTER OF GRAVITY OF THE PILE.
- DRIVE PILES TO THEIR FULL PENETRATION WITHOUT BENDING, RUPTURING, OR SEVERELY DAMAGING THE PILES. IF FAILURE IN THE ABOVE RESPECTS IS ENCOUNTERED, PULL THE PILE AND DRIVE A NEW PILE AT NO ADDITIONAL COST TO THE OWNER. IF A REPLACEMENT PILE FAILS TO DEVELOP FULL DRIVING RESISTANCE, PULL THE REPLACEMENT PILE AND DRIVE A NEW PILE WITH LARGER DIAMETER AT NO ADDITIONAL COST TO THE OWNER.

- JETTING TO ASSIST PENETRATION WILL NOT BE PERMITTED UNLESS ACCEPTED BY THE ENGINEER OF RECORD. PRE-DRILLING WILL NOT BE PERMITTED UNLESS ACCEPTED BY THE ENGINEER OF RECORD, WHEREBY ACCEPTED PRE-DRILLING TO ASSIST PENETRATION MAY BE USED WHERE EXTREME DRIVING RESISTANCE IS ENCOUNTERED, OR WHERE VIBRATIONS FROM DRIVING MAY BE DETRIMENTAL TO ADJACENT STRUCTURES.
- WHERE PILES ARE PUSHED UP BY PRESSURE FROM DRIVING OF ADJACENT PILES, RE-DRIVE AS REQUIRED AND AT NO ADDITIONAL COST TO THE OWNER.
- THE CONTRACTOR SHALL PROVIDE THE OWNER WITH A COMPLETE DRIVING RECORD WITH THE DATE OF FINAL INSTALLATION AND TIP ELEVATIONS. THIS RECORD SHALL BE SUBMITTED WEEKLY AND SIGNED BY A REPRESENTATIVE OF THE CONTRACTOR. THE CONTRACTOR SHALL KEEP AN ACCURATE SET OF PILE RECORDS INDICATING PILE NUMBER, PILE TYPE AND INSTALLED LENGTH, TYPE OF HAMMER AND RATED ENERGY, DATE OF INSTALLATION, FINAL TIP ELEVATION, AND CONTRACTOR'S REPRESENTATIVE NAME AND SIGNATURE.
- STEEL PIPE PILES MUST BE DRIVEN TO AN ULTIMATE CAPACITY OF 275 TONS. AT LEAST TWO PILES MUST BE TESTED WITH PILE DRIVING ANALYZER (PDA) TO CONFIRM PILE DRIVING REQUIREMENTS AND ULTIMATE CAPACITY. PROVIDE PDA REPORT TO ENGINEER FOR REVIEW AND ACCEPTANCE PRIOR TO CUTTING PILES TO GRADE. THE PILES FOR TESTING WILL BE SELECTED BY THE ENGINEER.

**PROTECTIVE COATING:**

- ALL STEEL SHEET PILES EXPOSED TO SALT WATER TO BE EPOXY COATED (BOTH SIDES) IN ACCORDANCE WITH SPECIFICATIONS AND TO 10 FEET BELOW DREDGED MUDLINE.
- COATING SHALL BE APPLIED IN ACCORDANCE WITH THE MANUFACTURERS RECOMMENDATION WITH SURFACE PREPARATION FOR IMMERSION SERVICE WITH MINIMUM GRIT BLASTING TO NEAR WHITE FINISH (SSPC-SP10 OR NACE).
- NO COATING SHALL BE APPLIED WITHIN THE LIMITS OF THE INTERLOCK. INTERLOCKS SHALL REMAIN FREE SLIDING.
- MATERIAL USED FOR FACTORY EPOXY COATING SHALL BE BAR-RUST 235 MULTI-PURPOSE EPOXY COATING AS MANUFACTURED BY DEVCO COATINGS OR EQUIVALENT ACCEPTED BY THE PROJECT ENGINEER FOR STEEL SHEET PILES.
- MATERIAL USED FOR FACTORY EPOXY COATING SHALL BE SCOTCHKOTE FUSION BOND EPOXY COATING 6233 AS MANUFACTURED BY 3M OR EQUIVALENT ACCEPTED BY THE PROJECT ENGINEER FOR STEEL PIPE PILES.
- FIELD TOUCH-UP COATING SHALL BE IDENTICAL TO FACTORY COATING AND APPLIED IN ACCORDANCE WITH THE MANUFACTURERS REQUIREMENTS.
- PROTECTIVE COATING TOPCOAT SHALL BE BLACK UNLESS OTHERWISE INDICATED ON THE DRAWINGS OR BY THE OWNER.
- SURFACES SHALL BE PREPARED IN STRICT ACCORDANCE WITH THE PROTECTIVE COATING SYSTEM MANUFACTURER'S WRITTEN INSTRUCTIONS. SURFACES ARE TO BE ABRASION-BLASTED TO A NEAR-WHITE SURFACE CLEANLINESS IN ACCORDANCE WITH SSPC-SP\_10. BLAST PROFILE ON STEEL SHALL BE 1.5 TO 2.5 MILS IN DEPTH AND BE OF A SHARP, JAGGED NATURE AS OPPOSED TO A "PEEN" PATTERN (FROM SHOT-BLASTING). SURFACES MUST BE SOUND, DRY, CLEAN, FREE OF OIL, GREASE, DIRT, MILDEW, FORM RELEASE AGENTS, CURING COMPOUNDS, LOOSE AND FLAKING PAINT, GRIT DUST, AND OTHER FOREIGN SUBSTANCES. ROTO-BLASTED SURFACES ARE NOT ACCEPTABLE.
- THE PROTECTIVE COATING SHALL BE INSTALLED IN STRICT ACCORDANCE WITH MANUFACTURER'S WRITTEN INSTRUCTIONS. COATING IS TO BE APPLIED IN TWO COATS TO ACHIEVE A MINIMUM OVERALL DRY FILM THICKNESS OF 15 MILS.
- ALL HOLIDAYS OR OTHER IMPERFECTIONS IN THE COATING SHALL BE REMOVED OR REPAIRED AT THE CONTRACTORS EXPENSE PRIOR TO FINAL ACCEPTANCE OF THE WORK.

**TEMPORARY WORK:**

- LABOR, EQUIPMENT, AND MATERIALS REQUIRED TO PERFORM THE WORK THAT, UPON COMPLETION, ARE NOT A PART OF THE WORK, SHALL BE FURNISHED, INSTALLED, AND SUBSEQUENTLY REMOVED FROM THE SITE BY THE CONTRACTOR.
- TEMPORARY WORK SHALL BE SUBJECT TO THE REQUIREMENTS OF THE STATE AND APPLICABLE LOCAL BUILDING CODES.
- THE CONTRACTOR SHALL SAFEGUARD AND PROTECT EXCAVATIONS.
- DURING EXECUTION OF THE WORK, THE CONTRACTOR IS REQUIRED TO INSTALL AND MAINTAIN REQUIRED SEDIMENTATION AND EROSION CONTROL MEASURES TO PROTECT ADJACENT WATERWAYS, STREETS, AND PROPERTIES. MEASURES INCLUDE BUT ARE NOT LIMITED TO TEMPORARY WATTLERS, STRAW WATTLES, HAY BALES, SILT FENCES, CONTAINMENT BOOMS, AND TURBIDITY CURTAINS. IN ACCORDANCE WITH STATE REGULATORY AUTHORIZATIONS, THE CONTRACTOR SHALL FURNISH, INSTALL, MAINTAIN TEMPORARY TURBIDITY CURTAINS DURING CONSTRUCTION. TEMPORARY MATERIALS AND EQUIPMENT SHALL CONFORM TO REQUIREMENTS FOR TEMPORARY WORK.

**TIMBER:**

- VISUALLY GRADED STRUCTURAL LUMBER AND WOOD CONSTRUCTION SHALL CONFORM TO ASTM D245-06 STANDARD PRACTICE FOR ESTABLISHING STRUCTURAL GRADES AND RELATED ALLOWABLE PROPERTIES FOR VISUALLY GRADED LUMBER.
- MECHANICAL STRENGTH OF TIMBER SHALL BE DETERMINED IN ACCORDANCE WITH ASTM D4761-16.
- HARDWARE USED TO CONNECT CCA TREATED TIMBER, INCLUDING BOLTS, NUTS AND WASHERS, ETC., SHALL BE HOT DIP GALVANIZED STEEL CONFORMING TO ASTM A307 GRADE A. GALVANIZING SHALL CONFORM TO THE REQUIREMENTS OF ASTM A153.
- HARDWARE AND FASTENERS USED TO CONNECT MCA TREATED TIMBER INCLUDING BOLTS, NUTS AND WASHERS, ETC., SHALL BE GRADE 316 STAINLESS STEEL AND CONFORM TO THE REQUIREMENTS OF THE RESPECTIVE ASTM STANDARD. HARDWARE SHALL PROVIDE A FLUSH FINISH WHERE APPLICABLE.

**TIMBER FLOATS:**

- WOOD FRAMING SHALL BE SOUTHERN YELLOW PINE NO. 1 STRUCTURAL STRESS GRADE WITH A MINIMUM CCA CONTENT OF 2.5 PCF AND SHALL BE KILN DRIED AFTER TREATMENT (KDAT). MOISTURE CONTENT SHALL NOT EXCEED 19% AFTER TREATMENT.
- WOOD DECKING SHALL BE SOUTHERN YELLOW PINE NO. 1 STRUCTURAL STRESS GRADE WITH A MINIMUM MCA CONTENT OF 0.23 PCF AND SHALL BE KILN DRIED AFTER TREATMENT (KDAT).
- CLEATS SHALL BE COMPOSED OF ALMAG 35 CAST ALUMINUM ALLOY CONFORMING TO THE REQUIREMENTS OF THE INDIVIDUALS USING THIS INFORMATION TO UNDERSTAND THAT COMPILING UTILITY INFORMATION IS NOT EXACT, AND IS SUBJECT TO CHANGE BASED UPON VARYING PLAN INFORMATION RECEIVED AND ACTUAL LOCATIONS.
- THE ACCURACY OF MEASURED UTILITY INVERTS AND PIPE SIZES IS SUBJECT TO FIELD CONDITIONS, THE ABILITY TO MAKE VISUAL OBSERVATIONS, DIRECT ACCESS TO THE VARIOUS ELEMENTS AND OTHER MATTERS.
- WOOD DECKING SHALL BE SOUTHERN YELLOW PINE NO. 1 STRUCTURAL STRESS GRADE WITH A MINIMUM CCA CONTENT OF 2.5 PCF AND SHALL BE KILN DRIED AFTER TREATMENT (KDAT).
- CLEATS SHALL BE COMPOSED OF ALMAG 35 CAST ALUMINUM ALLOY CONFORMING TO THE REQUIREMENTS OF THE INDIVIDUALS USING THIS INFORMATION TO UNDERSTAND THAT COMPILING UTILITY INFORMATION IS NOT EXACT, AND IS SUBJECT TO CHANGE BASED UPON VARYING PLAN INFORMATION RECEIVED AND ACTUAL LOCATIONS.
- THE ACCURACY OF MEASURED UTILITY INVERTS AND PIPE SIZES IS SUBJECT TO FIELD CONDITIONS, THE ABILITY TO MAKE VISUAL OBSERVATIONS, DIRECT ACCESS TO THE VARIOUS ELEMENTS AND OTHER MATTERS.

**UTILITY NOTES:**

- THE SUBSURFACE UTILITY INFORMATION SHOWN HEREON IS COMPILED BASED ON FIELD SURVEY INFORMATION, RECORD INFORMATION AS SUPPLIED BY THE APPROPRIATE UTILITY COMPANIES, AND PLAN INFORMATION SUPPLIED BY THE OWNER, IF ANY; THEREFORE NO GUARANTEE IS MADE AS TO THE ACCURACY OF SAID COMPILED SUBSURFACE INFORMATION TO ANY CERTAIN DEGREE OF STATED TOLERANCE. ONLY PHYSICALLY LOCATED SUB-SURFACE UTILITY FEATURES FALL WITHIN NORMAL STANDARD OF CARE ACCURACIES.
- THE LOCATIONS OF UNDERGROUND PIPES, CONDUITS, AND STRUCTURES HAVE BEEN DETERMINED FROM SAID INFORMATION, AND ARE APPROXIMATE ONLY. COMPILED LOCATIONS OF ANY UNDERGROUND STRUCTURES, NOT VISIBLY OBSERVED AND LOCATED, CAN VARY FROM THEIR ACTUAL LOCATIONS.
- ADDITIONAL BURIED UTILITIES/STRUCTURES MAY BE ENCOUNTERED.
- THE STATUS OF UTILITIES, WHETHER ACTIVE, ABANDONED, OR REMOVED, IS AN UNKNOWN CONDITION AS FAR AS OUR COMPILATION OF THIS INFORMATION.
- IT IS INCUMBENT UPON THE INDIVIDUALS USING THIS INFORMATION TO UNDERSTAND THAT COMPILING UTILITY INFORMATION IS NOT EXACT, AND IS SUBJECT TO CHANGE BASED UPON VARYING PLAN INFORMATION RECEIVED AND ACTUAL LOCATIONS.
- THE ACCURACY OF MEASURED UTILITY INVERTS AND PIPE SIZES IS SUBJECT TO FIELD CONDITIONS, THE ABILITY TO MAKE VISUAL OBSERVATIONS, DIRECT ACCESS TO THE VARIOUS ELEMENTS AND OTHER MATTERS.

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LEGEND		LEGEND	
DESCRIPTION	CALLOUT	DESCRIPTION	CALLOUT
CATCH BASIN		RM ELEVATION EQUALS	R=
CABLE TELEVISION MANHOLE		INVERT ELEVATION EQUALS	I=
DRAIN MANHOLE		TOP OF HOOD ELEVATION EQUALS	TH=
ELECTRIC MANHOLE		NO PIPES VISIBLE	NPV
MISCELLANEOUS MANHOLE		TOP OF WATER	TOW=
SEWER MANHOLE		TRAFFIC CONTROL BOX	TCB
TELEPHONE MANHOLE		UNDERGROUND LOOP DETECTOR	ULD
WATER MANHOLE		DETECTABLE WARNING PANEL	DWP
GAS SHUT-OFF		TOP OF WALL ELEVATION	60'43TW
WATER SHUT-OFF		TOP OF WATER ELEVATION	60'43TOW
WATER GATE		TOP OF PIPE ELEVATION	60'43TP
CLEANOUT		TOP OF RAILROAD TRACK ELEVATION	60'43TR
FIRE HYDRANT		CHAIN LINK FENCE	— X —
GATE VALVE		STRAW WATTLE	— o — o — o —
UTILITY POLE		EXISTING UNDERGROUND CABLE TV LINE	— CATV —
UTILITY POLE WITH CONDUIT LINE TO GRADE		EXISTING UNDERGROUND DRAIN LINE	— D —
LIGHT POLE		EXISTING UNDERGROUND ELECTRIC LINE	— E —
LIGHT BOLLARD		EXISTING UNDERGROUND GAS LINE	— G —
LANDSCAPE LIGHT		EXISTING UNDERGROUND SEWER LINE	— S —
HAND HOLE		EXISTING UNDERGROUND TELEPHONE LINE	— T —
TRASH CAN		UNDERGROUND WATER LINE	— W —
FIRE ALARM CALL BOX		PROPOSED STRAW WATTLE LINE	— SW —
METAL POST		OVERHEAD WIRES	— OHW —
CONCRETE POST		UNDERGROUND LIGHTING CIRCUIT	— UGE —
SIGN POST		MONITORING WELL	⊕
DECIDUOUS TREE WITH TRUNK DIAMETER		BENCHMARK	
CONIFEROUS TREE WITH DIAMETER		SILT CURTAIN	
HANDICAP PARKING		NAVIGATIONAL CHANNEL LIMIT	— — — — —
SPOT ELEVATION		APPROXIMATE PROPERTY LINE	— — — — —
BITUMINOUS CONCRETE BERM		MEAN HIGH WATER	— — — — —
SLOPED GRANITE CURB		MEAN LOW WATER	— · · · · ·
VERTICAL GRANITE CURB		ANNUAL HIGH TIDE LINE	— · — — —
VERTICAL CONCRETE CURB		PROPOSED FUEL LINE	— UGF —
WHEELCHAIR RAMP		PROPOSED WATER LINE	— W —
LANDSCAPE TIMBER		PROPOSED STORM DRAIN LINE	— SD —
SALT MARSH		HISTORICAL BORING	⊕
PHRAGMITES		BORING	⊕

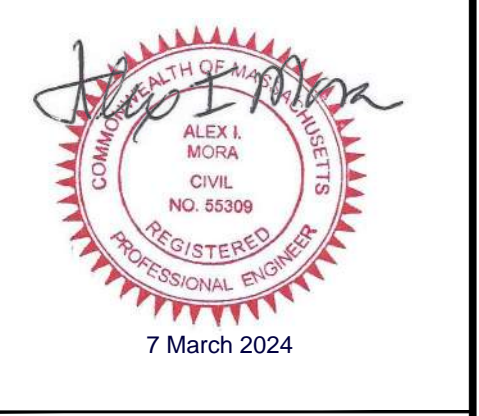
**LIST OF ABBREVIATIONS:**

ALTERNATE	-	ALT	
AMERICAN ASSOCIATION OF STATE & HIGHWAY TRANSPORTATION OFFICIALS	-	AASHTO	
APPROXIMATE	-	APPROX	
BENCHMARK	-	BM	
BOTTOM OF SLOPE	-	BOS	
BOTTOM OF CURB	-	BOC	
BUILDING	-	BLDG	
CATCH BASIN	-	CB	
CAST IN PLACE	-	C.I.P.	
CENTERLINE	-	CL	
CENTER TO CENTER	-	C-C	
CHAIN LINK FENCE	-	CLF	
CONTROLLED LOW-STRENGTH MATERIAL	-	CLSM	
CONTROL POINT	-	CP	
CUBIC FEET PER SECOND	-	CFS	
CUBIC YARDS	-	CY	
ELEVATION	-	EL. ELEV.	
EDGE OF PAVEMENT	-	EOP	
ENVIRONMENTAL PROTECTION AGENCY	-	EPA	
EXISTING	-	EX. EXIST	
FEET	-	FT	
GALVANIZED	-	GALV	
HIGH DENSITY POLYETHYLENE	-	HDPE	
HOT DIPPED GALVANIZED	-	HDG	
INCHES	-	IN	
INFILTRATION CHAMBER	-	I.F.	
KIPS PER SQUARE INCH	-	KSI	
LENGTH	-	L	
LINEAR FOOT	-	LF	
MANHOLE	-	MH	
MAXIMUM	-	MHD	
MASS HIGHWAY DEPARTMENT	-	MHD	
MEAN HIGH WATER	-	MHW	
MEAN LOWER LOW WATER	-	MLLW	
MINIMUM	-	MIN	
MISCELLANEOUS	-	MISC.	
NOT TO SCALE	-	NTS	
ORGANIC MATERIAL	-	OL	
OUTSIDE DIAMETER	-	OD	
OVERDREDGE	-	OD	
POUNDS PER SQUARE INCH	-	PSI	
PROPOSED	-	PROP.	
REMOVE & DISPOSE	-	R & D	
REMOVE & RESET	-	R & R	
SPECIFICATION	-	SPEC	
STATION	-	STA	
SQUARE FOOT	-	SF	
TOP OF CURB	-	TOC	
TOP OF SLOPE	-	TOS	
TRENCH DRAIN	-	T.D.	
TYPICAL	-	TYP	
UNDERGROUND ELECTRICAL	-	UGE	
WALL THICKNESS	-	WT	

**DATUM OFFSETS**

MLW	NAV D88		
12.11	6.40	AHTL	
10.48	4.77	MHW	
10.03	4.32	MHW	
5.71	0	NAV D88	
0	-5.71	MLW	
-0.31	-6.02	MLLW	

OFFSETS TAKEN FROM NOAA TIDAL STATION BOSTON #8443970 EPOCH 1983-2001 AND DATUM V4.1.2



**DEPARTMENT OF PUBLIC WORKS**  
**TOWN OF ORLEANS, MASSACHUSETTS**  
**ROCK HARBOR COMMERCIAL WHARF IMPROVEMENTS**

NO.	DATE	BY	REVISIONS	
			DESCRIPTION	
1				
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DATE OF PREPARATION		
SURVEYED	BY	DATE
MEC/JAH		10/24/19 & 3/22/21
DRAWN	BAM	12/05/2023
DESIGNED	SRS	06/28/2021
CHECKED	PSR	12/24/2023

**NOTES, LEGEND AND ABBREVIATIONS**

**ISSUED FOR BID**

PROJECT NO:	00190004.10
SHEET NUMBER	G-003

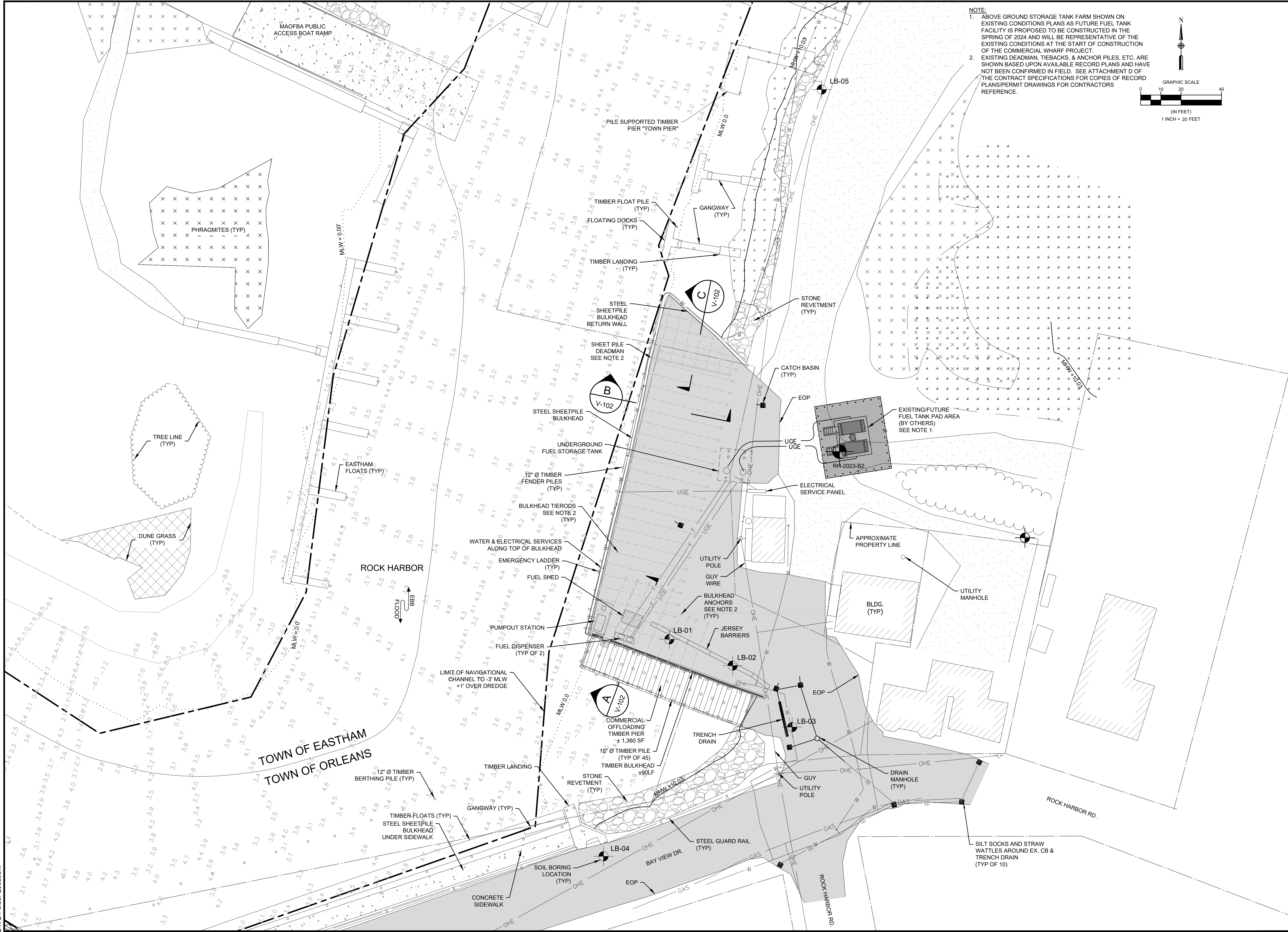
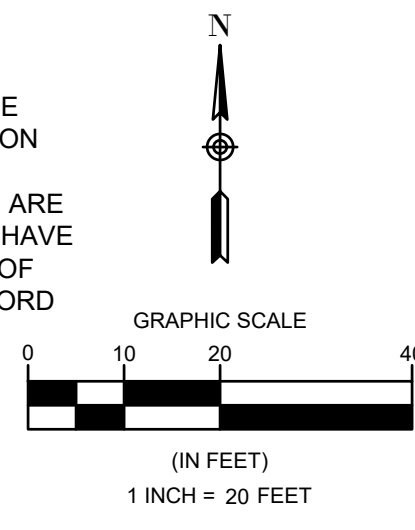


DEPARTMENT OF PUBLIC WORKS  
TOWN OF ORLEANS, MASSACHUSETTS  
ROCK HARBOR COMMERCIAL WHARF  
IMPROVEMENTS

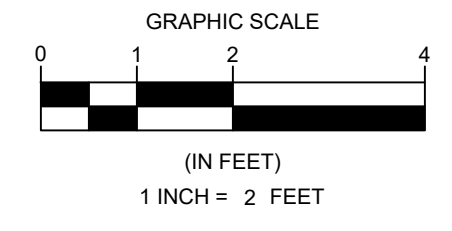
REVISIONS		DATE OF PREPARATION	
NO.	DESCRIPTION	BY	DATE
1			
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4			
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ISSUANCE:	
<b>ISSUED FOR BID</b>	
PROJECT NO:	00190004.10
SHEET NUMBER	V-101

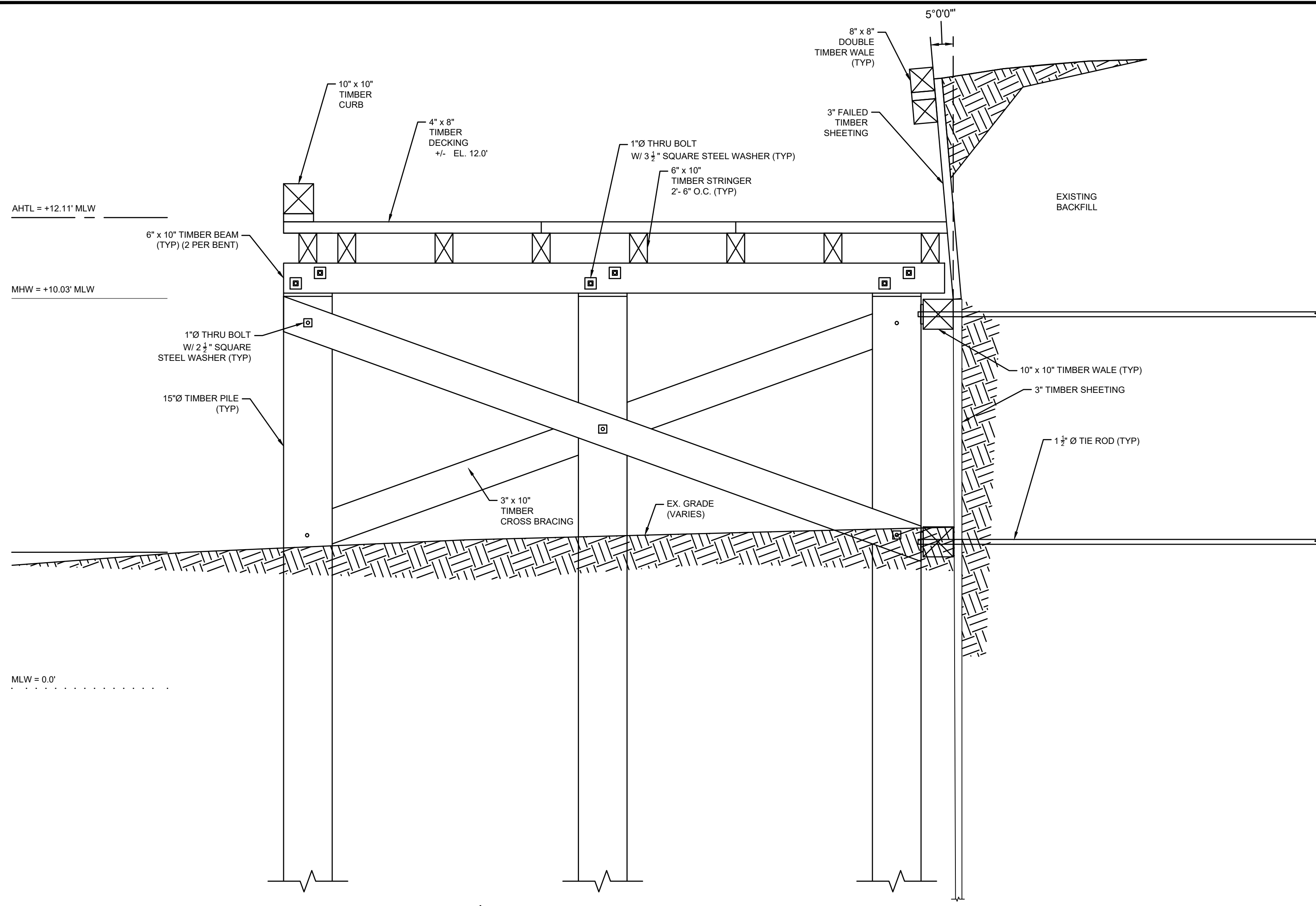
NOTE:  
1. ABOVE GROUND STORAGE TANK FARM SHOWN ON EXISTING CONDITIONS PLANS AS FUTURE FUEL TANK FACILITY IS PROPOSED TO BE CONSTRUCTED IN THE SPRING OF 2024 AND WILL BE REPRESENTATIVE OF THE EXISTING CONDITIONS AT THE START OF CONSTRUCTION OF THE COMMERCIAL WHARF PROJECT.  
2. EXISTING DEADMAN, TIEBACKS, & ANCHOR PILES, ETC. ARE SHOWN BASED UPON AVAILABLE RECORD PLANS AND HAVE NOT BEEN CONFIRMED IN FIELD. SEE ATTACHMENT D OF THE CONTRACT SPECIFICATIONS FOR COPIES OF RECORD PLANS/PERMIT DRAWINGS FOR CONTRACTORS REFERENCE.



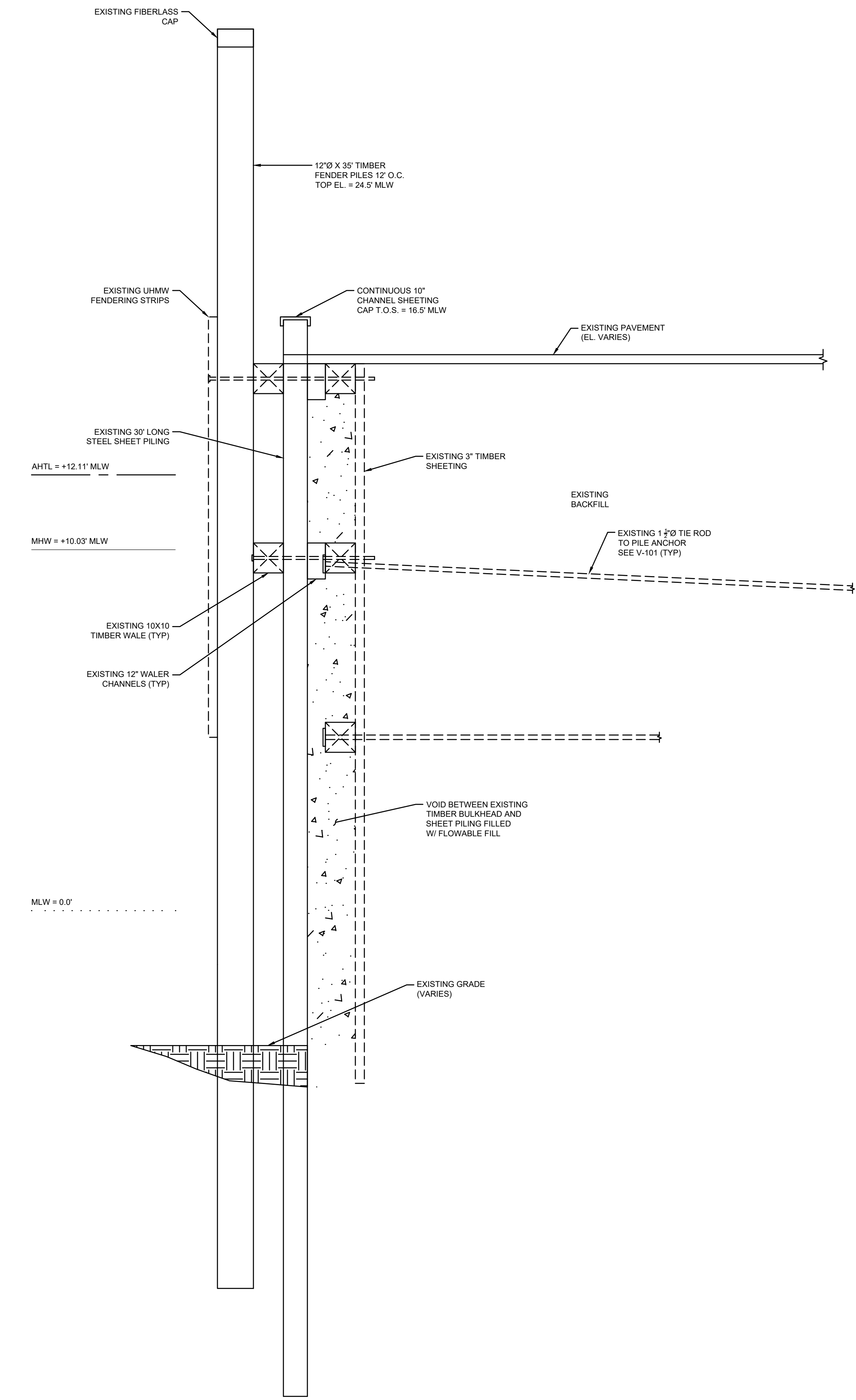
Thursday, March 7, 2024 11:35:26 AM  
DWG Filename: v-101 existing conditions.dwg  
Layout: v-101 existing conditions  
DWG Folder Location:



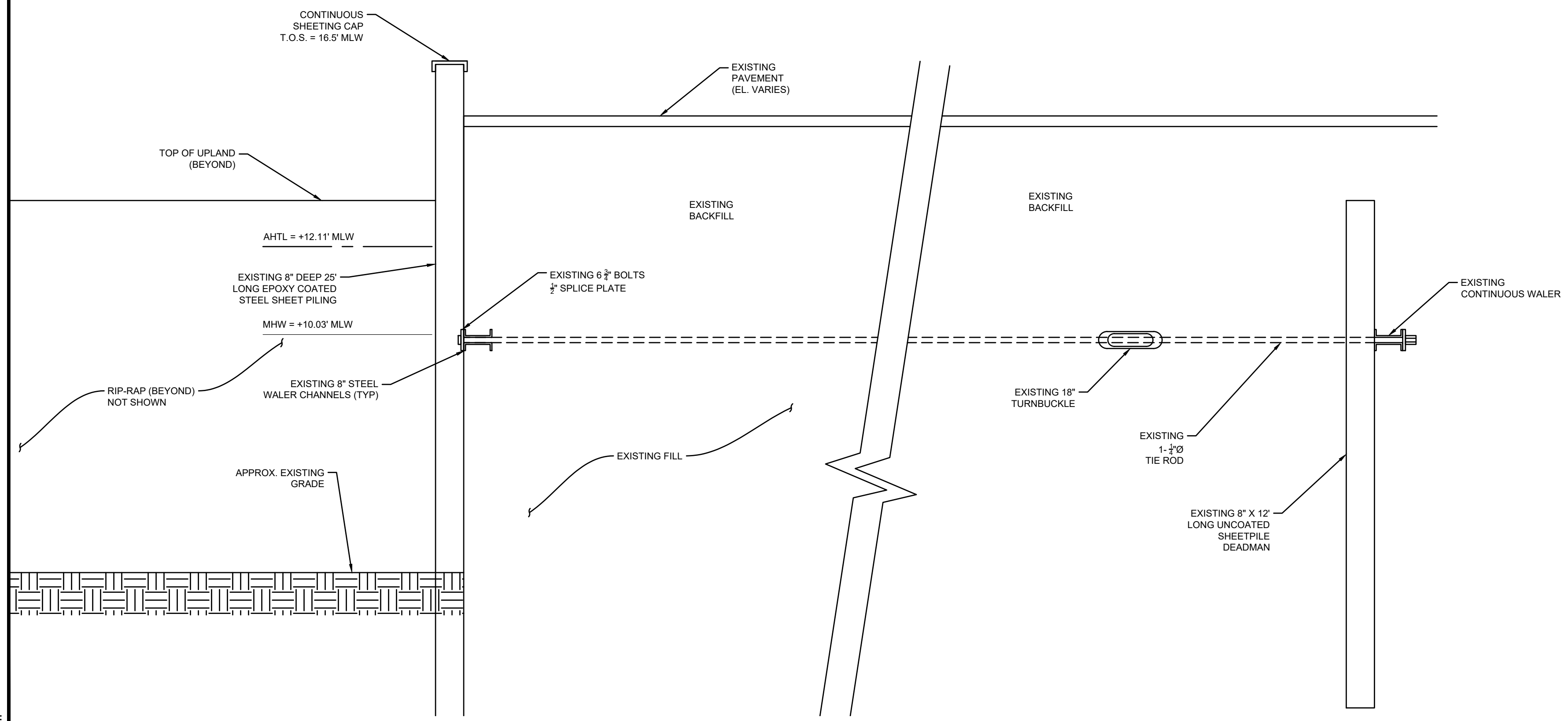
NOTE:  
1. EXISTING DEADMAN, TIEBACKS, & ANCHOR PILES, ETC. ARE SHOWN BASED UPON AVAILABLE RECORD PLANS AND HAVE NOT BEEN CONFIRMED IN FIELD. SEE ATTACHMENT D OF THE CONTRACT SPECIFICATIONS FOR COPIES OF RECORD PLANS/PERMIT DRAWINGS FOR CONTRACTORS REFERENCE.



**A** TYPICAL SECTION AT COMMERCIAL OFFLOADING TIMBER PIER/TIMBER BULKHEAD  
SCALE: 1" = 2'



**B** TYPICAL SECTION AT SHEET PILE BULKHEAD  
SCALE: 1" = 2'

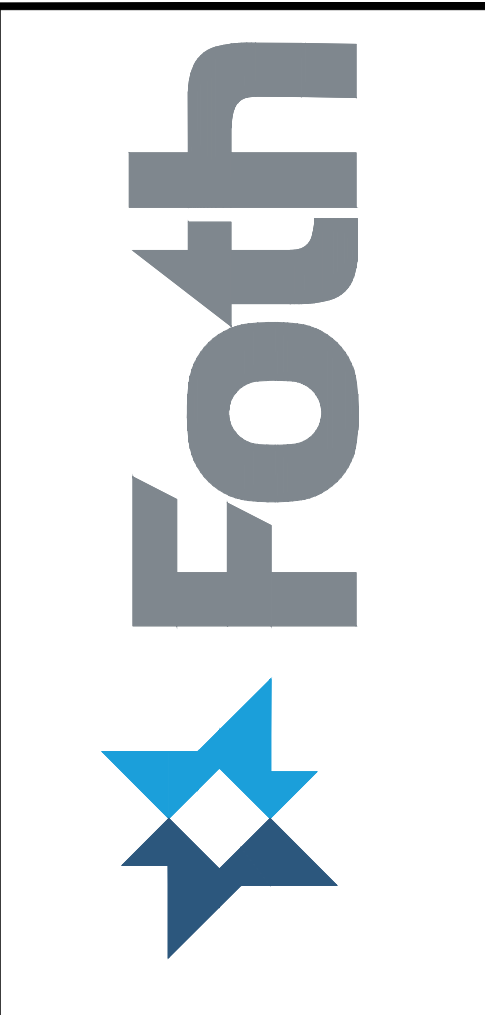
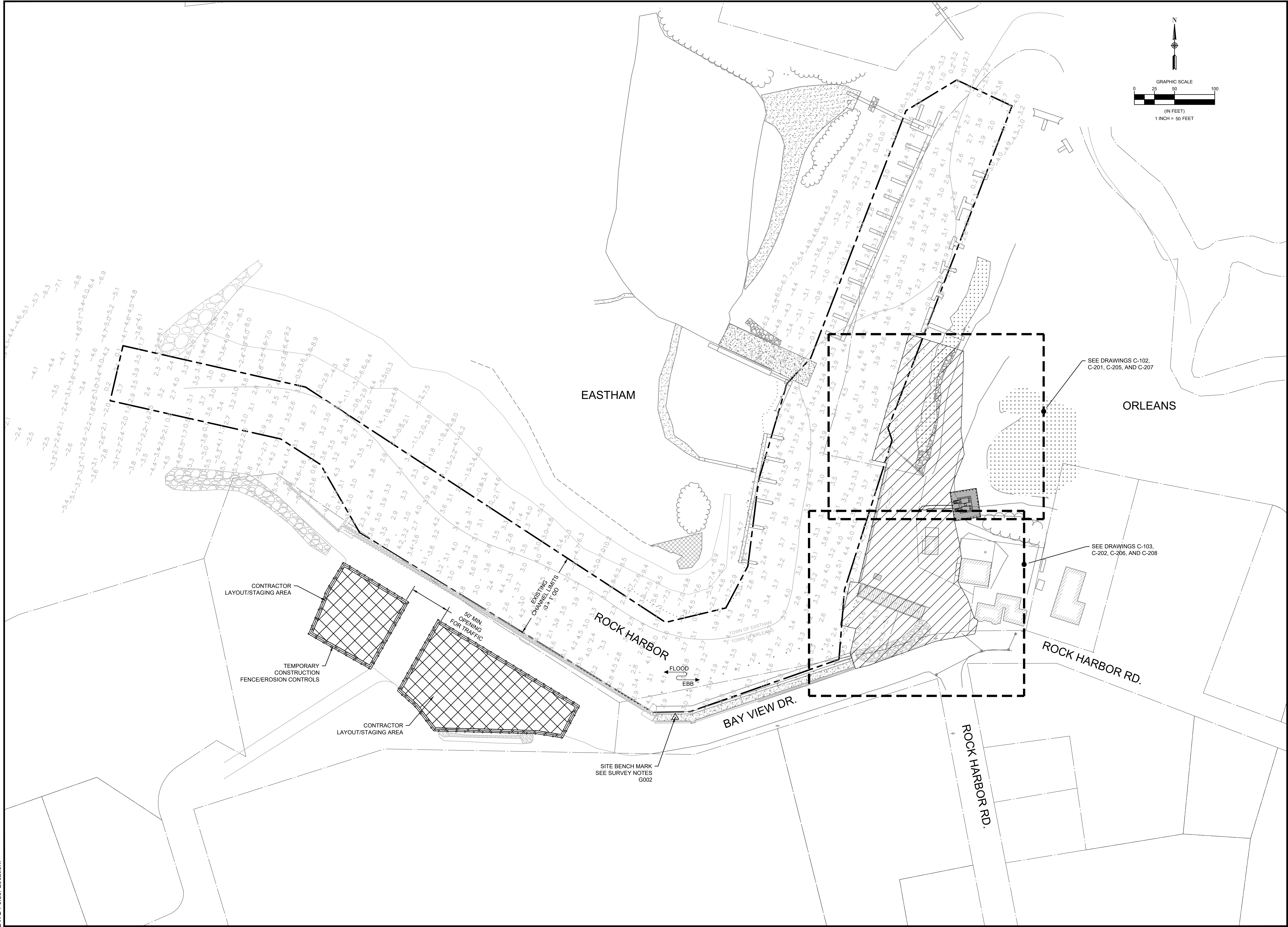


**C** TYPICAL SECTION AT SHEET PILE BULKHEAD RETURN WALL  
SCALE: 1" = 2'

REVISIONS		DESCRIPTION	
NO.	DATE	BY	DATE
1			
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DATE OF PREPARATION		
SURVEYED	MEC/JAH	10/24/19 & 3/2/21
DRAWN	BAM	12/05/2023
DESIGNED	SRS	06/28/2021
CHECKED	PSR	12/24/2023
SHEET TITLE:		
EXISTING SECTIONS		
ISSUANCE:		
ISSUED FOR BID		
PROJECT NO:	00190004.10	
SHEET NUMBER		





**DEPARTMENT OF PUBLIC WORKS**  
**TOWN OF ORLEANS, MASSACHUSETTS**  
**ROCK HARBOR COMMERCIAL WHARF IMPROVEMENTS**

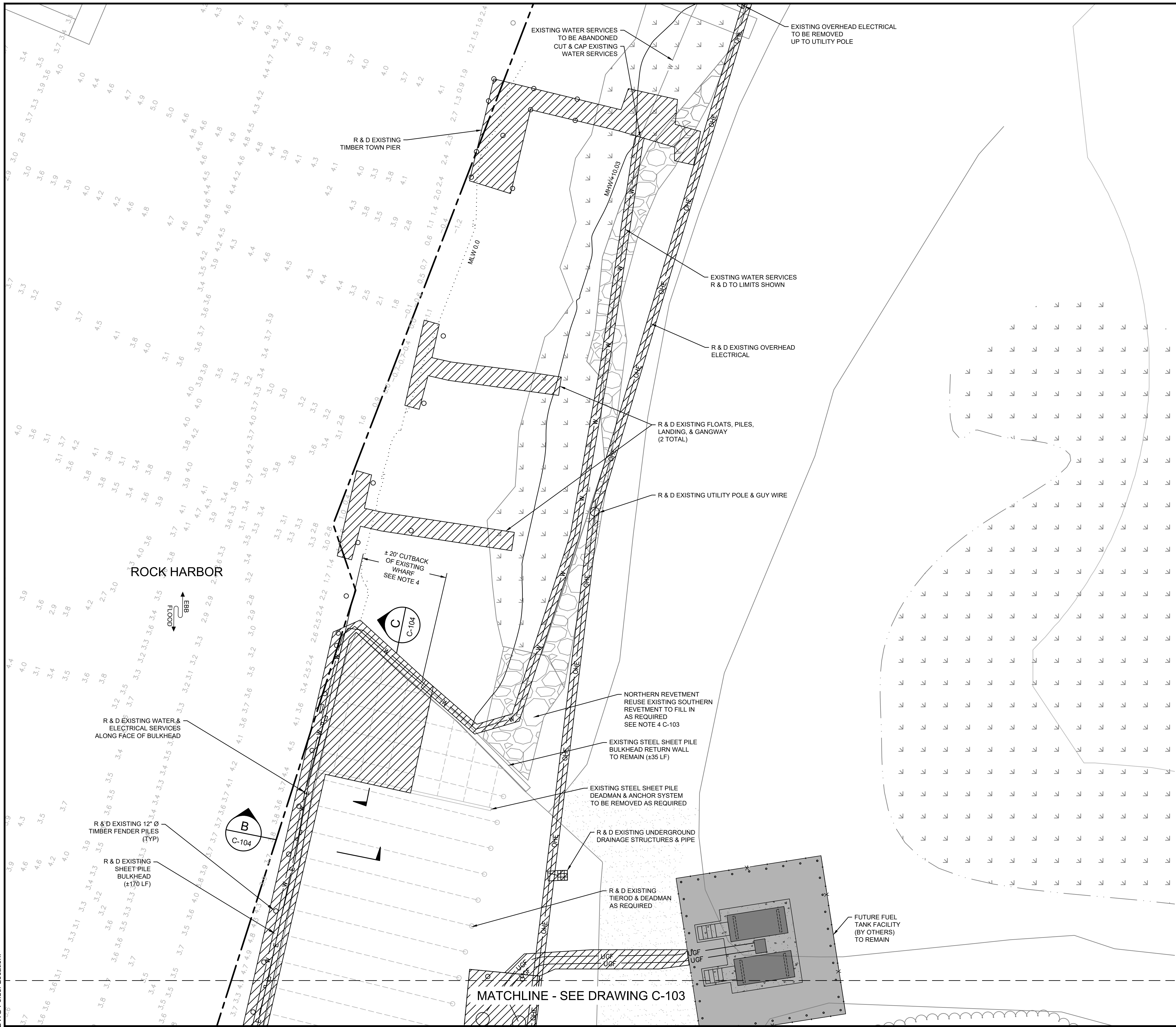
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NO.	DESCRIPTION	BY	DATE
1			
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DATE OF PREPARATION	
BY	DATE
MEC/JAH	10/24/19 & 3/2/21
BAM	12/05/2023
SRS	06/28/2021
PSR	12/24/2023

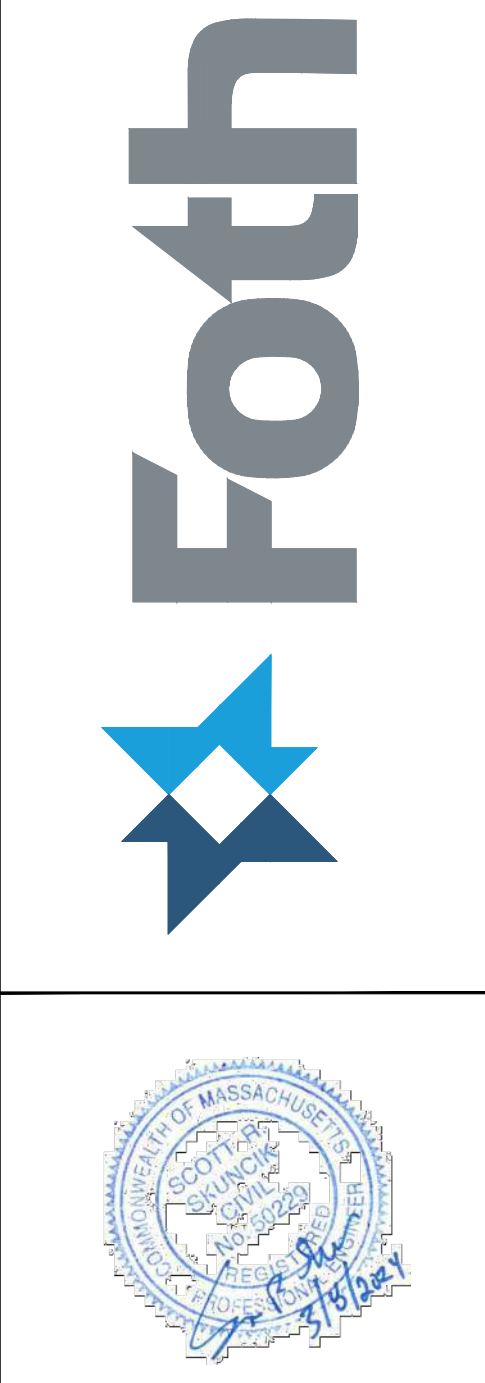
**KEY PLAN**

ISSUANCE:  
**ISSUED FOR BID**

PROJECT NO: 00190004.10  
 SHEET NUMBER  
**C-101**



- NOTE:**
1. ALL EXISTING PAVEMENT AND GRAVEL WITHIN LIMITS OF NEW FULL DEPTH PAVEMENT TO BE REMOVED.
  2. R & D - REMOVE AND DISPOSAL.
  3. R & R - REMOVE AND RESET.
  4. EXISTING BACKFILL TO BE REMOVED/DREDGED TO ELEVATION -3.0 MLW WITH 1' OF ALLOWABLE OVERDIG/OVERDREDGE TO -4 MLW (± 2,300 CY). SEE MADEP 401WQC 22-WW08-0018-AAP FOR REUSE/DISPOSAL REQUIREMENTS.



**DEPARTMENT OF PUBLIC WORKS**  
**TOWN OF ORLEANS, MASSACHUSETTS**  
**ROCK HARBOR COMMERCIAL WHARF IMPROVEMENTS**

REVISIONS		DATE OF PREPARATION	
NO.	DESCRIPTION	BY	DATE
1			
2			
3			
4			

SHEET TITLE: <b>DEMOLITION PLAN 1 OF 2</b>		
ISSUANCE: <b>ISSUED FOR BID</b>		
PROJECT NO:	00190004.10	
SHEET NUMBER	C-102	



DEPARTMENT OF PUBLIC WORKS  
TOWN OF ORLEANS, MASSACHUSETTS  
ROCK HARBOR COMMERCIAL WHARF IMPROVEMENTS

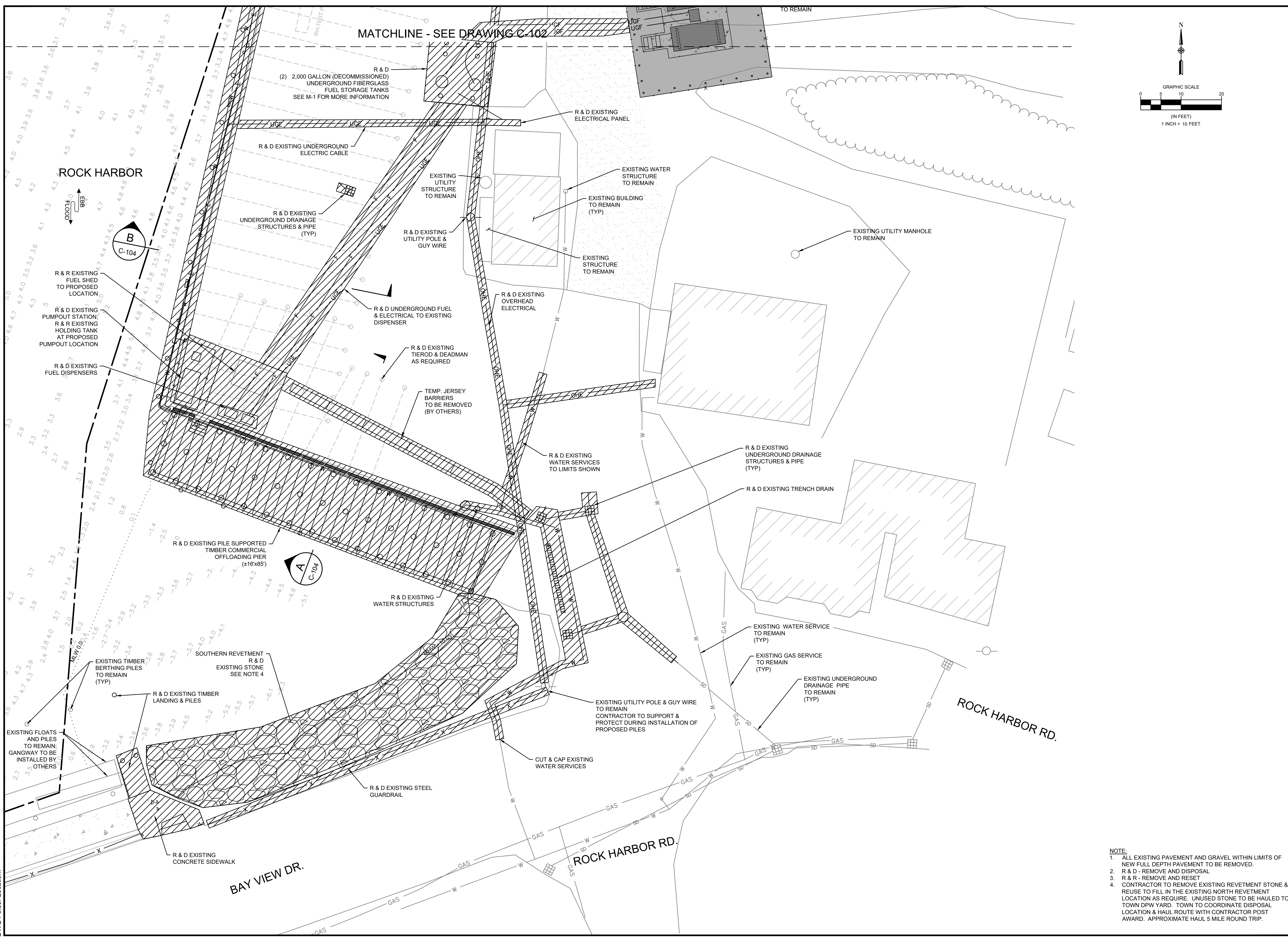
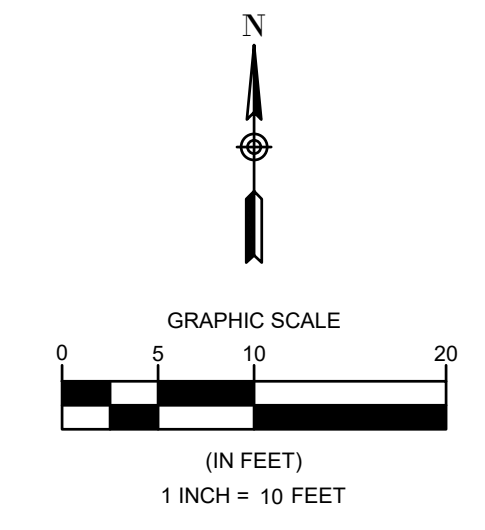
REVISIONS		DATE OF PREPARATION	
NO	DESCRIPTION	BY	DATE
1			
2			
3			
4			

DATE OF PREPARATION	
BY	DATE
SURVEYED	MEC/JAH 10/24/19 & 3/22/21
DRAWN	BAM 12/05/2023
DESIGNED	SRS 06/28/2021
CHECKED	PSR 12/24/2023

SHEET TITLE:  
**DEMOLITION PLAN  
2 OF 2**

ISSUANCE:  
**ISSUED FOR BID**

PROJECT NO: 00190004.10  
SHEET NUMBER  
C-103



- NOTE:**
1. ALL EXISTING PAVEMENT AND GRAVEL WITHIN LIMITS OF NEW FULL DEPTH PAVEMENT TO BE REMOVED.
  2. R & D - REMOVE AND DISPOSAL
  3. R & R - REMOVE AND RESET
  4. CONTRACTOR TO REMOVE EXISTING REVETMENT STONE & REUSE TO FILL IN THE EXISTING NORTH REVETMENT LOCATION AS REQUIRE. UNUSED STONE TO BE HAULED TO TOWN DPW YARD. TOWN TO COORDINATE DISPOSAL LOCATION & HAUL ROUTE WITH CONTRACTOR POST AWARD. APPROXIMATE HAUL 5 MILE ROUND TRIP.

Thursday, March 7, 2024 11:35:36 AM  
 DWG Filename: c-101 key plan.dwg  
 Layout: c-103 demolition plan 2 of 2  
 DWG Folder Location:

REVISIONS		DESCRIPTION	
NO	DATE	BY	DATE
1			
2			
3			
4			
5			

DATE OF PREPARATION

BY	DATE
SURVEYED MEC/JAH	10/24/19 & 3/2/21
DRAWN BAM	12/05/2023
DESIGNED SRS	06/28/2021
CHECKED PSR	12/24/2023

SHEET TITLE:

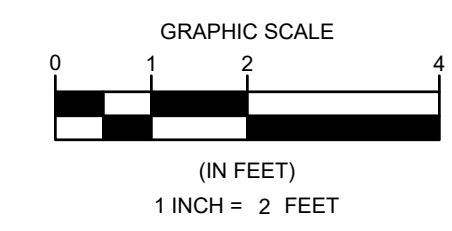
ISSUANCE:

**ISSUED FOR BID**

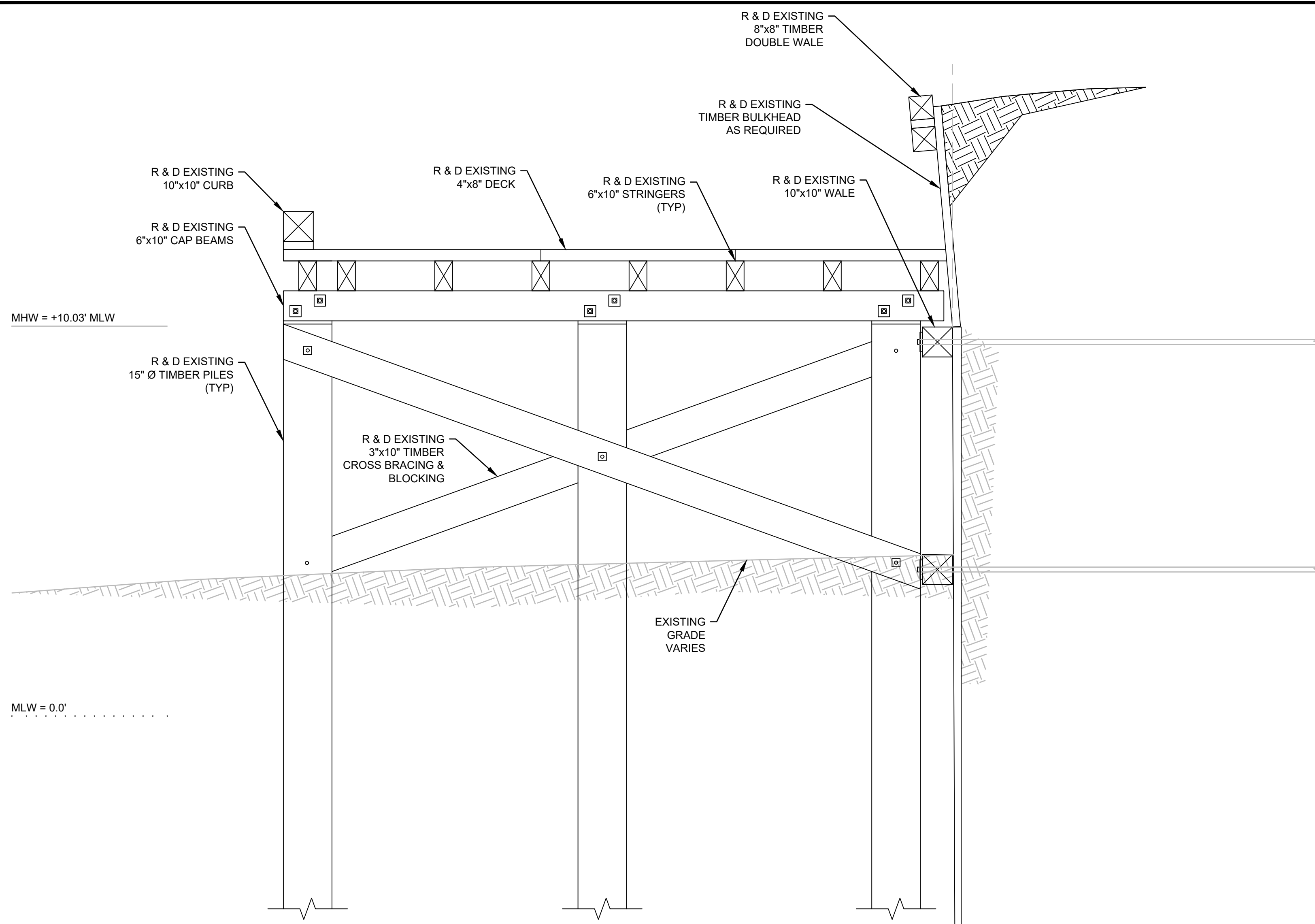
PROJECT NO: 00190004.10

SHEET NUMBER

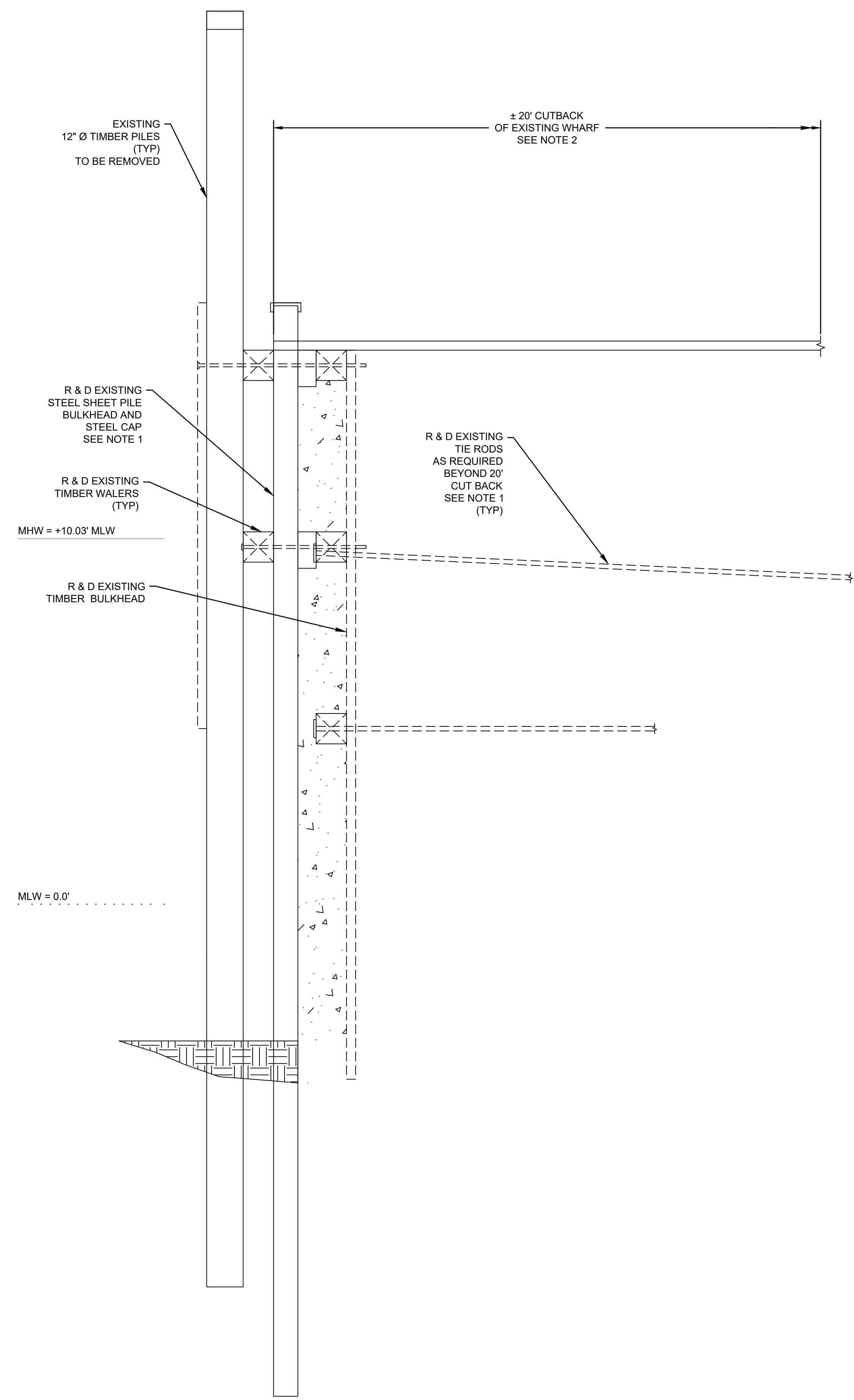
C-104



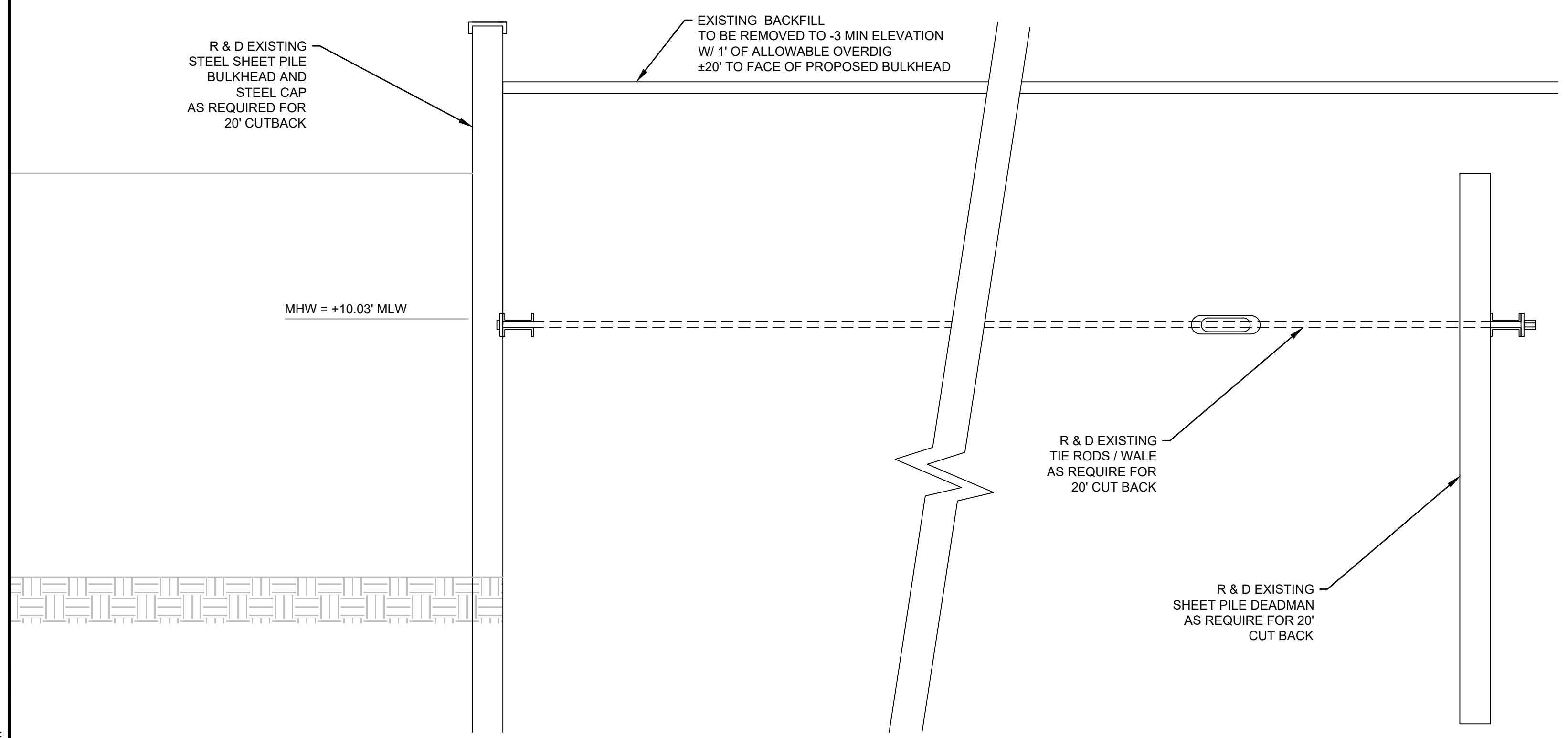
NOTE:  
1. EXISTING DEADMAN, TIEBACKS, & ANCHOR PILES, ETC. ARE SHOWN BASED UPON AVAILABLE RECORD PLANS AND HAVE NOT BEEN CONFIRMED IN FIELD. SEE ATTACHMENT D OF THE CONTRACT SPECIFICATIONS FOR COPIES OF RECORD PLANS/PERMIT DRAWINGS FOR CONTRACTORS REFERENCE.  
2. EXISTING BACKFILL TO BE REMOVED/DREDGED TO ELEVATION -3.0 MLW WITH 1' OF ALLOWABLE OVERDIG/OVERDREDGE TO -4 MLW (± 2,300 CY). SEE MADEP 401WQC 22-WW08-0018-AAP FOR REUSE/DISPOSAL REQUIREMENTS.



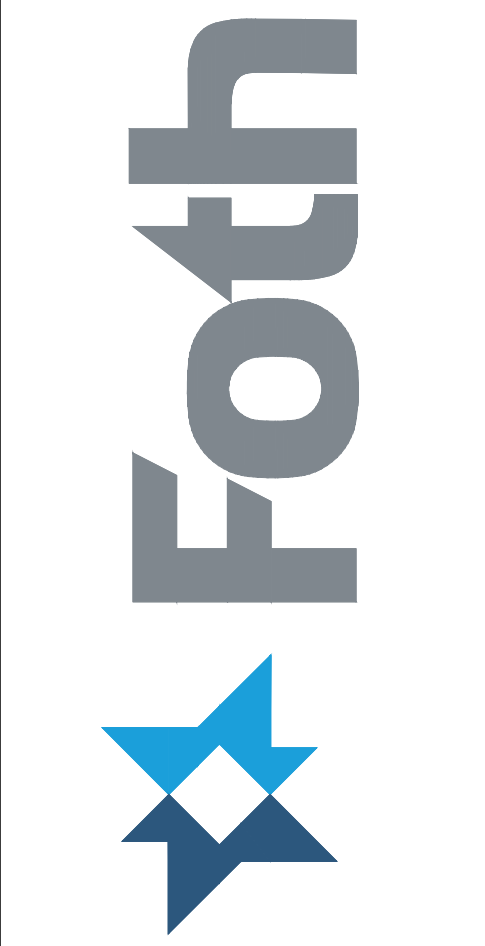
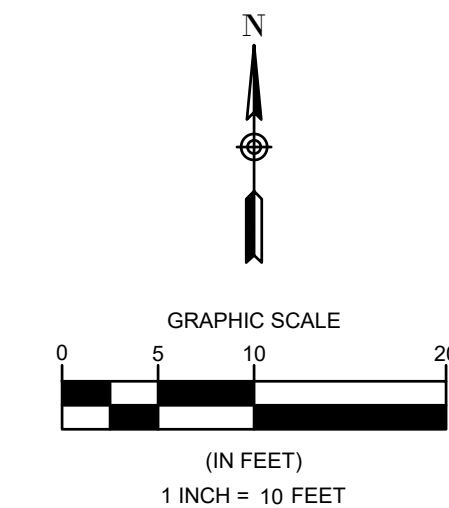
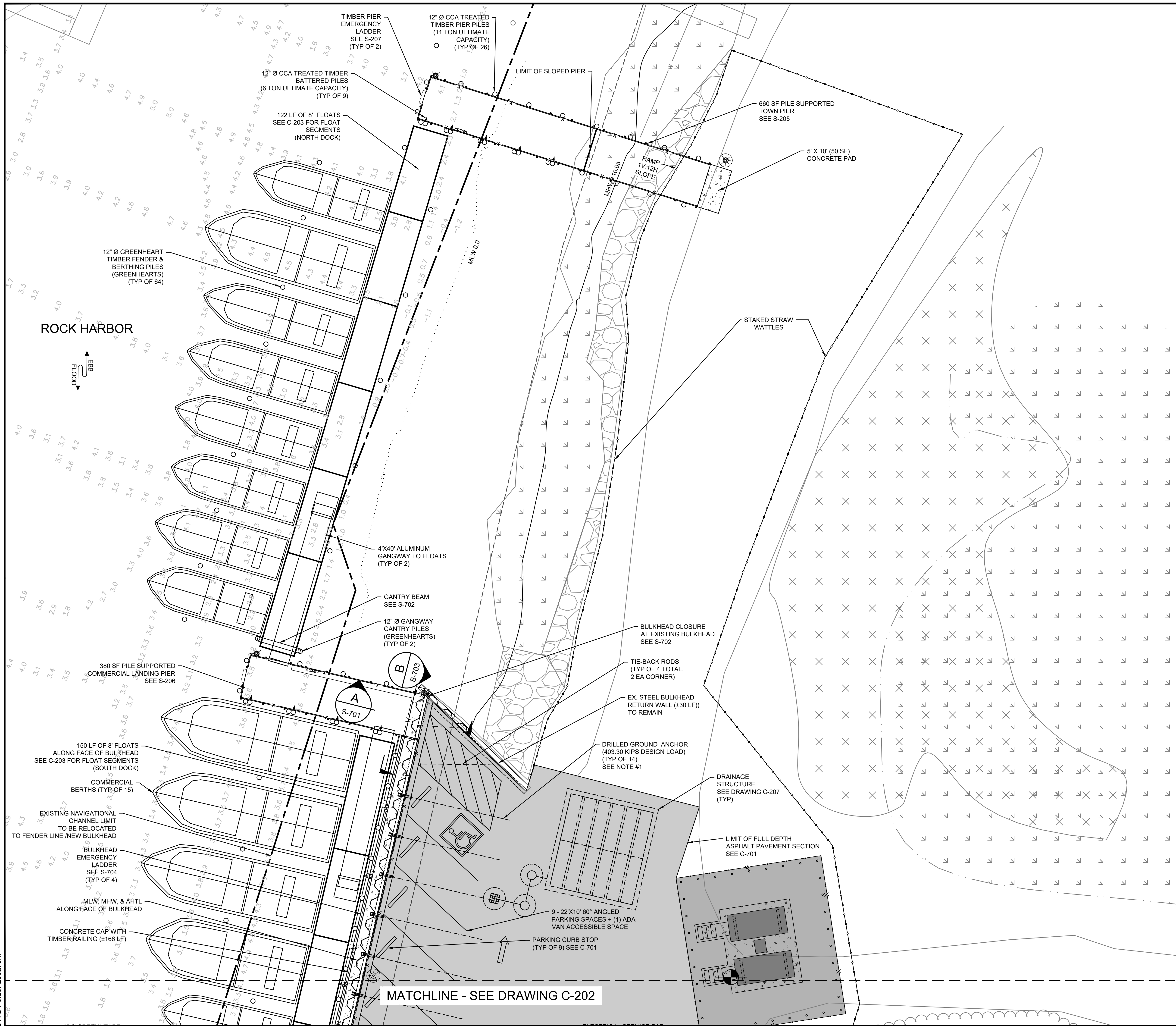
**A** TYPICAL DEMOLITION SECTION AT PILE SUPPORTED TIMBER PIER/TIMBER BULKHEAD  
SCALE: 1" = 2'  
C-102



**B** TYPICAL SECTION AT SHEET PILE BULKHEAD  
SCALE: 1" = 2'  
C-102



**C** TYPICAL SECTION AT SHEET PILE BULKHEAD RETURN WALL  
SCALE: 1" = 2'  
C-102



**DEPARTMENT OF PUBLIC WORKS**  
**TOWN OF ORLEANS, MASSACHUSETTS**  
**ROCK HARBOR COMMERCIAL WHARF IMPROVEMENTS**

REVISIONS		DATE OF PREPARATION	
NO.	DESCRIPTION	BY	DATE
1		MEC/JAH	10/24/19 & 3/2/21
2		BAM	12/05/2023
3		SRS	06/28/2021
4		PSR	12/24/2023

**SITE PLAN 1 OF 2**

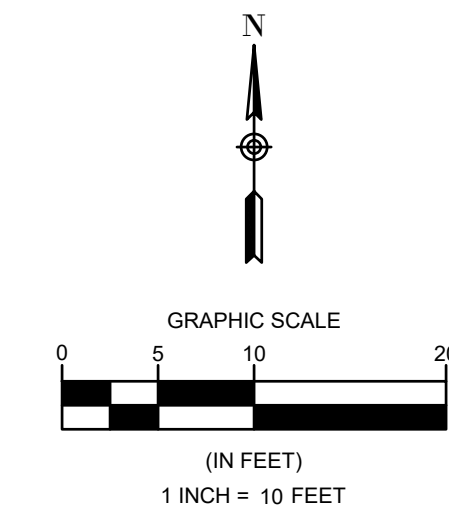
**ISSUED FOR BID**

PROJECT NO: 00190004.10  
 SHEET NUMBER  
**C-201**

**NOTE:**  
 1. CONTRACTOR TO DESIGN GROUND ANCHOR ASSEMBLY INCLUDING GROUND ANCHOR, STAND-OFF PLATES AND CAP PLATES. CONTRACTOR SHALL SUBMIT CALCULATIONS AND DRAWINGS FOR GROUND ANCHOR DESIGN, STAMPED BY AN ENGINEER REGISTERED IN THE STATE OF MA. FOR SOILS INFORMATION SEE ATTACHMENT "A" OF THE CONTRACT DOCUMENTS.

**MATCHLINE - SEE DRAWING C-202**

MATCHLINE - SEE DRAWING C-201



DEPARTMENT OF PUBLIC WORKS  
TOWN OF ORLEANS, MASSACHUSETTS  
ROCK HARBOR COMMERCIAL WHARF  
IMPROVEMENTS

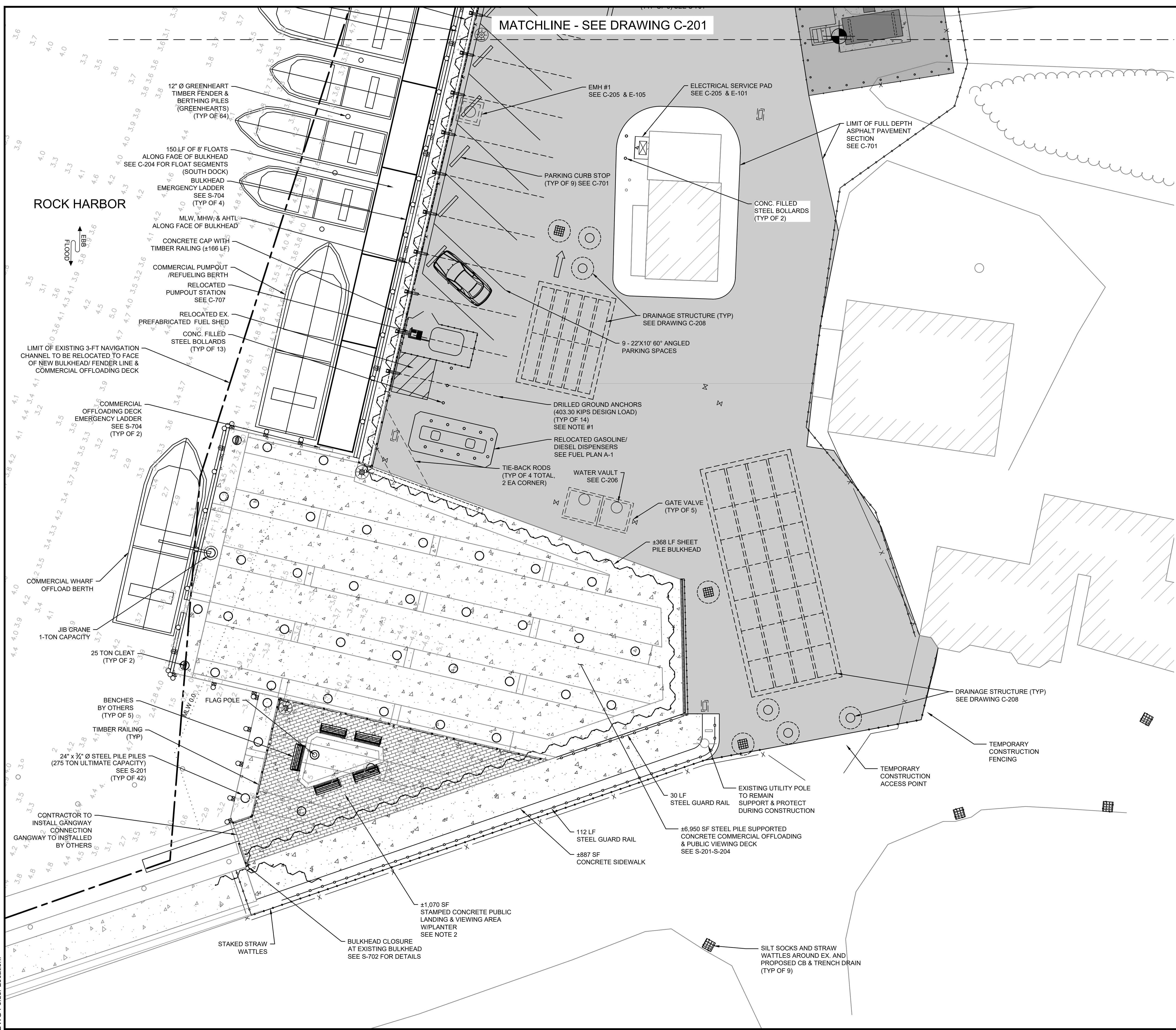
REVISIONS		DATE OF PREPARATION	
NO.	DESCRIPTION	BY	DATE
1		MEC/JAH	10/24/19 & 3/2/21
2		BAM	12/05/2023
3		SRS	06/28/2021
4		PSR	12/24/2023

SITE PLAN  
2 OF 2

ISSUANCE:  
**ISSUED FOR BID**

PROJECT NO: 00190004.10  
SHEET NUMBER

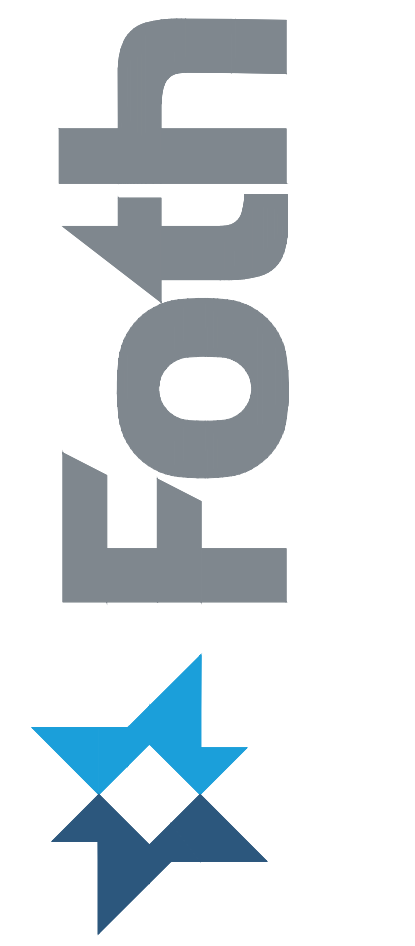
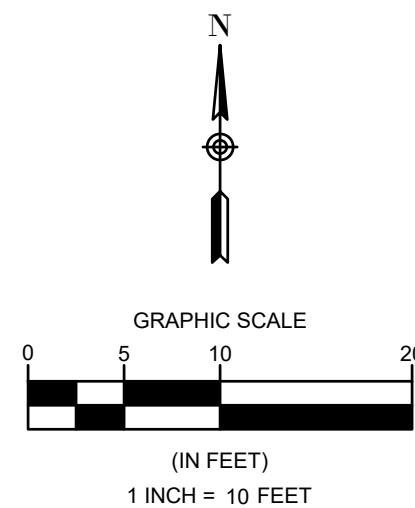
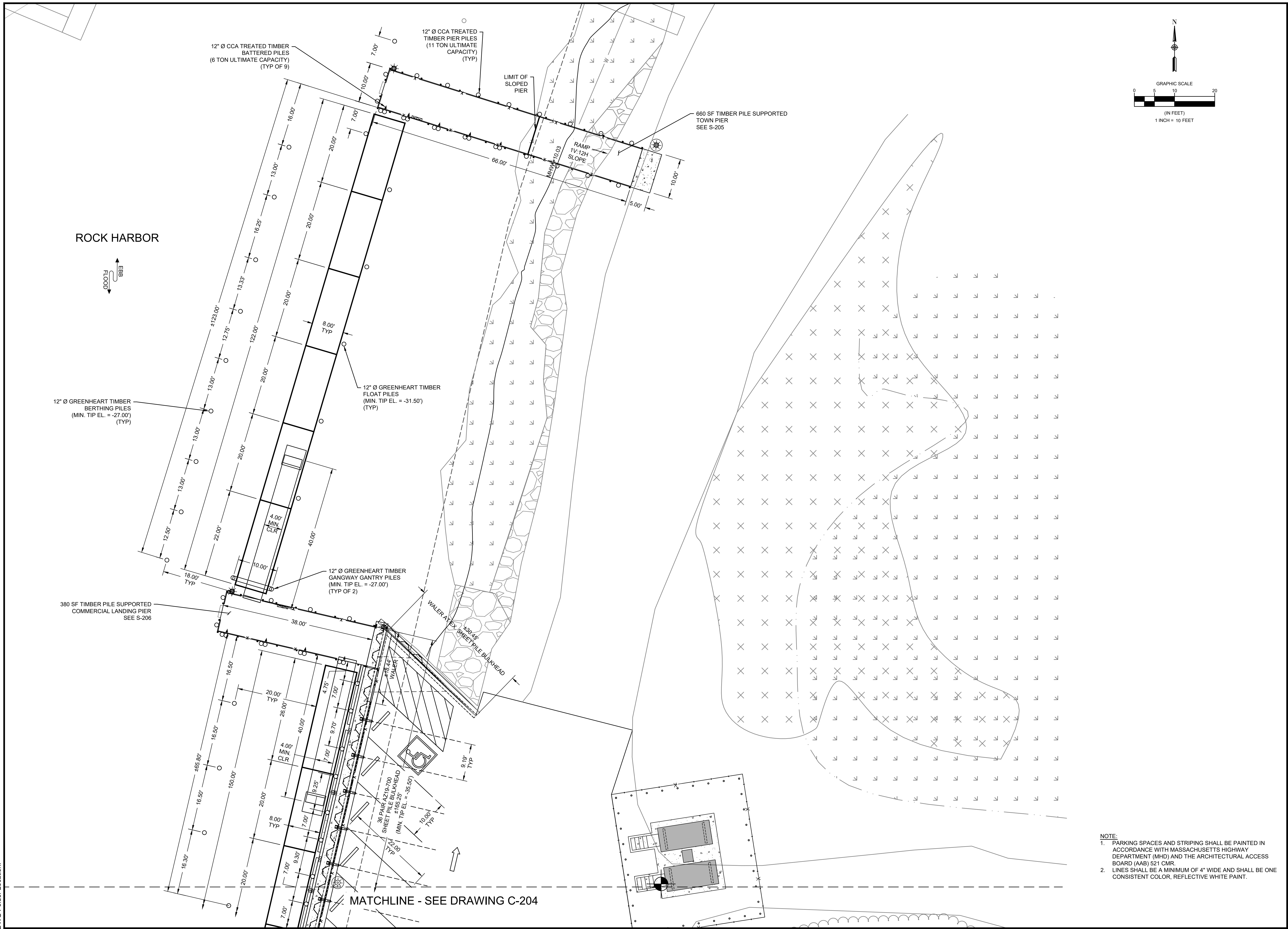
C-202



**NOTE:**

- CONTRACTOR TO DESIGN GROUND ANCHOR ASSEMBLY INCLUDING GROUND ANCHOR, STAND-OFF PLATES AND CAP PLATES. CONTRACTOR SHALL SUBMIT CALCULATIONS AND DRAWINGS FOR GROUND ANCHOR DESIGN, STAMPED BY AN ENGINEER REGISTERED IN THE STATE OF MA. FOR SOILS INFORMATION SEE ATTACHMENT "A" OF THE CONTRACT DOCUMENTS.
- SEE CAST-IN-PLACE CONCRETE SPECIFICATION FOR COLOR & PATTERN OF STAMPED CONCRETE DECK.

Thursday, March 7, 2024 11:35:55 AM  
 DWG Filename: c-201 general site plan.dwg  
 DWG Folder Location: Layout: c-202 site plan 2 of 2



**DEPARTMENT OF PUBLIC WORKS**  
**TOWN OF ORLEANS, MASSACHUSETTS**  
**ROCK HARBOR COMMERCIAL WHARF IMPROVEMENTS**

REVISIONS		DATE OF PREPARATION	
NO.	DESCRIPTION	BY	DATE
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SHEET TITLE:		
<b>LAYOUT PLAN 1 OF 2</b>		
ISSUANCE:		
<b>ISSUED FOR BID</b>		
PROJECT NO:	00190004.10	
SHEET NUMBER	C-203	

**NOTE:**  
 1. PARKING SPACES AND STRIPING SHALL BE PAINTED IN ACCORDANCE WITH MASSACHUSETTS HIGHWAY DEPARTMENT (MHD) AND THE ARCHITECTURAL ACCESS BOARD (AAB) 521 CMR.  
 2. LINES SHALL BE A MINIMUM OF 4" WIDE AND SHALL BE ONE CONSISTENT COLOR, REFLECTIVE WHITE PAINT.

DEPARTMENT OF PUBLIC WORKS  
 TOWN OF ORLEANS, MASSACHUSETTS  
 ROCK HARBOR COMMERCIAL WHARF  
 IMPROVEMENTS

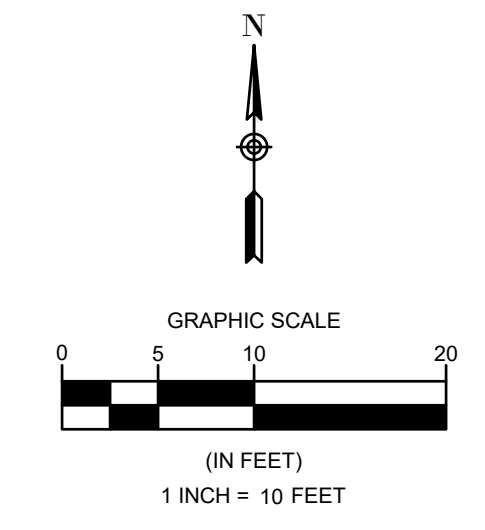
REVISIONS		DESCRIPTION	
NO.	DATE	BY	DATE
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DATE OF PREPARATION		
SURVEYED	BY	DATE
MEC/JAH		10/24/19 & 3/2/21
DRAWN	BAM	12/05/2023
DESIGNED	SRS	06/28/2021
CHECKED	PSR	12/24/2023

SHEET TITLE:  
**LAYOUT PLAN  
 2 OF 2**

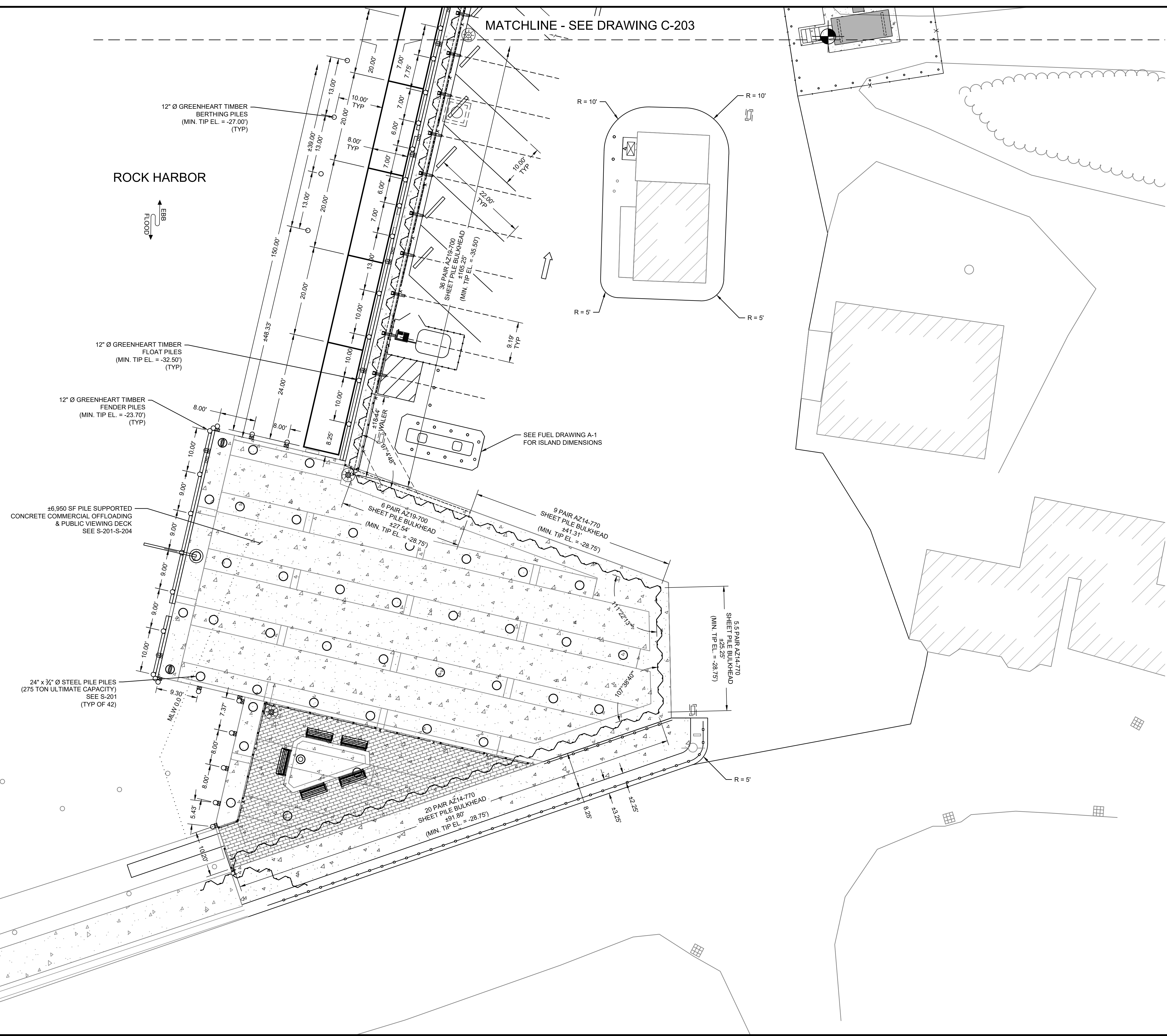
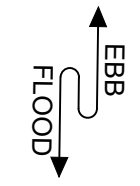
ISSUANCE:  
**ISSUED FOR BID**

PROJECT NO: 00190004.10  
 SHEET NUMBER



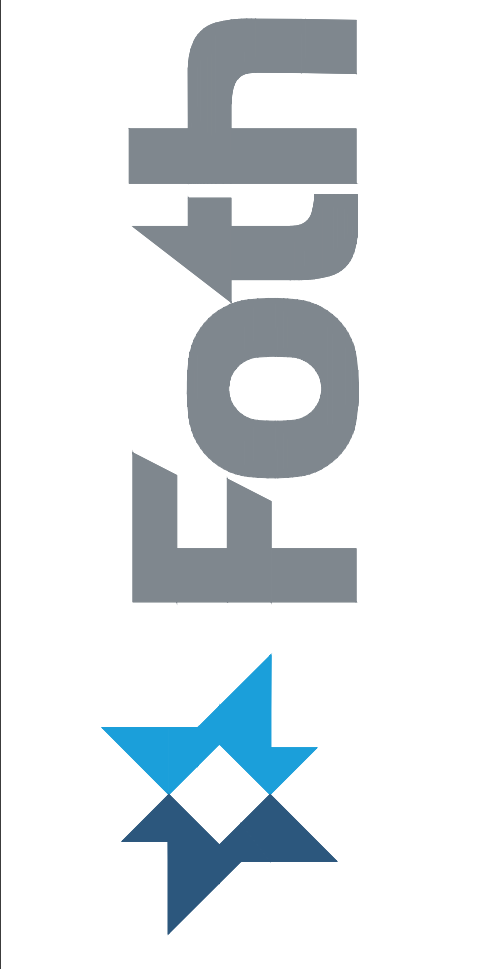
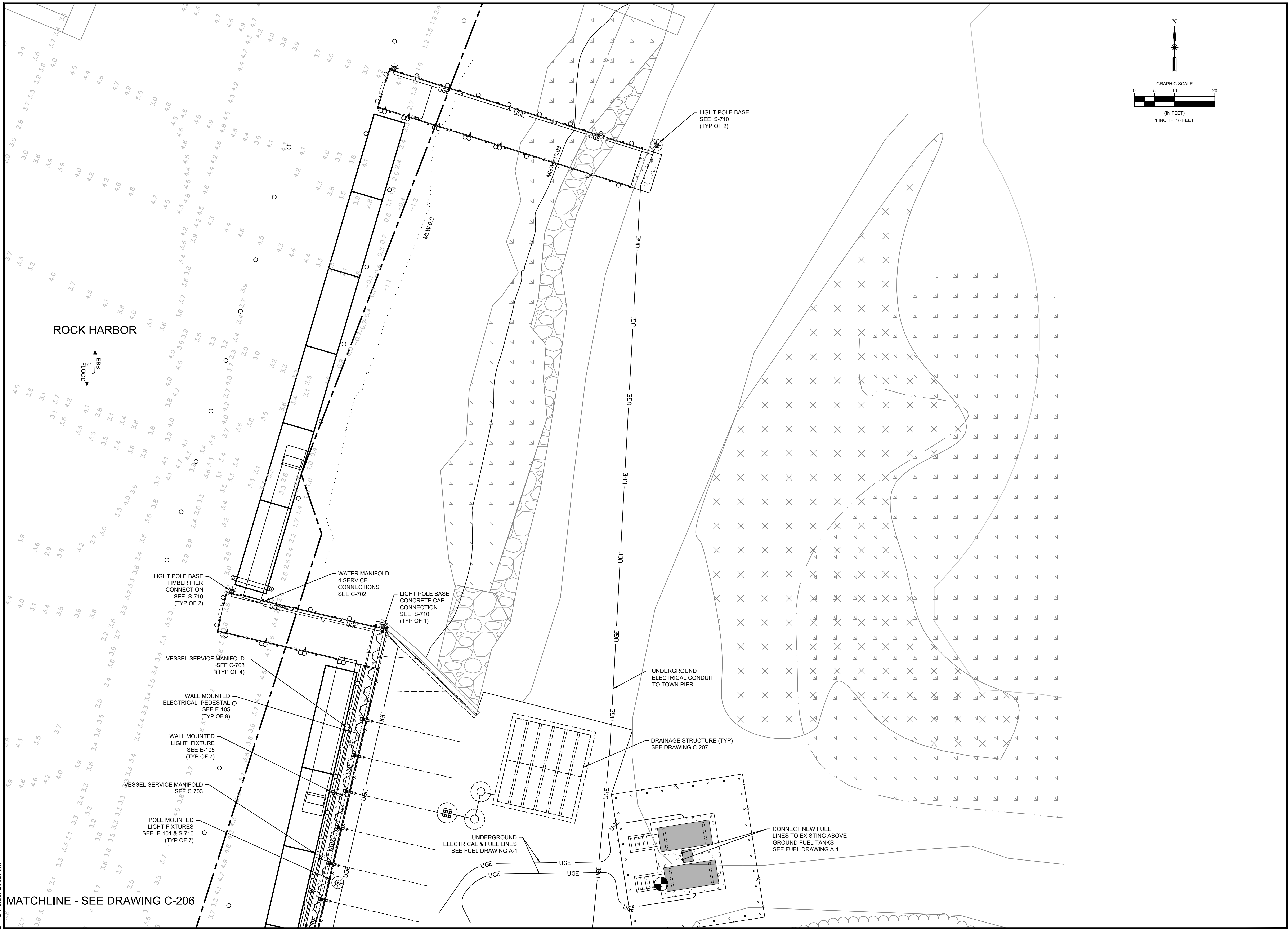
MATCHLINE - SEE DRAWING C-203

ROCK HARBOR



NOTE:  
 1. PARKING SPACES AND STRIPING SHALL BE PAINTED IN ACCORDANCE WITH MASSACHUSETTS HIGHWAY DEPARTMENT (MHD) AND THE ARCHITECTURAL ACCESS BOARD (AAB) 521 CMR.  
 2. LINES SHALL BE A MINIMUM OF 4" WIDE AND SHALL BE ONE CONSISTENT COLOR, REFLECTIVE WHITE PAINT.





**DEPARTMENT OF PUBLIC WORKS**  
**TOWN OF ORLEANS, MASSACHUSETTS**  
**ROCK HARBOR COMMERCIAL WHARF IMPROVEMENTS**

REVISIONS		DATE OF PREPARATION	
NO	DESCRIPTION	BY	DATE
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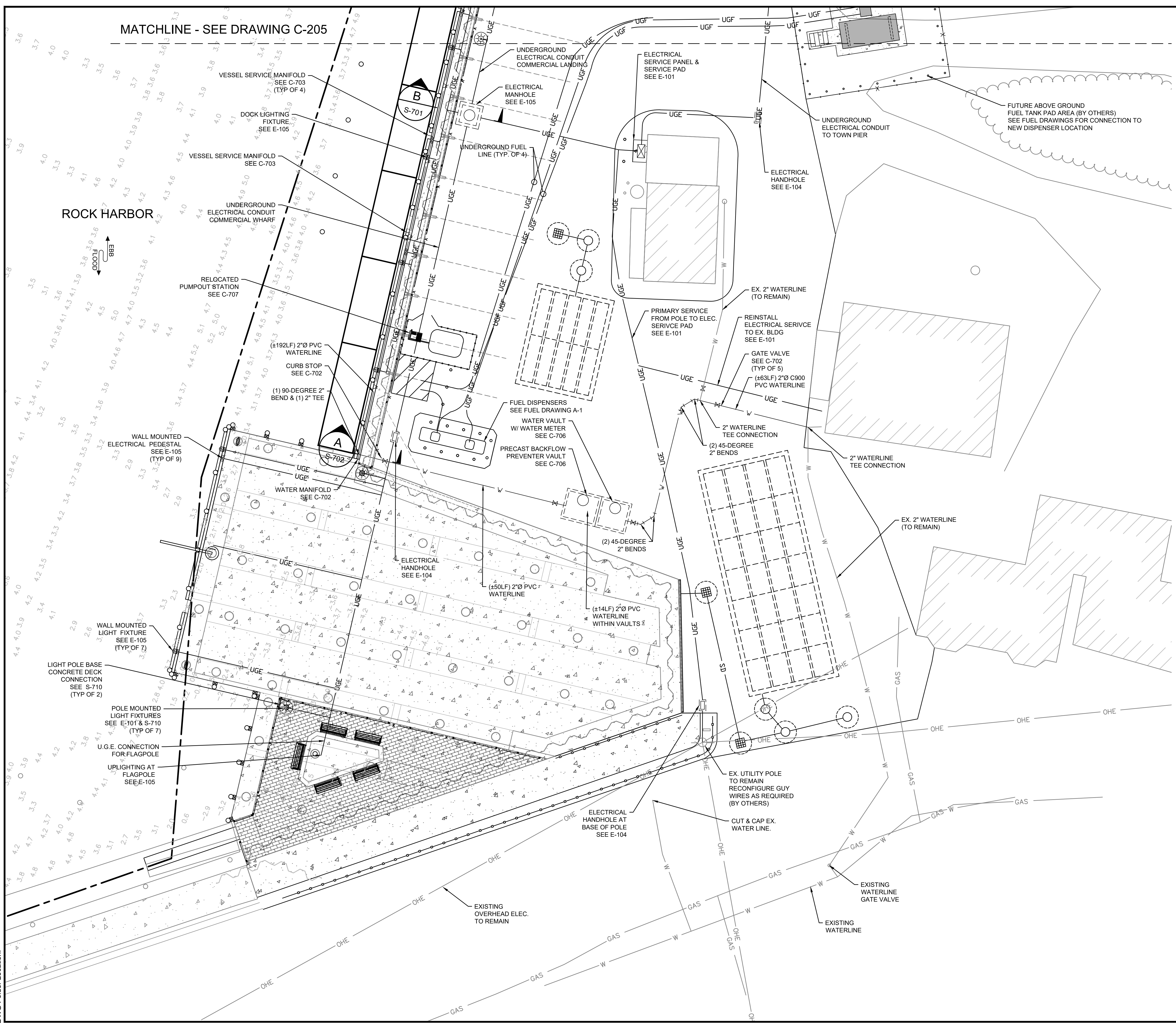
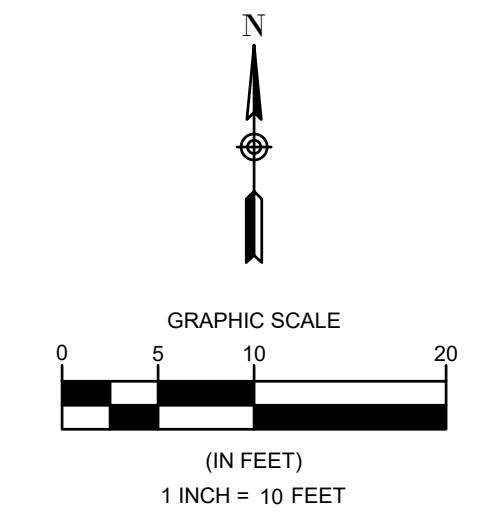
SURVEYED		MEC/JAH	10/24/19 & 3/2/21
DRAWN		BAM	12/05/2023
DESIGNED		SRS	06/28/2021
CHECKED		PSR	12/24/2023
SHEET TITLE:			
<b>UTILITY PLAN 1 OF 2</b>			
ISSUANCE:			
<b>ISSUED FOR BID</b>			
PROJECT NO: 00190004.10			
SHEET NUMBER			
<b>C-205</b>			



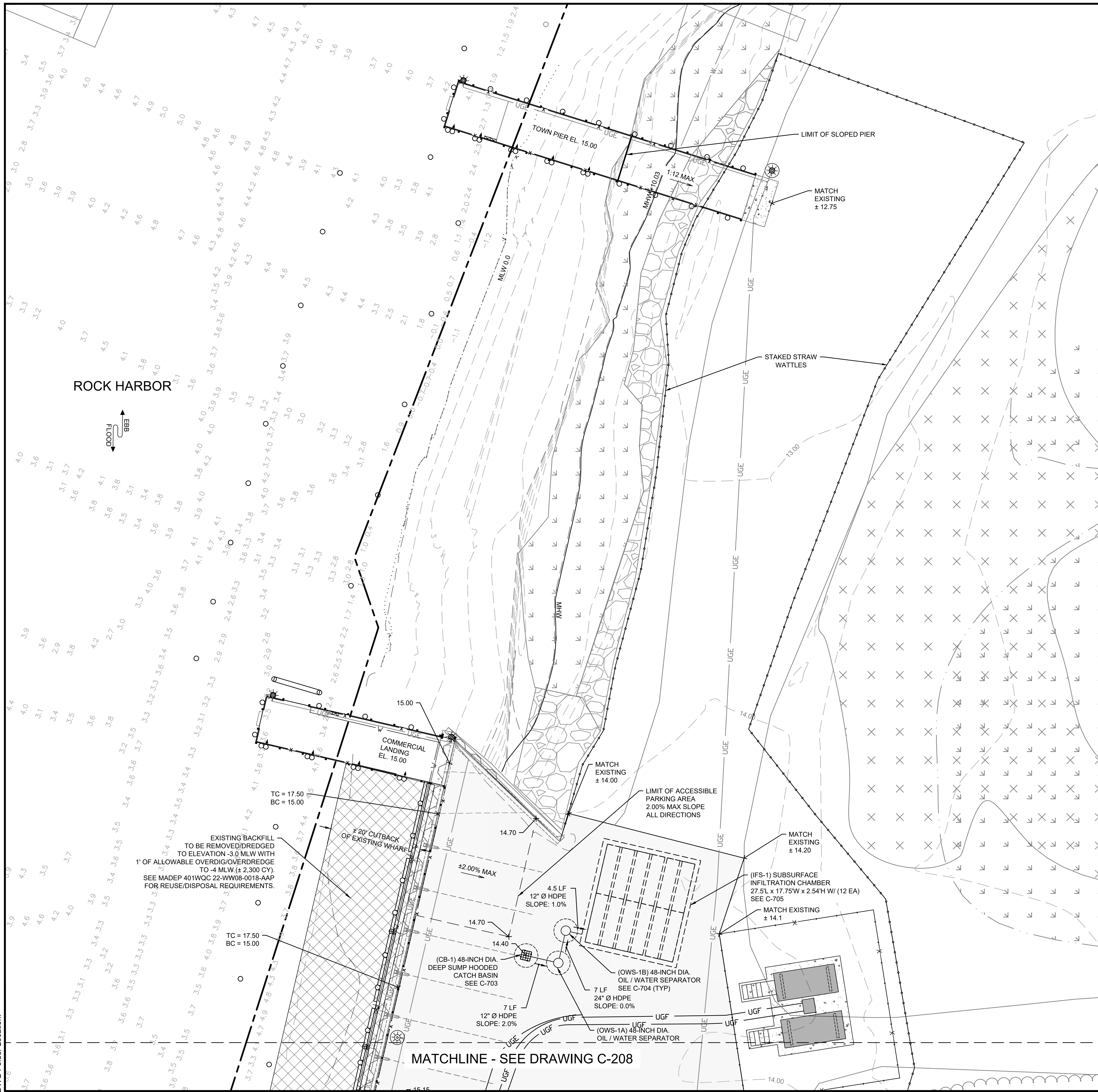
DEPARTMENT OF PUBLIC WORKS  
 TOWN OF ORLEANS, MASSACHUSETTS  
 ROCK HARBOR COMMERCIAL WHARF  
 IMPROVEMENTS

REVISIONS		DATE OF PREPARATION	
NO.	DESCRIPTION	BY	DATE
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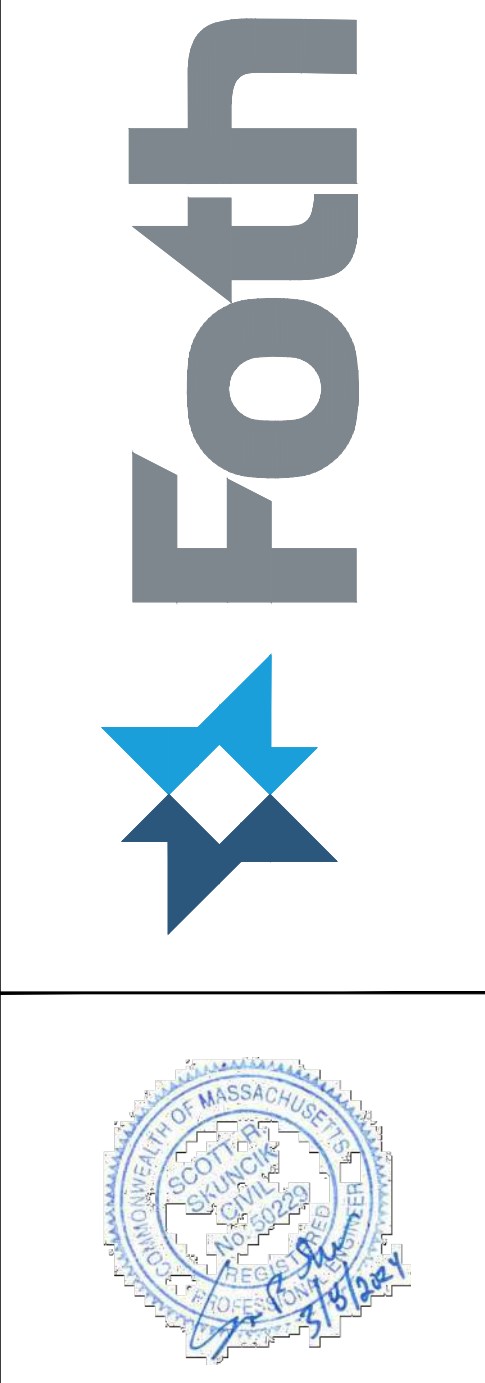
SHEET TITLE:	
UTILITY PLAN 2 OF 2	
ISSUANCE:	
ISSUED FOR BID	
PROJECT NO:	00190004.10
SHEET NUMBER	
C-206	



Thursday, March 7, 2024 11:36:16 AM  
 DWG Filename: c-205 utility plan.dwg  
 DWG Folder Location: Layout: c-206 utility plan sheet 2 of 2



STRUCTURE ID	DESCRIPTION	RIM	INV. IN	INV. OUT	SUMP
CB-1	48" I.D. CATCH BASIN W/ SUMP & HOOD	14.40	-	11.20	3'-0"
OWS-1A	48" I.D. OIL / WATER SEPARATOR	14.40	11.04	5.98	-
OWS-1B	48" I.D. OIL / WATER SEPARATOR	14.40	5.98	11.00	-
IFS-1	12-UNIT INFILTRATION SYSTEM	-	10.96	-	-
IFS-1	INFILTRATION SYSTEM STONE	-	10.46	-	-



DEPARTMENT OF PUBLIC WORKS  
 TOWN OF ORLEANS, MASSACHUSETTS  
 ROCK HARBOR COMMERCIAL WHARF IMPROVEMENTS

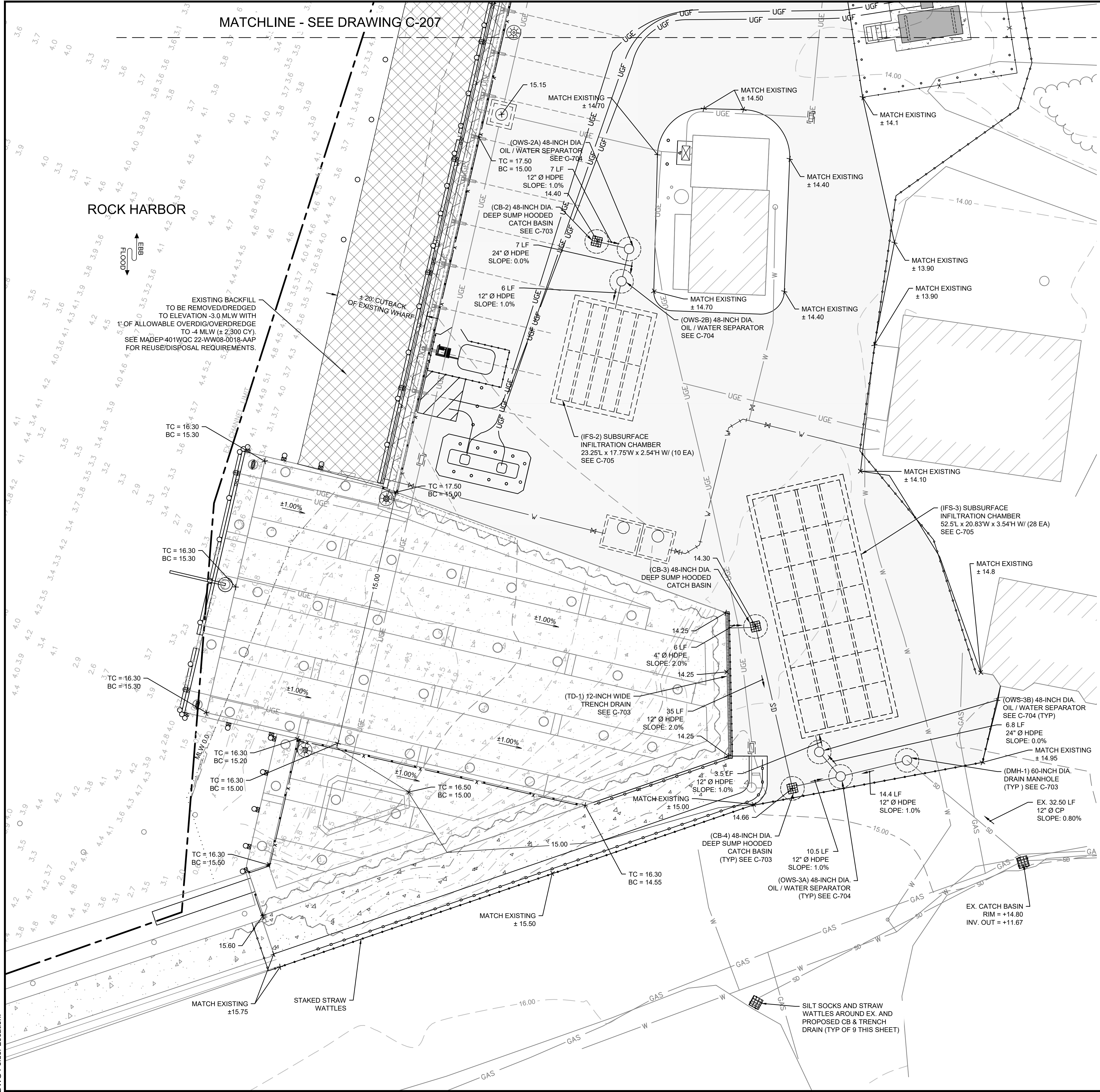
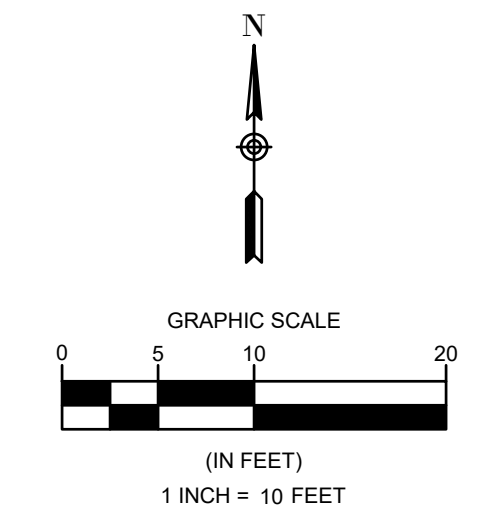
REVISIONS		DATE OF PREPARATION	
NO.	DESCRIPTION	BY	DATE

ISSUED FOR BID

PROJECT NO: 00190004.10  
 SHEET NUMBER

**GRADING AND DRAINAGE PLAN  
 1 OF 2**

DEPARTMENT OF PUBLIC WORKS  
TOWN OF ORLEANS, MASSACHUSETTS  
ROCK HARBOR COMMERCIAL WHARF IMPROVEMENTS



STRUCTURE ID	DESCRIPTION	RIM	INV. IN	INV. OUT	SUMP
CB-2	48" I.D. CATCH BASIN W/ SUMP & HOOD	14.40	-	11.58	3'-0"
OWS-2A	48" I.D. OIL / WATER SEPARATOR	14.40	11.51	6.48	-
OWS-2B	48" I.D. OIL / WATER SEPARATOR	14.40	6.48	11.47	-
IFS-2	10-UNIT INFILTRATION SYSTEM	-	11.40	-	-
IFS-2	INFILTRATION SYSTEM STONE	-	10.90	-	-
TD-1	12-INCH WIDE TRENCH DRAIN	14.25	-	10.70	-
CB-3	48" I.D. CATCH BASIN W/ SUMP & HOOD	14.30	10.70	10.60	3'-0"
CB-4	48" I.D. CATCH BASIN W/ SUMP & HOOD	14.66	10.25	10.18	3'-0"
OWS-3A	48" I.D. OIL / WATER SEPARATOR	14.66	10.08 (CB-4) 10.11 (DMH-1)	5.04	-
OWS-3B	48" I.D. OIL / WATER SEPARATOR	14.66	5.04	10.04	-
IFS-3	28-UNIT INFILTRATION SYSTEM	-	10.00	-	-
IFS-3	INFILTRATION SYSTEM STONE	-	9.50	-	-
DMH-1	60" I.D. DRAIN MANHOLE	14.66	11.40	10.25	-
EX. CB	EXISTING CATCH BASIN	14.80	-	11.67	-

Thursday, March 7, 2024 11:36:36 AM  
DWG Filename: c-207 grading and drainage plan.dwg  
Layout: c-208 grading and drainage plan 2 of 2  
DWG Folder Location:

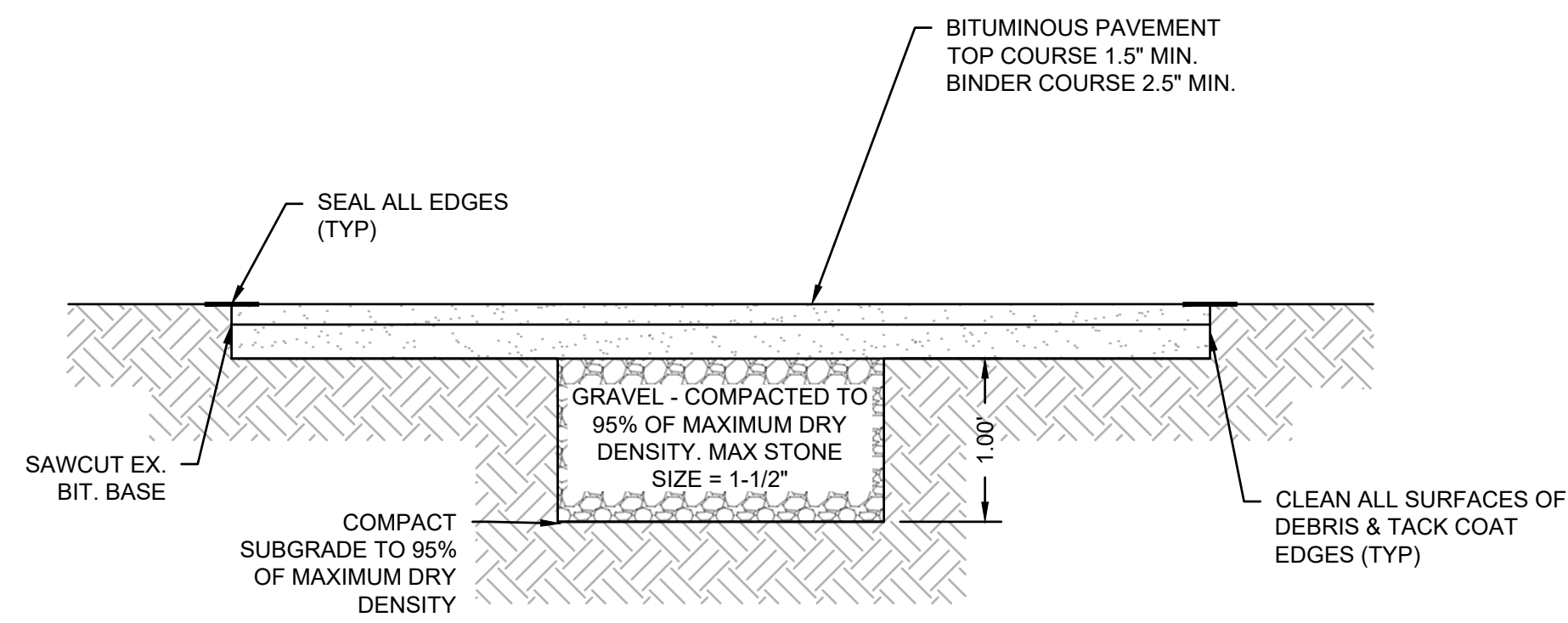
REVISIONS		DESCRIPTION	
NO.	DATE	BY	

DATE OF PREPARATION		
SURVEYED	BY	DATE
MEC/JAH		10/24/19 & 3/22/21
DRAWN	BAM	12/05/2023
DESIGNED	SRS	06/28/2021
CHECKED	PSR	12/24/2023

SHEET TITLE:  
**GRADING AND DRAINAGE PLAN 2 OF 2**

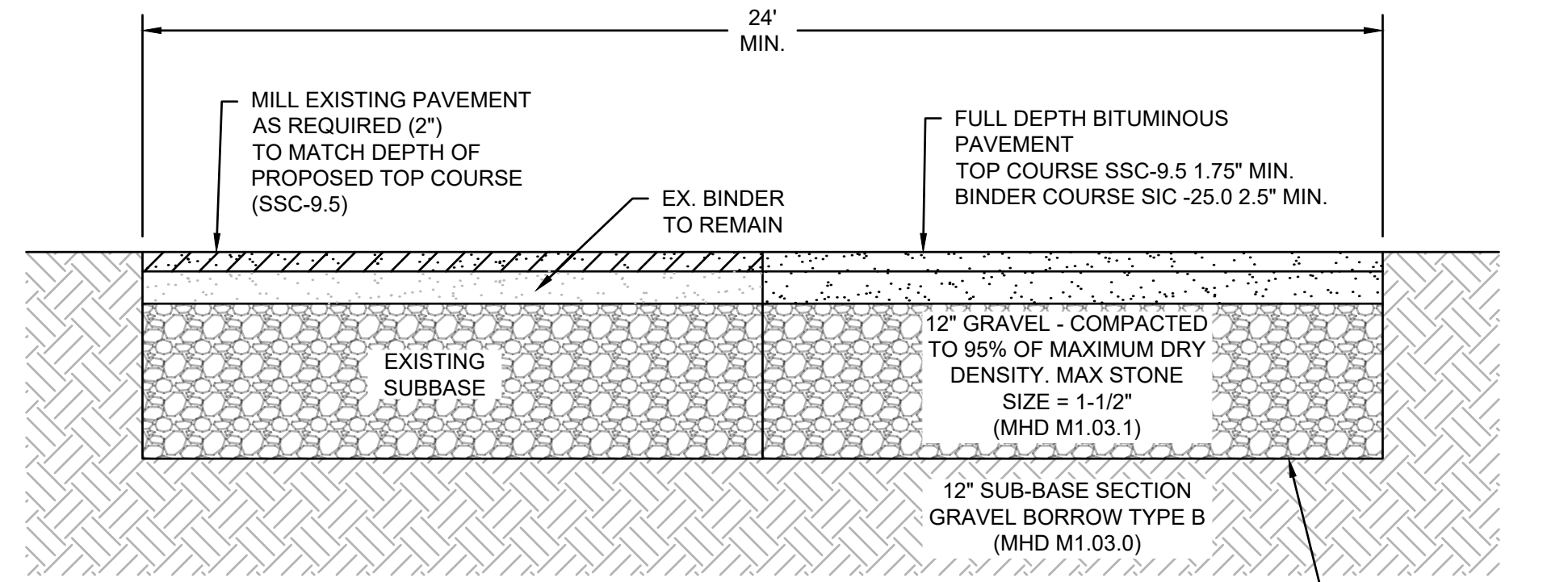
ISSUANCE:  
**ISSUED FOR BID**

PROJECT NO: 00190004.10  
SHEET NUMBER



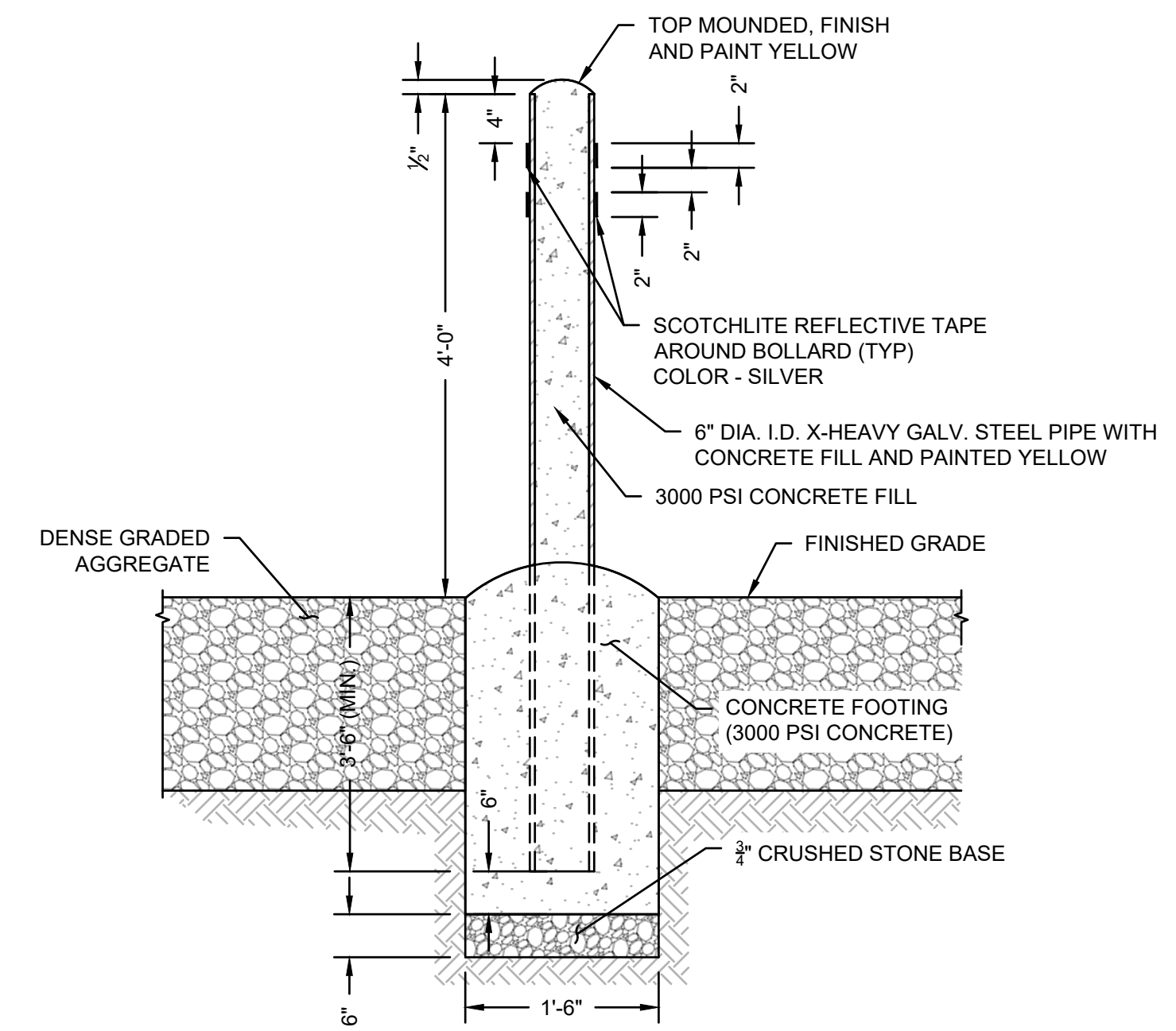
- NOTES:
1. NEW BASE COURSE - PROVIDE BASE COURSE MATERIAL IN LIFTS NOT EXCEEDING 8\"/>

**TYPICAL BITUMINOUS CONCRETE PAVEMENT RESTORATION DETAIL**  
SCALE: N.T.S.

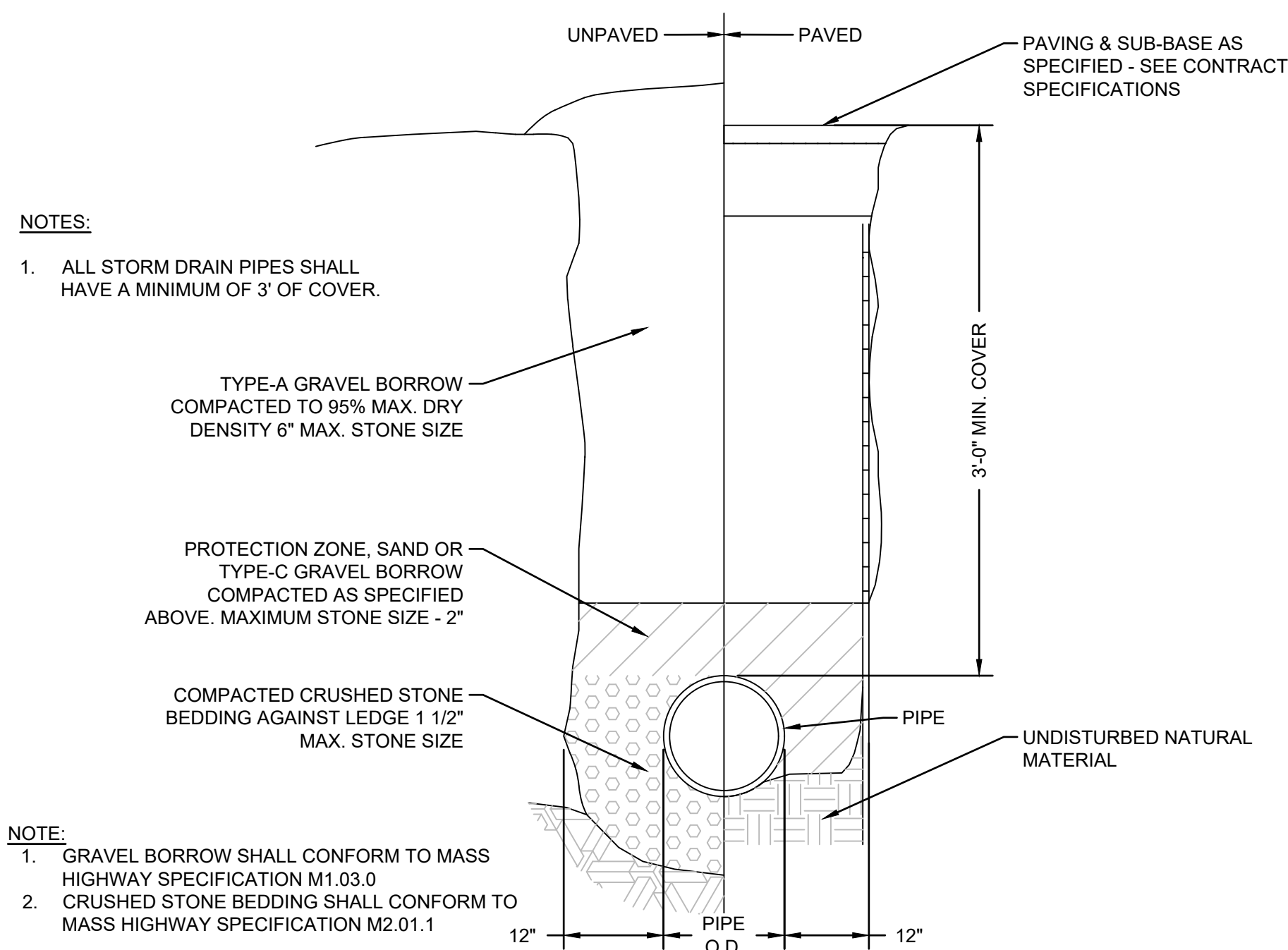


- NOTES:
1. NEW BASE COURSE - PROVIDE BASE COURSE MATERIAL IN LIFTS NOT EXCEEDING 8\"/>

**TYPICAL FULL DEPTH PAVEMENT DETAIL**  
SCALE: N.T.S.



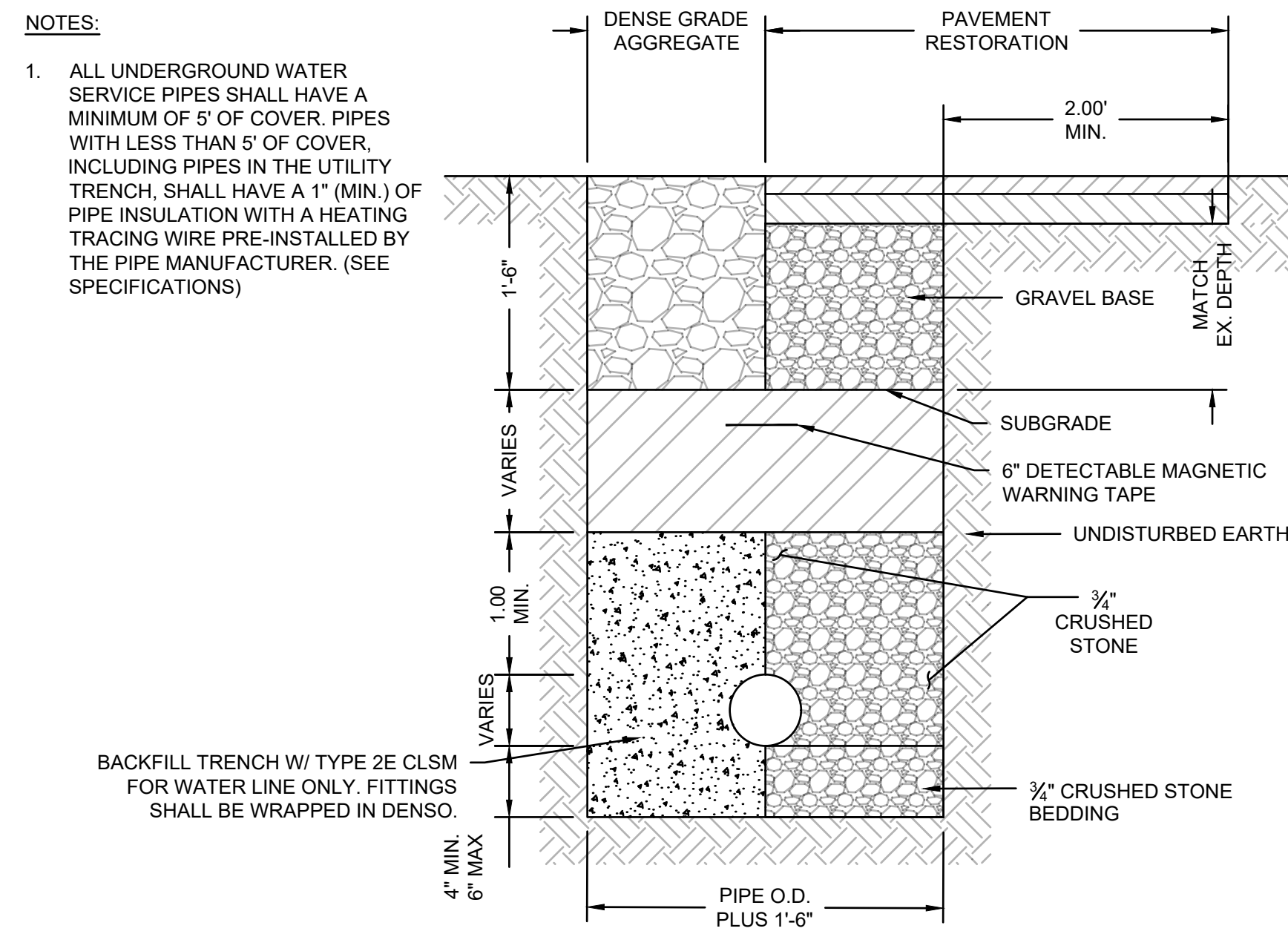
**STEEL BOLLARD DETAIL**  
SCALE: N.T.S.



- NOTES:
1. ALL STORM DRAIN PIPES SHALL HAVE A MINIMUM OF 3\"/>

- NOTE:
1. GRAVEL BORROW SHALL CONFORM TO MASS HIGHWAY SPECIFICATION M1.03.0
  2. CRUSHED STONE BEDDING SHALL CONFORM TO MASS HIGHWAY SPECIFICATION M2.01.1

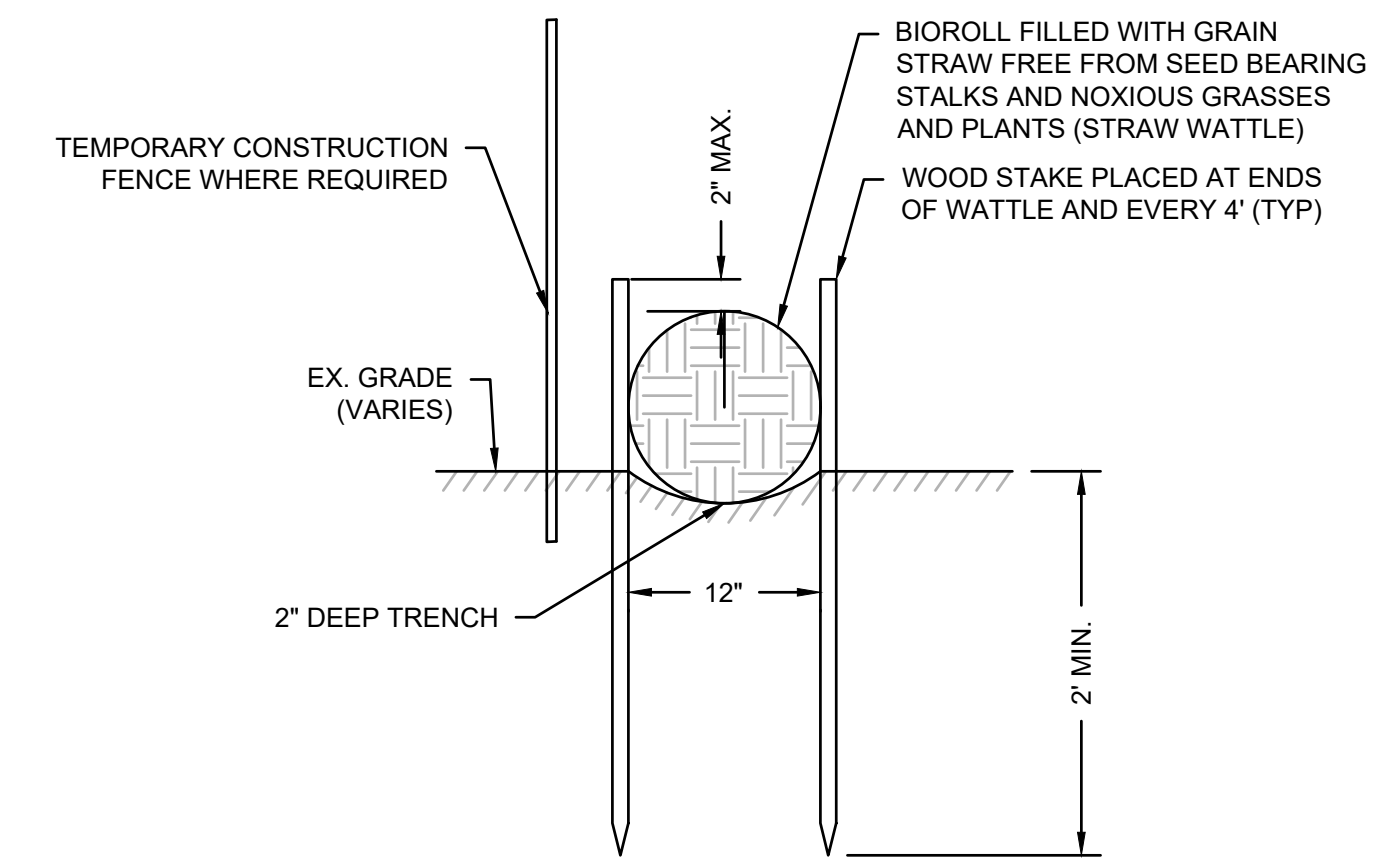
**TYPICAL STORM DRAIN TRENCH DETAIL**  
SCALE: N.T.S.



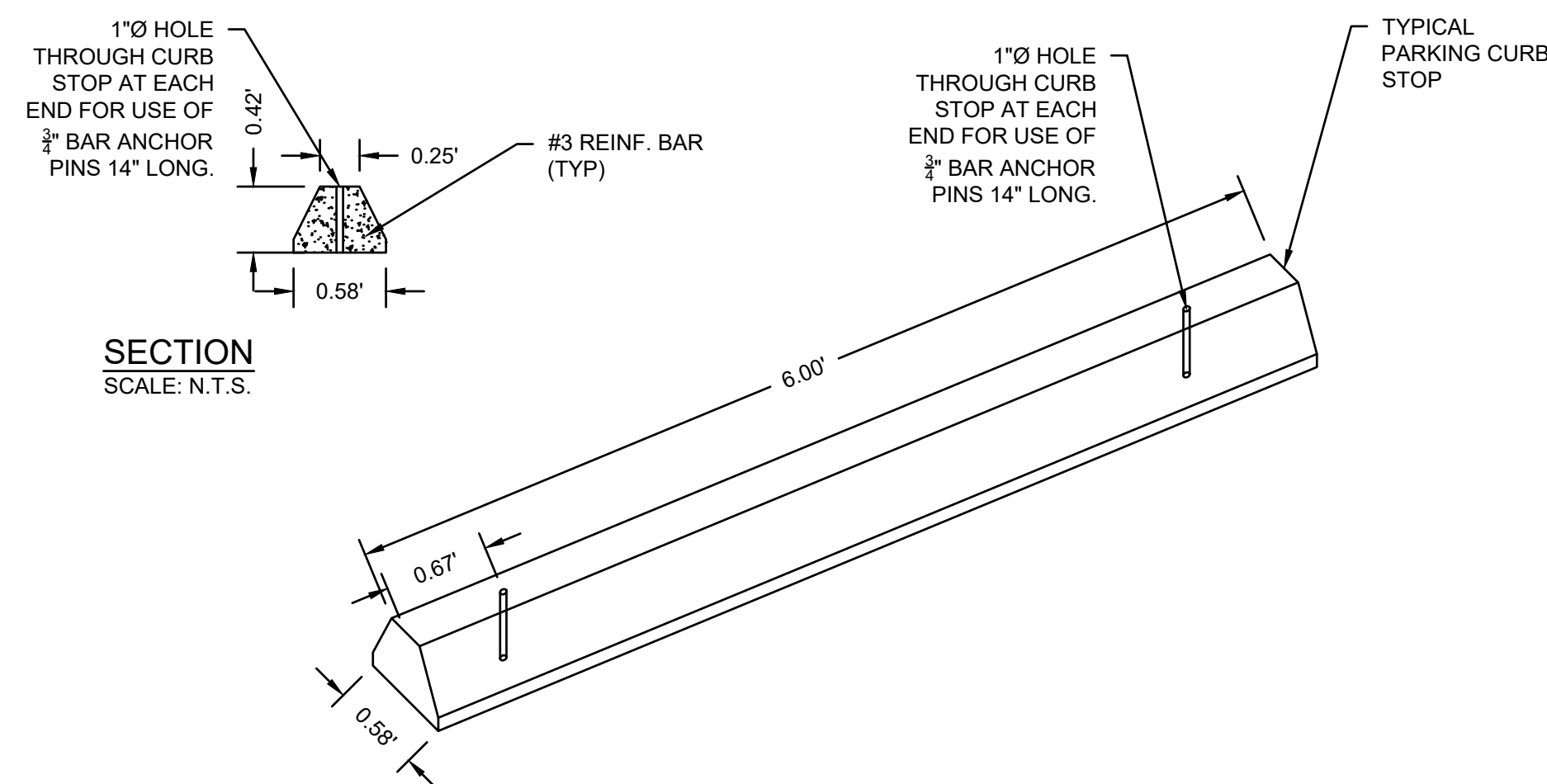
- NOTES:
1. ALL UNDERGROUND WATER SERVICE PIPES SHALL HAVE A MINIMUM OF 5\"/>

BACKFILL TRENCH W/ TYPE 2E CLSM FOR WATER LINE ONLY. FITTINGS SHALL BE WRAPPED IN DENSO.

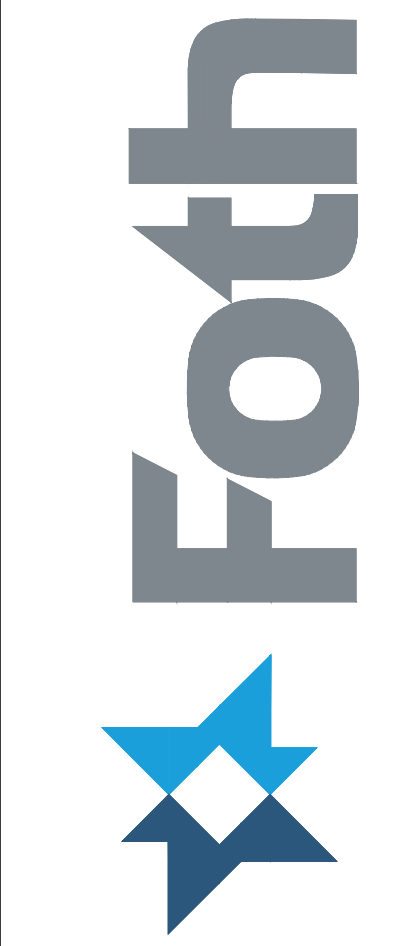
**TYPICAL WATER TRENCH DETAIL**  
SCALE: N.T.S.



**STRAW WATTLE DETAIL**  
SCALE: N.T.S.



**PARKING CURB STOP**  
SCALE: N.T.S.



DEPARTMENT OF PUBLIC WORKS  
TOWN OF ORLEANS, MASSACHUSETTS  
ROCK HARBOR COMMERCIAL WHARF IMPROVEMENTS

REVISIONS	
NO.	DESCRIPTION

DATE OF PREPARATION		
BY	DATE	
MEC/JAH	10/24/19 & 3/2/21	
BAM	12/05/2023	
SRS	06/28/2021	
PSR	12/24/2023	

SHEET TITLE:  
**STANDARD CIVIL DETAILS**

ISSUANCE:  
**ISSUED FOR BID**

PROJECT NO: 00190004.10  
SHEET NUMBER

C-701

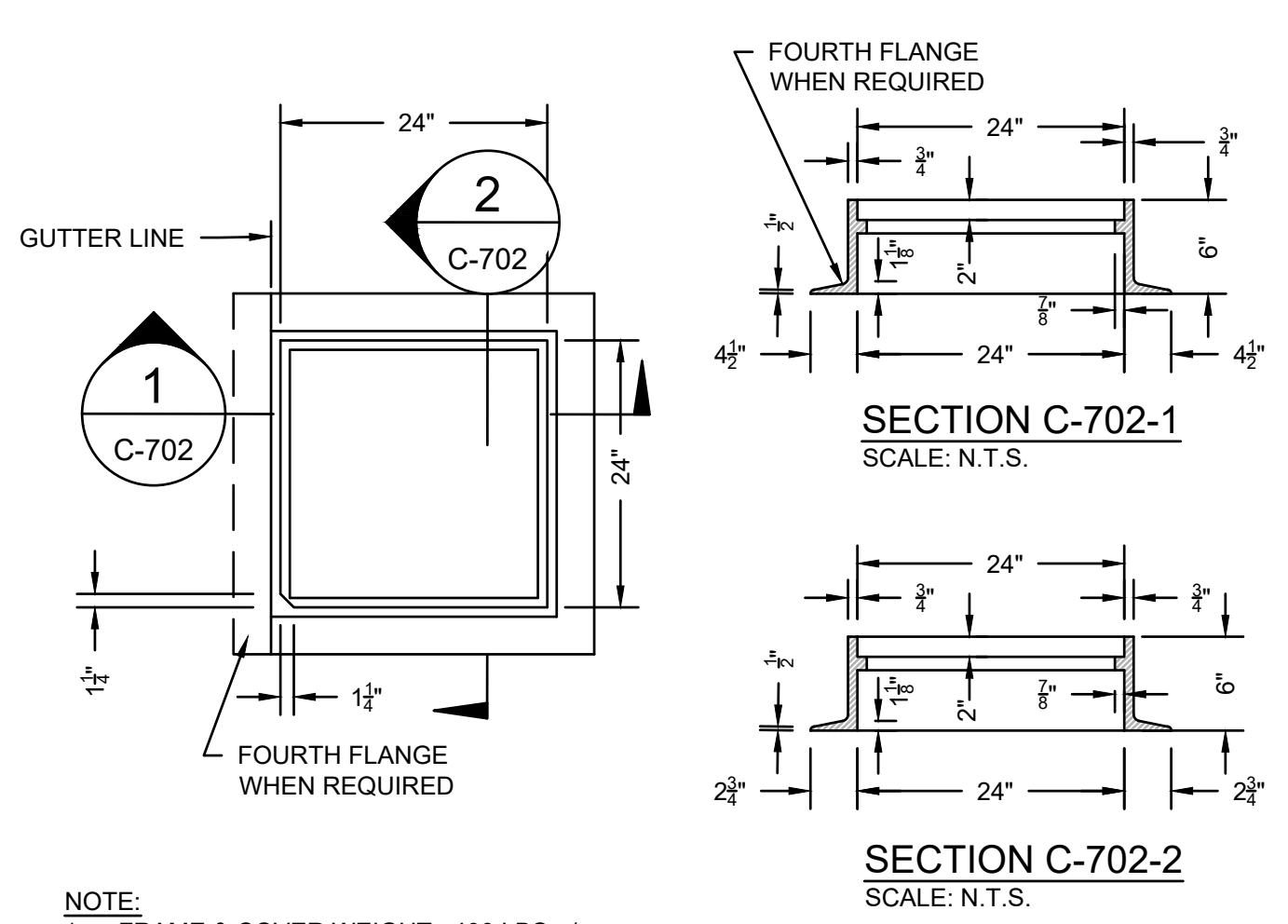
NO.	BY	DATE	DESCRIPTION

DATE OF PREPARATION	
BY	DATE
MEC/JAH	10/24/19 & 3/2/21
BAM	12/05/2023
SRS	06/28/2021
PSR	12/24/2023

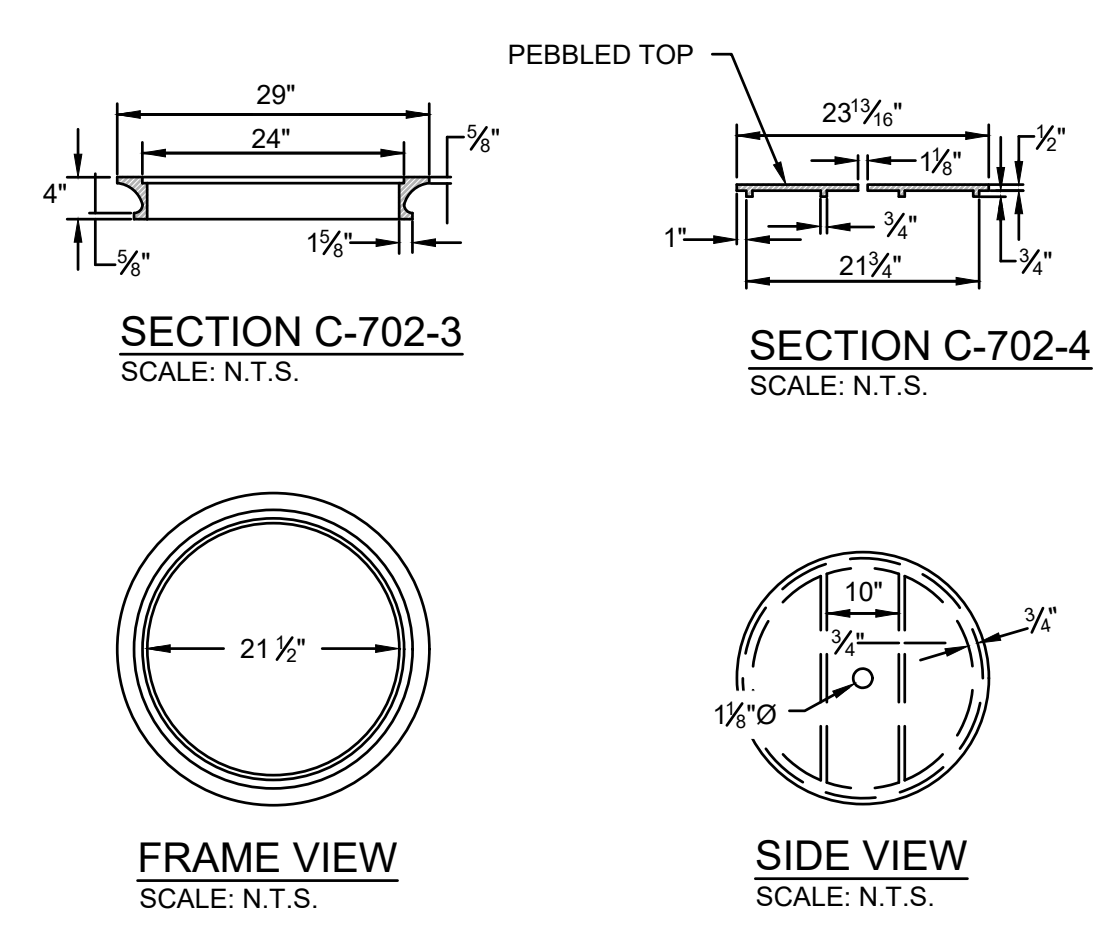
SHEET TITLE:  
**DRAINAGE AND WATER SERVICE DETAILS 1 OF 2**

ISSUANCE:  
**ISSUED FOR BID**

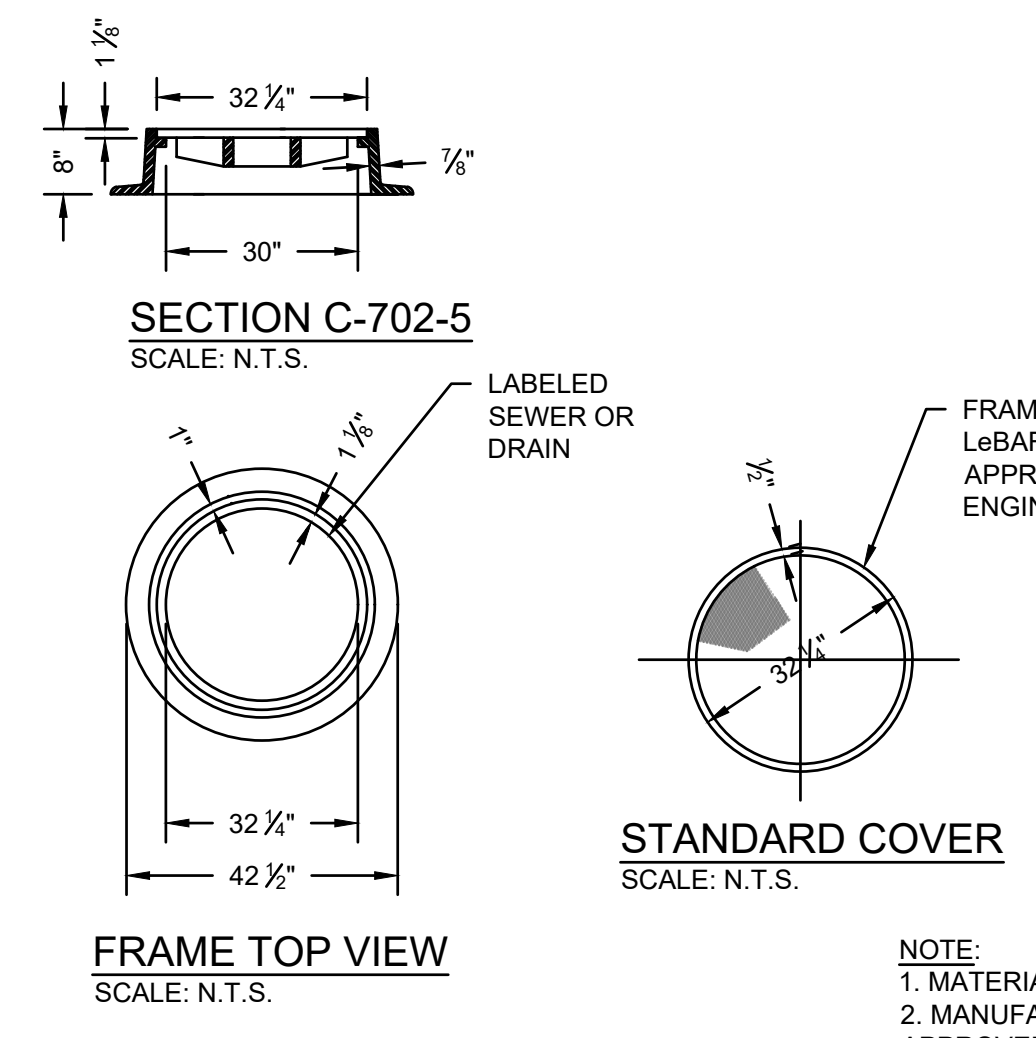
PROJECT NO: 00190004.10  
 SHEET NUMBER



NOTE:  
 1. FRAME & COVER WEIGHT : 400 LBS +/-  
 2. MATERIAL - CAST IRON  
 3. TO BE USED WITH SQUARE OPENING TYPE GRATE LeBARON MODEL# LF-246 OR APPROVED EQUAL



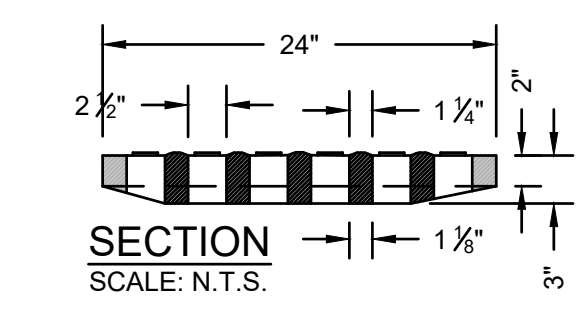
NOTE:  
 1. MINIMUM COVER WEIGHT - 73 lbs  
 2. MINIMUM FRAME WEIGHT - 113 lbs  
 3. MATERIAL - CAST IRON  
 4. SIDEWALK AREA USE ONLY



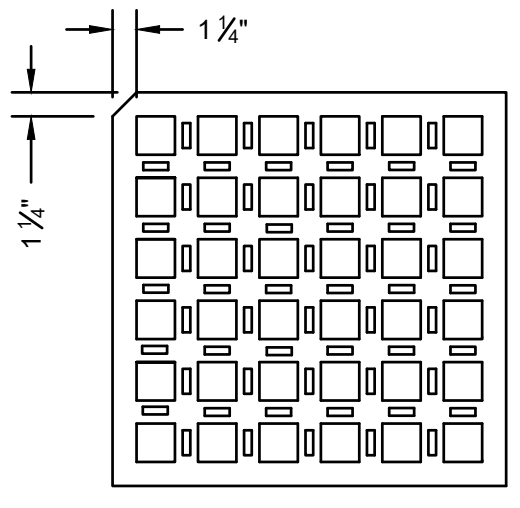
**MANHOLE FRAME & COVER: TYPE "A"**  
SCALE: N.T.S.

NOTE:  
 1. MATERIAL - CAST IRON  
 2. MANUFACTURED BY LeBARON OR TOWN APPROVED EQUAL

**CATCH BASIN SQUARE FRAME**  
SCALE: N.T.S.



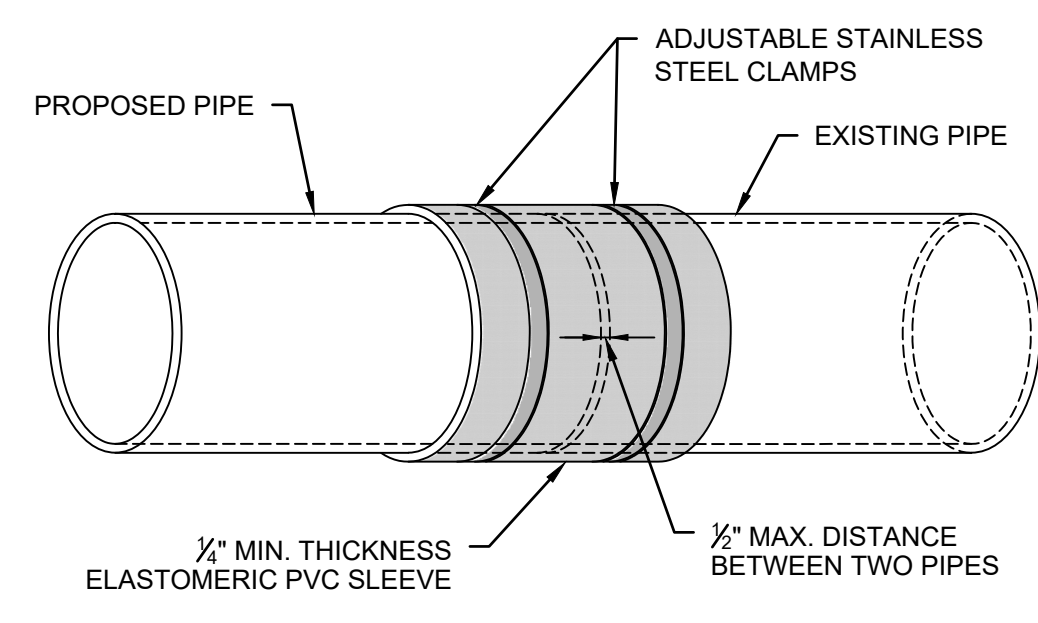
NOTES:  
 1. MINIMUM GRATE WEIGHT - 220± lbs  
 2. MATERIAL - CAST IRON  
 3. TO BE USED WITH STANDARD CATCH BASIN FRAME LeBARON MOD# LF-246 OR TOWN APPROVED EQUAL



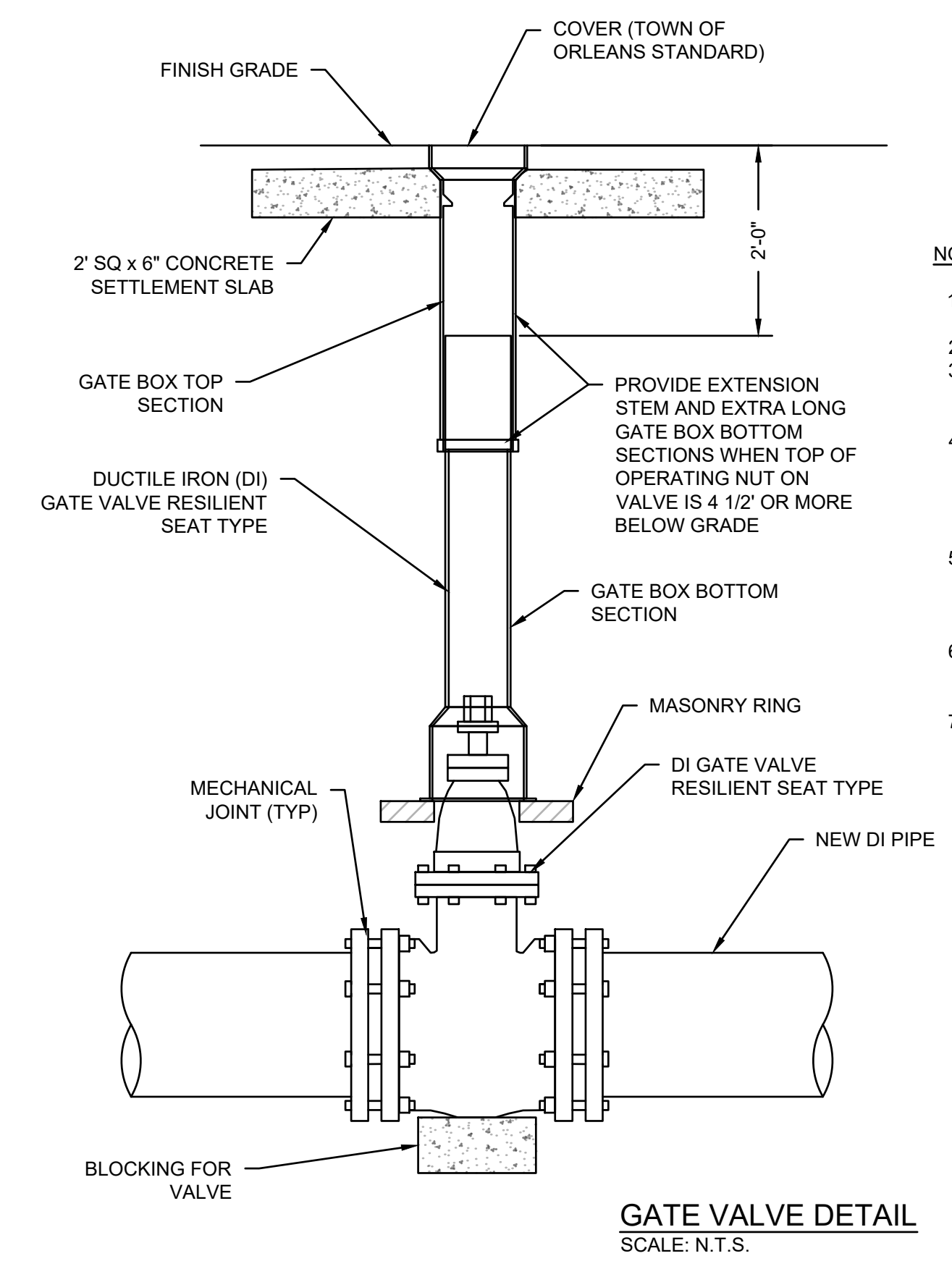
**SQUARE OPENING TYPE CATCH BASIN GRATE**  
SCALE: N.T.S.

**CATCH BASIN FRAME & COVER**  
SCALE: N.T.S.

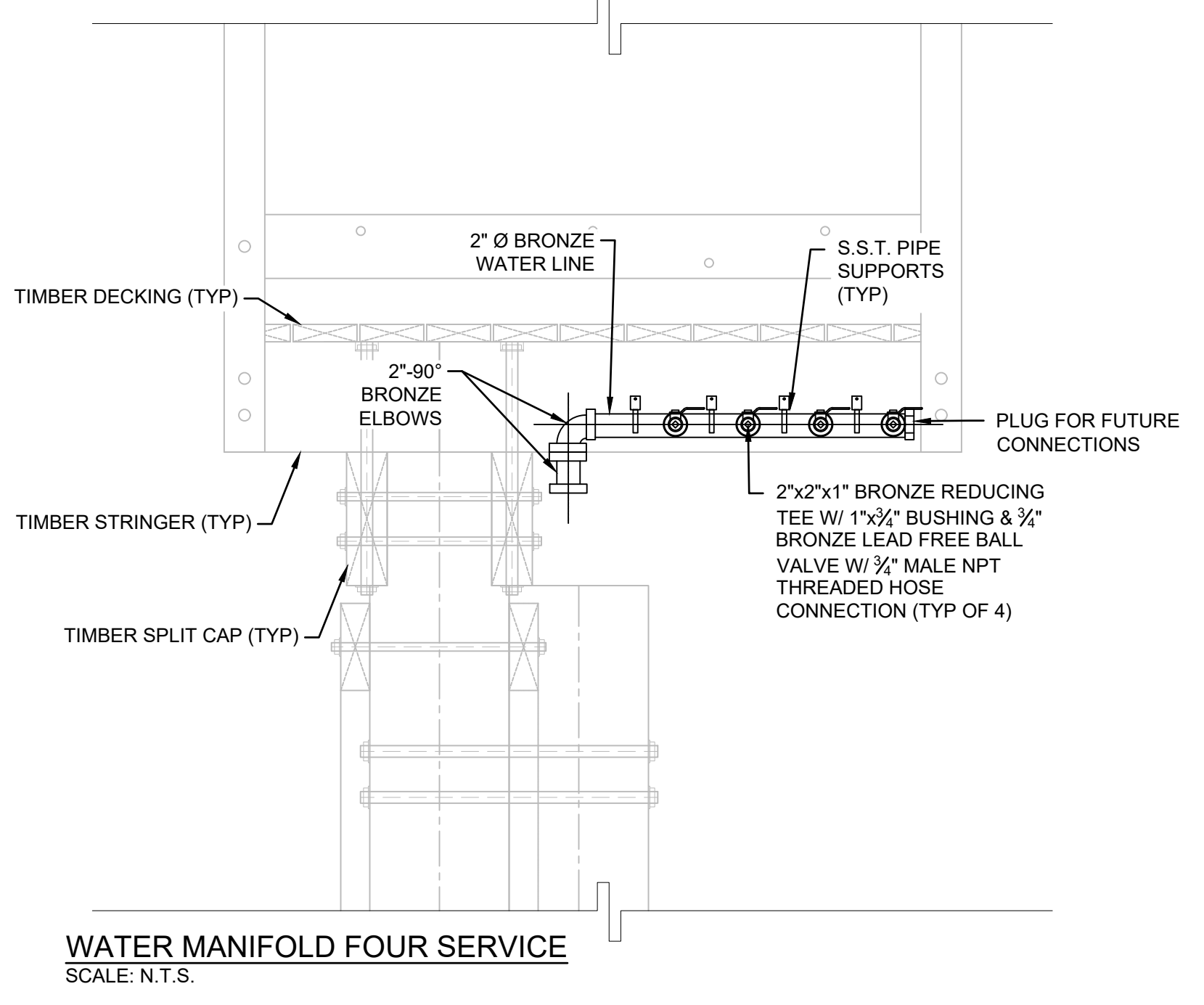
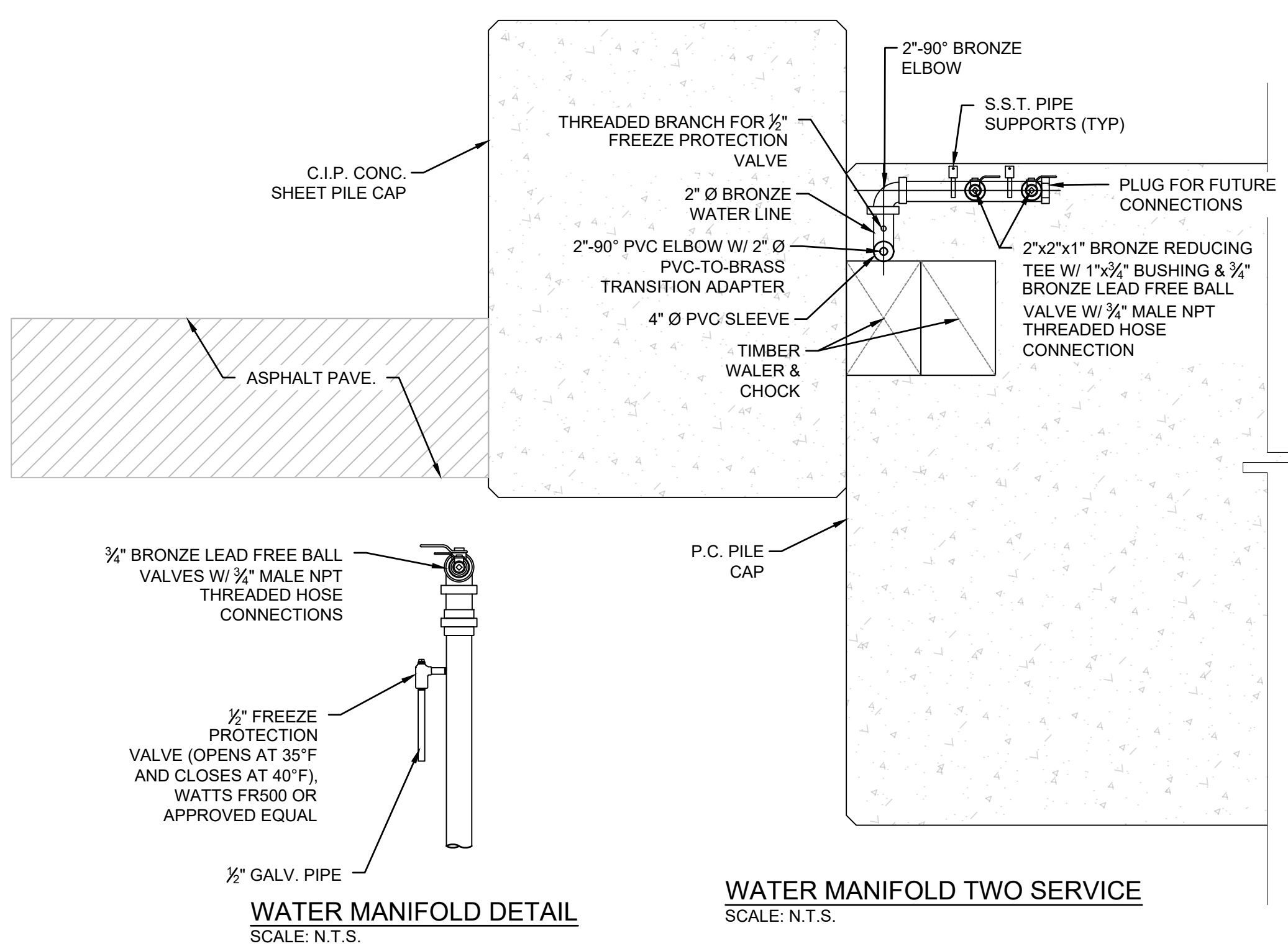
NOTE:  
 1. USE WHERE NEW PIPE MEETS EXISTING PIPE OR AS NEEDED.  
 2. PROPOSED PIPE MAY HAVE AN OUTSIDE DIAMETER (O.D.) THAT IS DIFFERENT THAN THE O.D. OF THE EXISTING PIPE. THE CONTRACTOR SHALL VERIFY THE O.D. PRIOR TO ORDERING THE COUPLING.

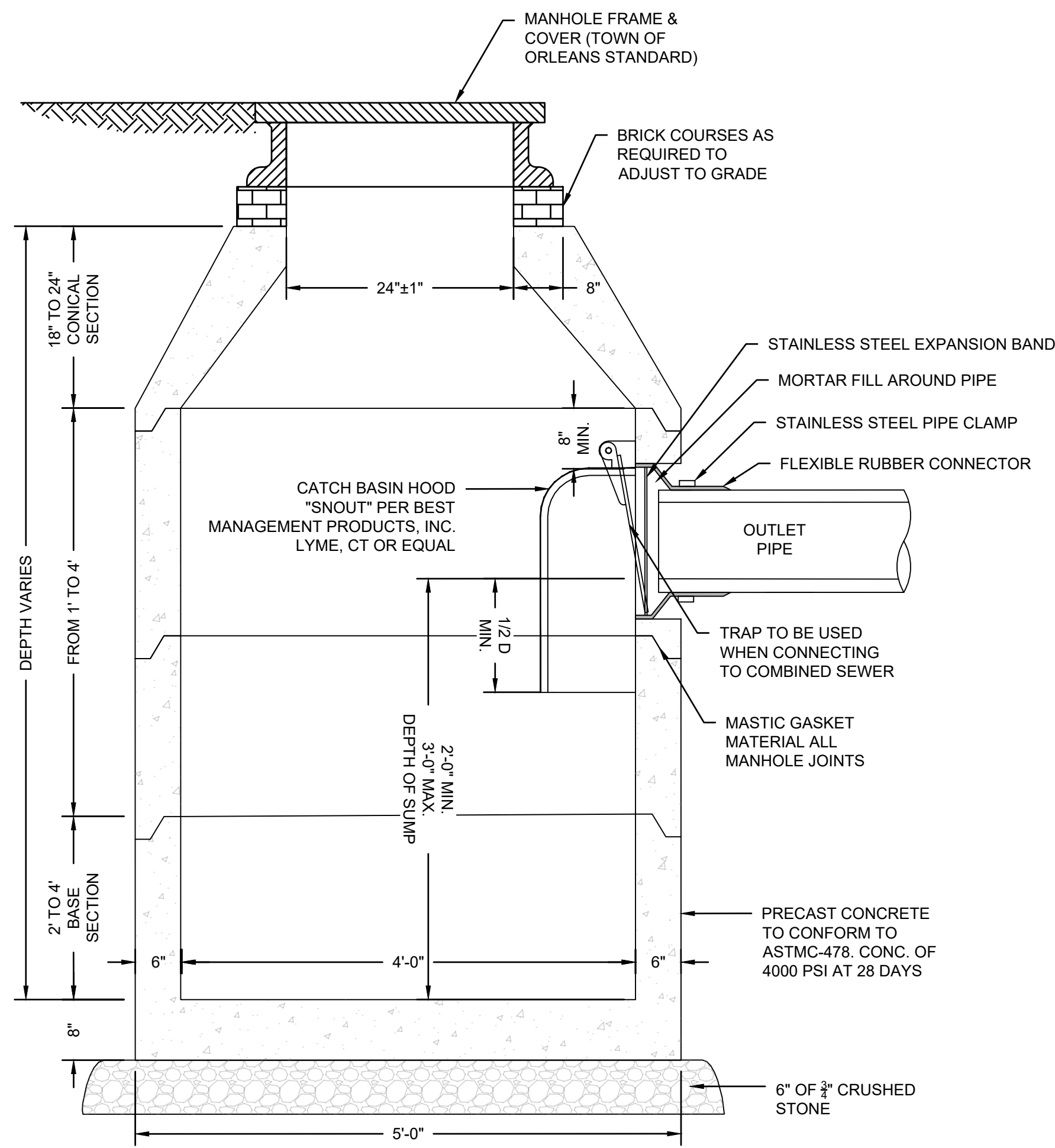


**NEW PIPE TO EXISTING PIPE CONNECTION DETAIL**  
SCALE: N.T.S.



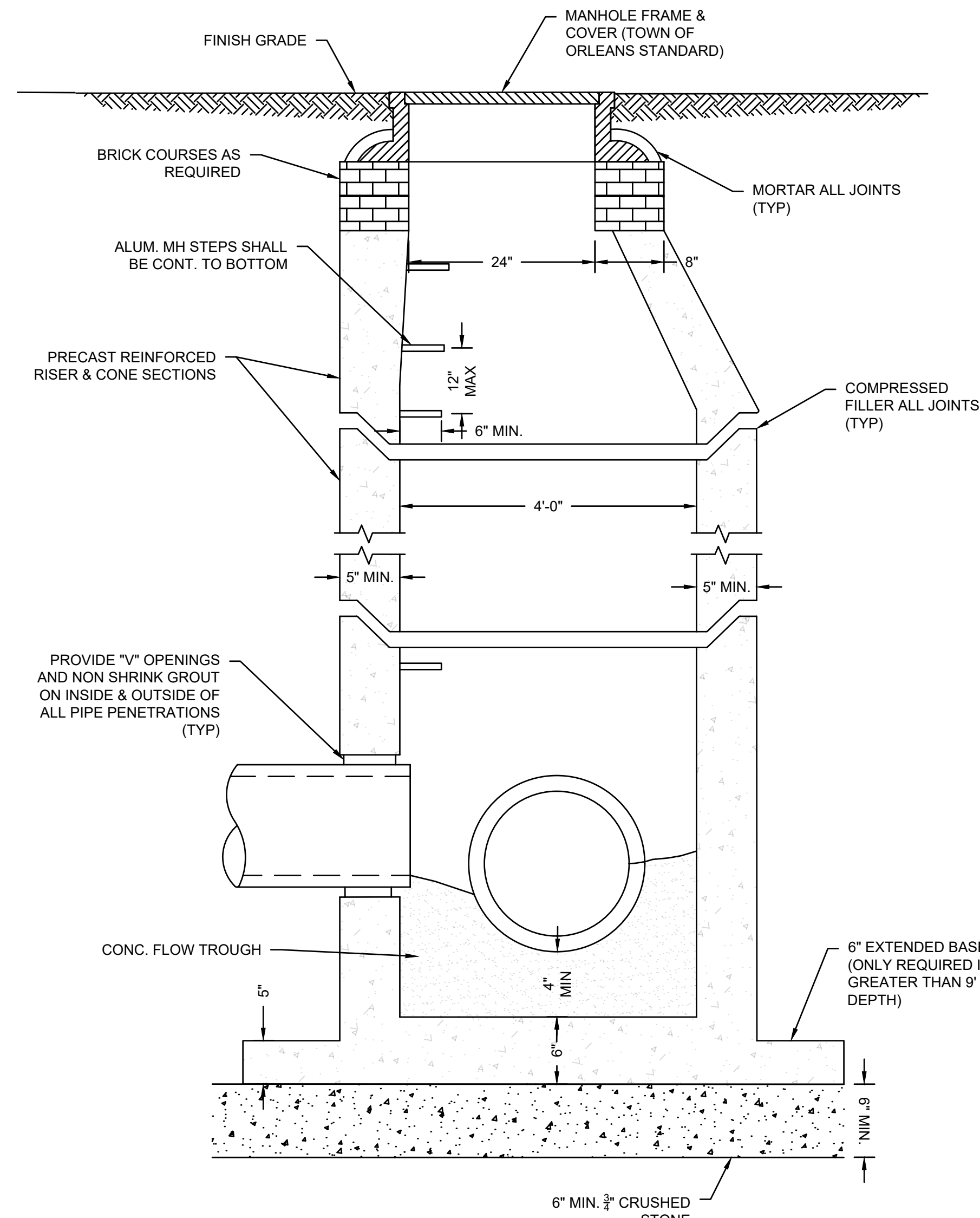
NOTES:  
 1. WATER LINE PIPE SHALL BE WRAPPED IN V-BIO POLY.  
 2. NITRIL GASKETS SHALL BE USED.  
 3. ALL WORK MUST BE PERFORMED BY A DPI LICENSED AND BONDED CONTRACTOR.  
 4. CONTRACTOR SHALL COORDINATE ANY SHUT DOWN OF THE MAIN LINE WITH THE TOWN OF ORLEANS DPW OPERATIONS DIVISION.  
 5. WRITTEN NOTIFICATION OF ALL AFFECTED CUSTOMERS MUST BE PERFORMED BY THE CONTRACTOR.  
 6. ALL WORK MUST BE PERMITTED BY DPW AND ALL OTHER APPROPRIATE AGENCIES.  
 7. ALL WORK MUST BE INSPECTED BY DPW INSPECTOR OR DESIGNEE.



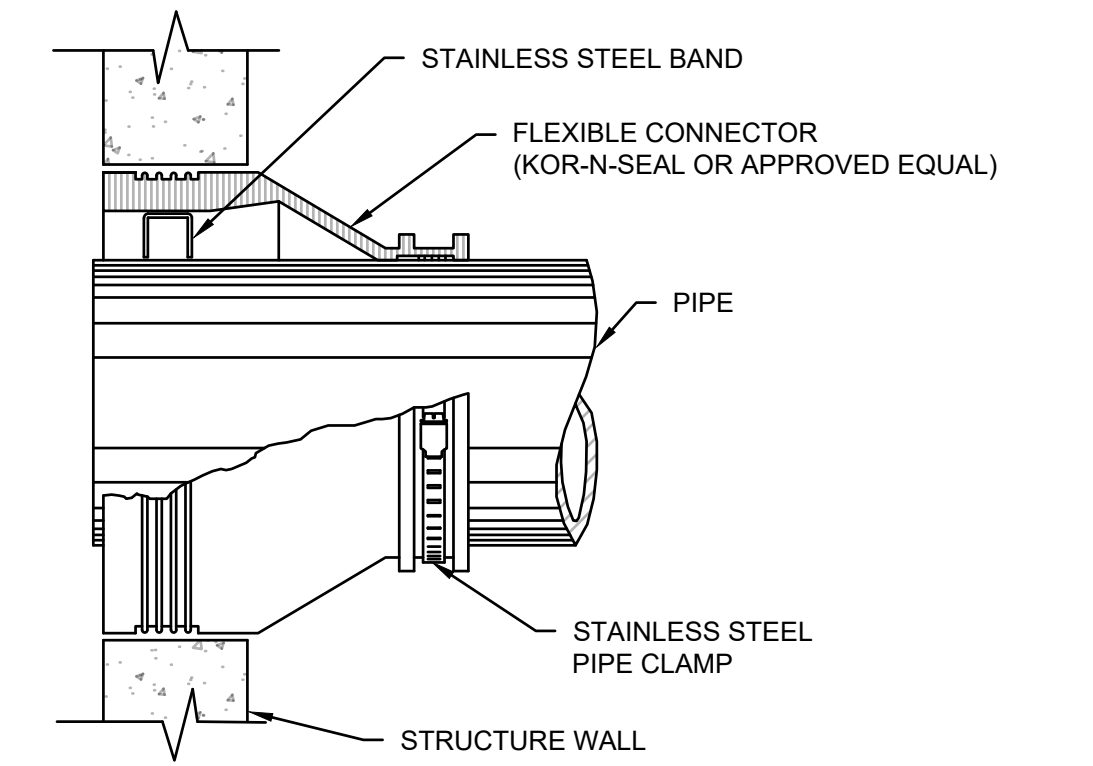


**PRECAST CONCRETE CATCH BASIN**  
SCALE: N.T.S.

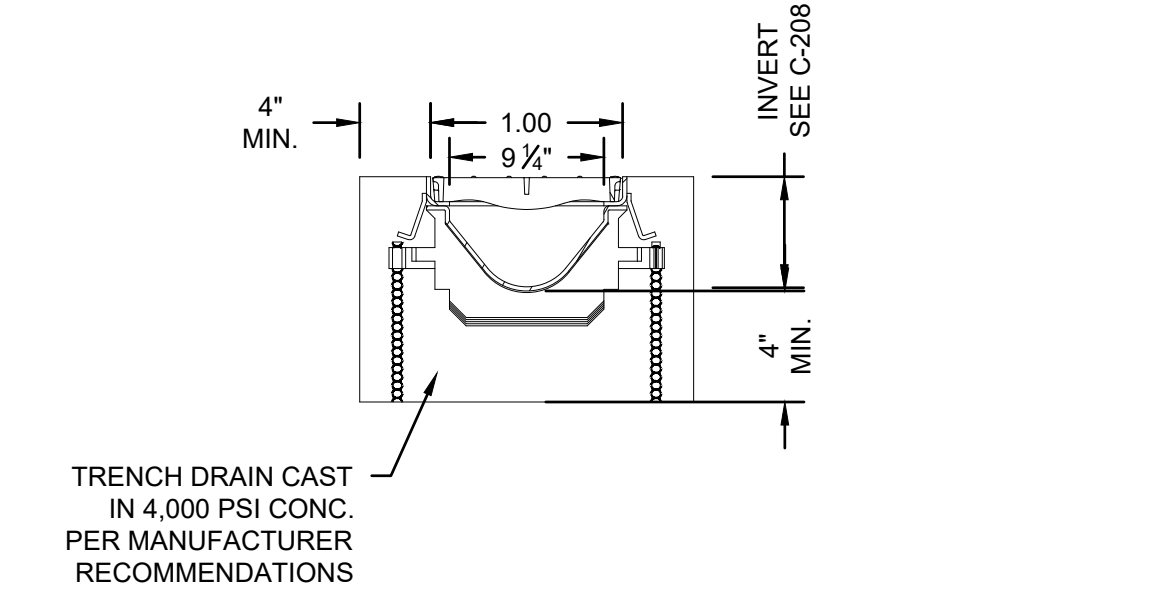
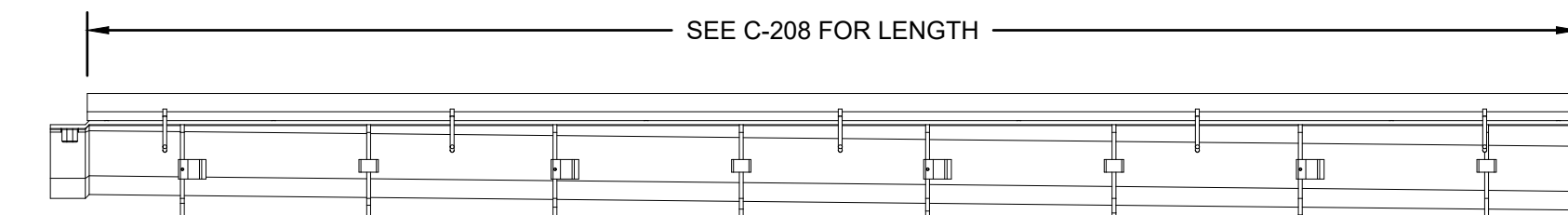
**NOTE:**  
1. ALL CATCH BASINS SHALL MEET THE REQUIREMENTS OF THE TOWN OF ORLEANS DEPARTMENT OF PUBLIC WORKS. ANY CATCH BASINS INSTALLED ADJACENT TO GRANITE CURBING MUST RECEIVE GRANITE THROAT STONES.



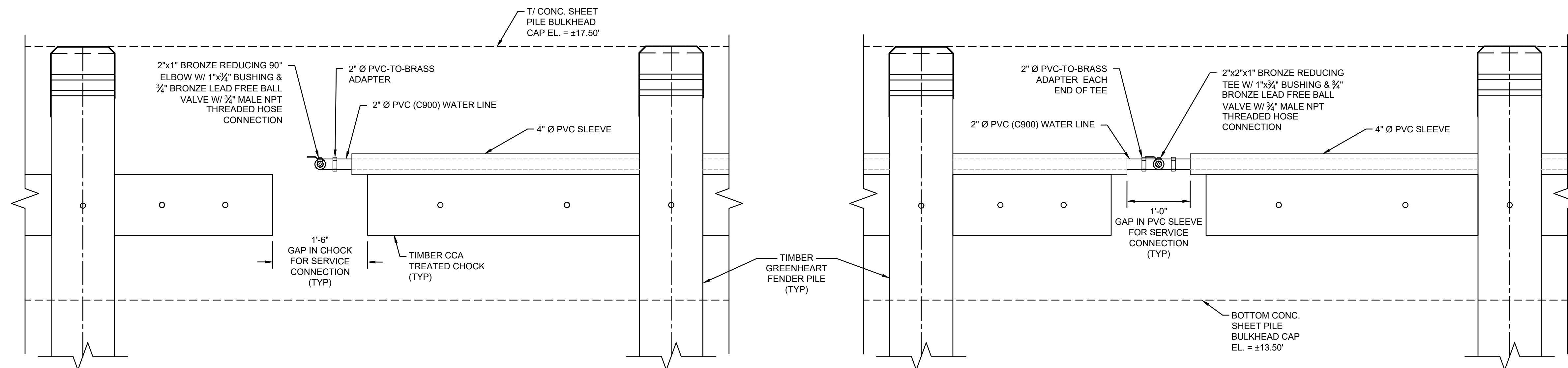
**PRECAST CONCRETE DRAIN MANHOLE**  
SCALE: N.T.S.



**DRAIN PIPE CONNECTION TO EXISTING PIPE OR MANHOLE**  
SCALE: N.T.S.



**TRENCH DRAIN DETAIL**  
SCALE: N.T.S.



**VESSEL SERVICE MANIFOLD DETAIL**  
SCALE: N.T.S.



**DEPARTMENT OF PUBLIC WORKS**  
**TOWN OF ORLEANS, MASSACHUSETTS**  
**ROCK HARBOR COMMERCIAL WHARF IMPROVEMENTS**

REVISIONS		DESCRIPTION	
NO.	DATE	BY	DATE
1			
2			
3			
4			
5			

DATE OF PREPARATION

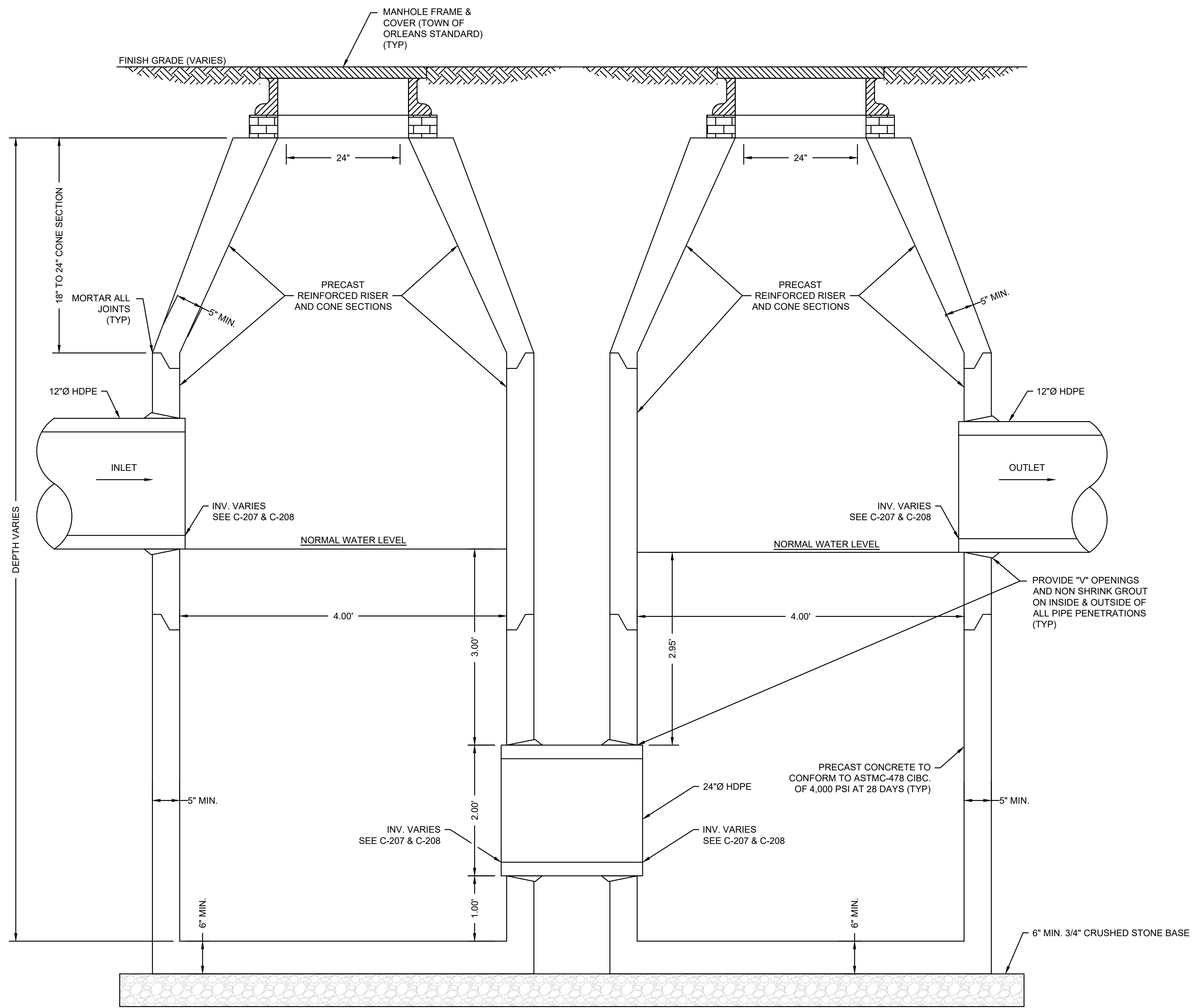
SURVEYED	BY	DATE
MEC/JAH		10/24/19 & 3/2/21
DRAWN	BY	DATE
BAM		12/05/2023
DESIGNED	BY	DATE
SRS		06/28/2021
CHECKED	BY	DATE
PSR		12/24/2023

**DRAINAGE AND WATER SERVICE DETAILS 2 OF 2**

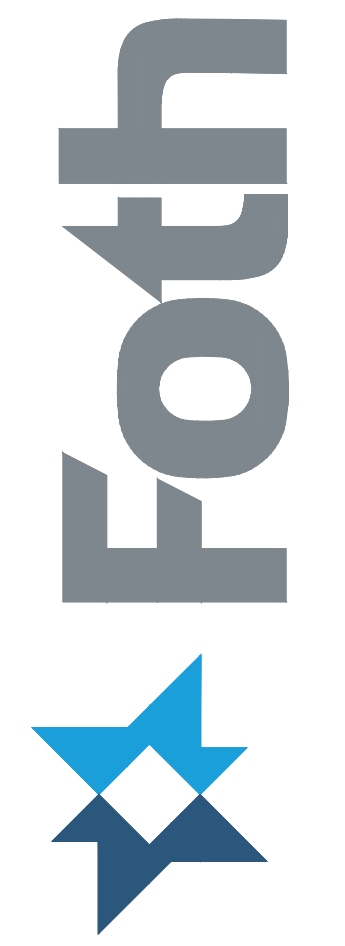
**ISSUED FOR BID**

PROJECT NO: 00190004.10  
SHEET NUMBER

C-703



PRECAST CONCRETE OIL / WATER SEPARATOR  
SCALE: N.T.S.



DEPARTMENT OF PUBLIC WORKS  
TOWN OF ORLEANS, MASSACHUSETTS  
ROCK HARBOR COMMERCIAL WHARF  
IMPROVEMENTS

NO.	BY	DATE	REVISIONS	
			DESCRIPTION	
1				
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DATE OF PREPARATION		
	BY	DATE
SURVEYED	MEC/JAH	10/24/19 & 3/2/21
DRAWN	BAM	12/05/2023
DESIGNED	SRS	06/28/2021
CHECKED	PSR	12/24/2023

SHEET TITLE:  
**DRAINAGE  
DETAILS**

ISSUANCE:  
**ISSUED FOR BID**

PROJECT NO: 00190004.10  
SHEET NUMBER

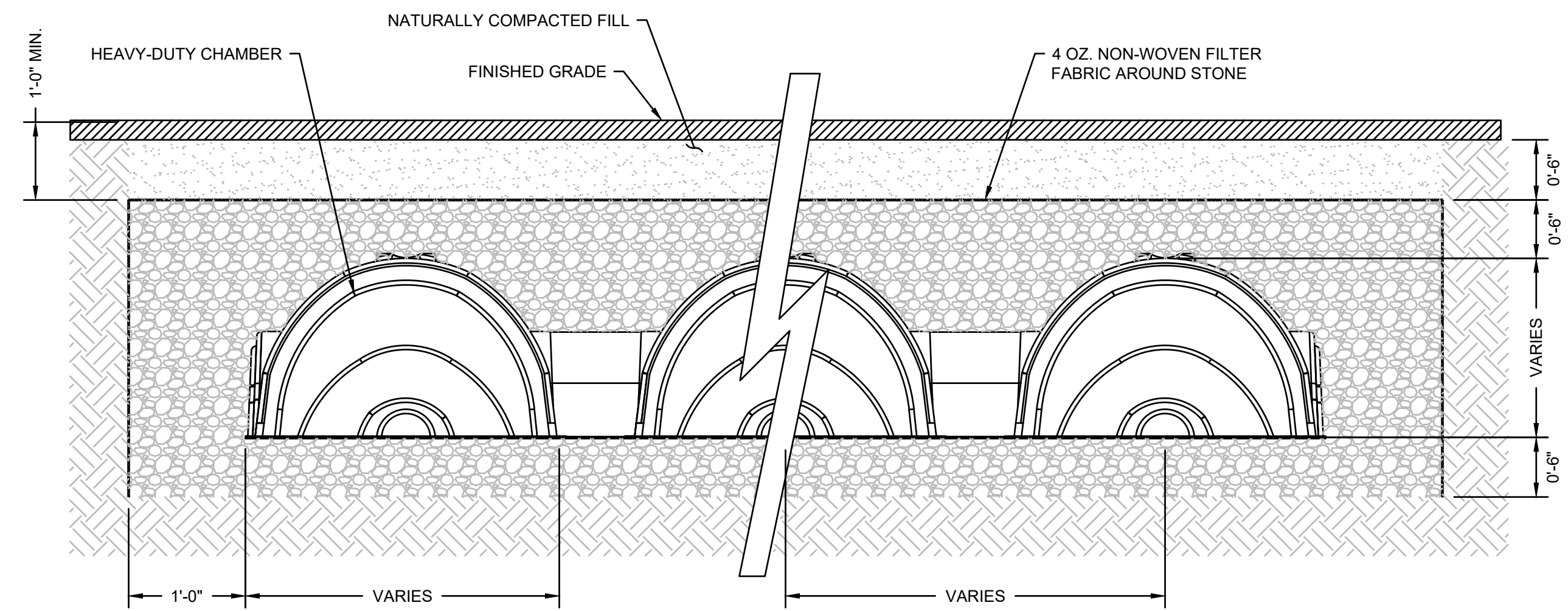
C-704



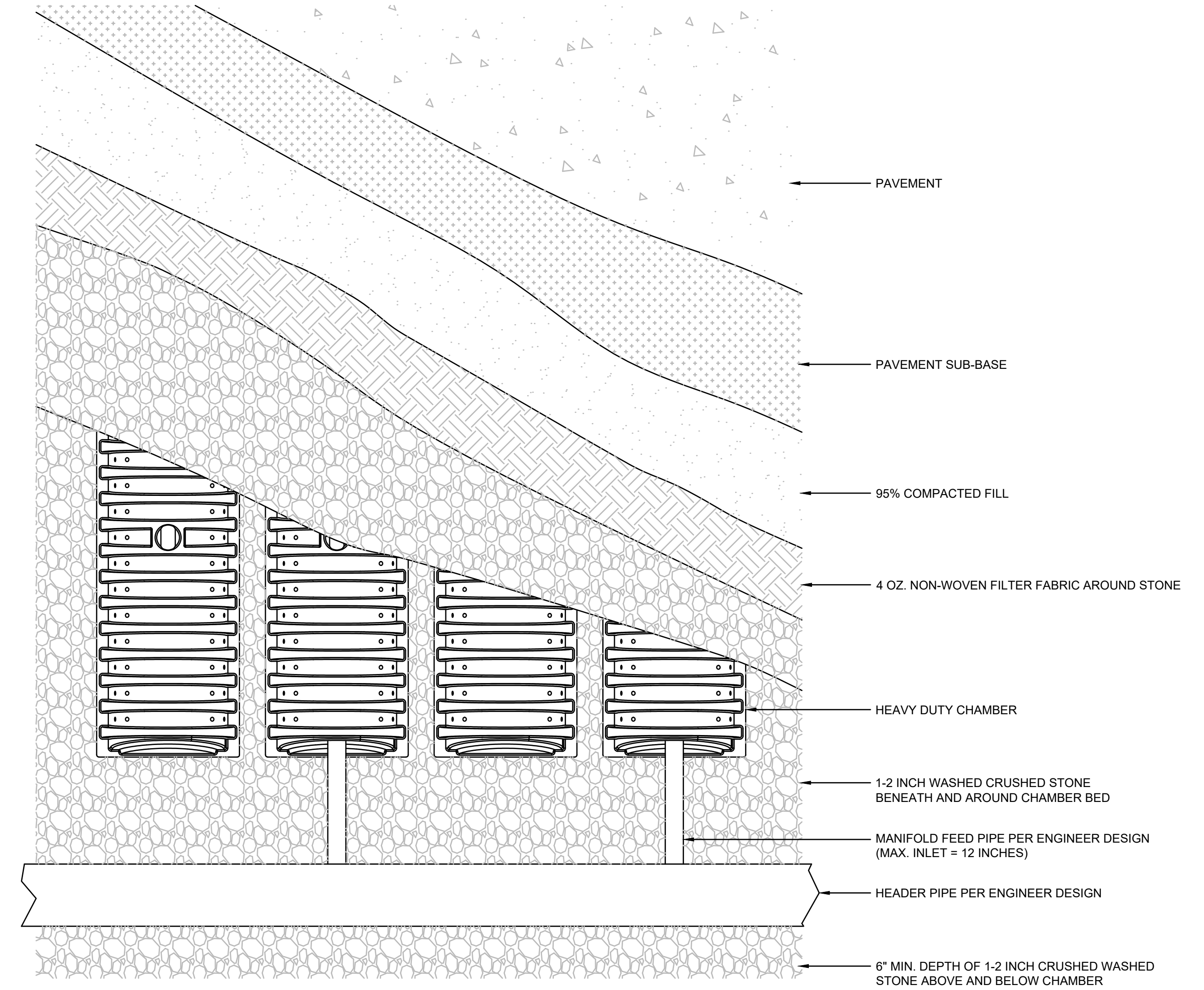
**INFILTRATION CHAMBER SPECIFICATIONS**

**GENERAL**

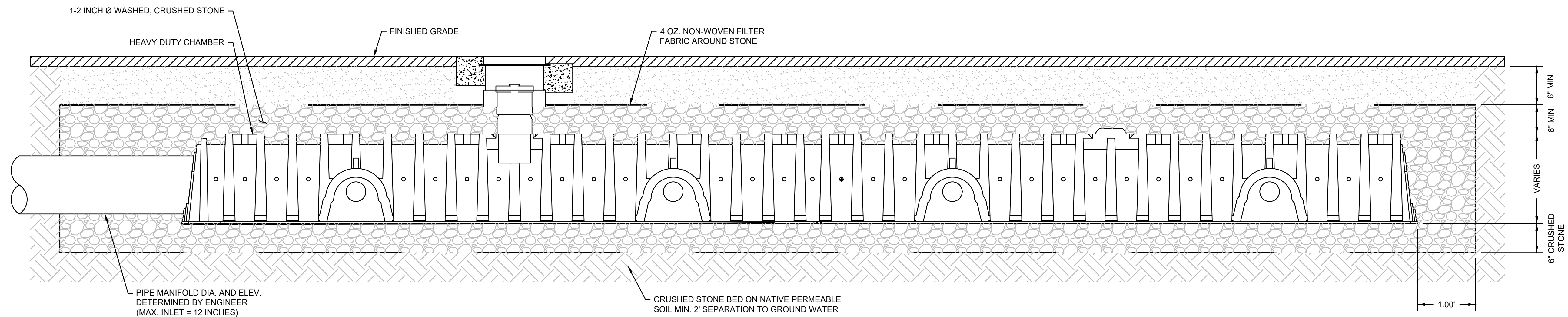
1. THE CHAMBER WILL HAVE 16 CORRUGATIONS.
2. THE NOMINAL STORAGE VOLUME OF A JOINED CHAMBER SHALL BE 27.16 FT<sup>3</sup> / UNIT - WITHOUT STONE FOR CHAMBERS #1 & #2 AND 42.5 FT<sup>3</sup> / UNIT - WITHOUT STONE FOR CHAMBER #3.
3. THE CHAMBERS SHALL BE VACUUM THERMOFORMED OF BLACK HIGH MOLECULAR WEIGHT HIGH DENSITY POLYETHYLENE (HMWHDPE) IN AN ISO-9001:2000 CERTIFIED FACILITY.
4. CHAMBERS ARE TO BE MANUFACTURED WITH AN OPEN BOTTOM, INTEGRALLY FORMED END WALLS AND PERFORATED SIDEWALLS.
5. ALL CHAMBERS SHALL BE ARCHED IN SHAPE AND HAVE SIXTY ¼ INCH ROUND DISCHARGE HOLES BORED INTO THE SIDEWALLS OF THE UNIT'S CORE TO PROMOTE INFILTRATION/EXFILTRATION.
6. CHAMBERS SHALL BE DESIGNED TO WITHSTAND AASHTO H-20 LOAD RATING (32,000 LBS. /AXLE) WHEN INSTALLED ACCORDING TO THE MANUFACTURER INSTALLATION INSTRUCTIONS.
7. THE UNITS MAY BE TRIMMED TO CUSTOM LENGTHS BY CUTTING BACK TO ANY CORRUGATION.
8. REPEATING SUPPORT PANELS AND END WALLS OF THE ELONGATED CHAMBER SHALL BE SPACED EVERY 7.5 FEET.



**UNDERGROUND STORMWATER INFILTRATION CHAMBER SECTION**  
SCALE: N.T.S.



**UNDERGROUND STORMWATER INFILTRATION CHAMBER PLAN VIEW**  
SCALE: N.T.S.



**UNDERGROUND STORMWATER INFILTRATION CHAMBER DETAIL**  
SCALE: N.T.S.



**DEPARTMENT OF PUBLIC WORKS**  
**TOWN OF ORLEANS, MASSACHUSETTS**  
**ROCK HARBOR COMMERCIAL WHARF IMPROVEMENTS**

NO.	DATE	DESCRIPTION

DATE OF PREPARATION		
BY	DATE	
MEC/JAH	10/24/19	3/2/21
BAM	12/05/2023	
SRS	06/28/2021	
PSR	12/24/2023	

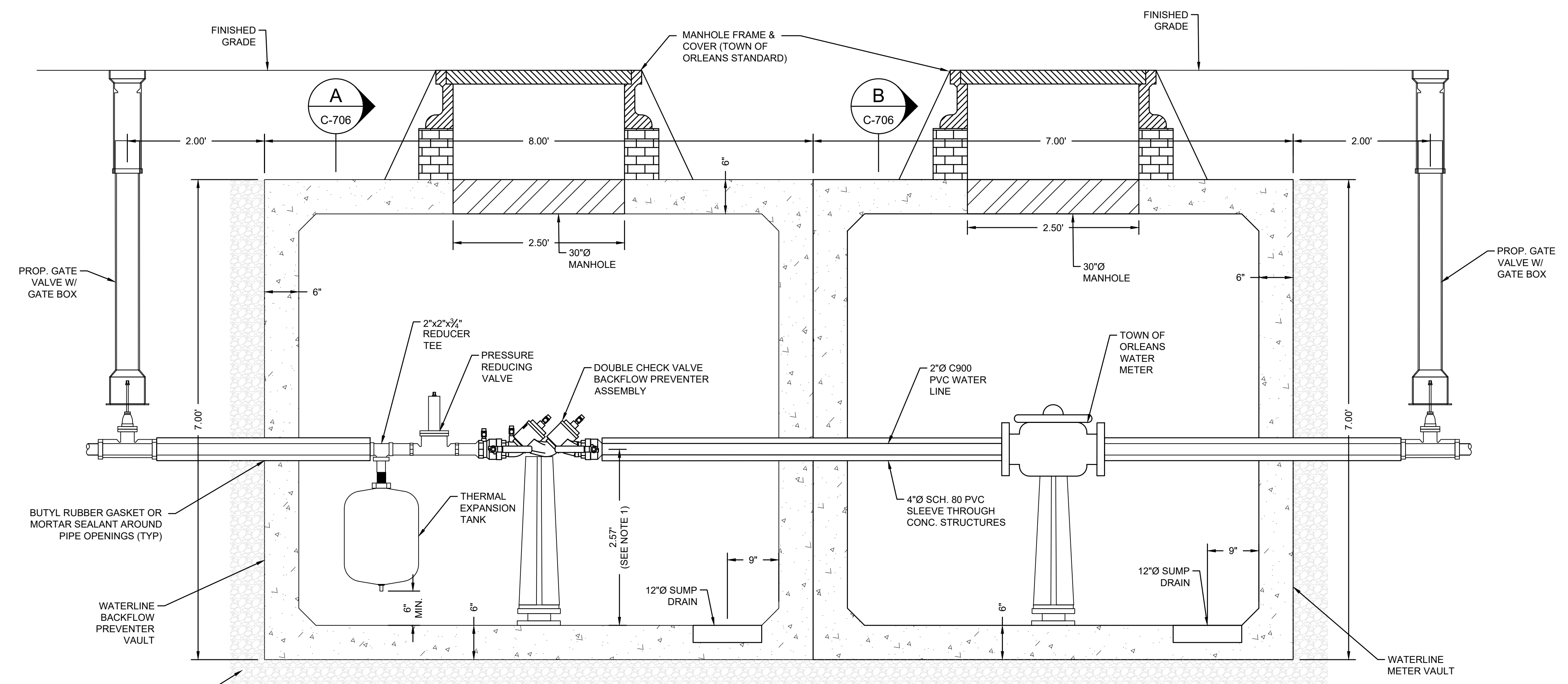
SHEET TITLE:  
**INFILTRATION SYSTEM DETAILS**

ISSUANCE:  
**ISSUED FOR BID**

PROJECT NO: 00190004.10

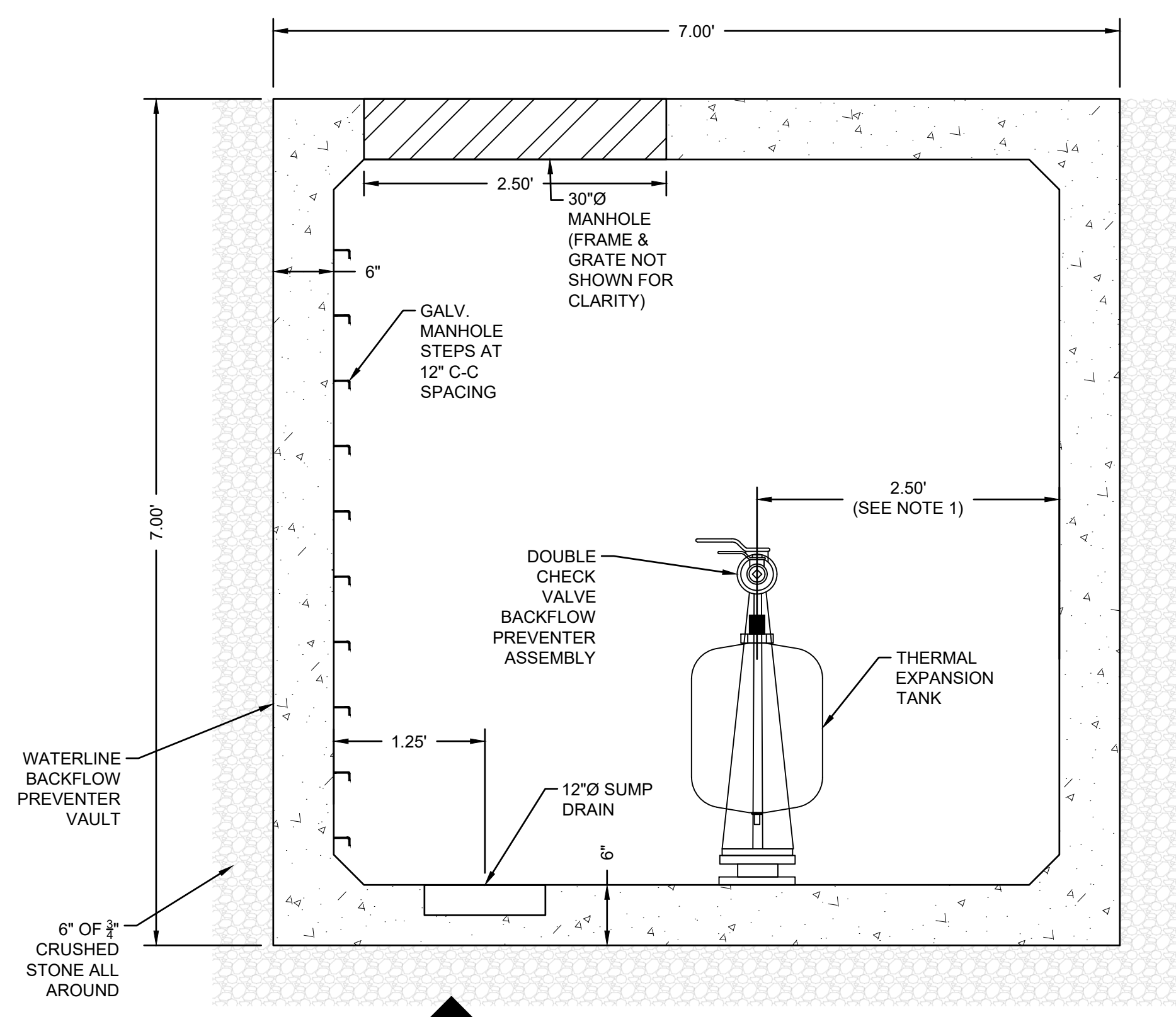
SHEET NUMBER

C-705

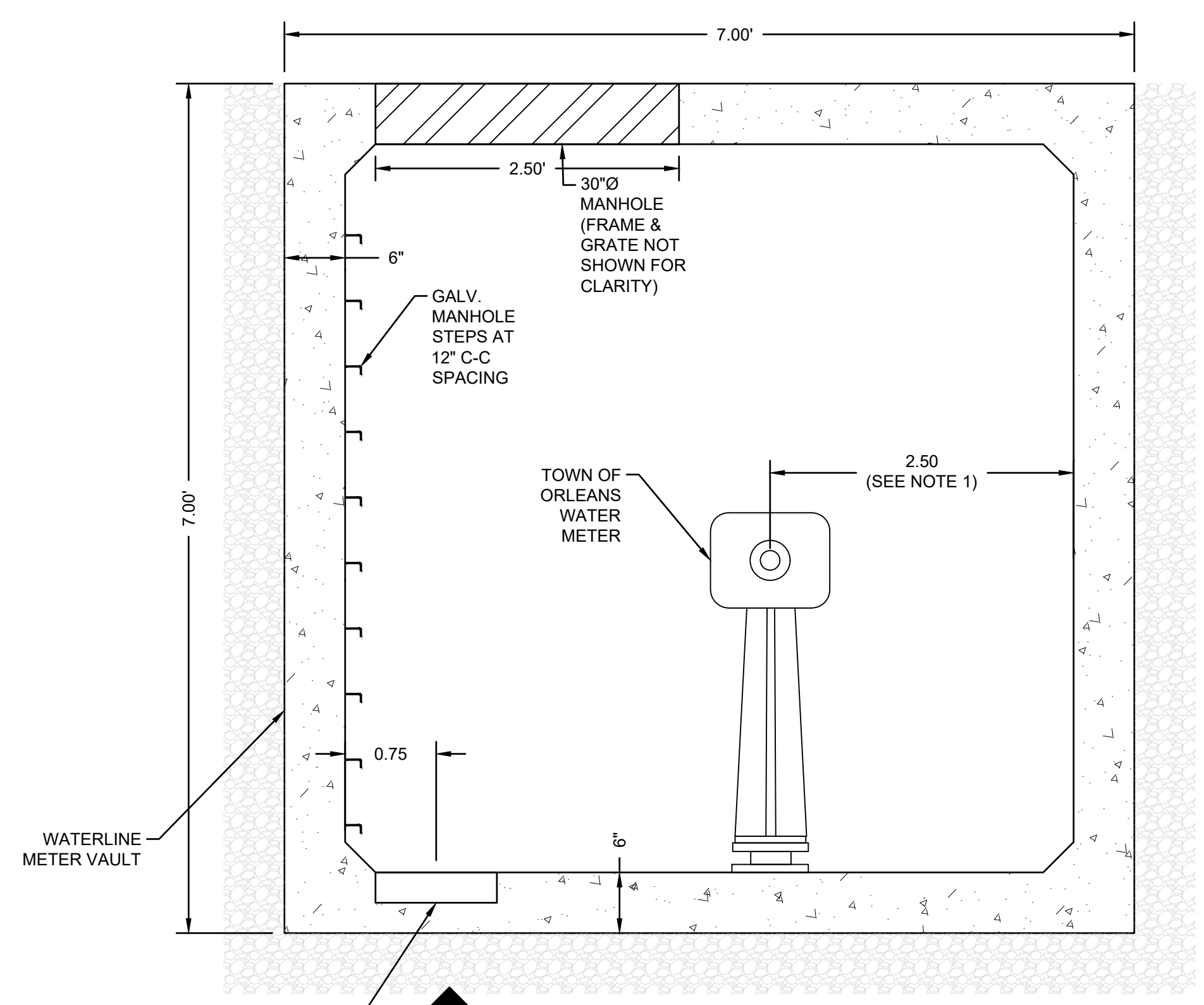


**NOTE:**  
 1. CONTRACTOR TO VERIFY SIZE & REQUIREMENTS OF THE WATER METER & BACKFLOW PREVENTER AND ADJUST SPACING AS NEEDED.

**WATERLINE & BACKFLOW VAULT UNIT**  
 SCALE: N.T.S.



**A** BACKFLOW VAULT SECTION C-706-1  
 SCALE: N.T.S.



**B** WATERLINE VAULT SECTION C-706-2  
 SCALE: N.T.S.

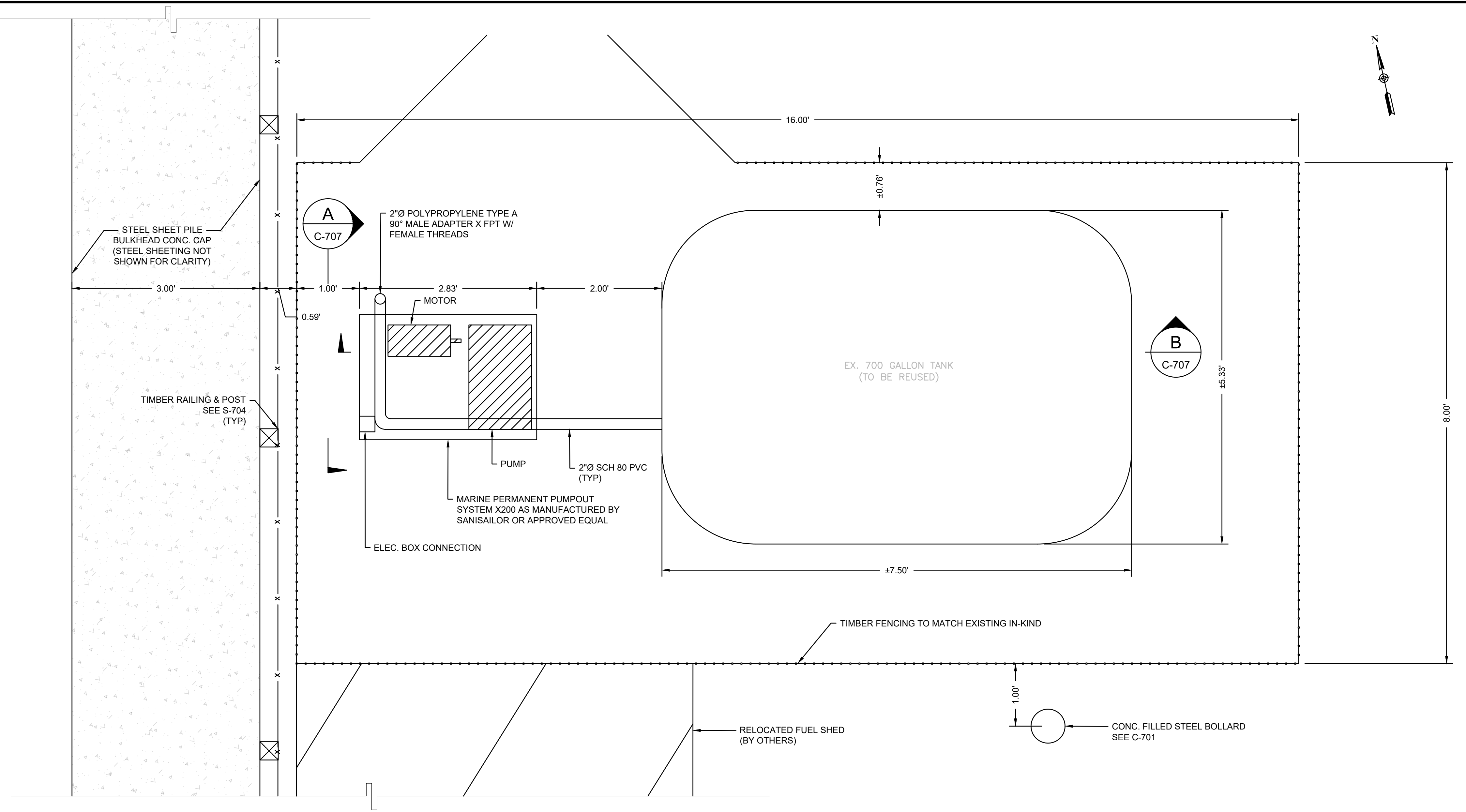
REVISIONS		DATE OF PREPARATION	
NO.	DESCRIPTION	BY	DATE
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SURVEYED	BY	DATE
MEC/JAH		10/24/19 & 3/2/21
DRAWN	BY	DATE
BAM		12/05/2023
DESIGNED	BY	DATE
SRS		06/28/2021
CHECKED	BY	DATE
PSR		12/24/2023

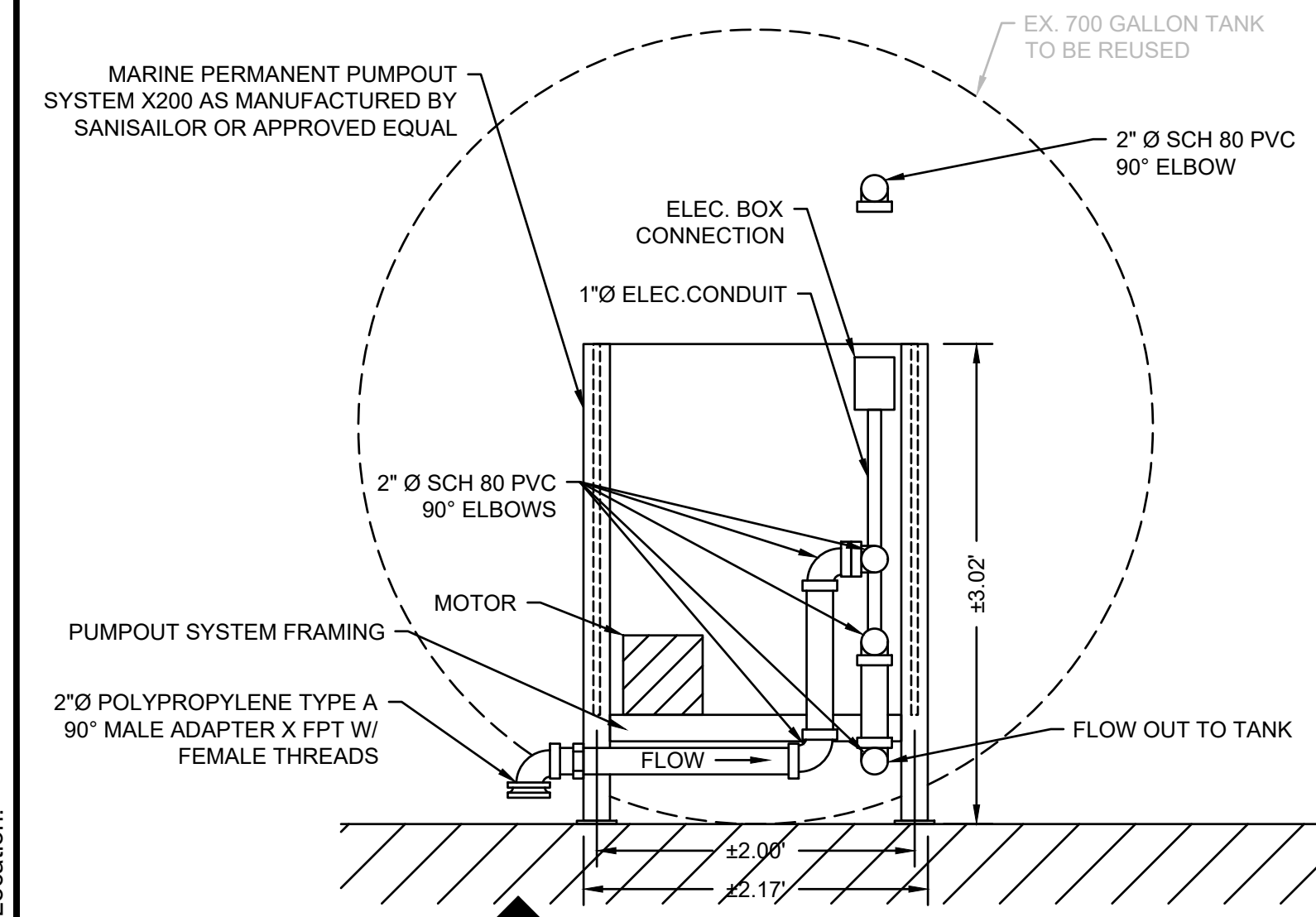
SHEET TITLE:  
**WATERLINE VAULT UNIT**

ISSUANCE:  
**ISSUED FOR BID**

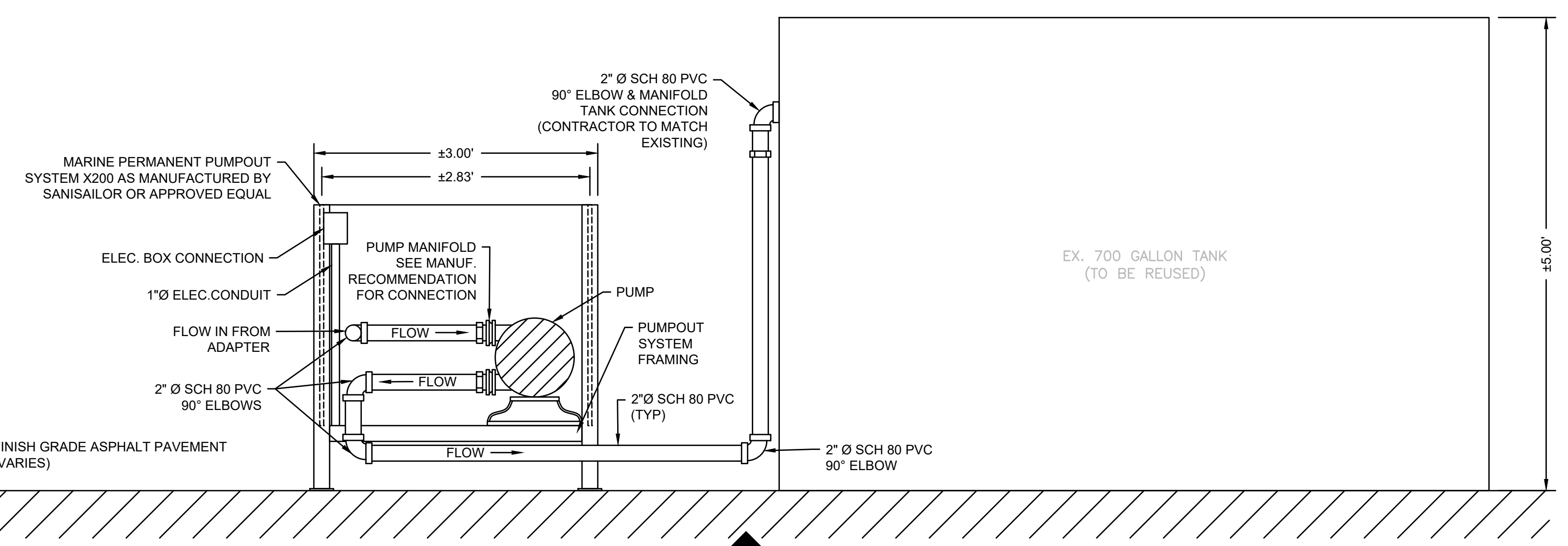
PROJECT NO: 00190004.10  
 SHEET NUMBER  
**C-706**



PUMPOUT STATION PLAN VIEW  
 SCALE: 1" = 1'



A PUMPOUT STATION DETAIL  
 SCALE: 1" = 1'



B PUMPOUT STATION SECTION  
 SCALE: 1" = 1'

NOTE:  
 1. NEW PUMPOUT STATION CONFIGURATION TO MATCH EXISTING SETUP.  
 2. PUMPOUT LINE TO BOATS APPROX. 50'-0" LONG.

NO.	BY	DATE	DESCRIPTION

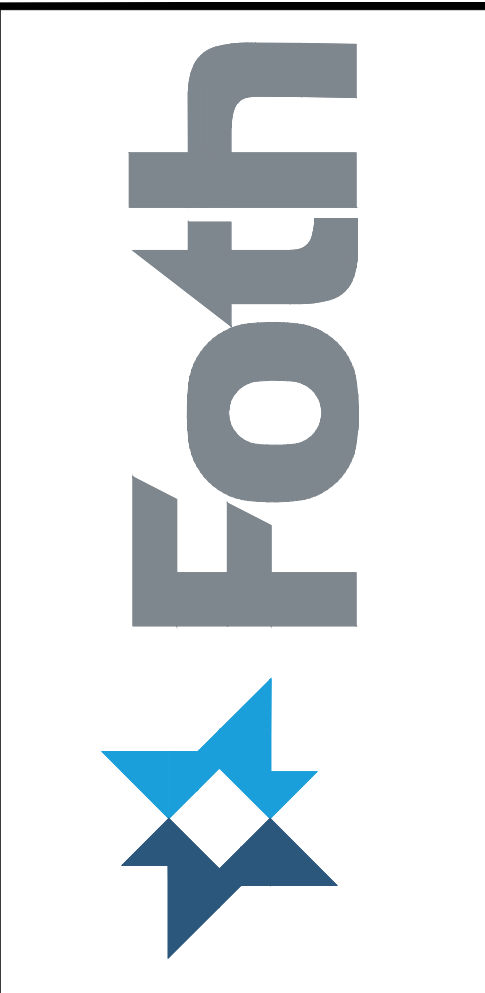
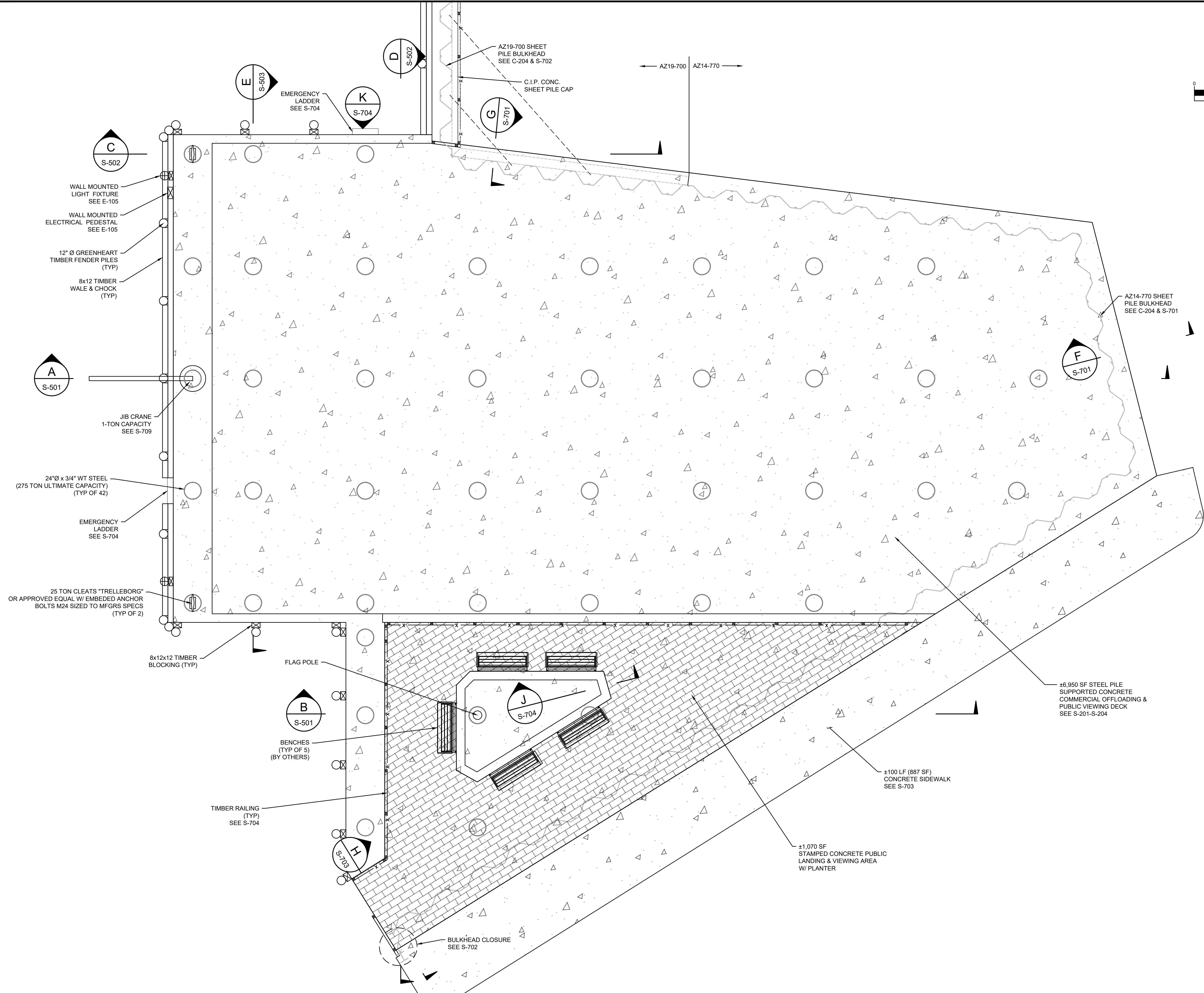
DATE OF PREPARATION		
SURVEYED	BY	DATE
MEC/JAH	MEC/JAH	10/24/19 & 3/2/21
DRAWN	BAM	12/05/2023
DESIGNED	SRS	06/28/2021
CHECKED	PSR	12/24/2023

SHEET TITLE:  
**PUMPOUT STATION DETAILS**

ISSUANCE:  
**ISSUED FOR BID**

PROJECT NO: 00190004.10  
 SHEET NUMBER

Thursday, March 7, 2024 11:37:43 AM  
 DWG Filename: s-101 commercial wharf structural site plan.dwg  
 DWG Folder Location:



**DEPARTMENT OF PUBLIC WORKS**  
**TOWN OF ORLEANS, MASSACHUSETTS**  
**ROCK HARBOR COMMERCIAL WHARF IMPROVEMENTS**

NO.	BY	DATE	REVISIONS	
			DESCRIPTION	DATE
1				
2				
3				
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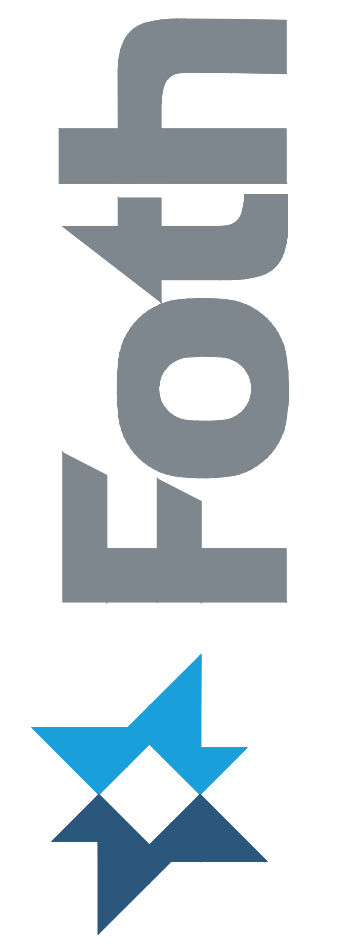
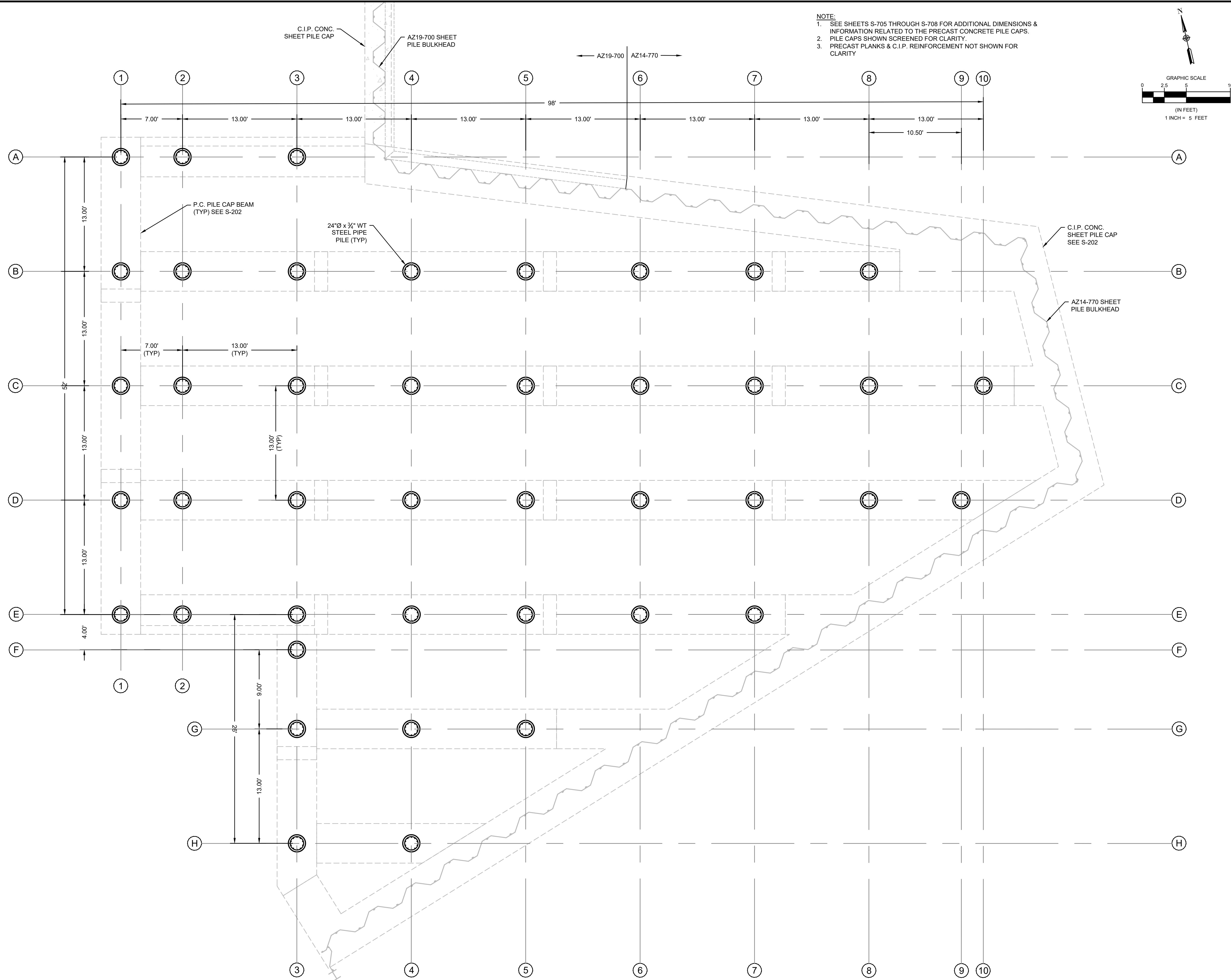
DATE OF PREPARATION		
SURVEYED	BY	DATE
MEC/JAH		10/24/19 & 3/2/21
DRAWN	BAM	12/05/2023
DESIGNED	SRS	06/28/2021
CHECKED	PSR	12/24/2023

SHEET TITLE:  
**COMMERCIAL WHARF STRUCTURAL SITE PLAN**

ISSUANCE:  
**ISSUED FOR BID**

PROJECT NO: 00190004.10  
 SHEET NUMBER  
**S-101**

Thursday, March 7, 2024 11:37:53 AM  
 DWG Filename: s-201 precast pile cap plan.dwg  
 Layout: s-201 commercial wharf pile layout plan  
 DWG Folder Location:



**DEPARTMENT OF PUBLIC WORKS**  
**TOWN OF ORLEANS, MASSACHUSETTS**  
**ROCK HARBOR COMMERCIAL WHARF IMPROVEMENTS**

REVISIONS		DATE OF PREPARATION	
NO.	DESCRIPTION	BY	DATE
1			
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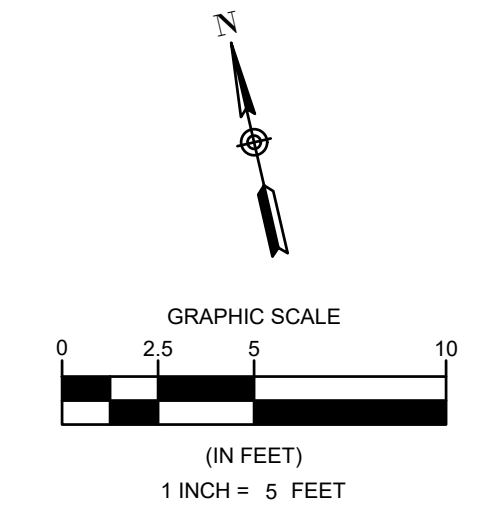
SHEET TITLE:		
<b>COMMERCIAL WHARF PILE LAYOUT PLAN</b>		
ISSUANCE:		
<b>ISSUED FOR BID</b>		
PROJECT NO:	00190004.10	
SHEET NUMBER	S-201	

DEPARTMENT OF PUBLIC WORKS  
 TOWN OF ORLEANS, MASSACHUSETTS  
 ROCK HARBOR COMMERCIAL WHARF IMPROVEMENTS

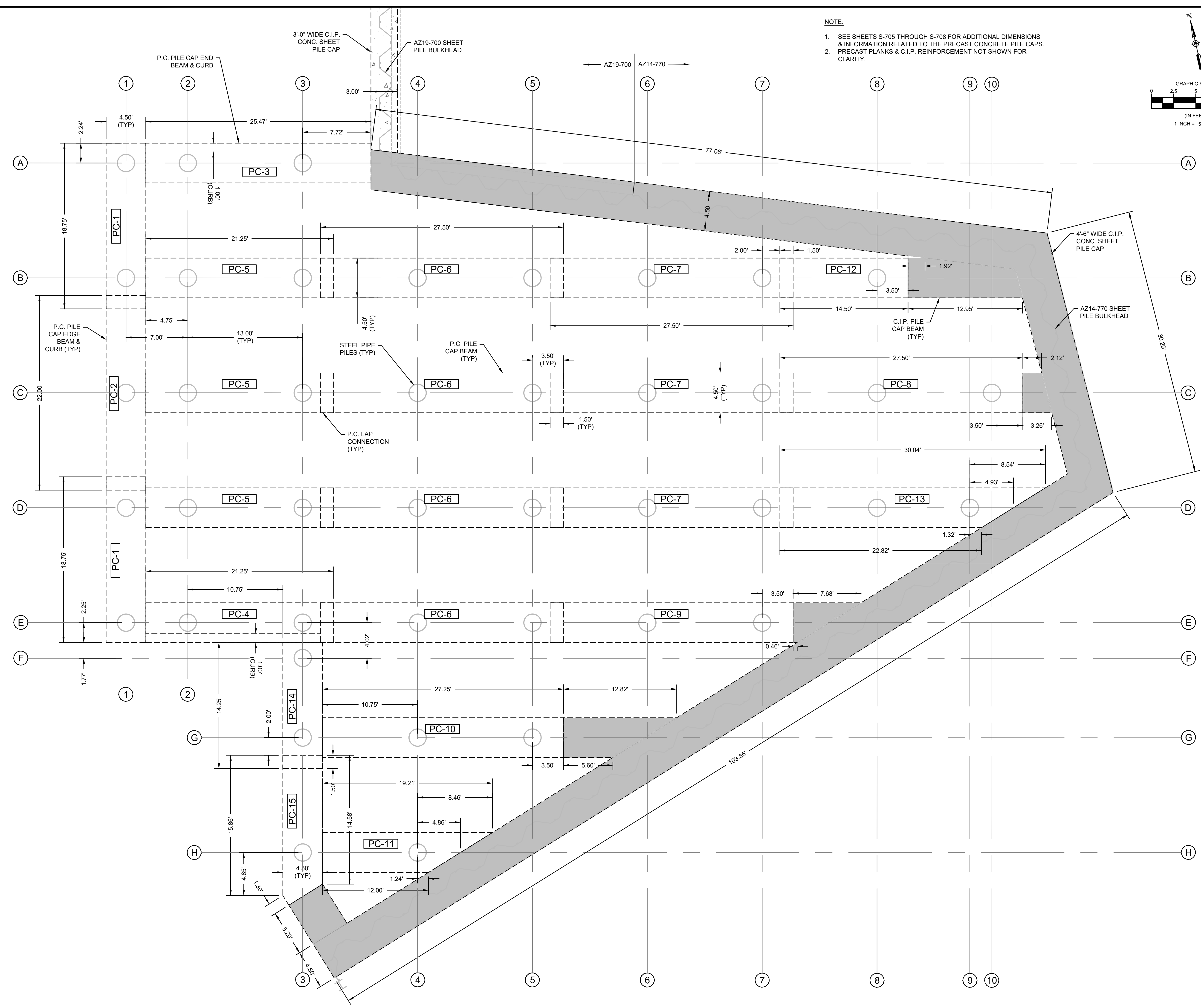
REVISIONS		DATE OF PREPARATION	
NO.	DESCRIPTION	BY	DATE
1			
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ISSUANCE:  
**ISSUED FOR BID**

PROJECT NO: 00190004.10  
 SHEET NUMBER  
**S-202**



**NOTE:**  
 1. SEE SHEETS S-705 THROUGH S-708 FOR ADDITIONAL DIMENSIONS & INFORMATION RELATED TO THE PRECAST CONCRETE PILE CAPS.  
 2. PRECAST PLANKS & C.I.P. REINFORCEMENT NOT SHOWN FOR CLARITY.



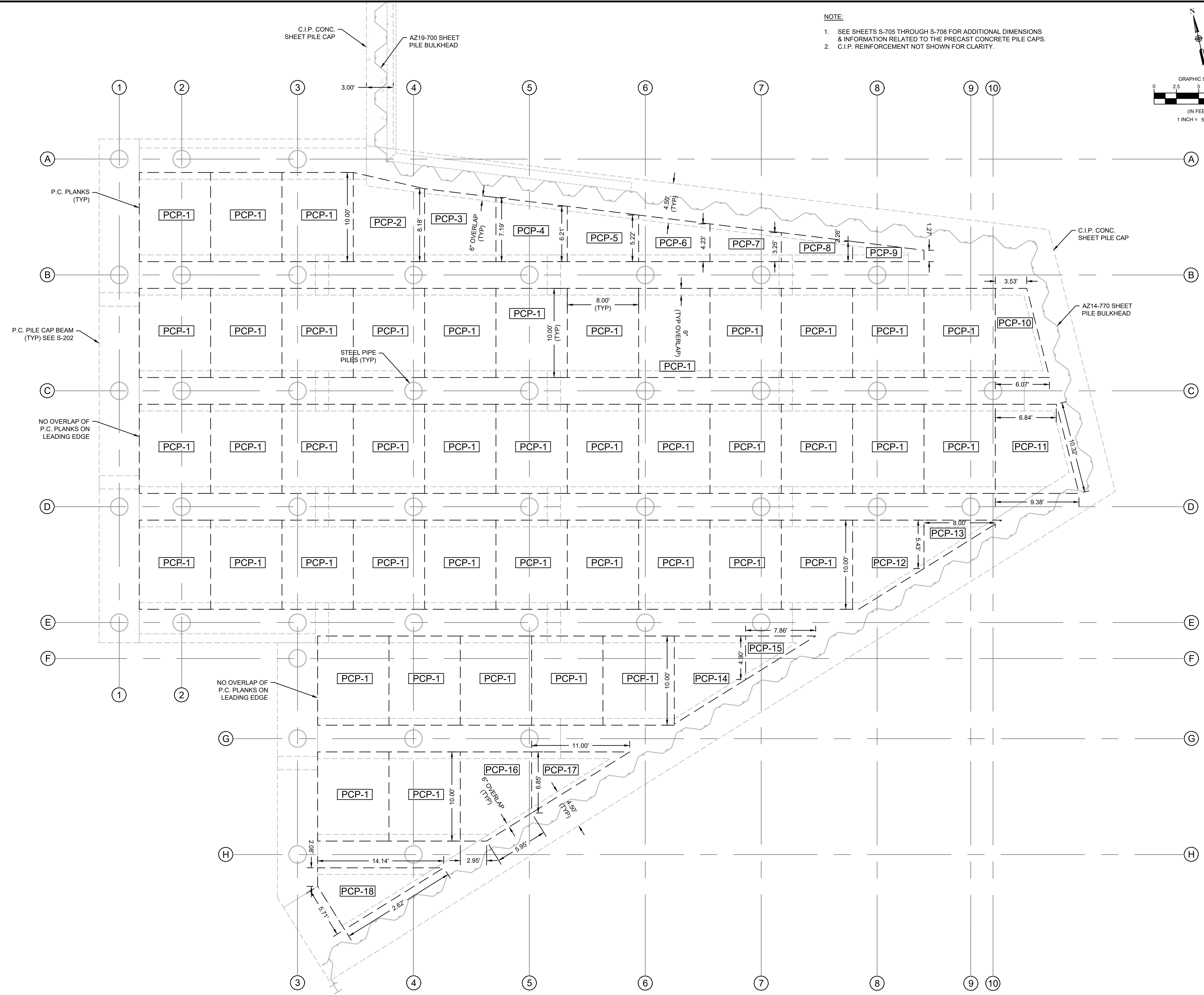
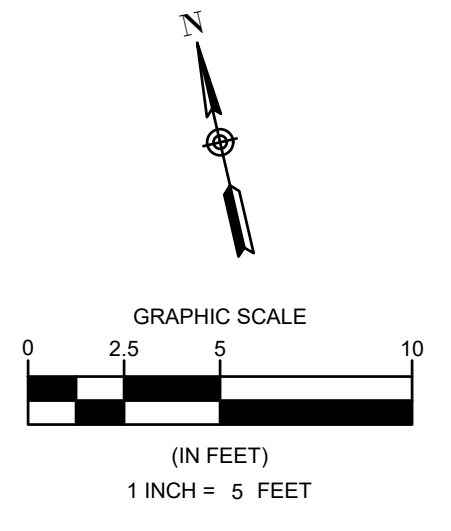
Thursday, March 7, 2024 11:38:03 AM  
 DWG Filename: s-201 precast pile cap plan.dwg Layout: s-202 commercial wharf pile cap layout plan  
 DWG Folder Location:

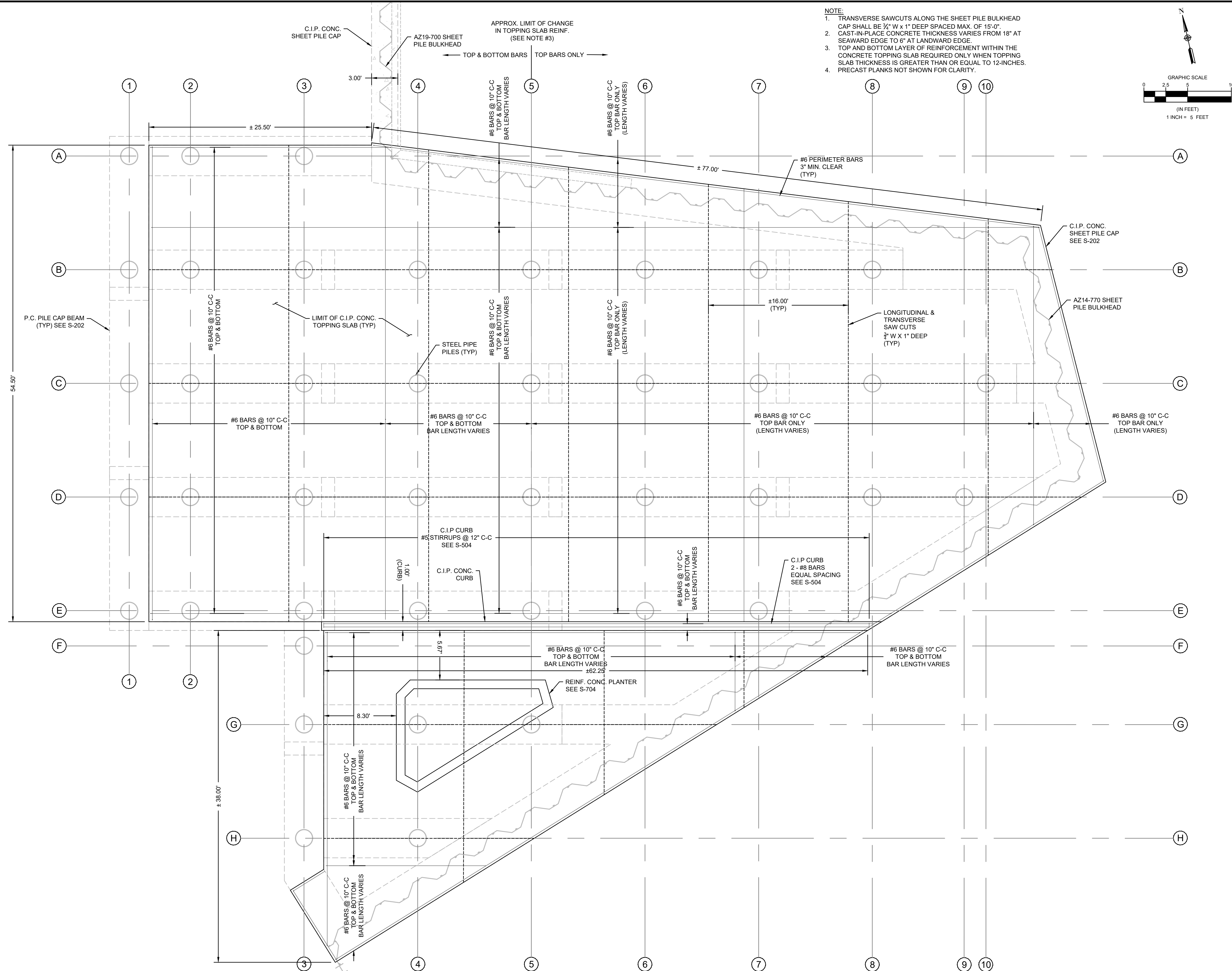
DEPARTMENT OF PUBLIC WORKS  
 TOWN OF ORLEANS, MASSACHUSETTS  
 ROCK HARBOR COMMERCIAL WHARF  
 IMPROVEMENTS

REVISIONS		DATE OF PREPARATION	
NO.	DESCRIPTION	BY	DATE

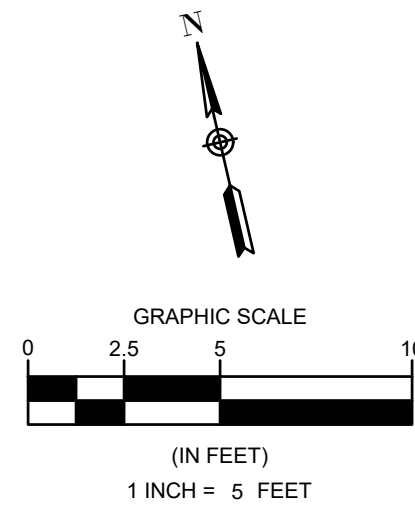
SHEET TITLE:	
COMMERCIAL WHARF PRECAST PLANKS LAYOUT PLAN	
ISSUANCE:	
ISSUED FOR BID	
PROJECT NO:	00190004.10
SHEET NUMBER	S-203

NOTE:  
 1. SEE SHEETS S-705 THROUGH S-708 FOR ADDITIONAL DIMENSIONS & INFORMATION RELATED TO THE PRECAST CONCRETE PILE CAPS.  
 2. C.I.P. REINFORCEMENT NOT SHOWN FOR CLARITY.





- NOTE:
1. TRANSVERSE SAWCUTS ALONG THE SHEET PILE BULKHEAD CAP SHALL BE 3/4" W X 1" DEEP SPACED MAX. OF 15'-0".
  2. CAST-IN-PLACE CONCRETE THICKNESS VARIES FROM 18" AT SEAWARD EDGE TO 6" AT LANDWARD EDGE.
  3. TOP AND BOTTOM LAYER OF REINFORCEMENT WITHIN THE CONCRETE TOPPING SLAB REQUIRED ONLY WHEN TOPPING SLAB THICKNESS IS GREATER THAN OR EQUAL TO 12-INCHES. PRECAST PLANKS NOT SHOWN FOR CLARITY.
  - 4.



ALEX MORAN  
 CIVIL  
 NO. 55369  
 REGISTERED PROFESSIONAL ENGINEER  
 7 March 2024

DEPARTMENT OF PUBLIC WORKS  
 TOWN OF ORLEANS, MASSACHUSETTS  
 ROCK HARBOR COMMERCIAL WHARF IMPROVEMENTS

REVISIONS		DATE OF PREPARATION	
NO.	DESCRIPTION	BY	DATE
1			
2			
3			
4			
5			

SHEET TITLE:		
COMMERCIAL WHARF CIP DECK LAYOUT PLAN		
ISSUANCE:		
ISSUED FOR BID		
PROJECT NO:	00190004.10	
SHEET NUMBER	S-204	



DEPARTMENT OF PUBLIC WORKS  
 TOWN OF ORLEANS, MASSACHUSETTS  
 ROCK HARBOR COMMERCIAL WHARF IMPROVEMENTS

NO.	BY	DATE	DESCRIPTION

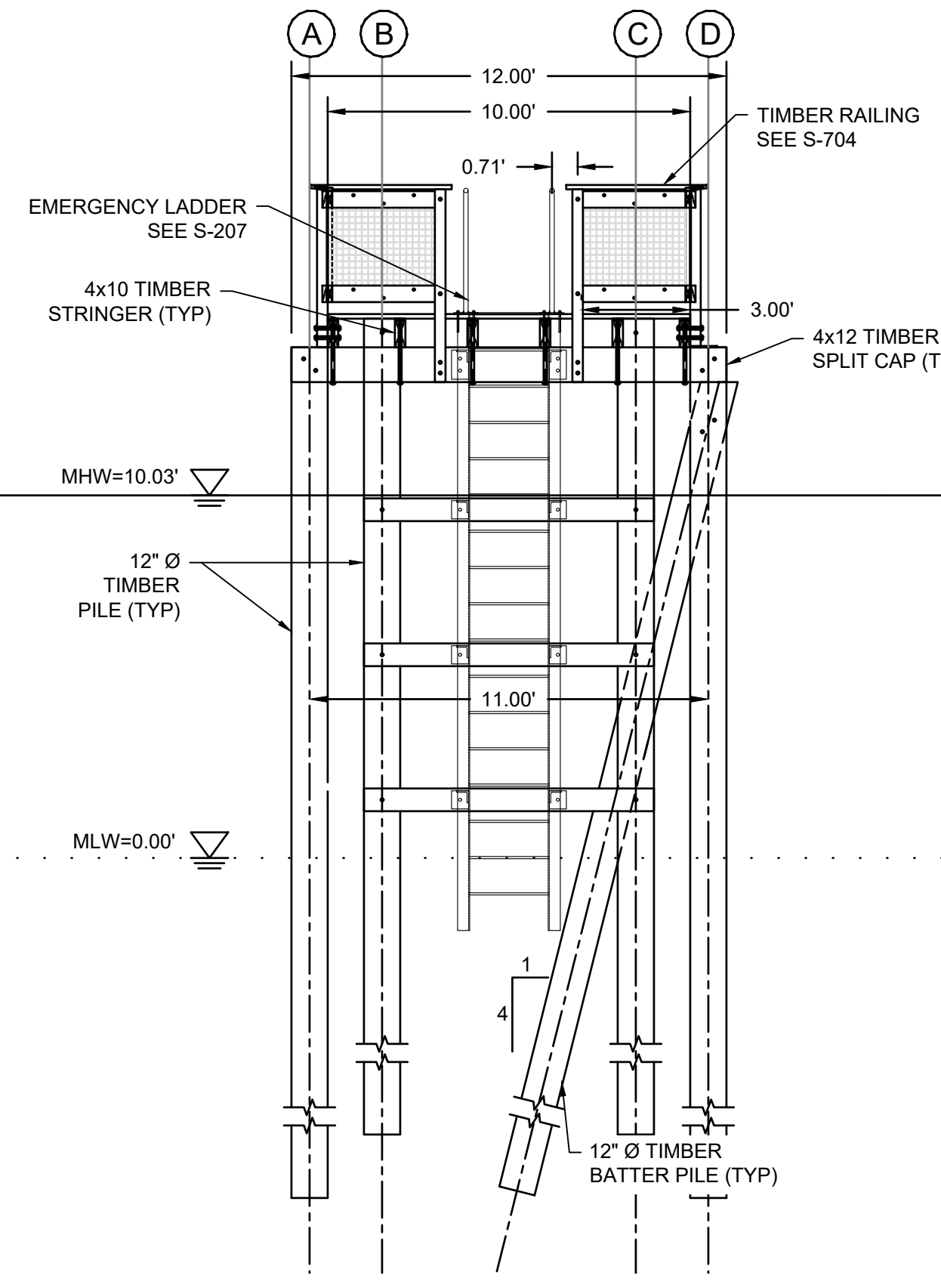
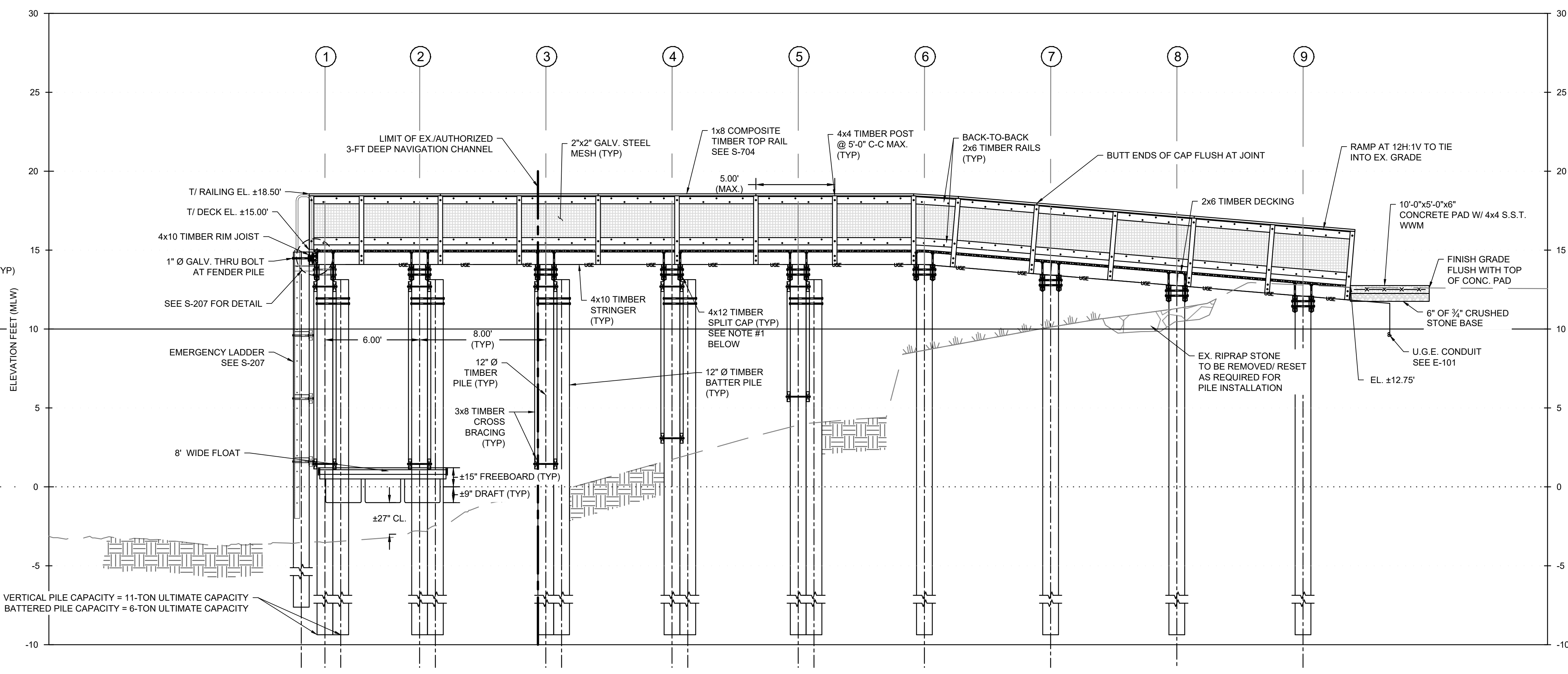
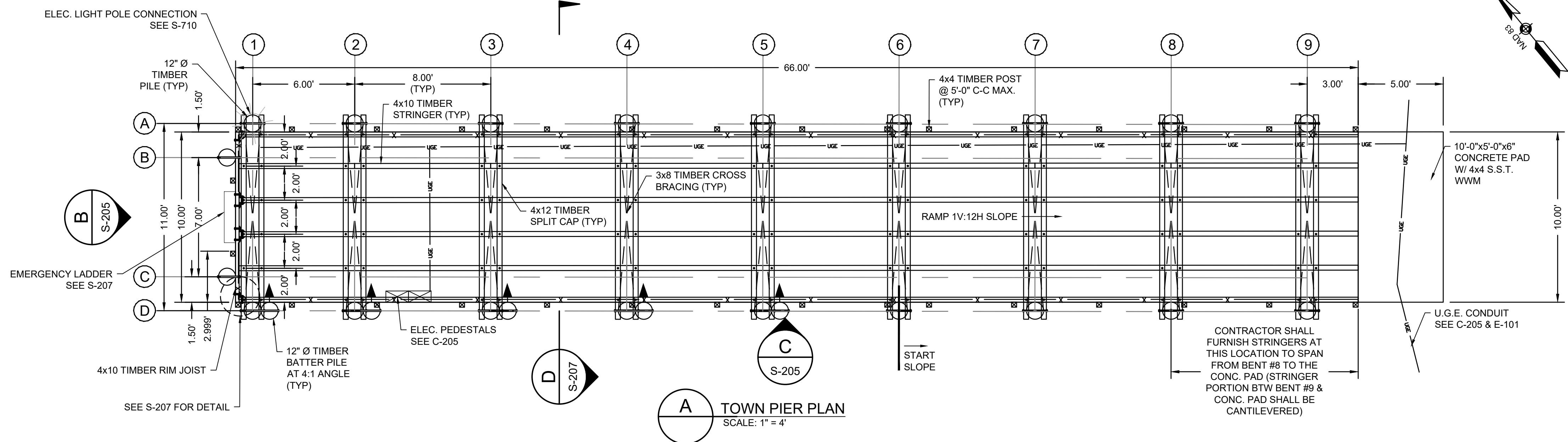
DATE OF PREPARATION

BY	DATE
MEC/JAH	10/24/19 & 3/2/21
BAM	12/05/2023
SRS	06/28/2021
PSR	12/24/2023

SHEET TITLE:  
**TOWN PIER PLAN, PROFILE, & SECTION**

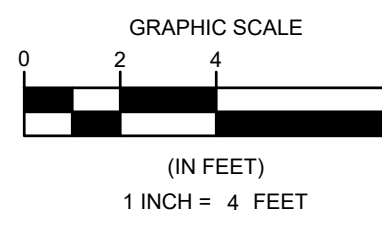
ISSUANCE:  
**ISSUED FOR BID**

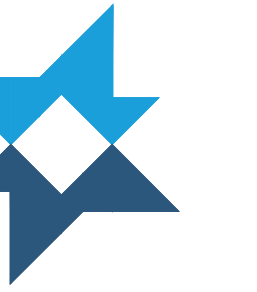
PROJECT NO: 00190004.10  
 SHEET NUMBER  
**S-205**



NOTE:  
 1. CROSS BRACING NOT SHOWN FOR CLARITY.  
 2. TIMBER RIM JOIST & CONNECTION NOT SHOWN FOR CLARITY.

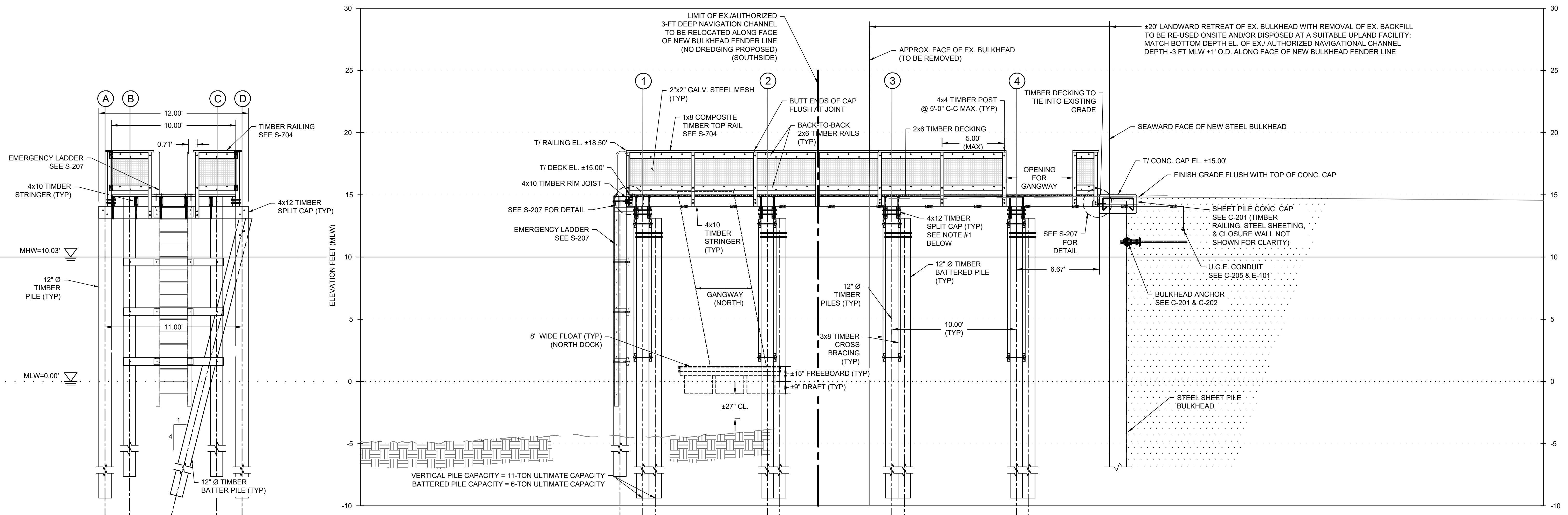
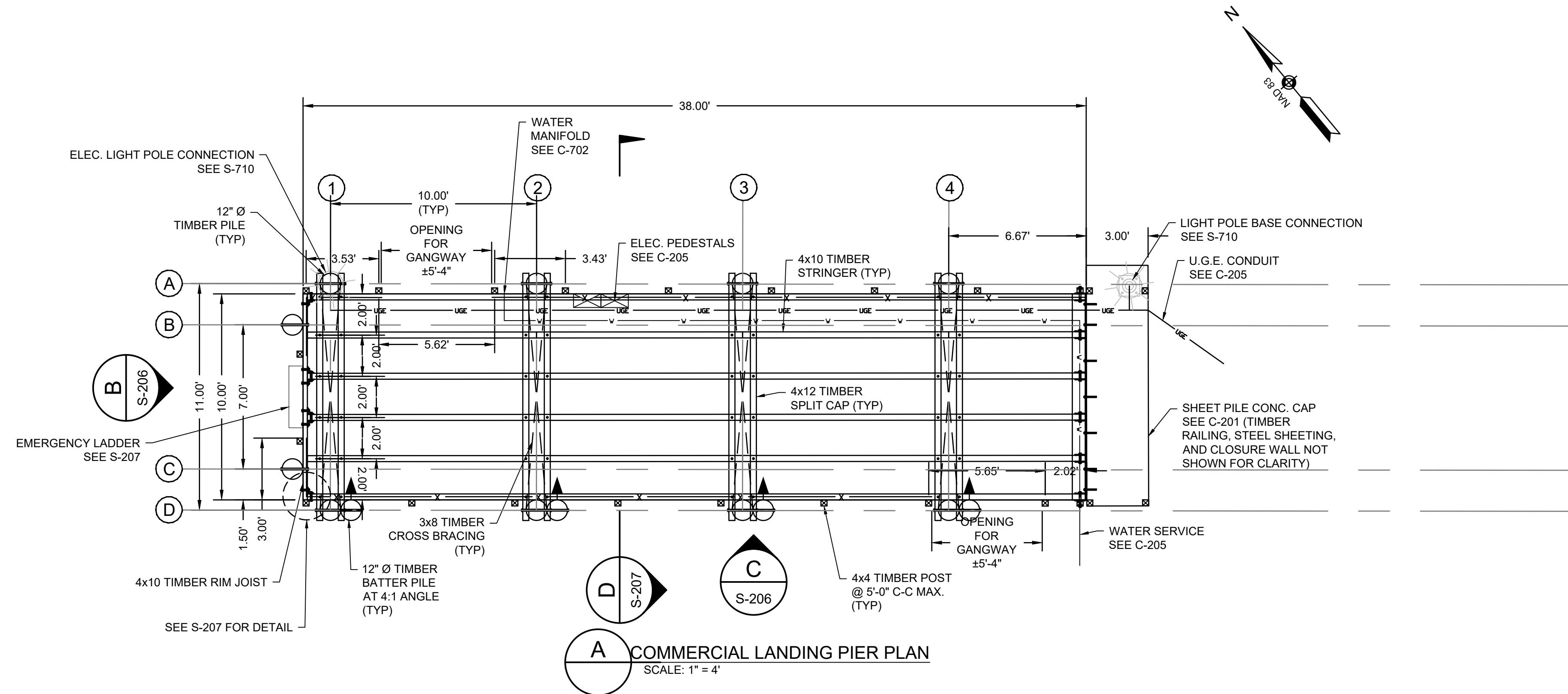
NOTE:  
 1. NOTCH PILE AS REQUIRED FOR TIMBER SPLIT CAP.





7 March 2024

DEPARTMENT OF PUBLIC WORKS  
TOWN OF ORLEANS, MASSACHUSETTS  
ROCK HARBOR COMMERCIAL WHARF IMPROVEMENTS



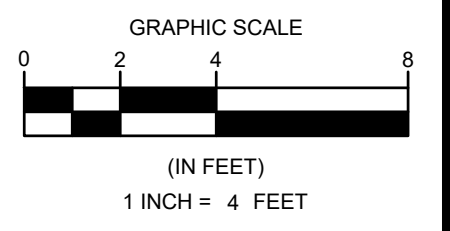
REVISIONS		DESCRIPTION	
NO.	DATE	BY	DATE
1			
2			
3			
4			

DATE OF PREPARATION		
SURVEYED	BY	DATE
MEC/JAH		10/24/19 & 3/2/21
DRAWN	BAM	12/05/2023
DESIGNED	SRS	06/28/2021
CHECKED	PSR	12/24/2023

SHEET TITLE:  
**COMMERCIAL LANDING PIER PLAN, PROFILE, & SECTION**

ISSUANCE:  
**ISSUED FOR BID**

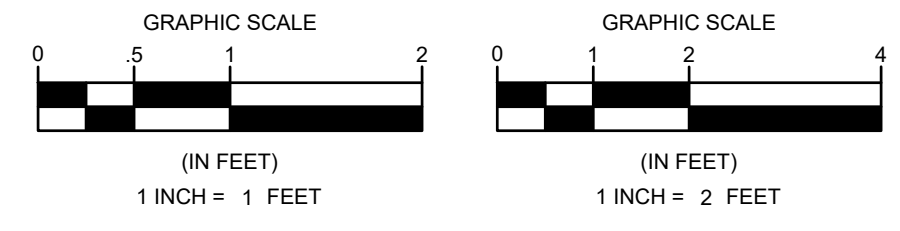
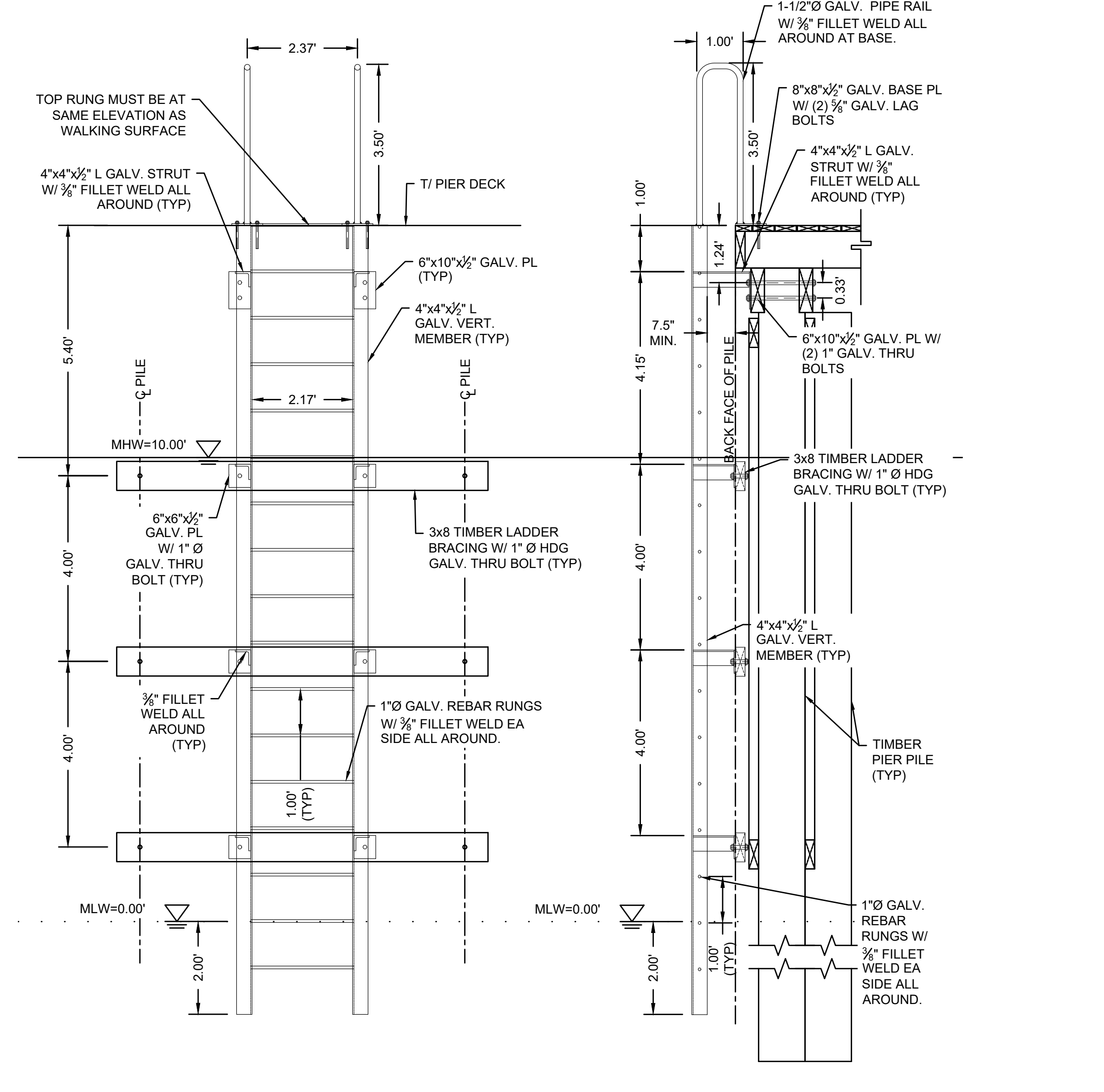
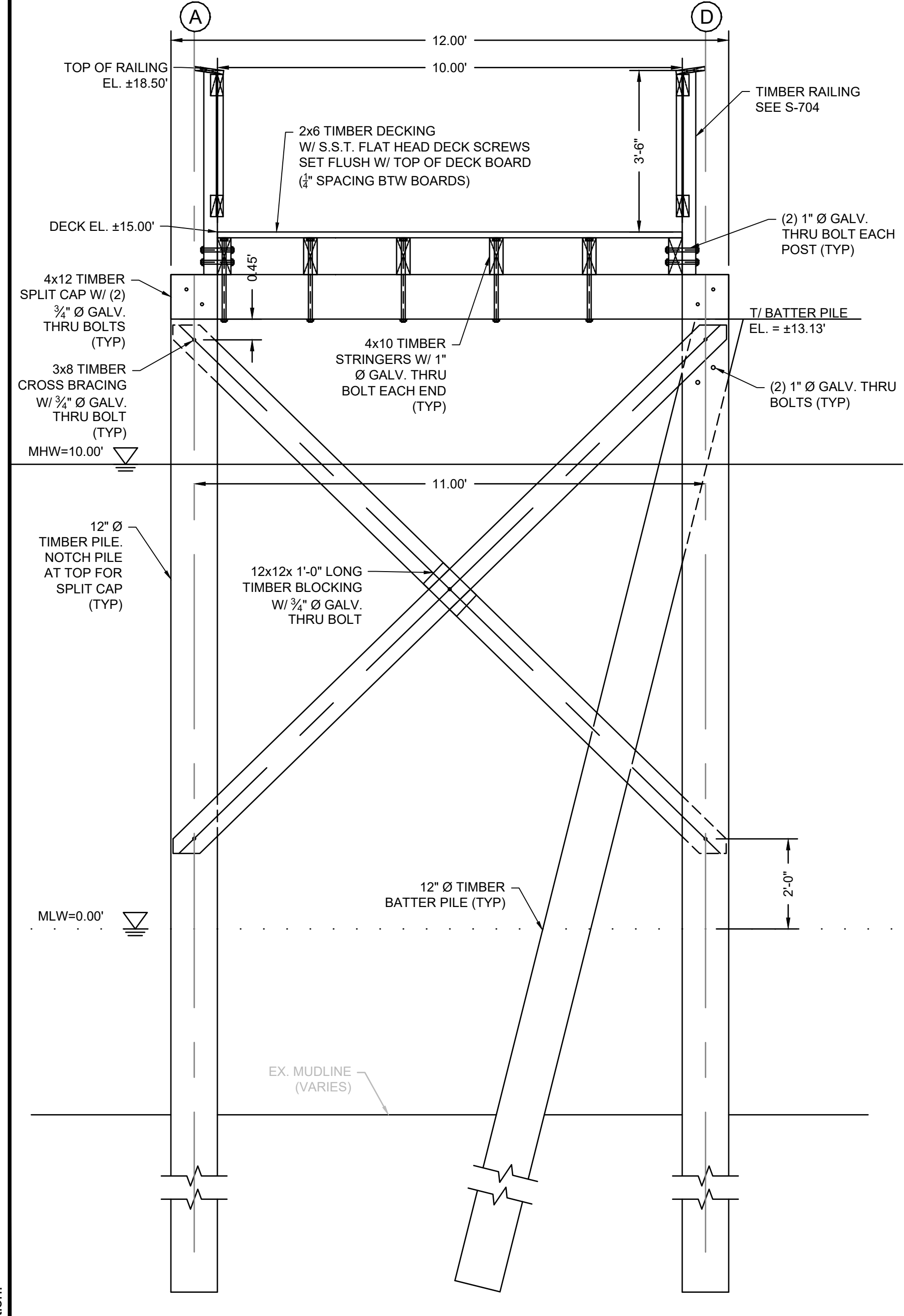
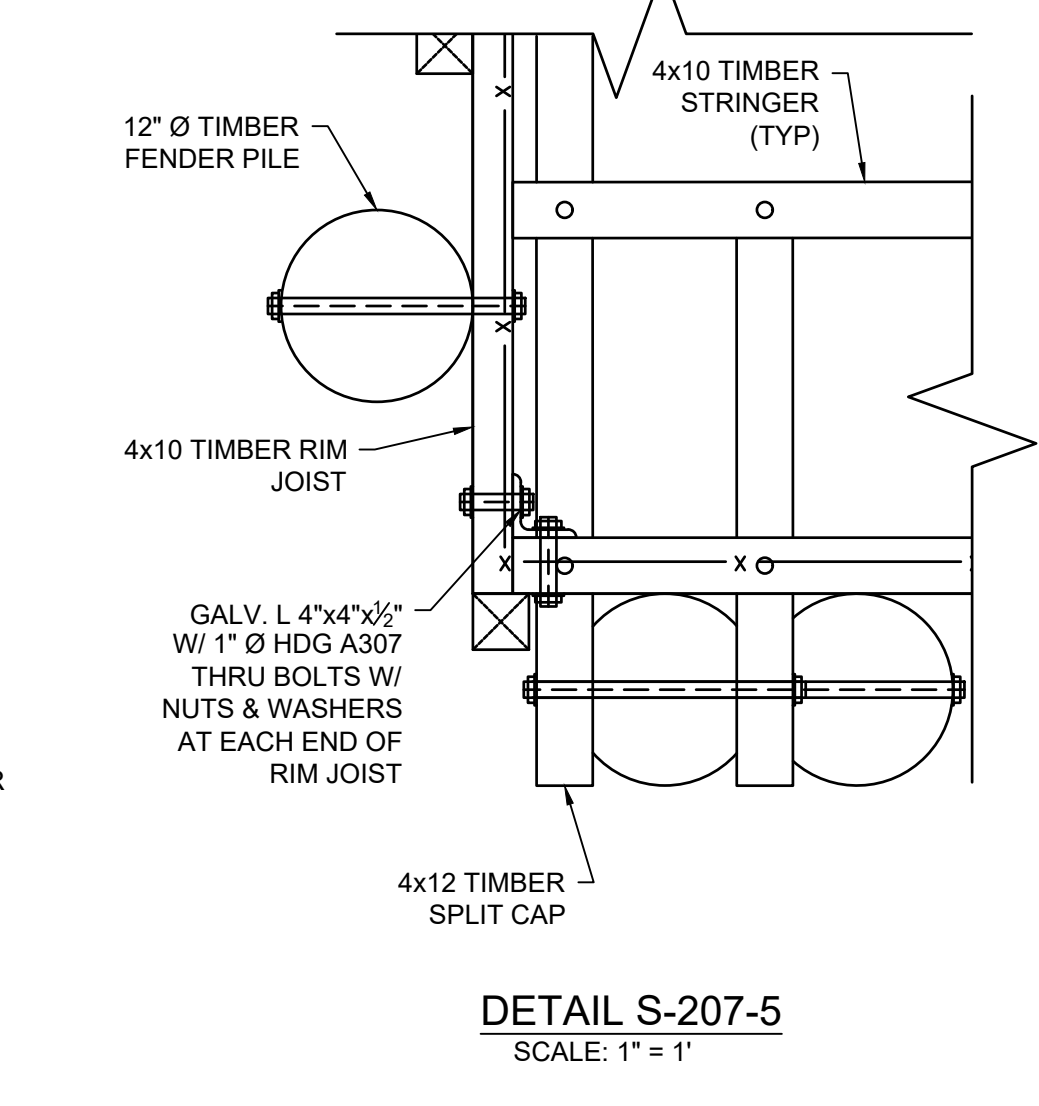
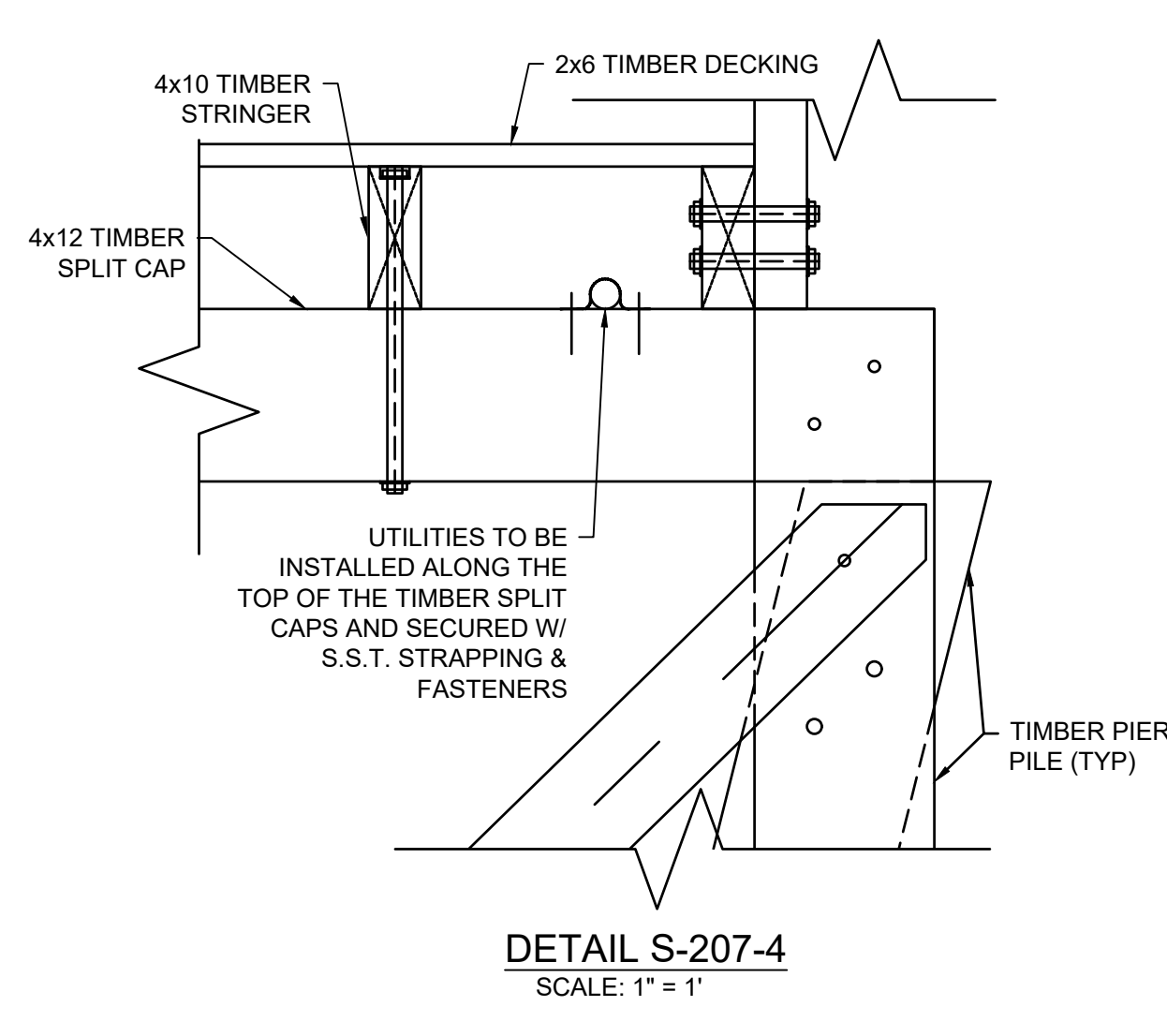
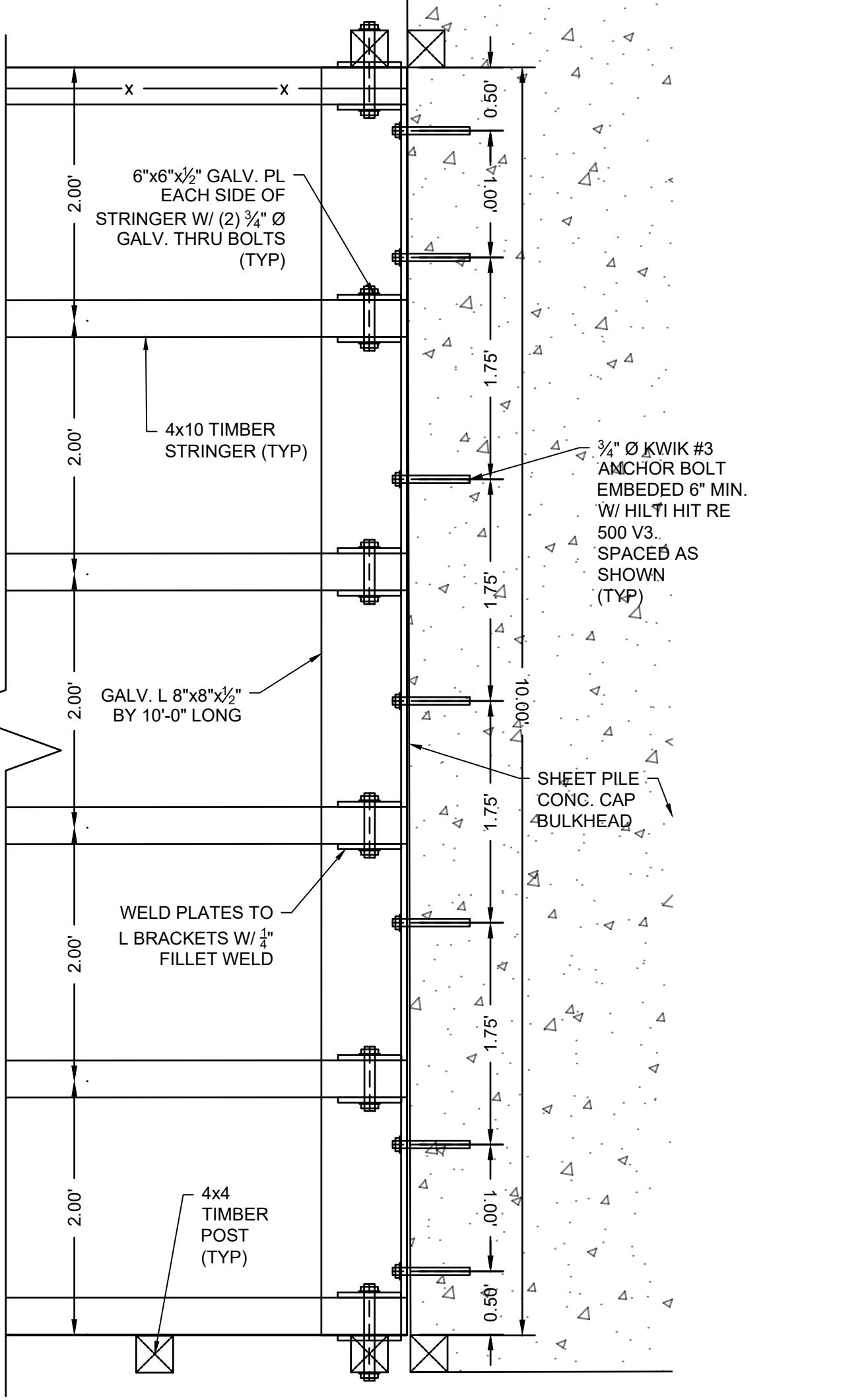
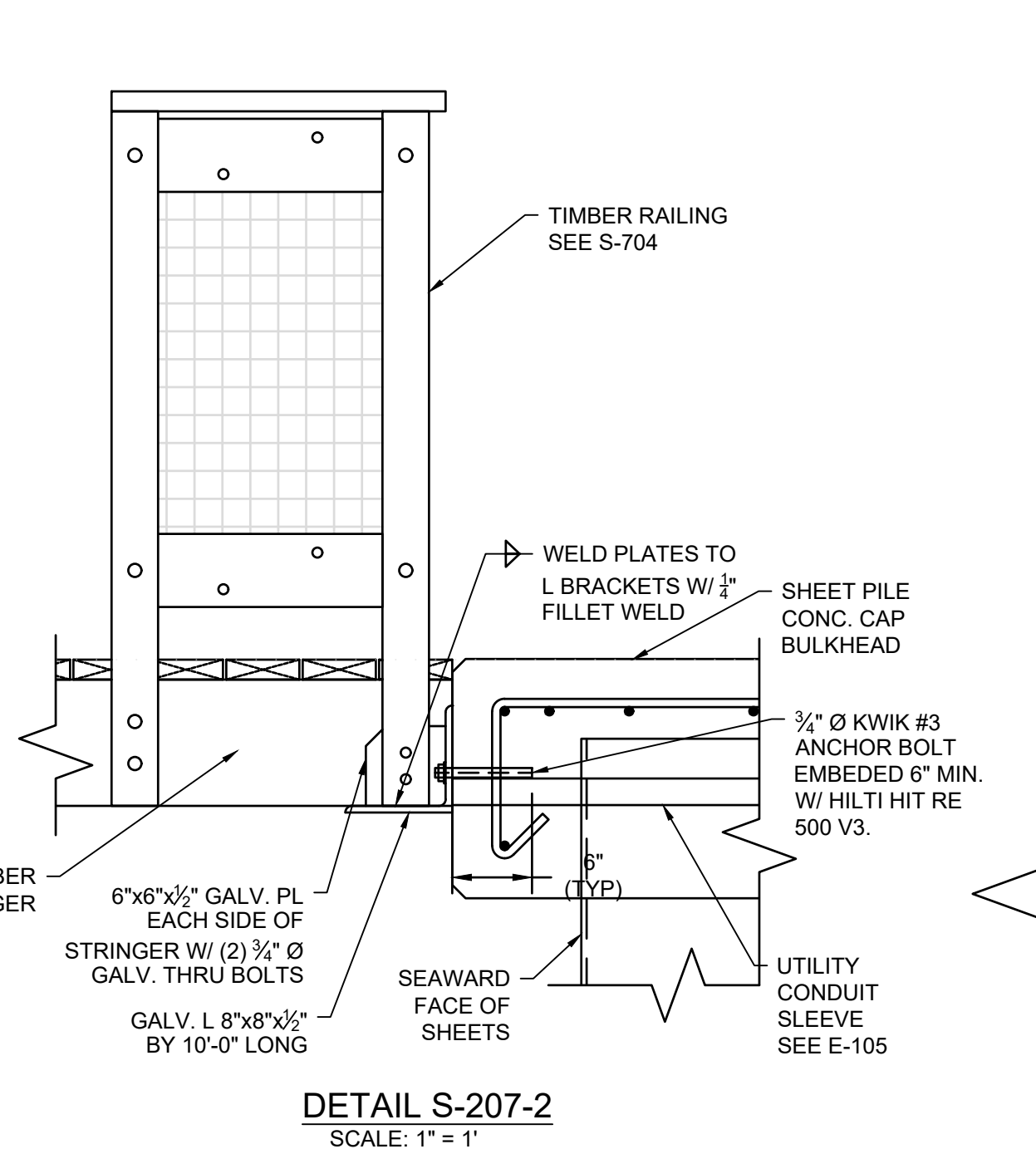
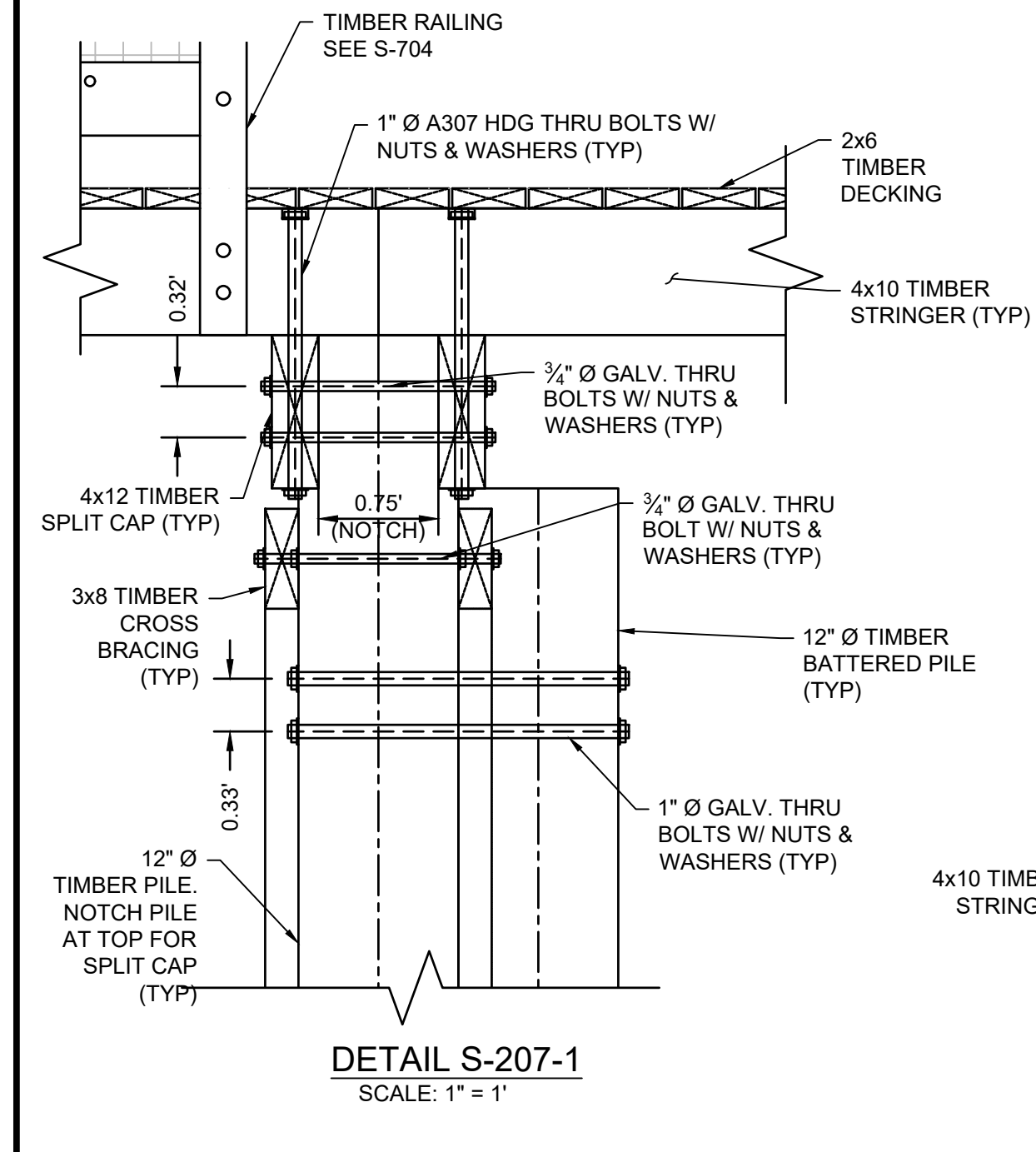
PROJECT NO: 00190004.10  
SHEET NUMBER



Thursday, March 7, 2024 11:38:47 AM  
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Layout: commercial landing pier plan profile & section  
DWG Folder Location:

REVISIONS	DESCRIPTION	DATE	BY
1			
2			
3			
4			

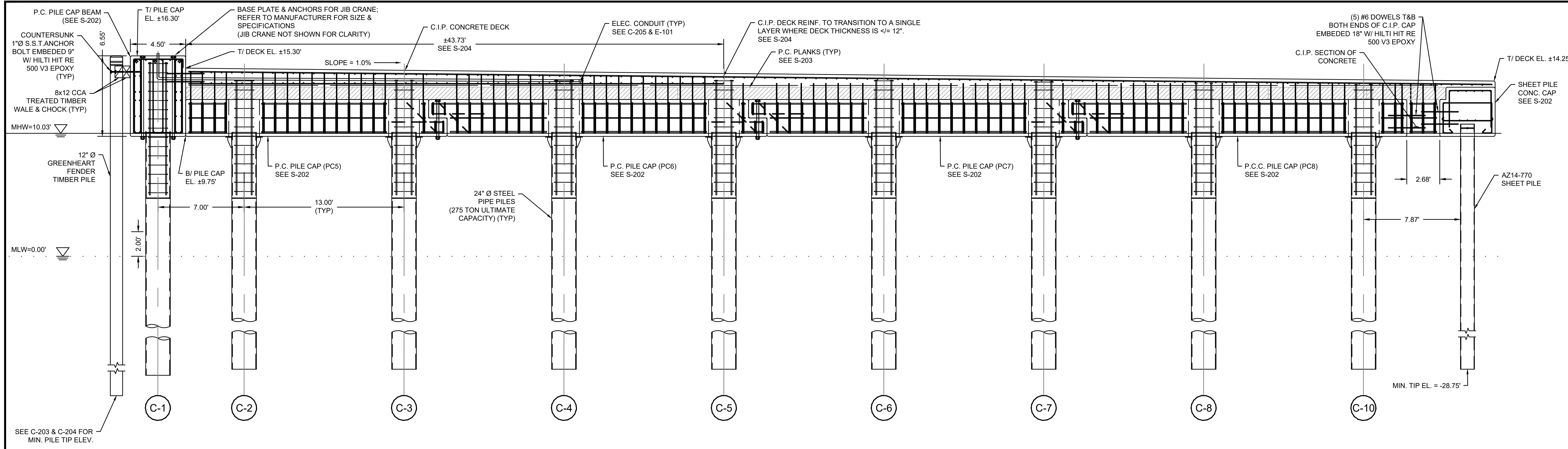
DATE OF PREPARATION	
BY	DATE
SURVEYED	MEC/JAH 10/24/19 & 3/2/21
DRAWN	BAM 12/05/2023
DESIGNED	SRS 06/28/2021
CHECKED	PSR 12/24/2023
SHEET TITLE:	
TIMBER PIER DETAILS	
ISSUANCE:	
ISSUED FOR BID	
PROJECT NO: 00190004.10	
SHEET NUMBER	
S-207	



D TYPICAL PIER ELEVATION  
SCALE: 1" = 2"

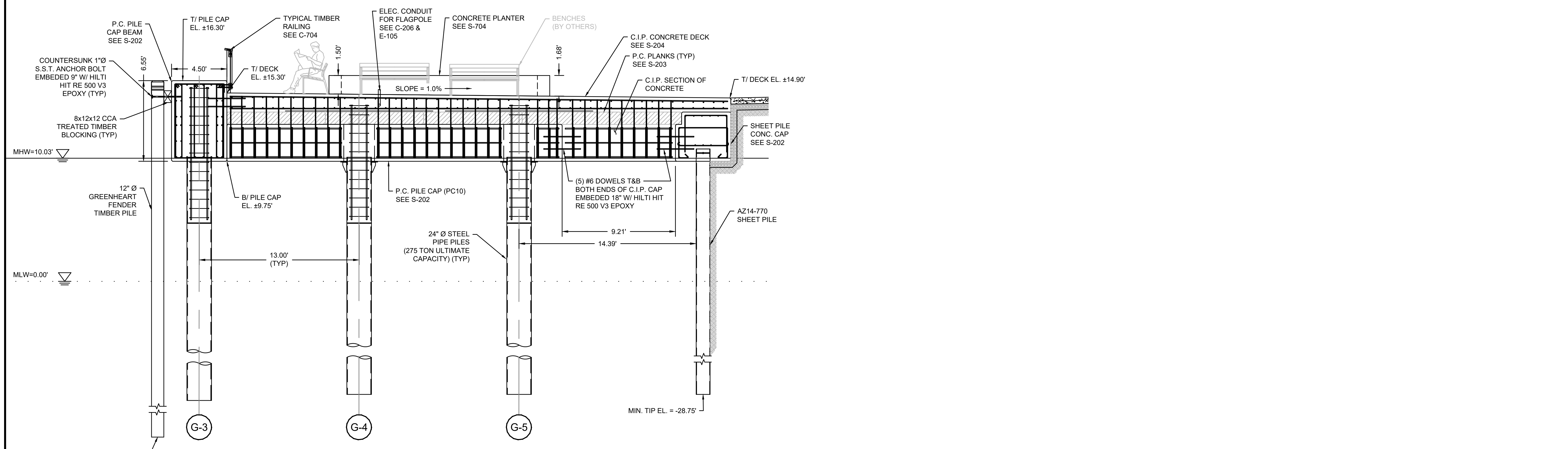
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DWG Filename: s-205 town pier p&p&sections.dwg Layout: s-207 timber pier details  
DWG Folder Location:

**DEPARTMENT OF PUBLIC WORKS**  
**TOWN OF ORLEANS, MASSACHUSETTS**  
**ROCK HARBOR COMMERCIAL WHARF IMPROVEMENTS**



**A**  
**COMMERCIAL WHARF DECK SECTION**  
 SCALE: 1" = 4'

NOTE:  
 1. NOT ALL OF THE PILE PLUG REINFORCEMENT IS SHOWN FOR CLARITY. SEE S-504 FOR PILE PLUG DETAIL.



**B**  
**PUBLIC VIEWING DECK SECTION**  
 SCALE: 1" = 4'

NOTE:  
 1. NOT ALL OF THE PILE PLUG REINFORCEMENT IS SHOWN FOR CLARITY. SEE S-504 FOR PILE PLUG DETAIL.

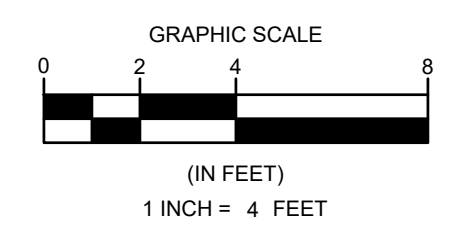
REVISIONS	
NO.	DESCRIPTION

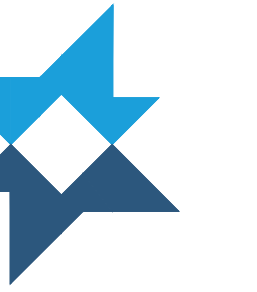
DATE OF PREPARATION	
SURVEYED	MEC/JAH 10/24/19 & 3/2/21
DRAWN	BAM 12/05/2023
DESIGNED	SRS 06/28/2021
CHECKED	PSR 12/24/2023

**SECTION VIEWS**  
**1 OF 4**

ISSUANCE:  
**ISSUED FOR BID**

PROJECT NO: 00190004.10  
 SHEET NUMBER  
**S-501**





DEPARTMENT OF PUBLIC WORKS  
 TOWN OF ORLEANS, MASSACHUSETTS  
 ROCK HARBOR COMMERCIAL WHARF  
 IMPROVEMENTS

REVISIONS		DATE	DESCRIPTION
NO.	BY	DATE	DESCRIPTION
1			
2			
3			
4			
5			

DATE OF PREPARATION

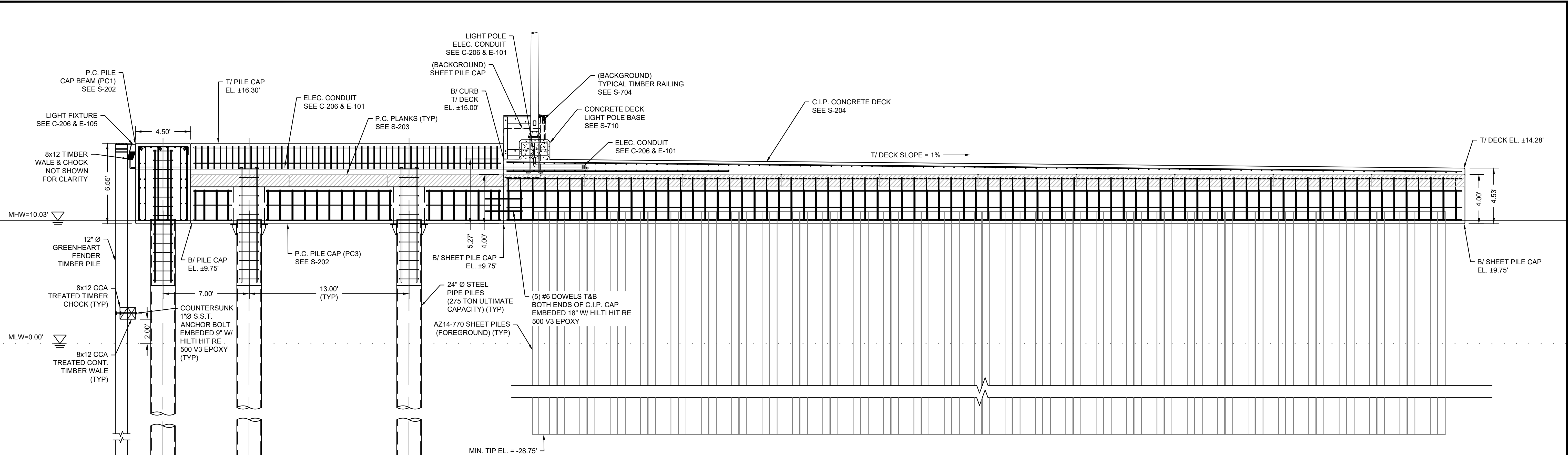
SURVEYED	BY	DATE
MEC/JAH		10/24/19 & 3/2/21
DRAWN	BY	DATE
BAM		12/05/2023
DESIGNED	BY	DATE
SRS		06/28/2021
CHECKED	BY	DATE
PSR		12/24/2023

SHEET TITLE:

SECTION VIEWS  
 2 OF 4

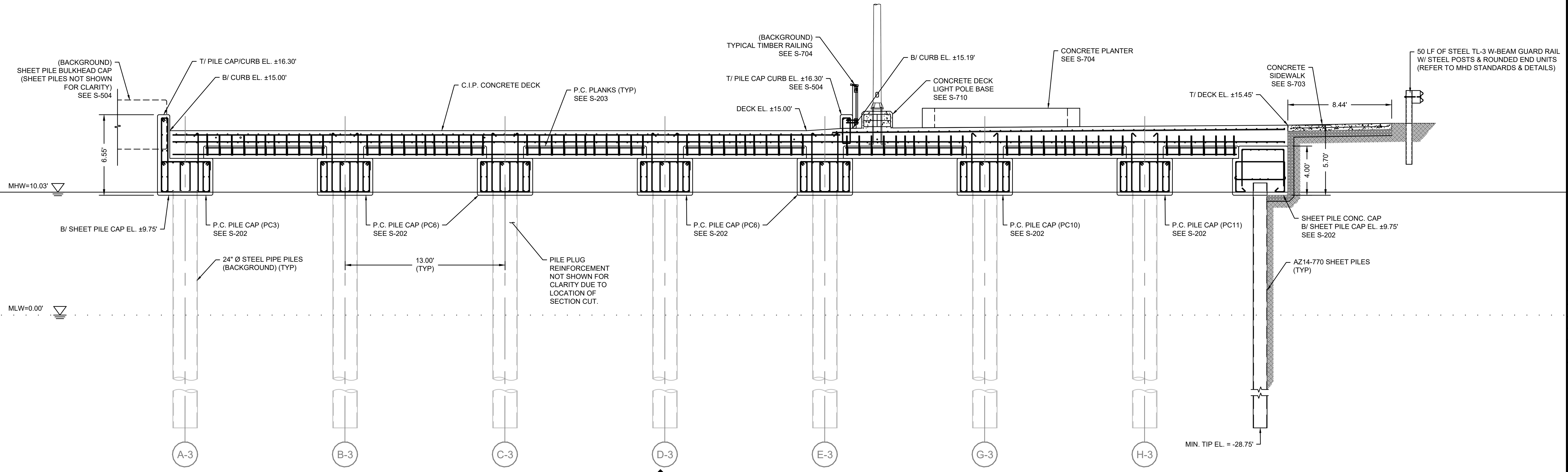
ISSUANCE:  
**ISSUED FOR BID**

PROJECT NO: 00190004.10  
 SHEET NUMBER



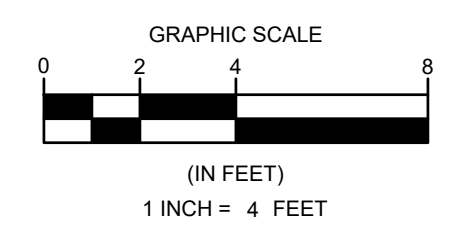
**C** BULKHEAD / COMMERCIAL WHARF SECTION  
 SCALE: 1" = 4"  
 S-101

NOTE:  
 1. NOT ALL OF THE PILE PLUG REINFORCEMENT IS SHOWN FOR CLARITY. SEE S-504 FOR PILE PLUG DETAIL.



**D** COMMERCIAL WHARF & PUBLIC VIEWING DECK ELEVATION  
 SCALE: 1" = 4"  
 S-101

NOTE:  
 1. PRECAST PILE CAP BEAM SUPPORT NOT SHOWN FOR CLARITY.  
 2. BENCHES (BY OTHERS) NOT SHOWN FOR CLARITY.



DEPARTMENT OF PUBLIC WORKS  
 TOWN OF ORLEANS, MASSACHUSETTS  
 ROCK HARBOR COMMERCIAL WHARF  
 IMPROVEMENTS

NO.	BY	DATE	DESCRIPTION

DATE OF PREPARATION

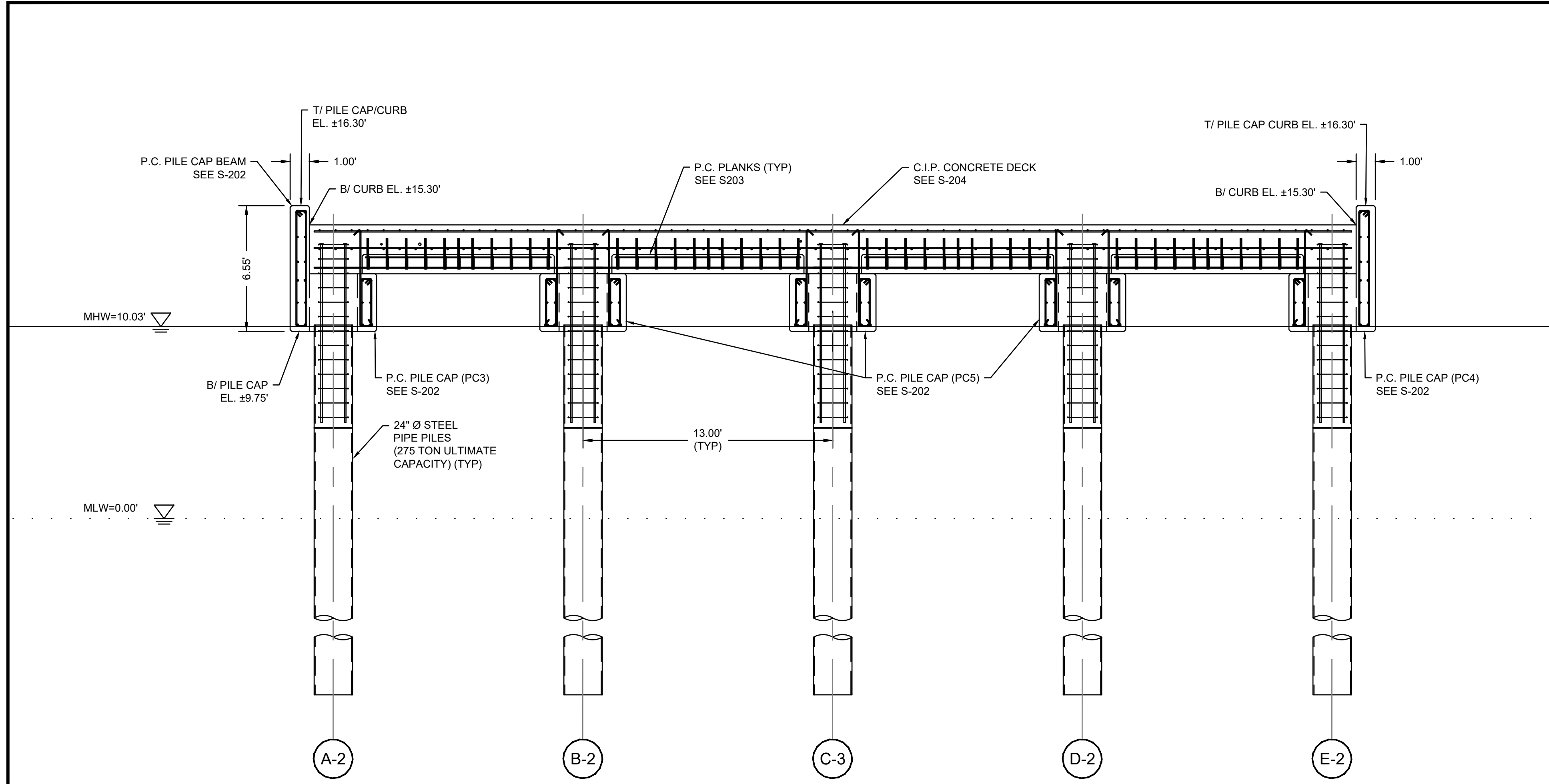
	BY	DATE
SURVEYED	MEC/JAH	10/24/19 & 3/2/21
DRAWN	BAM	12/05/2023
DESIGNED	SRS	06/28/2021
CHECKED	PSR	12/24/2023

SHEET TITLE:

**SECTION VIEWS  
3 OF 4**

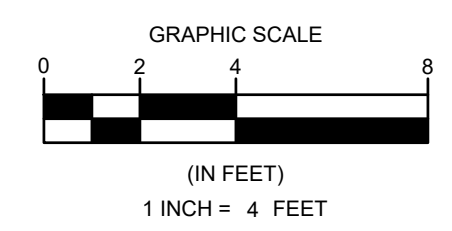
ISSUANCE:  
**ISSUED FOR BID**

PROJECT NO: 00190004.10  
 SHEET NUMBER  
**S-503**



**E** COMMERCIAL WHARF MIDDLE SECTION  
 S-101 SCALE: 1" = 4'

- NOTE:
- NOT ALL OF THE PILE PLUG REINFORCEMENT IS SHOWN FOR CLARITY. SEE S-504 FOR PILE PLUG DETAIL.
  - PRECAST PILE CAP BEAM SUPPORT NOT SHOWN FOR CLARITY.



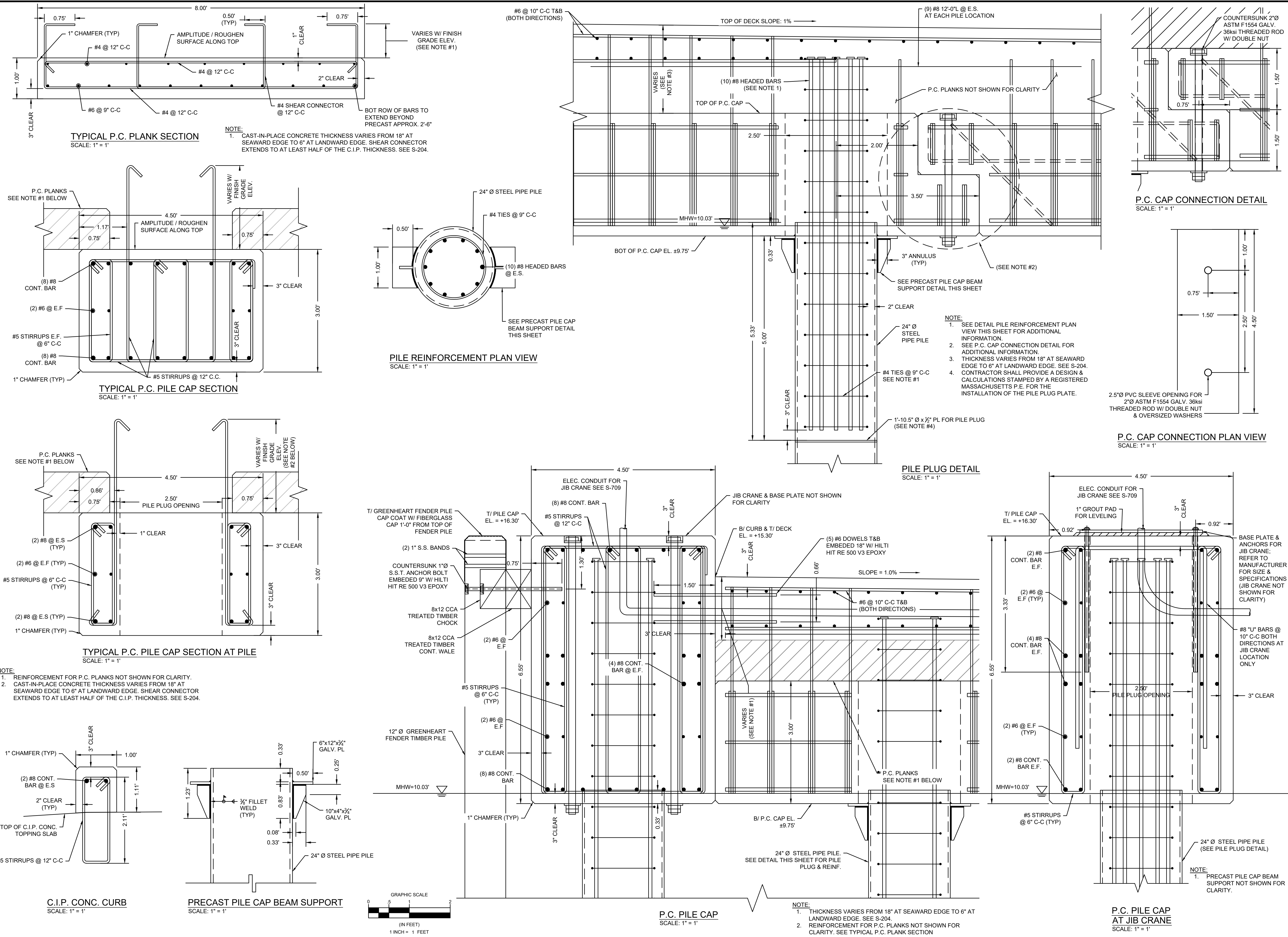
NO.	DATE	DESCRIPTION

DATE OF PREPARATION	
BY	DATE
SURVEYED	MEC/JAH 10/24/19 & 3/2/21
DRAWN	BAM 12/05/2023
DESIGNED	SRS 06/28/2021
CHECKED	PSR 12/24/2023

SHEET TITLE:  
**SECTION VIEWS  
4 OF 4**

ISSUANCE:  
**ISSUED FOR BID**

PROJECT NO: 00190004.10  
SHEET NUMBER



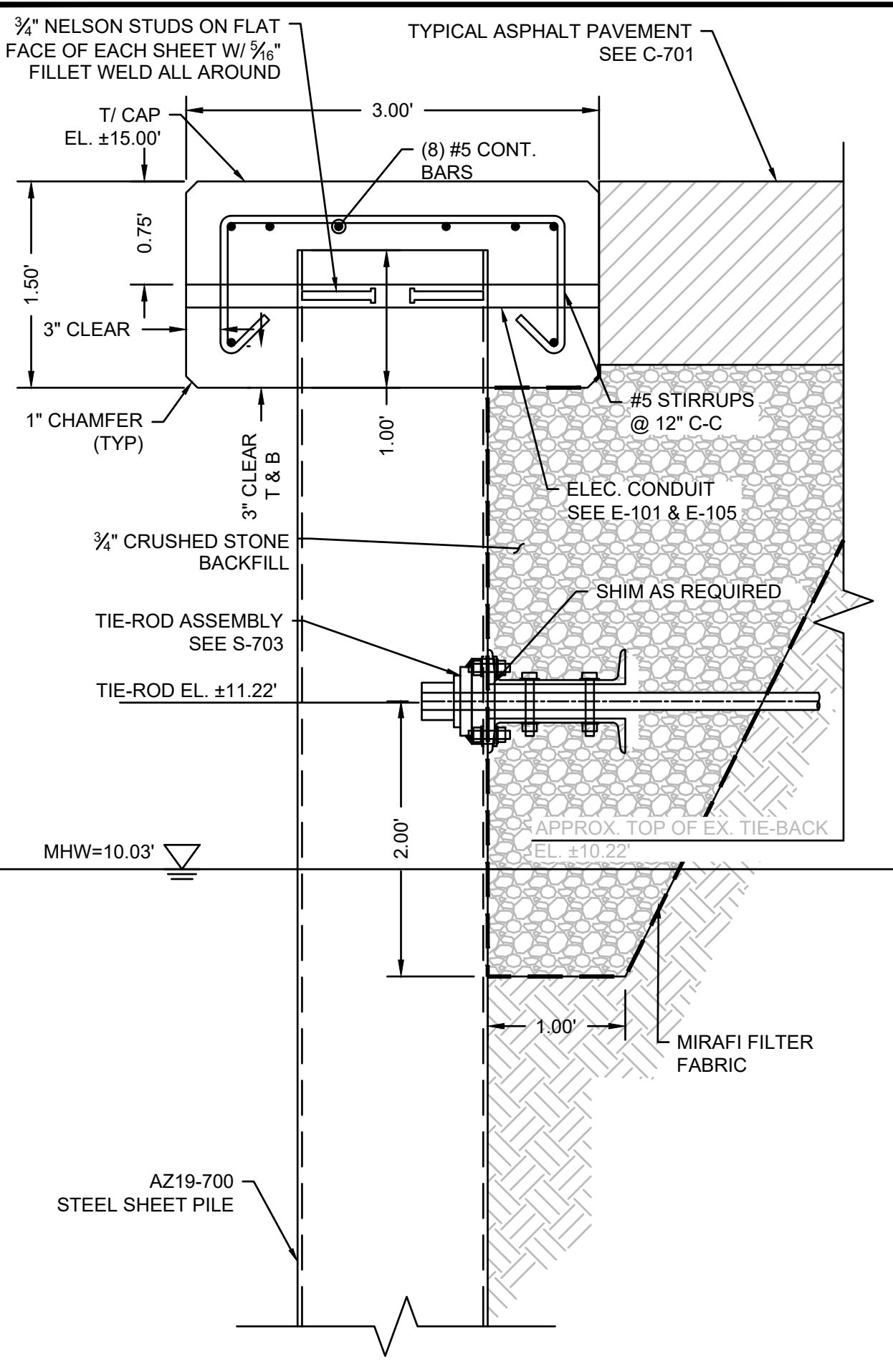
Thursday, March 7, 2024 11:40:31 AM  
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Layout: s-504 section views 4  
DWG Folder Location:

REVISIONS		DATE OF PREPARATION	
NO.	DESCRIPTION	BY	DATE

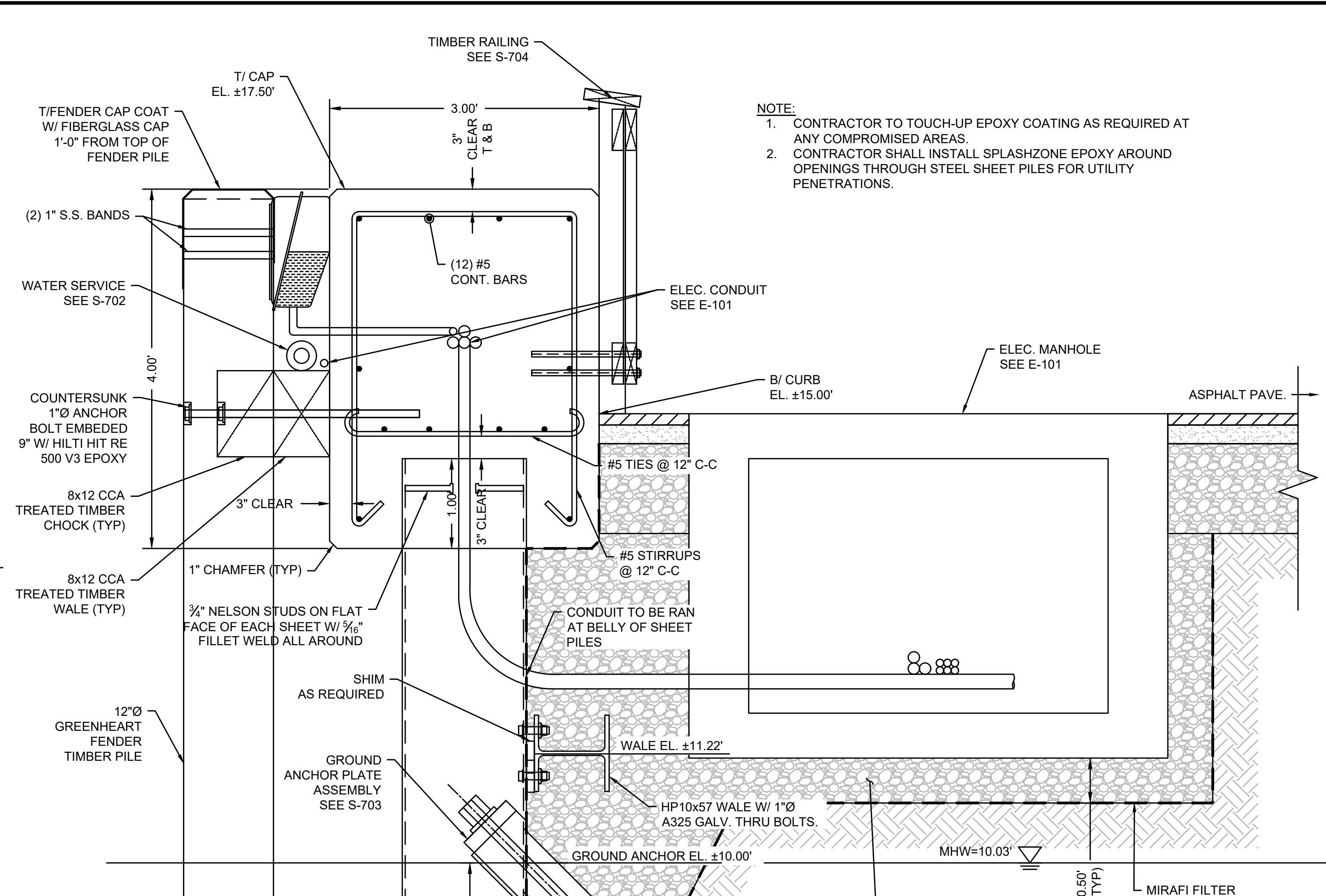
SHEET TITLE:  
**STRUCTURAL DETAILS 1 OF 8**

ISSUANCE:  
**ISSUED FOR BID**

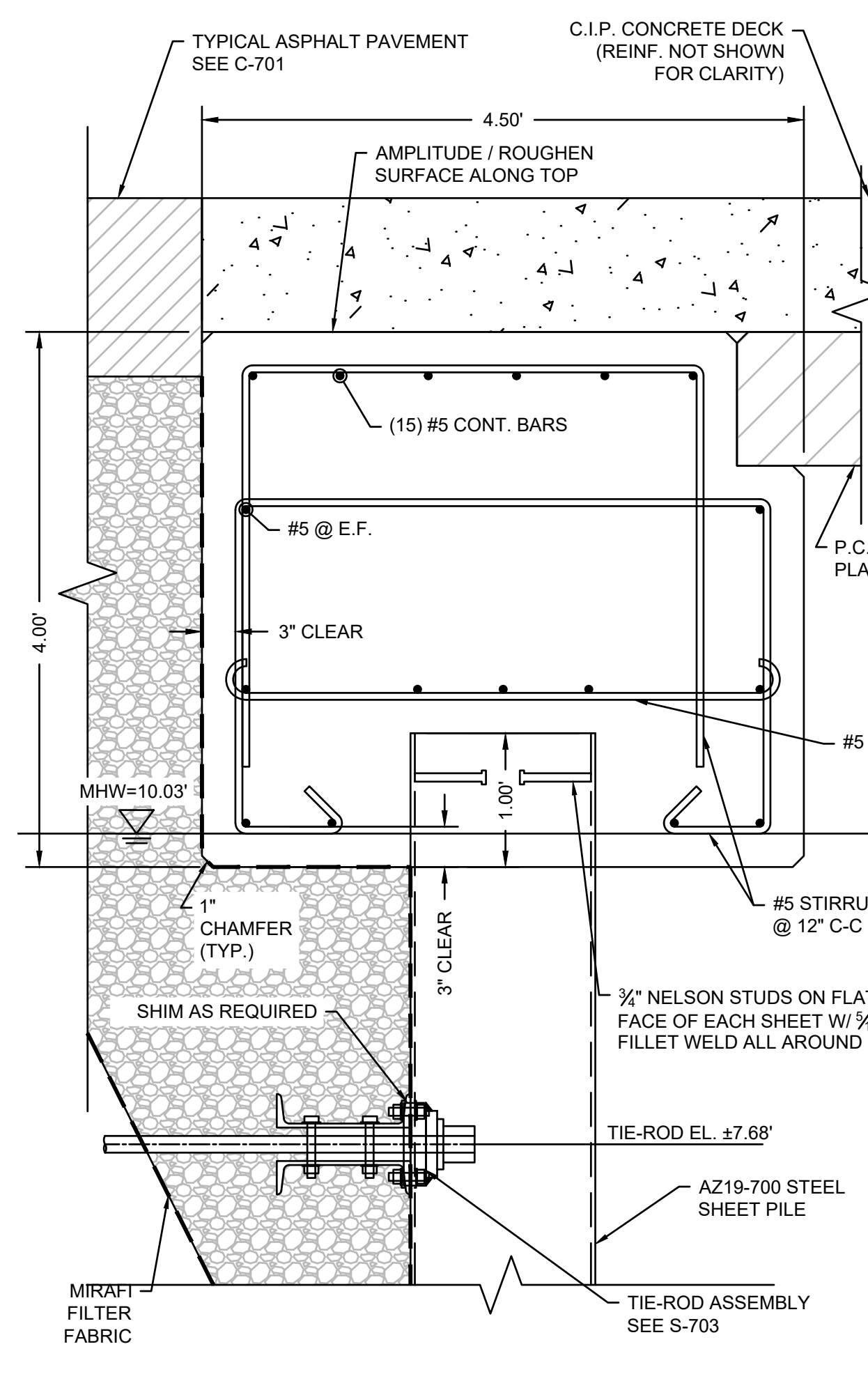
PROJECT NO: 00190004.10  
 SHEET NUMBER  
**S-701**



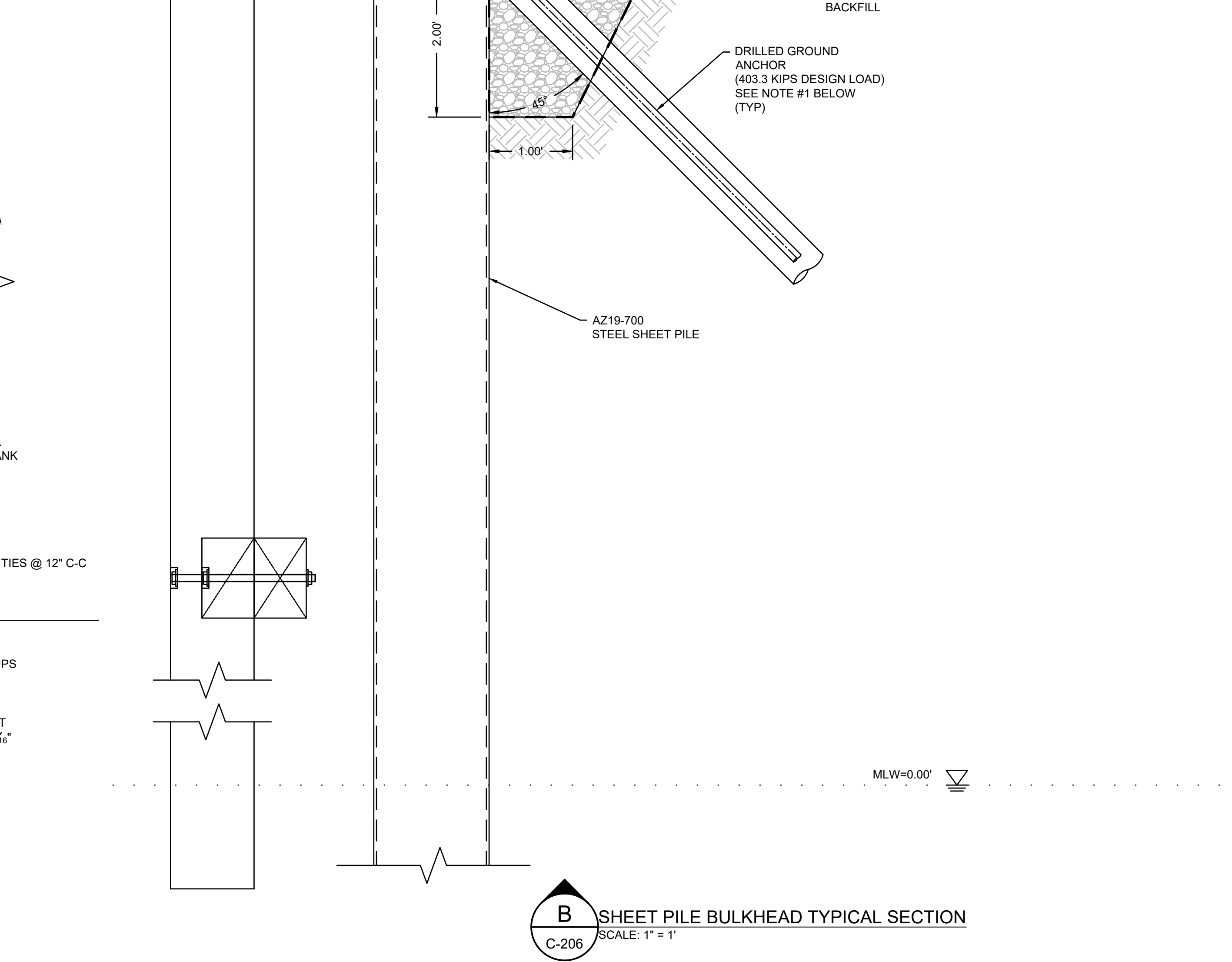
**A** SHEET PILE BULKHEAD SECTION AT COMMERCIAL LANDING PIER  
 SCALE: 1" = 1'



NOTE:  
 1. CONTRACTOR TO TOUCH-UP EPOXY COATING AS REQUIRED AT ANY COMPROMISED AREAS.  
 2. CONTRACTOR SHALL INSTALL SPLASHZONE EPOXY AROUND OPENINGS THROUGH STEEL SHEET PILES FOR UTILITY PENETRATIONS.



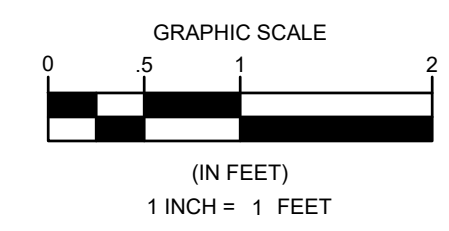
**G** SHEET PILE BULKHEAD SECTION AT LOWER WALE  
 SCALE: 1" = 1'



**F** SHEET PILE BULKHEAD SECTION AT TRENCH DRAIN  
 SCALE: 1" = 1'

**B** SHEET PILE BULKHEAD TYPICAL SECTION  
 SCALE: 1" = 1'

NOTE:  
 1. CONTRACTOR TO DESIGN GROUND ANCHOR ASSEMBLY INCLUDING GROUND ANCHOR, STAND-OFF PLATES AND CAP PLATES. CONTRACTOR SHALL SUBMIT CALCULATIONS AND DRAWINGS FOR GROUND ANCHOR DESIGN, STAMPED BY AN ENGINEER REGISTERED IN THE STATE OF MA. FOR SOILS INFORMATION SEE ATTACHMENT "A" OF THE CONTRACT DOCUMENTS.

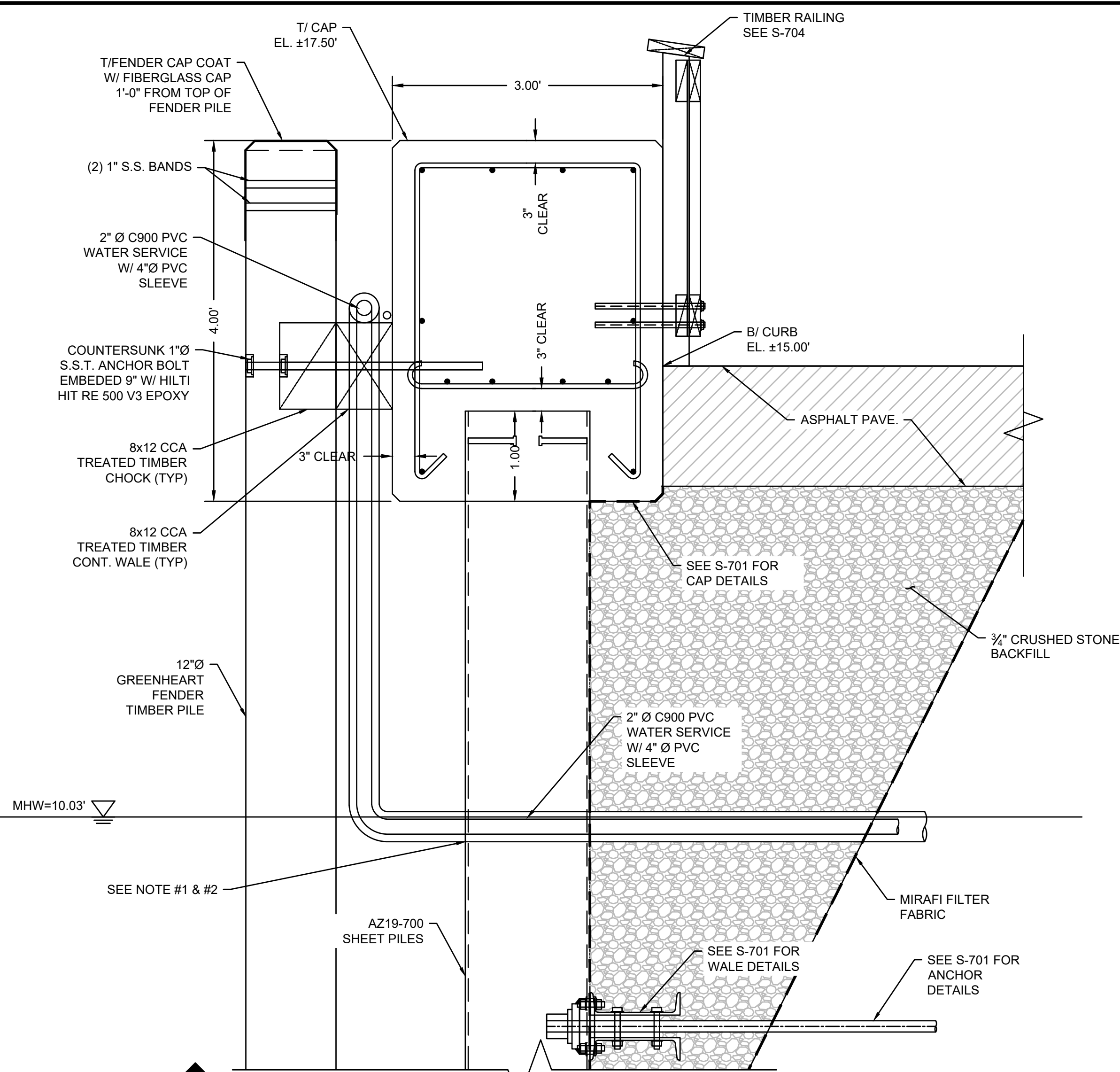




NO.	DATE	DESCRIPTION
1	10/24/19	ISSUED FOR BID
2	12/05/2023	REVISED
3	06/28/2021	REVISED
4	12/24/2023	REVISED

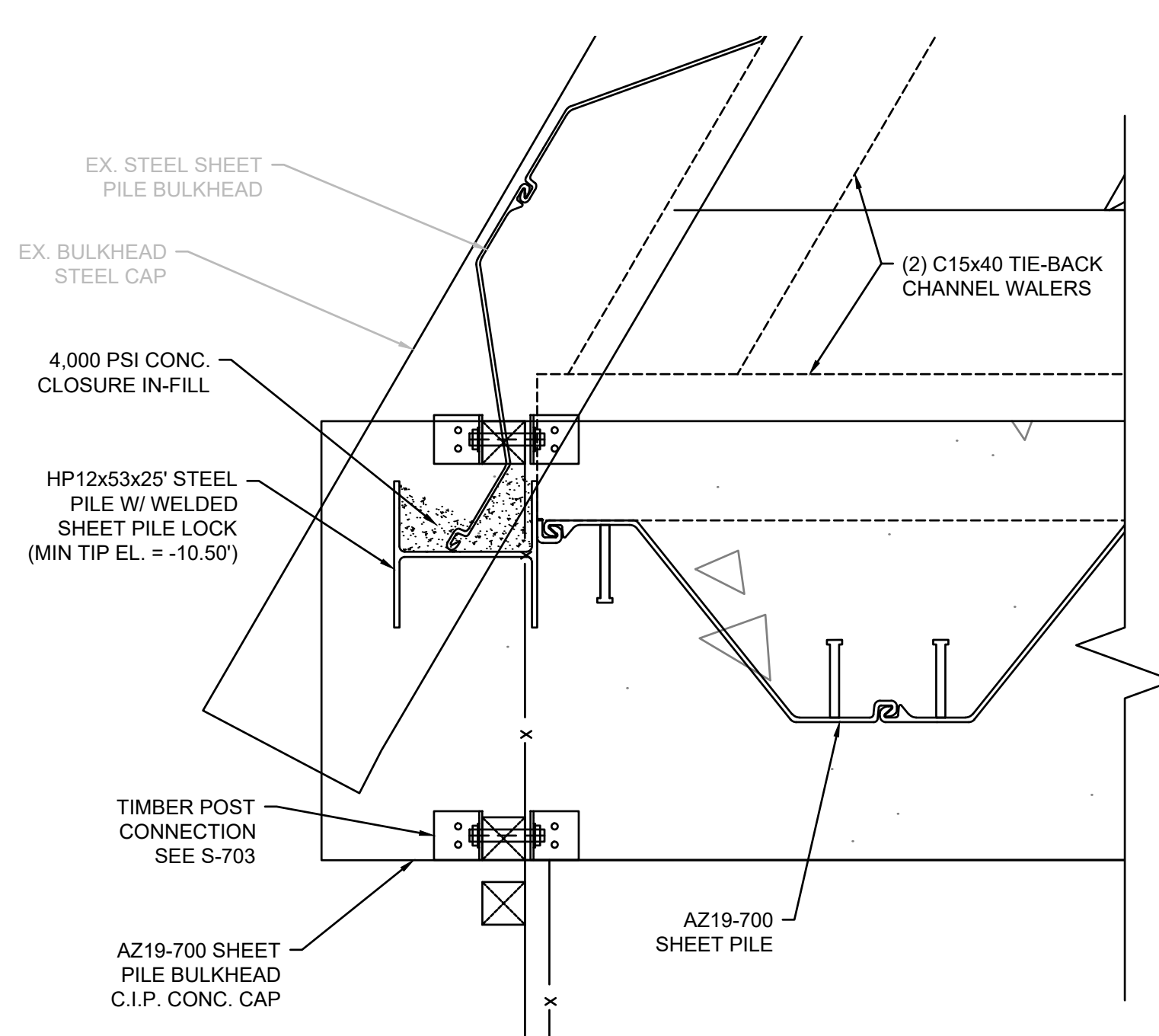
DATE OF PREPARATION	
BY	DATE
SURVEYED	MEC/JAH 10/24/19 & 3/2/21
DRAWN	BAM 12/05/2023
DESIGNED	SRS 06/28/2021
CHECKED	PSR 12/24/2023

SHEET TITLE:	
<b>STRUCTURAL DETAILS 2 OF 8</b>	
ISSUANCE:	
<b>ISSUED FOR BID</b>	
PROJECT NO:	00190004.10
SHEET NUMBER	<b>S-702</b>



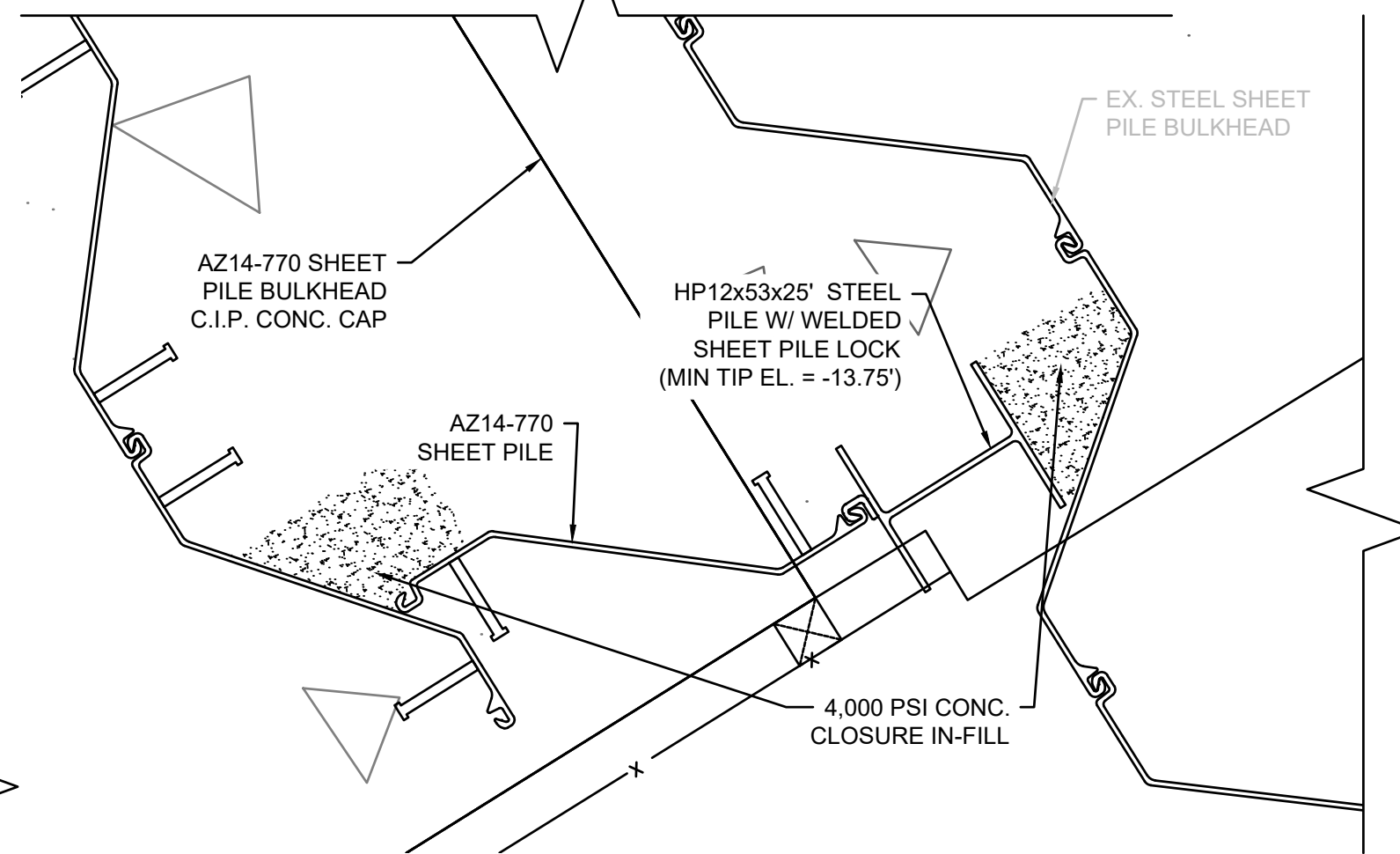
**A WATER SERVICE DETAIL THROUGH SHEETPILE**  
 C-206  
 SCALE: 1" = 1'

**NOTE:**  
 1. CONTRACTOR TO TOUCH-UP EPOXY COATING AS REQUIRED AT ANY COMPROMISED AREAS.  
 2. CONTRACTOR SHALL INSTALL SPLASHZONE EPOXY AROUND OPENINGS THROUGH STEEL SHEET PILES FOR UTILITY PENETRATIONS.

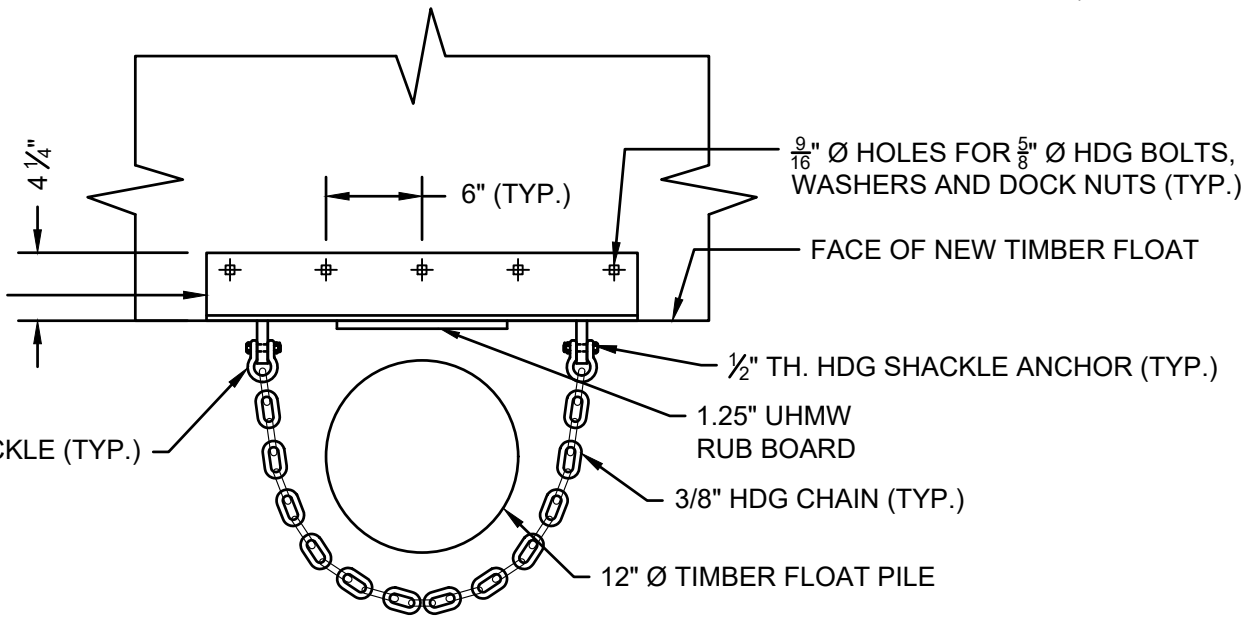


**NORTHERN SHEET PILE BULKHEAD CLOSURE DETAIL**  
 SCALE: 1" = 1'

**NOTE:**  
 1. LIGHT POLE & CONNECTION NOT SHOWN FOR CLARITY.

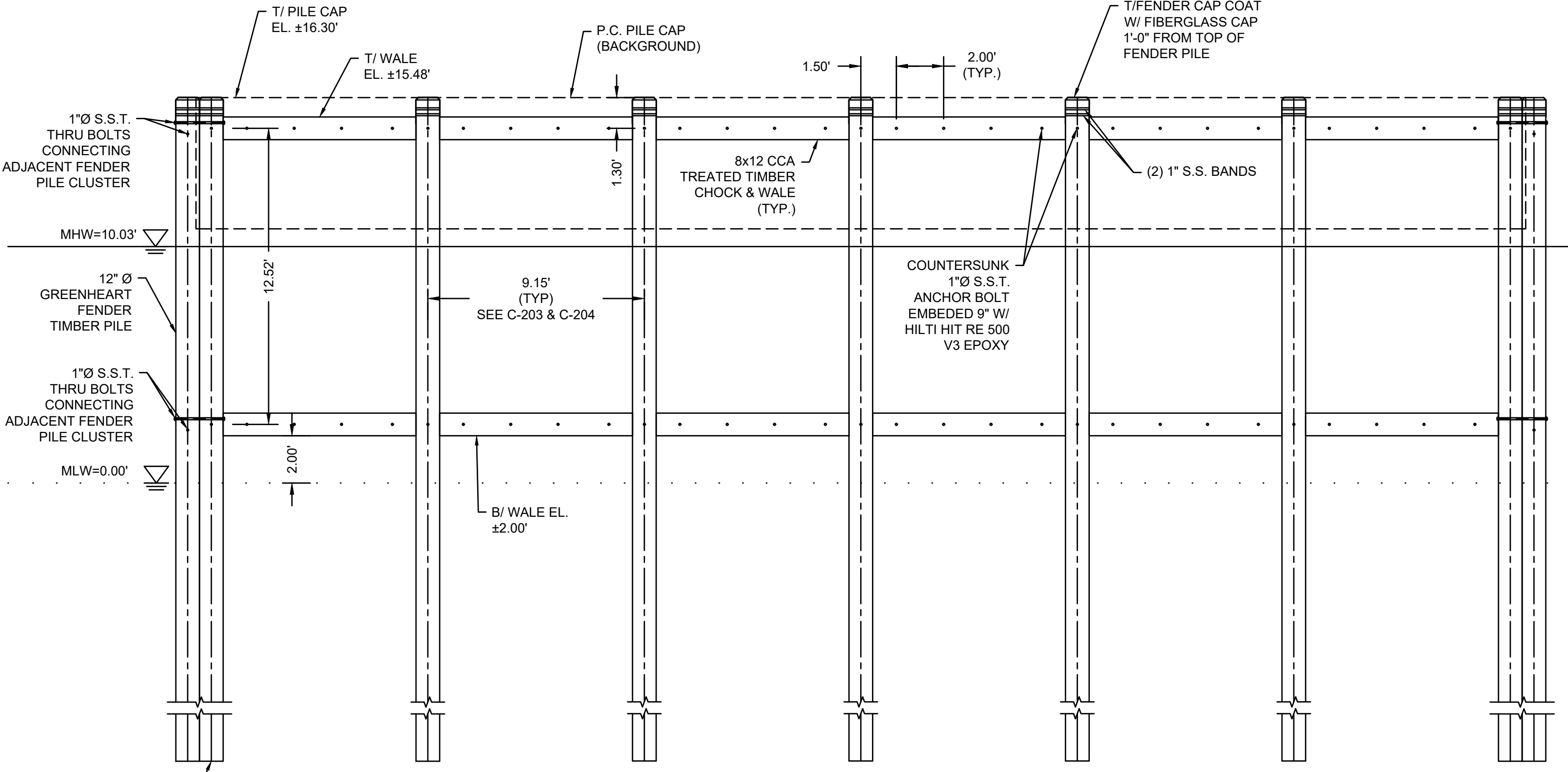


**SOUTHERN SHEET PILE BULKHEAD CLOSURE DETAIL**  
 SCALE: 1" = 1'

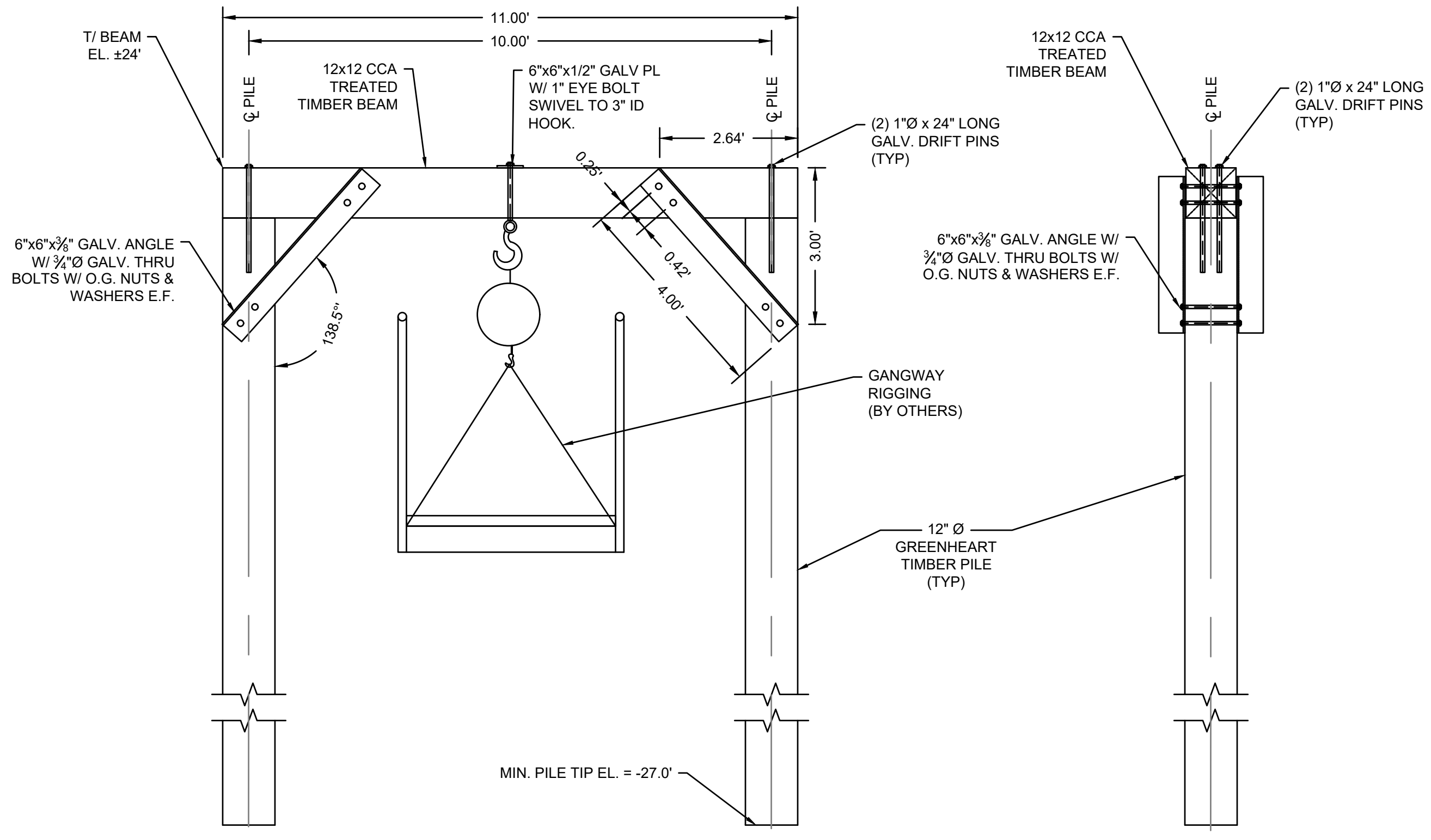


**FLOAT PILE GUIDE DETAIL**  
 SCALE: 1" = 1'

**NOTE:**  
 CONTRACTOR SHALL INSTALL SECTIONS OF 2" SCH 40 PVC PIPE ALONG CHAIN TO PREVENT BINDING OF CHAIN AND CHAFFING OF STEEL PILE.



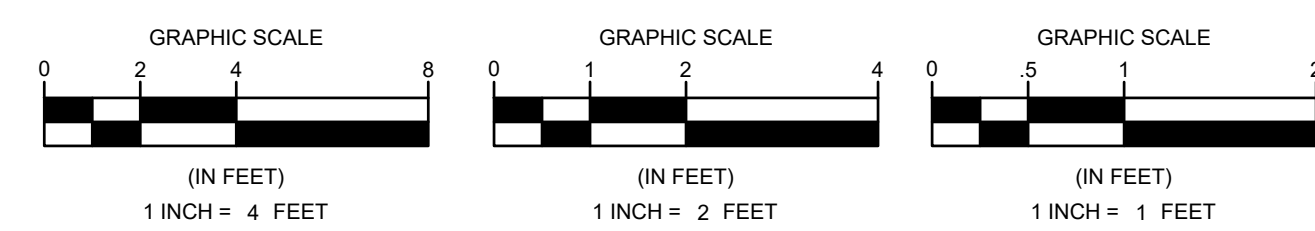
**ELEVATION AT COMMERCIAL OFF-LOADING BERTH**  
 SCALE: 1" = 4'



**ELEVATION**

**GANTRY BEAM DETAIL**  
 SCALE: 1" = 2'

**SECTION**



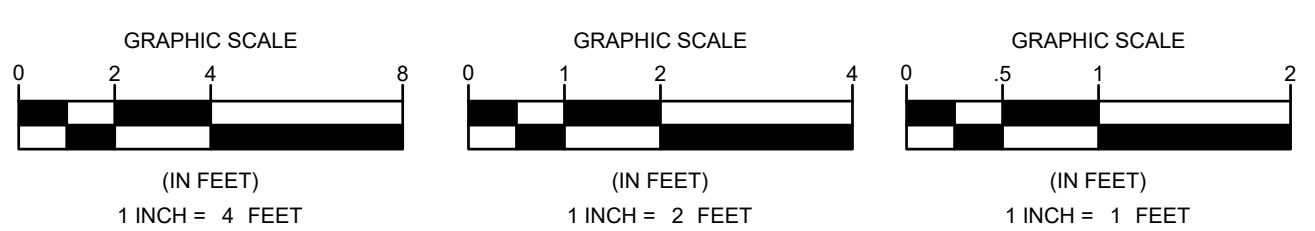
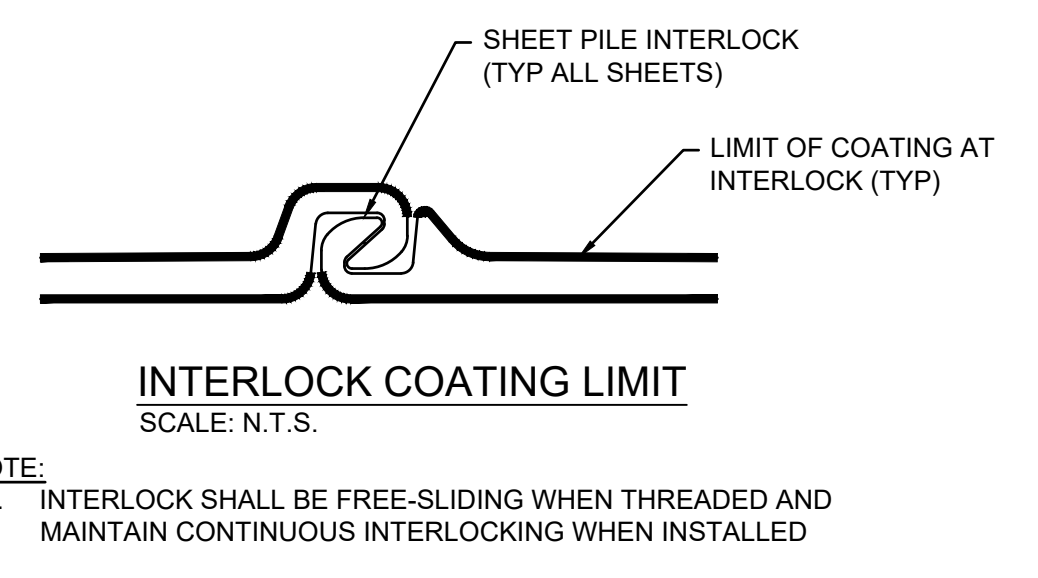
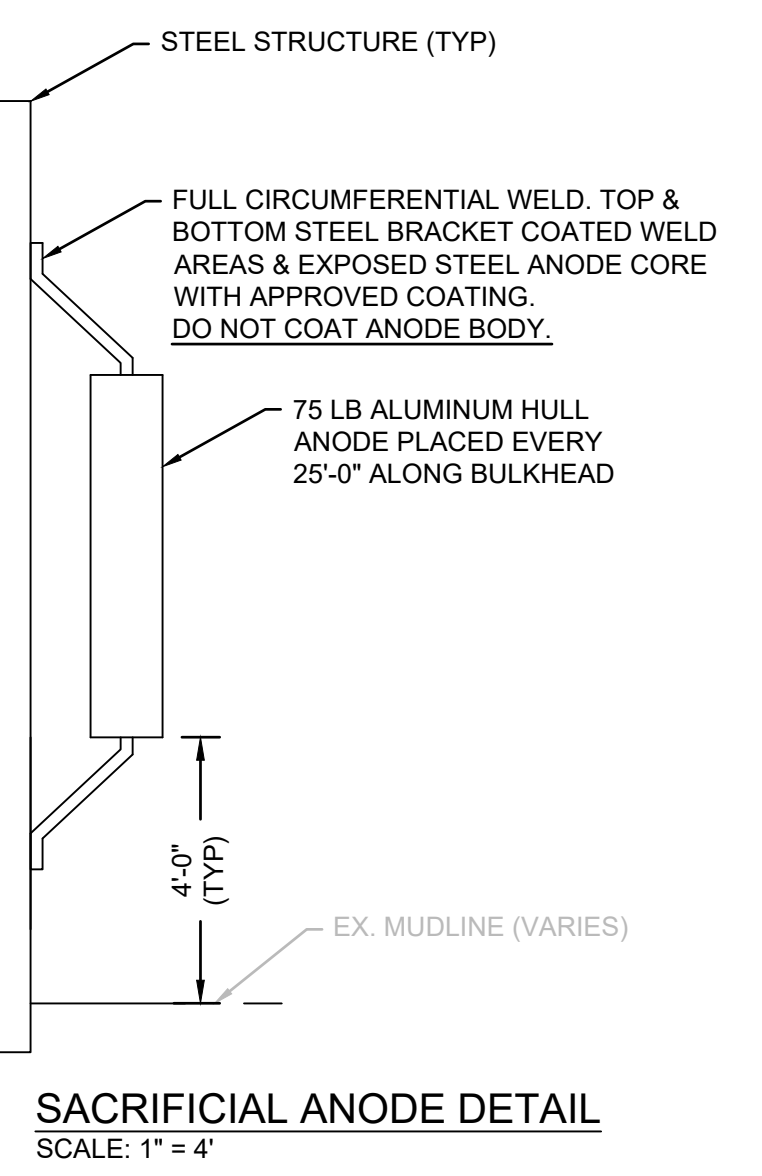
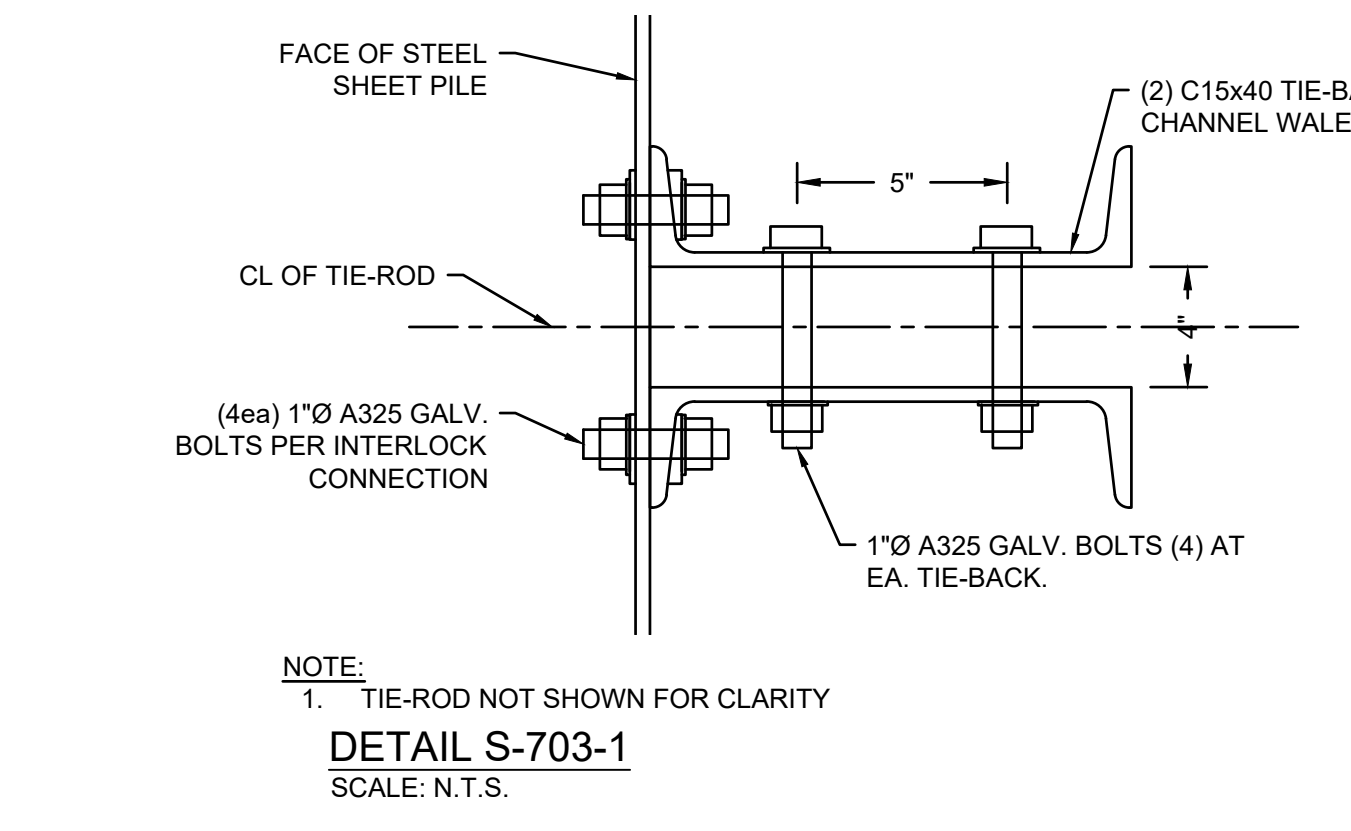
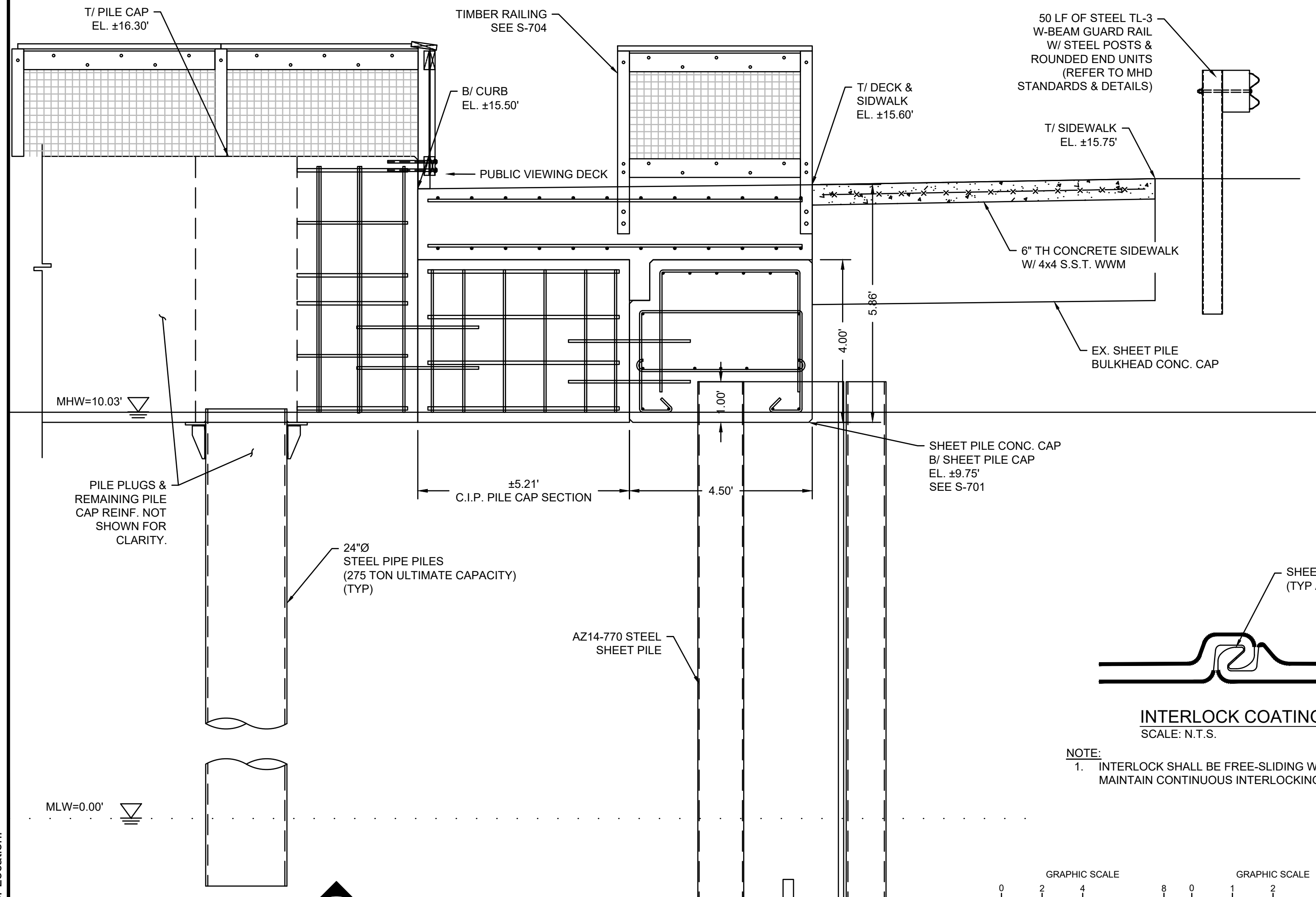
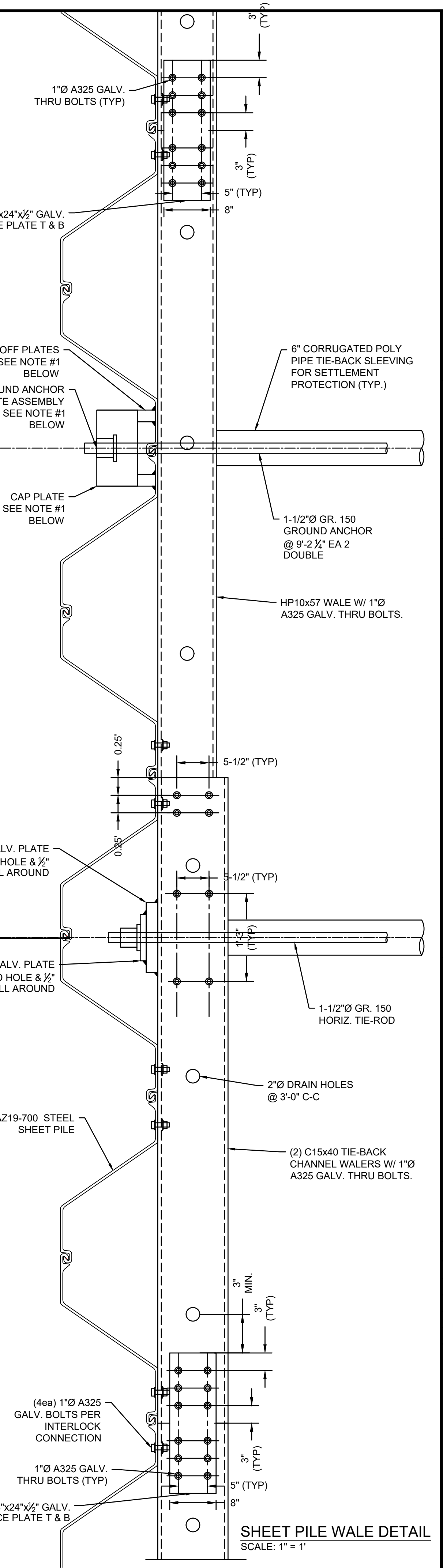
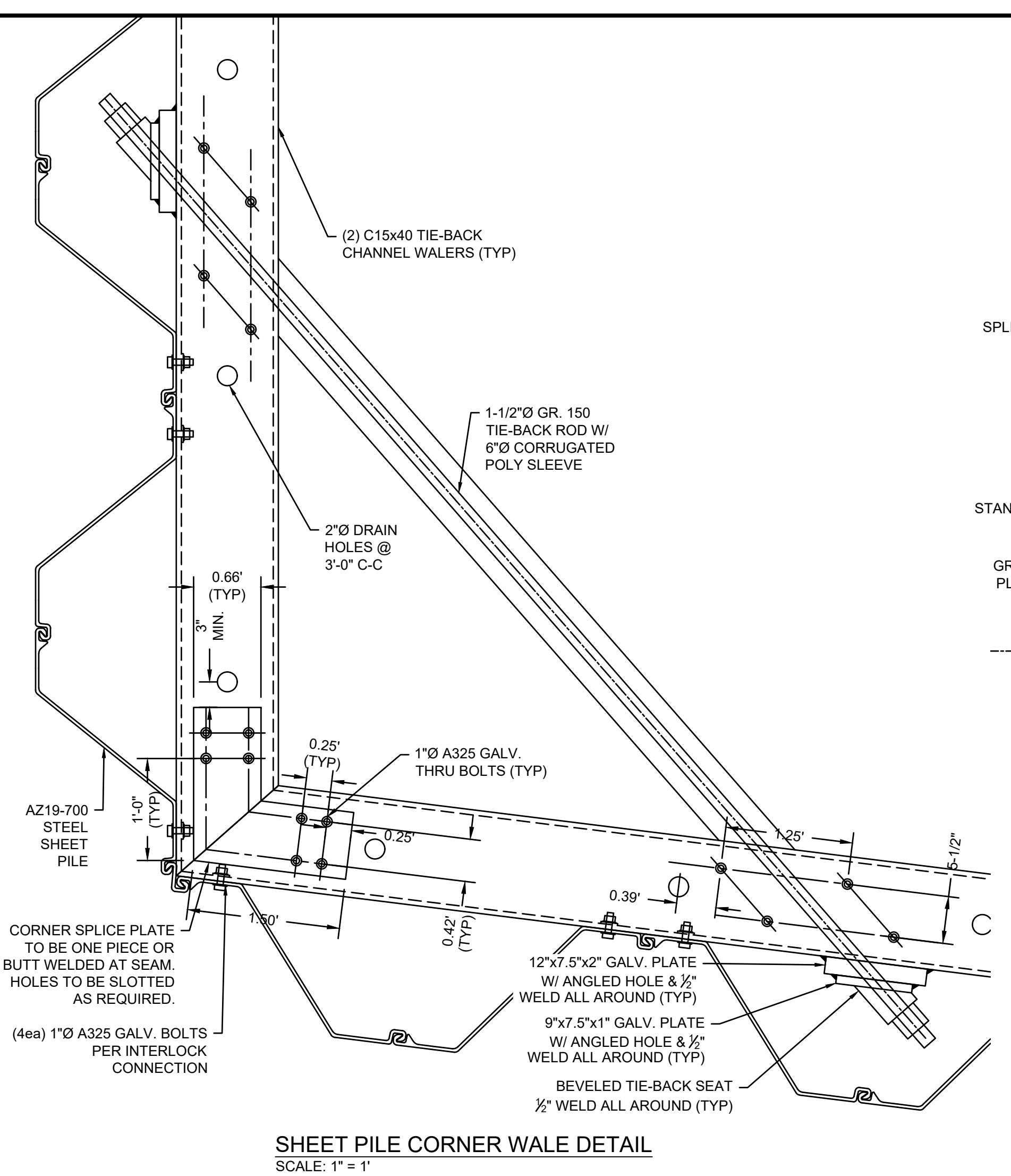
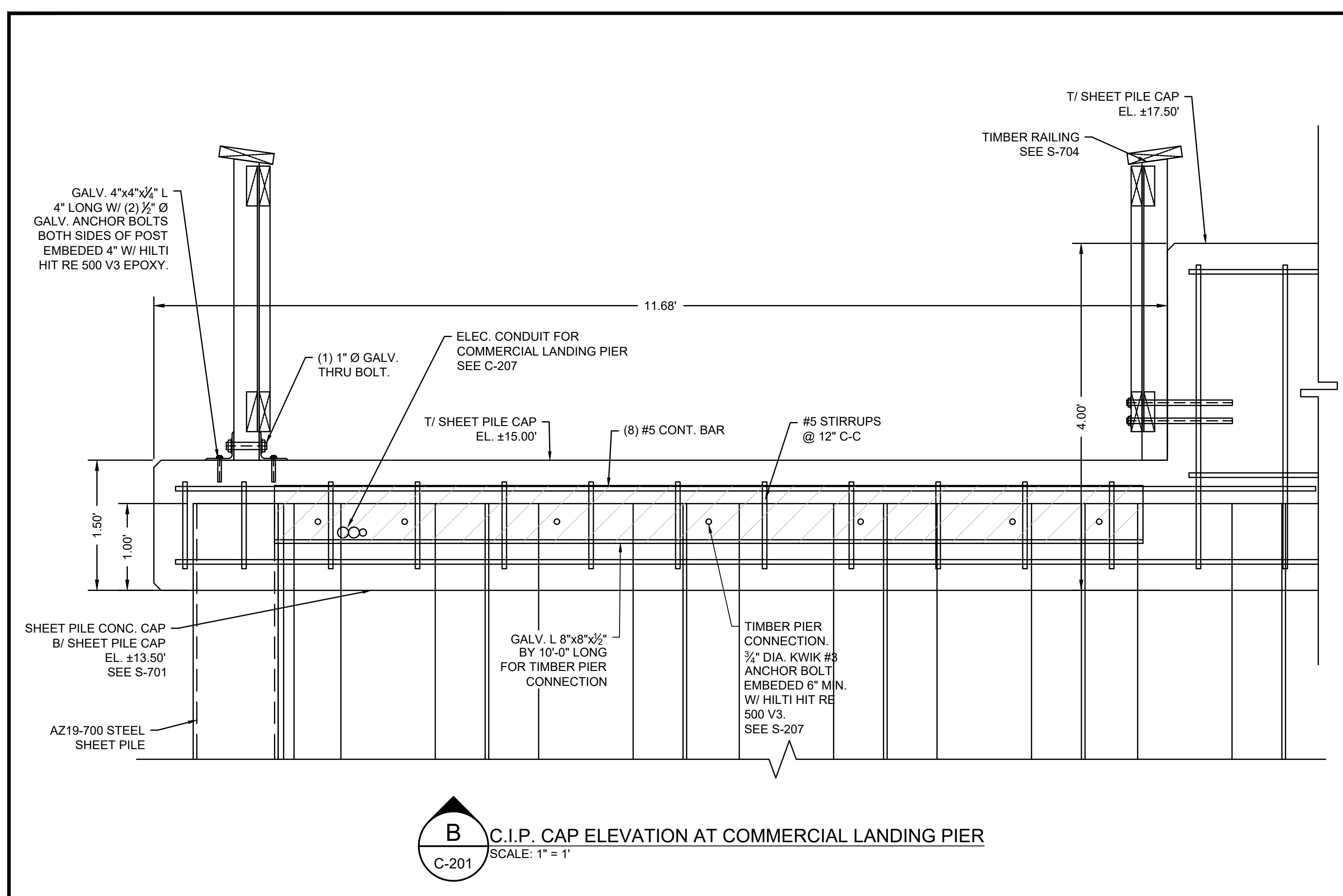
REVISIONS		DESCRIPTION	
NO.	DATE	BY	DATE

DATE OF PREPARATION		
SURVEYED	BY	DATE
MEC/JAH		10/24/19 & 3/2/21
DRAWN	BAM	12/05/2023
DESIGNED	SRS	06/28/2021
CHECKED	PSR	12/24/2023

SHEET TITLE:  
**STRUCTURAL DETAILS 3 OF 8**

ISSUANCE:  
**ISSUED FOR BID**

PROJECT NO: 00190004.10  
SHEET NUMBER  
**S-703**



NOTE:  
1. CONTRACTOR TO DESIGN GROUND ANCHOR ASSEMBLY INCLUDING GROUND ANCHOR, STAND-OFF PLATES AND CAP PLATES. CONTRACTOR SHALL SUBMIT CALCULATIONS AND DRAWINGS FOR GROUND ANCHOR DESIGN, STAMPED BY AN ENGINEER REGISTERED IN THE STATE OF MA. FOR SOILS INFORMATION SEE ATTACHMENT "A" OF THE CONTRACT DOCUMENTS.

**DEPARTMENT OF PUBLIC WORKS  
TOWN OF ORLEANS, MASSACHUSETTS  
ROCK HARBOR COMMERCIAL WHARF  
IMPROVEMENTS**

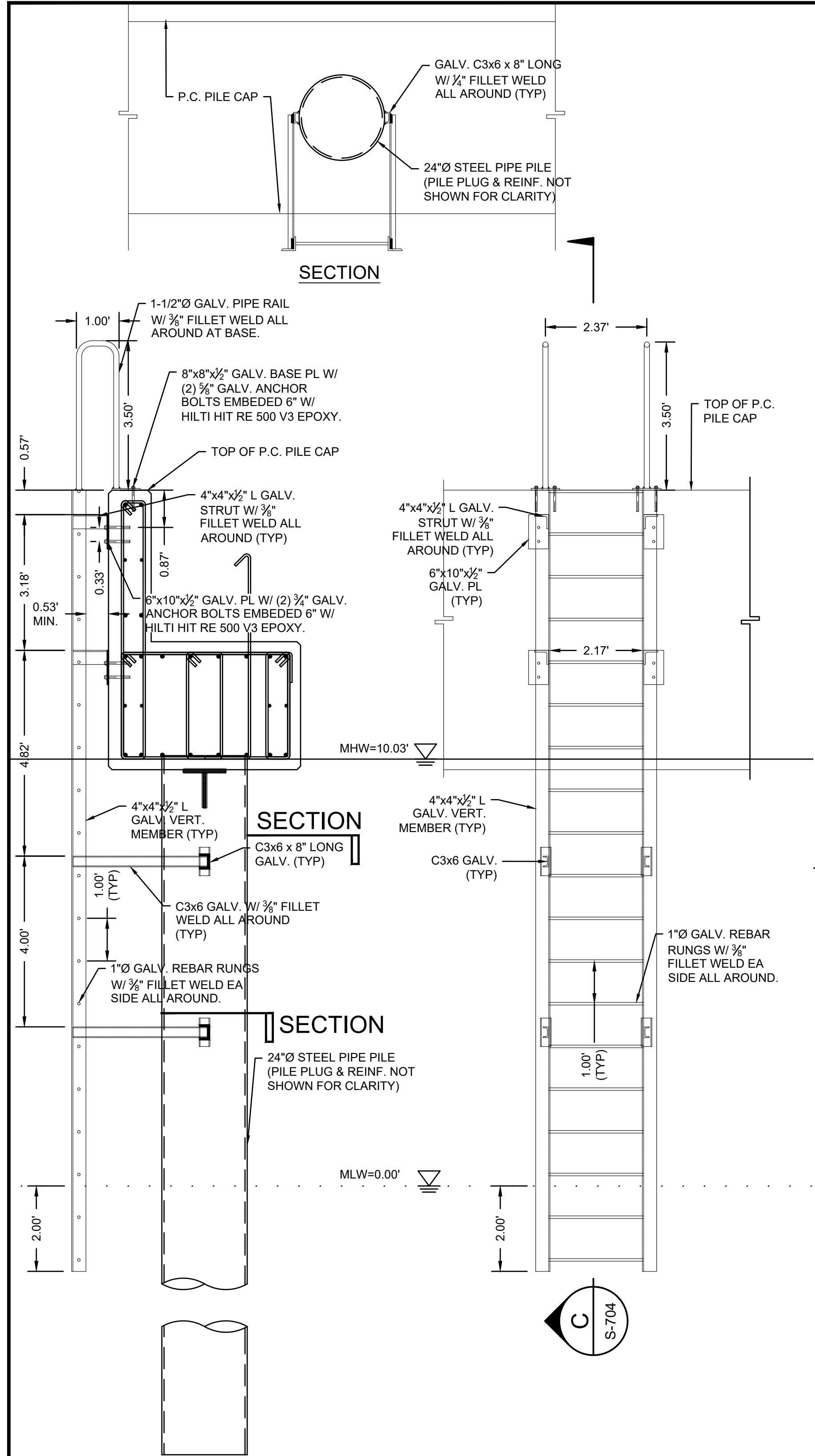
REVISIONS	
NO.	DESCRIPTION

DATE OF PREPARATION	
BY	DATE
SURVEYED	MEC/JAH 10/24/19 & 3/2/21
DRAWN	BAM 12/05/2023
DESIGNED	SRS 06/28/2021
CHECKED	PSR 12/24/2023

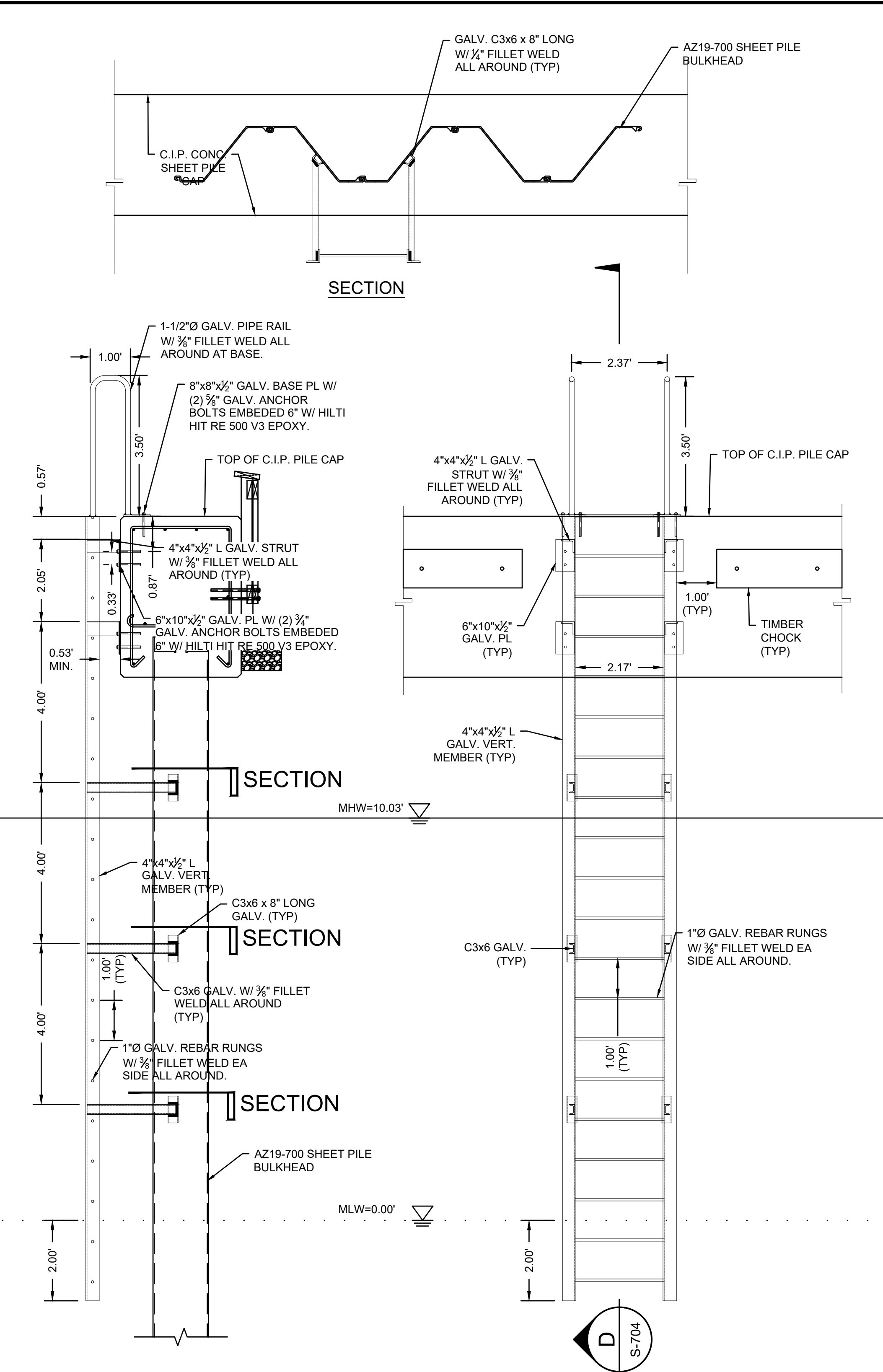
SHEET TITLE:  
**STRUCTURAL  
DETAILS 4 OF 8**

ISSUANCE:  
**ISSUED FOR BID**

PROJECT NO: 00190004.10  
SHEET NUMBER  
**S-704**

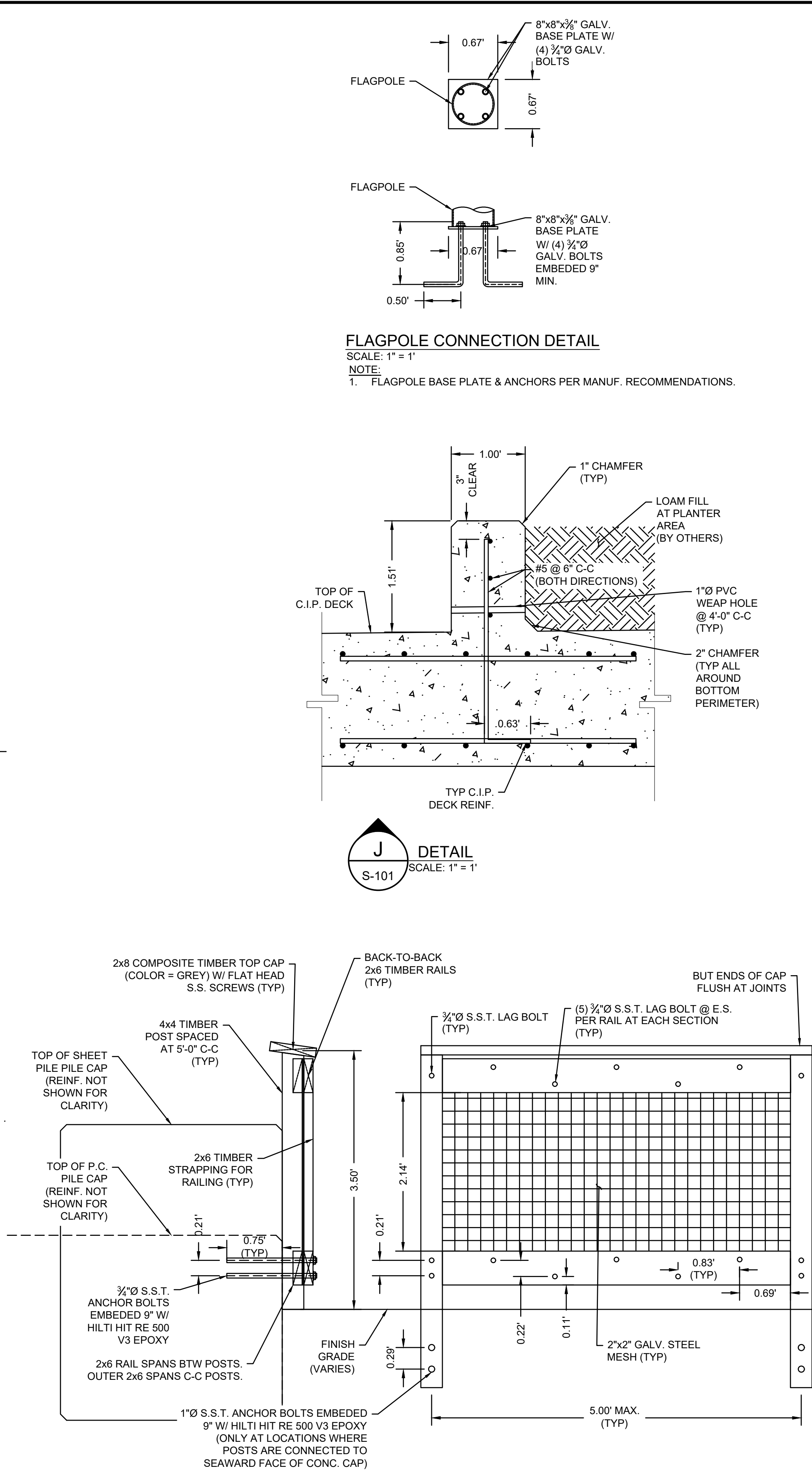


**C EMERGENCY LADDER  
PILE CONNECTION SECTION**  
SCALE: 1" = 2"



**D EMERGENCY LADDER  
SHEET PILE CONNECTION SECTION**  
SCALE: 1" = 2"

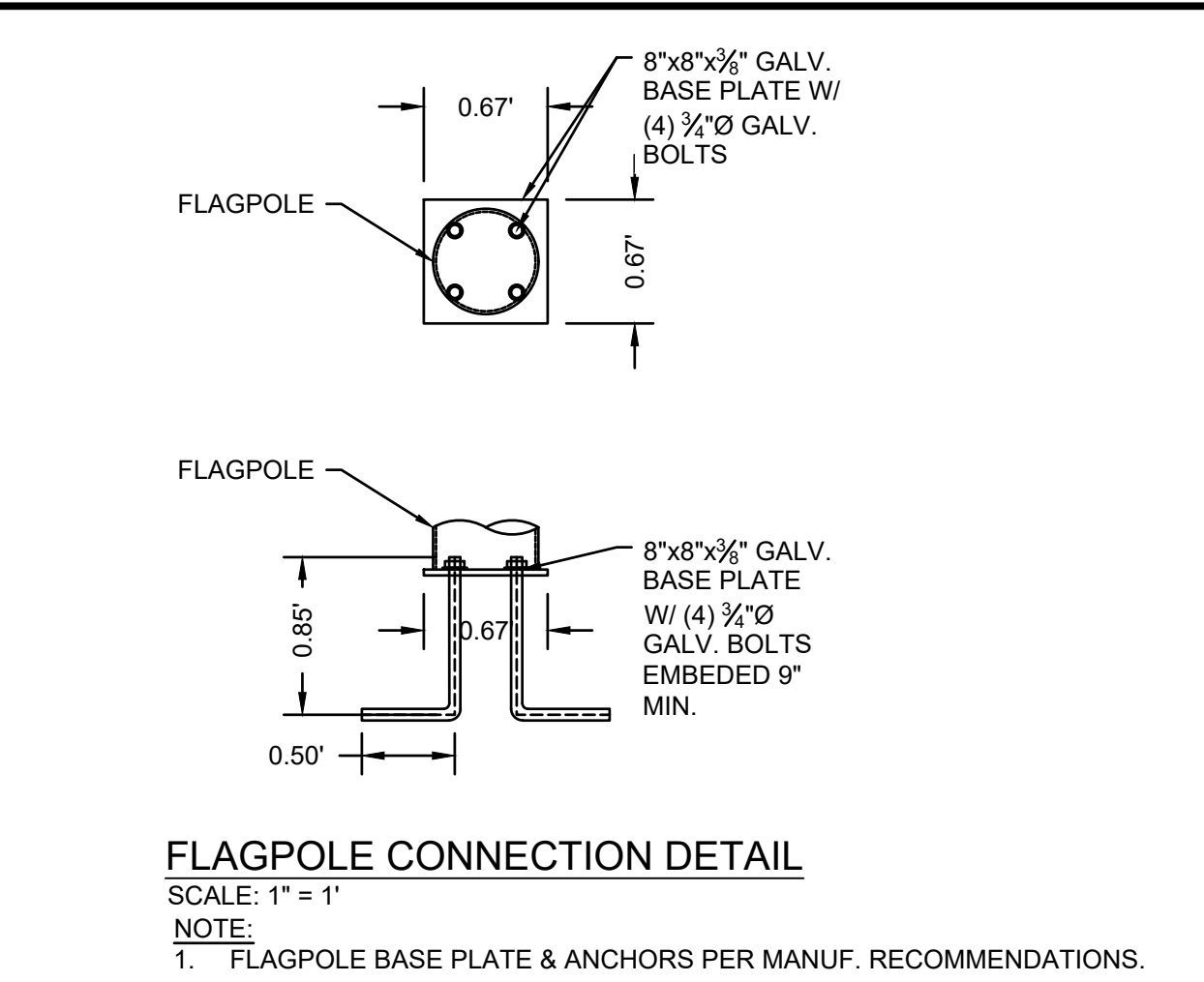
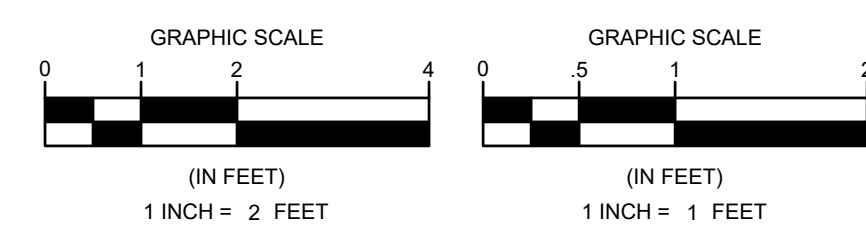
NOTE:  
1. GROUND ANCHOR, BULKHEAD  
WALER, TIMBER FENDER WALER &  
CHOCK NOT SHOWN FOR CLARITY.



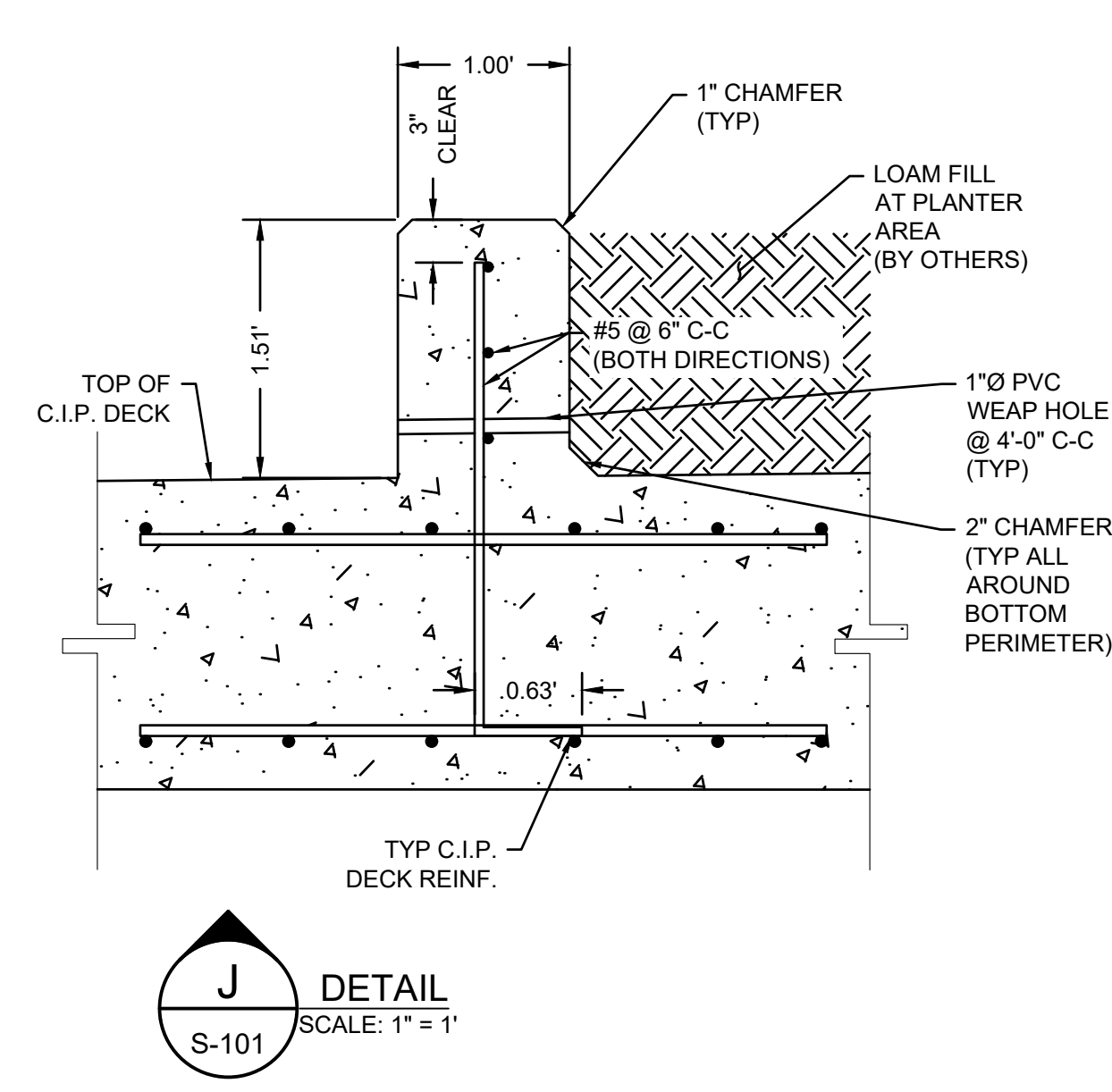
**B EMERGENCY LADDER  
SHEET PILE CONNECTION SECTION**  
SCALE: 1" = 2"

**TIMBER RAILING DETAIL**  
SCALE: 1" = 1"

NOTE:  
1. CONTRACTOR TO MATCH EXISTING COMPOSITE TOP CAP & TIMBER RAILING DESIGN LOCATED ALONG  
BAY VIEW DRIVE, ORLEANS, MA.



**FLAGPOLE CONNECTION DETAIL**  
SCALE: 1" = 1"  
NOTE:  
1. FLAGPOLE BASE PLATE & ANCHORS PER MANUF. RECOMMENDATIONS.



**J DETAIL**  
SCALE: 1" = 1"

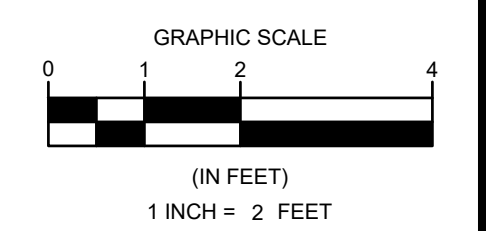
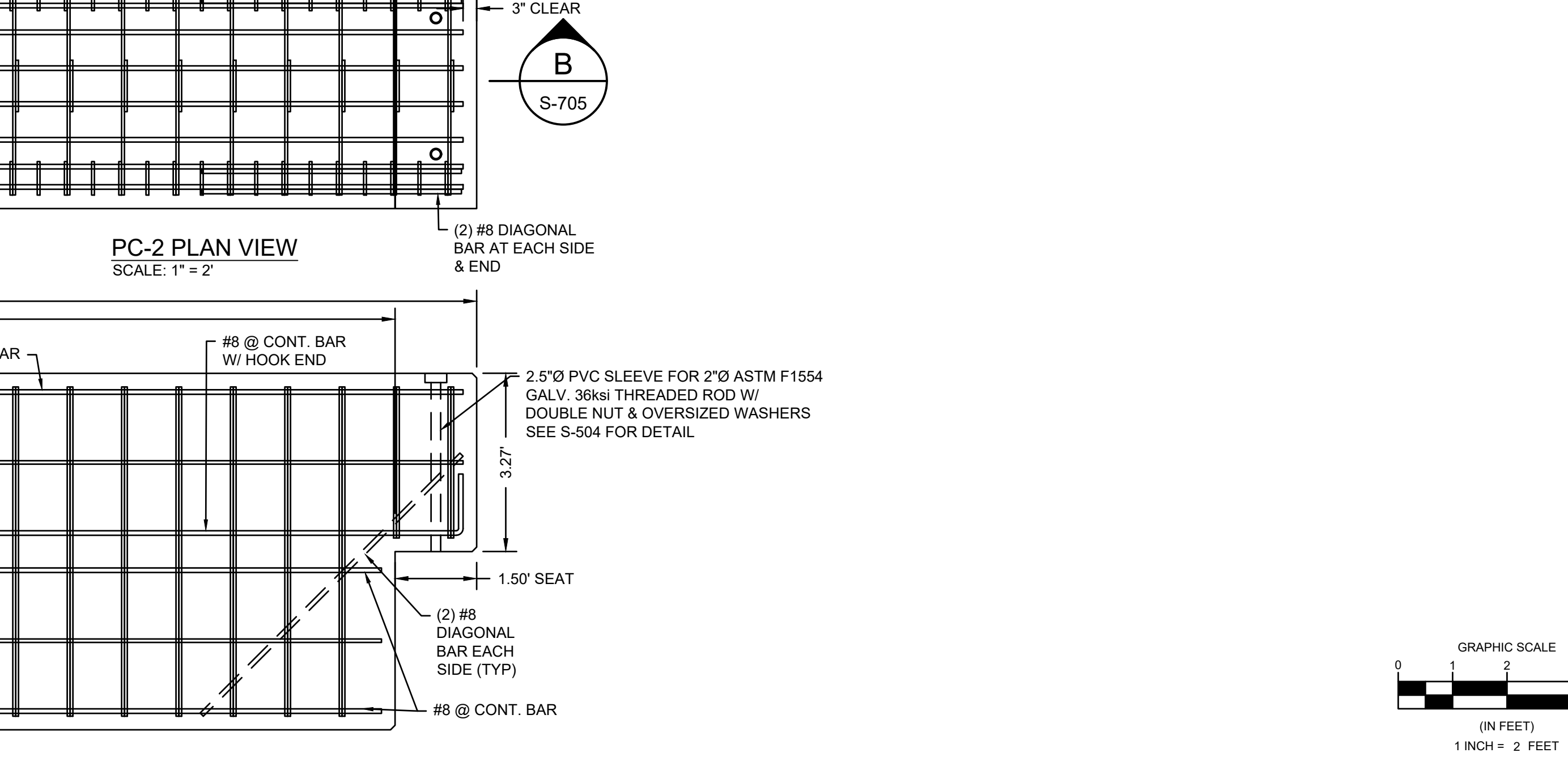
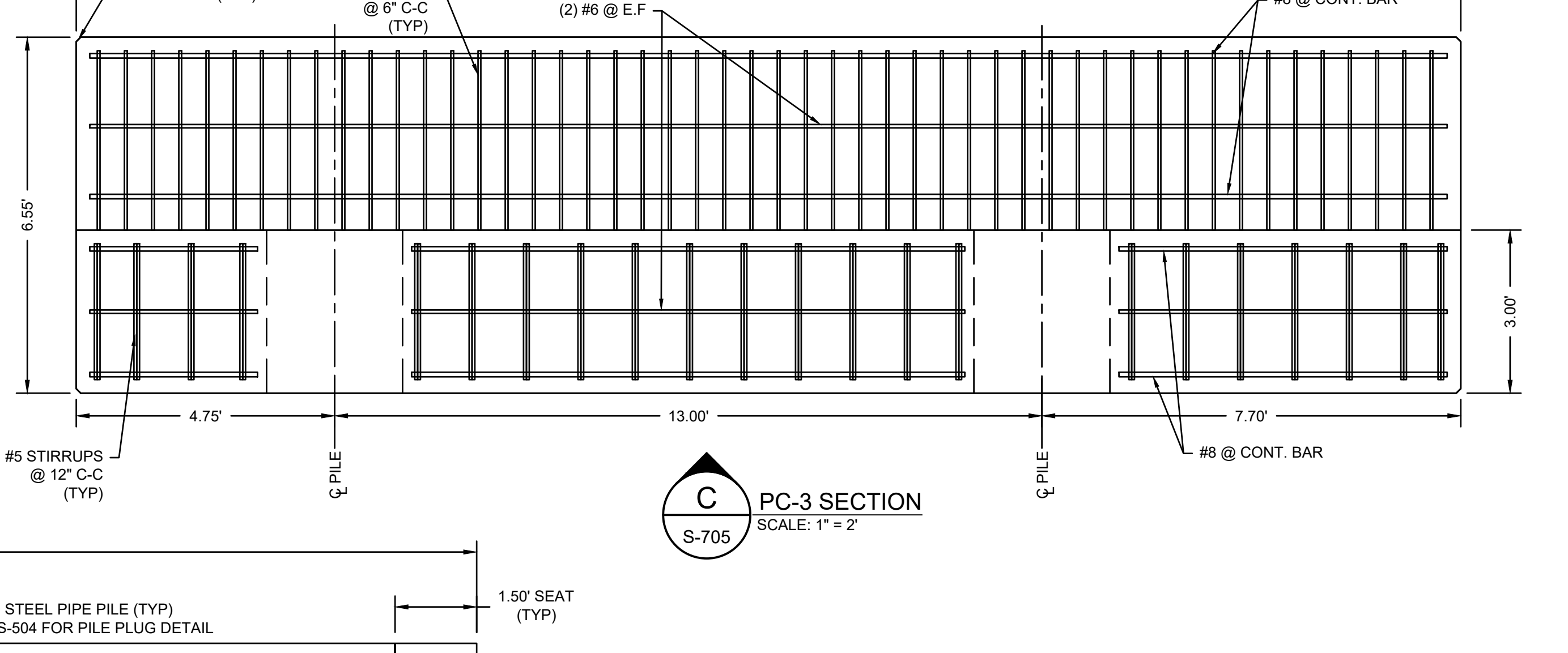
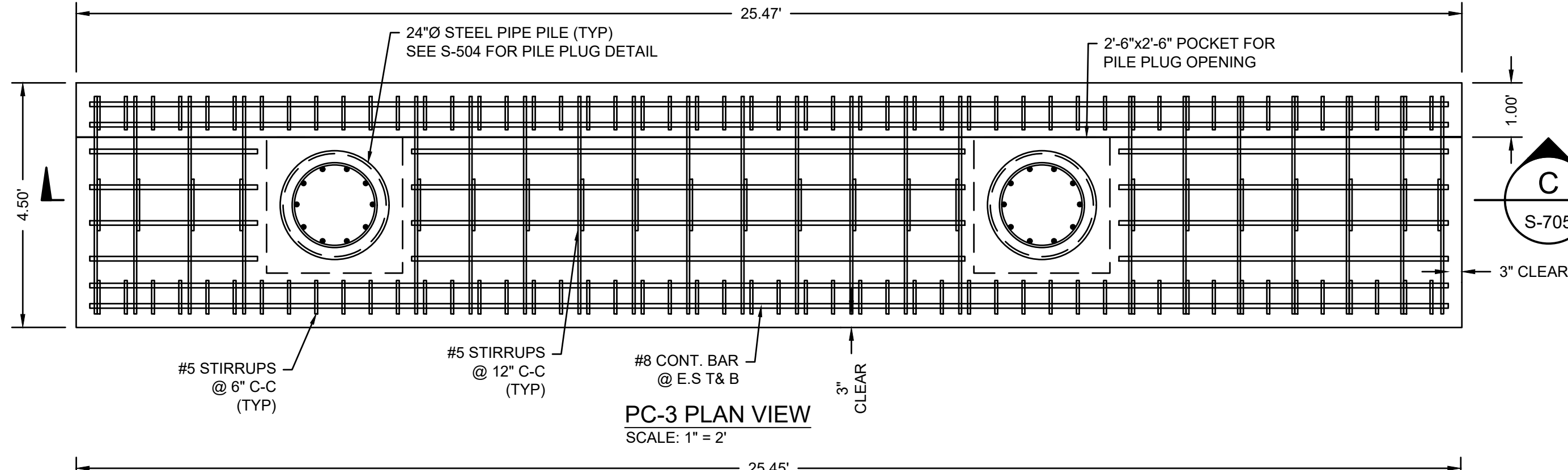
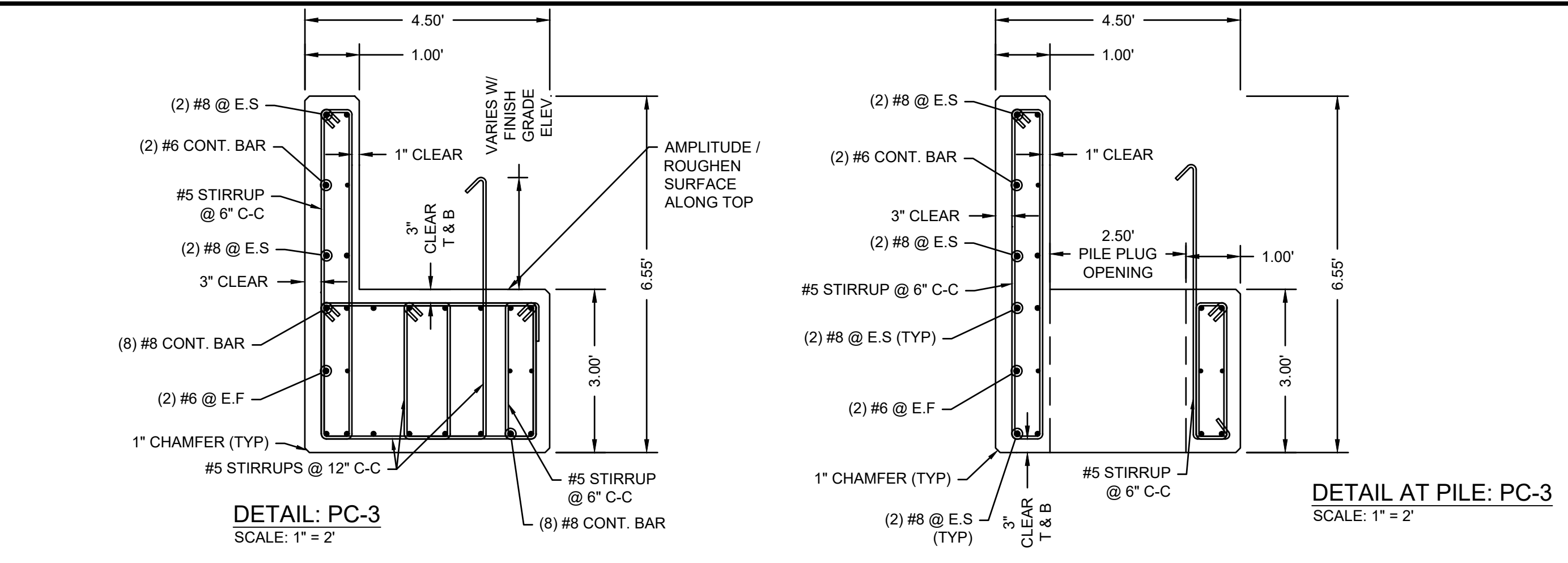
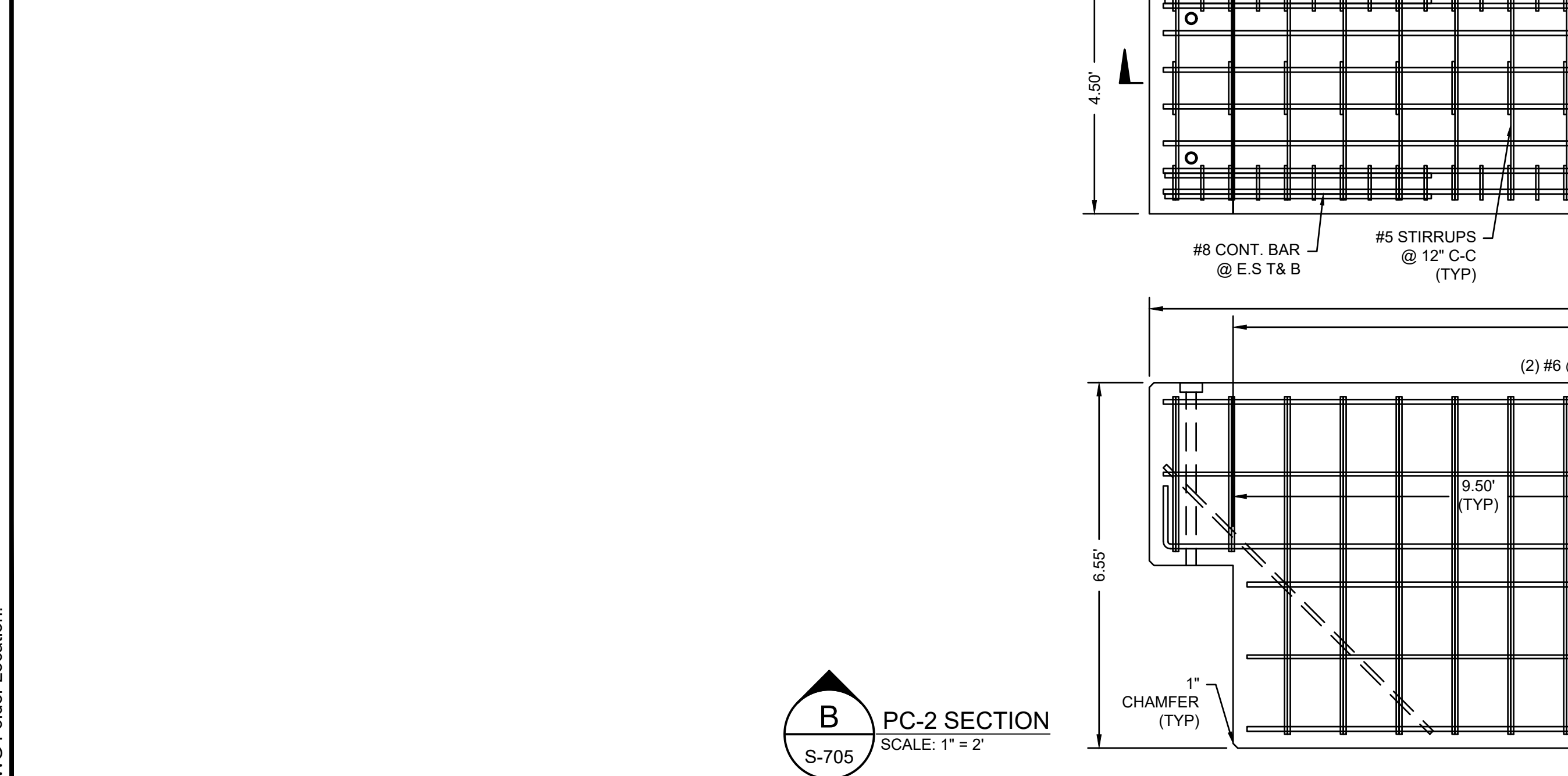
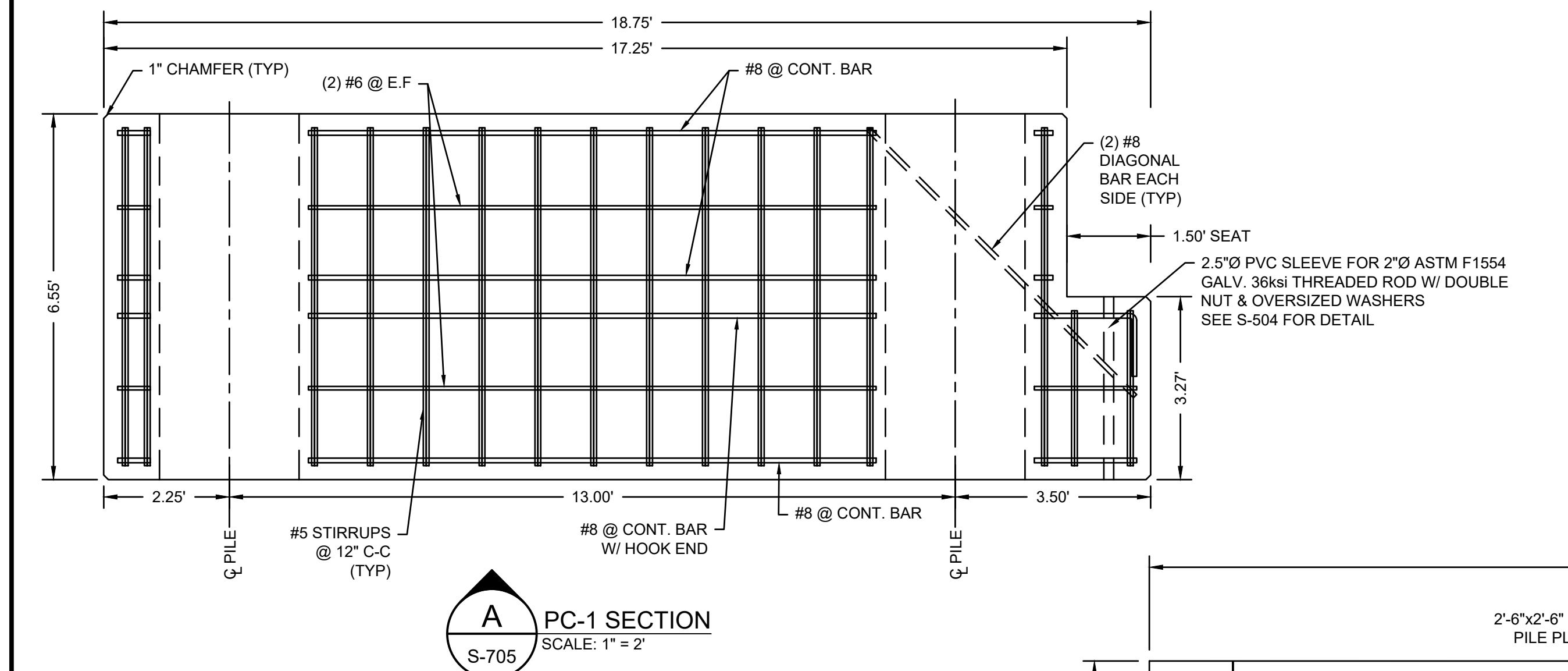
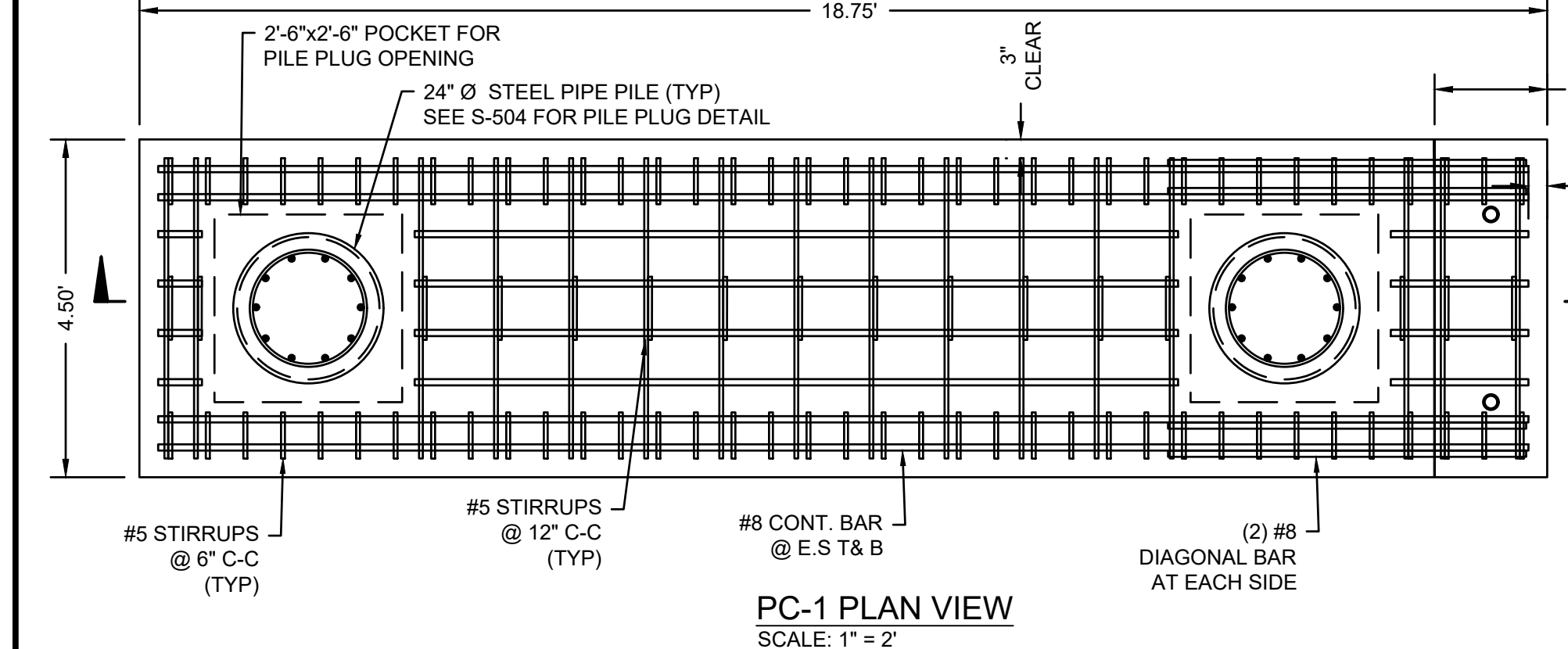
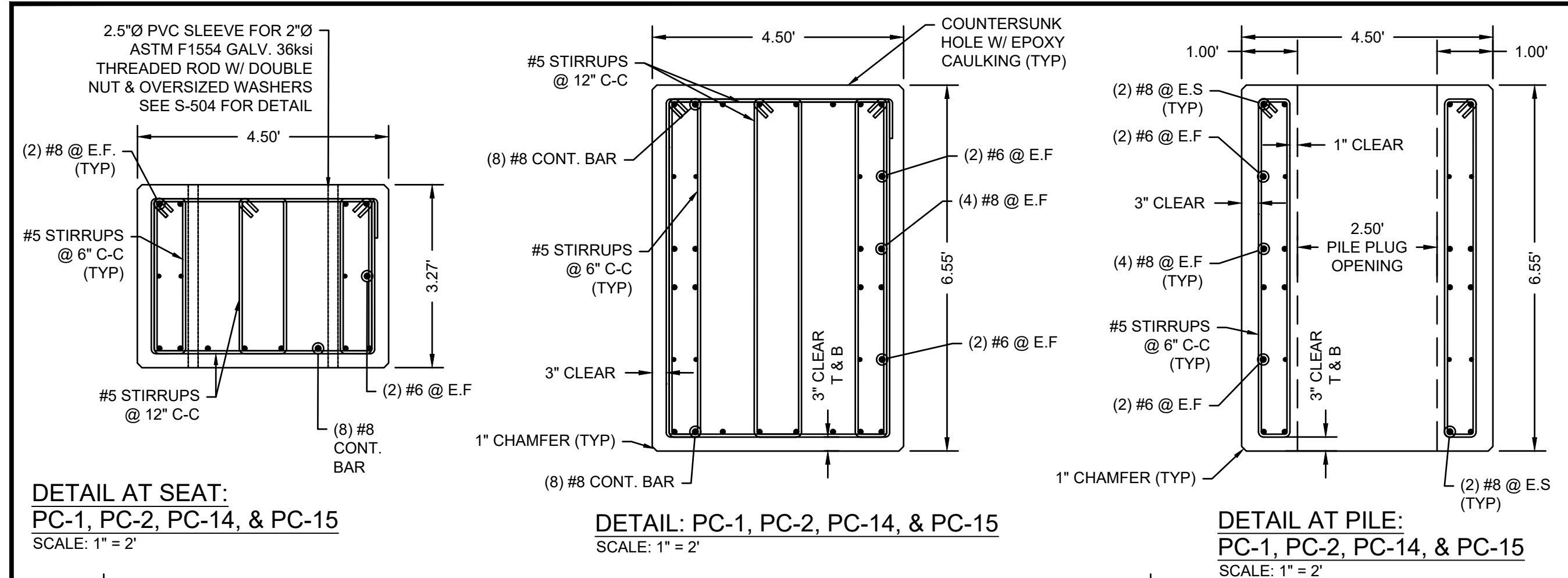
NO.	BY	DATE	DESCRIPTION

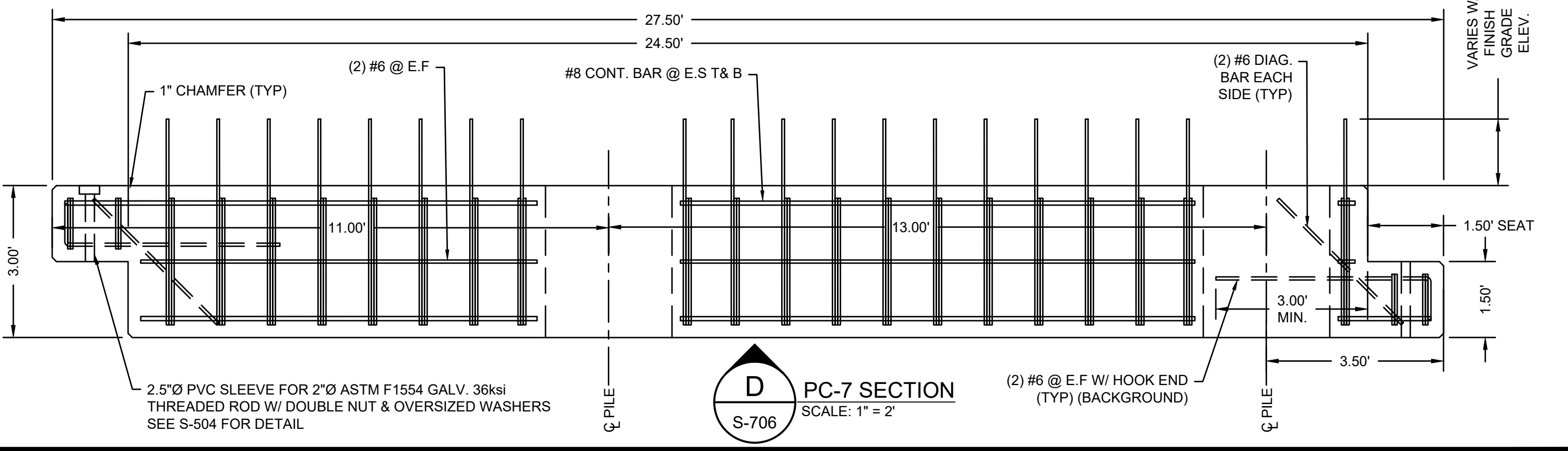
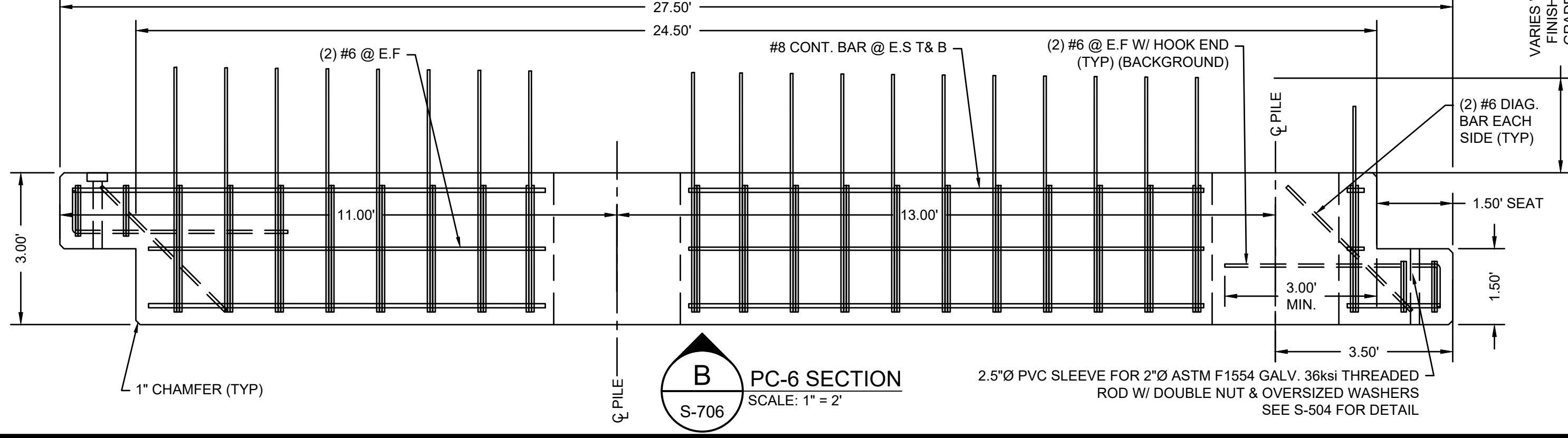
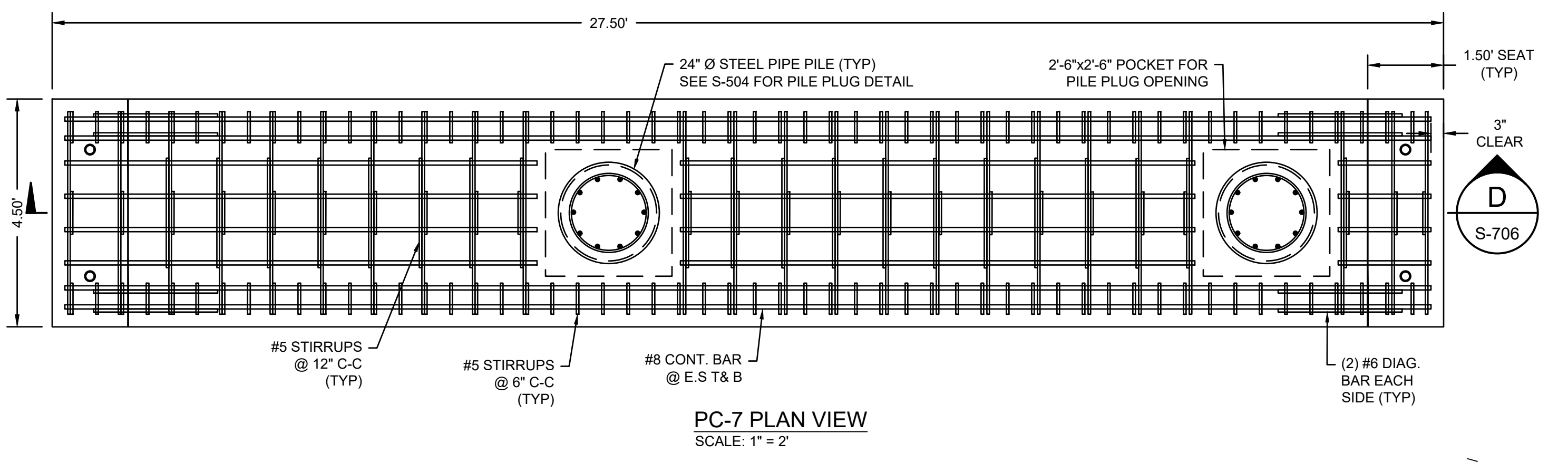
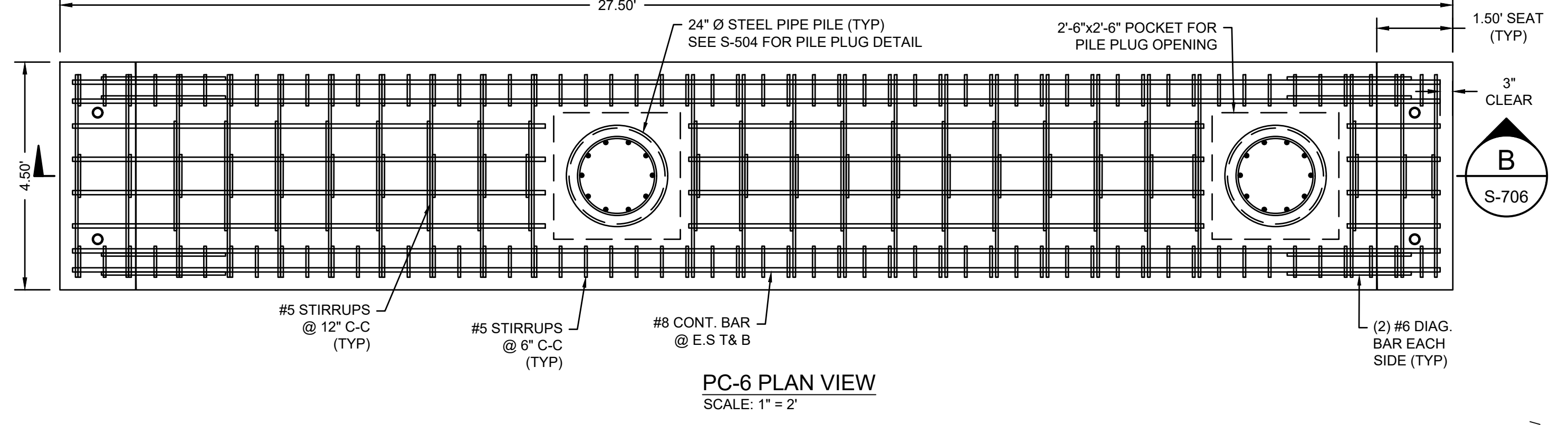
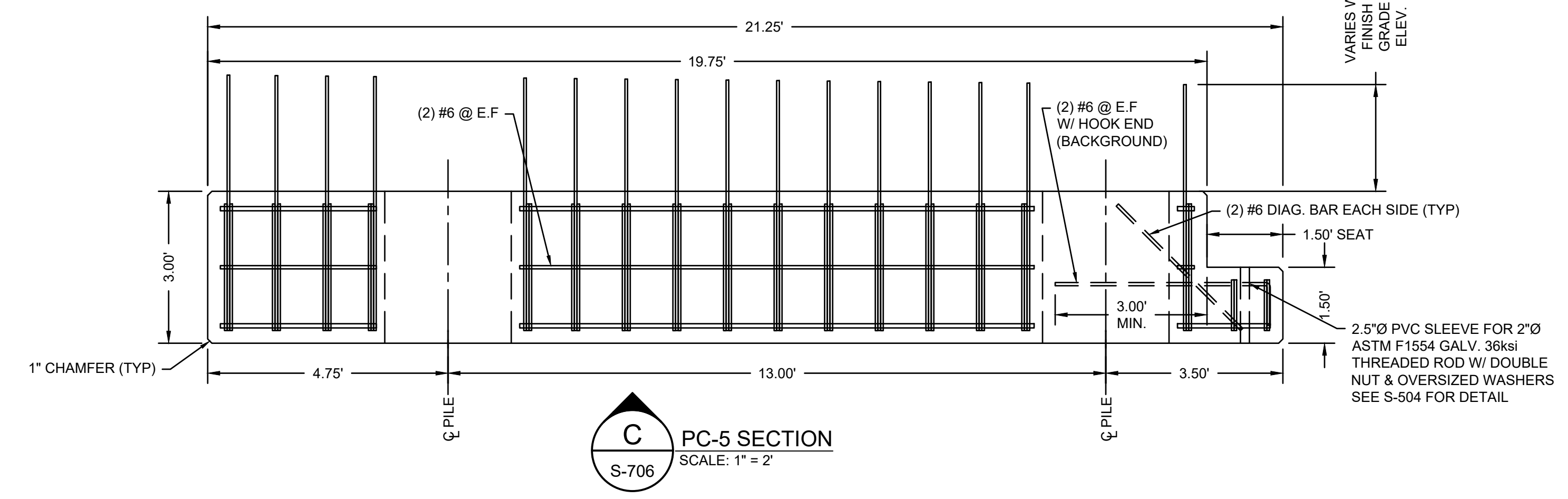
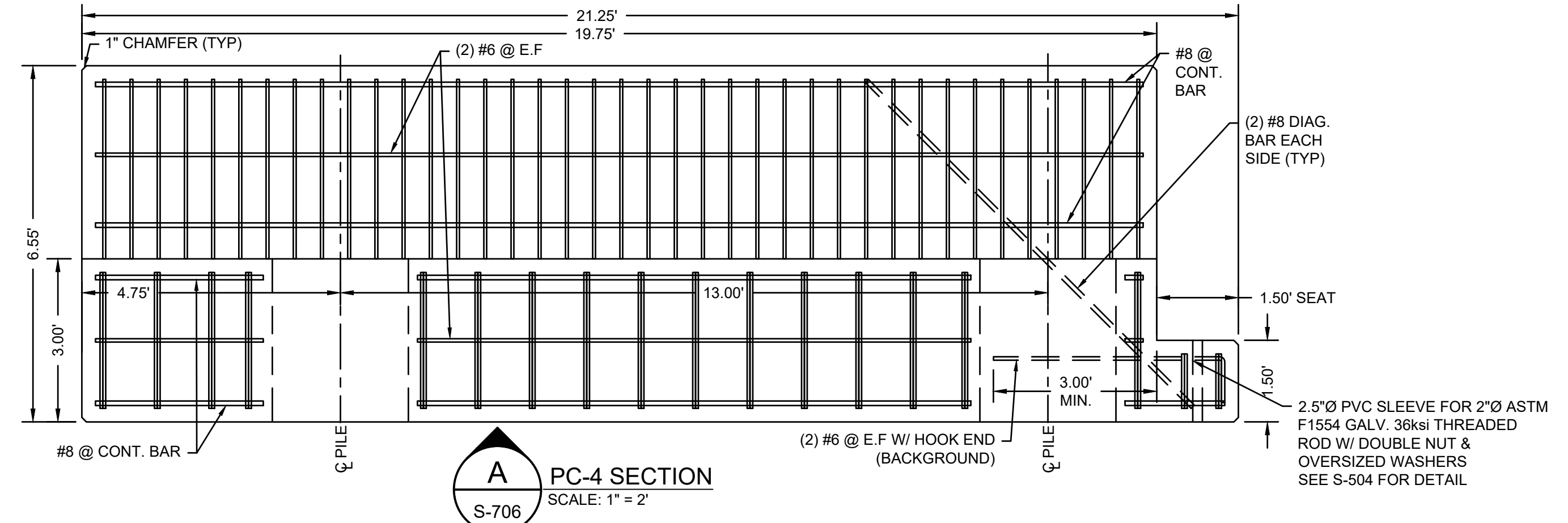
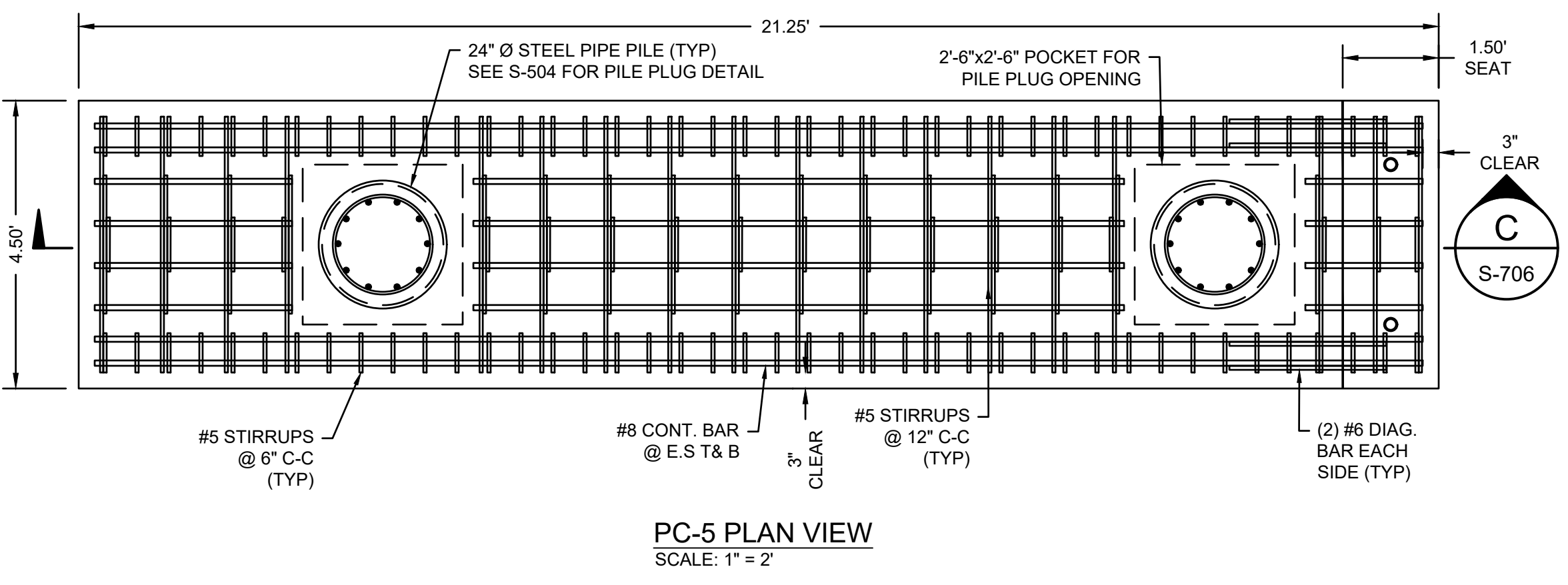
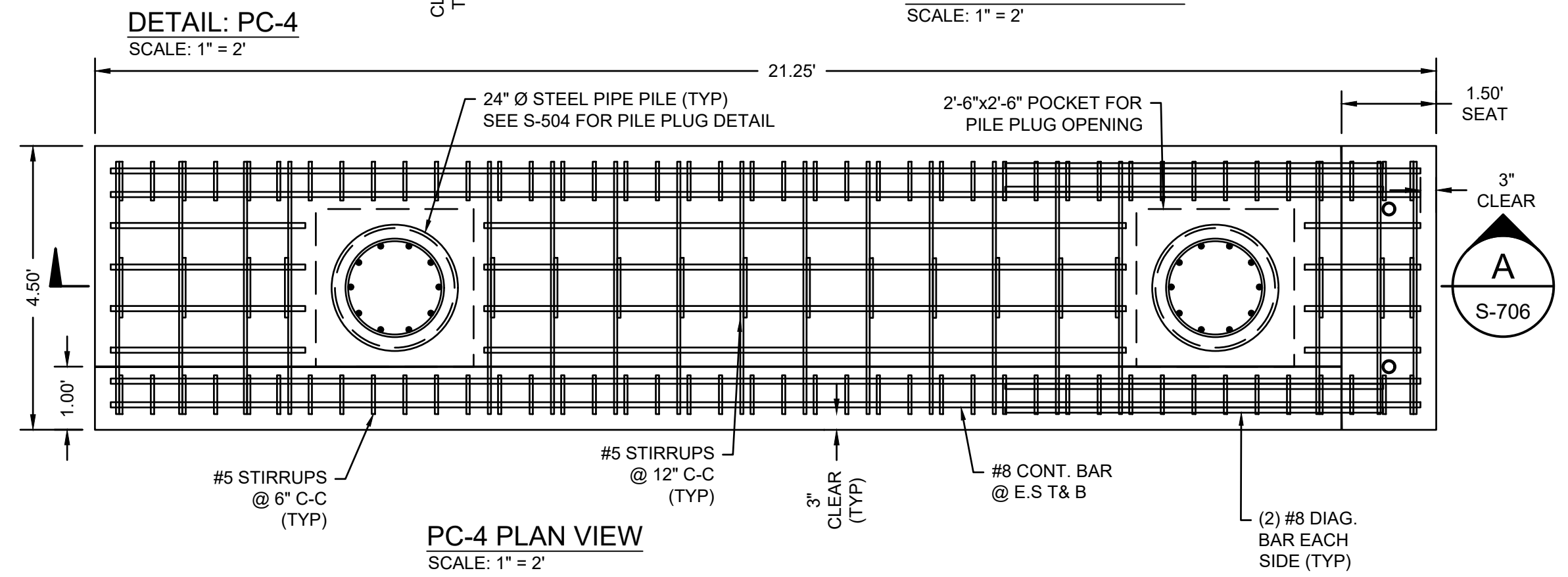
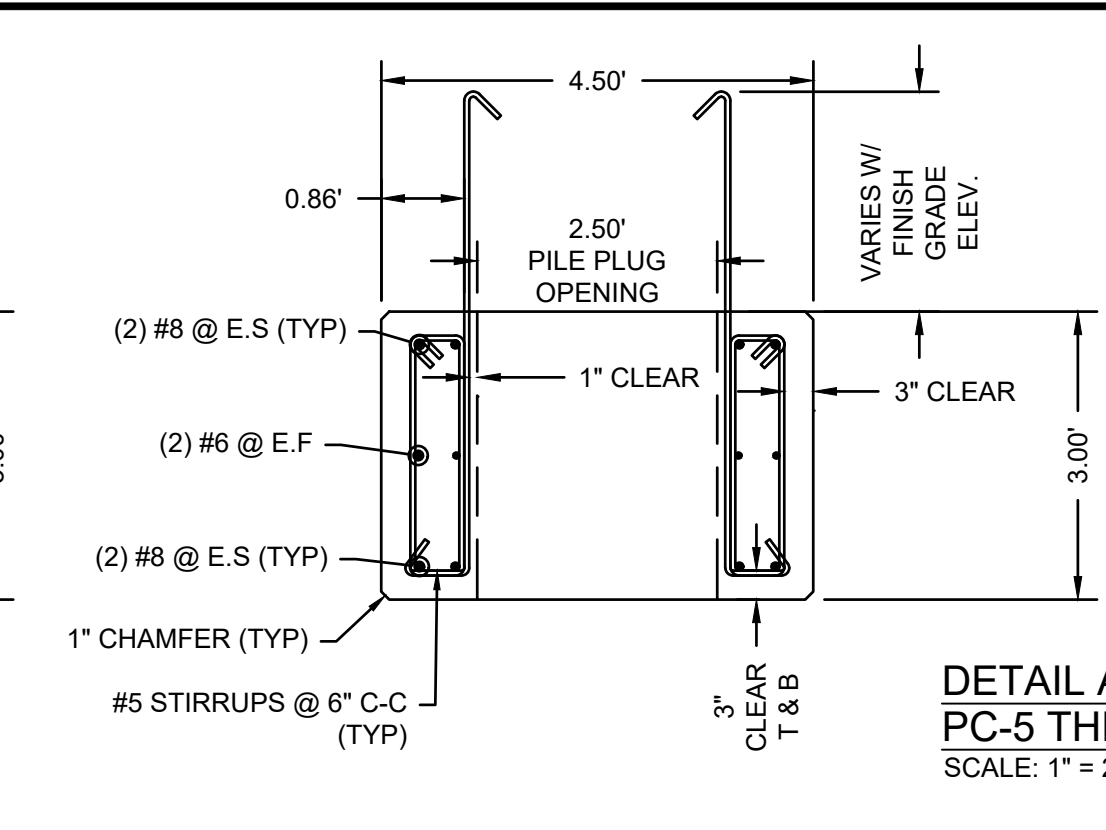
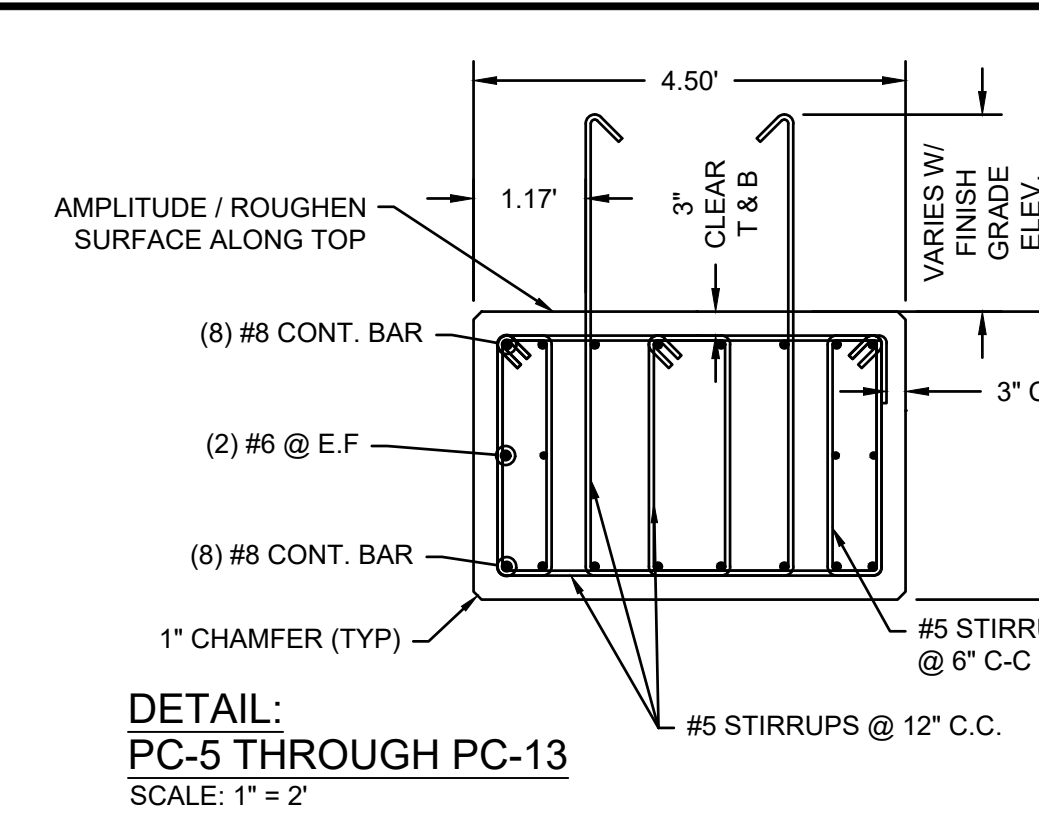
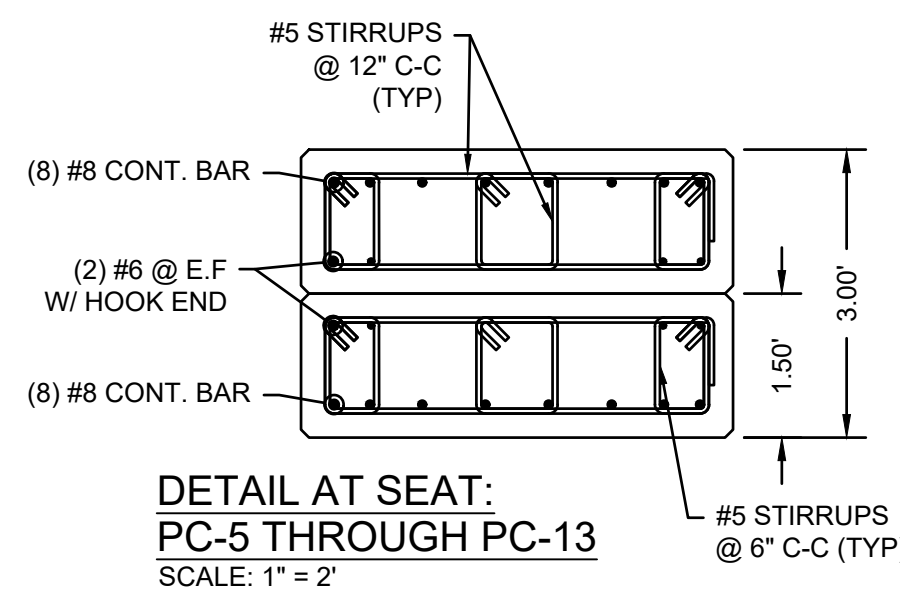
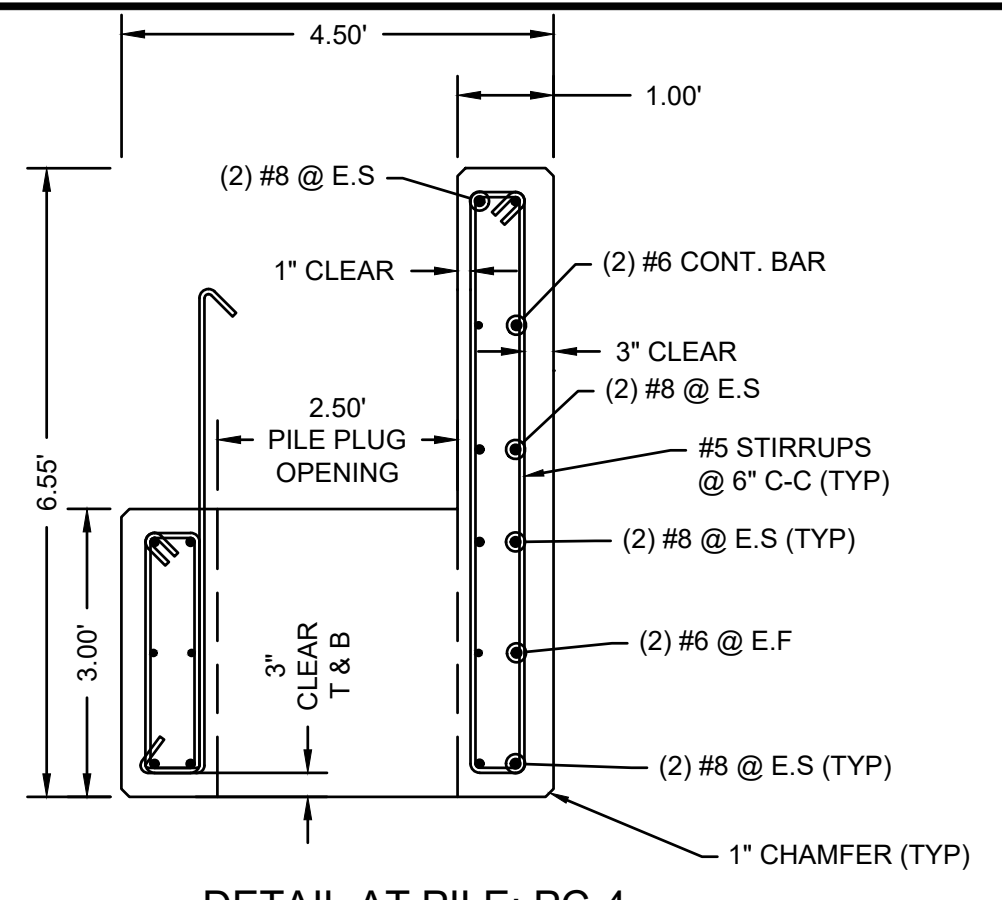
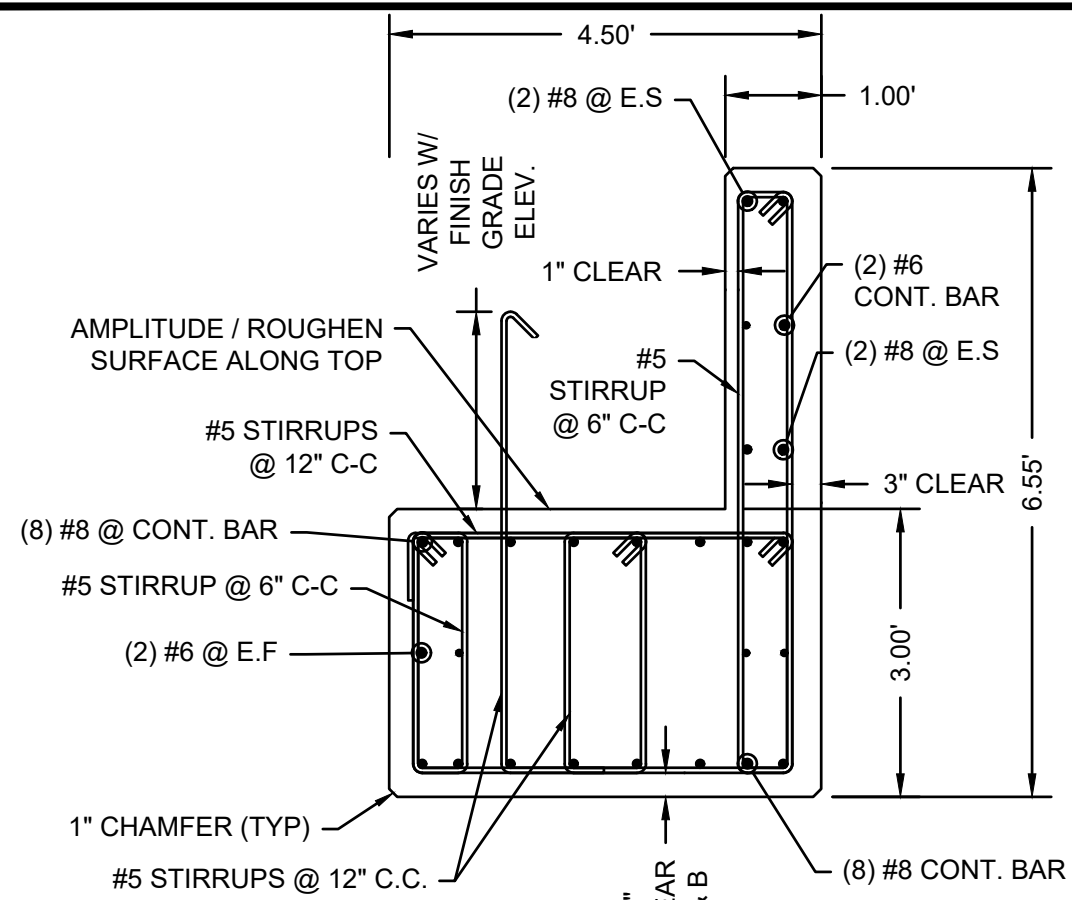
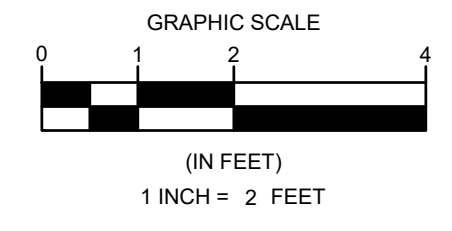
DATE OF PREPARATION	
BY	DATE
SURVEYED	MEC/JAH 10/24/19 & 3/22/21
DRAWN	BAM 12/05/2023
DESIGNED	SRS 06/28/2021
CHECKED	PSR 12/24/2023

SHEET TITLE:  
**STRUCTURAL DETAILS 5 OF 8**

ISSUANCE:  
**ISSUED FOR BID**

PROJECT NO: 00190004.10  
 SHEET NUMBER  
**S-705**





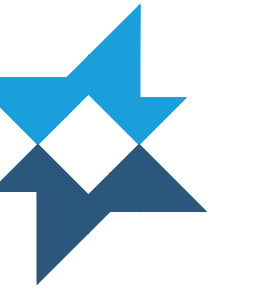
NO.	BY	DATE	DESCRIPTION

DATE OF PREPARATION	
BY	DATE
MEC/JAH	10/24/19 & 3/2/21
BAM	12/05/2023
SRS	06/28/2021
PSR	12/24/2023

SHEET TITLE:  
**STRUCTURAL DETAILS 6 OF 8**

ISSUANCE:  
**ISSUED FOR BID**

PROJECT NO: 00190004.10  
 SHEET NUMBER  
**S-706**

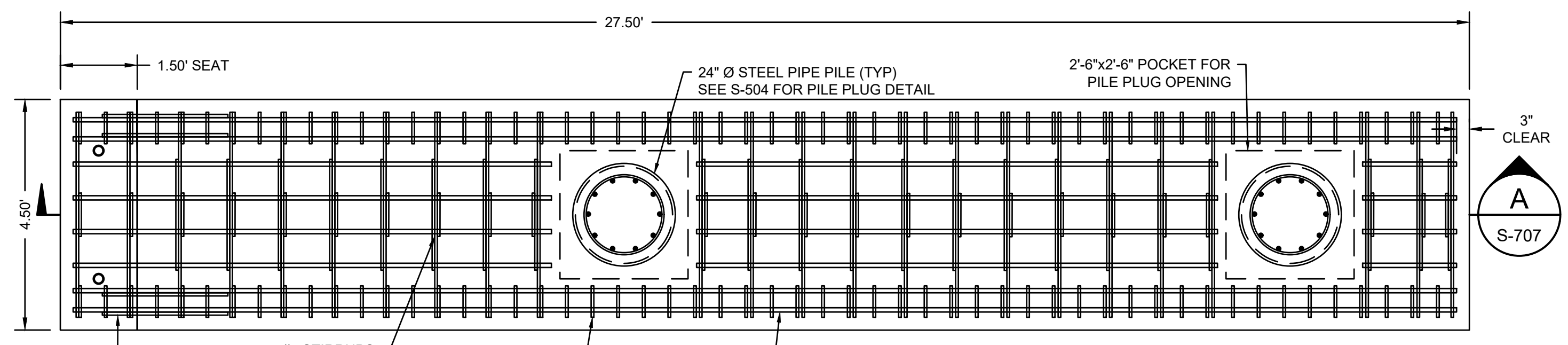


DEPARTMENT OF PUBLIC WORKS  
TOWN OF ORLEANS, MASSACHUSETTS  
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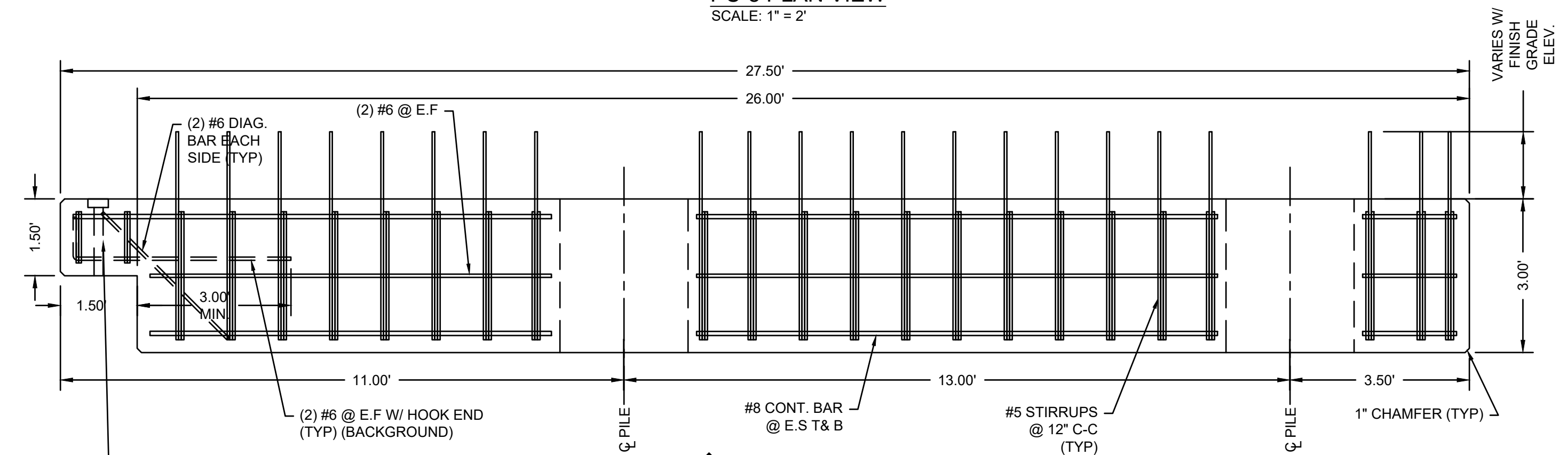
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DATE OF PREPARATION		
SURVEYED	BY	DATE
MEC/JAH		10/24/19 & 3/2/21
DRAWN	BAM	12/05/2023
DESIGNED	SRS	06/28/2021
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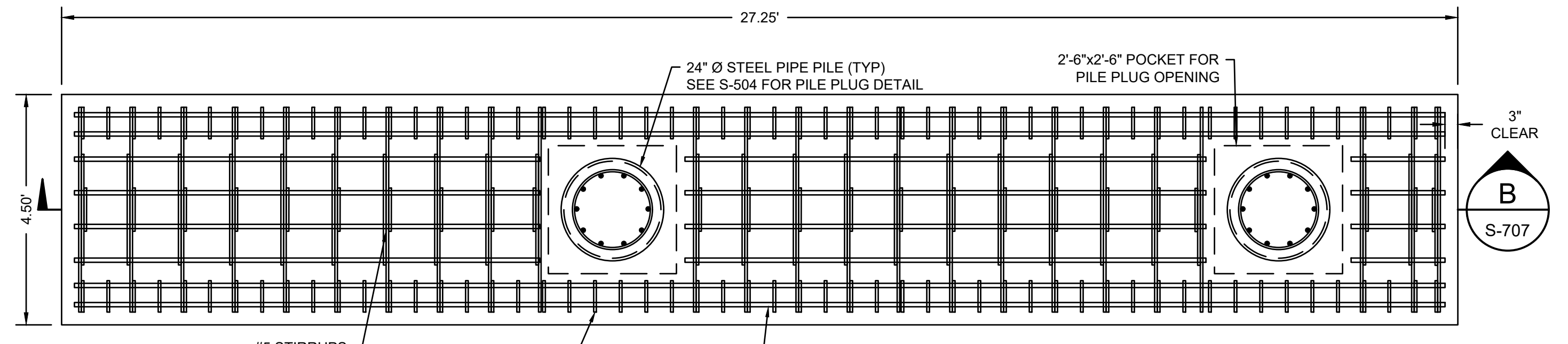
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**STRUCTURAL DETAILS 7 OF 8**  
ISSUANCE:  
**ISSUED FOR BID**  
PROJECT NO: 00190004.10  
SHEET NUMBER  
**S-707**



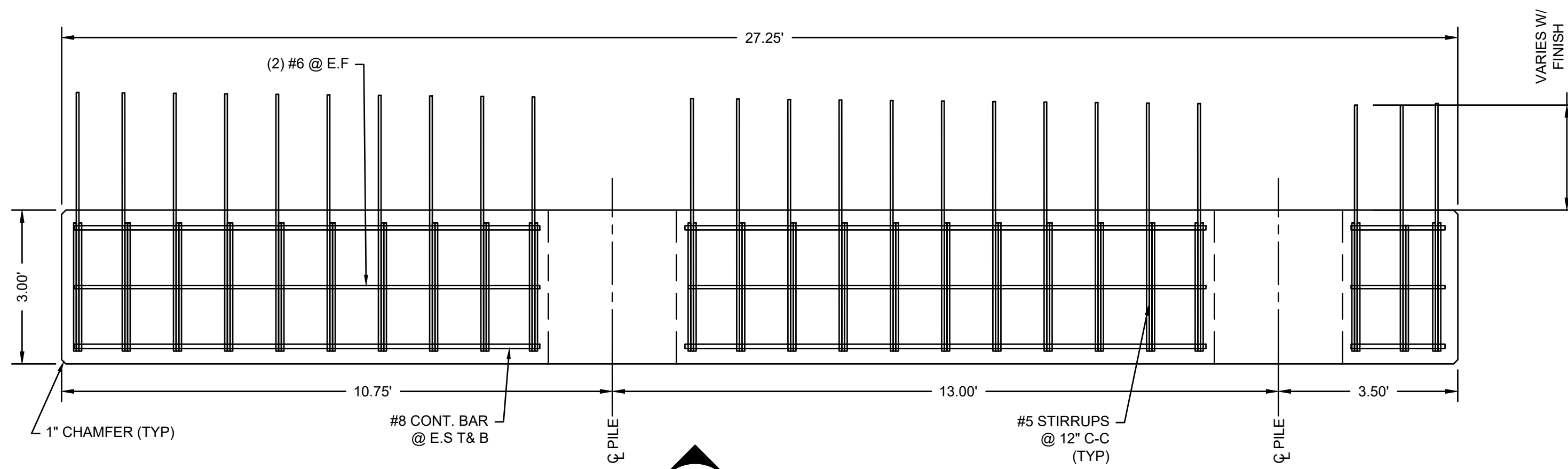
**PC-8 PLAN VIEW**  
SCALE: 1" = 2'



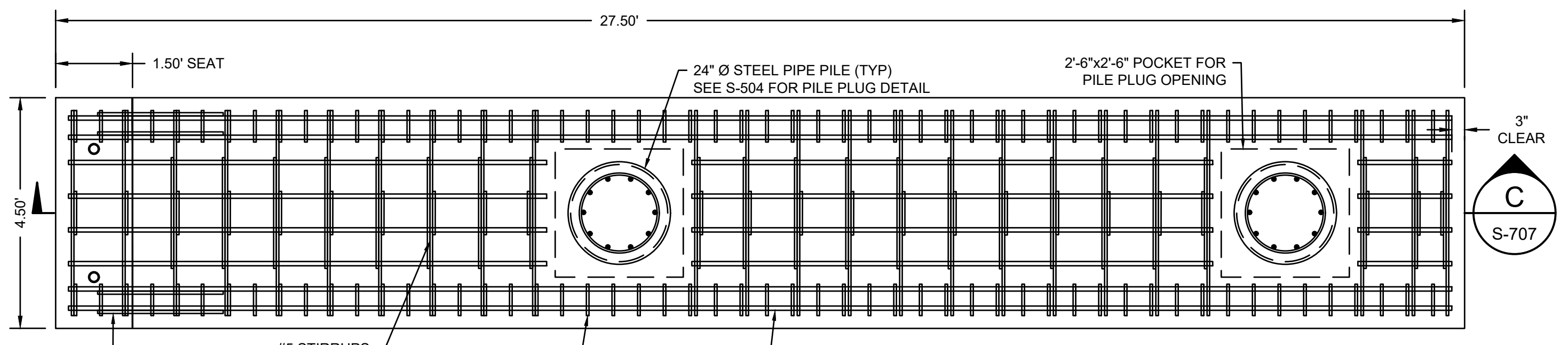
**PC-8 SECTION**  
SCALE: 1" = 2'  
NOTE: FOR CROSS SECTION, SEE S-706



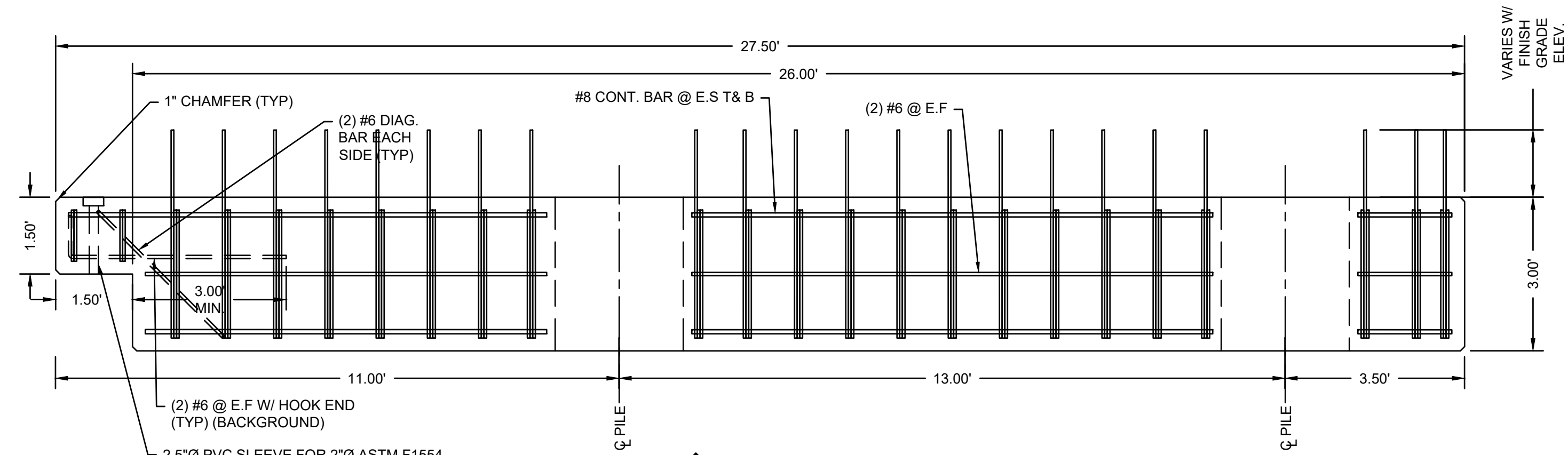
**PC-10 PLAN VIEW**  
SCALE: 1" = 2'



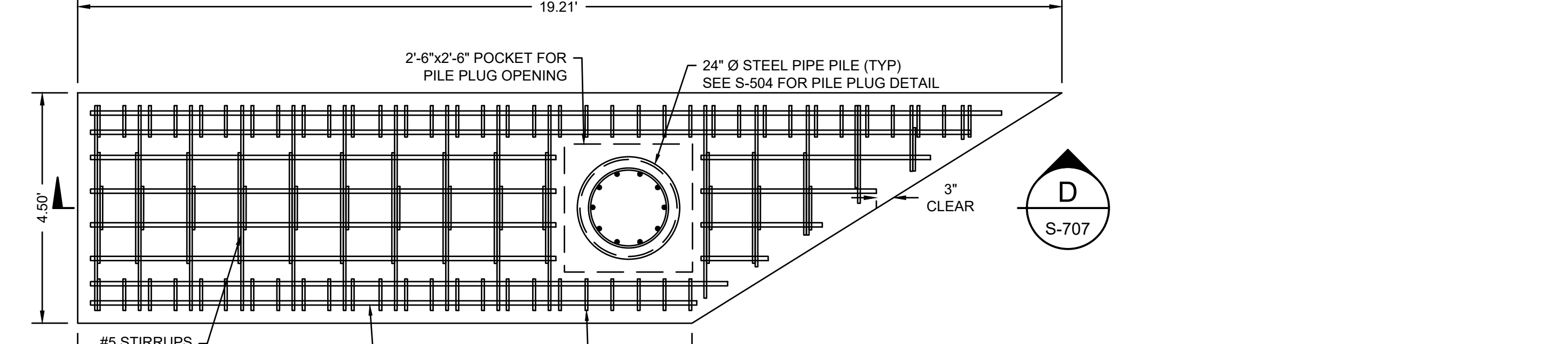
**PC-10 SECTION**  
SCALE: 1" = 2'  
NOTE: FOR CROSS SECTION, SEE S-706



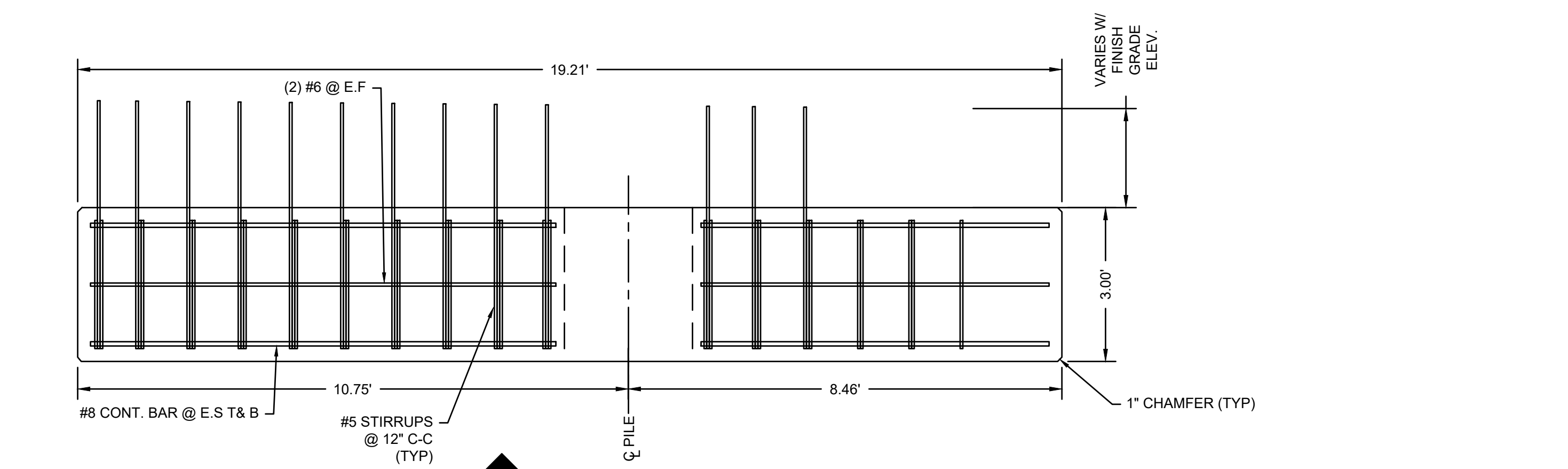
**PC-9 PLAN VIEW**  
SCALE: 1" = 2'



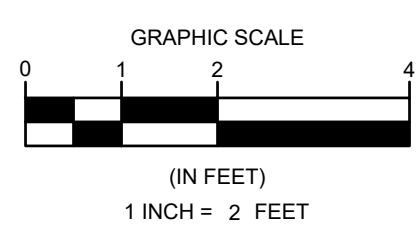
**PC-9 SECTION**  
SCALE: 1" = 2'  
NOTE: FOR CROSS SECTION, SEE S-706

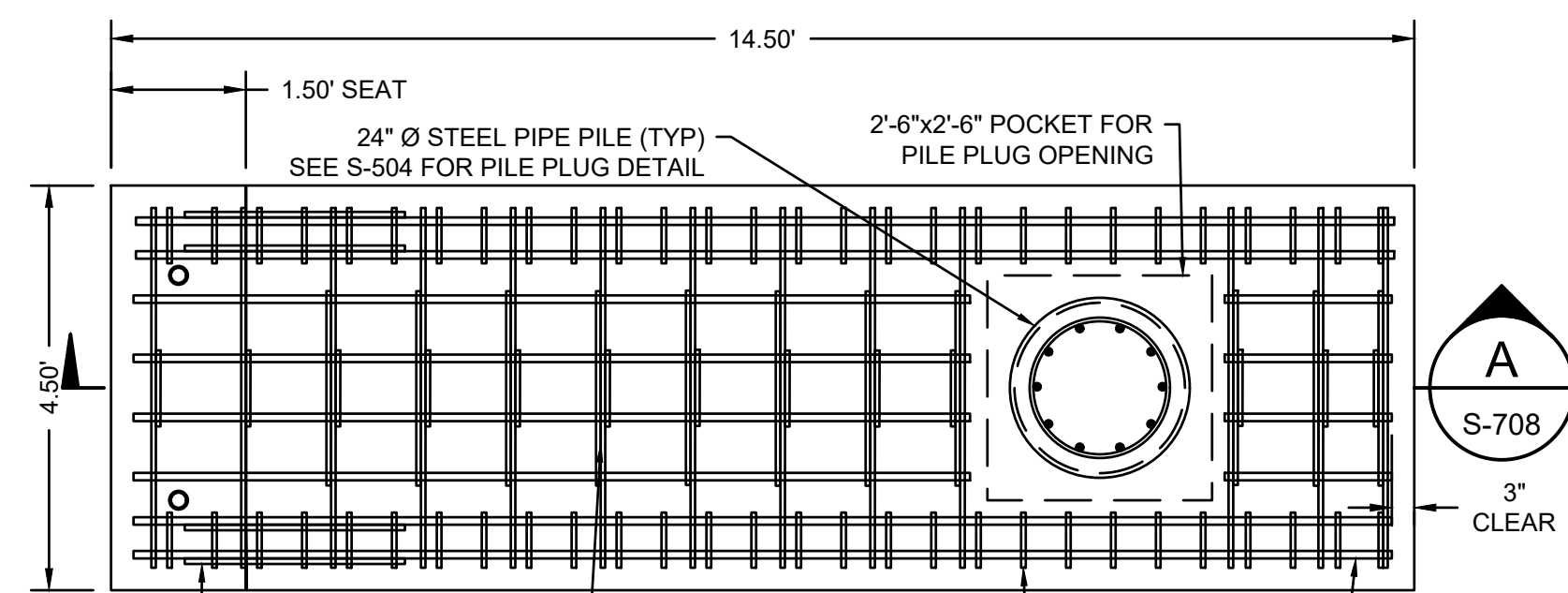


**PC-11 PLAN VIEW**  
SCALE: 1" = 2'

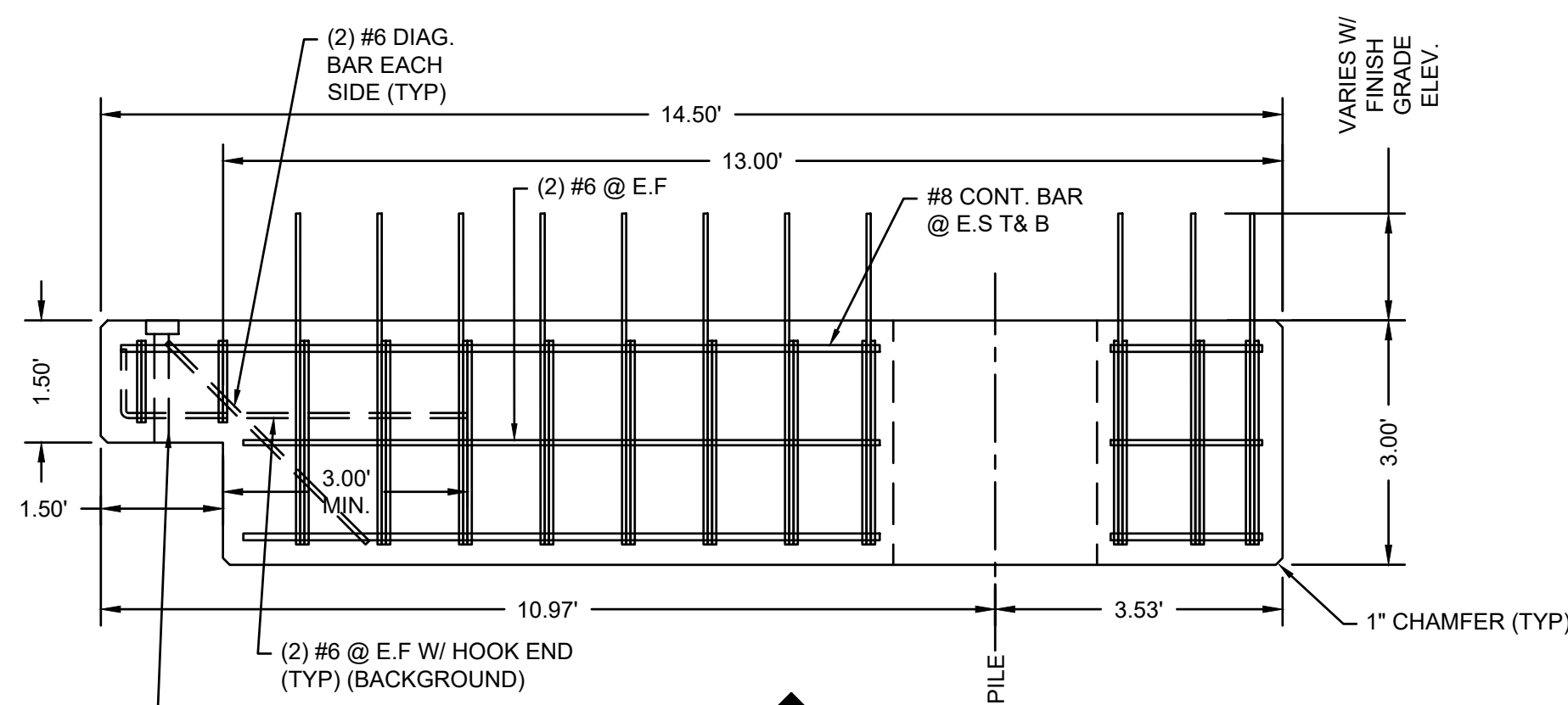


**PC-11 SECTION**  
SCALE: 1" = 2'  
NOTE: FOR CROSS SECTION, SEE S-706

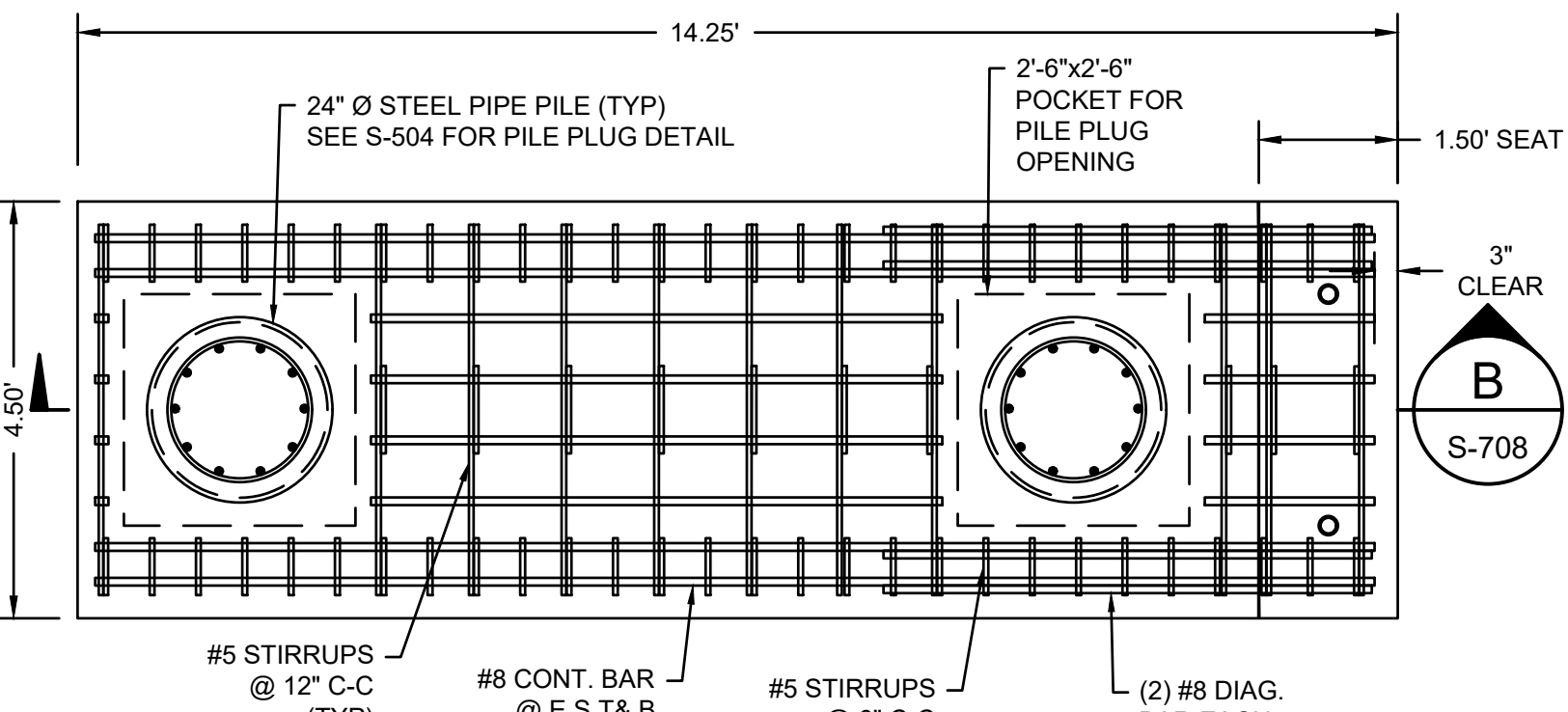




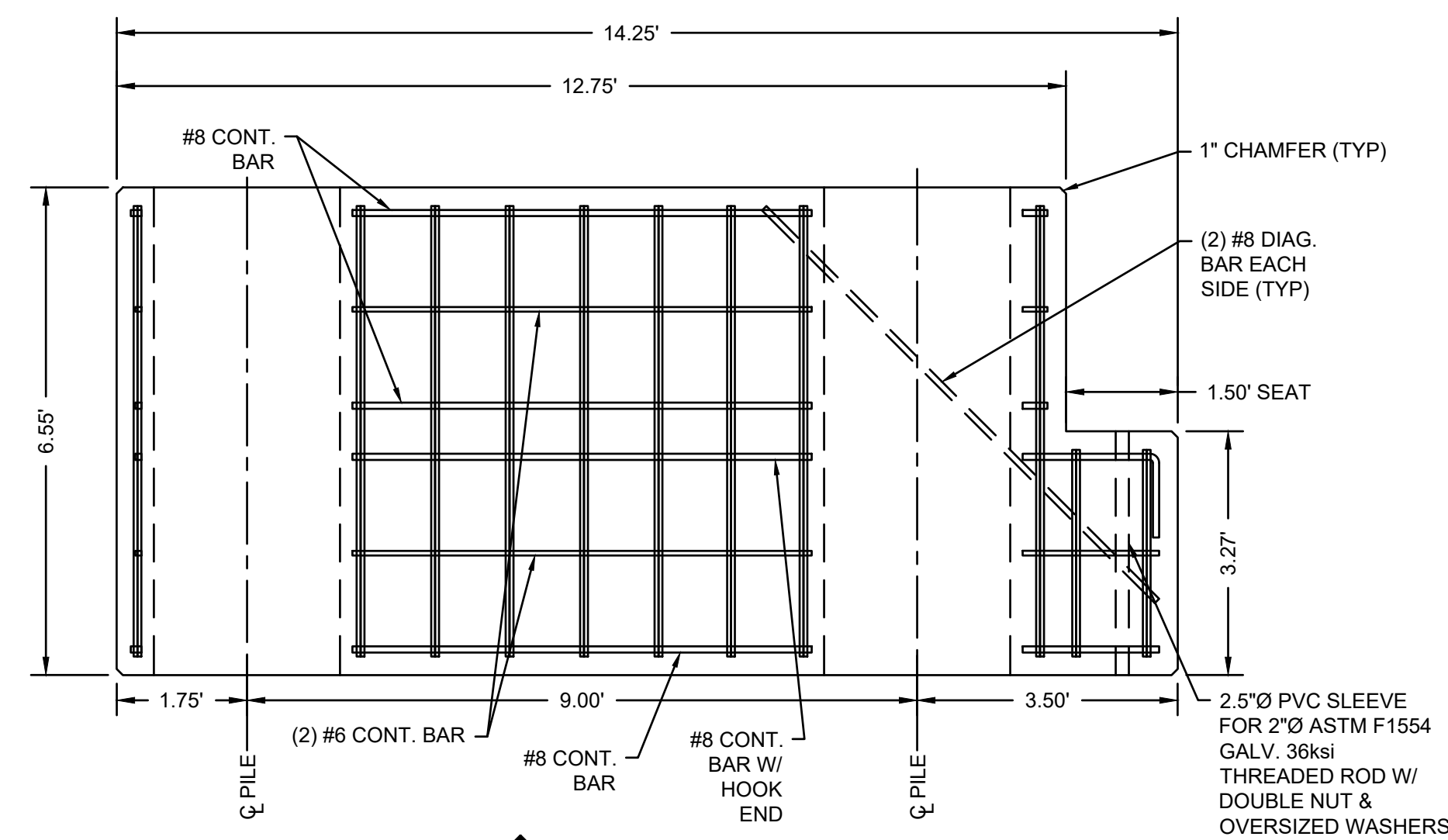
PC-12 PLAN VIEW  
SCALE: 1" = 2'



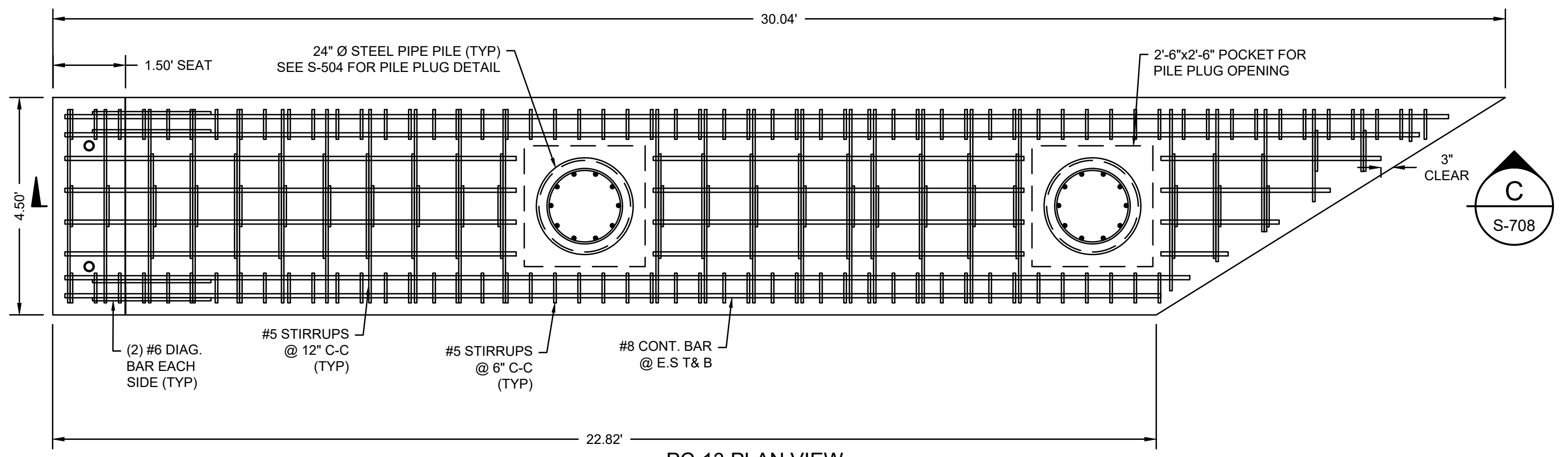
PC-12 SECTION  
SCALE: 1" = 2'  
NOTE: FOR CROSS SECTION, SEE S-706



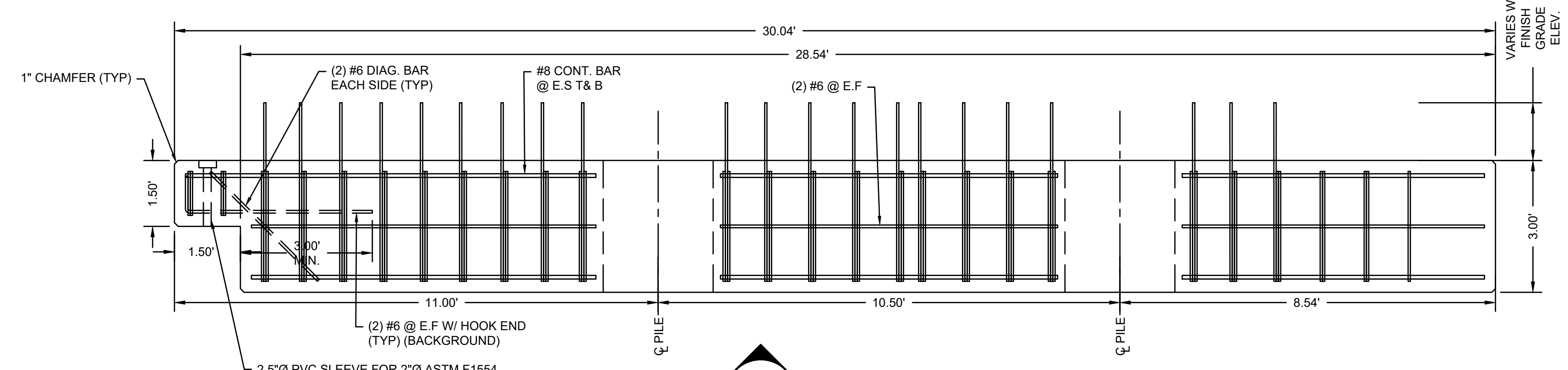
PC-14 PLAN VIEW  
SCALE: 1" = 2'



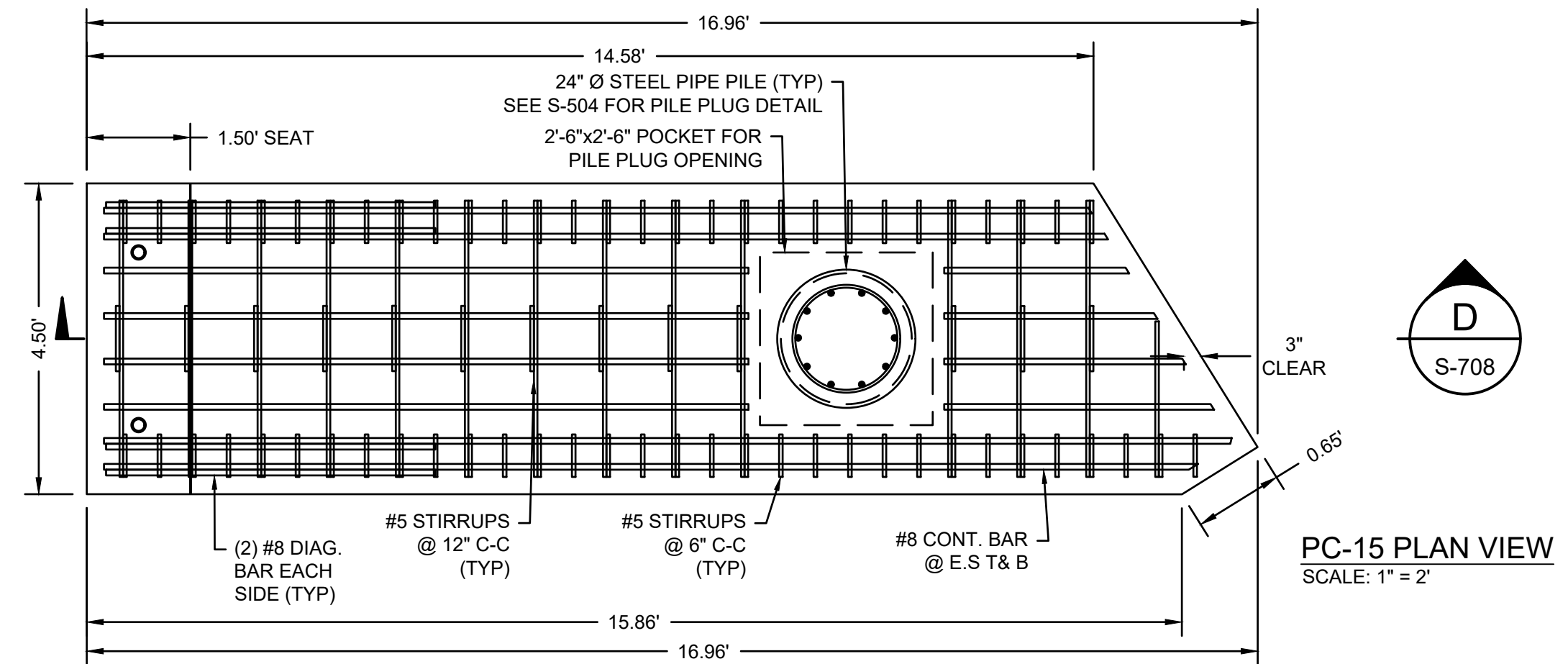
PC-14 SECTION  
SCALE: 1" = 2'  
NOTE: FOR CROSS SECTION, SEE S-705



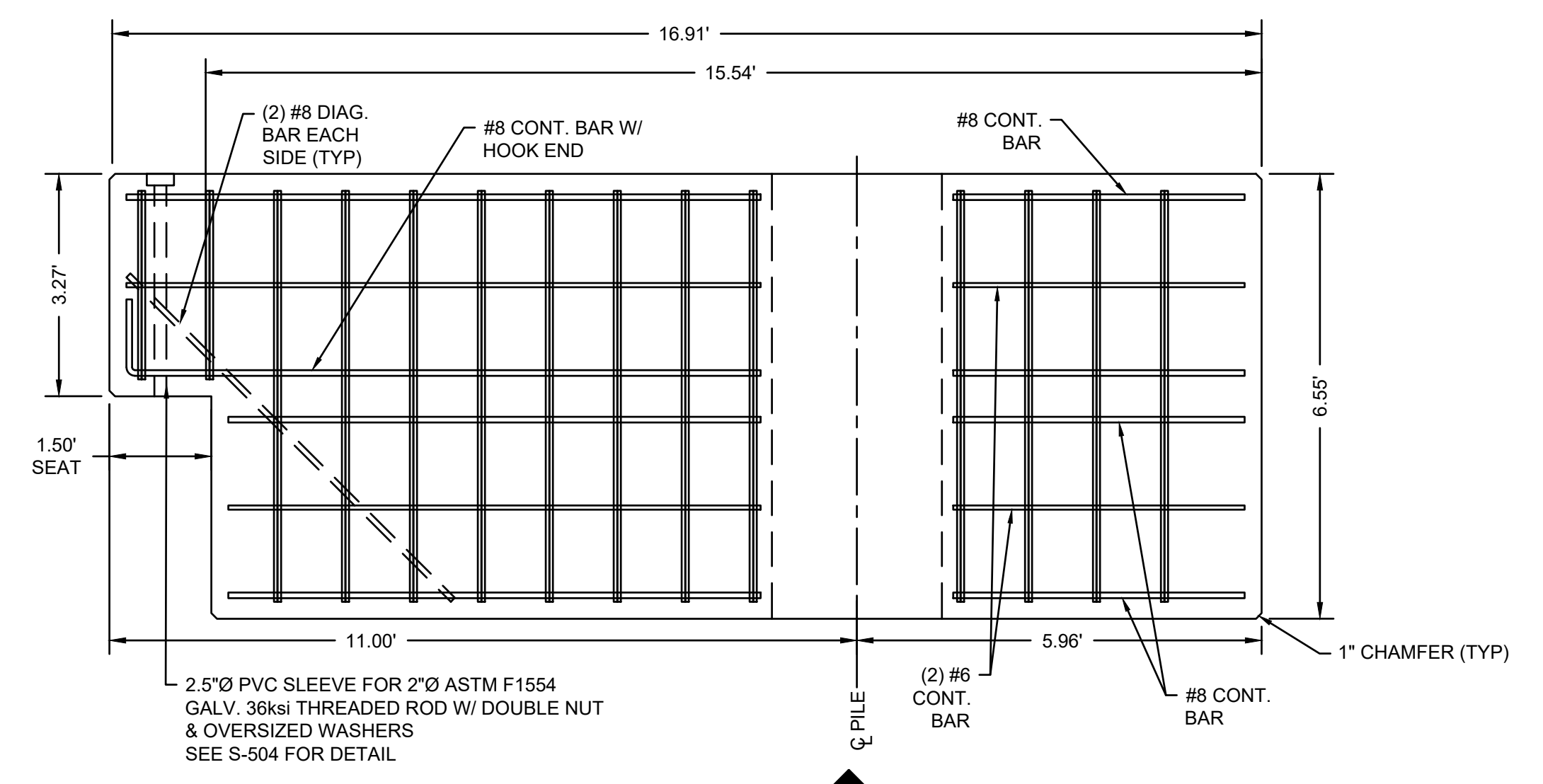
PC-13 PLAN VIEW  
SCALE: 1" = 2'



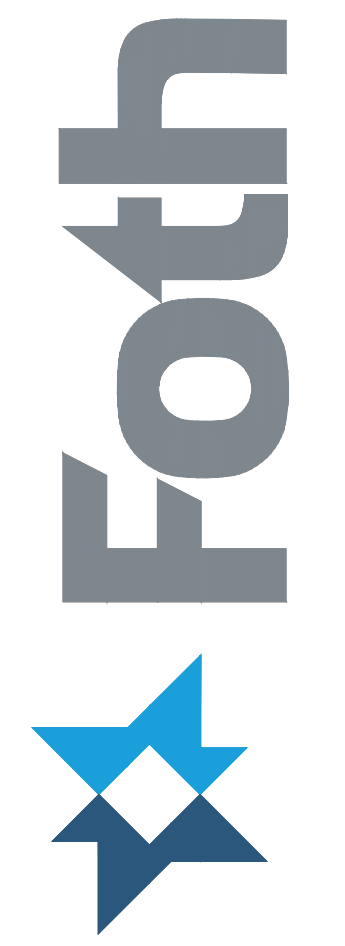
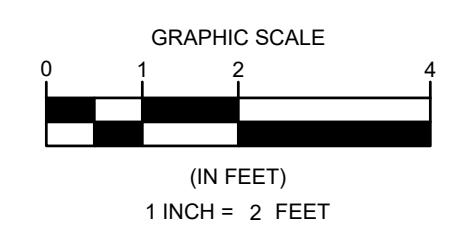
PC-13 SECTION  
SCALE: 1" = 2'  
NOTE: FOR CROSS SECTION, SEE S-706



PC-15 PLAN VIEW  
SCALE: 1" = 2'



PC-15 SECTION  
SCALE: 1" = 2'  
NOTE: FOR CROSS SECTION, SEE S-705



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TOWN OF ORLEANS, MASSACHUSETTS  
ROCK HARBOR COMMERCIAL WHARF IMPROVEMENTS

NO.	BY	DATE	REVISIONS	
			DESCRIPTION	

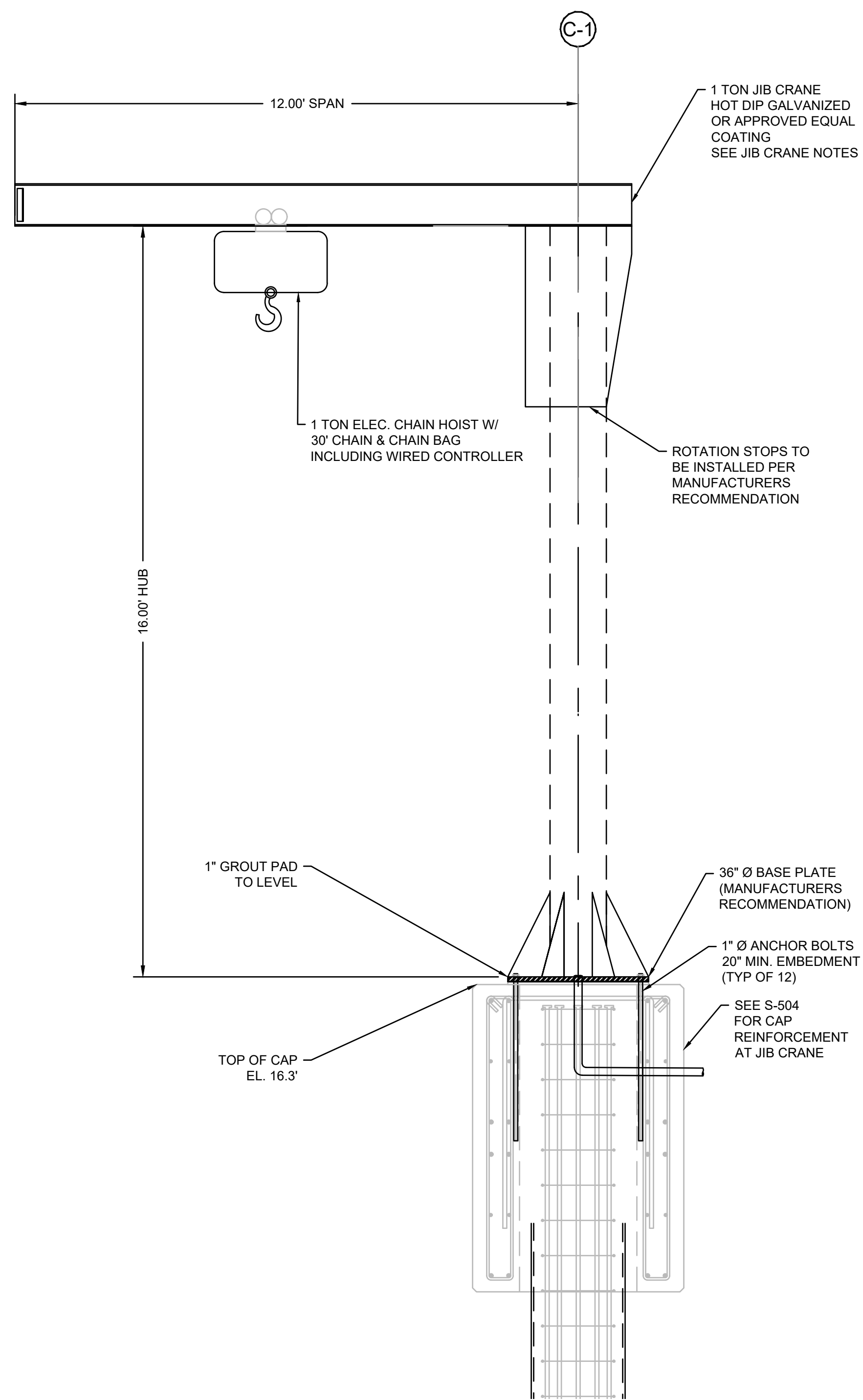
DATE OF PREPARATION		
SURVEYED	BY	DATE
MEC/JAH		10/24/19 & 3/2/21
DRAWN	BAM	12/05/2023
DESIGNED	SRS	06/28/2021
CHECKED	PSR	12/24/2023

SHEET TITLE:  
**STRUCTURAL DETAILS 8 OF 8**

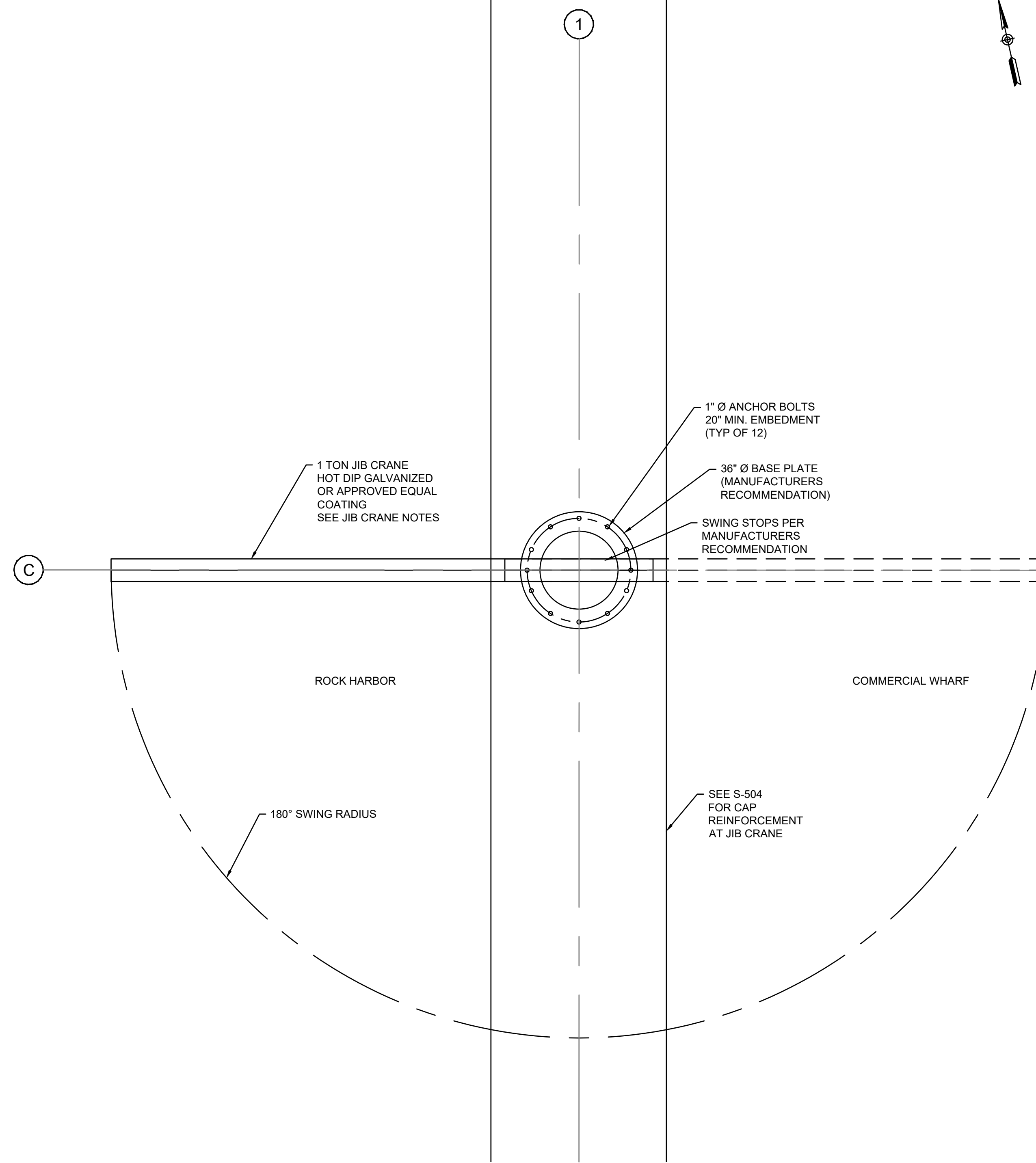
ISSUANCE:  
**ISSUED FOR BID**

PROJECT NO: 00190004.10  
SHEET NUMBER  
**S-708**

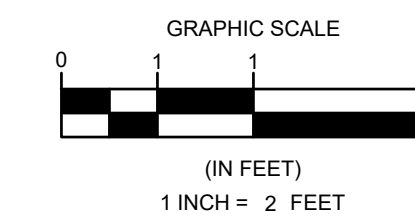
Thursday, March 7, 2024 11:43:56 AM  
DWG Filename: s-701 structural details.dwg Layout: s-708 structural details 8 of 8  
DWG Folder Location:



JIB CRANE SECTION  
SCALE: 1" = 2'



JIB CRANE PLAN VIEW  
SCALE: 1" = 2'



JIB CRANE NOTES:

- JIB CRANE MANUFACTURER NOT RESPONSIBLE FOR ANCHORAGE TO CONCRETE CAP. ALL OTHER COMPONENTS INCLUDING BASE PLATE SHALL BE DESIGNED BY JIB CRANE MANUFACTURER.
- JIB CRANE MANUFACTURER TO PROVIDE DESIGN FORCES FOR FOUNDATION ANALYSIS BY OTHERS.
- CONTRACTOR SHALL UTILIZE JIB CRANE BASE PLATE AND ANCHORAGE TEMPLATE TO LAYOUT ANCHOR BOLTS IN THE FIELD.
- JIB CRANE WARRANTY SHALL COVER ALL JIB CRANE COMPONENTS EXCEPT CONCRETE FOUNDATION.
- JIB CRANE TO BE HOT DIPPED GALVANIZED OR APPROVED EQUAL COATING.
- JIB CRANE SHALL BE INSTALLED IN ACCORDANCE WITH MANUFACTURERS RECOMMENDATIONS.
- CONTRACTOR TO INSTALL CONDUIT FOR ELECTRICAL SERVICE CONNECTION TO ELECTRIC WINCH AT MANUFACTURERS RECOMMENDED LOCATION.
- CONTRACTOR SHALL INSTALL ROTATION STOPS AND CHAIN HOIST IN ACCORDANCE WITH MANUFACTURERS RECOMMENDATIONS.



DEPARTMENT OF PUBLIC WORKS  
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IMPROVEMENTS

NO.	BY	DATE	REVISIONS	
			DESCRIPTION	
1				
2				
3				
4				
5				

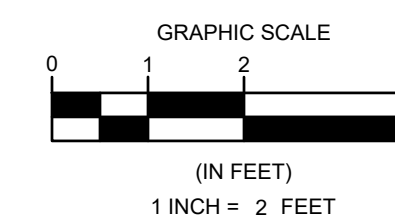
DATE OF PREPARATION		
	BY	DATE
SURVEYED	MEC/JAH	10/24/19 & 3/2/21
DRAWN	BAM	12/05/2023
DESIGNED	SRS	06/28/2021
CHECKED	PSR	12/24/2023

SHEET TITLE:  
**JIB CRANE  
DETAILS**

ISSUANCE:  
**ISSUED FOR BID**

PROJECT NO: 00190004.10  
SHEET NUMBER

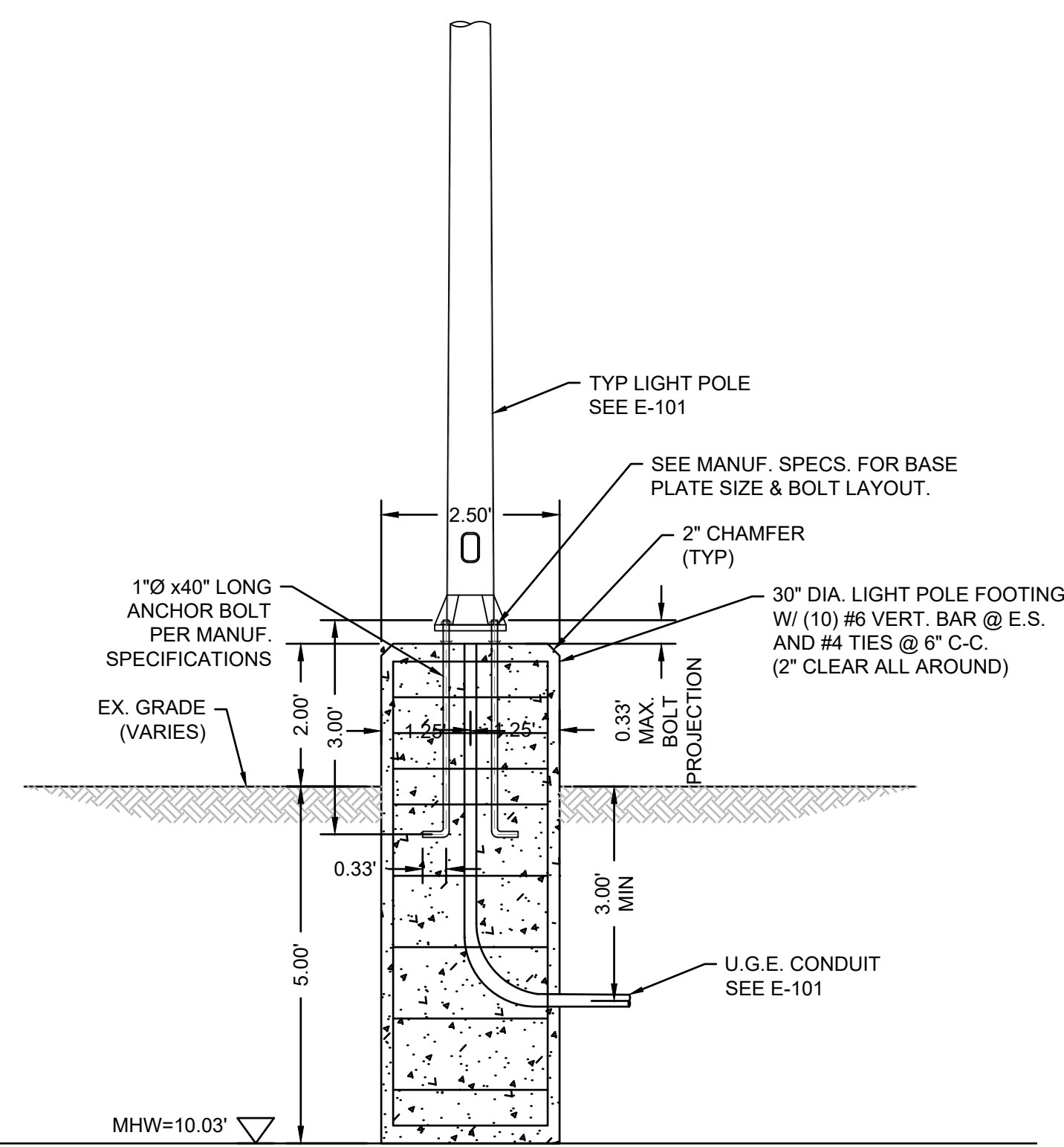
S-709



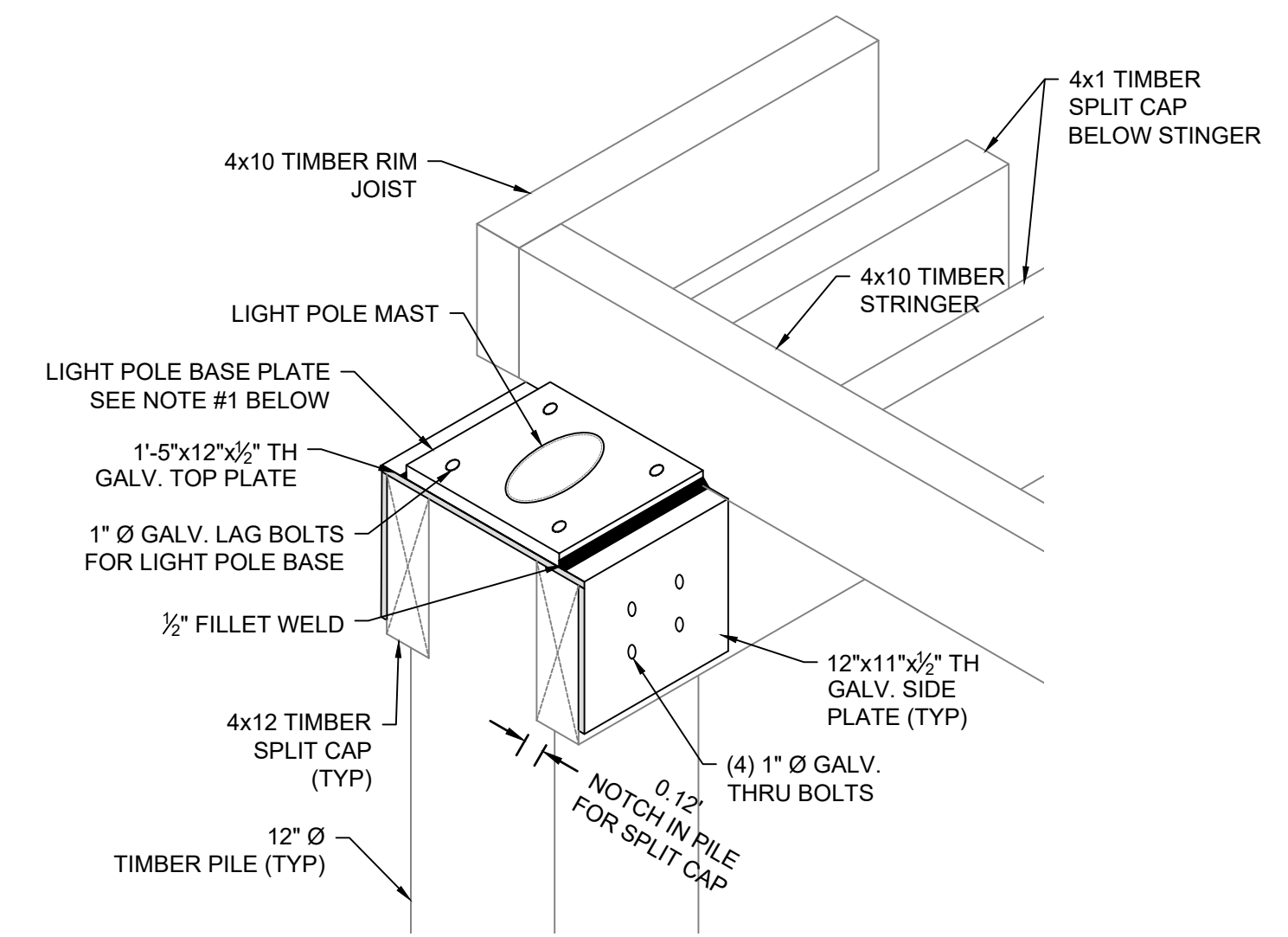


REVISIONS		DATE OF PREPARATION	
NO.	DESCRIPTION	BY	DATE
1			
2			
3			
4			

SHEET TITLE:	
LIGHT POLE BASE DETAILS	
ISSUANCE:	
ISSUED FOR BID	
PROJECT NO:	00190004.10
SHEET NUMBER	
S-710	

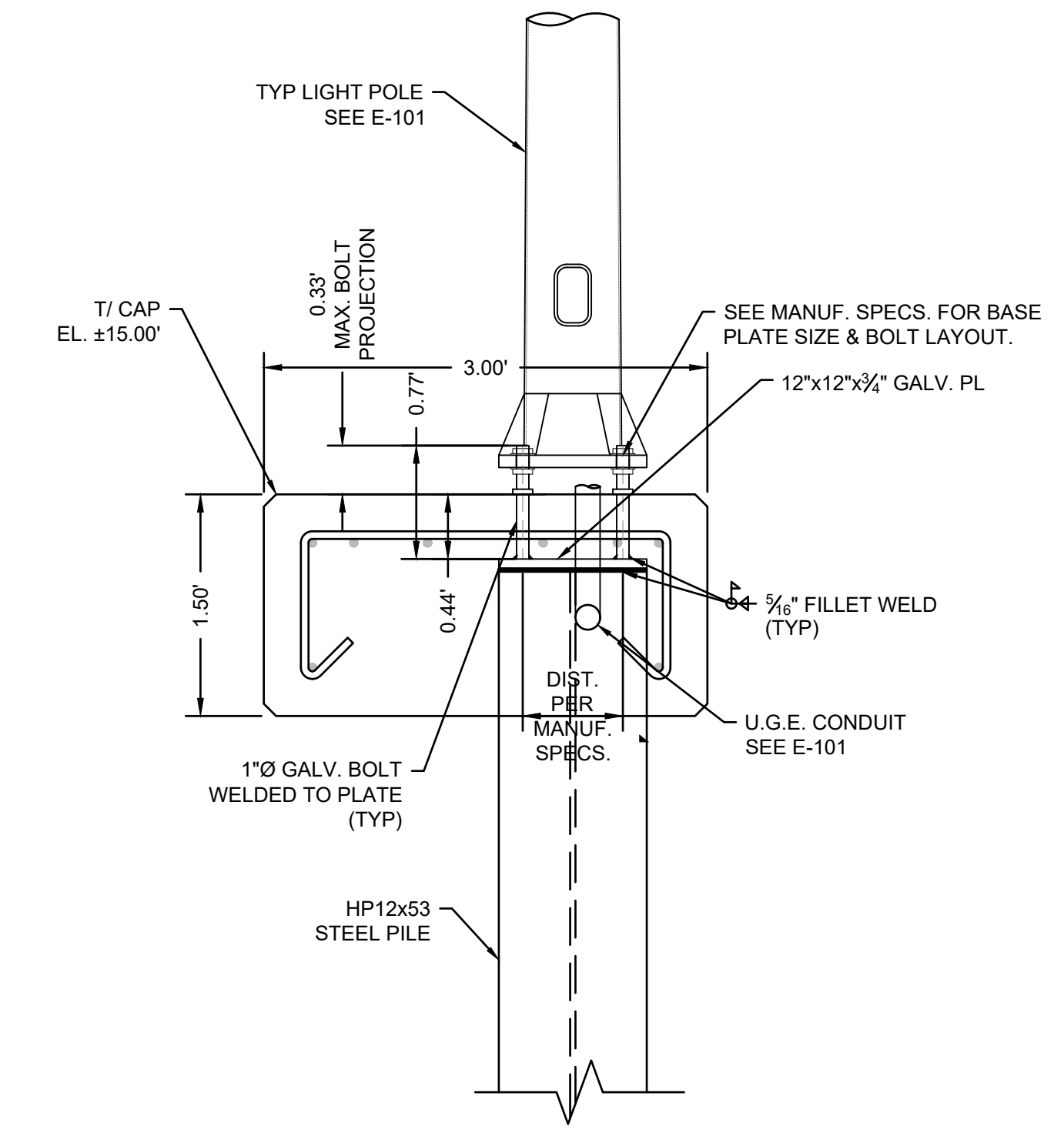


LIGHT POLE BASE DETAIL  
SCALE: 1" = 2"



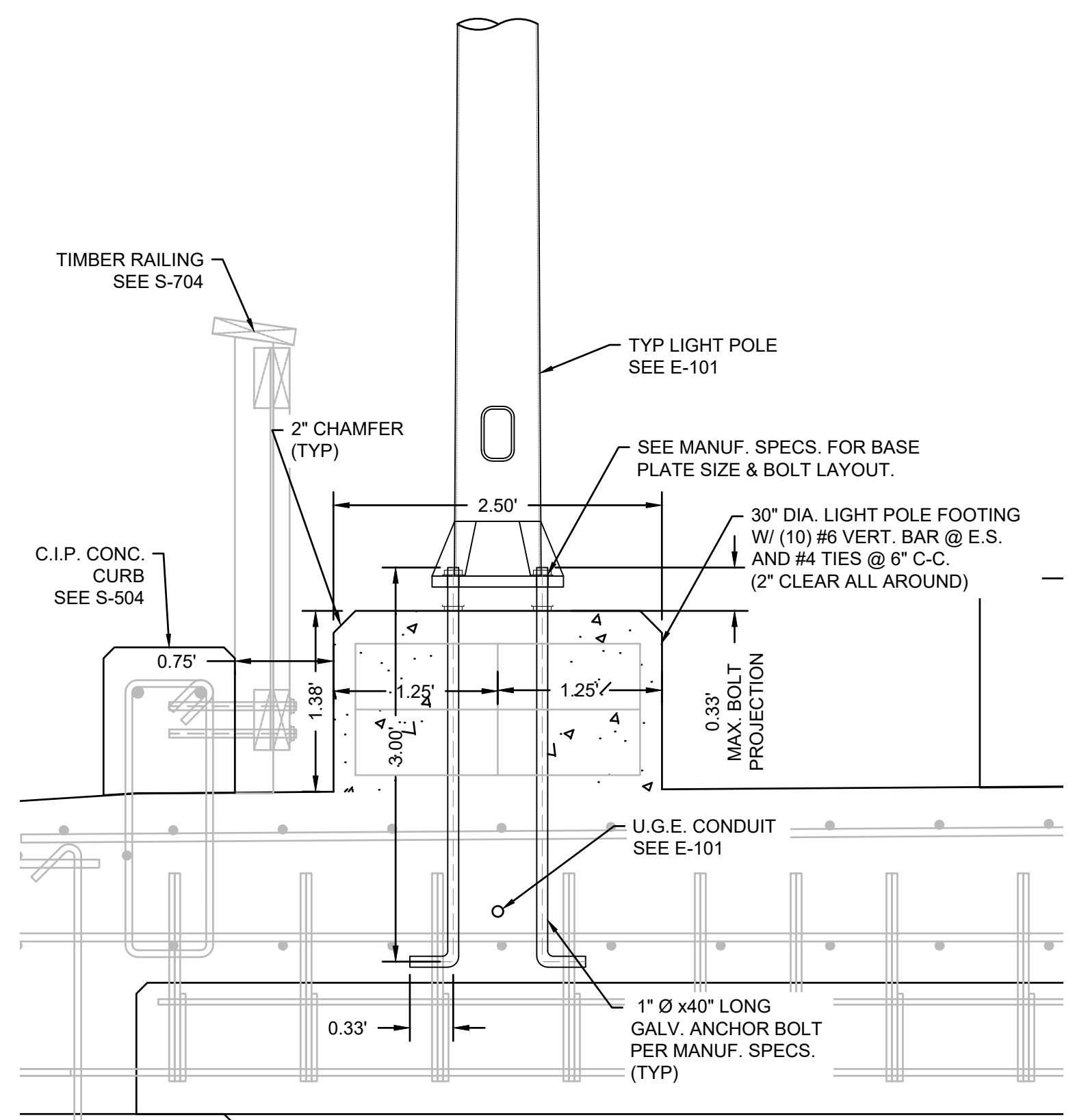
LIGHT POLE BASE TIMBER PIER CONNECTION DETAIL  
SCALE: 1" = 1"

- NOTE:
- 12"x12"x1" LIGHT POLE BASE PLATE SHOWN IN DETAIL ABOVE. CONTRACTOR TO PROVIDE ALTERNATE CONNECTION DETAIL SHOULD THE LIGHT POLE BASE PLATE INCREASE IN SIZE BEYOND WHAT IS REPRESENTED.
  - LIGHT POLE BASE PLATE SHALL BE GALVANIZED.



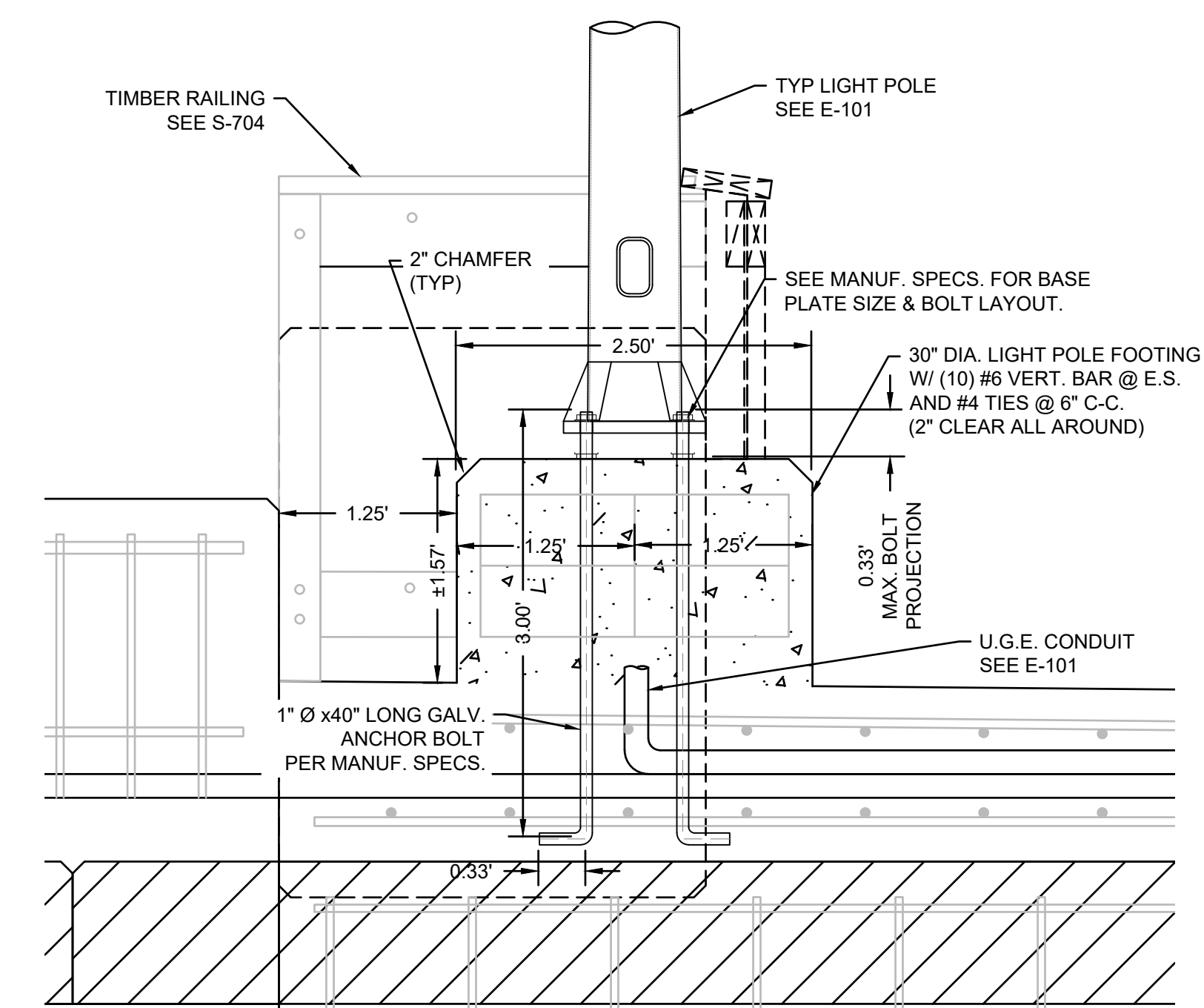
LIGHT POLE BASE CONCRETE CAP CONNECTION DETAIL  
SCALE: 1" = 1"

- NOTE:
- TIMBER RAILINGS AND PIER NOT SHOWN FOR CLARITY.
  - CONTRACTOR TO TOUCH-UP EPOXY COATING AS REQUIRED AT ANY COMPROMISED AREAS.
  - CONTRACTOR SHALL INSTALL SPLASHZONE EPOXY AROUND OPENINGS THROUGH STEEL SHEET PILES FOR UTILITY PENETRATIONS.



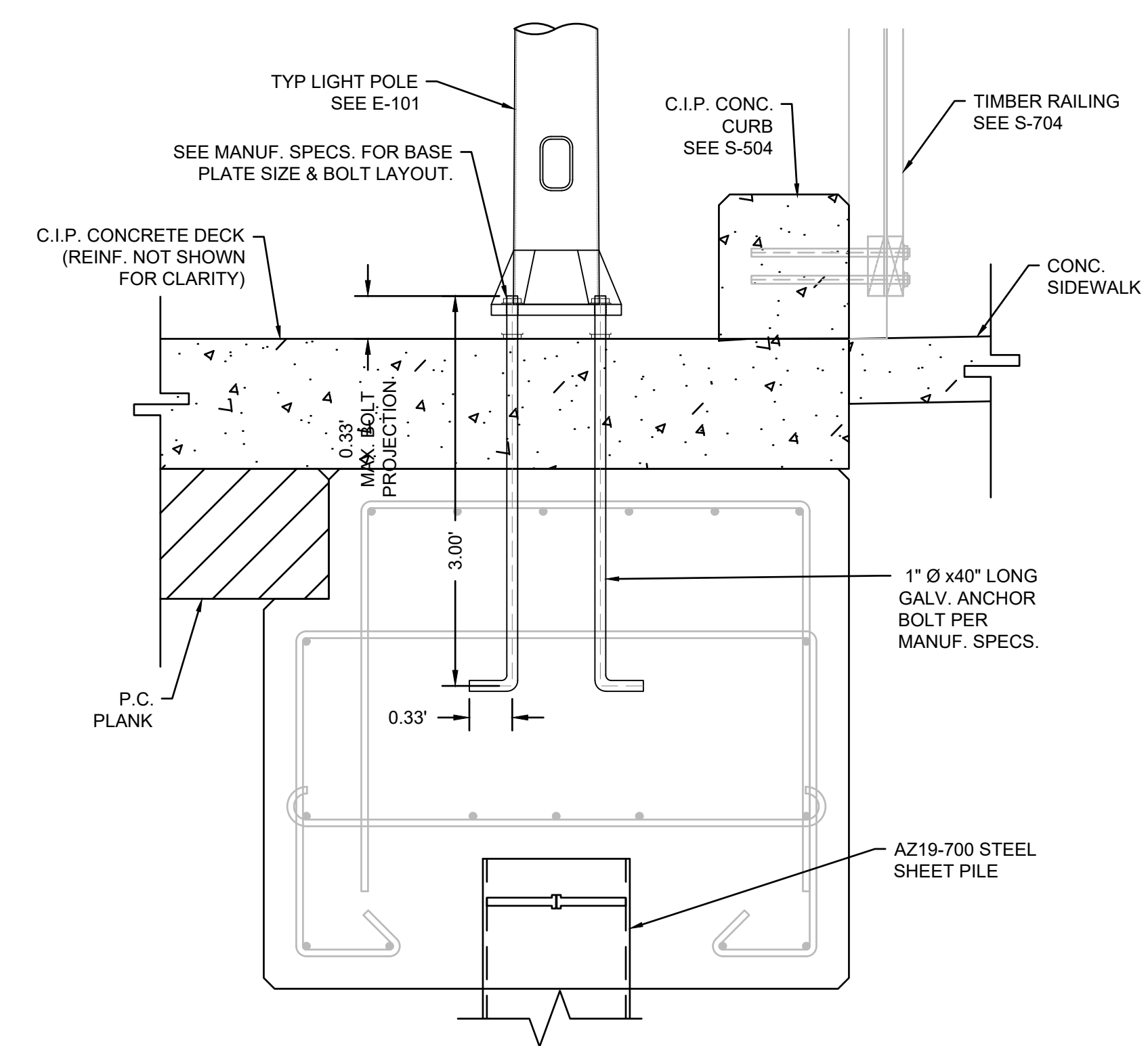
LIGHT POLE BASE CONCRETE DECK CONNECTION DETAIL  
SCALE: 1" = 1"

LOCATED ADJACENT TO PILE #3F



LIGHT POLE BASE CONCRETE DECK CONNECTION DETAIL  
SCALE: 1" = 1"

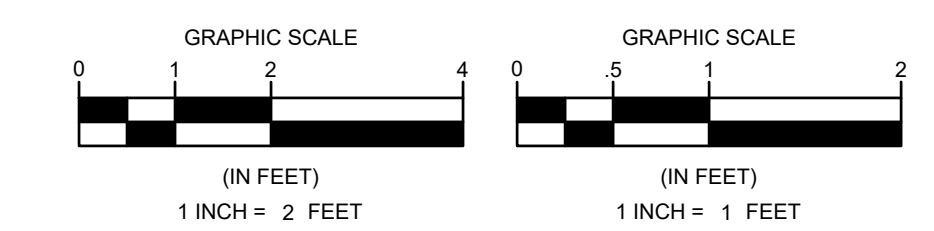
LOCATED ADJACENT TO PILE #3A

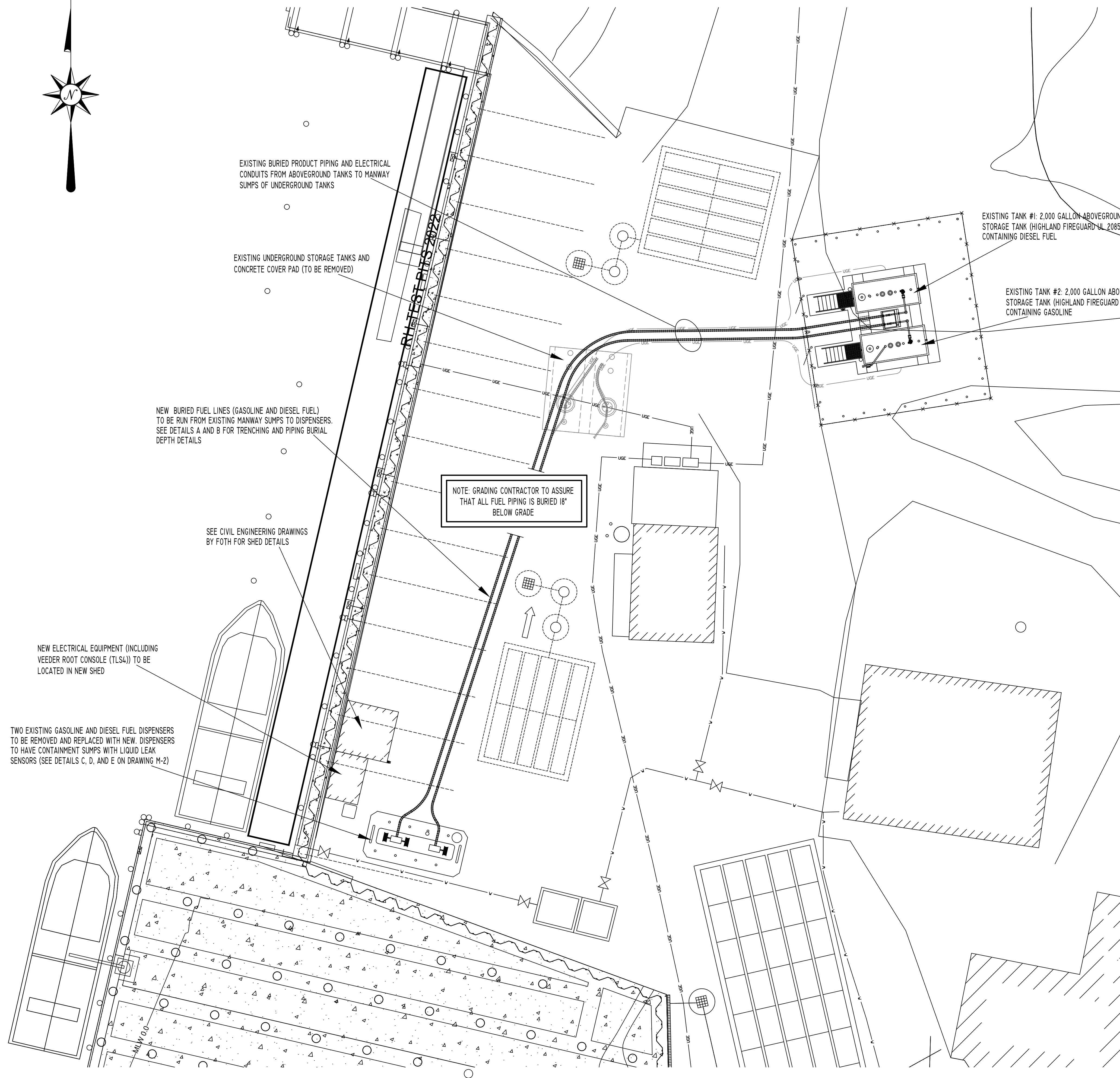
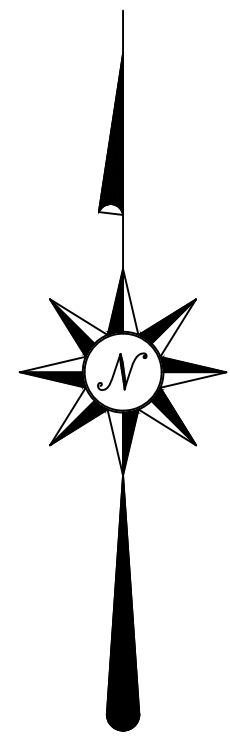


LIGHT POLE BASE CONCRETE DECK CONNECTION DETAIL  
SCALE: 1" = 1"

LOCATED ADJACENT TO PILE #7E

- NOTE:
- REINFORCEMENT FOR CAST-IN-PLACE CURB, DECK, AND PRECAST PLANKS NOT SHOWN FOR CLARITY.





# WEB ENGINEERING DRAWING LIST:

A-1 SITE DETAIL - PROPOSED MODIFICATIONS

M-1 MECHANICAL

M-2 DETAILS

S-1 CONCRETE

E-1 ELECTRICAL SCHEMATIC: POWER, DATA, AND SIGNAL CONDUITS

### CONTRACTOR RESPONSIBILITIES:

- 1) PROVIDE ENTIRE FUNCTIONING SYSTEM
- 2) PREPARE AND PROVIDE AN OPERATIONS AND MAINTENANCE MANUAL (IN PDF FORMAT PRIOR TO STARTUP).
- 3) STARTUP TROUBLESHOOTING AND OWNER TRAINING
- 4) DEMOLISH, DISMANTLE, AND DISPOSE OF OFFSITE IN ACCORDANCE WITH STATE AND FEDERAL REGULATIONS. ALL EXISTING PIPING, CONDUIT, EQUIPMENT, FITTINGS, DISPENSERS, CONTAINMENT SUMPS, EXCAVATION SOILS, ETC. NOT SPECIFICALLY DESIGNATED FOR RE-USE OR RETENTION BY THE OWNER. THE CONTRACTOR SHALL REMOVE SUCH ITEMS FROM THE PROPERTY PRIOR TO THE COMPLETION OF THE PROJECT.

### TESTING NOTES:

- 1) ANY ABOVEGROUND PIPING AFFECTED BY INSTALLATION OF NEW BURIED PIPING TO BE PRESSURE TESTED TO 50 PSI MIN. FOR 1 HOUR. SOAP ALL JOINTS.
- 2) PRIOR TO BACKFILLING, ALL BURIED PIPING TO BE HYDROSTATICALLY OR PNEUMATICALLY TESTED IN ACCORDANCE WITH API 1615 OR NFPA 30 AND IN ACCORDANCE WITH MANUFACTURER'S INSTALLATION MANUAL.
- 3) CONTRACTOR TO HYDROSTATICALLY TEST ALL DISPENSER SUMPS AS DESCRIBED IN 310 CMR 80.00
- 4) CONTRACTOR TO PROVIDE WRITTEN CERTIFICATION OF ALL TESTING RESULTS

### GENERAL NOTES:

- 1) ALL CONSTRUCTION TO MEET OR EXCEED:
  - A) NFPA 1 "FIRE CODE" - 2021 EDITION
  - B) NFPA 30 "FLAMMABLE AND COMBUSTIBLE LIQUIDS CODE" - 2021 EDITION
  - C) NFPA 30A "CODE FOR MOTOR FUEL DISPENSING FACILITIES AND REPAIR GARAGES" - 2021 EDITION
  - D) 527 CMR 1.00 "MASSACHUSETTS COMPREHENSIVE FIRE SAFETY CODE"
  - E) NATIONAL ELECTRICAL CODE FOR HAZARDOUS CLASSIFICATION.
- 2) PIPING AND VENTING TO MEET OR EXCEED ASME B31 "PRESSURE PIPING CODE" AND API 2000 FOR "VENTING ATMOSPHERIC AND LOW PRESSURE STORAGE TANKS."

— UGE ——— EXISTING UNDERGROUND ELECTRICAL  
 — OHW ——— EXISTING OVERHEAD ELECTRICAL



SCALE: 1 INCH = 10 FEET

SEE FOTH CIVIL DRAWINGS FOR COMPLETE SITE PLAN AND ELEVATION DATUM

THIS DRAWING TAKEN FROM PLANS OF LAND BY FOTH INFRASTRUCTURE & ENVIRONMENT, LLC OF MARION, MASSACHUSETTS, DATED JULY 25, 2023 AND SHOULD NOT BE USED FOR THE DETERMINATION OF PROPERTY LINES, METES, BOUNDS, ETC.

# A-1

TOWN OF ORLEANS DEPARTMENT OF PUBLIC WORKS  
ROCK HARBOR ROAD, ORLEANS, MASSACHUSETTS

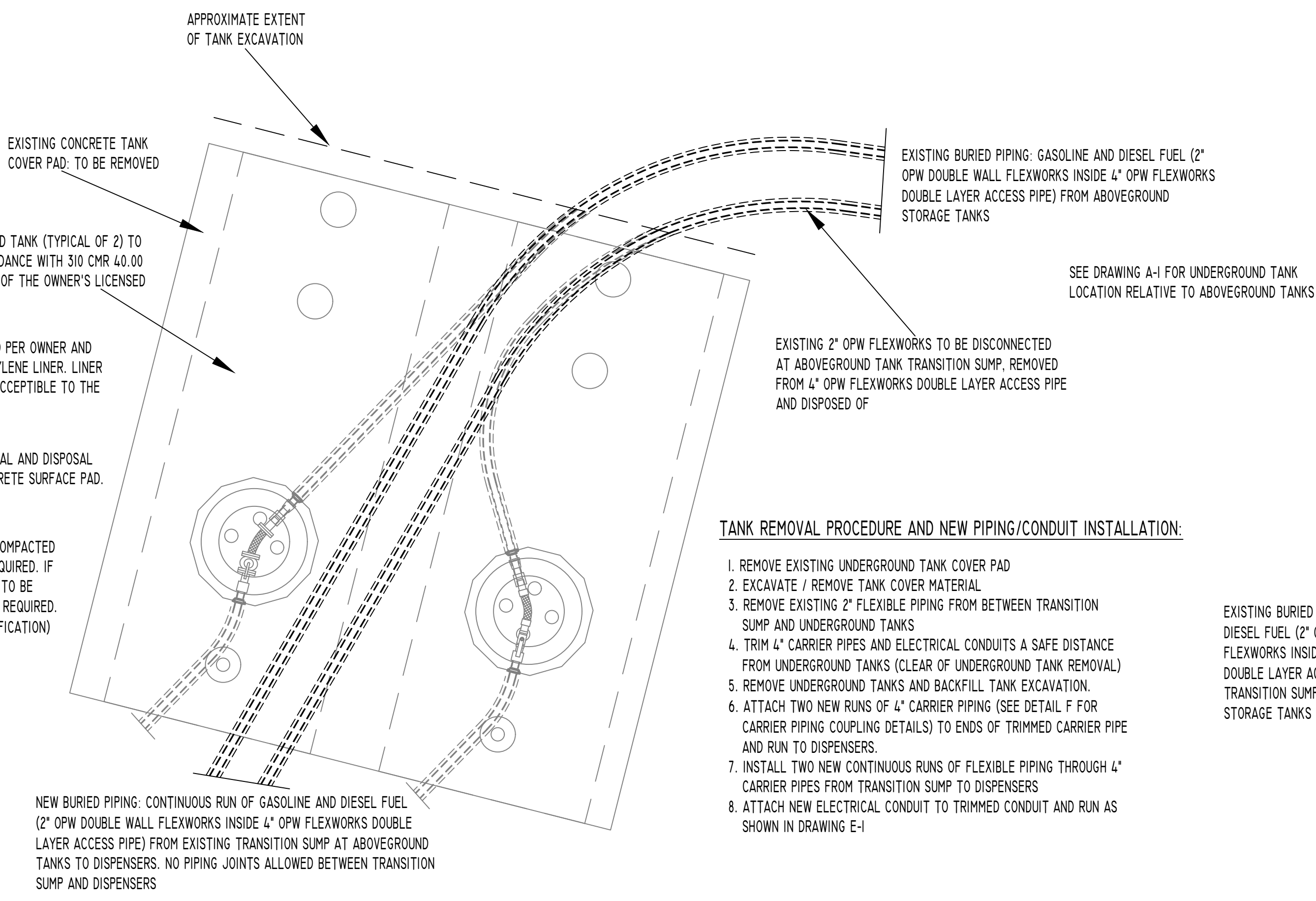
SITE DETAIL - PROPOSED MODIFICATIONS

WEB ENGINEERING ASSOCIATES, INC.  
111 SUMMER STREET, SCITUATE, MASSACHUSETTS 02066

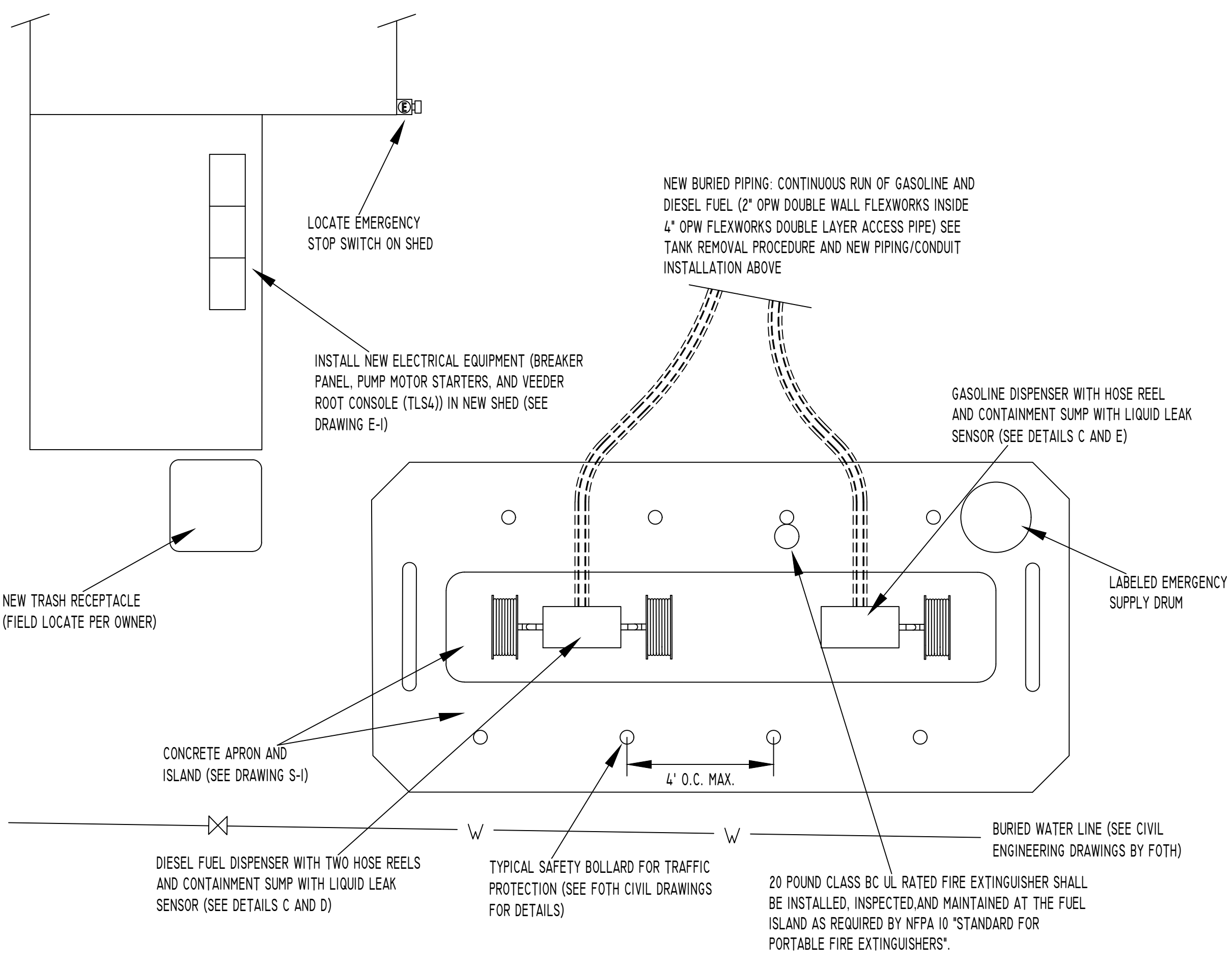
DATE REVISION



DATE	REVISION



PLAN VIEW: UNDERGROUND STORAGE TANKS



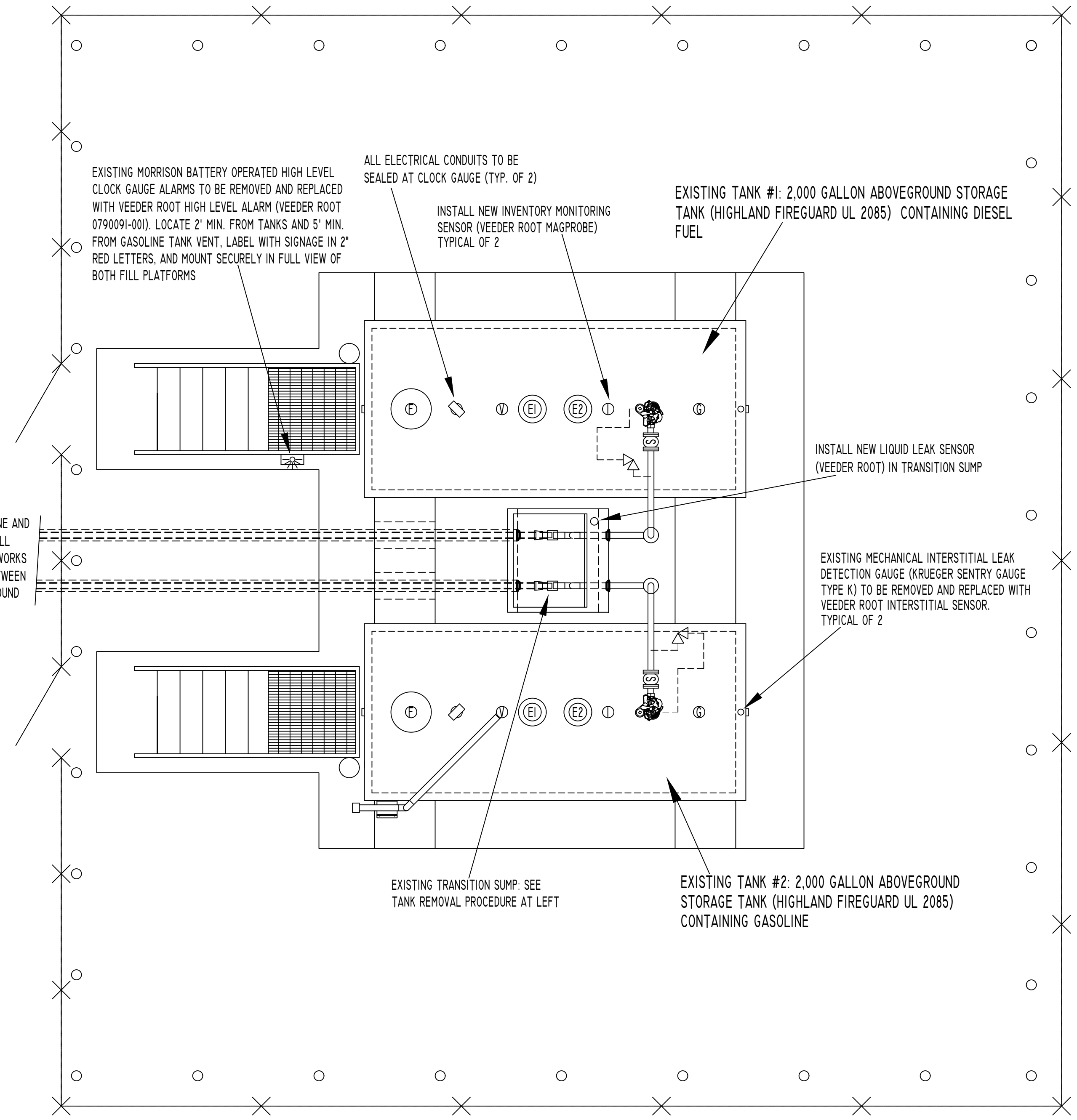
PLAN VIEW: DISPENSER AREA

**SIGNAGE:**

WARNING SIGNS SHALL BE CONSPICUOUSLY POSTED ON THE FRONT AND BACK OF FUELING ASSEMBLIES AND SHALL INCORPORATE THE FOLLOWING LANGUAGE:

**WARNING**  
**NO SMOKING - STOP MOTOR**

THE WORDS "WARNING" AND "NO SMOKING - STOP MOTOR" SHALL CONSIST OF BLOCK LETTERS NOT LESS THAN ONE INCH IN HEIGHT, WHITE LETTERS ON A RED BACKGROUND. THE REMAINING SENTENCES SHALL CONSIST OF BLOCK LETTERS NOT LESS THAN 1/2 INCH IN HEIGHT, RED LETTERS ON A WHITE BACKGROUND.



PLAN VIEW: EXISTING ABOVEGROUND STORAGE TANKS

**FUELING PROCEDURES SIGNAGE:**

FUELING PROCEDURE SIGNAGE (TO BE MOUNTED ON SHED IN FULL VIEW OF FUELING) REFERRED TO IN NFPA 1, PARAGRAPH 28.1.8.2.6(6) SHALL INCLUDE THE FOLLOWING INFORMATION:

- 1) PROCEDURES BEFORE FUELING
  - A) STOP ALL ENGINES AND AUXILIARIES
  - B) SHUT OFF ALL ELECTRICITY, OPEN FLAMES, AND HEAT SOURCES
  - C) CHECK BILGES FOR FUEL VAPORS
  - D) EXTINGUISH ALL SMOKING MATERIALS
  - E) CLOSE ACCESS FITTINGS AND OPENINGS THAT COULD ALLOW FUEL VAPORS TO ENTER ENCLOSED SPACES
  - F) REMOVE ALL PERSONNEL FROM THE VESSEL/BARGE EXCEPT FOR THE PERSON HANDLING THE FUELING HOSE
- 2) PROCEDURES DURING FUELING
  - A) MAINTAIN NOZZLE CONTACT WITH FILL PIPE
  - B) ATTEND FUEL-FILLING NOZZLE AT ALL TIMES
  - C) WIPE UP SPILLS IMMEDIATELY
  - D) AVOID OVERFILLING
- 3) PROCEDURES AFTER FUELING AND BEFORE STARTING ENGINE
  - A) INSPECT BILGES FOR LEAKAGE OR FUEL ODORS
  - B) VENTILATE UNTIL ODORS ARE REMOVED

**ADDITIONAL EMERGENCY SIGNAGE AT DISPENSING AREAS WITH EMERGENCY INSTRUCTIONS IN CASE OF FIRE OR SPILL:**

- 1) USE EMERGENCY STOP BUTTON
- 2) REPORT ACCIDENT BY CALLING LOCAL FIRE NUMBER
- 3) REPORT LOCATION

HIGH LEVEL ALARM, EMERGENCY STOP SWITCHES, AND EMERGENCY SHUT OFF VALVES TO BE LABELED WITH SIGNAGE IN 2" RED LETTERS ON A WHITE BACKGROUND. SIGNAGE MATERIAL TO BE ALUMINUM FIRMLY MOUNTED TO SUPPORT SUBJECT TO MAXIMUM WIND LOADS

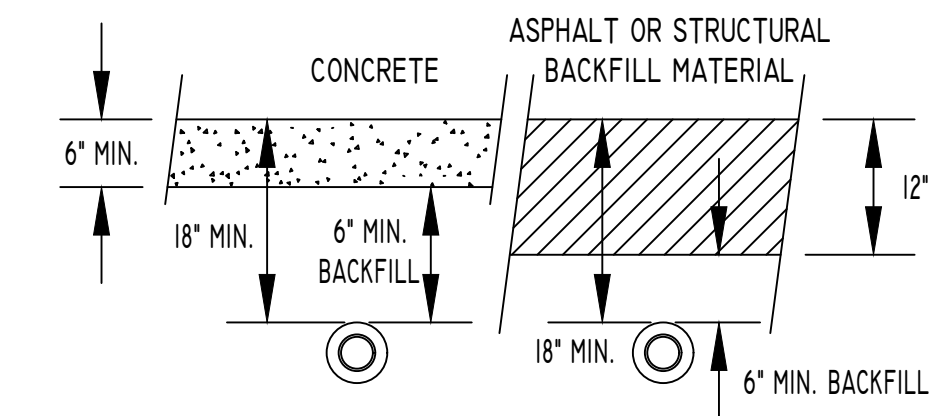
**SAFETY SIGNAGE TO BE LOCATED AT ALL FUELING STATIONS INDICATING:**

- 1) NO SMOKING
- 2) TURN OFF ENGINE WHEN FUELING VEHICLES
- 3) EMERGENCY TELEPHONE NUMBERS.

SEE DRAWING M-2 FOR REFERENCED DETAILS

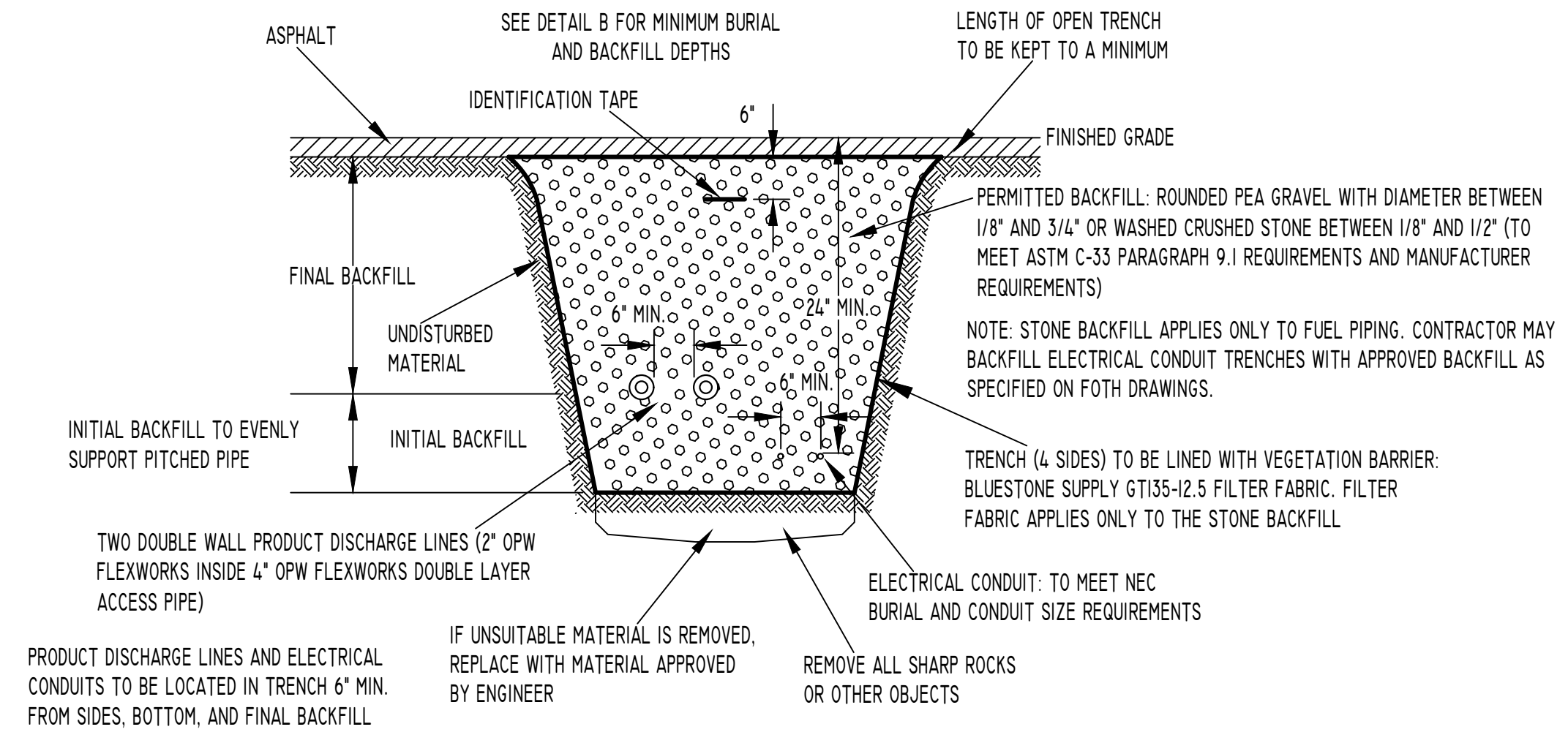
DATE	REVISION

FILE: DETAILS  
DRAWN BY: JAS  
DATE: 2/6/24  
JOB #: 22-E-012  
WEB DRAWING NO. 24.005  
SCALE: 3/8" = 1'



2" OPW FLEXWORKS FLEXIBLE PIPING INSIDE  
4" OPW FLEXWORKS DOUBLE LAYER ACCESS PIPE

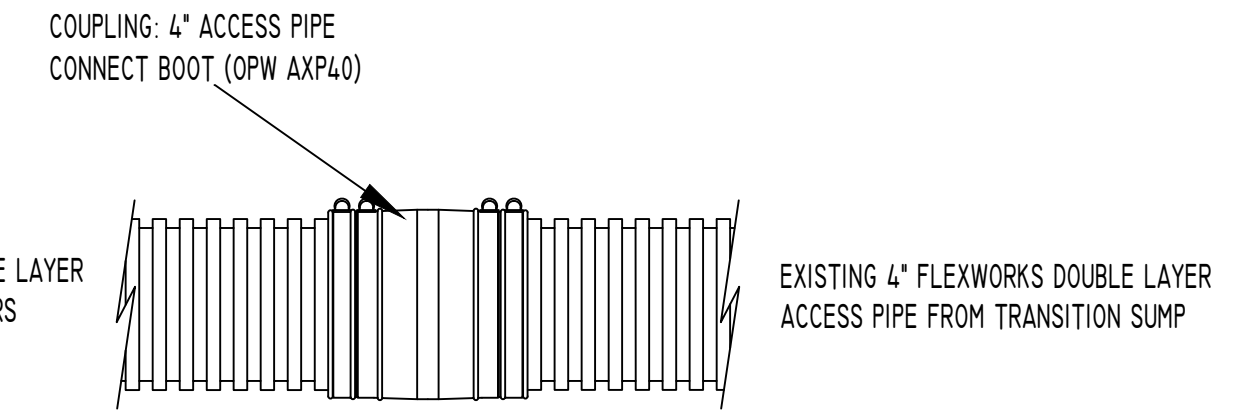
**DETAIL B**  
MINIMUM PIPING BURIAL DEPTHS  
NOT TO SCALE



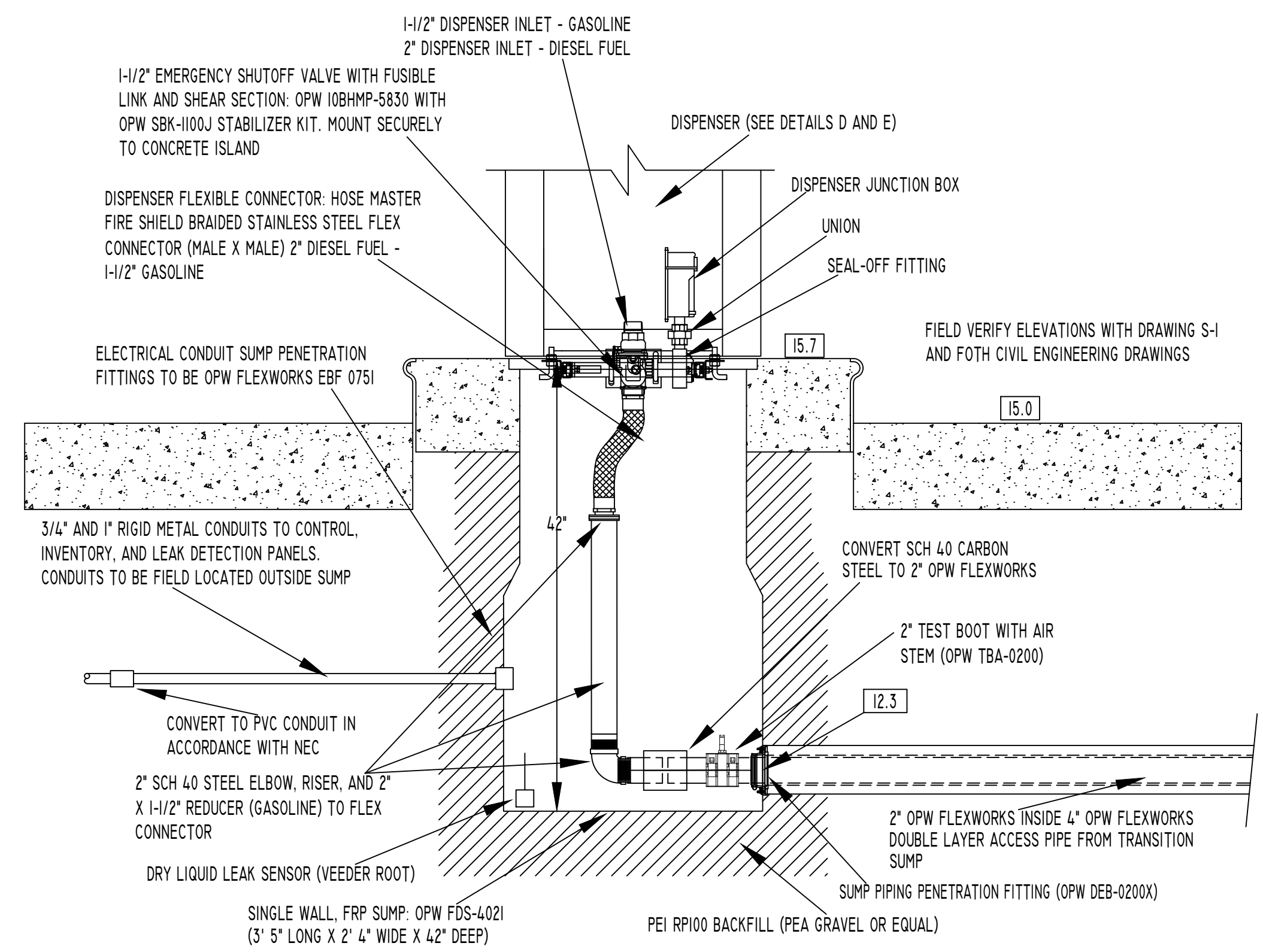
**DETAIL A**  
TYPICAL PIPING TRENCH  
NOT TO SCALE

**ADDITIONAL DISPENSER SPECIFICATIONS:**

- ELECTRONIC DISPLAYS. MECHANICAL REGISTERS ARE NOT ACCEPTABLE.
- FOR EACH HOSE, BACKLIT 1.5" LIQUID CRYSTAL (LCD) TOTAL SALE AND 1" GALLONS DISPLAYS, AND 1/2" UNIT PRICE DISPLAY.
- DISPLAY BACKUP FOR A MINIMUM OF 15 MINUTES IN THE EVENT OF POWER LOSS.
- SEPARATE DISPLAY FOR EACH HOSE FOR ERROR CODES AND INDICATING OPERATING MODE.
- ALL DISPLAYS COVERED WITH TEMPERED OR DOUBLE-STRENGTH GLASS (PLASTIC NOT ACCEPTABLE).
- ELECTRONIC REGISTER - 115VAC / 240VAC 50/60 HZ
- ELECTROMECHANICAL TOTALIZER, 7-DIGIT NON-RESETTABLE, FOR EACH HOSE LOCATED ON DISPENSER DIAL FACE BEZELS FOR INVENTORY CONTROL.
- ELECTRONIC 6-DIGIT NON-RESETTABLE AND RESETTABLE TOTALIZERS PER HOSE.
- DIAGNOSTICS INCLUDING LOG OF LAST 50 ERRORS/EVENTS. DISPENSER SOFTWARE CONFIGURABLE AND DOWNLOADABLE FROM PC.
- HAND HELD REMOTE CONTROL FOR ACCESSING TOTALS, DIAGNOSTICS, & CONFIGURING DISPENSER VIA LCD W/O OPENING CABINET.
- DUAL PULSE OUTPUT INTERFACE FOR EACH HOSE FOR CONNECTION TO FUEL CONTROL AND TANK MONITORING SYSTEMS - 120VAC.
- CABINET: LOWER HYDRAULIC CABINET TOP, SIDES, AND BASE CONSTRUCTED FROM STAINLESS STEEL.
- TOP REGISTER CABINET CONSTRUCTED FROM GALVANNEALED STEEL WITH POWDER-COATED BLACK FINISH.
- STAINLESS STEEL LOWER DOORS.
- HINGED LOWER DOORS FOR EASY SERVICE ACCESS WITHOUT HAVING TO REMOVE PANELS.
- LED-LIGHTED BRAND PANELS LABELED UNLEADED.
- LANE-ORIENTED NOZZLE BOOT ON EACH DISPENSER SIDE WITH LIFT-TO-START NOZZLE HOOKS TO TURN ON/OFF DISPENSER.
- NOZZLE BOOTS SHALL ACCOMMODATE UL STANDARD INTERCHANGEABLE NOZZLES AND SHORT SPOUT VAPOR RECOVERY NOZZLES.
- HOSE HANGER FOR EACH HOSE OUTLET TO KEEP HOSES OFF THE ISLAND WHEN NOT IN USE.
- TWO (2) POSITIVE DISPLACEMENT, TWO-PISTON METERS WITH INTEGRAL HALL EFFECT PULSERS WITH NO MOVING PARTS TO WEAR OUT.
- ELECTRONIC CALIBRATION WITHOUT THE NEED TO SET MECHANICAL ADJUSTERS.
- ONE (1) PROPORTIONAL SOLENOID VALVE FOR EACH HOSE, PROGRAMMABLE THROUGH ELECTRONIC REGISTER TO SET MAXIMUM FLOW RATE.
- ONE (1) INTERNAL FILTER WITH 30-MICRON ELEMENT FOR EACH HOSE TO HELP ENSURE PRODUCT PURITY.
- TWO (2) 1" DISCHARGE OUTLETS WITH 3/4" REDUCING BUSHINGS SO THAT EITHER A 3/4" OR 1" HOSES MAY BE USED.
- ONE (1) 1.5 INCH NPT INLET FOR ONE PRODUCT.
- EXPLOSION-PROOF JUNCTION BOX IN HYDRAULIC CABINET TO MAKE ALL DISPENSER POWER AND CONTROL WIRING TERMINATIONS.
- WARRANTY: ONE YEAR PARTS AND LABOR.
- STANDARDS/APPROVALS: ADA COMPLIANT USER CONTROLS PER ANSI A117.1; C-UL-US LISTED; FCC, W&M APPROVALS.

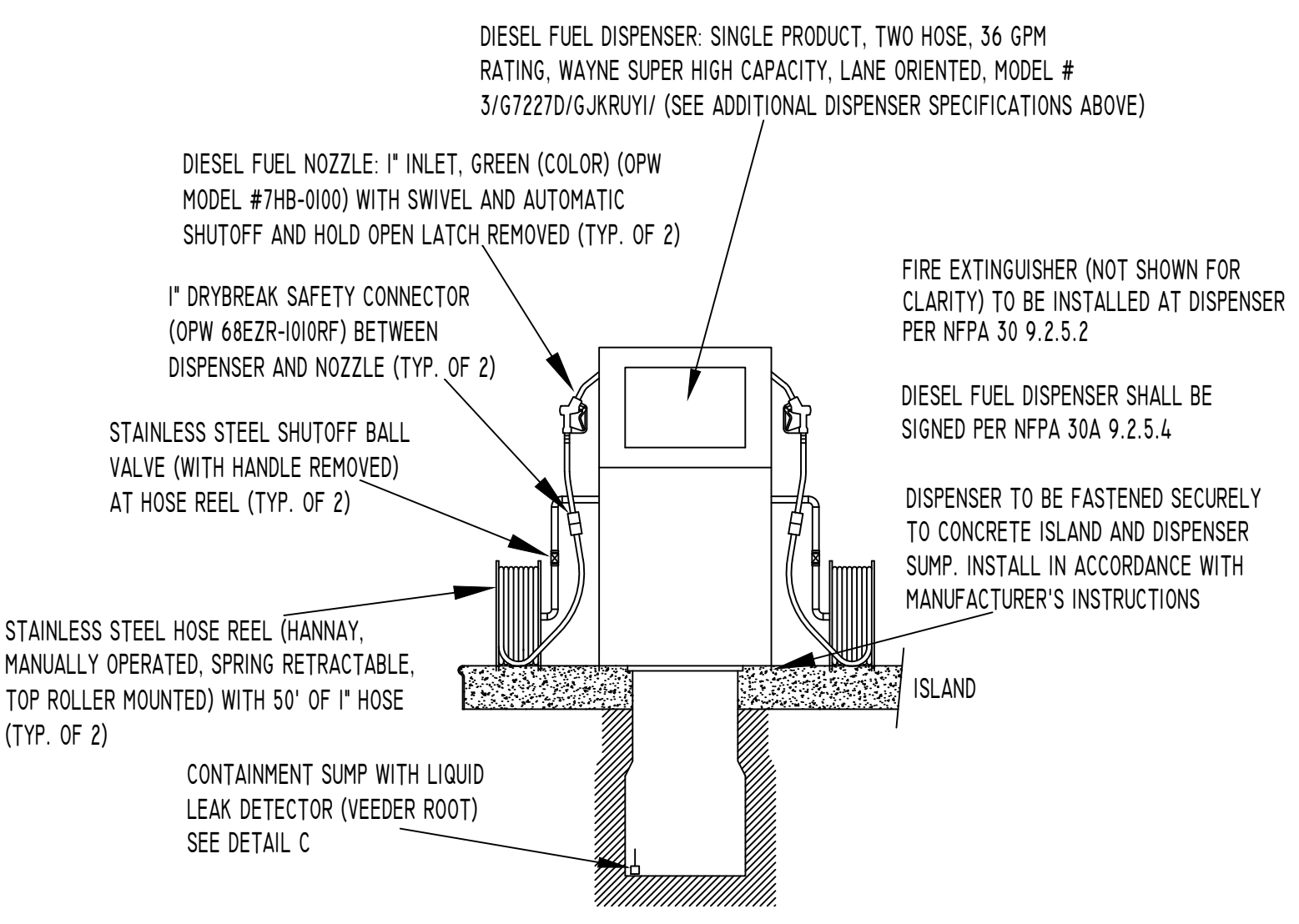


**DETAIL F**  
4" OPW CARRIER PIPE COUPLING  
NOT TO SCALE

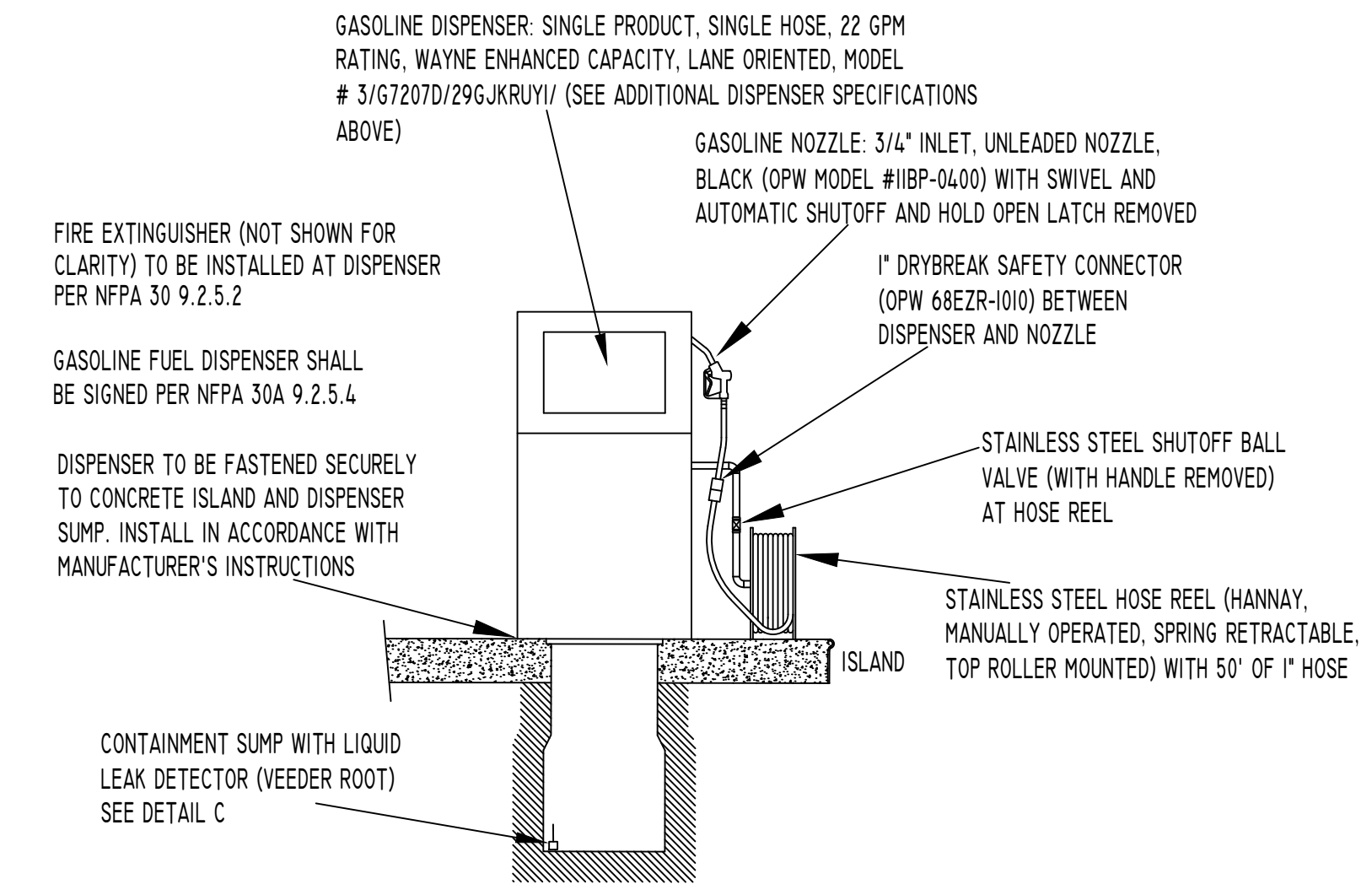


**DETAIL C**  
DIESEL FUEL AND GASOLINE DISPENSER  
CONTAINMENT SUMP  
NOT TO SCALE

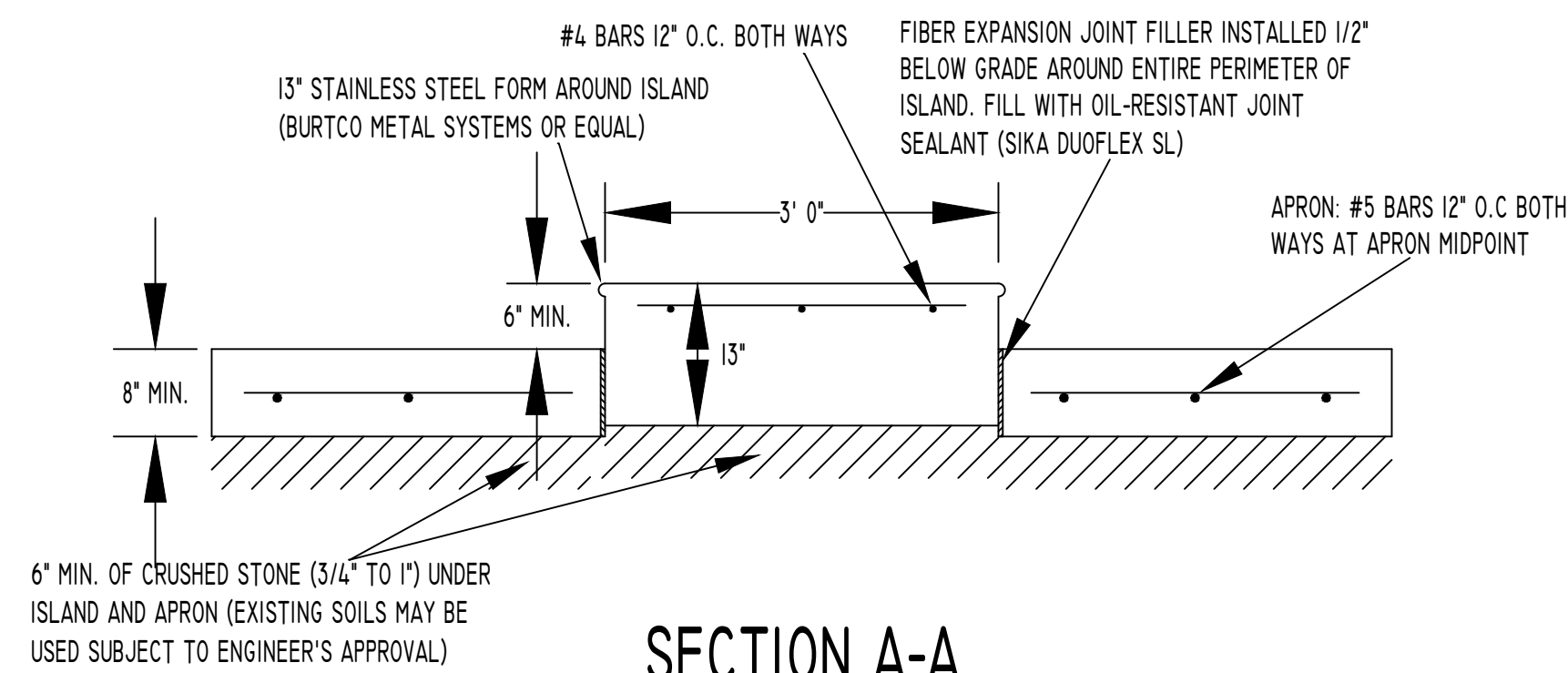
xxx.x PROPOSED ELEVATION



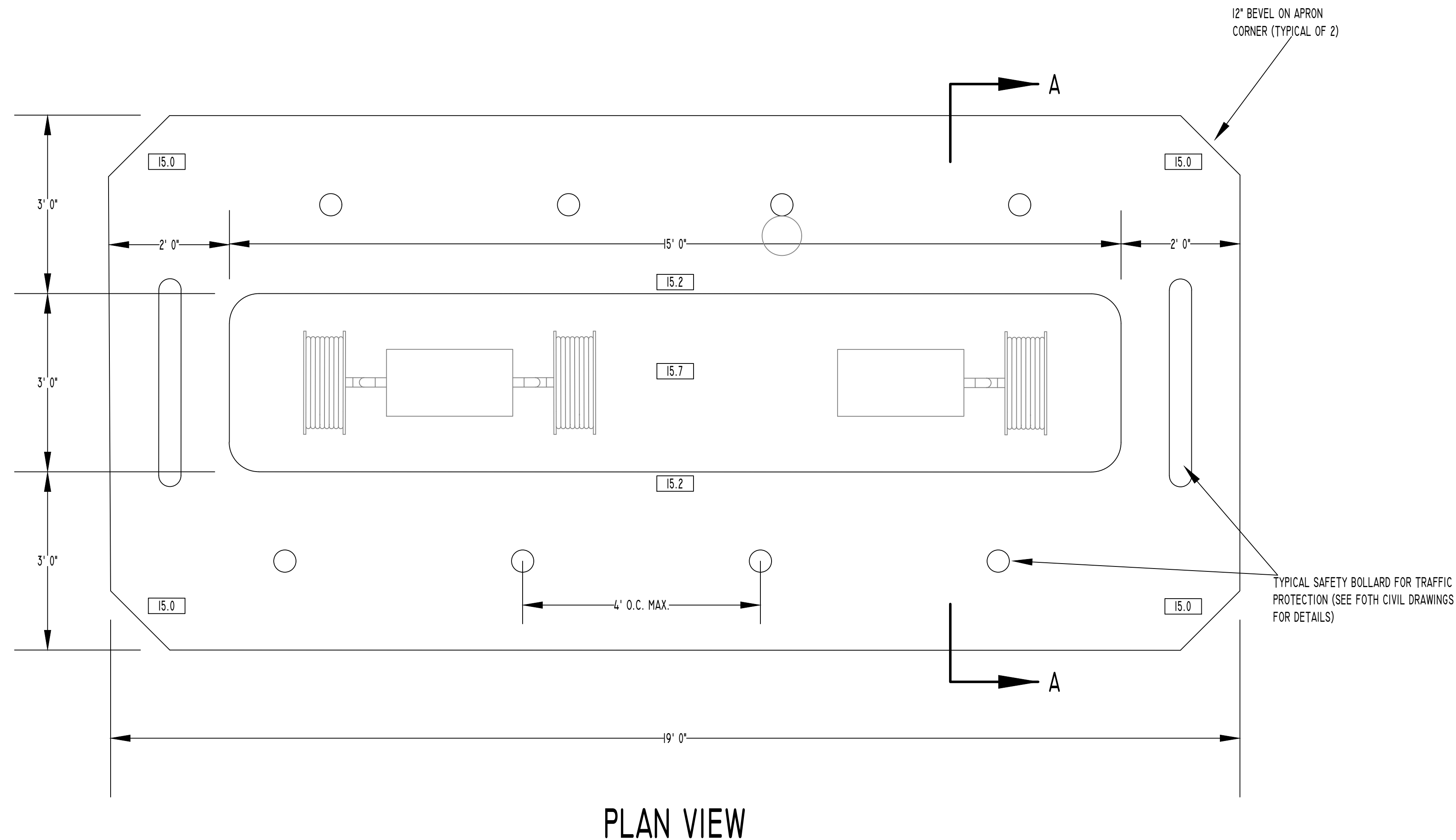
**DETAIL D**  
DIESEL FUEL DISPENSER  
NOT TO SCALE



**DETAIL E**  
GASOLINE DISPENSER  
NOT TO SCALE



SECTION A-A  
FUELING ISLAND AND APRON  
NOT TO SCALE



PLAN VIEW

GENERAL GEOTECHNICAL AND CONCRETE NOTES:

- 1) ALL CONSTRUCTION SHALL BE IN CONFORMANCE WITH THE LATEST STATE OF NEW MASSACHUSETTS BUILDING CODE.
  - 2) ALL CONCRETE WITH MAX WC-0.45 SHALL ATTAIN A MINIMUM COMPRESSIVE STRENGTH OF 4000 PSI AT THE END OF 28 DAYS EXCEPT AS NOTED. PROVIDE PROOF OF COMPRESSION THROUGH A MINIMUM OF FIVE FIELD SAMPLES CYLINDERS PER CONCRETE POUR. (CRACK FIRST AT 7 DAYS AND THREE AT 28, AND ONE HELD) ALL EXTERIOR EXPOSED CONCRETE SHALL BE AIR ENTRAINED. (NOMINAL 6%) ALL PROPOSED CONCRETE MIXES SHALL BE SUBMITTED TO THE ENGINEER FOR APPROVAL PRIOR TO CONSTRUCTION. ALL APPROVED MIX DESIGNS SHALL BE IN STRICT CONFORMANCE TO CHAPTER 4 OF ACI 318. ALL CONCRETE SHALL CONFORM TO ACI 350R CONCRETE SANITARY ENGINEERING STRUCTURES. PROVIDE PROCEDURES FOR CURING CONCRETE TO ENGINEER FOR APPROVAL.
  - 3) ALL REINFORCING STEEL, EXCEPT AS OTHERWISE NOTED, SHALL BE DEFORMED BARS CONFORMING TO ASTM DESIGNATION A615 GRADE 60.
  - 4) SHORE, SHEET AND BRACE EXCAVATIONS AS REQUIRED TO ASSURE COMPLETE SAFETY AGAINST COLLAPSE OF EARTH AND DAMAGE TO ADJACENT PROPERTY INCLUDING BUT NOT LIMITED TO EXISTING STREETS, OF EARTH AND DAMAGE TO ADJACENT PROPERTY INCLUDING BUT NOT LIMITED TO EXISTING STREETS, BUILDING AND UTILITY LINES. ALL SHORING, SHEETING AND BRACING SHALL BE DESIGNED BY A REGISTERED PROFESSIONAL ENGINEER.
  - 5) ALL EXCAVATIONS SHALL BE CARRIED DOWN TO UNDISTURBED MATERIAL HAVING A MINIMUM BEARING CAPACITY OF 2500 PSF OR SHALL BEAR ON COMPACTED FILL WHICH SHALL BE PREPARED IN THE FOLLOWING MANNER:
    - A) REMOVE ALL EXISTING FILL AND ORGANIC LOAMY MATERIAL TO ELEVATIONS SHOWN ON DESIGN DRAWINGS AS BEING UNSUITABLE.
    - B) STRUCTURAL FILL BACKFILLING FOR EXCAVATIONS AT COLUMNS AND SLAB ON GRADE UNDERLAYMENT (TO WITHIN 6" OF THE BOTTOM OF SLAB BOTTOM).
- | SIEVE SIZE | % PASS |
|------------|--------|
| 3-1/2"     | 100    |
| 3/4"       | 50-100 |
| NO. 4      | 25-75  |
- C) THE 6" IMMEDIATELY BELOW THE CONCRETE TO BE PROCESSED STONE BASE MEETING C700T 817 SECTION M.05.01 WITH MAX GRAIN SIZE 1.25".
  - D) COMPACTION SHALL BE CARRIED OUT ONLY WHILE A COMPETENT INSPECTOR, APPROVED BY THE ENGINEER, IS ON THE PROJECT. COMPACT TO AT LEAST 95% OF MODIFIED OPTIMUM DENSITY, PER ASTM D1557.
  - E) DEPTH OF EXCAVATION REQUIRED IS ESTIMATED AND NOT TO BE CONSTRUED AS LIMITING IN ANY WAY THE AMOUNT OF EXCAVATION REQUIRED TO REACH GOOD BEARING. NO FOOTINGS OR CONCRETE ARE TO BE PLACED IN WATER OR ON FROZEN GROUND.
- 6) SHOP DRAWINGS, REVIEWED BY THE GENERAL CONTRACTOR, FOR REINFORCING, AND POUR SCHEDULES SHALL BE SUBMITTED TO THE ENGINEER AND A STAMPED APPROVAL RECEIVED BEFORE FABRICATION CAN PROCEED. ERECTION SHALL BE MADE FROM SHOP DRAWINGS ONLY.
  - 7) ALL TYPES OF SLABS AND BEAMS SHALL BE PLACED WITHOUT HORIZONTAL CONSTRUCTION JOINTS. VERTICAL CONSTRUCTION JOINTS AND STOPS IN CONCRETE WORK SHALL BE MADE AT THE MIDSPAN OR AT POINTS OF MINIMUM SHEAR. PROVIDE DOWELS AT VERTICAL SLAB CONSTRUCTION JOINTS OF AN EQUIVALENT OF 0.5% OF THE VERTICAL CONCRETE JOINT AREA.
  - 8) CONSTRUCTION JOINTS MAY NOT BE ADDED, EXCEPT WITH THE APPROVAL OF AN ENGINEER.
  - 9) ALL SHORING SHALL REMAIN IN PLACE UNTIL CONCRETE HAS ATTAINED 75% OF ITS 28 DAY STRENGTH.
  - 10) ALL REINFORCING, INCLUDING COLUMN AND PIER TIES, SHALL BE DETAILED IN ACCORDANCE WITH ACI MANUAL AS AMENDED TO DATE.
  - 11) WHERE CONTINUOUS BARS ARE CALLED FOR, INDICATED, OR REQUIRED, THEY SHALL BE RUN CONTINUOUSLY AROUND CORNERS, LAPPED AT NECESSARY SPLICES, SPLICES STAGGERED WHEREVER POSSIBLE, AND HOOKED AT DISCONTINUOUS ENDS. LAPS SHALL BE CLASS B.
  - 12) PROVIDE AND SCHEDULE WITH REBAR PLACEMENT SHOP DRAWINGS, ACCESSORIES TO HOLD THE REINFORCING PER ACI 318 CODE AND ACI 315 DETAILING MANUAL.
  - 13) CLEARANCE OF MAIN REINFORCING BARS FROM ADJACENT CONCRETE SURFACES SHALL BE:
  - 14) WHERE UNFORMED FACE OF CONCRETE IS IN CONTACT WITH EARTH, 3"
  - 15) WHERE FORMED FACE OF CONCRETE IS IN CONTACT WITH EARTH, OR EXPOSED TO WEATHER, 2"
  - 16) THE MAXIMUM ALLOWABLE DEVIATION FROM THE FIGURES ABOVE, WHEN PLACING REINFORCING IN THE FORMS, SHALL BE 1/4" FOR ALL SHAPES.
  - 17) COORDINATE ALL CONCRETE CONSTRUCTION WITH EQUIPMENT LOCATIONS AND MANUFACTURER'S REQUIREMENTS.
  - 18) ALL EXPOSED CONCRETE EDGES TO HAVE CHAMFER (ENGINEER TO APPROVE ALL CHAMFER STRIPS)
  - 19) ALL CONCRETE TO BE CONTINUOUSLY AND ADEQUATELY VIBRATED DURING PLACEMENT.

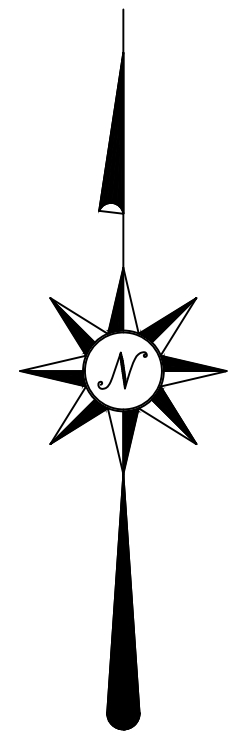
XX.X PROPOSED ELEVATION

FOOTPRINT OF DISPENSERS AND HOSE REELS

DATE	REVISION

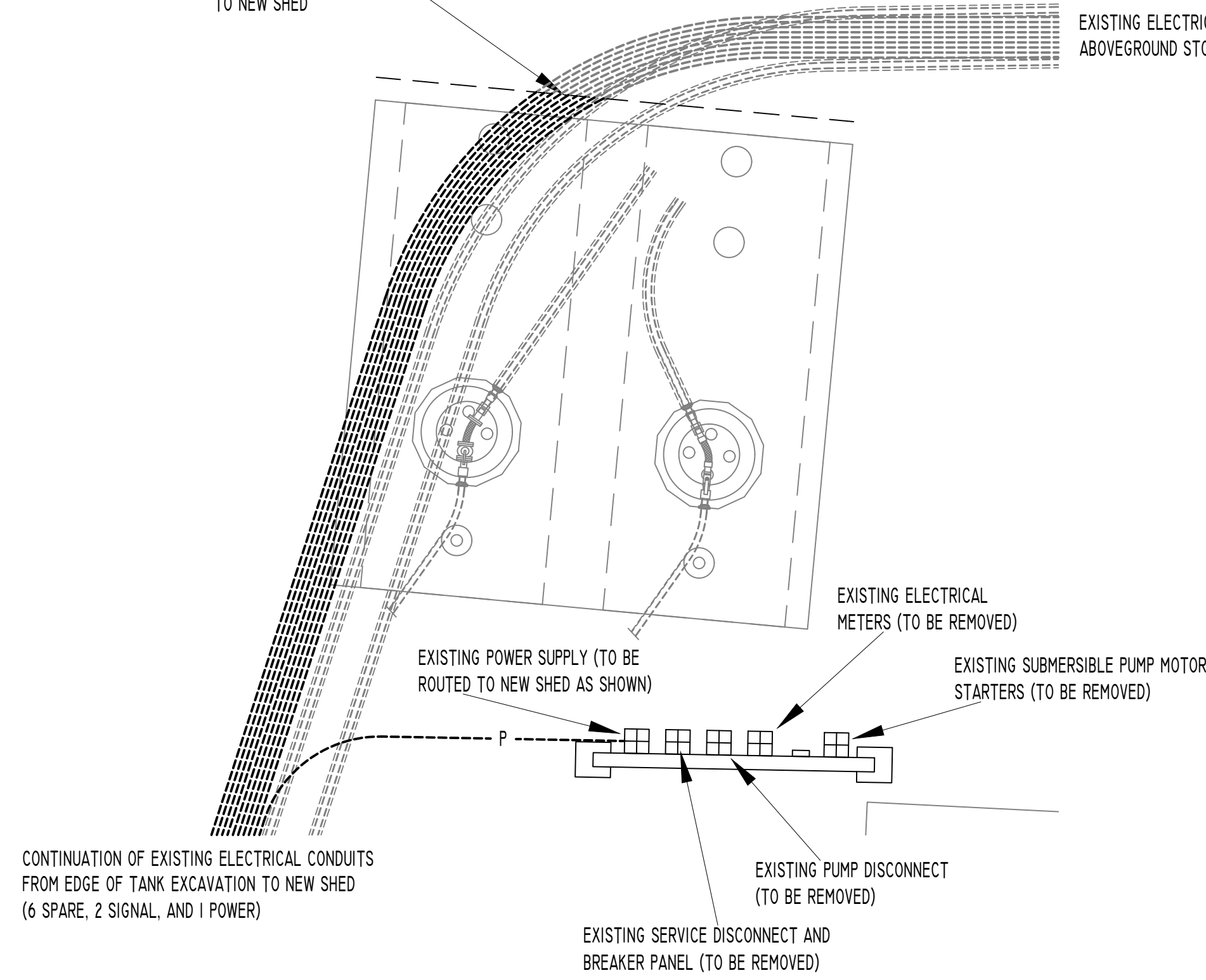
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DRAWN BY: JAS  
DATE: 2/6/24  
JOB #: 22-E-012  
WEB DRAWING NO. 24006  
SCALE: 3/4" = 1'





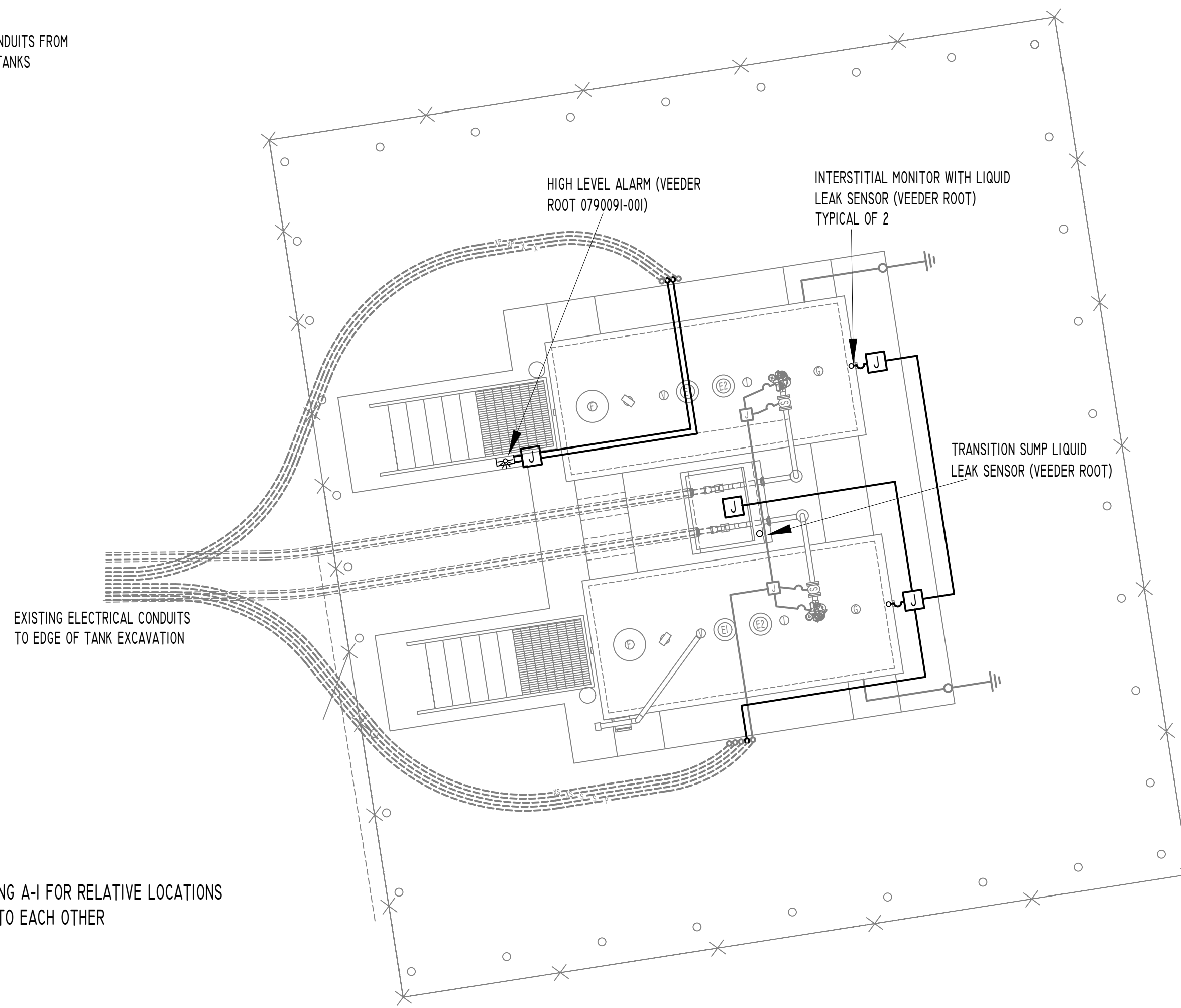
UPON REMOVAL OF EXISTING TANK PAD AND EXCAVATION OF TANK TOP COVER MATERIAL, EXISTING ELECTRICAL CONDUITS TO BE TRIMMED BACK TO EDGE OF TANK FIELD EXCAVATION. AFTER BACKFILLING OF TANK EXCAVATION, EXISTING CONDUITS TO BE COUPLED TO NEW AND EXTENDED TO NEW SHED

EXISTING ELECTRICAL CONDUITS FROM ABOVEGROUND STORAGE TANKS



EXISTING ELECTRICAL EQUIPMENT AND FORMER UST AREA

SEE DRAWING A-I FOR RELATIVE LOCATIONS OF AREAS TO EACH OTHER



ABOVEGROUND STORAGE TANK AREA

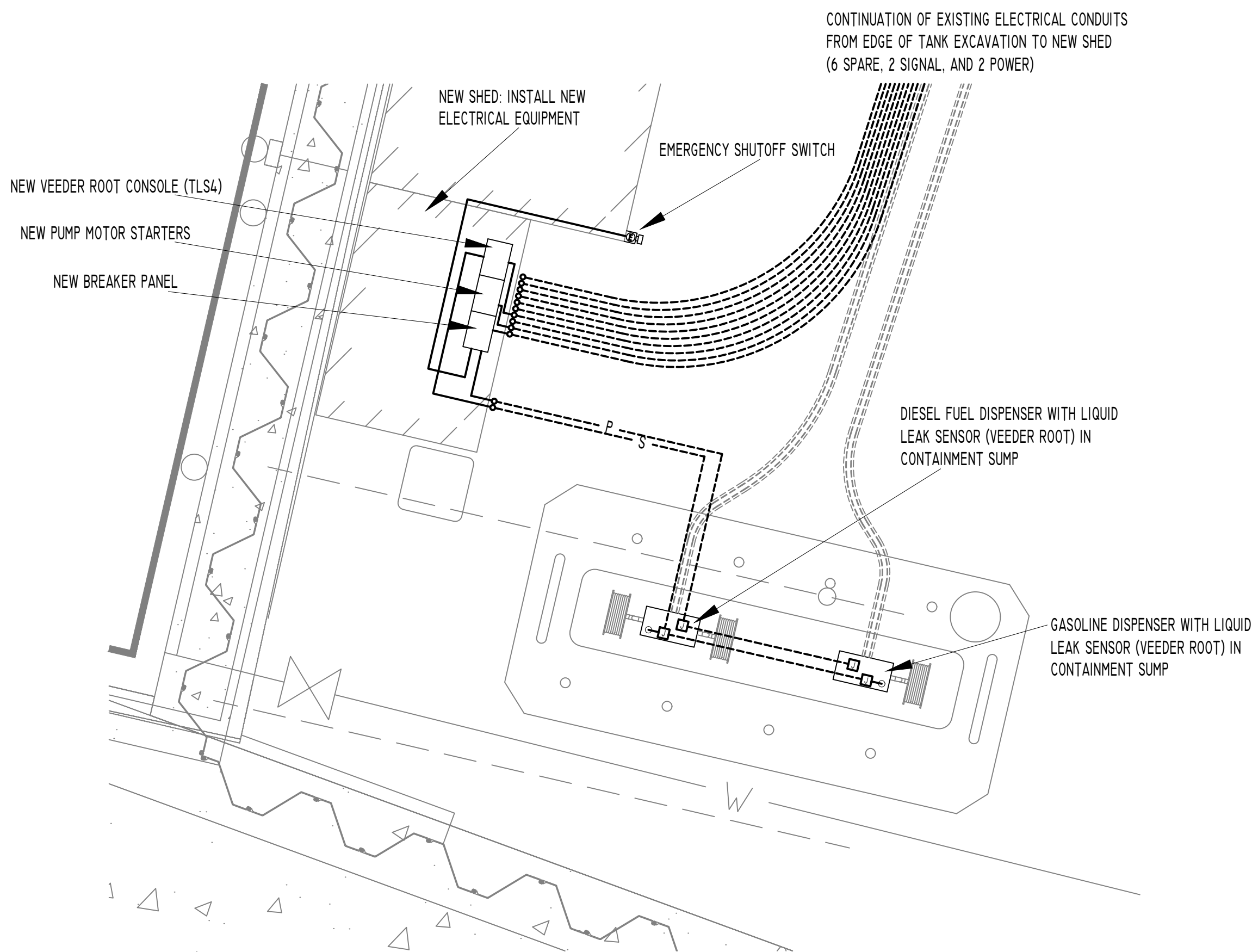
GENERAL ELECTRICAL NOTES:

- 1) WORK SHALL BE PERFORMED IN CONFORMANCE TO THE LATEST EDITION OF THE NATIONAL ELECTRICAL CODE (NEC)
- 2) EQUIPMENT AND DEVICES ARE TO BE INSTALLED AS INDICATED IN THEIR MANUFACTURERS' INSTRUCTIONS AND NOTE 1 ABOVE.
- 3) FEEDER AND CONTROL RACEWAYS ARE TO CONTAIN COPPER CONDUCTORS OF A MINIMUM SIZE OF #12 AWG AND USE CONDUITS OF A MINIMUM SIZE OF 3/4 INCH. CONDUCTOR INSULATION COLORS ARE TO FOLLOW THE GENERAL ELECTRIC "GEOTROL" COLOR CODE.
- 4) PANEL SCHEDULES ARE TO BE UPDATED BY TYPING IN THE INFORMATION FOR CIRCUITS CONNECTED.
- 5) ABOVEGROUND RACEWAYS SHALL BE RIGID GALVANIZED STEEL WITH RIGID GALVANIZED STEEL FITTINGS INSTALLED PER MANUFACTURERS' INSTRUCTIONS TO CREATE A WATER-TIGHT CORROSION RESISTANT RACEWAY. ALL RIGID GALVANIZED STEEL CONDUIT AND FITTINGS TO BE PVC COATED (ROBOY OR EQUAL). ALL EXPOSED GALVANIZED STEEL TO BE TOUCHED UP IN FIELD AFTER INSTALLATION.
- 6) UNDERGROUND RACEWAYS SHALL BE SCHEDULE 40 PVC ELECTRICAL CONDUIT. PVC SHALL CONVERT TO GALVANIZED STEEL UNDERGROUND A MINIMUM 2 FEET BEFORE CONVERTING BACK TO ABOVE GRADE OR INSIDE A SUMP.
- 7) FUEL ISLAND ELECTRICAL EQUIPMENT IS TO BE FED FROM SWITCHED NEUTRAL BREAKERS THROUGH A CONTACTOR THAT DISCONNECTS POWER, NEUTRAL, AND GROUND CONDUCTORS FOR EACH ITEM. THE CONTRACTOR IS TO BE ACTIVATED IN A FAILSAFE MODE BY THE E-STOP BUTTONS.
- 8) ALL BURIED ELECTRICAL TO HAVE CAUTION TAPE INSTALLED JUST BELOW GRADE AS SHOWN IN DETAIL A ON DRAWING M-2

ALL ELECTRICAL EQUIPMENT TO HAVE LOCK OUT TAG OUT CAPABLE DISCONNECT SWITCHES.

EMERGENCY SHUTOFF DEVICES OR ELECTRICAL DISCONNECTS SHALL DISCONNECT POWER TO ALL DISPENSING DEVICES, ALL REMOTE PUMPS SERVING THE DISPENSING DEVICES, ALL ASSOCIATED POWER, CONTROL, AND SIGNAL CIRCUITS, AND ALL OTHER ELECTRICAL EQUIPMENT IN THE HAZARDOUS (CLASSIFIED) LOCATIONS SURROUNDING THE FUEL DISPENSING DEVICES. WHEN MORE THAN ONE EMERGENCY SHUTOFF DEVICE OR ELECTRICAL DISCONNECT IS PROVIDED, ALL DEVICES SHALL BE INTERCONNECTED. RESETTING FROM AN EMERGENCY SHUTOFF CONDITION SHALL REQUIRE MANUAL INTERVENTION AND THE MANNER OF RESETTING SHALL BE APPROVED BY THE AUTHORITY HAVING JURISDICTION.

NOTE: CONTRACTOR TO DEMONSTRATE PROPER INSTALLATION OF SPARE ELECTRICAL CONDUITS BY BLOWING STRING THROUGH CONDUITS. STRING SHALL BE LEFT IN PLACE AND SUITABLY ACCESSIBLE FOR FUTURE ELECTRICAL WORK



NEW ELECTRICAL SHED AND DISPENSER ISLAND AREA

ELECTRICAL, BONDING, LIGHTNING PROTECTION, AND GROUNDING NOTES:

- 1) ALL ELECTRICAL CONSTRUCTION SHALL MEET OR EXCEED ALL APPLICABLE MASSACHUSETTS STATE ELECTRICAL CODES AND THE NATIONAL ELECTRICAL CODE FOR HAZARDOUS USE AREAS.
- 2) ELECTRICAL CLASSIFICATION: CLASS I, DIV 1/2
- 3) GROUNDING AND BONDING TO MEET OR EXCEED NFPA 30-2021 6.5.4.1. PROVIDE ONE GROUNDING ROD AT EACH TANK: 1/2" X 10' DRIVEN SOLID COPPER.
- 4) ABOVE GROUND STORAGE TANKS, STAINLESS STEEL PIPING, AND CONCRETE REINFORCEMENT TO BE INCLUDED IN LIGHTNING PROTECTION/GROUNDING SYSTEM.
- 5) ALL CONNECTIONS TO BE MADE WITH #2 BARE STRANDED COPPER WIRE.

CONDUIT SIZES ARE MINIMUM SIZES. CONTRACTOR MAY COMBINE WIRE IN CONDUIT IN STRICT ACCORDANCE WITH THE NATIONAL ELECTRICAL CODE AND EQUIPMENT MANUFACTURER'S REQUIREMENTS.

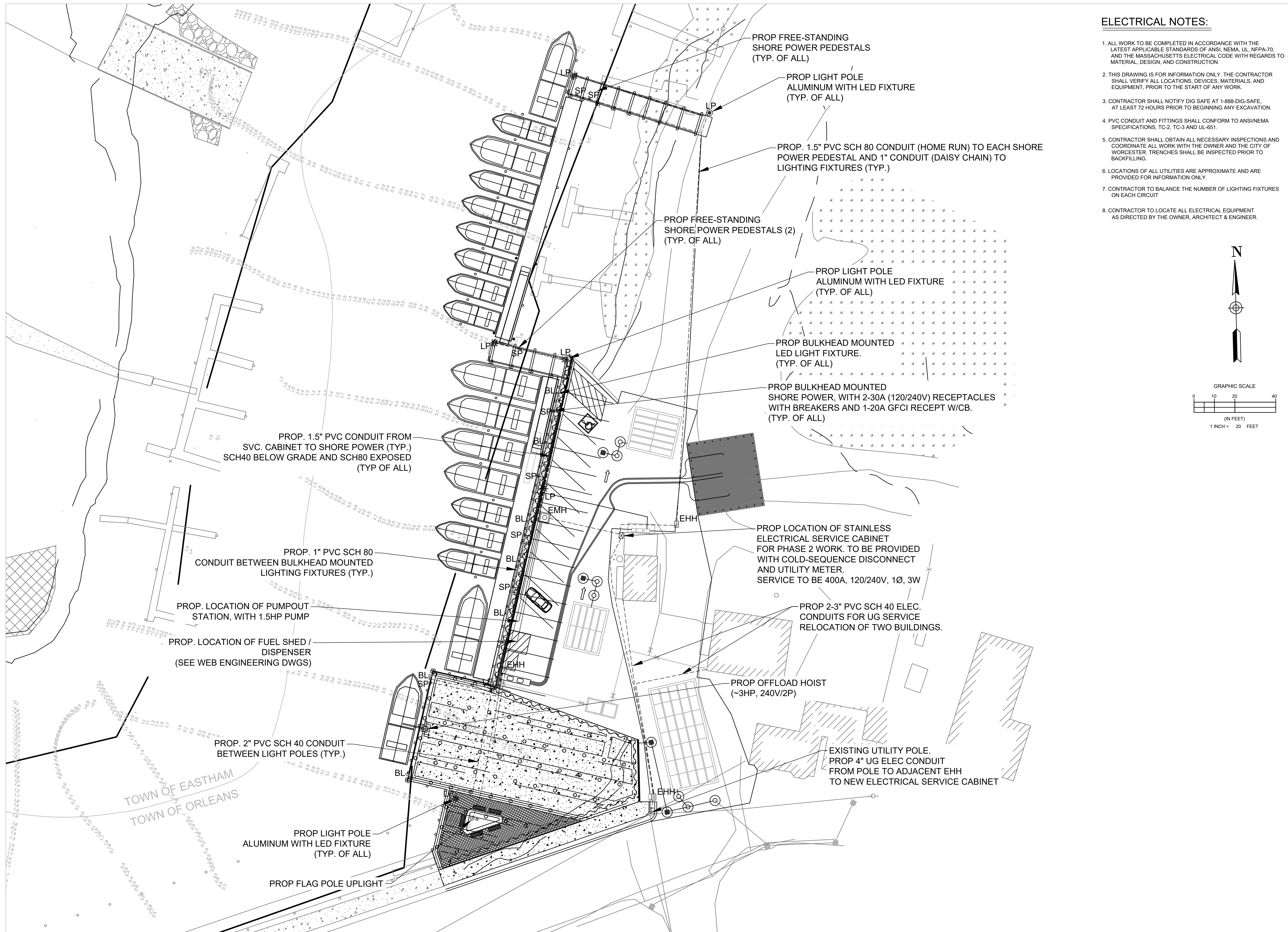
LOCATION OF CONDUITS SHOWN IS SCHEMATIC ONLY.

	JUNCTION BOX - SIZED PER NEC BY CONTRACTOR
	JUNCTION BOX WITH FLEXIBLE CONDUIT CONNECTION
	UNDERGROUND CONDUIT (POWER)
	UNDERGROUND CONDUIT (SIGNAL)
	ABOVEGROUND CONDUIT (POWER)
	ABOVEGROUND CONDUIT (SIGNAL)
	UNDERGROUND CONDUIT (X-SPARE, XP-SPARE POWER, XS-SPARE SIGNAL)
	CONDUIT "STUB UP" (TRANSITION FROM BURIED TO ABOVE GRADE)

DATE	REVISION

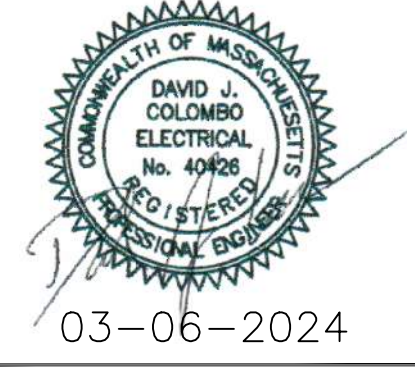
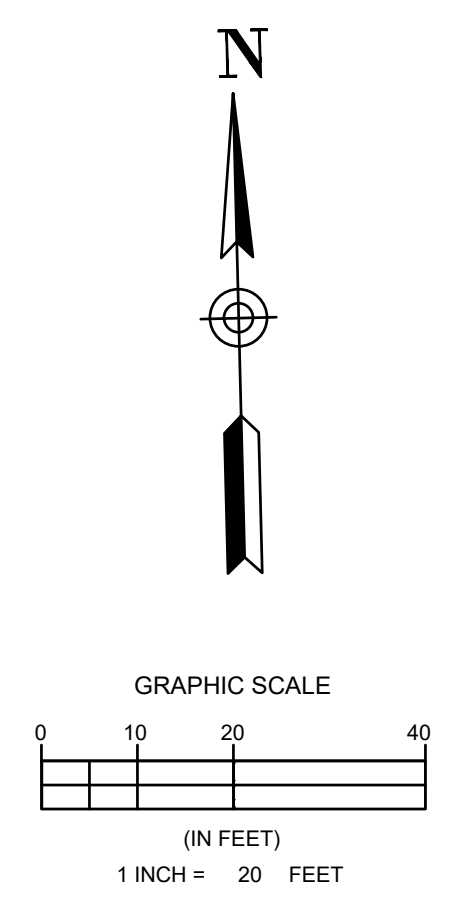
FILE: ELECTRICAL A  
DRAWN BY: JAS  
DATE: 2/6/24  
JOB #: 22-E-012  
WEB DRAWING NO. 24007  
SCALE: 1/4" = 1'





**ELECTRICAL NOTES:**

1. ALL WORK TO BE COMPLETED IN ACCORDANCE WITH THE LATEST APPLICABLE STANDARDS OF ANSI, NEMA, UL, NFPA-70, AND THE MASSACHUSETTS ELECTRICAL CODE WITH REGARDS TO MATERIAL, DESIGN, AND CONSTRUCTION.
2. THIS DRAWING IS FOR INFORMATION ONLY. THE CONTRACTOR SHALL VERIFY ALL LOCATIONS, DEVICES, MATERIALS, AND EQUIPMENT, PRIOR TO THE START OF ANY WORK.
3. CONTRACTOR SHALL NOTIFY DIG SAFE AT 1-888-DIG-SAFE, AT LEAST 72 HOURS PRIOR TO BEGINNING ANY EXCAVATION.
4. PVC CONDUIT AND FITTINGS SHALL CONFORM TO ANSINEMA SPECIFICATIONS, TC-2, TC-3 AND UL-651.
5. CONTRACTOR SHALL OBTAIN ALL NECESSARY INSPECTIONS AND COORDINATE ALL WORK WITH THE OWNER AND THE CITY OF WORCESTER. TRENCHES SHALL BE INSPECTED PRIOR TO BACKFILLING.
6. LOCATIONS OF ALL UTILITIES ARE APPROXIMATE AND ARE PROVIDED FOR INFORMATION ONLY.
7. CONTRACTOR TO BALANCE THE NUMBER OF LIGHTING FIXTURES ON EACH CIRCUIT
8. CONTRACTOR TO LOCATE ALL ELECTRICAL EQUIPMENT AS DIRECTED BY THE OWNER, ARCHITECT & ENGINEER.



**DEPARTMENT OF PUBLIC WORKS  
TOWN OF ORLEANS, MASSACHUSETTS  
ROCK HARBOR COMMERCIAL  
WHARF IMPROVEMENTS**

REVISIONS		DESCRIPTION	
NO	DATE	BY	
1			
2			
3			
4			

DATE OF PREPARATION: \_\_\_\_\_

SURVEYED	BY	DATE
MEC/JAH		10/24/19 & 3/2/21
DRAWN	DJC	3/6/2024
DESIGNED	DJC	3/6/2024
CHECKED	DJC	3/6/2024

ISSUANCE: **ISSUED FOR BID**

PROJECT NO: 00190004.10  
SHEET NUMBER: \_\_\_\_\_  
**ELECTRICAL  
SITE PLAN**  
E-101

SYMBOL	DESCRIPTION	NOTES
<b>LIGHTING FIXTURES</b>		
FP	WALL OR CEILING MOUNTED LIGHTING FIXTURE	UPPER CASE LETTERS INDICATE FIXTURE TYPE. REFER TO FIXTURE SCHEDULE FOR MANUFACTURER SUBSCRIPT LOWER CASE LETTERS INDICATE SWITCH CONTROL ASSOCIATIONS 
FP	SHADING OF FIXTURES THIS: 	
FP	INDICATES FIXTURE ON NIGHT/EMERGENCY CIRCUIT OR EMERGENCY BATTERY BACK UP BALLAST WHERE APPLICABLE. CONTRACTOR SHALL CONFIRM LOCATION OF REMOTE EMERGENCY BALLAST WITH ARCHITECT PRIOR TO PURCHASE AND INSTALLATION.	
FP	EMERGENCY BALLAST SHALL BE SIMILAR TO BODINE BOOST OR B30 WITH INTEGRAL INDICATOR LIGHT TEST SWITCH. PROVIDE 2 LAMP APPLICATION WHERE APPLICABLE.	
FP	CONTRACTOR SHALL PROVIDE ALL MOUNTING HARDWARE APPLICABLE TO CEILING, WALL, AND FLOOR TYPE INTO WHICH FIXTURE IS INSTALLED.	
FP	CONTRACTOR SHALL COORDINATE MOUNTING HEIGHT WITH ARCHITECTURAL INTERIOR/EXTERIOR ELEVATIONS. CONTRACTOR SHALL COORDINATE AND CONFIRM K RATING OF LAMPS TO ACHIEVE COLOR AS PER ARCHITECT.	
FP	CONTRACTOR SHALL FURNISH AND SUPPLY ANY STEP DOWN TRANSFORMERS FOR ANY LOW VOLTAGE LIGHTING	
<b>EMERGENCY LIGHTING</b>		
EB	EMERGENCY LIGHTING WITH BATTERY UNIT	ALL EMERGENCY BATTERY PACKS SHALL HAVE REMOTE HEAD CAPABILITY UNLESS NOTED OTHERWISE
ER	DUAL REMOTE EMERGENCY LIGHTING HEAD	
ER	SINGLE REMOTE EMERGENCY LIGHTING HEAD	
<b>EXIT SIGNS</b>		
WP	CEILING MOUNTED EXIT SIGN	ALL EXIT SIGNS SHALL BE FURNISHED WITH INTERNAL 90 MINUTE BATTERY UNLESS NOTED OTHERWISE
WP	WALL MOUNTED EXIT SIGN	APPLICATION OF SHADDED QUADRANTS AND ARROWS THIS: 
WP	INDICATE LETTERED FACE AND DIRECTIONAL CHEVRONS AS REQUIRED	
WP	UPPER CASE LETTERS INDICATE REFERENCE TO LIGHTING FIXTURE SCHEDULE	
<b>WIRING DEVICES-SWITCHES</b>		
SW	SINGLE POLE SWITCH	20A 120-277V AC "WP" - INDICATES WEATHER PROOF
SP	SINGLE POLE SWITCH WITH PILOT LIGHT	
S2	DOUBLE POLE SWITCH	SUBSCRIPT UPPER CASE LETTERS DENOTE SWITCH TYPE AS LISTED IN NON-STANDARD SWITCHES
S3	THREE-WAY SWITCH	UNLESS NOTED OTHERWISE SWITCHES SHALL BE MOUNTED 48" TO CENTER LINE AFF
S4	FOUR-WAY SWITCH	
ST	SPRING WOUND INTERVAL TIME SWITCH	TORK OR EQUAL 30 MINUTE MAX
D	LINEAR SLIDE BAR DIMMER SWITCH	1500W-120 VOLT RATING UNLESS NOTED OTHERWISE
OC	CEILING MOUNTED CORRIDOR OCCUPANCY SENSOR (80' RADIUS)	WATT STOPPER: W-2000H CONTRACTOR SHALL FURNISH AND INSTALL ALL NECESSARY POWER PACKS, RELAYS, CABLES, AND CONTROL MODULES TO COMPLETE SYSTEM
OC	CEILING MOUNTED DUAL TECHNOLOGY SENSOR (1,600 sq ft)	WATT STOPPER: DT-300 SUBSCRIPT LOWER CASE LETTERS INDICATE SWITCH LEG CONTROL
OC	WALL MOUNTED DUAL TECHNOLOGY OCCUPANCY SENSOR	WATT STOPPER: DW-100
OC	WALL MOUNTED DUAL TECHNOLOGY DUAL RELAY SENSOR	WATT STOPPER: DW-200
OC	CEILING MOUNTED ON/OFF DAYLIGHT SENSOR	WATT STOPPER: LMS-105
<b>LIGHTING CONTROL SYSTEM</b>		
TC	7 DAY ASTRONOMICAL TIME CLOCK	TORK OR EQUAL
PC	WALL MOUNTED PHOTOCELL	
LC	LIGHTING CONTACTOR	
KS	KEY SWITCH LINE VOLTAGE	
MS	MASTER CONTROL SWITCH	
<b>TELECOMMUNICATION SYSTEMS</b>		
MHNC	MODULAR HOME NETWORK CENTER PROVIDE (1) DEDICATED 120V CIRCUIT & DOUBLE DUPLEX RECEPTACLE	PASS & SEYMOUR OR EQUAL
W	WALL MOUNTED DATA OUTLET	4"x4" SQUARE OUTLET BOX WITH 1" BACK TO TELEPHONE CLOSET
W	WALL MOUNTED COMBINATION TEL/DATA OUTLET	P - DENOTES PUBLIC PAY PHONE W - DENOTES POWER FEED F - DENOTES MODULAR FURNITURE BEZEL (2)VOICE,(2)DATA OUTLETS BY OTHERS
W	WALL MOUNTED TEL OUTLET	
T	FIRE RATED FURNITURE FEED POKE THROUGH DEVICE FOR TEL/DATA CONNECTIONS TO ELECTRIFIED FURNITURE	
H-T	4" SQUARE OUTLET BOX WITH 1 1/2" GROMMETTED HOLE COVERPLATE FOR TEL/DATA CONNECTION TO ELECTRIFIED FURNITURE PARTITIONS, MOUNTED 8" AFF	
TV	WALL MOUNTED CABLE TV OUTLET	4"x4" SQUARE OUTLET BOX WITH 1" CONDUIT STUBBED 6" ABOVE ACCESSIBLE CEILING SEE ARCH PLAN FOR MOUNTING HEIGHT
TV	CEILING MOUNTED CABLE TV OUTLET	
CT	CABLE TRAY	12" WIDE, 4" DEEP, CENTER SPLINE EQUAL TO WIREMOLD SPECIMATE. PROVIDE ALL CONNECTORS AND HARDWARE FOR INSTALLATION OF LAYOUT SHOWN

SYMBOL	DESCRIPTION	NOTES
<b>WIRING DEVICES - RECEPTACLES</b>		
1	WALL DUPLEX CONVENIENCE OUTLET MTD 18" AFF	20A/125V, 2P, 3W, GNDG., NEMA 5-20R SHADING OF SYMBOL THIS: 
1G	CEILING MOUNTED DUPLEX CONVENIENCE OUTLET	INDICATES RECEPTACLE WITH EACH HALF SEPARATELY WIRED. (HALF CONSTANT HALF SWITCH CONTROLLED)
1G	ISOLATED GROUND DUPLEX CONVENIENCE OUTLET	"1"- INDICATES CIRCUIT NUMBER SUBSCRIPT LOWER CASE LETTERS INDICATE SWITCH CONTROL ASSOCIATIONS SHADING OF SYMBOL THIS: 
H	HOSPITAL GRADE DUPLEX CONVENIENCE OUTLET	INDICATES RECEPTACLE MTD 6" ABOVE CENTER TO CENTER LINE OR 48" AFF UNLESS NOTED OTHERWISE
H	WALL MTD SINGLE CONVENIENCE OUTLET	"WP" - INDICATES WEATHER PROOF "GT" DENOTES GROUND FAULT INTERRUPTING TYPE RECEPTACLE ALL POWER OUTLET FACEPLATES SHALL BE LABELED WITH CIRCUIT NUMBER AND PANEL DESIGNATION FEEDING OUTLET
USB	DUPLEX CONVENIENCE OUTLET ARCHITECTED WITH USB OUTLET	
H9	WALL MOUNTED SPECIAL PURPOSE POWER RECEPTACLE	NUMERAL WITHIN SQUARE DENOTES RECEPTACLE TYPE AS LISTED IN SCHEDULE OF NON-STANDARD RECEPTACLES
P	FIRE RATED FURNITURE FEED POKE THROUGH DEVICE FOR POWER CONNECTIONS TO ELECTRIFIED FURNITURE	
H9P	4" SQUARE OUTLET BOX TO OUTLETS LOCATED IN FURNITURE PARTITIONS (SEE FLOOR PLANS)	
<b>WIRING DEVICES - MISCELLANEOUS</b>		
PP	2 CHANNEL PWR/DATA POWER POLE WITH ELEC DEVICES AND PLATES	WIREMOLD AMDPPT SERIES OR EQUAL
PP	2 PIECE SURFACE MTD RACEWAY WITH 20A DUPLEX RECEPTACLES SPRING AS SHOWN ON ELECTRICAL PLANS	WIREMOLD OR EQUAL
PP	2 PIECE MULTI-CHANNEL RACEWAY WITH 20A DUPLEX RECEPTACLES AND DATA OUTLETS SPRING AS SHOWN ON ELECTRICAL PLANS	WIREMOLD OR EQUAL
PP	FLUSH FLOOR MOUNTED POWER/DATA CONVENIENCE RECEPTACLES	POKE THRU APPLICATION: 2 HOUR RATED, WIREMOLD RC SERIES OR EQUAL, COORDINATE FINAL POWER AND TEL/DATA TERMINATIONS WITH TENANT FLOOR TRENCH APPLICATION: DEEP RECTANGULAR CAST IRON BOX WIREMOLD OR EQUAL PROVIDE 1" FROM TEL/DATA TO 6" AFF. CONTRACTOR SHALL SUPPLY ALL COVERS AND FACE PLATES SPECIFIC TO SERIES
<b>JUNCTION BOXES</b>		
J	CEILING MOUNTED JUNCTION BOX	
J	WALL MOUNTED JUNCTION BOX	
J	SURFACE MOUNTED JUNCTION BOX	
J	FLUSH FLOOR MOUNTED JUNCTION BOX	
J	PULL BOX	
J	JUNCTION BOX WITH FLEXIBLE CONNECTION TO EQUIPMENT	P - DENOTES POWER FEED C - DENOTES COMMUNICATIONS FEED
<b>MOTORS AND CONTROLS</b>		
M	MOTOR	COMPLETE INFO. FOR MOTOR IS INDICATED BY APPLICATION OF INDEXING SYMBOLS REFERENCE TO SCHEDULE OF MECHANICAL EQUIPMENT
M	MAGNETIC MOTOR STARTER COMPLETE W/ THERMAL OVERLOAD PROTECTION	SUBSCRIPT INDICATES NEMA SIZE COMPLETE INFORMATION FOR CONTROL ITEMS IS INDICATED BY THE APPLICATION OF INDEXING SYMBOL REFERENCE APPLIED TO ASSOCIATED EQUIP.
M	MANUAL MOTOR STARTER (THERMAL OVERLOAD SWITCH)	
M	VARIABLE FREQUENCY DRIVE	REFER TO HVAC SCHEDULE FOR MOTOR LOAD HORSEPOWER SIZE
M	CONTROL PANEL (MECHANICAL EQUIP)	FURNISHED AND INSTALLED BY OTHERS. WIRED BY THE ELECTRICAL CONTRACTOR
<b>DISTRIBUTION EQUIPMENT</b>		
M	SURFACE MOUNTED PANEL	
M	FLUSH MOUNTED PANEL	
M	SURGE SUPPRESSION	PROVIDE PER SPECIFICATIONS
M	TRANSFORMER	SEE ELECTRICAL PLANS FOR KVA RATING
M	GROUNDING PER SPECIFICATION	
M	METER SOCKET AND METER	METER SOCKET PROVIDED BY CONTRACTOR PROVIDED BY LOCAL UTILITY CO.
M	OVERCURRENT AND/OR SWITCHING DEVICES	COMPLETE INFORMATION FOR DEVICES IS INDICATED BY APPLICATION OF TAG SYMBOLS
M	"WP" - INDICATES WEATHER PROOF	
M	INDICATES UNFUSED SWITCH 30 - FRAME SIZE	
M	INDICATES FUSED SWITCH 30 - FRAME SIZE 15 - FUSE SIZE	
M	INDICATES ENCLOSED CIRCUIT BREAKER	
M	INDICATES COMBINATION FUSED SWITCH AND STARTER 30 - FRAME SIZE 15 - FUSE SIZE	
M	INDICATES COMBINATION ENCLOSED CIRCUIT BREAKER AND STARTER	
M	INDICATES BY OTHERS	
M	WALL MOUNTED EMERGENCY POWER OFF BUTTON	

SYMBOL	DESCRIPTION	NOTES
<b>BRANCH CIRCUITRY</b>		
↗	LIGHTING AND APPLIANCE BRANCH CIRCUITRY CONCEALED ABOVE	ARROW HEAD INDICATES HOME RUN CIRCUITRY TO 20A-1P CIRCUIT BREAKER (UNLESS NOTED OTHERWISE) NUMBER OF ARROW HEADS INDICATE NUMBER OF BRANCH POLES REQUIRED IN PANEL.
↘	LIGHTING BRANCH CIRCUITRY CONCEALED BELOW	CROSS MARKS INDICATE NUMBER OR NO. 12 WIRES IN 3/4" CONDUIT PLUS GROUND. ABSENCE OF CROSSMARKS INDICATES 2, 1, 2 GROUND
↖	LIGHTING AND APPLIANCE BRANCH RUN EXPOSED	HOME RUNS ARE INDICATED THIS: 
↗	INDIVIDUAL RUN TURNING UP	"1,2,3" DENOTES PANEL DESIGNATION. "1,2,3" DENOTES CIRCUIT NO'S 1,2,3 CONTAINING 20A 1P. CB'S IN PANELBOARD
↘	INDIVIDUAL RUN TURNING DOWN	CONDUIT RUNS REQUIRING CIRCUIT BREAKER GREATER THAN 20A-1P WIRE SIZE GREATER THAN 3/4" ARE NOTED THIS: 
↖	INDIVIDUAL RUN TURNING UP/DOWN	
<b>GENERAL CIRCUITRY</b>		
BS	BUSWAY	
CB	CIRCUIT BREAKER BUS PLUS, BREAKERS AS INDICATED	
FE	BUSWAY FEED/ LUG CONNECTION	
PE	IDENTIFICATION OF INDIVIDUAL RUN OTHER THAN BRANCH CIRCUITRY OR SECONDARY FEEDERS	PE - PRIMARY ELECTRIC TE - TELEPHONE TV - TELEVISION CAT - CABLE TELEVISION E - EMERGENCY
<b>SECONDARY FEEDERS</b>		
↗	FEEDER RUN CONCEALED ABOVE	ARROW HEAD INDICATES HOME RUN TO PANEL BOARD
↘	FEEDER RUN CONCEALED BELOW	
↖	FEEDER RUN AS PER SPECIFIC NOTATION	
<b>TAG SYMBOLS</b>		
HEX	INDEX SYMBOL	HEXAGONAL SYMBOLS CONTAINING TWO UPPER CASE LETTERS INDICATE REFERENCE TO A SCHEDULE OF SPECIAL EQUIPMENT
HEX	HEXAGONAL SYMBOLS CONTAINING UPPER CASE LETTERS AND NUMERICALS INDICATE REFERENCE TO SCHEDULE OF MECHANICAL EQUIPMENT	
HEX	HEXAGONAL SYMBOLS CONTAINING NUMERICALS ONLY INDICATE REFERENCE TO AN EXPLANATION OF ELECTRICAL WORK REQUIREMENT	
∧	GANGING CROSS REFERENCE	THE NOTED INDICATION ADJACENT TO A DEVICE DENOTES THAT THE DEVICE IS TO BE GANGED IN A BOX WITH ANOTHER DEVICE SIMILARLY NOTED AT THE SAME LOCATION ON ANOTHER DRAWING
( )	SPECIAL MOUNTING HEIGHT INDICATIONS	DIMENSION NOTED IN PARENTHESIS ADJACENT TO ANY ITEM OF THE DRAWINGS INDICATES THE HEIGHT OF IT'S HORIZONTAL CENTERLINE ABOVE FINISHED FLOOR
*	MOUNTING HEIGHT REFERENCE TO ARCHITECTURAL DRAWINGS	
□	LINE INDICATING PHYSICAL SIZE OF ELECTRICAL ITEMS	INDICATION USED CIRCUMSCRIBING OTHER SYMBOLS TO DELINEATE PHYSICAL SIZE
○	DETAIL TITLE ANNOTATION INDICATING DETAIL NUMBER	
⌋	WIRING DEVICE GANGING SYMBOL	GANGING SYMBOL SHOWN IN CIRCUITRY RUN IN COMBINATION WITH ANY WIRING DEVICE SYMBOL THIS: 
⌋	DENOTES WIRING DEVICES WHICH ARE TO BE GANGED IN A COMMON PLATE OUTLET	
<b>NURSE / EMERGENCY CALL SYSTEMS</b>		
NC	NURSE CALL PATIENT PULL CHORD	
NC	NURSE CALL PATIENT DOME LIGHT	
NC	NURSE CALL DUTY STAFF STATION	
NCAP	NURSE CALL ANNUNCIATOR PANEL	
EC	EMERGENCY CALL PULL CHORD	
EC	EMERGENCY CALL DOME LIGHT	
EC	EMERGENCY CALL REMOTE STATION	
ECPP	EMERGENCY CALL COMMUNICATION PANEL	
<b>SECURITY/INTERCOM/ACCESS SYSTEMS</b>		
DB	DOOR BELL PUSH BUTTON	EXTERIOR APPLICATION: EDWARDS OR EQUAL
DB	DOOR BELL CHIME/BELL	
CR	CARD READER	
DC	DOOR CONTACT	
ES	ELECTRIC DOOR STRIKE	
LA	LOCAL DOOR ALARM	
IS	INTERCOM SPEAKER VOLUME CONTROL	
IS	INTERCOM STATION TALK/ACCESS	
INTP	MAIN INTERCOM PANEL	
MD	WALL MOUNTED MOTION DETECTOR	
MD	CEILING MOUNTED MOTION DETECTOR	
MD	CEILING MOUNTED PUBLIC ADDRESS SPEAKER	
CCTV	CLOSED CIRCUIT TELEVISION CAMERA	
SCP	SECURITY CONTROL PANEL	
IAP	INTRUSION ALARM PANEL	
HC	HANDICAP ACCESS PUSH BUTTON	AREA OF RESCUE ASSISTANCE INDICATOR LIGHT W/ BATTERY BACKUP SIMILAR TO HOUSING DEVICES ADA 1000 PHONE LINE.

SYMBOL	DESCRIPTION	NOTES
<b>FIRE ALARM SYSTEM</b>		
F	MANUAL FIRE ALARM PULL STATION	
F	FIRE FIGHTER FIRE EMERG PHONE	
F	VISUAL ONLY FIRE ALARM DEVICE	
F	COMBINATION AUDIO AND VISUAL FIRE ALARM DEVICE	
F	CEILING MOUNTED AUDIO AND VISUAL FIRE ALARM DEVICE	
S	WALL MOUNTED FIRE ALARM SPEAKER	
S	WALL MOUNTED FIRE ALARM SPEAKER AND STROBE	
M	WALL MOUNTED MINI-HORN	
M	WALL MOUNTED FIRE ALARM MINI-HORN & STROBE	
F	FIRE ALARM MASTER BOX	
K	KNOX BOX	
H	ROTATING FIRE ALARM BEACON LIGHT	
EB	ELECTRIC BELL PROVIDE (1) DEDICATED 120V CIRCUIT	
FA	FIRE ALARM CONTROL PANEL	COMBINATION SMOKE DETECTOR/ IMPAIRED HEARING
FA	FIRE ALARM ANNUNCIATOR PANEL	COMBINATION HEAT DETECTOR/ VISUAL ALARM FOR HEARING IMPAIRED
RTS	REMOTE TEST STATION	CEILING MOUNTED CARBON MONOXIDE DETECTOR
H	REMOTE INDICATOR ALARM DEVICE	WALL MOUNTED CARBON MONOXIDE DETECTOR
S	SMOKE DETECTOR	DETECTOR TYPE SUBSCRIPT: L LOCAL 120V DETECTOR R RECEIVER UNIT D IN DUCT DETECTOR E ELEVATOR RECALL B BEAM TYPE PHOTOELECTRIC SA SUPPLY AIR DUCT DETECTOR RA RETURN AIR DUCT DETECTOR CO COMBINATION SMOKE/CARBON MONOXIDE DETECTOR
H	HEAT DETECTOR	
H	WALL MOUNTED SMOKE OR HEAT DETECTOR	
PS	SPRINKLER SYSTEM MONITOR	MONITOR TYPE: C CONTROL MODULE M MONITOR MODULE
TS	FS WATER FLOW TAMPER SWITCH PS DRY ALARM PRESSURE SWITCH	
DH	MAGNETIC DOOR HOLDER	PROVIDE CONNECTION TO DOOR HARDWARE INTEGRAL HOLDERS
SK	SMOKE EXHAUST FAN KEY SWITCH	
I	ADDRESSABLE CONTROL OR MONITOR MODULE	MODULE SUBSCRIPT TYPE: C CONTROL MODULE M MONITOR MODULE
<b>EXISTING ELECTRICAL EQUIPMENT</b>		
ETR	EXISTING TO REMAIN	ALL EXISTING TO REMAIN LIGHTING SHALL BE CLEANED AND RELAMPED
X	EXISTING EQUIPMENT TO BE REMOVED	CONTRACTOR SHALL VERIFY THAT ALL EXISTING TO REMAIN ELECTRICAL DEVICES ARE OPERATIONAL & FUNCTIONAL. IF ETR DEVICES ARE NOT OPERATIONAL, IT SHALL BE REPLACED WITH A NEW DEVICE OF THAT TYPE. ALL REPLACED DEVICES SHALL MATCH EXISTING
XR	EXISTING EQUIPMENT TO BE REMOVED AND RELOCATED	CONTRACTOR SHALL EXTEND AND CONNECT EXISTING WIRING TO NEW LOCATION OF RELOCATED EQUIPMENT. CONTRACTOR SHALL REPLACE EXISTING WIRING BACK TO SOURCE IF NECESSARY IF EXISTING WIRING DOES NOT REACH RELOCATED EQUIPMENT. CONTRACTOR SHALL EVALUATE CONDITION OF EXISTING WIRING AND REPLACE IF NECESSARY.
RX	NEW LOCATION OF RELOCATED EXISTING EQUIPMENT	
RR	REMOVE EXISTING DEVICE AND REINSTALL NEW DEVICE IN SAME LOCATION	
Y	DOTTED DENOTES EXISTING ELECTRICAL EQUIPMENT	
<b>SECURITY/INTERCOM/ACCESS SYSTEMS</b>		
DB	DOOR BELL PUSH BUTTON	EXTERIOR APPLICATION: EDWARDS OR EQUAL
DB	DOOR BELL CHIME/BELL	
CR	CARD READER	
DC	DOOR CONTACT	
ES	ELECTRIC DOOR STRIKE	
LA	LOCAL DOOR ALARM	
IS	INTERCOM SPEAKER VOLUME CONTROL	
IS	INTERCOM STATION TALK/ACCESS	
INTP	MAIN INTERCOM PANEL	
MD	WALL MOUNTED MOTION DETECTOR	
MD	CEILING MOUNTED MOTION DETECTOR	
MD	CEILING MOUNTED PUBLIC ADDRESS SPEAKER	
CCTV	CLOSED CIRCUIT TELEVISION CAMERA	
SCP	SECURITY CONTROL PANEL	
IAP	INTRUSION ALARM PANEL	
HC	HANDICAP ACCESS PUSH BUTTON	AREA OF RESCUE ASSISTANCE INDICATOR LIGHT W/ BATTERY BACKUP SIMILAR TO HOUSING DEVICES ADA 1000 PHONE LINE.

GENERAL NOTES		
1.	ALL CONDUITS AND EQUIPMENT SHALL BE INSTALLED AND GROUND IN ACCORDANCE WITH THE LATEST RULES AND REGULATIONS OF THE APPLICABLE LOCAL AND NATIONAL CODES.	
2.	CONDUIT RUNS ARE SHOWN DIAGRAMMATICALLY ONLY AND SHALL BE INSTALLED IN A MANNER TO PREVENT CONTACTS WITH EQUIPMENT AND STRUCTURAL CONDITIONS. EXPOSED CONDUITS SHALL BE INSTALLED PARALLEL TO BEAMS AND WALLS. EMPTY CONDUITS SHALL HAVE MINIMUM PULL LINE TO MOTORS AND OTHER EQUIPMENT.	
3.	CONDUITS SHALL BE TERMINATED SO AS TO PERMIT NEAT CONNECTIONS TO MOTORS AND OTHER EQUIPMENT.	
4.	NO CONDUIT SMALLER THAN 3/4" NOR WIRE SIZE SMALLER THAN #12 AWG FOR POWER SHALL BE USED UNLESS OTHERWISE NOTED.	
5.	THE WIRING DIAGRAM, QUANTITY AND SIZE OF THE WIRES AND CONDUIT REPRESENT A SUGGESTED ARRANGEMENT BASED UPON SELECTED STANDARD COMPONENTS. THE CONTRACTOR SHALL VERIFY THE BASIC SEQUENCE AND METHOD OF CONTROL MUST BE MAINTAINED AS INDICATED ON THE DRAWINGS AND/OR SPECIFICATIONS.	
6.	SWITCHES SHALL BE MOUNTED 4'-0" ABOVE FINISHED FLOOR UNLESS OTHERWISE NOTED. RECEPTACLES SHALL BE MOUNTED 18" AFF	
7.	ALL SURFACE MOUNTED PANELS AND PANELBOARDS ON THE INSIDE OF EXTERIOR WALLS ABOVE GRADE OR IN OTHER LOCATIONS CONSIDERED AS DAMP, SHALL BE MOUNTED 50 AS TO MAINTAIN A 1/4" AIR SPACE BETWEEN THE ENCLOSURE AND THE WALL.	
8.	ALL PANELBOARDS SHALL BE MOUNTED SO THAT THE DISTANCE FROM THE TOP CIRCUIT BREAKER OPERATING HANDLE TO THE FLOOR SHALL NOT EXCEED 6'-6"	
9.	LIGHTING FIXTURES SHALL BE MOUNTED ACCORDING TO THE MOUNTING HEIGHT GIVEN ON THE DRAWINGS, WITH THE DISTANCE BEING MEASURED FROM THE BOTTOM OF THE LIGHTING FIXTURE TO THE FINISHED FLOOR.	
10.	FOR LOCATION OF HVAC, PLUMBING, FIRE PROTECTION, AND MISCELLANEOUS EQUIPMENT SEE RESPECTIVE TRADE DRAWINGS.	
11.	ALL CONDUIT RUNS CROSSING EXPANSION JOINTS SHALL HAVE EXPANSION OR EXPANSION AND DEFLECTION TYPE FITTINGS AS REQUIRED. FOR EXACT LOCATIONS OF EXPANSION JOINTS SEE STRUCTURAL DRAWINGS.	
12.	ALL MOTOR STARTER CONTROL TRANSFORMERS SHALL BE SIZED TO PROVIDE SUFFICIENT VOLT-AMPERE CAPACITY FOR OPERATING ALL ELECTRICAL DEVICES ASSOCIATED WITH CONTROL OF THE MOTOR. IN ADDITION TO THE STARTER COIL, IT SHALL INCLUDE REVERSE TRIP DEVICES, INDICATED UNLESS OTHERWISE NOTED.	
13.	CONDUIT AND WIRE (NOT SHOWN) FOR FIXTURES, SWITCHES AND/OR RECEPTACLES SHALL BE FURNISHED AND INSTALLED BY THE ELECTRICAL CONTRACTOR AND SHALL BE: 1. EXPOSED IN UNFINISHED AREAS. 2. CONCEALED ABOVE HUNG CEILING AND IN WALLS a. #12 (MIN.) CU WIRE (MIN.) TYPE "THHN/THWN" NO. OF WIRES AS REQUIRED.	
14.	FOR EQUIPMENT AND CONSTRUCTION DETAILS SEE STRUCTURAL DRAWINGS.	
15.	ALL 120V BRANCH CIRCUITS GREATER THAN 100 LINEAR FEET SHALL BE #10AWG MIN.	
16.	THE ELECTRICAL CONTRACTOR SHALL PROVIDE LAYOUTS FOR ALL ELECTRICAL ROOMS BASED ON ACTUAL EQUIPMENT OF MANUFACTURER SELECTED. SUBMIT FOR REVIEW PRIOR TO INSTALLATION.	
17.	PROVIDE ELECTRICAL OUTLET PLATE GASKET SEALS AT RECEPTACLES, SWITCHES AND OTHER ELECTRICAL BOXES ON EXTERIOR WALLS AND ON INTERIOR WALLS BETWEEN CONDITIONED AND NON-CONDITIONED SPACES.	
18.	THE ELECTRICAL CONTRACTOR SHALL SUBMIT A PLAN FOR APPROVAL SHOWING ALL ELECTRICAL TELEPHONE, SECURITY, FIRE ALARM, COMMUNICATION AND OTHER SYSTEMS CONDUITS IN SLAB AND ABOVE CEILING ETC. COORDINATE WITH OTHER TRADES AND BUILDING'S STRUCTURE TO AVOID ANY CONFLICT.	
19.	ALL TERMINATION LUGS SHALL BE SIZED ACCORDINGLY TO ACCOMMODATE INDICATED CONDUCTORS.	
20.	THE ELECTRICAL CONTRACTOR SHALL SUBMIT PLANS FOR APPROVAL SHOWING ALL COMMUNICATIONS EQUIPMENT AND DEVICES THROUGHOUT THE BUILDING. THE ELECTRICAL CONTRACTOR SHALL ALSO LABEL AND IDENTIFY ALL CONDUITS THAT SERVE DIFFERENT SYSTEMS.	
21.	REFER TO THE ARCHITECTURAL REFLECTED CEILING PLANS AND ELEVATIONS FOR EXACT LOCATIONS OF ALL LIGHT FIXTURES.	
22.	COORDINATE LOCATIONS OF ALL LIGHT FIXTURES IN MECHANICAL AND ELECTRICAL ROOMS WITH LAYOUT OF EQUIPMENT, PIPING AND DUCTWORK.	
23.	ALL EXIT SIGNS SHALL BE UNSWITCHED.	
24.	ALL SWITCHED LIGHT FIXTURES CIRCUITED TO A NORMAL/EMERGENCY CIRCUIT ARE TO BE WIRED WITH AN EMERGENCY BY-PASS RELAY.	
25.	ALL 20 AMPERE, SINGLE POLE CIRCUITS SHALL BE PROVIDED WITH A SEPARATE FULL SIZE NEUTRAL CONDUCTOR.	
26.	CONFIRM EXACT POWER REQUIREMENTS AND CONNECTION LOCATIONS FOR ALL EQUIPMENT WITH THE PLUMBING, FIRE PROTECTION, HVAC AND GENERAL CONTRACTOR	
27.	PROVIDE AN 800 KIT FOR ALL MECH EQUIPMENT RATED LESS THAN 1/2HP (TYP)	
28.	CERTAIN SYMBOLS IN THE SYMBOL LIST DO NOT APPEAR ELSEWHERE IN THE DRAWINGS. SUCH SYMBOLS ARE INCLUDED TO PERMIT INTERPRETATIONS TO BE MADE IN THE EVENT OF DESIGN CHANGES.	
29.	THE ELECTRICAL CONTRACTOR SHALL MAINTAIN RATING OF ANY CEILING, WALL, FLOOR OR ANY BUILDING STRUCTURE THAT ANY ELECTRICAL SYSTEM PENETRATES. SEE ARCHITECTURAL PLAN FOR RATINGS.	
<b>ABBREVIATIONS</b>		
ABBR	ABBREVIATIONS	L LENGTH
A/AMP	AMPERE	LA LIGHTING ARRESTOR
AC	ALTERNATING CURRENT	LP LIGHTING PANEL
A/C	AIR CONDITIONING	LTG LIGHTING
AD	ABOVE FINISHED FLOOR	LV LOW VOLTAGE
AFG	ABOVE FINISHED GRADE	M METER
ARCH	ARCHITECTURAL	MM MILLIMETER
ATC	AUTOMATIC TEMPERATURE CONTROL	MCB MAIN CIRCUIT BREAKER
ATS	AUTOMATIC TRANSFER SWITCH	MFC MASS ELECTRIC COMPANY
AUTO	AUTOMATIC	MECH MECHANICAL
BAT	BATTERY	MFR MANUFACTURER
BIS	BYPASS ISOLATOR SWITCH	MLO MAIN LUG ONLY
C	CONDUIT	MISC MISCELLANEOUS
CATV	CABLE TELEVISION	MTD MOUNTED
CAB	CABINET	N NEUTRAL
CB	CIRCUIT BREAKER	N/C NORMALLY CLOSED
CCTV	CLOSED CIRCUIT TELEVISION	NEC NATIONAL ELECTRIC CODE
CKT	CIRCUIT	NEMA NATIONAL ELECTRICAL MANUFACTURERS ASSOCIATION
CL	CENTRILINE	NIC NOT IN CONTRACT
CM	CENTIMETER	NL NIGHT LIGHTING OUT
COL	CEILING	N/O NORMALLY OPEN
CO	COLUMN	NUM NUMBER
C/T	CURRENT TRANSFORMER	OC ON CENTER
CW	COOL WHITE	O/C OVERCURRENT
DET	DETAIL	OL OVERLOAD
DIA	DIAMETER	OL OVERLOAD
DISC	DISCONNECT	OL OVERLOAD
DN	DOWN	PB PULL BOX
DP	DISTRIBUTION PANEL	PH PHASE
DPDT	DOUBLE POLE DOUBLE THROW	PNL PANEL
PP	PUMP	PP PUMP
PST	POTENTIAL TRANSFORMER	PRI PRIMARY
P/T	POTENTIAL TRANSFORMER	P/T POTENTIAL TRANSFORMER
DT	DUST TIGHT	PVC POLYVINYL CHLORIDE
DWG	DRAWING	PWR POWER
EA	EACH	
EC	ELECTRICAL CONTRACTOR	RECEPT RECEPTACLE



**GENERAL NOTES:**

- IN THIS DOCUMENT, "CONTRACTOR" SHALL REFER TO GENERAL CONTRACTOR AND "SUBCONTRACTOR" SHALL REFER TO THE ELECTRICAL CONTRACTOR AND THEIR SUBCONTRACTORS.
- THE SYSTEM DESIGN SHALL BE INSTALLED IN ACCORDANCE WITH THESE DOCUMENTS AND SPECIFICATIONS AND IN ACCORDANCE WITH THE NATIONAL ELECTRICAL CODE (NEC), THE UTILITY, AND THE AUTHORITY HAVING JURISDICTION (AHJ). ANY LOCAL CODE THAT SUPERSEDES THE NEC SHALL GOVERN.
- SUBCONTRACTORS SHALL HAVE A MINIMUM OF TWO PEOPLE WORKING TOGETHER AT ALL TIMES.
- THESE DOCUMENTS AND SPECIFICATIONS ARE THE MINIMUM REQUIRED FOR PROJECT COMPLETION. SUBCONTRACTOR SHALL ENSURE THAT THESE REQUIREMENTS ARE MET OR EXCEEDED WITH HIGH QUALITY EQUIPMENT, MATERIALS, AND WORKMANSHIP.
- THE EQUIPMENT AND COMPONENTS SHALL BE MARKED IN ACCORDANCE WITH THE APPLICABLE ARTICLES OF THE NEC AND AS SHOWN IN THESE DOCUMENTS.
- ALL EQUIPMENT AND MATERIALS SHALL BE INSTALLED PER THE MANUFACTURER'S INSTRUCTIONS. ANY METHODS AND MATERIALS NOT SPECIFIED SHALL BE SUBMITTED AND APPROVED PRIOR TO INSTALLATION.
- ALL EQUIPMENT AND ENCLOSURES SHALL BE FREE FROM DEBRIS AND ANY MATERIALS THAT MAY CAUSE DAMAGE.
- SUBCONTRACTOR SHALL PROVIDE SUBMITTALS FOR ALL EQUIPMENT AND MATERIALS. SUBMITTALS SHALL BE APPROVED PRIOR TO ANY WORK PERFORMED. SUBCONTRACTOR WILL BE AT RISK FOR WORK PERFORMED WITH ANY SUBMITTALS THAT ARE NOT APPROVED.
- SUBCONTRACTOR SHALL CALL "811" PRIOR TO ANY GROUND PENETRATION AND PROVIDE TICKET NUMBER TO CONTRACTOR.
- ALL EXISTING UTILITIES SHALL BE FIELD VERIFIED AND MARKED. SUBCONTRACTOR SHALL COORDINATE WITH UTILITY FOR REQUIRED SHUTDOWN SERVICES. ANY UTILITIES THAT REMAIN SHALL BE PROTECTED DURING CONSTRUCTION. ANY DAMAGE SHALL BE REPAIRED TO THE UTILITY OWNER'S SATISFACTION.
- SUBCONTRACTOR SHALL VERIFY ALL EXISTING SITE CONDITIONS AND MEASUREMENTS AND SHALL NOTIFY CONTRACTOR AND DOCUMENT ANY DISCREPANCIES PRIOR TO ANY WORK.
- ALL FORMING, BRACING, AND SHORING FOR EQUIPMENT SHALL BE SUPPLIED AND INSTALLED BY THE SUBCONTRACTOR.
- ANY CHANGES INITIATED BY SUBCONTRACTOR SHALL BE SUBMITTED FOR APPROVAL PRIOR TO ANY WORK. APPROVED CHANGES SHALL BE INCLUDED IN THESE DOCUMENT REVISIONS AND PROVIDED TO THE ENGINEER OF RECORD. SUBCONTRACTOR WILL BE AT RISK FOR WORK PERFORMED WITHOUT APPROVAL.
- SUBCONTRACTOR SHALL PROVIDE SHOP DRAWINGS OF ALL EQUIPMENT MOUNTING, MATERIALS, AND HARDWARE AND MOCK-UP IMAGES FOR APPROVAL PRIOR TO ANY WORK.
- SUBCONTRACTOR SHALL RECORD ALL CHANGES AND PROVIDE REDLINED DRAWINGS TO THE CONTRACTOR AT THE COMPLETION OF THE PROJECT.

**GENERAL ELECTRICAL NOTES**

- DRAWINGS ARE NECESSARILY DIAGRAMMATIC BY THEIR NATURE AND ARE NOT INTENDED TO SHOW EVERY CONNECTION IN DETAIL OR EVERY PIPE OR CONDUIT IN ITS EXACT LOCATION. CAREFULLY INVESTIGATE STRUCTURAL AND FINISH CONDITIONS AND COORDINATE THE WORK, ORGANIZE AND LAY OUT WORK SO THAT IT WILL BE CONCEALED IN FURRED CHASES AND SUSPENDED CEILING, ETC., IN FINISHED PORTIONS OF THE BUILDING, UNLESS SPECIFICALLY NOTED TO BE EXPOSED. INSTALL ALL WORK PARALLEL OR PERPENDICULAR TO BUILDING LINES UNLESS OTHERWISE NOTED.
- THE INTENT OF THE DRAWINGS IS TO ESTABLISH THE TYPES OF SYSTEMS AND FUNCTIONS, NOT TO SET FORTH EACH ITEM ESSENTIAL TO THE FUNCTIONING OF THE SYSTEM. INSTALL THE WORK COMPLETE, INCLUDING MINOR DETAILS NECESSARY TO PERFORM THE FUNCTION INDICATED. REVIEW PERTINENT DRAWINGS, MANUFACTURER'S INSTALLATION MANUALS, ETC., AND ADJUST THE WORK TO CONDITIONS SHOWN, WHERE DISCREPANCIES OCCUR BETWEEN DRAWINGS, SPECIFICATIONS, MANUFACTURER INSTALLATION AND OPERATION MANUALS AND ACTUAL FIELD CONDITIONS, NOTIFY THE OWNER & ENGINEER PRIOR TO BEGINNING ANY WORK.
- COORDINATE THE ACTUAL LOCATIONS OF ELECTRICAL EQUIPMENT WITH BUILDING FEATURES AND OTHER EQUIPMENT IN THE FIELD. REVIEW ANY PROPOSED CHANGES IN ELECTRICAL EQUIPMENT LOCATION WITH THE OWNER.
- ALL DIMENSIONAL INFORMATION RELATED TO NEW STRUCTURES SHALL BE TAKEN FROM THE APPROPRIATE DRAWINGS. ALL DIMENSIONAL INFORMATION RELATED TO EXISTING FACILITIES SHALL BE TAKEN FROM ACTUAL MEASUREMENTS MADE BY THE CONTRACTOR ON THE SITE.
- WORK MATERIALS AND EQUIPMENT SHALL COMPLY WITH THE RULES AND REGULATIONS SPECIFIED IN THE EDITION OF NATIONAL FIRE PROTECTION ASSOCIATION (NFPA) ADOPTED BY THE JURISDICTION OF THE PROJECT.
- ALL EQUIPMENT AND MATERIALS SHALL BE DELIVERED TO THE PROJECT SITE CLEAN AND SEALED FOR PROTECTION. TAKE SUCH PRECAUTIONS AS ARE NECESSARY TO PROTECT APPARATUS AND MATERIALS FROM DAMAGE. PROTECT FACTORY FINISH FROM DAMAGE DURING CONSTRUCTION UNTIL ACCEPTANCE OF THE PROJECT. RESTORE ANY FINISHES THAT BECAME STAINED OR DAMAGED TO OWNER & ENGINEER'S SATISFACTION.
- PROVIDE NEW PRODUCTS OF MANUFACTURERS REGULARLY ENGAGED IN PRODUCTION OF SUCH EQUIPMENT. PROVIDE THE MANUFACTURER'S LATEST STANDARD DESIGN FOR THE TYPE OF PRODUCT SPECIFIED.
- PRODUCTS SHALL CONFORM TO REQUIREMENTS OF THE NATIONAL ELECTRICAL CODE WHERE UNDERWRITERS' LABORATORIES HAVE SET STANDARDS AND LISTED PRODUCTS AND ISSUED LABELS. PRODUCTS USED SHALL BE LISTED AND LABELED TO THOSE STANDARDS BY UL OR ANOTHER AGENCY ACCEPTABLE TO THE AUTHORITY HAVING JURISDICTION. PRODUCTS SHALL BE INSTALLED IN ACCORDANCE WITH THE LISTING OF THE EQUIPMENT.
- SUPPLY SIDE CONNECTIONS AS PERMITTED BY NEC ARTICLE 690.64 SHALL BE MADE IN ACCORDANCE WITH NEC ARTICLE 230.
- DESIGNATIONS: EXTERNALLY MARK ALL EQUIPMENT, DEVICES, FEEDERS, BRANCH CIRCUITS AND SIMILAR ITEMS WITH NAMEPLATES AS IDENTIFIED ELSEWHERE IN THESE DRAWINGS AND SPECIFICATIONS.
- MATERIALS AND EQUIPMENT TO BE REMOVED, EXCEPT ITEMS SPECIFICALLY NOTED TO BE RELOCATED OR RETURNED TO THE OWNER, BECOME PROPERTY OF THE SUBCONTRACTOR AND SHALL BE IMMEDIATELY REMOVED FROM THE PROJECT SITE. IF THE OWNER IDENTIFIES OTHER ITEMS DURING CONSTRUCTION, THOSE ITEMS BECOME OWNER PROPERTY AND SHALL BE TURNED OVER TO THE OWNER.
- COORDINATE THE SCHEDULING OF ALL WORK REQUIRING ELECTRICAL SHUTDOWNS WITH THE OWNER. THIS MAY REQUIRE PERFORMING THE WORK OUTSIDE OF NORMAL WORKING HOURS, AND/OR PROVIDING TEMPORARY POWER WITH A PORTABLE GENERATOR OR BY OTHER APPROVED MEANS. COORDINATE TEMPORARY POWER REQUIREMENTS AND POSSIBLE ALTERNATE POWER SOURCES WITH THE OWNER.
- EQUIPMENT INSTALLATION SHALL BE IN ACCORDANCE WITH THE RESPECTIVE EQUIPMENT MANUFACTURER'S PUBLISHED RECOMMENDATIONS.
- OBSERVE ALL CLEARANCES REQUIRED BY NEC 110.26.
- EQUIPMENT SHALL BE SET LEVEL AND PLUMB.
- SEAL OPENINGS INTO EQUIPMENT TO PREVENT ENTRANCE OF ANIMALS, BIRDS AND INSECTS.
- ALL UNUSED OPENINGS SUCH AS, BUT NOT LIMITED TO, KNOCKOUTS ON PANELS AND BOXES, SURFACE WIREWAY OPENINGS, BUSWAY OPENINGS, AND CIRCUIT BREAKER EMPLY SLOTS SHALL BE COVERED WITH APPROVED COVER PLATES.
- ON ROOF MOUNTED INSTALLATIONS WITH A PARAPET LESS THAN 54" IN HEIGHT, SERVICEABLE EQUIPMENT SHALL BE SET BACK AT LEAST 10" FROM THE EDGE OF THE ROOF.
- COOPERATE WITH TRADES OF ADJACENT, RELATED OR AFFECTED MATERIALS OR OPERATIONS, AND WITH TRADES PERFORMING CONTINUATION OF THIS WORK IN ORDER TO EFFECT TIMELY AND ACCURATE PLACING OF WORK AND TO COORDINATE, IN PROPER AND CORRECT SEQUENCE, THE WORK OF SUCH TRADES.
- WORK SHALL BE PERFORMED BY COMPETENT WORKERS SKILLED IN THEIR TRADE.
- THIS INSTALLATION SHALL BE COMPLETE AND FUNCTIONAL.
- COORDINATE SYSTEM TURNOVER WITH OWNER & ENGINEER.
- SUBCONTRACTOR SHALL FOLLOW OWNER & ENGINEER SEQUENCE AND PROCEDURES FOR QUALITY ASSURANCE TESTING AND SYSTEM COMMISSIONING DURING INSTALLATION, INCLUDING MEGGER TESTING OF ALL CONDUCTORS AFTER BEING PULLED THROUGH CONDUIT BUT PRIOR TO TERMINATION.
- OWNER & ENGINEER RESERVES THE RIGHT TO APPROVE OR DISAPPROVE ANY PRODUCTS OR WORK NOT IN CONFORMANCE WITH THESE SPECIFICATIONS.

ID	KVA	480 VOLT OVERCURRENT	208 VOLT OVERCURRENT	480V FEEDER	120/208V FEEDER	GROUNDING
T1	9	20A 3P	30A 3P	3#12 & 1#12G - 3/4"	4#10 & 1#10G - 3/4"	1#6 - 3/4"
T2	15	30A 3P	50A 3P	3#12 & 1#12G - 3/4"	4#8 & 1#10G - 1"	1#6 - 3/4"
T3	30	60A 3P	100A 3P	3#4 & 1#10G - 1"	4#8 & 1#10G - 1 1/4"	1#6 - 3/4"
T4	45	80A 3P	150A 3P	3#3 & 1#10G - 1 1/4"	4#10 & 1#10G - 2"	1#6 - 3/4"
T5	75	150A 3P	250A 3P	3#10 & 1#10G - 1 1/2"	4-250kcmil & 1#10G - 2"	1#2 - 3/4"
T6	112.5	200A 3P	400A 3P	3#20 & 1#10G - 2"	4-500kcmil & 1#10G - 2"	1#10 - 3/4"
T7	150	300A 3P	600A 3P	3-350kcmil & 1#10G - 2"	4-500kcmil & 2#20G - 2"	1#20 - 3/4"
T8	225	400A 3P	800A 3P	3-500kcmil & 1#10G - 2"	4-500kcmil & 2#10G - 2"	1#20 - 3/4"
T9	300	600A 3P	1000A 3P	3-600kcmil & 2#10G - 2"	4-600kcmil & 3#35G - 2"	1#30 - 3/4"
T10	500	900A 3P	1600A 3P	3-900kcmil & 3#20G - 2"	4-900kcmil & 4#30G - 2"	1#30 - 3/4"

**CONDUIT NOTES:**

- ALL WORK TO BE COMPLETED IN ACCORDANCE WITH THE LATEST APPLICABLE STANDARDS OF ANSI, NEMA, UL, NFPA-70, WITH REGARDS TO MATERIAL, DESIGN, AND CONSTRUCTION.
- THIS DRAWING IS FOR INFORMATION ONLY. THE CONTRACTOR SHALL VERIFY ALL LOCATIONS, DEVICES, MATERIALS, AND EQUIPMENT, PRIOR TO THE START OF ANY WORK.
- CONTRACTOR SHALL NOTIFY DIG SAFE AT 1-888-DIG-SAFE. AT LEAST 72 HOURS PRIOR TO BEGINNING ANY EXCAVATION.
- PVC CONDUIT AND FITTINGS SHALL CONFORM TO ANSINEMA SPECIFICATIONS, TC-2, TC-3 AND UL-651.
- CONTRACTOR SHALL OBTAIN ALL NECESSARY INSPECTIONS AND COORDINATE ALL WORK WITH THE OWNER AND THE ENGINEER. TRENCHES SHALL BE INSPECTED PRIOR TO BACKFILLING.
- LOCATIONS OF ALL UTILITIES ARE APPROXIMATE AND ARE PROVIDED FOR INFORMATION ONLY.
- CONTRACTOR TO LOCATE ALL ELECTRICAL EQUIPMENT AS DIRECTED BY THE OWNER, ARCHITECT & ENGINEER.

**LIGHTING NOTES:**

- SEE DRAWING FOR ELECTRICAL LEGEND AND GENERAL NOTES.
- COORDINATE LIGHTING FIXTURE MOUNTING HEIGHTS WITH ARCHITECTURAL CASEWORK AND INTERIOR ELEVATION DRAWINGS.
- COORDINATE EXACT LIGHTING FIXTURE LOCATIONS AND LENGTHS WITH ARCHITECTURAL REFLECTED CEILING PLAN.
- ALL NEW EQUIPMENT SHALL MATCH BASE BUILDING STANDARDS AND SPECIFICATIONS, UNLESS NOTED OTHERWISE. ALL NEW EQUIPMENT SHALL BE COMPATIBLE WITH THE EXISTING SYSTEM.
- CIRCUIT NUMBER DESIGNATIONS ARE INTENDED TO ILLUSTRATE BRANCH WIRING CONFIGURATION ONLY.
- ELECTRICAL CONTRACTOR SHALL COORDINATE AND CONFIRM K RATING (TEMPERATURE) OF FIXTURE LAMPS TO ACHIEVE COLOR AS PER ARCHITECT. LAMPS SHALL BE 3000K UNLESS NOTED OTHERWISE.
- PROVIDE "HOT" UNSWITCHED POWER AT ALL LIFE SAFETY BATTERY BALLASTS AND EXIT SIGNS. BRANCH CIRCUITS SHALL BE 3 WIRE WHERE REQUIRED. ALL EXIT SIGNS SHALL BE SUPPLIED WITH INTERNAL, 90 MINUTE, EMERGENCY BATTERY.
- ELECTRICAL CONTRACTOR SHALL PROVIDE AND INSTALL ANY STEP DOWN TRANSFORMERS, WIRING, AND CONTROLS FOR LOW VOLTAGE LIGHTING WHERE NECESSARY.
- THE ELECTRICAL CONTRACTOR SHALL PROVIDE ALL MOUNTING HARDWARE APPLICABLE TO FIXTURE AND CEILING TYPES INTO WHICH FIXTURE IS TO BE INSTALLED. REFER TO ARCHITECT'S REFLECTED CEILING PLAN FOR CEILING MATERIALS.
- ALL EMERGENCY BATTERY PACKS SHALL BE SUPPLIED WITH CONTACTS TO ACCEPT REMOTE EMERGENCY HEADS.
- CONTRACTOR SHALL COORDINATE ALL LIGHTING WITH NEW SYSTEMS ABOVE CEILING PRIOR TO INSTALLATION. CONTRACTOR SHALL RESOLVE ANY INSTALLATION CONFLICTS IN FIELD AND NOTIFY ARCHITECT AND ENGINEER OF CHANGE.
- WHERE LIGHT FIXTURES ARE LOCATED WITHIN RATED CEILING OR WALLS, THE ELECTRICAL CONTRACTOR SHALL BE RESPONSIBLE FOR PROVIDING A UL APPROVED FIRE RATED ENCLOSURE. PROVIDE ELCO FIRE BOX OR APPROVED EQUAL.
- COORDINATE WITH THE ARCHITECTURAL DRAWING THE CEILING TYPES AND PROVIDE IC RATINGS WERE REQUIRED.
- ALL EXPOSED AND SURFACE MOUNTED CONDUIT SHALL BE GALVANIZED RIGID STEEL.
- PROVIDE A 7 DAY PROGRAMMABLE ASTRONOMICAL TIME CLOCK WITH INTEGRAL PHOTOCCELL FOR ALL EXTERIOR LIGHTING (TYPICAL).
- ALL FIXTURES UTILIZING HID LAMPS SHALL MEET THE ENERGY INDEPENDENT AND SECURITY ACT "EISA"

LEGEND OF FEEDER SIZES - COPPER CONDUCTORS					
FEEDER SYMBOL	CONDUCTORS (3 PHASE, 3 WIRE) WITH GROUND	MINIMUM RACEWAY SIZE	CONDUCTORS (3 PHASE, 4 WIRE) WITH GROUND	MINIMUM RACEWAY SIZE	NOMINAL AMPERE RATING
①	3-6 AWG & 1-10 AWG GND.	3/4"			60
②	3-4 AWG & 1-8 AWG GND.	1"	4-6 AWG & 1-10 AWG GND.	1"	70
③	3-1 AWG & 1-6 AWG GND.	1 1/4"	4-4 AWG & 1-8 AWG GND.	1 1/4"	100
④	3-1 AWG & 1-6 AWG GND.	1 1/2"	4-1 AWG & 1-8 AWG GND.	1 1/2"	125
⑤	3-1/0 AWG & 1-6 AWG GND.	1 1/2"	4-1 AWG & 1-6 AWG GND.	2"	150
⑥	3-2/0 AWG & 1-6 AWG GND.	2"	4-1/0 AWG & 1-6 AWG GND.	2"	175
⑦	3-3/0 AWG & 1-6 AWG GND.	2"	4-2/0 AWG & 1-6 AWG GND.	2"	200
⑧	3-4/0 AWG & 1-4 AWG GND.	2"	4-3/0 AWG & 1-6 AWG GND.	2"	225
⑨	3-250 KCMIL & 1-4 AWG GND.	2 1/2"	4-4/0 AWG & 1-4 AWG GND.	2 1/2"	250
⑩	3-350 KCMIL & 1-4 AWG GND.	3"	4-250 KCMIL & 1-4 AWG GND.	3"	300
⑪	3-500 KCMIL & 1-3 AWG GND.	3"	4-350 KCMIL & 1-4 AWG GND.	3"	350
⑫	3-600 KCMIL & 1-3 AWG GND.	3"	4-500 KCMIL & 1-3 AWG GND.	4"	400
⑬	6-250 KCMIL & 2-2 AWG GND.	2-2 1/2"	4-600 KCMIL & 1-3 AWG GND.	4"	500
⑭	6-350 KCMIL & 2-1 AWG GND.	2-3"	8-250 KCMIL & 2-2 AWG GND.	2-3"	600
⑮	6-600 KCMIL & 2-1/0 AWG GND.	2-3 1/2"	8-350 KCMIL & 2-1 AWG GND.	2-3 1/2"	800
⑯	9-400 KCMIL & 3-2/0 AWG GND.	3-3"	8-600 KCMIL & 2-1/0 AWG GND.	2-4"	1000
⑰	9-600 KCMIL & 3-3/0 AWG GND.	3-3 1/2"	12-400 KCMIL & 3-2/0 AWG GND.	3-3 1/2"	1200
⑱	12-600 KCMIL & 4-4/0 AWG GND.	4-3 1/2"	12-600 KCMIL & 3-3/0 AWG GND.	3-3 1/2"	1600
⑲	15-600 KCMIL & 5-250 KCMIL GND.	5-3 1/2"	16-600 KCMIL & 4-4/0 AWG GND.	4-3 1/2"	2000
⑳	18-600 KCMIL & 6-350 KCMIL GND.	6-3 1/2"	20-600 KCMIL & 5-250 KCMIL GND.	5-3 1/2"	2500
㉑	24-500 KCMIL & 8-400 KCMIL GND.	8-3 1/2"	24-600 KCMIL & 6-350 KCMIL GND.	6-3 1/2"	3000
㉒	24-600 KCMIL & 8-500 KCMIL GND.	8-3 1/2"	32-500 KCMIL & 8-400 KCMIL GND.	8-4"	3500
㉓	27-600 KCMIL & 9-500 KCMIL GND.	9-3 1/2"	32-600 KCMIL & 8-500 KCMIL GND.	8-3 1/2"	4000
㉔	30-600 KCMIL & 10-500 KCMIL GND.	10-3 1/2"	36-600 KCMIL & 9-500 KCMIL GND.	9-3 1/2"	4000
㉕			40-600 KCMIL & 10-500 KCMIL GND.	10-3 1/2"	4000

■ DENOTES ADDITIONAL INSULATED/ISOLATED GROUND WIRE REQUIRED FOR ALL FEEDERS TO PANELBOARDS (SERVING ISOLATED GROUND RECEPTACLES REFER TO ISOLATED GROUNDING DETAIL FOR ADDITIONAL INFORMATION)

\* DENOTES ADDITIONAL NEUTRAL CONDUCTOR REQUIRED (200%) FOR ALL FEEDERS TO PANELBOARD

EXAMPLES

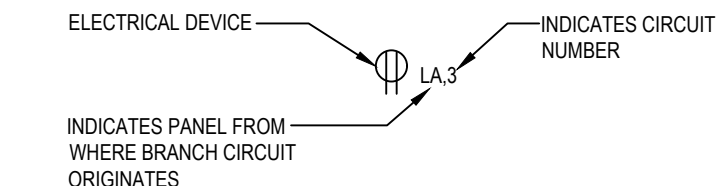
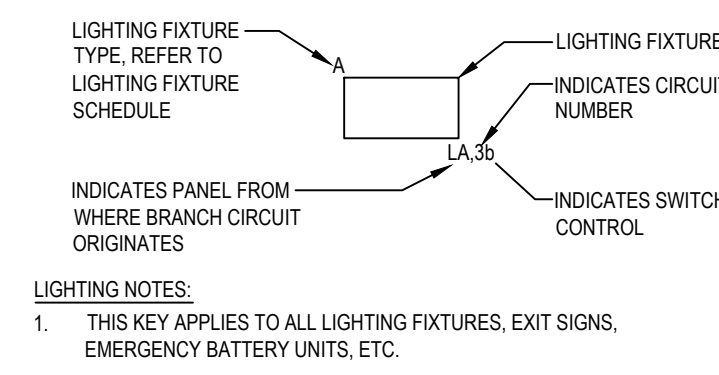
■ ④ 4-6 AWG, 1-10 AWG IG & 1-10 AWG GND. - 1" CONDUIT

\* ③ 3-6 AWG, 1-1 AWG NEUTRAL & 1-10 AWG GND. - 1 1/2" CONDUIT

㉕ DENOTES SINGLE-PHASE 2C-W/3GND.

BRANCH CIRCUITS SCHEDULE	
120 OR 277 VOLT 1Ø, 2W. CIRCUITS	
CIRCUIT BREAKER	CONDUCTOR
30A-1P	2#10+1#0 GND. - 3/4"
40A-1P	2#8+1#0 GND. - 3/4"
50A-1P	2#6+1#0 GND. - 3/4"
60A-1P	2#6+1#0 GND. - 3/4"
208 VOLT 1Ø, 2W. CIRCUITS	
CIRCUIT BREAKER	CONDUCTOR
20A-2P	2#12+1#2 GND. - 3/4"
30A-2P	2#10+1#0 GND. - 3/4"
40A-2P	2#8+1#0 GND. - 3/4"
50A-2P	2#6+1#0 GND. - 3/4"
60A-2P	2#6+1#0 GND. - 3/4"
208/120 VOLT, 1Ø, 3W CIRCUITS	
CIRCUIT BREAKER	CONDUCTOR
20A-2P	3#12+1#2 GND. - 3/4"
30A-2P	3#10+1#0 GND. - 3/4"
40A-2P	3#8+1#0 GND. - 3/4"
50A-2P	3#6+1#0 GND. - 3/4"
60A-2P	3#6+1#0 GND. - 3/4"
208 OR 480 VOLTS, 3Ø, 3W CIRCUITS	
CIRCUIT BREAKER	CONDUCTOR
20A-3P	3#12+1#2 GND. - 3/4"
30A-3P	3#10+1#0 GND. - 3/4"
40A-3P	3#8+1#0 GND. - 3/4"
50A-3P	3#6+1#0 GND. - 3/4"
60A-3P	3#6+1#0 GND. - 3/4"
208Y/120 & 480Y/277 VOLT, 3Ø, 4W CIRCUITS	
CIRCUIT BREAKER	CONDUCTOR
20A-3P	4#12+1#2 GND. - 3/4"
30A-3P	4#10+1#0 GND. - 3/4"
40A-3P	4#8+1#0 GND. - 3/4"
50A-3P	4#6+1#0 GND. - 1"
60A-3P	4#6+1#0 GND. - 1"

NEMA ENCLOSURE SCHEDULE	
TYPE	DESCRIPTION
1	GENERAL PURPOSE
2	DUST TIGHT
3	WATERPROOF (WEATHER RESISTANT)
4	RAIN TIGHT
5	WATER TIGHT
6	DUST TIGHT
7	SUBMERSIBLE
8	A,B,C OR D HAZARDOUS LOCATIONS CLASS 1, AIR BREAK
9	A,B,C OR D HAZARDOUS LOCATIONS CLASS 1, OIL IMMERSIBLE
10	E,F OR G HAZARDOUS LOCATIONS CLASS 2, 3, 4
11	BUREAU OF MINES-EXPLOSION PROOF
12	ACID OR FLAME RESISTANT OIL IMMERSIBLE
1	INDUSTRIAL USE
2	DUST PROOF



POWER NOTES:  
1. THIS KEY APPLIES TO ALL RECEPTACLES, JUNCTION BOXES, DISCONNECT SWITCHES, THERMAL SWITCHES, ETC.

- GENERAL NOTES:  
1. WIRING (MC, NM, FMC, THIN, ETC) AND CONDUIT SHALL BE REQUIRED BETWEEN ALL LIGHTING FIXTURES, RECEPTACLES, OUTLETS, ETC. INDICATED WITH CIRCUIT NUMBERS AND PANEL DESIGNATIONS. REFER TO SPECIFICATIONS FOR APPLICABLE MEANS AND METHODS.  
2. ALTHOUGH ALL BRANCH CIRCUIT WIRE AND CONDUIT IS NOT SHOWN, IT IS THE INTENT OF THESE DOCUMENTS THAT A COMPLETE BRANCH CIRCUIT WIRING SYSTEM BE INSTALLED.  
3. WIRING SHALL BE 2#12+1#2G-1/2" MINIMUM.

**CIRCUITING KEY**  
N.T.S.

DISTRIBUTION PANEL SCHEDULE						
PHASE: 1	WIRES: 3	VOLTAGE: 120/240V	MAIN: 400A MAIN C.B.		42 CIRCUIT PANEL MINIMUM	
CIRCUIT	FRAME	POLES	TRIP	DESCRIPTION OF LOAD	CONDUIT & WIRE SIZE	COMMENTS
M	400	2	400	MAIN BREAKER	3W#600MCM W/#10GND CU 4" PVC	
1	80	2	80	FUEL DISPENSING EQUIPMENT	3W#2AWG W/#8GND CU 1.5" PVC	FUEL ISLAND / DISPENSER
2	50	2	50	SHORE POWER PEDESTAL	3W#4AWG W/#8GND CU 1.5" PVC	50A/2P POWER PEDESTAL (9 TOTAL)
3	50	2	50	SHORE POWER PEDESTAL	3W#4AWG W/#8GND CU 1.5" PVC	50A/2P POWER PEDESTAL
4	50	2	50	SHORE POWER PEDESTAL	3W#4AWG W/#8GND CU 1.5" PVC	50A/2P POWER PEDESTAL
5	50	2	50	SHORE POWER PEDESTAL	3W#4AWG W/#8GND CU 1.5" PVC	50A/2P POWER PEDESTAL
6	50	2	50	SHORE POWER PEDESTAL	3W#4AWG W/#8GND CU 1.5" PVC	50A/2P POWER PEDESTAL
7	50	2	50	SHORE POWER PEDESTAL	3W#4AWG W/#8GND CU 1.5" PVC	50A/2P POWER PEDESTAL
8	50	2	50	SHORE POWER PEDESTAL	3W#4AWG W/#8GND CU 1.5" PVC	50A/2P POWER PEDESTAL
9	50	2	50	SHORE POWER PEDESTAL	3W#4AWG W/#8GND CU 1.5" PVC	50A/2P POWER PEDESTAL
10	50	2	50	SHORE POWER PEDESTAL	3W#4AWG W/#8GND CU 1.5" PVC	50A/2P POWER PEDESTAL
11	20	2	20	BULKHEAD LIGHTING CIRCUIT #1	2W#10AWG W/#10GND CU 1" PVC	5 X 175W FIXTURES (NORTH)
12	20	2	20	BULKHEAD LIGHTING CIRCUIT #2	2W#10AWG W/#10GND CU 1" PVC	2 X 175W FIXTURES (SOUTH)
13	20	2	20	OFFLOAD HOIST	2W#10AWG W/#10GND CU 1" PVC	3HP, 240V
14	20	1	20	FLAG POLE LIGHT	2W#10AWG W/#10GND CU 1" PVC	VIA TIME CLOCK IN CABINET
15	20	2	20	LIGHT POLE CIRCUIT #1	3W#8AWG W/#10GND CU 2" PVC	2 FIXTURES (NORTH)
16	20	2	20	LIGHT POLE CIRCUIT #2	3W#8AWG W/#10GND CU 2" PVC	3 FIXTURES (MIDDLE)
17	20	2	20	LIGHT POLE CIRCUIT #3	3W#8AWG W/#10GND CU 2" PVC	2 FIXTURES (SOUTH)
18	20	2	20	PUMPOUT CIRCUIT	3W#10AWG W/#10GND CU 1" PVC	1.5HP X200
19	20	1	20	GFCI RECEPTACLE, TC POWER & LIGHT	2W#12AWG W/#12GND CU 1" EMT	INSIDE CABINET
20	20	1	20	SPARE		
21	20	1	20	SPARE		
22	20	2	20	SPARE		

**PROPOSED ELECTRICAL PANELBOARD SCHEDULE**  
NOT TO SCALE

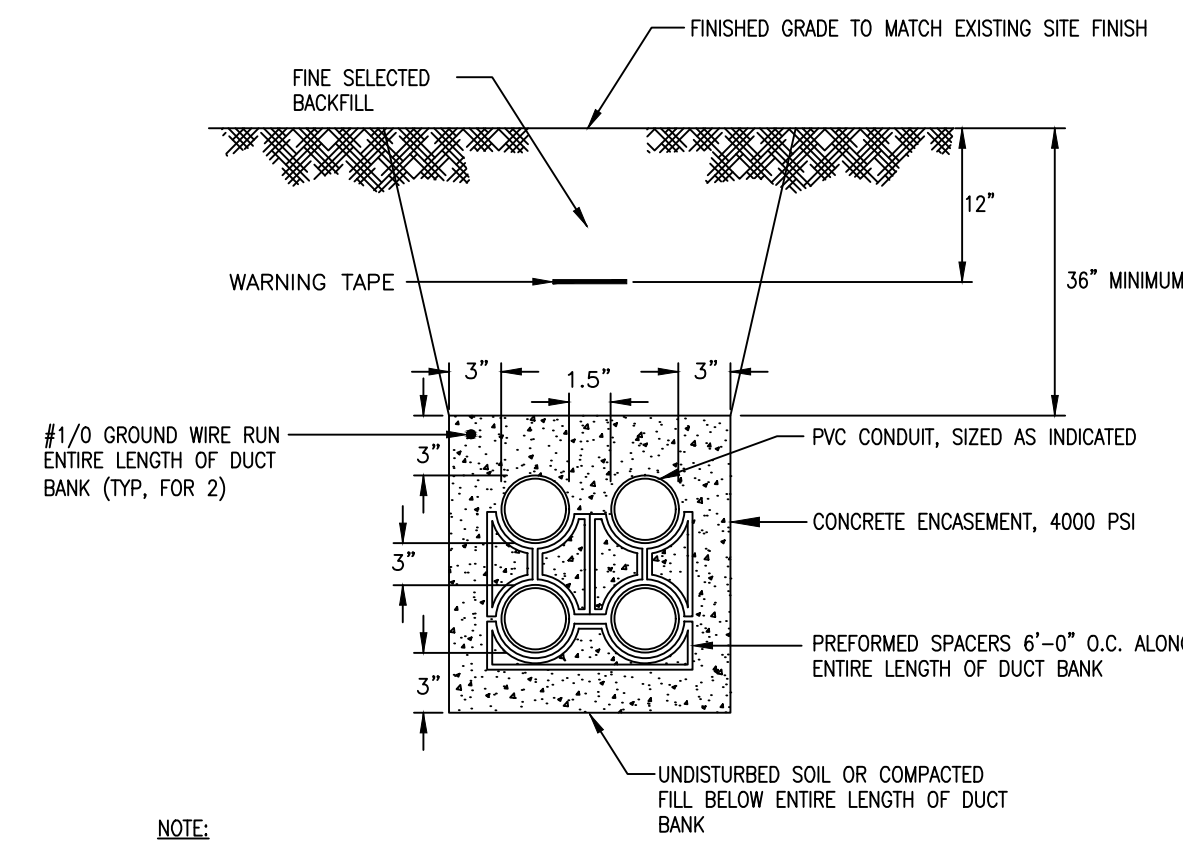
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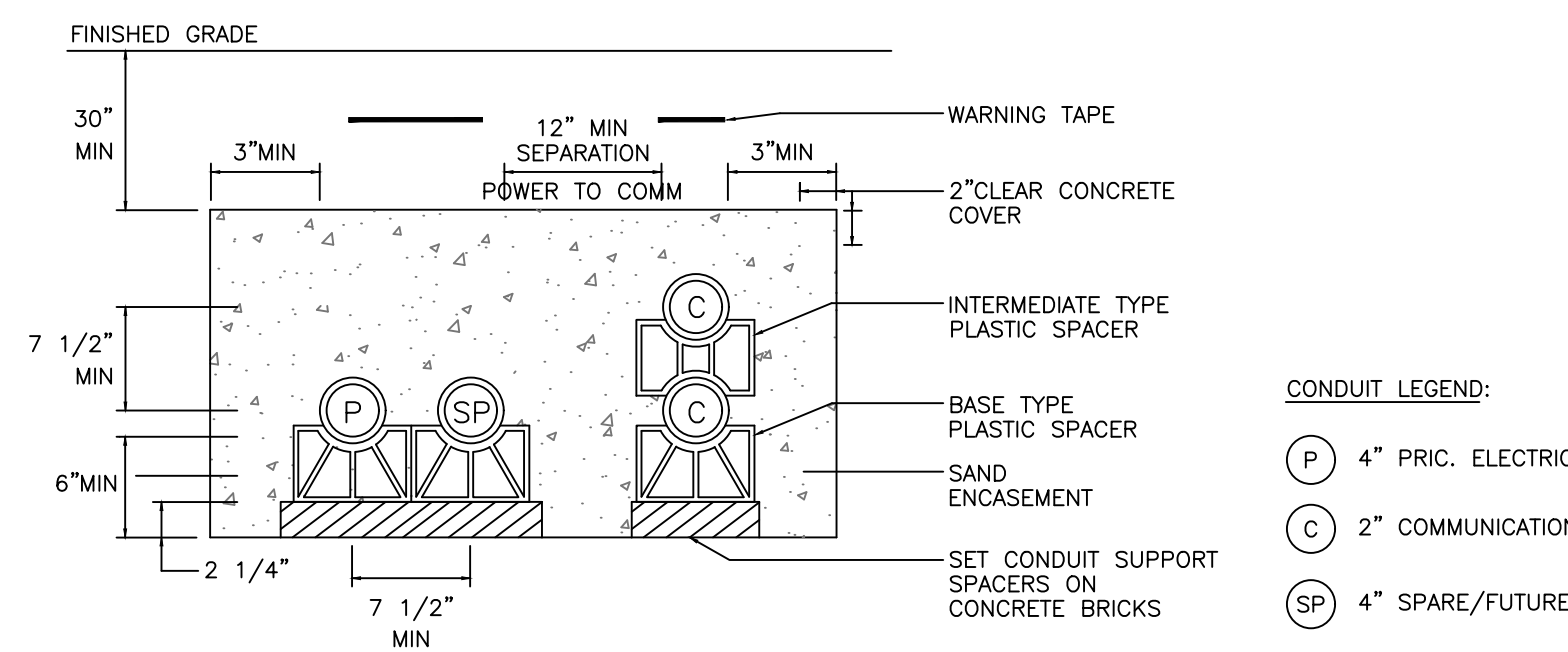
03-06-2024

**DEPARTMENT OF PUBLIC WORKS  
TOWN OF ORLEANS, MASSACHUSETTS  
ROCK HARBOR COMMERCIAL  
WHARF IMPROVEMENTS**

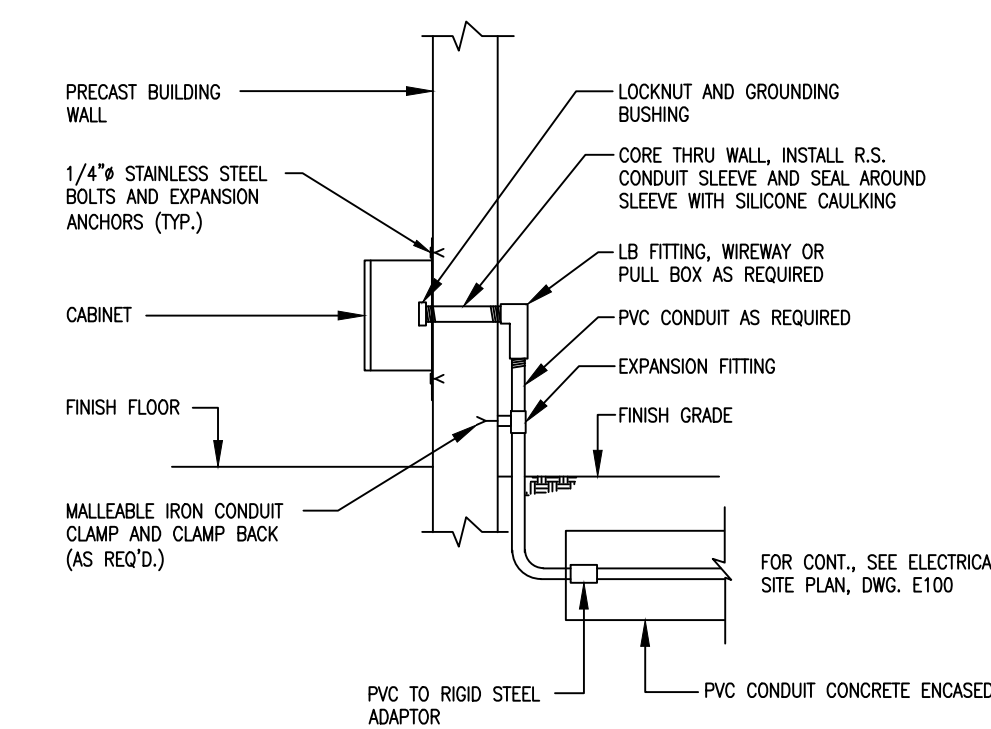
REVISIONS		DATE	DESCRIPTION
NO.	BY		
1			
2			



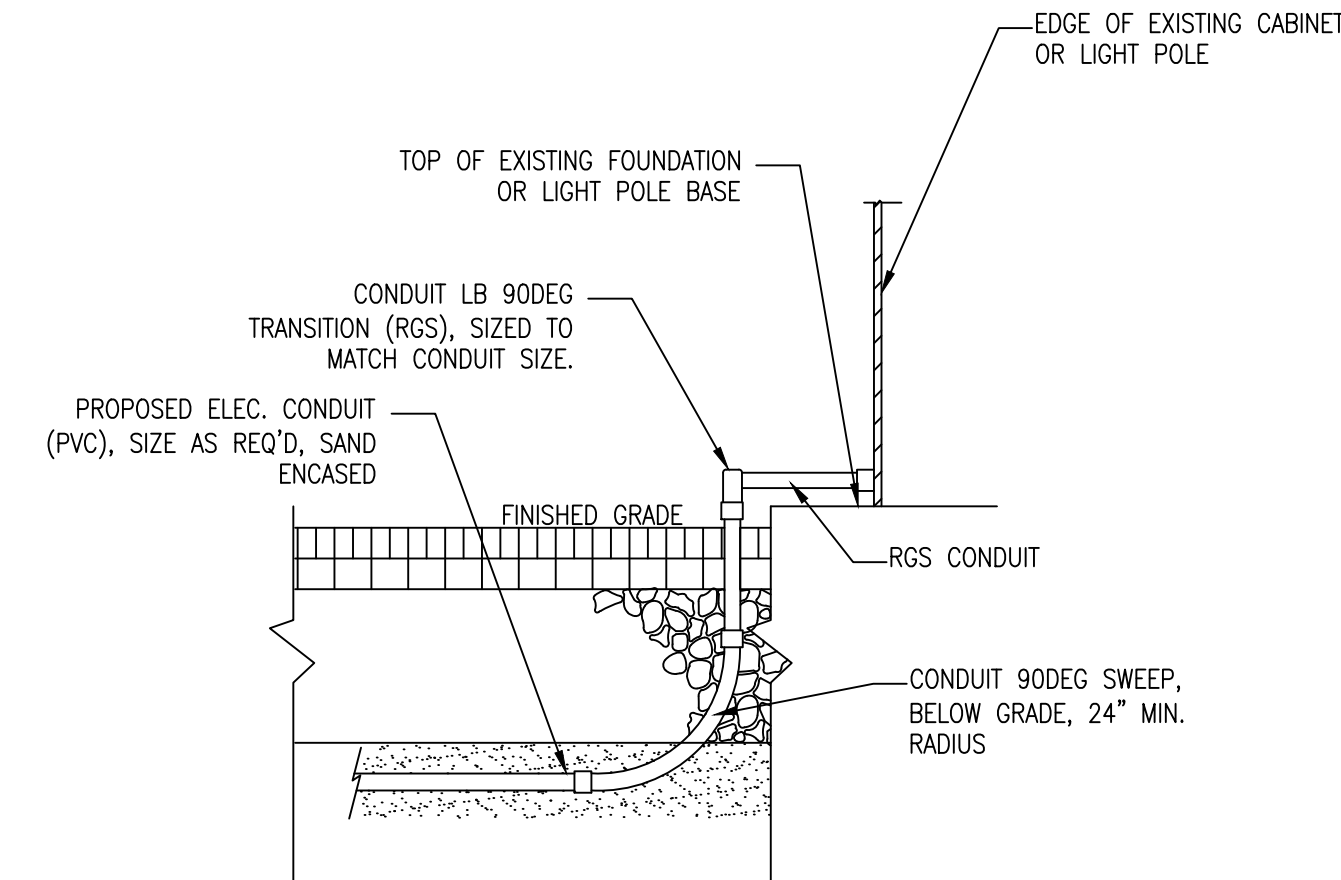
**E104 1**  
TYPICAL DUCTBANK SECTION  
N.T.S.



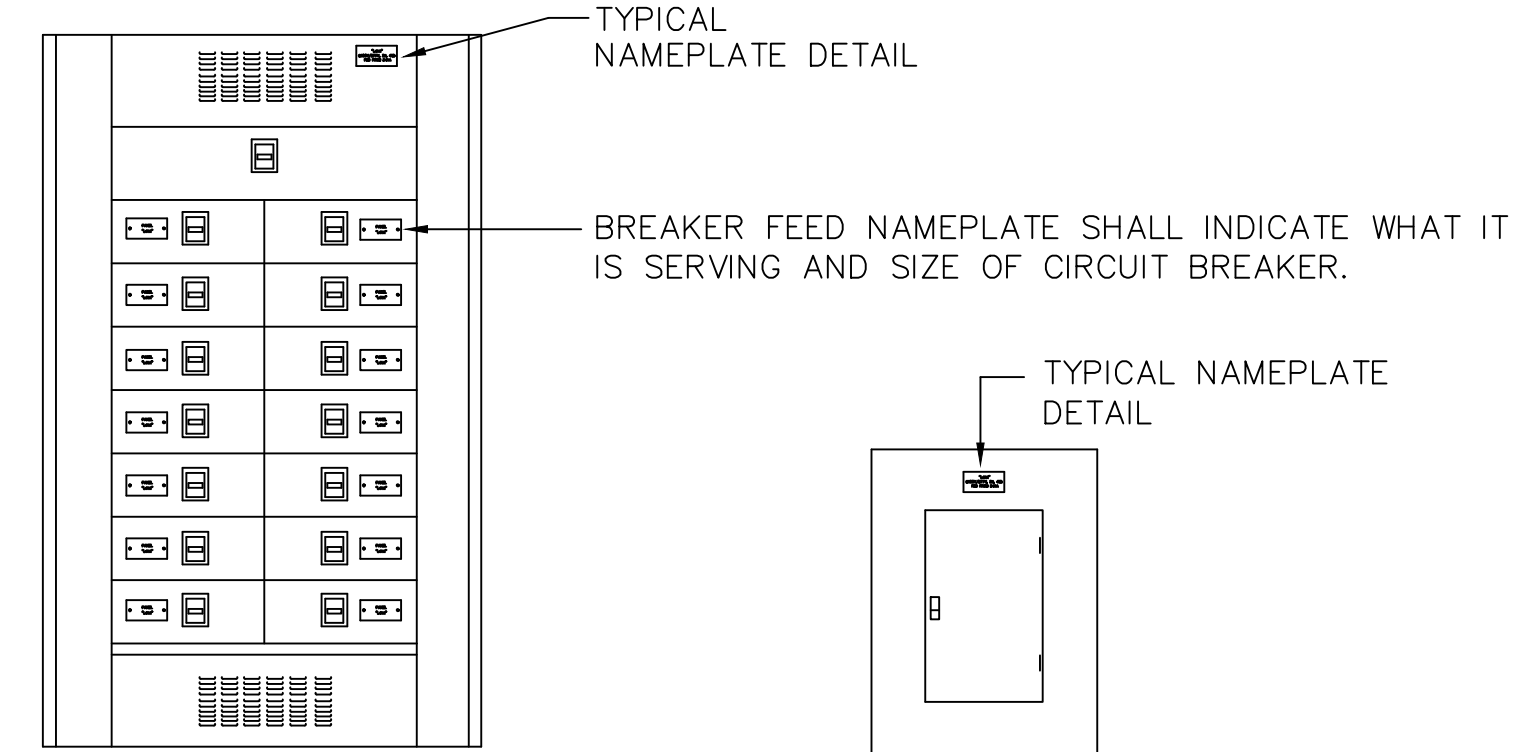
**E104 2**  
COMBINED ELEC./COMM. TRENCH DETAIL  
NOT TO SCALE



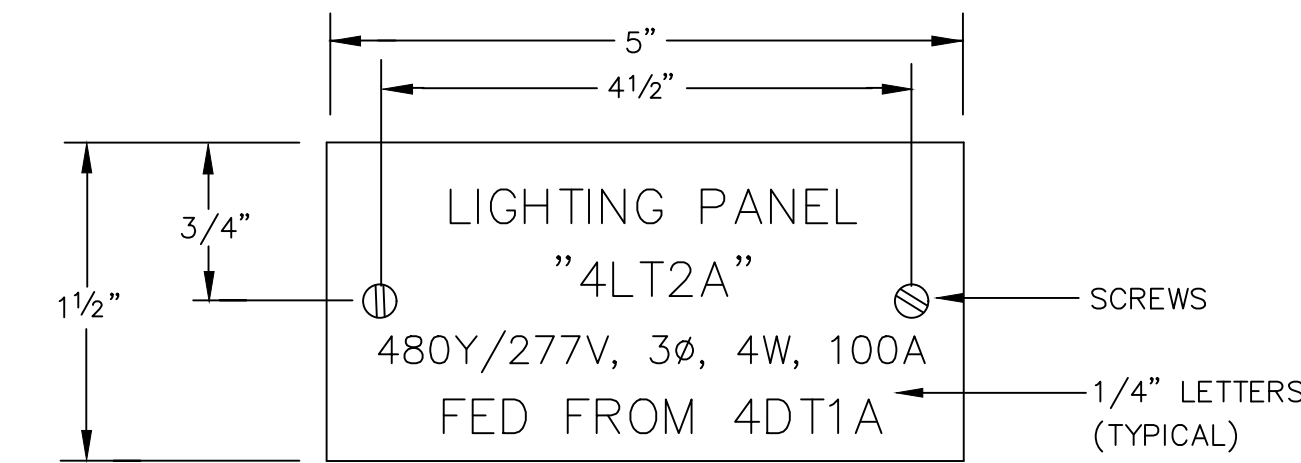
**E104 4**  
TYPICAL THRU-WALL CONDUIT DETAIL  
N.T.S.



**E104 5**  
CONDUIT TRANSITION ABOVE/BELOW GRADE  
N.T.S.

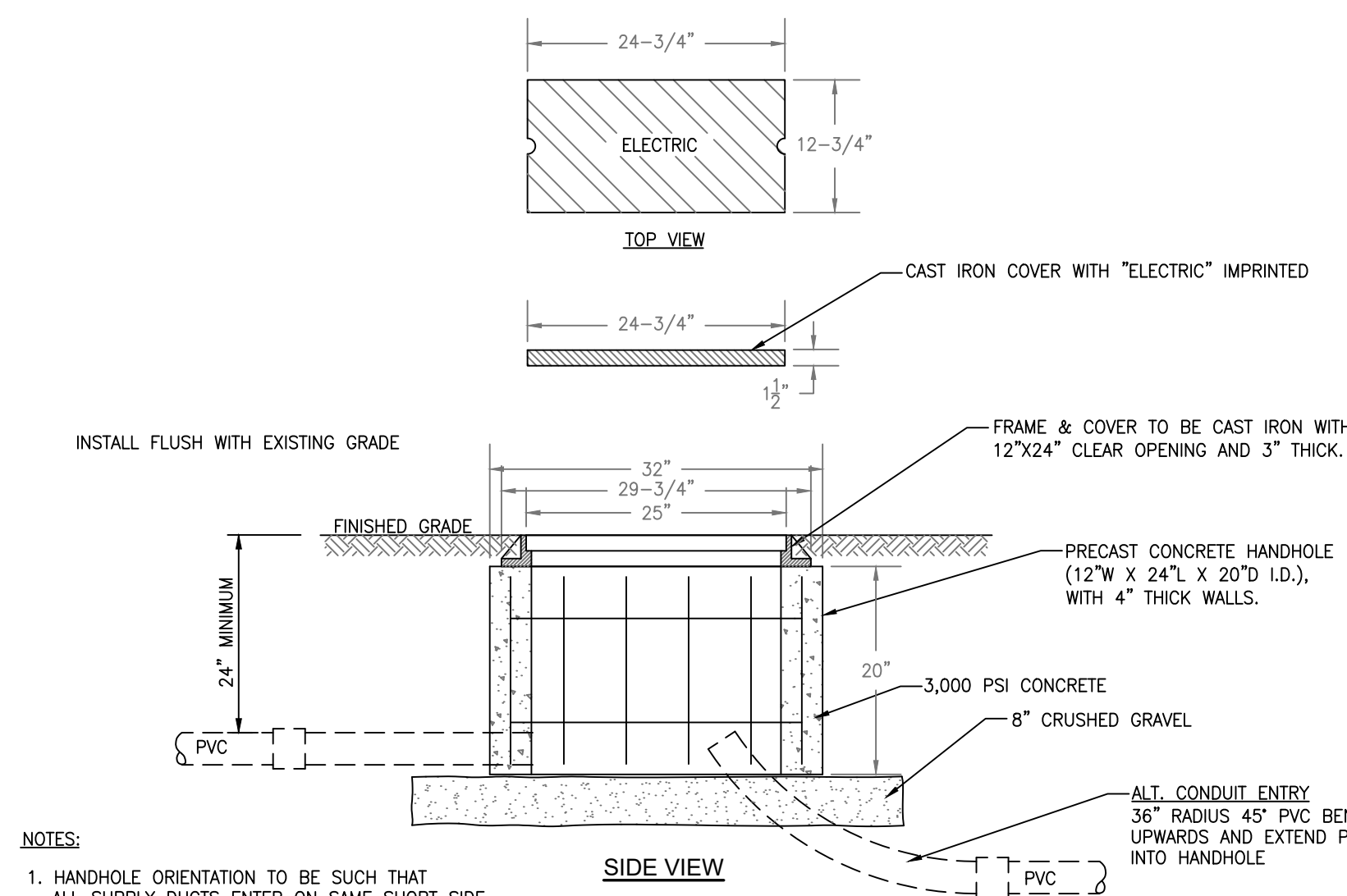


**E104 8**  
TYPICAL PANELBOARD NAMEPLATE LOCATIONS  
N.T.S.



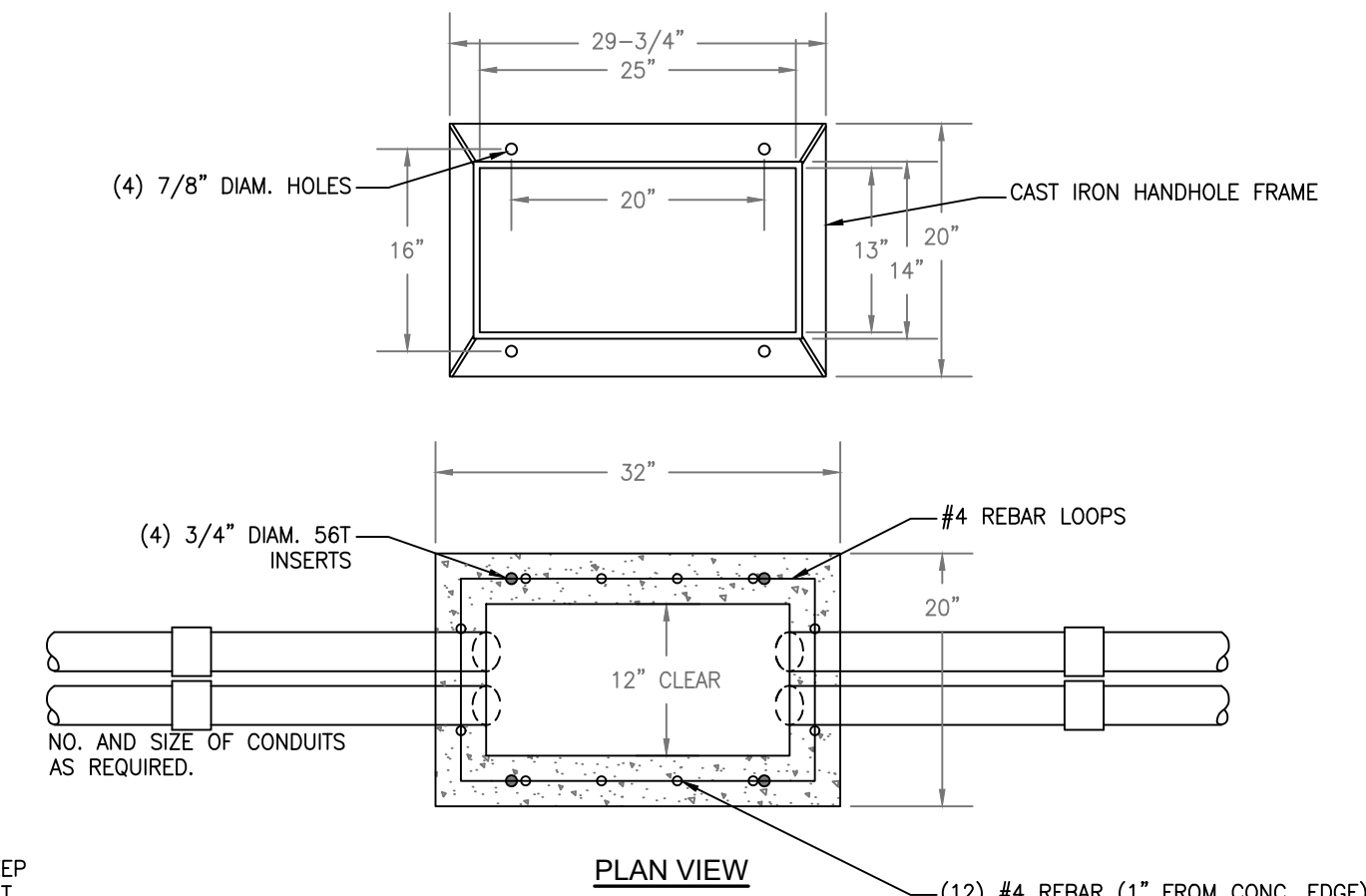
- NOTES:**
- REFER TO SPECIFICATIONS FOR ADDITIONAL NAMEPLATE REQUIREMENTS.
  - NAMEPLATE TO BE 1/16" THICK WHITE PLASTIC WITH BLACK CENTER LAMINATE. FACE SHALL BE WHITE, ENGRAVED LETTERS SHALL BE BLACK.
  - SECURE NAMEPLATE TO SURFACES WITH (2) FLAT HEAD BRASS SCREWS. ADHESIVE CEMENT SHALL NOT BE ALLOWED.
  - NAMEPLATE INFORMATION SHALL INCLUDE DEVICE NAME, SUPPLY VOLTAGE, AMPERAGE AND LOCATION FED FROM.

**E104 9**  
TYPICAL PANELBOARD NAMEPLATE  
N.T.S.

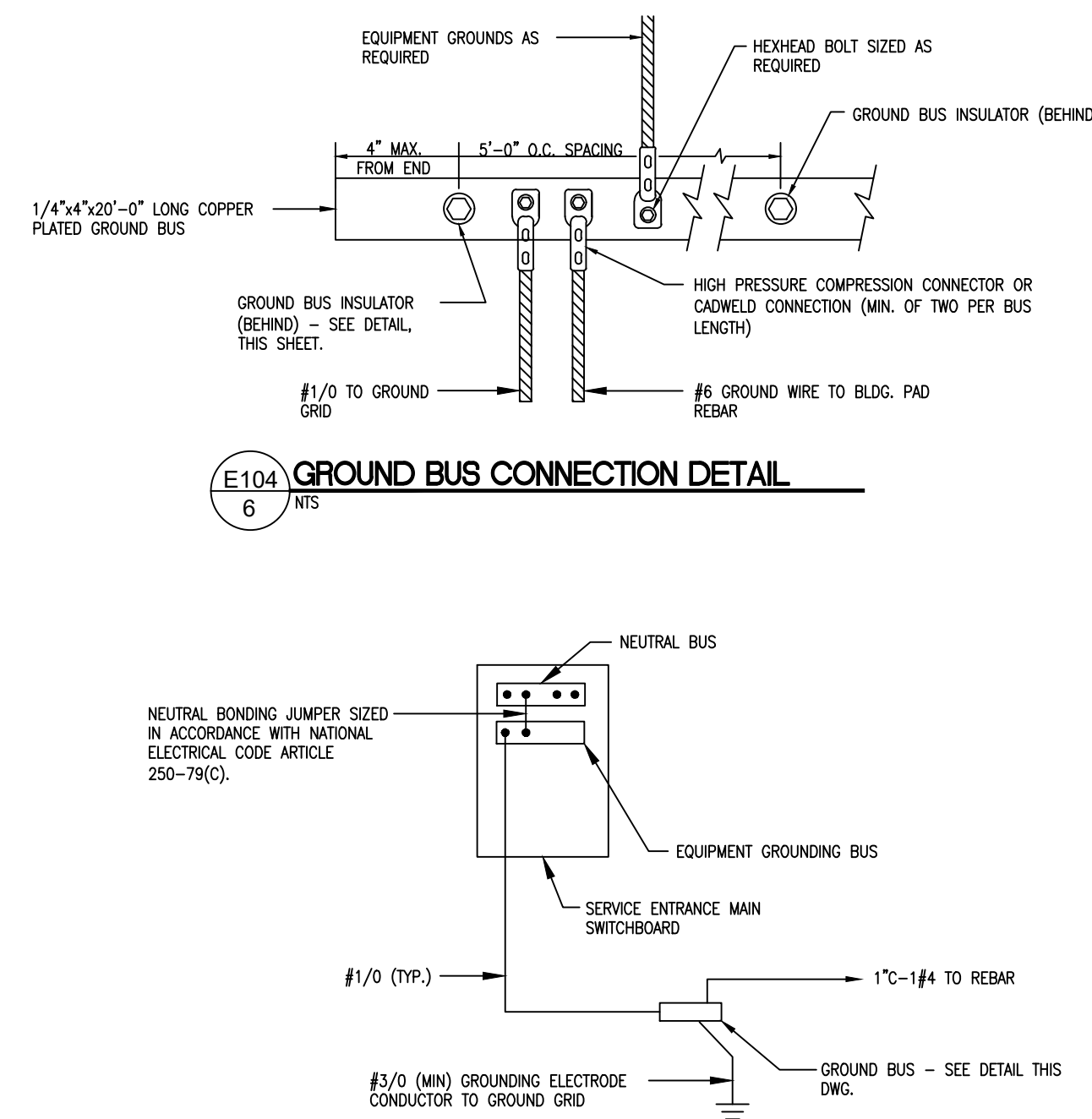


- NOTES:**
- HANDHOLE ORIENTATION TO BE SUCH THAT ALL SUPPLY DUCTS ENTER ON SAME SHORT SIDE.
  - SIZE AND NUMBER OF CONDUITS AS REQUIRED.
  - CONDUIT LOCATIONS SHOWN ARE TYPICAL.

**E104 3**  
PRECAST ELECTRIC HANDHOLE DETAIL  
N.T.S.



**E104 6**  
GROUND BUS CONNECTION DETAIL  
N.T.S.



**E104 7**  
SYSTEM GROUNDING CONNECTIONS DETAIL  
N.T.S.

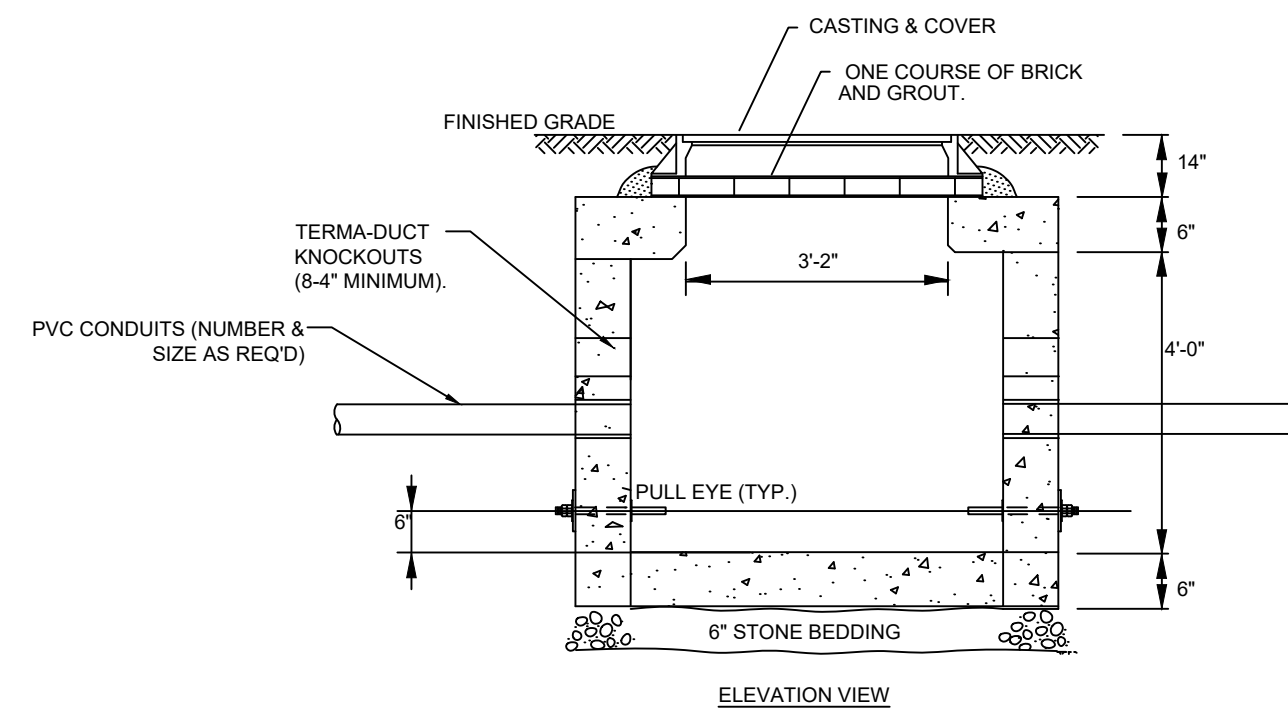
NO.	BY	DATE	DESCRIPTION

DATE OF PREPARATION	
BY	DATE

SHEET TITLE:  
**ELECTRICAL DETAILS**

ISSUANCE:  
**ISSUED FOR BID**

PROJECT NO: 0021M087.00  
SHEET NUMBER  
**E-104**

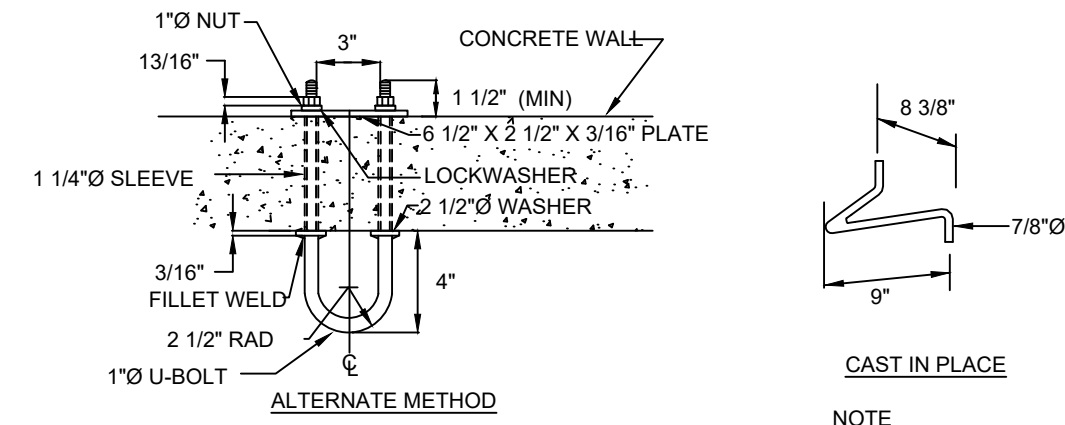


**4'X4' ELEC MANHOLE DETAIL**  
N.T.S.

**ELECTRIC MH INSTALLATION NOTES:**

1. THE FIRST 12" OF FILL SHOULD BE SAND OR OTHER GRANULAR MATERIAL (NOT TO EXCEED 1/2") TAMPED USING LIGHTWEIGHT EQUIPMENT SUCH AS PNEUMATIC OR VIBRATING TAMPERS.
2. BACKFILL SHALL BE FREE FROM LARGE STONES, FROZEN MATERIAL, WOOD, AND OTHER EXTRANEIOUS MATERIALS.
3. ALL BACKFILL SHALL BE THOROUGHLY COMPACTED IN LAYERS OF NOT MORE THAN 6 INCHES.
4. IN ROCK EXCAVATION, PROVIDE 6" DEAD SAND CUSHION AROUND STRUCTURES.
5. CONTRACTOR SHALL PLACE MARKING TAPE 18" ABOVE DUCT STRUCTURE.
6. DEPTH OF SUB BASE AND MATERIAL USED SHALL CONFORM TO STANDARD STATE AND/OR MUNICIPAL SPECIFICATIONS.

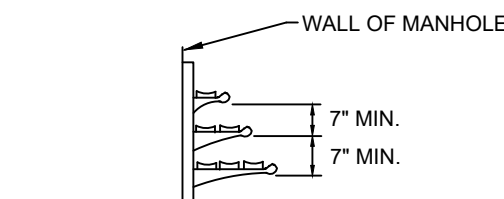
**E105 1 PRECAST ELECTRIC MANHOLE DETAIL**  
N.T.S.



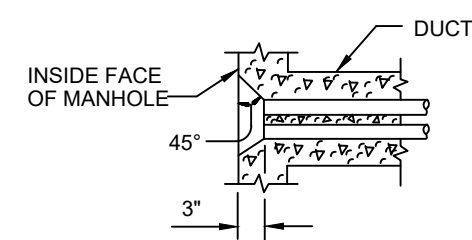
**DETAIL OF PULLING-IN IRON**

CAST IN PLACE

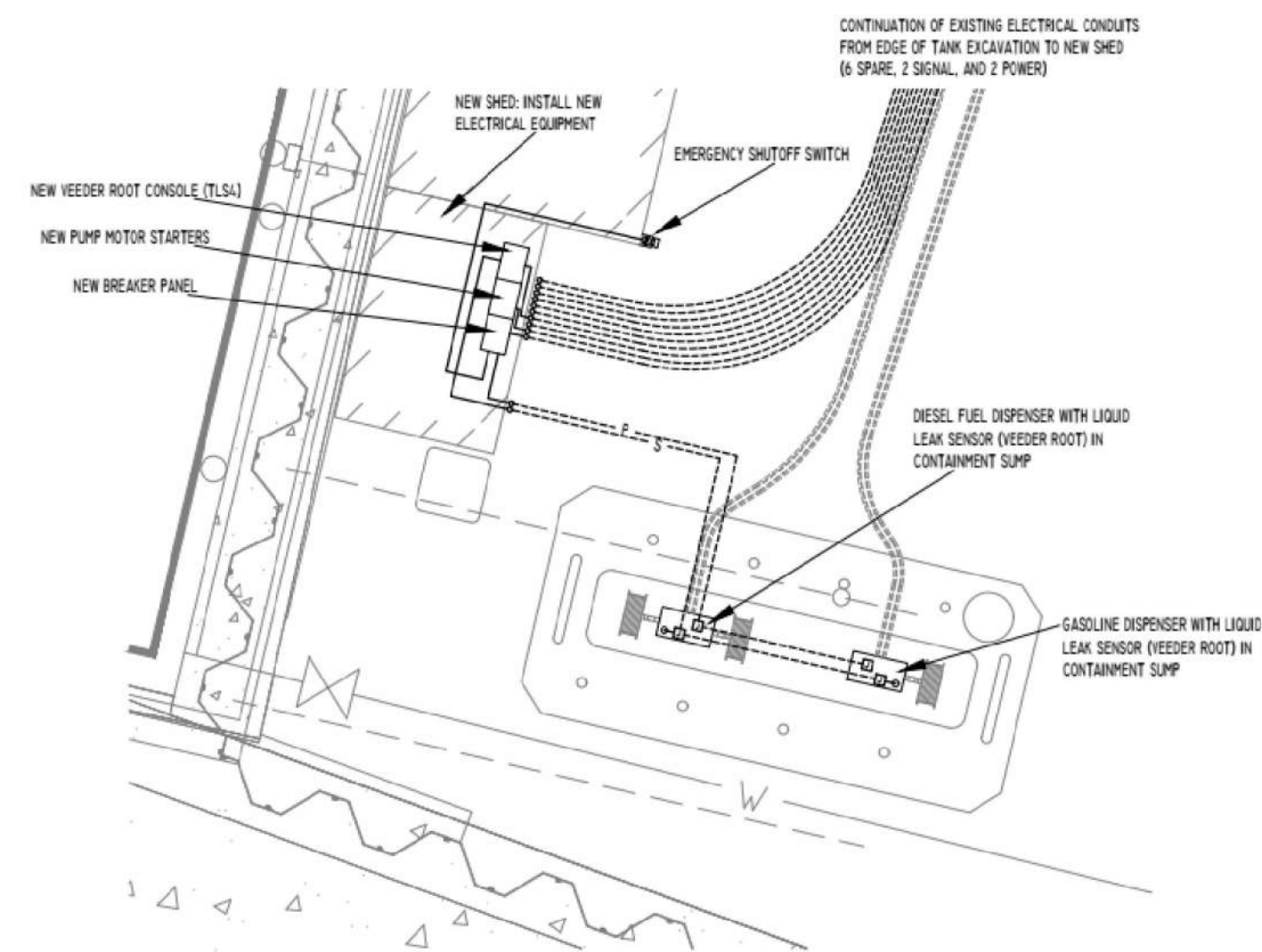
NOTE: ALL METAL PARTS SHALL BE HOT DIP GALVANIZED



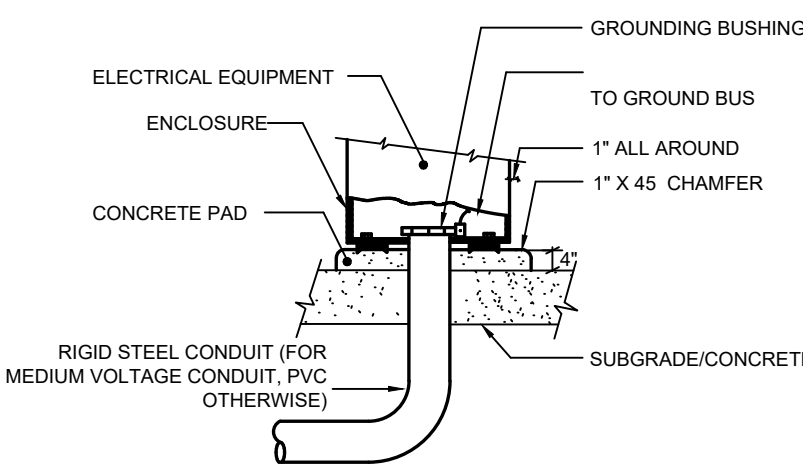
**TYPICAL CABLE RACK**



**TYPICAL DUCT ENTRANCE**

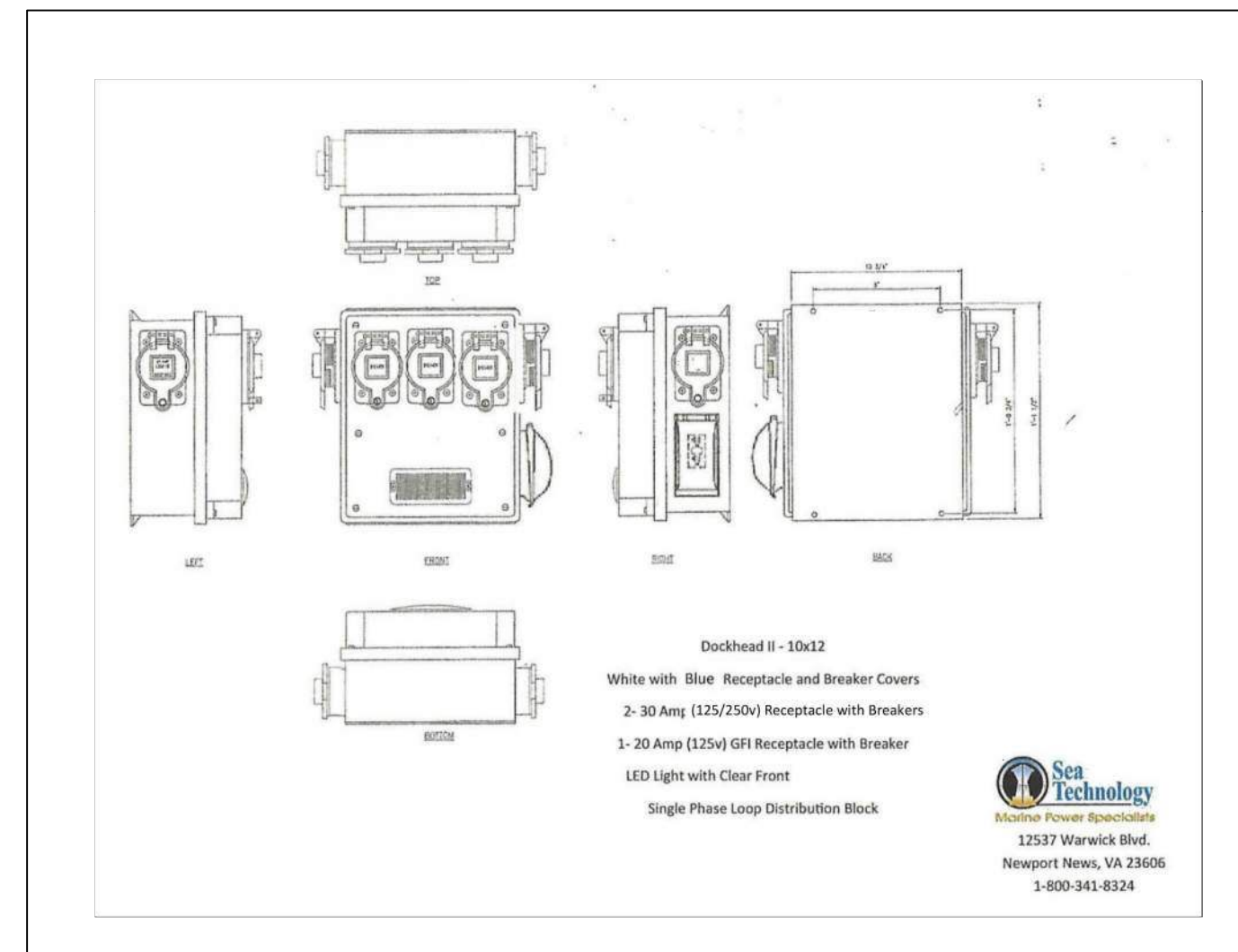


**E106 6 FUEL ISLAND ELECTRICAL DETAIL**  
SEE WEB ENGINEERING DRAWINGS FOR ADDITIONAL DETAILS

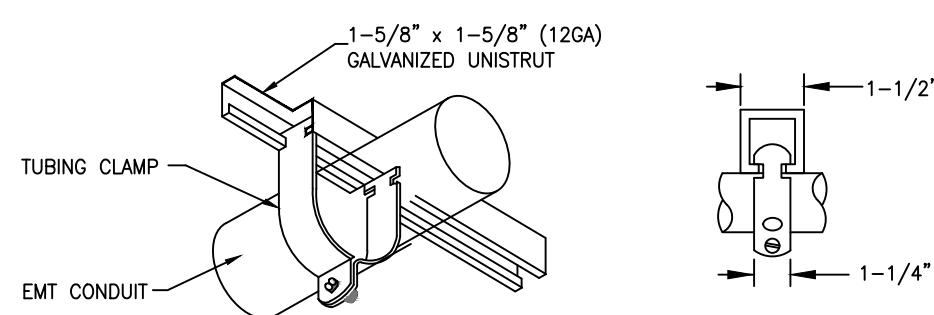


**E105 3 CONDUIT ENTRANCE FROM BELOW**  
NOT TO SCALE

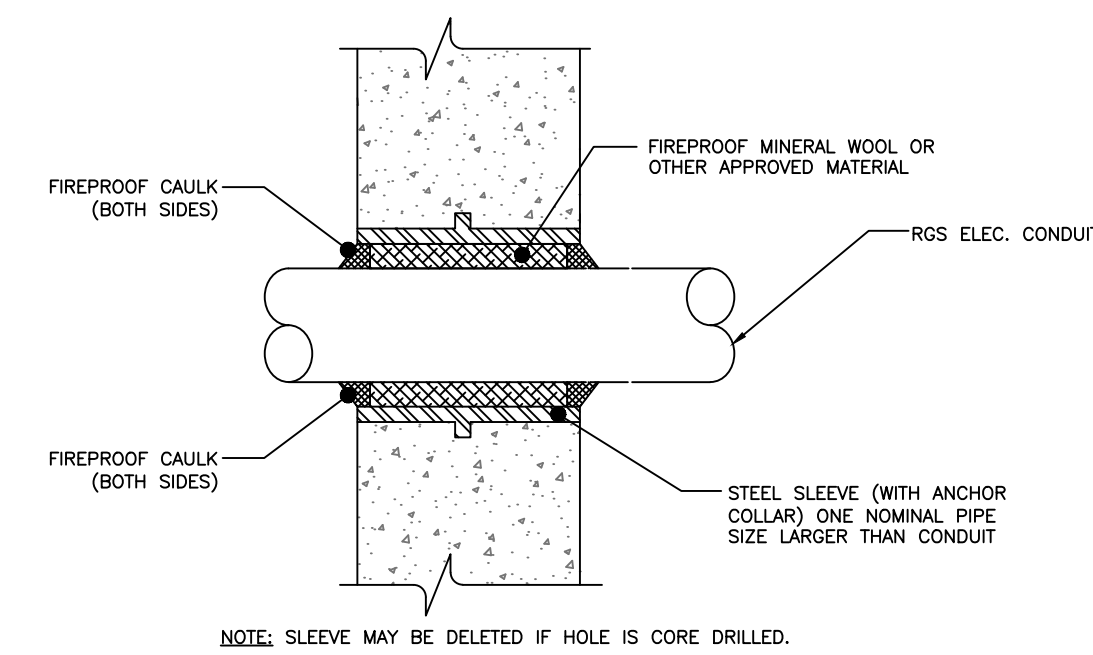
**E105 2 PRECAST MANHOLE PULLING IRON DETAILS**  
N.T.S.



**E105 4 50A-208V SHORE POWER RECEPTACLE DETAIL**  
NOT TO SCALE



**E105 5 CONDUIT ATTACHMENT DETAIL**  
N.T.S.



NOTE: SLEEVE MAY BE DELETED IF HOLE IS CORE DRILLED.

**E105 7 CONDUIT PENETRATION DETAIL**  
N.T.S.

03-06-2024

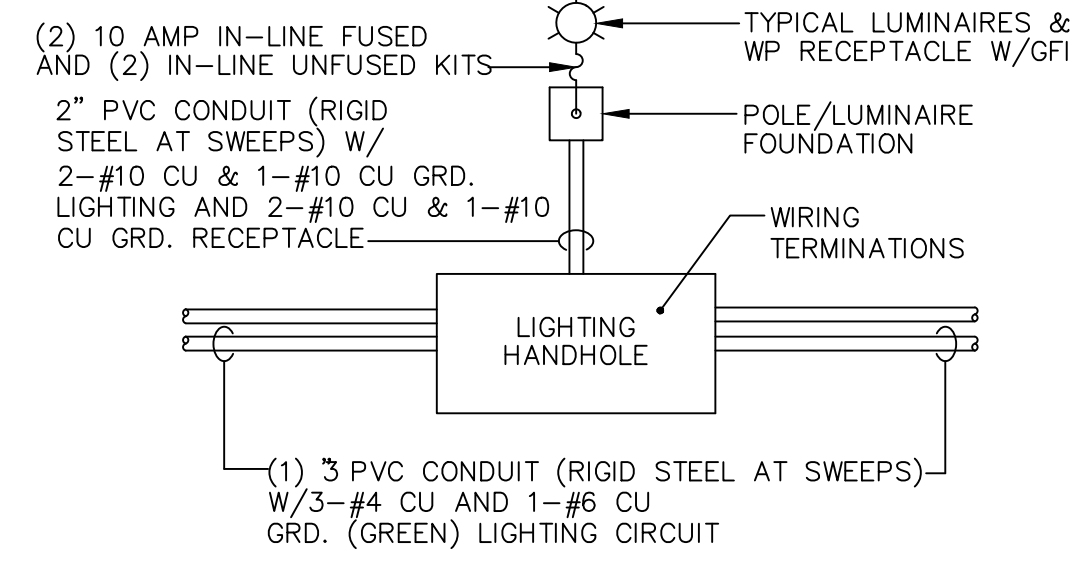
**DEPARTMENT OF PUBLIC WORKS**  
**TOWN OF ORLEANS, MASSACHUSETTS**  
**ROCK HARBOR COMMERCIAL**  
**WHARF IMPROVEMENTS**

NO.	BY	DATE	REVISIONS	
			DESCRIPTION	DATE

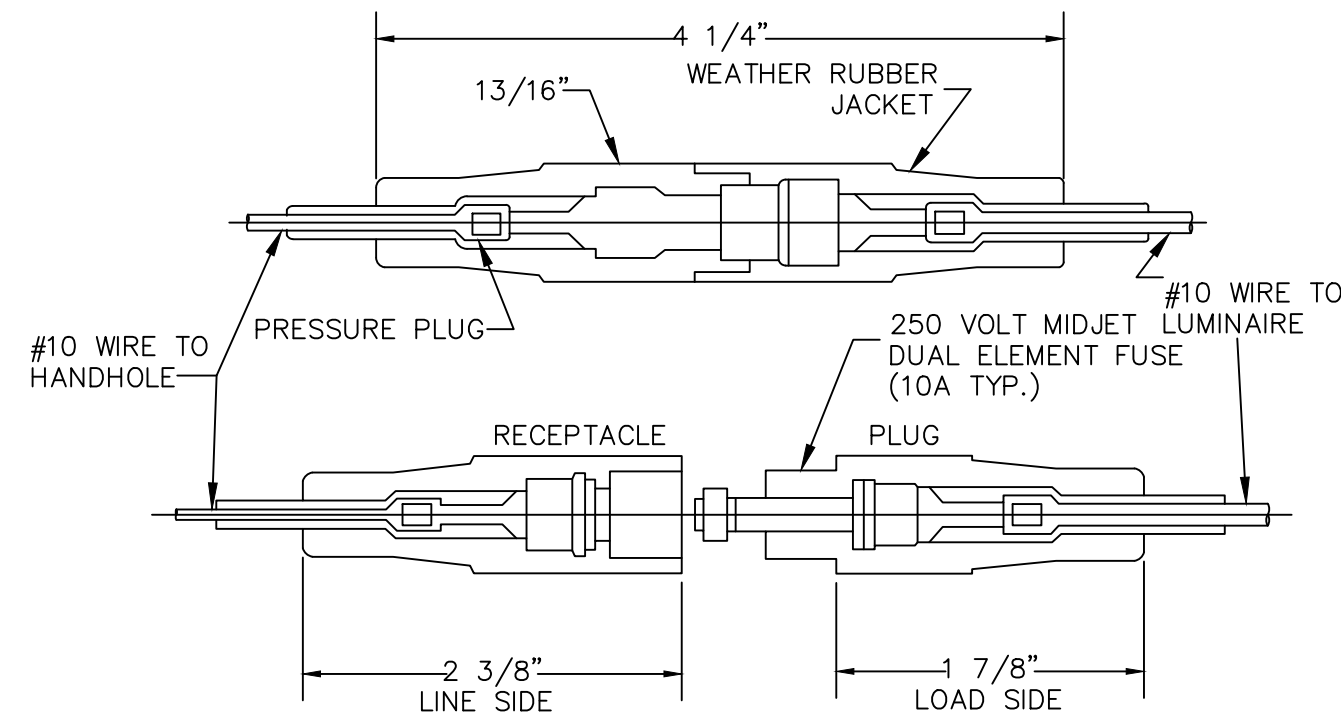
DATE OF PREPARATION		
BY	DATE	

SHEET TITLE:  
**ELECTRICAL DETAILS**

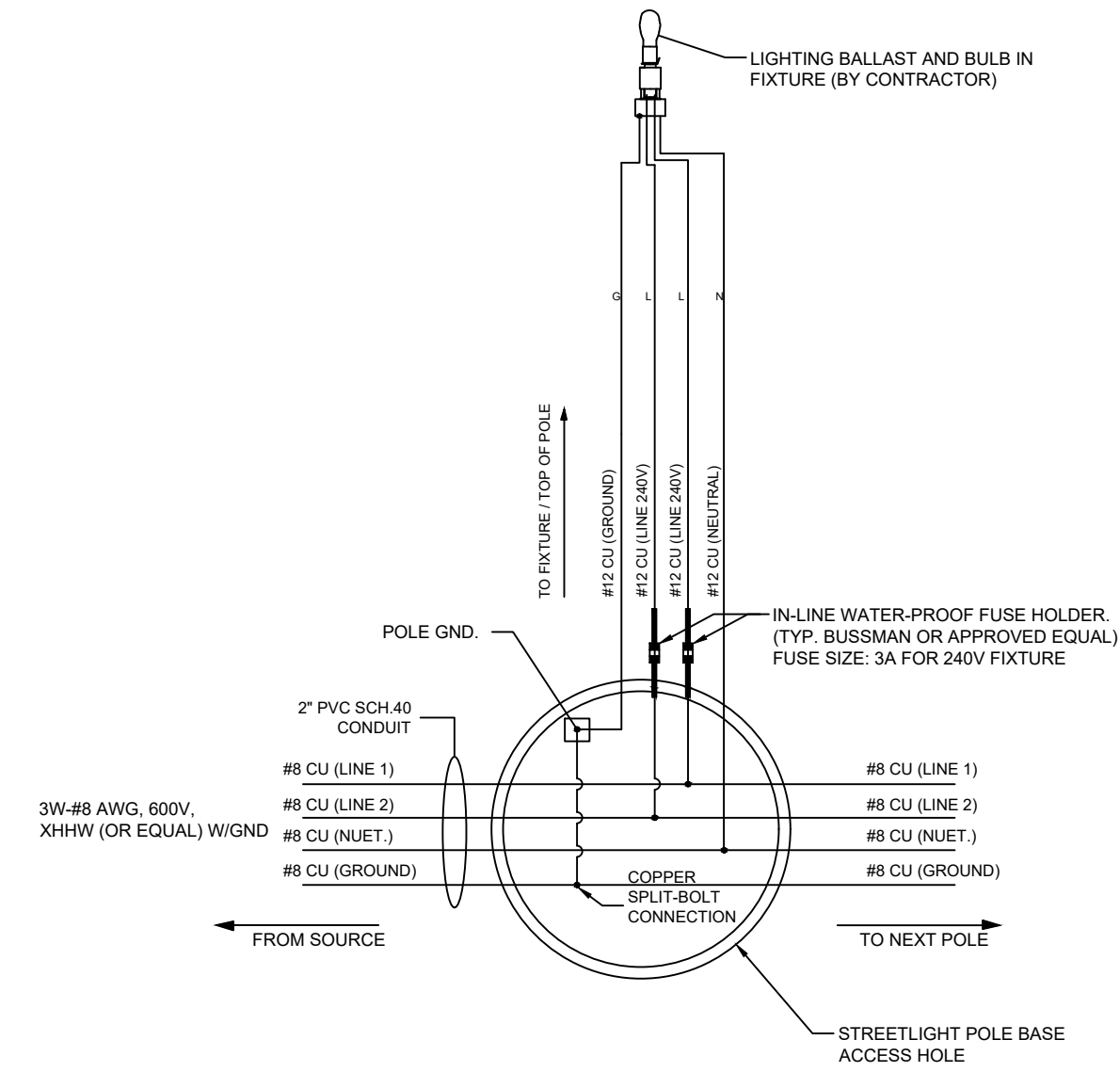
ISSUANCE:  
**ISSUED FOR BID**  
PROJECT NO: 0021M087.00  
SHEET NUMBER  
**E-105**



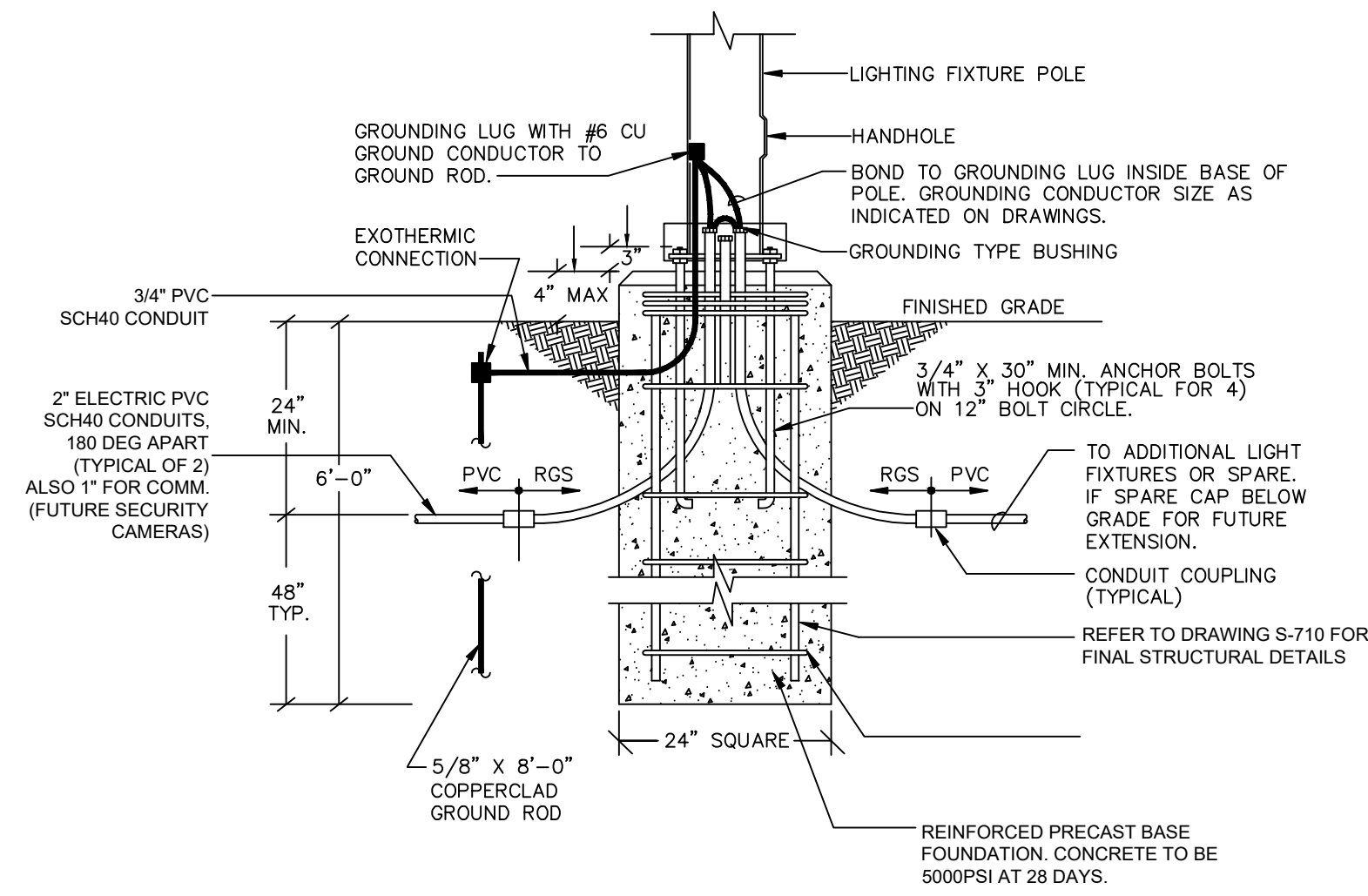
**E106**  
 1  
 N.T.S.  
**TYPICAL HANDHOLE/CONDUIT DETAIL**



**E106**  
 2  
 N.T.S.  
**FUSE DETAIL, LIGHT POLE BASE**

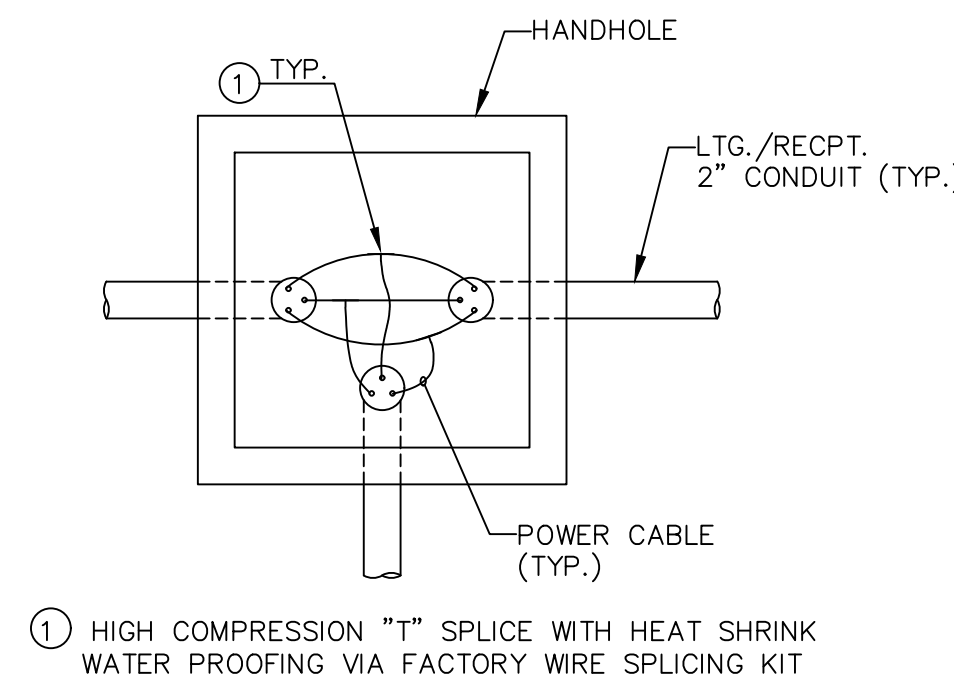


**E106**  
 5  
 N.T.S.  
**TYPICAL LIGHT POLE WIRING DETAIL**

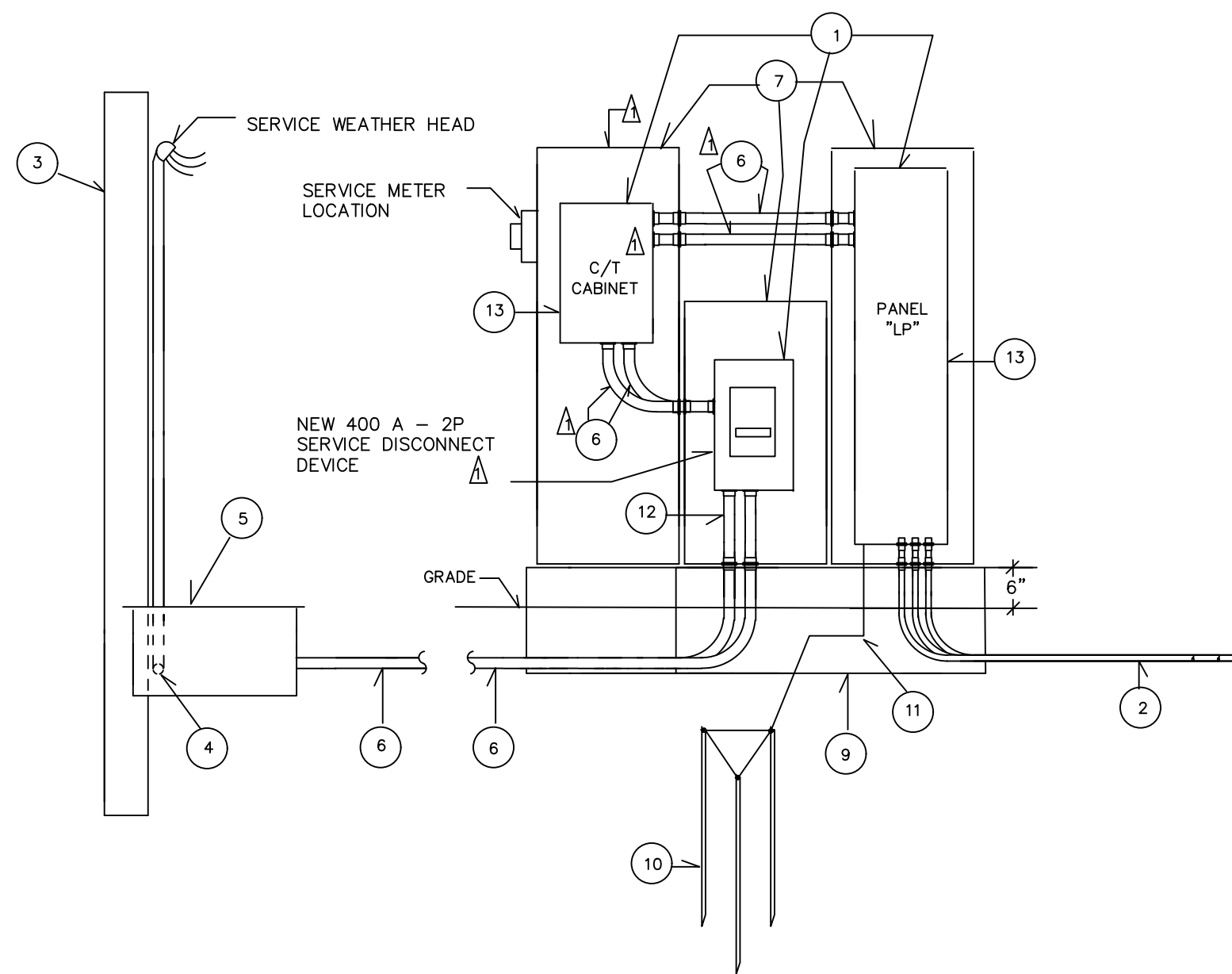


**E106**  
 3  
 N.T.S.  
**TYPICAL LIGHT POLE DETAIL**

- LIGHT POLE FOUNDATION NOTES:**
- BOLT PATTERN SHOWN IS TYPICAL AND NOT FOR CONSTRUCTION CONTRACTOR TO PROVIDE BOLT PATTERN DETAILS BASED ON SELECTED MANUFACTURER.
  - PROVIDE REBAR DETAIL FROM PRECAST CONCRETE VENDOR FOR APPROVAL.
  - CONDUIT LOCATIONS SHOWN ARE TYPICAL.



**E106**  
 4  
 N.T.S.  
**TYPICAL POWER CABLE SPLICING DETAIL**



**E106**  
 6  
 N.T.S.  
**ELECTRICAL SERVICE CABINET DETAIL**

**ELECTRICAL NOTES**

- INSTALL A MAIN SERVICE DISCONNECT DEVICE, PANEL BOARD, C/T CABINET AND UTILITY SERVICE METER ON NEW CONCRETE HOUSEKEEPING PAD. THE PANELBOARD SHALL BE RATED AT 400 AMP, 120/240 VOLT, SINGLE PHASE, 60 HZ, MOUNTED IN TYPE 4X ENCLOSURES.
- TYPICAL CONDUIT OUT TO SHORE POWER CENTERS AND RELOCATED SHED.
- EXISTING UTILITY POLE.
- ONE (1), 4" SCHED. 40, PVC CONDUIT, WITH 3# 600 MCM + 1# 3AWG CU GND., IN EACH.
- PROVIDE NEW UTILITY COMPANY APPROVED PULL BOX AT BASE OF EXISTING UTILITY POLE.
- 1 - 4" C., WITH 3#600 MCM + 1#3AWG CU GND., IN EACH FROM PULL BOX TO MAIN SERVICE DISCONNECT DEVICE TO C/T CABINET AND TO PANELBOARD. PIPING BETWEEN ENCLOSURES TO BE SCH 80 PVC.
- PANEL BOARD, C/T CABINET AND MAIN DISCONNECT DEVICE TO BE LOCATED IN NEMA 4X, TYPE 304, CORROSION RESISTANT, STAINLESS STEEL ENCLOSURES (SIZE AS REQUIRED) PER APPROVED MANUFACTURER, WITH LOCKING HANDLE, INTERNAL FRAME FOR MOUNTING PANELBOARD AND THE C/T EQUIPMENT AND ALL NECESSARY ACCESSORIES INCLUDING AN EXTERNALLY MOUNTED PHOTOCELL AND INTERNALLY MOUNTED TIME CLOCKS FOR CONTROL OF THE WALL LIGHTS & FLAG POLE LIGHT (TYPE A) AN INTERNAL LIGHT KIT WITH LIGHT SWITCH AND 20A, 120 VOLT, GFI PROTECTED DUPLEX RECEPTACLES.
- ALL CONDUITS INDICATED ARE RUN UNDERGROUND FROM THE PANEL BOARD TO THE SHORE POWER CENTERS AND LIGHTING.
- REINFORCED HOUSEKEEPING PAD (SIZE AS REQUIRED).
- EXISTING GROUND RODS TO REMAIN AND TO BE REUSED, AFTER TESTING FOR GROUND INTEGRITY, FOR NEW PANEL GROUND AS REQUIRED BY NFPA-70, ARTICLE 250.
- 1 # 2/0 GROUND WIRE TO EXISTING GROUND ROD COUNTERPOISE.
- EXISTING SERVICE CONDUITS TO BE REROUTED TO THE ENCLOSURE OF THE NEW MAIN SERVICE DISCONNECT DEVICE AS INDICATED.
- NEW 400A, 120/240V 42 CIRCUIT PANELBOARD.



03-06-2024

DEPARTMENT OF PUBLIC WORKS  
 TOWN OF ORLEANS, MASSACHUSETTS  
 ROCK HARBOR COMMERCIAL  
 WHARF IMPROVEMENTS

NO.	BY	DATE	REVISIONS	
			DESCRIPTION	

DATE OF PREPARATION	
BY	DATE

SHEET TITLE:	

ISSUANCE:	

PROJECT NO: 0021M087.00  
 SHEET NUMBER  
**E-106**

**ATTACHMENT C**

**MA PREVAILING WAGE RATES**

Date Issued: 02/26/2024 (41 pages)



MAURA HEALEY  
Governor

KIM DRISCOLL  
Lt. Governor

THE COMMONWEALTH OF MASSACHUSETTS  
EXECUTIVE OFFICE OF LABOR AND WORKFORCE DEVELOPMENT  
DEPARTMENT OF LABOR STANDARDS

Prevailing Wage Rates

As determined by the Director under the provisions of the  
Massachusetts General Laws, Chapter 149, Sections 26 to 27H

LAUREN JONES  
Secretary

MICHAEL FLANAGAN  
Director

**Awarding Authority:** Town of Orleans, MA  
**Contract Number:** N/A **City/Town:** ORLEANS  
**Description of Work:** Installation of steel bulkhead, timber piers, steel pile-supported concrete off-loading/public viewing deck, timber berthing piles and floats, drainage and utility services (water, electric and fuel).  
**Job Location:** 113 Rock Harbor Road Orleans, MA 02653

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**Information about Prevailing Wage Schedules for Awarding Authorities and Contractors**

- **The wage rates will remain in effect for the duration of the project, except in the case of multi-year public construction projects. For construction projects lasting longer than one year, awarding authorities must request an updated wage schedule no later than two weeks before the anniversary of the date the contract was executed by the awarding authority and the general contractor.** For multi-year CM AT RISK projects, the awarding authority must request an annual update no later than two weeks before the anniversary date, determined as the earlier of: (a) the execution date of the GMP Amendment, or (b) the execution date of the first amendment to permit procurement of construction services. The annual update requirement is not applicable to 27F "rental of equipment" contracts. **The updated wage schedule must be provided to all contractors, including general and sub-contractors, working on the construction project.**
- This wage schedule applies only to the specific project referenced at the top of this page and uniquely identified by the "Wage Request Number" on all pages of this schedule.
- An Awarding Authority must request an updated wage schedule if it has not opened bids or selected a contractor within 90 days of the date of issuance of the wage schedule. For CM AT RISK projects (bid pursuant to G.L. c.149A), the earlier of: (a) the execution date of the GMP Amendment, or (b) the bid for the first construction scope of work must be within 90-days of the wage schedule issuance date.
- The wage schedule shall be incorporated in any advertisement or call for bids for the project as required by M.G.L. c. 149, § 27. The wage schedule shall be made a part of the contract awarded for the project. The wage schedule must be posted in a conspicuous place at the work site for the life of the project in accordance with M.G.L. c. 149 § 27. The wages listed on the wage schedule must be paid to employees performing construction work on the project whether they are employed by the prime contractor, a filed sub-bidder, or a sub-contractor.
- Apprentices working on the project are required to be registered with the Massachusetts Division of Apprentice Standards (DAS). Apprentices must keep their apprentice identification card on their persons during all work hours on the project. An apprentice registered with DAS may be paid the lower apprentice wage rate at the applicable step as provided on the prevailing wage schedule. **Any apprentice not registered with DAS regardless of whether they are registered with another federal, state, local, or private agency must be paid the journeyworker's rate.**
- Every contractor or subcontractor working on the construction project must submit weekly payroll reports and a Statement of Compliance directly to the awarding authority by mail or email and keep them on file for three years. Each weekly payroll report must contain: the employee's name, address, occupational classification, hours worked, and wages paid. Do not submit weekly payroll reports to DLS. For a sample payroll reporting form go to <http://www.mass.gov/dols/pw>.
- Contractors with questions about the wage rates or classifications included on the wage schedule have an affirmative obligation to inquire with DLS at (617) 626-6953.
- Contractors must obtain the wage schedules from awarding authorities. Failure of a contractor or subcontractor to pay the prevailing wage rates listed on the wage schedule to all employees who perform construction work on the project is a violation of the law and subjects the contractor or subcontractor to civil and criminal penalties.
- Employees not receiving the prevailing wage rate set forth on the wage schedule may file a complaint with the Fair Labor Division of the office of the Attorney General at (617) 727-3465.

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
<b>Construction</b>						
(2 AXLE) DRIVER - EQUIPMENT <i>TEAMSTERS JOINT COUNCIL NO. 10 ZONE B</i>	01/01/2024	\$38.95	\$15.07	\$18.67	\$0.00	\$72.69
	06/01/2024	\$39.95	\$15.07	\$18.67	\$0.00	\$73.69
	12/01/2024	\$39.95	\$15.07	\$20.17	\$0.00	\$75.19
	01/01/2025	\$39.95	\$15.57	\$20.17	\$0.00	\$75.69
	06/01/2025	\$40.95	\$15.57	\$20.17	\$0.00	\$76.69
	12/01/2025	\$40.95	\$15.57	\$21.78	\$0.00	\$78.30
	01/01/2026	\$40.95	\$16.17	\$21.78	\$0.00	\$78.90
	06/01/2026	\$41.95	\$16.17	\$21.78	\$0.00	\$79.90
	12/01/2026	\$41.95	\$16.17	\$23.52	\$0.00	\$81.64
	01/01/2027	\$41.95	\$16.77	\$23.52	\$0.00	\$82.24
(3 AXLE) DRIVER - EQUIPMENT <i>TEAMSTERS JOINT COUNCIL NO. 10 ZONE B</i>	01/01/2024	\$39.02	\$15.07	\$18.67	\$0.00	\$72.76
	06/01/2024	\$40.02	\$15.07	\$18.67	\$0.00	\$73.76
	12/01/2024	\$40.02	\$15.07	\$20.17	\$0.00	\$75.26
	01/01/2025	\$40.02	\$15.57	\$20.17	\$0.00	\$75.76
	06/01/2025	\$41.02	\$15.57	\$20.17	\$0.00	\$76.76
	12/01/2025	\$41.02	\$15.57	\$21.78	\$0.00	\$78.37
	01/01/2026	\$41.02	\$16.17	\$21.78	\$0.00	\$78.97
	06/01/2026	\$42.02	\$16.17	\$21.78	\$0.00	\$79.97
	12/01/2026	\$42.02	\$16.17	\$23.52	\$0.00	\$81.71
	01/01/2027	\$42.02	\$16.77	\$23.52	\$0.00	\$82.31
(4 & 5 AXLE) DRIVER - EQUIPMENT <i>TEAMSTERS JOINT COUNCIL NO. 10 ZONE B</i>	01/01/2024	\$39.14	\$15.07	\$18.67	\$0.00	\$72.88
	06/01/2024	\$40.14	\$15.07	\$18.67	\$0.00	\$73.88
	12/01/2024	\$40.14	\$15.07	\$20.17	\$0.00	\$75.38
	01/01/2025	\$40.14	\$15.57	\$20.17	\$0.00	\$75.88
	06/01/2025	\$41.14	\$15.57	\$20.17	\$0.00	\$76.88
	12/01/2025	\$41.14	\$15.57	\$21.78	\$0.00	\$78.49
	01/01/2026	\$41.14	\$16.17	\$21.78	\$0.00	\$79.09
	06/01/2026	\$42.14	\$16.17	\$21.78	\$0.00	\$80.09
	12/01/2026	\$42.14	\$16.17	\$23.52	\$0.00	\$81.83
	01/01/2027	\$42.14	\$16.77	\$23.52	\$0.00	\$82.43
ADS/SUBMERSIBLE PILOT <i>PILE DRIVER LOCAL 56 (ZONE 2)</i>	08/01/2020	\$103.05	\$9.40	\$23.12	\$0.00	\$135.57
For apprentice rates see "Apprentice- PILE DRIVER"						
AIR TRACK OPERATOR <i>LABORERS - ZONE 2</i>	12/01/2023	\$38.61	\$9.65	\$17.14	\$0.00	\$65.40
For apprentice rates see "Apprentice- LABORER"						
AIR TRACK OPERATOR (HEAVY & HIGHWAY) <i>LABORERS - ZONE 2 (HEAVY &amp; HIGHWAY)</i>	12/01/2023	\$38.61	\$9.65	\$17.14	\$0.00	\$65.40
	06/01/2024	\$39.94	\$9.65	\$17.14	\$0.00	\$66.73
	12/01/2024	\$41.27	\$9.65	\$17.14	\$0.00	\$68.06
	06/01/2025	\$42.66	\$9.65	\$17.14	\$0.00	\$69.45
	12/01/2025	\$44.04	\$9.65	\$17.14	\$0.00	\$70.83
	06/01/2026	\$45.48	\$9.65	\$17.14	\$0.00	\$72.27
	12/01/2026	\$46.92	\$9.65	\$17.14	\$0.00	\$73.71
For apprentice rates see "Apprentice- LABORER (Heavy and Highway)"						

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
ASBESTOS REMOVER - PIPE / MECH. EQUIPT. <i>HEAT &amp; FROST INSULATORS LOCAL 6 (BOSTON)</i>	12/01/2023	\$40.80	\$14.50	\$11.05	\$0.00	\$66.35
	06/01/2024	\$41.80	\$14.50	\$11.05	\$0.00	\$67.35
	12/01/2024	\$42.80	\$14.50	\$11.05	\$0.00	\$68.35
	06/01/2025	\$43.80	\$14.50	\$11.05	\$0.00	\$69.35
	12/01/2025	\$44.80	\$14.50	\$11.05	\$0.00	\$70.35
ASPHALT RAKER <i>LABORERS - ZONE 2</i>	12/01/2023	\$38.11	\$9.65	\$17.14	\$0.00	\$64.90
For apprentice rates see "Apprentice- LABORER"						
ASPHALT RAKER (HEAVY & HIGHWAY) <i>LABORERS - ZONE 2 (HEAVY &amp; HIGHWAY)</i>	12/01/2023	\$38.11	\$9.65	\$17.14	\$0.00	\$64.90
	06/01/2024	\$39.44	\$9.65	\$17.14	\$0.00	\$66.23
	12/01/2024	\$40.77	\$9.65	\$17.14	\$0.00	\$67.56
	06/01/2025	\$42.16	\$9.65	\$17.14	\$0.00	\$68.95
	12/01/2025	\$43.54	\$9.65	\$17.14	\$0.00	\$70.33
	06/01/2026	\$44.98	\$9.65	\$17.14	\$0.00	\$71.77
	12/01/2026	\$46.42	\$9.65	\$17.14	\$0.00	\$73.21
For apprentice rates see "Apprentice- LABORER (Heavy and Highway)"						
ASPHALT/CONCRETE/CRUSHER PLANT-ON SITE <i>OPERATING ENGINEERS LOCAL 4</i>	12/01/2023	\$55.03	\$15.00	\$16.40	\$0.00	\$86.43
	06/01/2024	\$56.33	\$15.00	\$16.40	\$0.00	\$87.73
	12/01/2024	\$57.78	\$15.00	\$16.40	\$0.00	\$89.18
	06/01/2025	\$59.08	\$15.00	\$16.40	\$0.00	\$90.48
	12/01/2025	\$60.53	\$15.00	\$16.40	\$0.00	\$91.93
	06/01/2026	\$61.83	\$15.00	\$16.40	\$0.00	\$93.23
	12/01/2026	\$63.28	\$15.00	\$16.40	\$0.00	\$94.68
For apprentice rates see "Apprentice- OPERATING ENGINEERS"						
BACKHOE/FRONT-END LOADER <i>OPERATING ENGINEERS LOCAL 4</i>	12/01/2023	\$55.03	\$15.00	\$16.40	\$0.00	\$86.43
	06/01/2024	\$56.33	\$15.00	\$16.40	\$0.00	\$87.73
	12/01/2024	\$57.78	\$15.00	\$16.40	\$0.00	\$89.18
	06/01/2025	\$59.08	\$15.00	\$16.40	\$0.00	\$90.48
	12/01/2025	\$60.53	\$15.00	\$16.40	\$0.00	\$91.93
	06/01/2026	\$61.83	\$15.00	\$16.40	\$0.00	\$93.23
	12/01/2026	\$63.28	\$15.00	\$16.40	\$0.00	\$94.68
For apprentice rates see "Apprentice- OPERATING ENGINEERS"						
BARCO-TYPE JUMPING TAMPER <i>LABORERS - ZONE 2</i>	12/01/2023	\$38.11	\$9.65	\$17.14	\$0.00	\$64.90
For apprentice rates see "Apprentice- LABORER"						
BLOCK PAVER, RAMMER / CURB SETTER <i>LABORERS - ZONE 2</i>	12/01/2023	\$38.61	\$9.65	\$17.14	\$0.00	\$65.40
For apprentice rates see "Apprentice- LABORER"						
BLOCK PAVER, RAMMER / CURB SETTER (HEAVY & HIGHWAY) <i>LABORERS - ZONE 2 (HEAVY &amp; HIGHWAY)</i>	12/01/2023	\$38.61	\$9.65	\$17.14	\$0.00	\$65.40
	06/01/2024	\$39.94	\$9.65	\$17.14	\$0.00	\$66.73
	12/01/2024	\$41.27	\$9.65	\$17.14	\$0.00	\$68.06
	06/01/2025	\$42.66	\$9.65	\$17.14	\$0.00	\$69.45
	12/01/2025	\$44.04	\$9.65	\$17.14	\$0.00	\$70.83
	06/01/2026	\$45.48	\$9.65	\$17.14	\$0.00	\$72.27
	12/01/2026	\$46.92	\$9.65	\$17.14	\$0.00	\$73.71
For apprentice rates see "Apprentice- LABORER (Heavy and Highway)"						
BOILER MAKER <i>BOILERMAKERS LOCAL 29</i>	01/01/2024	\$48.12	\$7.07	\$20.60	\$0.00	\$75.79



**Classification**

**Effective Date    Base Wage    Health    Pension    Supplemental Unemployment    Total Rate**

**Apprentice - BOILERMAKER - Local 29**

**Effective Date - 01/01/2024**

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	65	\$31.28	\$7.07	\$13.22	\$0.00	\$51.57
2	65	\$31.28	\$7.07	\$13.22	\$0.00	\$51.57
3	70	\$33.68	\$7.07	\$14.23	\$0.00	\$54.98
4	75	\$36.09	\$7.07	\$15.24	\$0.00	\$58.40
5	80	\$38.50	\$7.07	\$16.25	\$0.00	\$61.82
6	85	\$40.90	\$7.07	\$17.28	\$0.00	\$65.25
7	90	\$43.31	\$7.07	\$18.28	\$0.00	\$68.66
8	95	\$45.71	\$7.07	\$19.32	\$0.00	\$72.10

**Notes:**

**Apprentice to Journeyworker Ratio:1:4**

BRICK/STONE/ARTIFICIAL MASONRY (INCL. MASONRY WATERPROOFING)	02/01/2024	\$62.40	\$11.49	\$23.59	\$0.00	\$97.48
BRICKLAYERS LOCAL 3 (NEW BEDFORD)	08/01/2024	\$64.50	\$11.49	\$23.59	\$0.00	\$99.58
	02/01/2025	\$65.80	\$11.49	\$23.59	\$0.00	\$100.88
	08/01/2025	\$67.95	\$11.49	\$23.59	\$0.00	\$103.03
	02/01/2026	\$69.30	\$11.49	\$23.59	\$0.00	\$104.38
	08/01/2026	\$71.50	\$11.49	\$23.59	\$0.00	\$106.58
	02/01/2027	\$72.90	\$11.49	\$23.59	\$0.00	\$107.98

**Classification**

**Effective Date   Base Wage   Health   Pension   Supplemental Unemployment   Total Rate**

**Apprentice - BRICK/PLASTER/CEMENT MASON - Local 3 New Bedford**

**Effective Date - 02/01/2024**

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	\$31.20	\$11.49	\$23.59	\$0.00	\$66.28
2	60	\$37.44	\$11.49	\$23.59	\$0.00	\$72.52
3	70	\$43.68	\$11.49	\$23.59	\$0.00	\$78.76
4	80	\$49.92	\$11.49	\$23.59	\$0.00	\$85.00
5	90	\$56.16	\$11.49	\$23.59	\$0.00	\$91.24

**Effective Date - 08/01/2024**

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	\$32.25	\$11.49	\$23.59	\$0.00	\$67.33
2	60	\$38.70	\$11.49	\$23.59	\$0.00	\$73.78
3	70	\$45.15	\$11.49	\$23.59	\$0.00	\$80.23
4	80	\$51.60	\$11.49	\$23.59	\$0.00	\$86.68
5	90	\$58.05	\$11.49	\$23.59	\$0.00	\$93.13

**Notes:**

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**Apprentice to Journeyworker Ratio:1:5**

<b>BULLDOZER/GRADER/SCRAPER</b>	12/01/2023	\$54.43	\$15.00	\$16.40	\$0.00	\$85.83
<i>OPERATING ENGINEERS LOCAL 4</i>	06/01/2024	\$55.71	\$15.00	\$16.40	\$0.00	\$87.11
	12/01/2024	\$57.15	\$15.00	\$16.40	\$0.00	\$88.55
	06/01/2025	\$58.43	\$15.00	\$16.40	\$0.00	\$89.83
	12/01/2025	\$59.87	\$15.00	\$16.40	\$0.00	\$91.27
	06/01/2026	\$61.15	\$15.00	\$16.40	\$0.00	\$92.55
	12/01/2026	\$62.59	\$15.00	\$16.40	\$0.00	\$93.99

For apprentice rates see "Apprentice- OPERATING ENGINEERS"

<b>CAISSON &amp; UNDERPINNING BOTTOM MAN</b>	12/01/2023	\$45.48	\$9.65	\$18.22	\$0.00	\$73.35
<i>LABORERS - FOUNDATION AND MARINE</i>	06/01/2024	\$46.96	\$9.65	\$18.22	\$0.00	\$74.83
	12/01/2024	\$48.43	\$9.65	\$18.22	\$0.00	\$76.30
	06/01/2025	\$49.93	\$9.65	\$18.22	\$0.00	\$77.80
	12/01/2025	\$51.43	\$9.65	\$18.22	\$0.00	\$79.30
	06/01/2026	\$52.98	\$9.65	\$18.22	\$0.00	\$80.85
	12/01/2026	\$54.48	\$9.65	\$18.22	\$0.00	\$82.35

For apprentice rates see "Apprentice- LABORER"

<b>CAISSON &amp; UNDERPINNING LABORER</b>	12/01/2023	\$44.33	\$9.65	\$18.22	\$0.00	\$72.20
<i>LABORERS - FOUNDATION AND MARINE</i>	06/01/2024	\$45.81	\$9.65	\$18.22	\$0.00	\$73.68
	12/01/2024	\$47.28	\$9.65	\$18.22	\$0.00	\$75.15
	06/01/2025	\$48.78	\$9.65	\$18.22	\$0.00	\$76.65
	12/01/2025	\$50.28	\$9.65	\$18.22	\$0.00	\$78.15
	06/01/2026	\$51.83	\$9.65	\$18.22	\$0.00	\$79.70
	12/01/2026	\$53.33	\$9.65	\$18.22	\$0.00	\$81.20

For apprentice rates see "Apprentice- LABORER"

<b>Classification</b>	<b>Effective Date</b>	<b>Base Wage</b>	<b>Health</b>	<b>Pension</b>	<b>Supplemental Unemployment</b>	<b>Total Rate</b>
CAISSON & UNDERPINNING TOP MAN <i>LABORERS - FOUNDATION AND MARINE</i>	12/01/2023	\$44.33	\$9.65	\$18.22	\$0.00	\$72.20
	06/01/2024	\$45.81	\$9.65	\$18.22	\$0.00	\$73.68
	12/01/2024	\$47.28	\$9.65	\$18.22	\$0.00	\$75.15
	06/01/2025	\$48.78	\$9.65	\$18.22	\$0.00	\$76.65
	12/01/2025	\$50.28	\$9.65	\$18.22	\$0.00	\$78.15
	06/01/2026	\$51.83	\$9.65	\$18.22	\$0.00	\$79.70
	12/01/2026	\$53.33	\$9.65	\$18.22	\$0.00	\$81.20
For apprentice rates see "Apprentice- LABORER"						
CARBIDE CORE DRILL OPERATOR <i>LABORERS - ZONE 2</i>	12/01/2023	\$38.11	\$9.65	\$17.14	\$0.00	\$64.90
For apprentice rates see "Apprentice- LABORER"						
CARPENTER <i>CARPENTERS -ZONE 2 (Eastern Massachusetts)</i>	09/01/2023	\$45.87	\$9.83	\$19.97	\$0.00	\$75.67
	03/01/2024	\$47.12	\$9.83	\$19.97	\$0.00	\$76.92
	09/01/2024	\$48.37	\$9.83	\$19.97	\$0.00	\$78.17
	03/01/2025	\$49.62	\$9.83	\$19.97	\$0.00	\$79.42
	09/01/2025	\$50.87	\$9.83	\$19.97	\$0.00	\$80.67
	03/01/2026	\$52.12	\$9.83	\$19.97	\$0.00	\$81.92
	09/01/2026	\$53.37	\$9.83	\$19.97	\$0.00	\$83.17
	03/01/2027	\$54.62	\$9.83	\$19.97	\$0.00	\$84.42

**Classification**

**Effective Date    Base Wage    Health    Pension    Supplemental Unemployment    Total Rate**

**Apprentice - CARPENTER - Zone 2 Eastern MA**

**Effective Date - 09/01/2023**

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	\$22.94	\$9.83	\$1.73	\$0.00	\$34.50
2	60	\$27.52	\$9.83	\$1.73	\$0.00	\$39.08
3	70	\$32.11	\$9.83	\$14.78	\$0.00	\$56.72
4	75	\$34.40	\$9.83	\$14.78	\$0.00	\$59.01
5	80	\$36.70	\$9.83	\$16.51	\$0.00	\$63.04
6	80	\$36.70	\$9.83	\$16.51	\$0.00	\$63.04
7	90	\$41.28	\$9.83	\$18.24	\$0.00	\$69.35
8	90	\$41.28	\$9.83	\$18.24	\$0.00	\$69.35

**Effective Date - 03/01/2024**

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	\$23.56	\$9.83	\$1.73	\$0.00	\$35.12
2	60	\$28.27	\$9.83	\$1.73	\$0.00	\$39.83
3	70	\$32.98	\$9.83	\$14.78	\$0.00	\$57.59
4	75	\$35.34	\$9.83	\$14.78	\$0.00	\$59.95
5	80	\$37.70	\$9.83	\$16.51	\$0.00	\$64.04
6	80	\$37.70	\$9.83	\$16.51	\$0.00	\$64.04
7	90	\$42.41	\$9.83	\$18.24	\$0.00	\$70.48
8	90	\$42.41	\$9.83	\$18.24	\$0.00	\$70.48

**Notes:**  
 % Indentured After 10/1/17; 45/45/55/55/70/70/80/80  
 Step 1&2 \$32.20/ 3&4 \$38.76/ 5&6 \$58.45/ 7&8 \$64.77

**Apprentice to Journeyworker Ratio:1:5**

CARPENTER WOOD FRAME	10/01/2023	\$25.55	\$7.02	\$4.80	\$0.00	\$37.37
CARPENTERS-ZONE 3 (Wood Frame)	10/01/2024	\$26.65	\$7.02	\$4.80	\$0.00	\$38.47
	10/01/2025	\$27.75	\$7.02	\$4.80	\$0.00	\$39.57
	10/01/2026	\$28.85	\$7.02	\$4.80	\$0.00	\$40.67

All Aspects of New Wood Frame Work



<b>Classification</b>	<b>Effective Date</b>	<b>Base Wage</b>	<b>Health</b>	<b>Pension</b>	<b>Supplemental Unemployment</b>	<b>Total Rate</b>
CHAIN SAW OPERATOR <i>LABORERS - ZONE 2</i>	12/01/2023	\$38.11	\$9.65	\$17.14	\$0.00	\$64.90
For apprentice rates see "Apprentice- LABORER"						
CLAM SHELLS/SLURRY BUCKETS/HEADING MACHINES <i>OPERATING ENGINEERS LOCAL 4</i>	12/01/2023	\$56.13	\$15.00	\$16.40	\$0.00	\$87.53
	06/01/2024	\$57.45	\$15.00	\$16.40	\$0.00	\$88.85
	12/01/2024	\$58.93	\$15.00	\$16.40	\$0.00	\$90.33
	06/01/2025	\$60.26	\$15.00	\$16.40	\$0.00	\$91.66
	12/01/2025	\$61.73	\$15.00	\$16.40	\$0.00	\$93.13
	06/01/2026	\$63.06	\$15.00	\$16.40	\$0.00	\$94.46
	12/01/2026	\$64.54	\$15.00	\$16.40	\$0.00	\$95.94
For apprentice rates see "Apprentice- OPERATING ENGINEERS"						
COMPRESSOR OPERATOR <i>OPERATING ENGINEERS LOCAL 4</i>	12/01/2023	\$35.62	\$15.00	\$16.40	\$0.00	\$67.02
	06/01/2024	\$36.47	\$15.00	\$16.40	\$0.00	\$67.87
	12/01/2024	\$37.42	\$15.00	\$16.40	\$0.00	\$68.82
	06/01/2025	\$38.27	\$15.00	\$16.40	\$0.00	\$69.67
	12/01/2025	\$39.22	\$15.00	\$16.40	\$0.00	\$70.62
	06/01/2026	\$40.08	\$15.00	\$16.40	\$0.00	\$71.48
	12/01/2026	\$41.03	\$15.00	\$16.40	\$0.00	\$72.43
For apprentice rates see "Apprentice- OPERATING ENGINEERS"						
DELEADER (BRIDGE) <i>PAINTERS LOCAL 35 - ZONE 2</i>	01/01/2024	\$56.06	\$9.95	\$23.95	\$0.00	\$89.96
	07/01/2024	\$57.26	\$9.95	\$23.95	\$0.00	\$91.16
	01/01/2025	\$58.46	\$9.95	\$23.95	\$0.00	\$92.36

**Classification**

**Effective Date    Base Wage    Health    Pension    Supplemental Unemployment    Total Rate**

**Apprentice - PAINTER Local 35 - BRIDGES/TANKS**

**Effective Date - 01/01/2024**

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	\$28.03	\$9.95	\$0.00	\$0.00	\$37.98
2	55	\$30.83	\$9.95	\$6.66	\$0.00	\$47.44
3	60	\$33.64	\$9.95	\$7.26	\$0.00	\$50.85
4	65	\$36.44	\$9.95	\$7.87	\$0.00	\$54.26
5	70	\$39.24	\$9.95	\$20.32	\$0.00	\$69.51
6	75	\$42.05	\$9.95	\$20.93	\$0.00	\$72.93
7	80	\$44.85	\$9.95	\$21.53	\$0.00	\$76.33
8	90	\$50.45	\$9.95	\$22.74	\$0.00	\$83.14

**Effective Date - 07/01/2024**

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	\$28.63	\$9.95	\$0.00	\$0.00	\$38.58
2	55	\$31.49	\$9.95	\$6.66	\$0.00	\$48.10
3	60	\$34.36	\$9.95	\$7.26	\$0.00	\$51.57
4	65	\$37.22	\$9.95	\$7.87	\$0.00	\$55.04
5	70	\$40.08	\$9.95	\$20.32	\$0.00	\$70.35
6	75	\$42.95	\$9.95	\$20.93	\$0.00	\$73.83
7	80	\$45.81	\$9.95	\$21.53	\$0.00	\$77.29
8	90	\$51.53	\$9.95	\$22.74	\$0.00	\$84.22

**Notes:**  
Steps are 750 hrs.

**Apprentice to Journeyworker Ratio:1:1**

DEMO: ADZEMAN LABORERS - ZONE 2	12/01/2023	\$44.48	\$9.65	\$18.07	\$0.00	\$72.20
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For apprentice rates see "Apprentice- LABORER"

DEMO: BACKHOE/LOADER/HAMMER OPERATOR LABORERS - ZONE 2	12/01/2023	\$45.48	\$9.65	\$18.07	\$0.00	\$73.20
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For apprentice rates see "Apprentice- LABORER"

DEMO: BURNERS LABORERS - ZONE 2	12/01/2023	\$45.23	\$9.65	\$18.07	\$0.00	\$72.95
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For apprentice rates see "Apprentice- LABORER"

DEMO: CONCRETE CUTTER/SAWYER LABORERS - ZONE 2	12/01/2023	\$45.48	\$9.65	\$18.07	\$0.00	\$73.20
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For apprentice rates see "Apprentice- LABORER"

DEMO: JACKHAMMER OPERATOR LABORERS - ZONE 2	12/01/2023	\$45.23	\$9.65	\$18.07	\$0.00	\$72.95
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For apprentice rates see "Apprentice- LABORER"

DEMO: WRECKING LABORER LABORERS - ZONE 2	12/01/2023	\$44.48	\$9.65	\$18.07	\$0.00	\$72.20
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For apprentice rates see "Apprentice- LABORER"

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
DIRECTIONAL DRILL MACHINE OPERATOR <i>OPERATING ENGINEERS LOCAL 4</i>	12/01/2023	\$54.43	\$15.00	\$16.40	\$0.00	\$85.83
	06/01/2024	\$55.71	\$15.00	\$16.40	\$0.00	\$87.11
	12/01/2024	\$57.15	\$15.00	\$16.40	\$0.00	\$88.55
	06/01/2025	\$58.43	\$15.00	\$16.40	\$0.00	\$89.83
	12/01/2025	\$59.87	\$15.00	\$16.40	\$0.00	\$91.27
	06/01/2026	\$61.15	\$15.00	\$16.40	\$0.00	\$92.55
	12/01/2026	\$62.59	\$15.00	\$16.40	\$0.00	\$93.99
For apprentice rates see "Apprentice- OPERATING ENGINEERS"						
DIVER <i>PILE DRIVER LOCAL 56 (ZONE 2)</i>	08/01/2020	\$68.70	\$9.40	\$23.12	\$0.00	\$101.22
For apprentice rates see "Apprentice- PILE DRIVER"						
DIVER TENDER <i>PILE DRIVER LOCAL 56 (ZONE 2)</i>	08/01/2020	\$49.07	\$9.40	\$23.12	\$0.00	\$81.59
For apprentice rates see "Apprentice- PILE DRIVER"						
DIVER TENDER (EFFLUENT) <i>PILE DRIVER LOCAL 56 (ZONE 2)</i>	08/01/2020	\$73.60	\$9.40	\$23.12	\$0.00	\$106.12
For apprentice rates see "Apprentice- PILE DRIVER"						
DIVER/SLURRY (EFFLUENT) <i>PILE DRIVER LOCAL 56 (ZONE 2)</i>	08/01/2020	\$103.05	\$9.40	\$23.12	\$0.00	\$135.57
For apprentice rates see "Apprentice- PILE DRIVER"						
DRAWBRIDGE OPERATOR (Construction) <i>DRAWBRIDGE - SEIU LOCAL 888</i>	07/01/2020	\$26.77	\$6.67	\$3.93	\$0.16	\$37.53
ELECTRICIAN <i>ELECTRICIANS LOCAL 223</i>	09/01/2023	\$47.87	\$11.75	\$16.86	\$0.00	\$76.48

**Apprentice - ELECTRICIAN - Local 223**

**Effective Date - 09/01/2023**

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	40	\$19.15	\$11.75	\$0.57	\$0.00	\$31.47
2	45	\$21.54	\$11.75	\$0.65	\$0.00	\$33.94
3	50	\$23.94	\$11.75	\$0.72	\$0.00	\$36.41
4	55	\$26.33	\$11.75	\$7.79	\$0.00	\$45.87
5	60	\$28.72	\$11.75	\$8.31	\$0.00	\$48.78
6	65	\$31.12	\$11.75	\$8.65	\$0.00	\$51.52
7	70	\$33.51	\$11.75	\$9.38	\$0.00	\$54.64
8	75	\$35.90	\$11.75	\$9.90	\$0.00	\$57.55

**Notes:**

**Apprentice to Journeyworker Ratio:2:3\*\*\***

ELEVATOR CONSTRUCTOR <i>ELEVATOR CONSTRUCTORS LOCAL 4</i>	01/01/2022	\$65.62	\$16.03	\$20.21	\$0.00	\$101.86
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**Apprentice - ELEVATOR CONSTRUCTOR - Local 4**

**Effective Date - 01/01/2022**

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	\$32.81	\$16.03	\$0.00	\$0.00	\$48.84
2	55	\$36.09	\$16.03	\$20.21	\$0.00	\$72.33
3	65	\$42.65	\$16.03	\$20.21	\$0.00	\$78.89
4	70	\$45.93	\$16.03	\$20.21	\$0.00	\$82.17
5	80	\$52.50	\$16.03	\$20.21	\$0.00	\$88.74

**Notes:**  
Steps 1-2 are 6 mos.; Steps 3-5 are 1 year

**Apprentice to Journeyworker Ratio:1:1**

ELEVATOR CONSTRUCTOR HELPER <i>ELEVATOR CONSTRUCTORS LOCAL 4</i>	01/01/2022	\$45.93	\$16.03	\$20.21	\$0.00	\$82.17
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For apprentice rates see "Apprentice - ELEVATOR CONSTRUCTOR"

FENCE & GUARD RAIL ERECTOR (HEAVY & HIGHWAY) <i>LABORERS - ZONE 2 (HEAVY &amp; HIGHWAY)</i>	12/01/2023	\$38.11	\$9.65	\$17.14	\$0.00	\$64.90
	06/01/2024	\$39.44	\$9.65	\$17.14	\$0.00	\$66.23
	12/01/2024	\$40.77	\$9.65	\$17.14	\$0.00	\$67.56
	06/01/2025	\$42.16	\$9.65	\$17.14	\$0.00	\$68.95
	12/01/2025	\$43.54	\$9.65	\$17.14	\$0.00	\$70.33
	06/01/2026	\$44.98	\$9.65	\$17.14	\$0.00	\$71.77
	12/01/2026	\$46.42	\$9.65	\$17.14	\$0.00	\$73.21

For apprentice rates see "Apprentice- LABORER (Heavy and Highway)"

FIELD ENG.INST.PERSON-BLDG,SITE,HVY/HWY <i>OPERATING ENGINEERS LOCAL 4</i>	11/01/2023	\$50.30	\$14.50	\$16.15	\$0.00	\$80.95
	05/01/2024	\$51.54	\$14.50	\$16.15	\$0.00	\$82.19
	11/01/2024	\$52.83	\$14.50	\$16.15	\$0.00	\$83.48
	05/01/2025	\$54.27	\$14.50	\$16.15	\$0.00	\$84.92
	11/01/2025	\$55.56	\$14.50	\$16.15	\$0.00	\$86.21
	05/01/2026	\$57.00	\$14.50	\$16.15	\$0.00	\$87.65
	11/01/2026	\$58.29	\$14.50	\$16.15	\$0.00	\$88.94
	05/01/2027	\$59.72	\$14.50	\$16.15	\$0.00	\$90.37

For apprentice rates see "Apprentice- OPERATING ENGINEERS"

FIELD ENG.PARTY CHIEF-BLDG,SITE,HVY/HWY <i>OPERATING ENGINEERS LOCAL 4</i>	11/01/2023	\$51.87	\$14.50	\$16.15	\$0.00	\$82.52
	05/01/2024	\$53.12	\$14.50	\$16.15	\$0.00	\$83.77
	11/01/2024	\$54.42	\$14.50	\$16.15	\$0.00	\$85.07
	05/01/2025	\$55.87	\$14.50	\$16.15	\$0.00	\$86.52
	11/01/2025	\$57.17	\$14.50	\$16.15	\$0.00	\$87.82
	05/01/2026	\$58.62	\$14.50	\$16.15	\$0.00	\$89.27
	11/01/2026	\$59.92	\$14.50	\$16.15	\$0.00	\$90.57
	05/01/2027	\$61.37	\$14.50	\$16.15	\$0.00	\$92.02

For apprentice rates see "Apprentice- OPERATING ENGINEERS"

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
FIELD ENG.ROD PERSON-BLDG,SITE,HVY/HWY <i>OPERATING ENGINEERS LOCAL 4</i>	11/01/2023	\$24.93	\$14.50	\$16.15	\$0.00	\$55.58
	05/01/2024	\$25.66	\$14.50	\$16.15	\$0.00	\$56.31
	11/01/2024	\$26.42	\$14.50	\$16.15	\$0.00	\$57.07
	05/01/2025	\$27.27	\$14.50	\$16.15	\$0.00	\$57.92
	11/01/2025	\$28.03	\$14.50	\$16.15	\$0.00	\$58.68
	05/01/2026	\$28.88	\$14.50	\$16.15	\$0.00	\$59.53
	11/01/2026	\$29.64	\$14.50	\$16.15	\$0.00	\$60.29
	05/01/2027	\$30.49	\$14.50	\$16.15	\$0.00	\$61.14
For apprentice rates see "Apprentice- OPERATING ENGINEERS"						
FIRE ALARM INSTALLER <i>ELECTRICIANS LOCAL 223</i>	09/01/2020	\$43.66	\$10.90	\$14.66	\$0.00	\$69.22
	For apprentice rates see "Apprentice- ELECTRICIAN"					
FIRE ALARM REPAIR / MAINTENANCE <i>/ COMMISSIONING ELECTRICIANS LOCAL 223</i>	09/01/2020	\$36.86	\$10.90	\$12.45	\$0.00	\$60.21
	For apprentice rates see "Apprentice- TELECOMMUNICATIONS TECHNICIAN"					
FIREMAN (ASST. ENGINEER) <i>OPERATING ENGINEERS LOCAL 4</i>	12/01/2023	\$44.47	\$15.00	\$16.40	\$0.00	\$75.87
	06/01/2024	\$45.53	\$15.00	\$16.40	\$0.00	\$76.93
	12/01/2024	\$46.71	\$15.00	\$16.40	\$0.00	\$78.11
	06/01/2025	\$47.77	\$15.00	\$16.40	\$0.00	\$79.17
	12/01/2025	\$48.94	\$15.00	\$16.40	\$0.00	\$80.34
	06/01/2026	\$50.00	\$15.00	\$16.40	\$0.00	\$81.40
	12/01/2026	\$51.18	\$15.00	\$16.40	\$0.00	\$82.58
For apprentice rates see "Apprentice- OPERATING ENGINEERS"						
FLAGGER & SIGNALER (HEAVY & HIGHWAY) <i>LABORERS - ZONE 2 (HEAVY &amp; HIGHWAY)</i>	12/01/2023	\$25.48	\$9.65	\$17.14	\$0.00	\$52.27
	06/01/2024	\$26.51	\$9.65	\$17.14	\$0.00	\$53.30
	12/01/2024	\$26.51	\$9.65	\$17.14	\$0.00	\$53.30
	06/01/2025	\$27.59	\$9.65	\$17.14	\$0.00	\$54.38
	12/01/2025	\$27.59	\$9.65	\$17.14	\$0.00	\$54.38
	06/01/2026	\$28.71	\$9.65	\$17.14	\$0.00	\$55.50
	12/01/2026	\$28.71	\$9.65	\$17.14	\$0.00	\$55.50
For apprentice rates see "Apprentice- LABORER (Heavy and Highway)"						
FLOORCOVERER <i>FLOORCOVERERS LOCAL 2168 ZONE II</i>	09/01/2023	\$48.97	\$8.83	\$20.27	\$0.00	\$78.07
	03/01/2024	\$49.47	\$8.83	\$20.27	\$0.00	\$78.57

**Classification**

**Effective Date   Base Wage   Health   Pension   Supplemental Unemployment   Total Rate**

**Apprentice - FLOORCOVERER - Local 2168 Zone II**

**Effective Date - 09/01/2023**

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	\$24.49	\$8.83	\$1.76	\$0.00	\$35.08
2	55	\$26.93	\$8.83	\$1.76	\$0.00	\$37.52
3	60	\$29.38	\$8.83	\$3.52	\$0.00	\$41.73
4	65	\$31.83	\$8.83	\$3.52	\$0.00	\$44.18
5	70	\$34.28	\$8.83	\$16.75	\$0.00	\$59.86
6	75	\$36.73	\$8.83	\$16.75	\$0.00	\$62.31
7	80	\$39.18	\$8.83	\$18.51	\$0.00	\$66.52
8	85	\$41.62	\$8.83	\$18.51	\$0.00	\$68.96

**Effective Date - 03/01/2024**

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	\$24.74	\$8.83	\$1.76	\$0.00	\$35.33
2	55	\$27.21	\$8.83	\$1.76	\$0.00	\$37.80
3	60	\$29.68	\$8.83	\$3.52	\$0.00	\$42.03
4	65	\$32.16	\$8.83	\$3.52	\$0.00	\$44.51
5	70	\$34.63	\$8.83	\$16.75	\$0.00	\$60.21
6	75	\$37.10	\$8.83	\$16.75	\$0.00	\$62.68
7	80	\$39.58	\$8.83	\$18.51	\$0.00	\$66.92
8	85	\$42.05	\$8.83	\$18.51	\$0.00	\$69.39

**Notes:** Steps are 750 hrs.  
 % After 10/1/17; 45/45/55/55/70/70/80/80 (1500hr Steps)  
 Step 1&2 \$32.63/ 3&4 \$39.28/ 5&6 \$59.86/ 7&8 \$66.52

**Apprentice to Journeyworker Ratio:1:1**

<b>FORK LIFT/CHERRY PICKER</b> <i>OPERATING ENGINEERS LOCAL 4</i>	12/01/2023	\$55.03	\$15.00	\$16.40	\$0.00	\$86.43
	06/01/2024	\$56.33	\$15.00	\$16.40	\$0.00	\$87.73
	12/01/2024	\$57.78	\$15.00	\$16.40	\$0.00	\$89.18
	06/01/2025	\$59.08	\$15.00	\$16.40	\$0.00	\$90.48
	12/01/2025	\$60.53	\$15.00	\$16.40	\$0.00	\$91.93
	06/01/2026	\$61.83	\$15.00	\$16.40	\$0.00	\$93.23
	12/01/2026	\$63.28	\$15.00	\$16.40	\$0.00	\$94.68

For apprentice rates see "Apprentice- OPERATING ENGINEERS"

<b>GENERATOR/LIGHTING PLANT/HEATERS</b> <i>OPERATING ENGINEERS LOCAL 4</i>	12/01/2023	\$35.62	\$15.00	\$16.40	\$0.00	\$67.02
	06/01/2024	\$36.47	\$15.00	\$16.40	\$0.00	\$67.87
	12/01/2024	\$37.42	\$15.00	\$16.40	\$0.00	\$68.82
	06/01/2025	\$38.27	\$15.00	\$16.40	\$0.00	\$69.67
	12/01/2025	\$39.22	\$15.00	\$16.40	\$0.00	\$70.62
	06/01/2026	\$40.08	\$15.00	\$16.40	\$0.00	\$71.48
	12/01/2026	\$41.03	\$15.00	\$16.40	\$0.00	\$72.43

For apprentice rates see "Apprentice- OPERATING ENGINEERS"

<b>GLAZIER (GLASS PLANK/AIR BARRIER/INTERIOR SYSTEMS)</b> <i>GLAZIERS LOCAL 1333</i>	06/01/2020	\$39.18	\$10.80	\$10.45	\$0.00	\$60.43
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**Classification**

**Effective Date    Base Wage    Health    Pension    Supplemental Unemployment    Total Rate**

**Apprentice - GLAZIER - Local 1333**

**Effective Date - 06/01/2020**

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	\$19.59	\$10.80	\$1.80	\$0.00	\$32.19
2	56	\$22.04	\$10.80	\$1.80	\$0.00	\$34.64
3	63	\$24.49	\$10.80	\$2.45	\$0.00	\$37.74
4	69	\$26.94	\$10.80	\$2.45	\$0.00	\$40.19
5	75	\$29.39	\$10.80	\$3.15	\$0.00	\$43.34
6	81	\$31.83	\$10.80	\$3.15	\$0.00	\$45.78
7	88	\$34.28	\$10.80	\$10.45	\$0.00	\$55.53
8	94	\$36.73	\$10.80	\$10.45	\$0.00	\$57.98

**Notes:**

**Apprentice to Journeyworker Ratio:1:3**

HOISTING ENGINEER/CRANES/GRADALLS	12/01/2023	\$55.03	\$15.00	\$16.40	\$0.00	\$86.43
OPERATING ENGINEERS LOCAL 4	06/01/2024	\$56.33	\$15.00	\$16.40	\$0.00	\$87.73
	12/01/2024	\$57.78	\$15.00	\$16.40	\$0.00	\$89.18
	06/01/2025	\$59.08	\$15.00	\$16.40	\$0.00	\$90.48
	12/01/2025	\$60.53	\$15.00	\$16.40	\$0.00	\$91.93
	06/01/2026	\$61.83	\$15.00	\$16.40	\$0.00	\$93.23
	12/01/2026	\$63.28	\$15.00	\$16.40	\$0.00	\$94.68

**Classification**

**Effective Date    Base Wage    Health    Pension    Supplemental Unemployment    Total Rate**

**Apprentice - OPERATING ENGINEERS - Local 4**

**Effective Date - 12/01/2023**

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	55	\$30.27	\$15.00	\$0.00	\$0.00	\$45.27
2	60	\$33.02	\$15.00	\$16.40	\$0.00	\$64.42
3	65	\$35.77	\$15.00	\$16.40	\$0.00	\$67.17
4	70	\$38.52	\$15.00	\$16.40	\$0.00	\$69.92
5	75	\$41.27	\$15.00	\$16.40	\$0.00	\$72.67
6	80	\$44.02	\$15.00	\$16.40	\$0.00	\$75.42
7	85	\$46.78	\$15.00	\$16.40	\$0.00	\$78.18
8	90	\$49.53	\$15.00	\$16.40	\$0.00	\$80.93

**Effective Date - 06/01/2024**

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	55	\$30.98	\$15.00	\$0.00	\$0.00	\$45.98
2	60	\$33.80	\$15.00	\$16.40	\$0.00	\$65.20
3	65	\$36.61	\$15.00	\$16.40	\$0.00	\$68.01
4	70	\$39.43	\$15.00	\$16.40	\$0.00	\$70.83
5	75	\$42.25	\$15.00	\$16.40	\$0.00	\$73.65
6	80	\$45.06	\$15.00	\$16.40	\$0.00	\$76.46
7	85	\$47.88	\$15.00	\$16.40	\$0.00	\$79.28
8	90	\$50.70	\$15.00	\$16.40	\$0.00	\$82.10

**Notes:**

**Apprentice to Journeyworker Ratio:1:6**

HVAC (DUCTWORK) SHEETMETAL WORKERS LOCAL 17 - B	10/01/2023	\$39.74	\$14.43	\$19.04	\$2.20	\$75.41
	04/01/2024	\$41.24	\$14.43	\$19.04	\$2.20	\$76.91
	10/01/2024	\$42.49	\$14.43	\$19.04	\$2.20	\$78.16
	04/01/2025	\$43.99	\$14.43	\$19.04	\$2.20	\$79.66
	10/01/2025	\$45.24	\$14.43	\$19.04	\$2.20	\$80.91
	04/01/2026	\$46.74	\$14.43	\$19.04	\$2.20	\$82.41

For apprentice rates see "Apprentice- SHEET METAL WORKER"

HVAC (ELECTRICAL CONTROLS) ELECTRICIANS LOCAL 223	09/01/2020	\$43.66	\$10.90	\$14.66	\$0.00	\$69.22
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For apprentice rates see "Apprentice- ELECTRICIAN"

HVAC (TESTING AND BALANCING - AIR) SHEETMETAL WORKERS LOCAL 17 - B	10/01/2023	\$39.74	\$14.43	\$19.04	\$2.20	\$75.41
	04/01/2024	\$41.24	\$14.43	\$19.04	\$2.20	\$76.91
	10/01/2024	\$42.49	\$14.43	\$19.04	\$2.20	\$78.16
	04/01/2025	\$43.99	\$14.43	\$19.04	\$2.20	\$79.66
	10/01/2025	\$45.24	\$14.43	\$19.04	\$2.20	\$80.91
	04/01/2026	\$46.74	\$14.43	\$19.04	\$2.20	\$82.41

For apprentice rates see "Apprentice- SHEET METAL WORKER"

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
HVAC (TESTING AND BALANCING -WATER) <i>PLUMBERS &amp; PIPEFITTERS LOCAL 51</i>	08/28/2023	\$51.99	\$10.15	\$19.95	\$0.00	\$82.09
	08/26/2024	\$54.74	\$10.15	\$19.95	\$0.00	\$84.84
	08/25/2025	\$57.49	\$10.15	\$19.95	\$0.00	\$87.59
For apprentice rates see "Apprentice- PIPEFITTER" or "PLUMBER/PIPEFITTER"						
HVAC MECHANIC <i>PLUMBERS &amp; PIPEFITTERS LOCAL 51</i>	08/28/2023	\$51.99	\$10.15	\$19.95	\$0.00	\$82.09
	08/26/2024	\$54.74	\$10.15	\$19.95	\$0.00	\$84.84
	08/25/2025	\$57.49	\$10.15	\$19.95	\$0.00	\$87.59
For apprentice rates see "Apprentice- PIPEFITTER" or "PLUMBER/PIPEFITTER"						
HYDRAULIC DRILLS <i>LABORERS - ZONE 2</i>	12/01/2023	\$38.61	\$9.65	\$17.14	\$0.00	\$65.40
For apprentice rates see "Apprentice- LABORER"						
HYDRAULIC DRILLS (HEAVY & HIGHWAY) <i>LABORERS - ZONE 2 (HEAVY &amp; HIGHWAY)</i>	12/01/2023	\$38.61	\$9.65	\$17.14	\$0.00	\$65.40
	06/01/2024	\$39.94	\$9.65	\$17.14	\$0.00	\$66.73
	12/01/2024	\$41.27	\$9.65	\$17.14	\$0.00	\$68.06
	06/01/2025	\$42.66	\$9.65	\$17.14	\$0.00	\$69.45
	12/01/2025	\$44.04	\$9.65	\$17.14	\$0.00	\$70.83
	06/01/2026	\$45.48	\$9.65	\$17.14	\$0.00	\$72.27
	12/01/2026	\$46.92	\$9.65	\$17.14	\$0.00	\$73.71
For apprentice rates see "Apprentice- LABORER (Heavy and Highway)"						
INSULATOR (PIPES & TANKS) <i>HEAT &amp; FROST INSULATORS LOCAL 6 (BOSTON)</i>	09/01/2023	\$53.50	\$14.75	\$19.61	\$0.00	\$87.86
	09/01/2024	\$56.92	\$14.75	\$19.61	\$0.00	\$91.28
	09/01/2025	\$60.34	\$14.75	\$19.61	\$0.00	\$94.70
	09/01/2026	\$63.76	\$14.75	\$19.61	\$0.00	\$98.12

**Apprentice - ASBESTOS INSULATOR (Pipes & Tanks) - Local 6 Boston**

**Effective Date - 09/01/2023**

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	\$26.75	\$14.75	\$14.32	\$0.00	\$55.82
2	60	\$32.10	\$14.75	\$15.37	\$0.00	\$62.22
3	70	\$37.45	\$14.75	\$16.43	\$0.00	\$68.63
4	80	\$42.80	\$14.75	\$17.49	\$0.00	\$75.04

**Effective Date - 09/01/2024**

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	\$28.46	\$14.75	\$14.32	\$0.00	\$57.53
2	60	\$34.15	\$14.75	\$15.37	\$0.00	\$64.27
3	70	\$39.84	\$14.75	\$16.43	\$0.00	\$71.02
4	80	\$45.54	\$14.75	\$17.49	\$0.00	\$77.78

**Notes:**

Steps are 1 year

**Apprentice to Journeyworker Ratio:1:4**

IRONWORKER/WELDER <i>IRONWORKERS LOCAL 37</i>	03/16/2021	\$42.46	\$7.70	\$17.10	\$0.00	\$67.26
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**Classification**

**Effective Date    Base Wage    Health    Pension    Supplemental Unemployment    Total Rate**

**Apprentice - IRONWORKER - Local 37**

**Effective Date - 03/16/2021**

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	70	\$29.72	\$7.70	\$17.10	\$0.00	\$54.52
2	75	\$31.85	\$7.70	\$17.10	\$0.00	\$56.65
3	80	\$33.97	\$7.70	\$17.10	\$0.00	\$58.77
4	85	\$36.09	\$7.70	\$17.10	\$0.00	\$60.89
5	90	\$38.21	\$7.70	\$17.10	\$0.00	\$63.01
6	95	\$40.34	\$7.70	\$17.10	\$0.00	\$65.14

**Notes:**

**Apprentice to Journeyworker Ratio:1:4**

JACKHAMMER & PAVING BREAKER OPERATOR LABORERS - ZONE 2	12/01/2023	\$38.11	\$9.65	\$17.14	\$0.00	\$64.90
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For apprentice rates see "Apprentice- LABORER"

LABORER LABORERS - ZONE 2	12/01/2023	\$37.86	\$9.65	\$17.14	\$0.00	\$64.65
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**Apprentice - LABORER - Zone 2**

**Effective Date - 12/01/2023**

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	60	\$22.72	\$9.65	\$16.89	\$0.00	\$49.26
2	70	\$26.50	\$9.65	\$16.89	\$0.00	\$53.04
3	80	\$30.29	\$9.65	\$16.89	\$0.00	\$56.83
4	90	\$34.07	\$9.65	\$16.89	\$0.00	\$60.61

**Notes:**

**Apprentice to Journeyworker Ratio:1:5**

LABORER (HEAVY & HIGHWAY) LABORERS - ZONE 2 (HEAVY & HIGHWAY)	12/01/2023	\$37.86	\$9.65	\$17.14	\$0.00	\$64.65
	06/01/2024	\$39.19	\$9.65	\$17.14	\$0.00	\$65.98
	12/01/2024	\$40.52	\$9.65	\$17.14	\$0.00	\$67.31
	06/01/2025	\$41.91	\$9.65	\$17.14	\$0.00	\$68.70
	12/01/2025	\$43.29	\$9.65	\$17.14	\$0.00	\$70.08
	06/01/2026	\$44.73	\$9.65	\$17.14	\$0.00	\$71.52
	12/01/2026	\$46.17	\$9.65	\$17.14	\$0.00	\$72.96





Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
For apprentice rates see "Apprentice- LABORER"						
LASER BEAM OPERATOR (HEAVY & HIGHWAY) LABORERS - ZONE 2 (HEAVY & HIGHWAY)	12/01/2023	\$38.11	\$9.65	\$17.14	\$0.00	\$64.90
	06/01/2024	\$39.44	\$9.65	\$17.14	\$0.00	\$66.23
	12/01/2024	\$40.77	\$9.65	\$17.14	\$0.00	\$67.56
	06/01/2025	\$42.16	\$9.65	\$17.14	\$0.00	\$68.95
	12/01/2025	\$43.54	\$9.65	\$17.14	\$0.00	\$70.33
	06/01/2026	\$44.98	\$9.65	\$17.14	\$0.00	\$71.77
	12/01/2026	\$46.42	\$9.65	\$17.14	\$0.00	\$73.21

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
For apprentice rates see "Apprentice- LABORER (Heavy and Highway)"						
MARBLE & TILE FINISHERS BRICKLAYERS LOCAL 3 - MARBLE & TILE	02/01/2024	\$47.89	\$11.49	\$21.37	\$0.00	\$80.75
	08/01/2024	\$49.57	\$11.49	\$21.37	\$0.00	\$82.43
	02/01/2025	\$50.61	\$11.49	\$21.37	\$0.00	\$83.47
	08/01/2025	\$52.33	\$11.49	\$21.37	\$0.00	\$85.19
	02/01/2026	\$53.41	\$11.49	\$21.37	\$0.00	\$86.27
	08/01/2026	\$55.17	\$11.49	\$21.37	\$0.00	\$88.03
	02/01/2027	\$56.29	\$11.49	\$21.37	\$0.00	\$89.15

**Apprentice - MARBLE & TILE FINISHER - Local 3 Marble & Tile**

**Effective Date - 02/01/2024**

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	\$23.95	\$11.49	\$21.37	\$0.00	\$56.81
2	60	\$28.73	\$11.49	\$21.37	\$0.00	\$61.59
3	70	\$33.52	\$11.49	\$21.37	\$0.00	\$66.38
4	80	\$38.31	\$11.49	\$21.37	\$0.00	\$71.17
5	90	\$43.10	\$11.49	\$21.37	\$0.00	\$75.96

**Effective Date - 08/01/2024**

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	\$24.79	\$11.49	\$21.37	\$0.00	\$57.65
2	60	\$29.74	\$11.49	\$21.37	\$0.00	\$62.60
3	70	\$34.70	\$11.49	\$21.37	\$0.00	\$67.56
4	80	\$39.66	\$11.49	\$21.37	\$0.00	\$72.52
5	90	\$44.61	\$11.49	\$21.37	\$0.00	\$77.47

**Notes:**

**Apprentice to Journeyworker Ratio:1:3**

MARBLE MASONS, TILELAYERS & TERRAZZO MECH BRICKLAYERS LOCAL 3 - MARBLE & TILE	02/01/2024	\$62.42	\$11.49	\$23.56	\$0.00	\$97.47
	08/01/2024	\$64.52	\$11.49	\$23.56	\$0.00	\$99.57
	02/01/2025	\$65.82	\$11.49	\$23.56	\$0.00	\$100.87
	08/01/2025	\$67.97	\$11.49	\$23.56	\$0.00	\$103.02
	02/01/2026	\$69.32	\$11.49	\$23.56	\$0.00	\$104.37
	08/01/2026	\$71.52	\$11.49	\$23.56	\$0.00	\$106.57
	02/01/2027	\$72.92	\$11.49	\$23.56	\$0.00	\$107.97

**Classification**

**Effective Date   Base Wage   Health   Pension   Supplemental Unemployment   Total Rate**

**Apprentice - MARBLE-TILE-TERRAZZO MECHANIC - Local 3 Marble & Tile**

**Effective Date - 02/01/2024**

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	\$31.21	\$11.49	\$23.56	\$0.00	\$66.26
2	60	\$37.45	\$11.49	\$23.56	\$0.00	\$72.50
3	70	\$43.69	\$11.49	\$23.56	\$0.00	\$78.74
4	80	\$49.94	\$11.49	\$23.56	\$0.00	\$84.99
5	90	\$56.18	\$11.49	\$23.56	\$0.00	\$91.23

**Effective Date - 08/01/2024**

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	\$32.26	\$11.49	\$23.56	\$0.00	\$67.31
2	60	\$38.71	\$11.49	\$23.56	\$0.00	\$73.76
3	70	\$45.16	\$11.49	\$23.56	\$0.00	\$80.21
4	80	\$51.62	\$11.49	\$23.56	\$0.00	\$86.67
5	90	\$58.07	\$11.49	\$23.56	\$0.00	\$93.12

**Notes:**

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**Apprentice to Journeyworker Ratio:1:5**

MECH. SWEEPER OPERATOR (ON CONST. SITES) <i>OPERATING ENGINEERS LOCAL 4</i>	12/01/2023	\$54.43	\$15.00	\$16.40	\$0.00	\$85.83
	06/01/2024	\$55.71	\$15.00	\$16.40	\$0.00	\$87.11
	12/01/2024	\$57.15	\$15.00	\$16.40	\$0.00	\$88.55
	06/01/2025	\$58.43	\$15.00	\$16.40	\$0.00	\$89.83
	12/01/2025	\$59.87	\$15.00	\$16.40	\$0.00	\$91.27
	06/01/2026	\$61.15	\$15.00	\$16.40	\$0.00	\$92.55
	12/01/2026	\$62.59	\$15.00	\$16.40	\$0.00	\$93.99

For apprentice rates see "Apprentice- OPERATING ENGINEERS"

MECHANICS MAINTENANCE <i>OPERATING ENGINEERS LOCAL 4</i>	12/01/2023	\$54.43	\$15.00	\$16.40	\$0.00	\$85.83
	06/01/2024	\$55.71	\$15.00	\$16.40	\$0.00	\$87.11
	12/01/2024	\$57.15	\$15.00	\$16.40	\$0.00	\$88.55
	06/01/2025	\$58.43	\$15.00	\$16.40	\$0.00	\$89.83
	12/01/2025	\$59.87	\$15.00	\$16.40	\$0.00	\$91.27
	06/01/2026	\$61.15	\$15.00	\$16.40	\$0.00	\$92.55
	12/01/2026	\$62.59	\$15.00	\$16.40	\$0.00	\$93.99

For apprentice rates see "Apprentice- OPERATING ENGINEERS"

MILLWRIGHT (Zone 2) <i>MILLWRIGHTS LOCAL 1121 - Zone 2</i>	01/01/2024	\$42.76	\$10.08	\$21.47	\$0.00	\$74.31
	01/06/2025	\$45.09	\$10.08	\$21.47	\$0.00	\$76.64
	01/05/2026	\$47.42	\$10.08	\$21.47	\$0.00	\$78.97

**Apprentice - MILLWRIGHT - Local 1121 Zone 2**

**Effective Date - 01/01/2024**

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	55	\$23.52	\$10.08	\$5.50	\$0.00	\$39.10
2	65	\$27.79	\$10.08	\$6.50	\$0.00	\$44.37
3	75	\$32.07	\$10.08	\$18.97	\$0.00	\$61.12
4	85	\$36.35	\$10.08	\$19.97	\$0.00	\$66.40

**Effective Date - 01/06/2025**

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	55	\$24.80	\$10.08	\$5.50	\$0.00	\$40.38
2	65	\$29.31	\$10.08	\$6.50	\$0.00	\$45.89
3	75	\$33.82	\$10.08	\$18.97	\$0.00	\$62.87
4	85	\$38.33	\$10.08	\$19.97	\$0.00	\$68.38

**Notes:** Step 1&2 Appr. indentured after 1/6/2020 receive no pension, but do receive annuity. (Step 1 \$5.72, Step 2 \$6.66)  
Steps are 2,000 hours

**Apprentice to Journeyworker Ratio:1:4**

<b>MORTAR MIXER</b> <i>LABORERS - ZONE 2</i>	12/01/2023	\$38.11	\$9.65	\$17.14	\$0.00	\$64.90
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For apprentice rates see "Apprentice- LABORER"

<b>OILER (OTHER THAN TRUCK CRANES,GRADALLS)</b> <i>OPERATING ENGINEERS LOCAL 4</i>	12/01/2023	\$24.41	\$15.00	\$16.40	\$0.00	\$55.81
	06/01/2024	\$25.01	\$15.00	\$16.40	\$0.00	\$56.41
	12/01/2024	\$25.67	\$15.00	\$16.40	\$0.00	\$57.07
	06/01/2025	\$26.27	\$15.00	\$16.40	\$0.00	\$57.67
	12/01/2025	\$26.93	\$15.00	\$16.40	\$0.00	\$58.33
	06/01/2026	\$27.52	\$15.00	\$16.40	\$0.00	\$58.92
	12/01/2026	\$28.19	\$15.00	\$16.40	\$0.00	\$59.59

For apprentice rates see "Apprentice- OPERATING ENGINEERS"

<b>OILER (TRUCK CRANES, GRADALLS)</b> <i>OPERATING ENGINEERS LOCAL 4</i>	12/01/2023	\$29.86	\$15.00	\$16.40	\$0.00	\$61.26
	06/01/2024	\$30.58	\$15.00	\$16.40	\$0.00	\$61.98
	12/01/2024	\$31.38	\$15.00	\$16.40	\$0.00	\$62.78
	06/01/2025	\$32.10	\$15.00	\$16.40	\$0.00	\$63.50
	12/01/2025	\$32.90	\$15.00	\$16.40	\$0.00	\$64.30
	06/01/2026	\$33.62	\$15.00	\$16.40	\$0.00	\$65.02
	12/01/2026	\$34.42	\$15.00	\$16.40	\$0.00	\$65.82

For apprentice rates see "Apprentice- OPERATING ENGINEERS"

<b>OTHER POWER DRIVEN EQUIPMENT - CLASS II</b> <i>OPERATING ENGINEERS LOCAL 4</i>	12/01/2023	\$54.43	\$15.00	\$16.40	\$0.00	\$85.83
	06/01/2024	\$55.71	\$15.00	\$16.40	\$0.00	\$87.11
	12/01/2024	\$57.15	\$15.00	\$16.40	\$0.00	\$88.55
	06/01/2025	\$58.43	\$15.00	\$16.40	\$0.00	\$89.83
	12/01/2025	\$59.87	\$15.00	\$16.40	\$0.00	\$91.27
	06/01/2026	\$61.15	\$15.00	\$16.40	\$0.00	\$92.55
	12/01/2026	\$62.59	\$15.00	\$16.40	\$0.00	\$93.99

For apprentice rates see "Apprentice- OPERATING ENGINEERS"

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
PAINTER (BRIDGES/TANKS) <i>PAINTERS LOCAL 35 - ZONE 2</i>	01/01/2024	\$56.06	\$9.95	\$23.95	\$0.00	\$89.96
	07/01/2024	\$57.26	\$9.95	\$23.95	\$0.00	\$91.16
	01/01/2025	\$58.46	\$9.95	\$23.95	\$0.00	\$92.36

**Apprentice - PAINTER Local 35 - BRIDGES/TANKS**

**Effective Date - 01/01/2024**

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	\$28.03	\$9.95	\$0.00	\$0.00	\$37.98
2	55	\$30.83	\$9.95	\$6.66	\$0.00	\$47.44
3	60	\$33.64	\$9.95	\$7.26	\$0.00	\$50.85
4	65	\$36.44	\$9.95	\$7.87	\$0.00	\$54.26
5	70	\$39.24	\$9.95	\$20.32	\$0.00	\$69.51
6	75	\$42.05	\$9.95	\$20.93	\$0.00	\$72.93
7	80	\$44.85	\$9.95	\$21.53	\$0.00	\$76.33
8	90	\$50.45	\$9.95	\$22.74	\$0.00	\$83.14

**Effective Date - 07/01/2024**

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	\$28.63	\$9.95	\$0.00	\$0.00	\$38.58
2	55	\$31.49	\$9.95	\$6.66	\$0.00	\$48.10
3	60	\$34.36	\$9.95	\$7.26	\$0.00	\$51.57
4	65	\$37.22	\$9.95	\$7.87	\$0.00	\$55.04
5	70	\$40.08	\$9.95	\$20.32	\$0.00	\$70.35
6	75	\$42.95	\$9.95	\$20.93	\$0.00	\$73.83
7	80	\$45.81	\$9.95	\$21.53	\$0.00	\$77.29
8	90	\$51.53	\$9.95	\$22.74	\$0.00	\$84.22

**Notes:**

Steps are 750 hrs.

**Apprentice to Journeyworker Ratio:1:1**

PAINTER (SPRAY OR SANDBLAST, NEW) *	01/01/2024	\$46.96	\$9.95	\$23.95	\$0.00	\$80.86
* If 30% or more of surfaces to be painted are new construction, NEW paint rate shall be used. <i>PAINTERS LOCAL 35 - ZONE 2</i>	07/01/2024	\$48.16	\$9.95	\$23.95	\$0.00	\$82.06
	01/01/2025	\$49.36	\$9.95	\$23.95	\$0.00	\$83.26

**Classification**

**Effective Date    Base Wage    Health    Pension    Supplemental Unemployment    Total Rate**

**Apprentice - PAINTER Local 35 Zone 2 - Spray/Sandblast - New**

**Effective Date - 01/01/2024**

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	\$23.48	\$9.95	\$0.00	\$0.00	\$33.43
2	55	\$25.83	\$9.95	\$6.66	\$0.00	\$42.44
3	60	\$28.18	\$9.95	\$7.26	\$0.00	\$45.39
4	65	\$30.52	\$9.95	\$7.87	\$0.00	\$48.34
5	70	\$32.87	\$9.95	\$20.32	\$0.00	\$63.14
6	75	\$35.22	\$9.95	\$20.93	\$0.00	\$66.10
7	80	\$37.57	\$9.95	\$21.53	\$0.00	\$69.05
8	90	\$42.26	\$9.95	\$22.74	\$0.00	\$74.95

**Effective Date - 07/01/2024**

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	\$24.08	\$9.95	\$0.00	\$0.00	\$34.03
2	55	\$26.49	\$9.95	\$6.66	\$0.00	\$43.10
3	60	\$28.90	\$9.95	\$7.26	\$0.00	\$46.11
4	65	\$31.30	\$9.95	\$7.87	\$0.00	\$49.12
5	70	\$33.71	\$9.95	\$20.32	\$0.00	\$63.98
6	75	\$36.12	\$9.95	\$20.93	\$0.00	\$67.00
7	80	\$38.53	\$9.95	\$21.53	\$0.00	\$70.01
8	90	\$43.34	\$9.95	\$22.74	\$0.00	\$76.03

**Notes:**  
Steps are 750 hrs.

**Apprentice to Journeyworker Ratio:1:1**

PAINTER (SPRAY OR SANDBLAST, REPAINT)	01/01/2024	\$45.02	\$9.95	\$23.95	\$0.00	\$78.92
PAINTERS LOCAL 35 - ZONE 2	07/01/2024	\$46.22	\$9.95	\$23.95	\$0.00	\$80.12
	01/01/2025	\$47.42	\$9.95	\$23.95	\$0.00	\$81.32

**Classification**

**Effective Date    Base Wage    Health    Pension    Supplemental Unemployment    Total Rate**

**Apprentice - PAINTER Local 35 Zone 2 - Spray/Sandblast - Repaint**

**Effective Date - 01/01/2024**

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	\$22.51	\$9.95	\$0.00	\$0.00	\$32.46
2	55	\$24.76	\$9.95	\$6.66	\$0.00	\$41.37
3	60	\$27.01	\$9.95	\$7.26	\$0.00	\$44.22
4	65	\$29.26	\$9.95	\$7.87	\$0.00	\$47.08
5	70	\$31.51	\$9.95	\$20.32	\$0.00	\$61.78
6	75	\$33.77	\$9.95	\$20.93	\$0.00	\$64.65
7	80	\$36.02	\$9.95	\$21.53	\$0.00	\$67.50
8	90	\$40.52	\$9.95	\$22.74	\$0.00	\$73.21

**Effective Date - 07/01/2024**

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	\$23.11	\$9.95	\$0.00	\$0.00	\$33.06
2	55	\$25.42	\$9.95	\$6.66	\$0.00	\$42.03
3	60	\$27.73	\$9.95	\$7.26	\$0.00	\$44.94
4	65	\$30.04	\$9.95	\$7.87	\$0.00	\$47.86
5	70	\$32.35	\$9.95	\$20.32	\$0.00	\$62.62
6	75	\$34.67	\$9.95	\$20.93	\$0.00	\$65.55
7	80	\$36.98	\$9.95	\$21.53	\$0.00	\$68.46
8	90	\$41.60	\$9.95	\$22.74	\$0.00	\$74.29

**Notes:**  
Steps are 750 hrs.

**Apprentice to Journeyworker Ratio:1:1**

PAINTER / TAPER (BRUSH, NEW) *	01/01/2024	\$45.56	\$9.95	\$23.95	\$0.00	\$79.46
* If 30% or more of surfaces to be painted are new construction, NEW paint rate shall be used. PAINTERS LOCAL 35 - ZONE 2	07/01/2024	\$46.76	\$9.95	\$23.95	\$0.00	\$80.66
	01/01/2025	\$47.96	\$9.95	\$23.95	\$0.00	\$81.86

**Classification**

**Effective Date    Base Wage    Health    Pension    Supplemental Unemployment    Total Rate**

**Apprentice - PAINTER - Local 35 Zone 2 - BRUSH NEW**

**Effective Date - 01/01/2024**

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	\$22.78	\$9.95	\$0.00	\$0.00	\$32.73
2	55	\$25.06	\$9.95	\$6.66	\$0.00	\$41.67
3	60	\$27.34	\$9.95	\$7.26	\$0.00	\$44.55
4	65	\$29.61	\$9.95	\$7.87	\$0.00	\$47.43
5	70	\$31.89	\$9.95	\$20.32	\$0.00	\$62.16
6	75	\$34.17	\$9.95	\$20.93	\$0.00	\$65.05
7	80	\$36.45	\$9.95	\$21.53	\$0.00	\$67.93
8	90	\$41.00	\$9.95	\$22.74	\$0.00	\$73.69

**Effective Date - 07/01/2024**

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	\$23.38	\$9.95	\$0.00	\$0.00	\$33.33
2	55	\$25.72	\$9.95	\$6.66	\$0.00	\$42.33
3	60	\$28.06	\$9.95	\$7.26	\$0.00	\$45.27
4	65	\$30.39	\$9.95	\$7.87	\$0.00	\$48.21
5	70	\$32.73	\$9.95	\$20.32	\$0.00	\$63.00
6	75	\$35.07	\$9.95	\$20.93	\$0.00	\$65.95
7	80	\$37.41	\$9.95	\$21.53	\$0.00	\$68.89
8	90	\$42.08	\$9.95	\$22.74	\$0.00	\$74.77

**Notes:**

Steps are 750 hrs.

**Apprentice to Journeyworker Ratio:1:1**

PAINTER / TAPER (BRUSH, REPAINT)	01/01/2024	\$43.62	\$9.95	\$23.95	\$0.00	\$77.52
PAINTERS LOCAL 35 - ZONE 2	07/01/2024	\$44.82	\$9.95	\$23.95	\$0.00	\$78.72
	01/01/2025	\$46.02	\$9.95	\$23.95	\$0.00	\$79.92

**Classification**

**Effective Date    Base Wage    Health    Pension    Supplemental Unemployment    Total Rate**

**Apprentice - PAINTER Local 35 Zone 2 - BRUSH REPAINT**

**Effective Date - 01/01/2024**

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	\$21.81	\$9.95	\$0.00	\$0.00	\$31.76
2	55	\$23.99	\$9.95	\$6.66	\$0.00	\$40.60
3	60	\$26.17	\$9.95	\$7.26	\$0.00	\$43.38
4	65	\$28.35	\$9.95	\$7.87	\$0.00	\$46.17
5	70	\$30.53	\$9.95	\$20.32	\$0.00	\$60.80
6	75	\$32.72	\$9.95	\$20.93	\$0.00	\$63.60
7	80	\$34.90	\$9.95	\$21.53	\$0.00	\$66.38
8	90	\$39.26	\$9.95	\$22.74	\$0.00	\$71.95

**Effective Date - 07/01/2024**

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	\$22.41	\$9.95	\$0.00	\$0.00	\$32.36
2	55	\$24.65	\$9.95	\$6.66	\$0.00	\$41.26
3	60	\$26.89	\$9.95	\$7.26	\$0.00	\$44.10
4	65	\$29.13	\$9.95	\$7.87	\$0.00	\$46.95
5	70	\$31.37	\$9.95	\$20.32	\$0.00	\$61.64
6	75	\$33.62	\$9.95	\$20.93	\$0.00	\$64.50
7	80	\$35.86	\$9.95	\$21.53	\$0.00	\$67.34
8	90	\$40.34	\$9.95	\$22.74	\$0.00	\$73.03

**Notes:**  
Steps are 750 hrs.

**Apprentice to Journeyworker Ratio:1:1**

PAINTER TRAFFIC MARKINGS (HEAVY/HIGHWAY)	12/01/2023	\$37.86	\$9.65	\$17.14	\$0.00	\$64.65
LABORERS - ZONE 2 (HEAVY & HIGHWAY)	06/01/2024	\$39.19	\$9.65	\$17.14	\$0.00	\$65.98
	12/01/2024	\$40.52	\$9.65	\$17.14	\$0.00	\$67.31
	06/01/2025	\$41.91	\$9.65	\$17.14	\$0.00	\$68.70
	12/01/2025	\$43.29	\$9.65	\$17.14	\$0.00	\$70.08
	06/01/2026	\$44.73	\$9.65	\$17.14	\$0.00	\$71.52
	12/01/2026	\$46.17	\$9.65	\$17.14	\$0.00	\$72.96

For apprentice rates see "Apprentice- LABORER (Heavy and Highway)

PANEL & PICKUP TRUCKS DRIVER	01/01/2024	\$38.78	\$15.07	\$18.67	\$0.00	\$72.52
TEAMSTERS JOINT COUNCIL NO. 10 ZONE B	06/01/2024	\$39.78	\$15.07	\$18.67	\$0.00	\$73.52
	12/01/2024	\$39.78	\$15.07	\$20.17	\$0.00	\$75.02
	01/01/2025	\$39.78	\$15.57	\$20.17	\$0.00	\$75.52
	06/01/2025	\$40.78	\$15.57	\$20.17	\$0.00	\$76.52
	12/01/2025	\$40.78	\$15.57	\$21.78	\$0.00	\$78.13
	01/01/2026	\$40.78	\$16.17	\$21.78	\$0.00	\$78.73
	06/01/2026	\$41.78	\$16.17	\$21.78	\$0.00	\$79.73
	12/01/2026	\$41.78	\$16.17	\$23.52	\$0.00	\$81.47
	01/01/2027	\$41.78	\$16.77	\$23.52	\$0.00	\$82.07



Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
PIER AND DOCK CONSTRUCTOR (UNDERPINNING AND DECK) <i>PILE DRIVER LOCAL 56 (ZONE 2)</i> For apprentice rates see "Apprentice- PILE DRIVER"	08/01/2020	\$46.11	\$9.40	\$23.12	\$0.00	\$78.63
PILE DRIVER <i>PILE DRIVER LOCAL 56 (ZONE 2)</i>	08/01/2020	\$46.11	\$9.40	\$23.12	\$0.00	\$78.63

**Apprentice - PILE DRIVER - Local 56 Zone 2**

**Effective Date - 08/01/2020**

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	0	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00

**Notes:** Apprentice wages shall be no less than the following Steps;  
(Same as set in Zone 1)  
1\$57.06/2\$61.96/3\$66.87/4\$69.32/5\$71.78/6\$71.78/7\$76.68/8\$76.68

**Apprentice to Journeyworker Ratio:1:5**

PIPELAYER <i>LABORERS - ZONE 2</i> For apprentice rates see "Apprentice- LABORER"	12/01/2023	\$38.11	\$9.65	\$17.14	\$0.00	\$64.90
PIPELAYER (HEAVY & HIGHWAY) <i>LABORERS - ZONE 2 (HEAVY &amp; HIGHWAY)</i>	12/01/2023	\$38.11	\$9.65	\$17.14	\$0.00	\$64.90
	06/01/2024	\$39.44	\$9.65	\$17.14	\$0.00	\$66.23
	12/01/2024	\$40.77	\$9.65	\$17.14	\$0.00	\$67.56
	06/01/2025	\$42.16	\$9.65	\$17.14	\$0.00	\$68.95
	12/01/2025	\$43.54	\$9.65	\$17.14	\$0.00	\$70.33
	06/01/2026	\$44.98	\$9.65	\$17.14	\$0.00	\$71.77
	12/01/2026	\$46.42	\$9.65	\$17.14	\$0.00	\$73.21
For apprentice rates see "Apprentice- LABORER (Heavy and Highway)						
PLUMBER & PIPEFITTER <i>PLUMBERS &amp; PIPEFITTERS LOCAL 51</i>	08/28/2023	\$51.99	\$10.15	\$19.95	\$0.00	\$82.09
	08/26/2024	\$54.74	\$10.15	\$19.95	\$0.00	\$84.84
	08/25/2025	\$57.49	\$10.15	\$19.95	\$0.00	\$87.59

**Apprentice - PLUMBER/PIPEFITTER - Local 51**

**Effective Date - 08/28/2023**

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	40	\$20.80	\$10.15	\$2.50	\$0.00	\$33.45
2	50	\$26.00	\$10.15	\$2.50	\$0.00	\$38.65
3	60	\$31.19	\$10.15	\$8.80	\$0.00	\$50.14
4	70	\$36.39	\$10.15	\$14.08	\$0.00	\$60.62
5	80	\$41.59	\$10.15	\$17.60	\$0.00	\$69.34

**Effective Date - 08/26/2024**

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	40	\$21.90	\$10.15	\$2.50	\$0.00	\$34.55
2	50	\$27.37	\$10.15	\$2.50	\$0.00	\$40.02
3	60	\$32.84	\$10.15	\$8.80	\$0.00	\$51.79
4	70	\$38.32	\$10.15	\$14.08	\$0.00	\$62.55
5	80	\$43.79	\$10.15	\$17.60	\$0.00	\$71.54

**Notes:**  
Steps 2000hrs. Prior 9/1/05; 40/40/45/50/55/60/65/75/80/85

**Apprentice to Journeyworker Ratio:1:3**

PNEUMATIC CONTROLS (TEMP.) <i>PLUMBERS &amp; PIPEFITTERS LOCAL 51</i>	08/28/2023	\$51.99	\$10.15	\$19.95	\$0.00	\$82.09
	08/26/2024	\$54.74	\$10.15	\$19.95	\$0.00	\$84.84
	08/25/2025	\$57.49	\$10.15	\$19.95	\$0.00	\$87.59

For apprentice rates see "Apprentice- PIPEFITTER" or "PLUMBER/PIPEFITTER"

PNEUMATIC DRILL/TOOL OPERATOR <i>LABORERS - ZONE 2</i>	12/01/2023	\$38.11	\$9.65	\$17.14	\$0.00	\$64.90
	12/01/2024	\$40.77	\$9.65	\$17.14	\$0.00	\$67.56
	06/01/2024	\$39.44	\$9.65	\$17.14	\$0.00	\$66.23
	06/01/2025	\$42.16	\$9.65	\$17.14	\$0.00	\$68.95
	12/01/2025	\$43.54	\$9.65	\$17.14	\$0.00	\$70.33
	06/01/2026	\$44.98	\$9.65	\$17.14	\$0.00	\$71.77
	12/01/2026	\$46.42	\$9.65	\$17.14	\$0.00	\$73.21

For apprentice rates see "Apprentice- LABORER (Heavy and Highway)"

POWDERMAN & BLASTER <i>LABORERS - ZONE 2</i>	12/01/2023	\$38.86	\$9.65	\$17.14	\$0.00	\$65.65
	12/01/2024	\$42.02	\$9.40	\$16.89	\$0.00	\$68.31
	06/01/2024	\$40.69	\$9.40	\$16.89	\$0.00	\$66.98
	06/01/2025	\$43.41	\$9.40	\$16.89	\$0.00	\$69.70
	12/01/2025	\$44.79	\$9.40	\$16.89	\$0.00	\$71.08
	06/01/2026	\$46.23	\$9.40	\$16.89	\$0.00	\$72.52
	12/01/2026	\$47.67	\$9.40	\$16.89	\$0.00	\$73.96

For apprentice rates see "Apprentice- LABORER"

POWDERMAN & BLASTER (HEAVY & HIGHWAY) <i>LABORERS - ZONE 2 (HEAVY &amp; HIGHWAY)</i>	12/01/2023	\$39.36	\$9.40	\$16.89	\$0.00	\$65.65
	12/01/2024	\$42.02	\$9.40	\$16.89	\$0.00	\$68.31
	06/01/2024	\$40.69	\$9.40	\$16.89	\$0.00	\$66.98
	06/01/2025	\$43.41	\$9.40	\$16.89	\$0.00	\$69.70
	12/01/2025	\$44.79	\$9.40	\$16.89	\$0.00	\$71.08
	06/01/2026	\$46.23	\$9.40	\$16.89	\$0.00	\$72.52
	12/01/2026	\$47.67	\$9.40	\$16.89	\$0.00	\$73.96

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
For apprentice rates see "Apprentice- LABORER (Heavy and Highway)						
POWER SHOVEL/DERRICK/TRENCHING MACHINE <i>OPERATING ENGINEERS LOCAL 4</i>	12/01/2023	\$55.03	\$15.00	\$16.40	\$0.00	\$86.43
	06/01/2024	\$56.33	\$15.00	\$16.40	\$0.00	\$87.73
	12/01/2024	\$57.78	\$15.00	\$16.40	\$0.00	\$89.18
	06/01/2025	\$59.08	\$15.00	\$16.40	\$0.00	\$90.48
	12/01/2025	\$60.53	\$15.00	\$16.40	\$0.00	\$91.93
	06/01/2026	\$61.83	\$15.00	\$16.40	\$0.00	\$93.23
	12/01/2026	\$63.28	\$15.00	\$16.40	\$0.00	\$94.68
For apprentice rates see "Apprentice- OPERATING ENGINEERS"						
PUMP OPERATOR (CONCRETE) <i>OPERATING ENGINEERS LOCAL 4</i>	12/01/2023	\$54.43	\$15.00	\$16.40	\$0.00	\$85.83
	06/01/2024	\$55.71	\$15.00	\$16.40	\$0.00	\$87.11
	12/01/2024	\$57.15	\$15.00	\$16.40	\$0.00	\$88.55
	06/01/2025	\$58.43	\$15.00	\$16.40	\$0.00	\$89.83
	12/01/2025	\$59.87	\$15.00	\$16.40	\$0.00	\$91.27
	06/01/2026	\$61.15	\$15.00	\$16.40	\$0.00	\$92.55
	12/01/2026	\$62.59	\$15.00	\$16.40	\$0.00	\$93.99
For apprentice rates see "Apprentice- OPERATING ENGINEERS"						
PUMP OPERATOR (DEWATERING, OTHER) <i>OPERATING ENGINEERS LOCAL 4</i>	12/01/2023	\$35.62	\$15.00	\$16.40	\$0.00	\$67.02
	06/01/2024	\$36.47	\$15.00	\$16.40	\$0.00	\$67.87
	12/01/2024	\$37.42	\$15.00	\$16.40	\$0.00	\$68.82
	06/01/2025	\$38.27	\$15.00	\$16.40	\$0.00	\$69.67
	12/01/2025	\$39.22	\$15.00	\$16.40	\$0.00	\$70.62
	06/01/2026	\$40.08	\$15.00	\$16.40	\$0.00	\$71.48
	12/01/2026	\$41.03	\$15.00	\$16.40	\$0.00	\$72.43
For apprentice rates see "Apprentice- OPERATING ENGINEERS"						
READY-MIX CONCRETE DRIVER <i>TEAMSTERS 653 - Southeastern Concrete (Weymouth)</i>	08/01/2023	\$25.00	\$13.91	\$6.90	\$0.00	\$45.81
For apprentice rates see "Apprentice- OPERATING ENGINEERS"						
RECLAIMERS <i>OPERATING ENGINEERS LOCAL 4</i>	12/01/2023	\$54.43	\$15.00	\$16.40	\$0.00	\$85.83
	06/01/2024	\$55.71	\$15.00	\$16.40	\$0.00	\$87.11
	12/01/2024	\$57.15	\$15.00	\$16.40	\$0.00	\$88.55
	06/01/2025	\$58.43	\$15.00	\$16.40	\$0.00	\$89.83
	12/01/2025	\$59.87	\$15.00	\$16.40	\$0.00	\$91.27
	06/01/2026	\$61.15	\$15.00	\$16.40	\$0.00	\$92.55
	12/01/2026	\$62.59	\$15.00	\$16.40	\$0.00	\$93.99
For apprentice rates see "Apprentice- OPERATING ENGINEERS"						
RIDE-ON MOTORIZED BUGGY OPERATOR <i>LABORERS - ZONE 2</i>	12/01/2023	\$38.11	\$9.65	\$17.14	\$0.00	\$64.90
For apprentice rates see "Apprentice- LABORER"						
ROLLER/SPREADER/MULCHING MACHINE <i>OPERATING ENGINEERS LOCAL 4</i>	12/01/2023	\$54.43	\$15.00	\$16.40	\$0.00	\$85.83
	06/01/2024	\$55.71	\$15.00	\$16.40	\$0.00	\$87.11
	12/01/2024	\$57.15	\$15.00	\$16.40	\$0.00	\$88.55
	06/01/2025	\$58.43	\$15.00	\$16.40	\$0.00	\$89.83
	12/01/2025	\$59.87	\$15.00	\$16.40	\$0.00	\$91.27
	06/01/2026	\$61.15	\$15.00	\$16.40	\$0.00	\$92.55
	12/01/2026	\$62.59	\$15.00	\$16.40	\$0.00	\$93.99
For apprentice rates see "Apprentice- OPERATING ENGINEERS"						

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
ROOFER (Inc.Roofer Waterproofing &Roofer Damproofg) ROOFERS LOCAL 33	02/01/2024	\$50.03	\$12.78	\$21.45	\$0.00	\$84.26
	08/01/2024	\$51.53	\$12.78	\$21.45	\$0.00	\$85.76
	02/01/2025	\$52.78	\$12.78	\$21.45	\$0.00	\$87.01
	08/01/2025	\$54.28	\$12.78	\$21.45	\$0.00	\$88.51
	02/01/2026	\$55.53	\$12.78	\$21.45	\$0.00	\$89.76

**Apprentice - ROOFER - Local 33**

**Effective Date - 02/01/2024**

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	\$25.02	\$12.78	\$6.21	\$0.00	\$44.01
2	60	\$30.02	\$12.78	\$21.45	\$0.00	\$64.25
3	65	\$32.52	\$12.78	\$21.45	\$0.00	\$66.75
4	75	\$37.52	\$12.78	\$21.45	\$0.00	\$71.75
5	85	\$42.53	\$12.78	\$21.45	\$0.00	\$76.76

**Effective Date - 08/01/2024**

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	\$25.77	\$12.78	\$6.21	\$0.00	\$44.76
2	60	\$30.92	\$12.78	\$21.45	\$0.00	\$65.15
3	65	\$33.49	\$12.78	\$21.45	\$0.00	\$67.72
4	75	\$38.65	\$12.78	\$21.45	\$0.00	\$72.88
5	85	\$43.80	\$12.78	\$21.45	\$0.00	\$78.03

**Notes:** \*\* 1:5, 2:6-10, the 1:10; Reroofing: 1:4, then 1:1  
 Step 1 is 2000 hrs.; Steps 2-5 are 1000 hrs.  
 (Hot Pitch Mechanics' receive \$1.00 hr. above ROOFER)

**Apprentice to Journeyworker Ratio:\*\***

ROOFER SLATE / TILE / PRECAST CONCRETE ROOFERS LOCAL 33	02/01/2024	\$50.28	\$12.78	\$21.45	\$0.00	\$84.51
	08/01/2024	\$51.78	\$12.78	\$21.45	\$0.00	\$86.01
	02/01/2025	\$53.03	\$12.78	\$21.45	\$0.00	\$87.26
	08/01/2025	\$54.53	\$12.78	\$21.45	\$0.00	\$88.76
	02/01/2026	\$55.78	\$12.78	\$21.45	\$0.00	\$90.01

For apprentice rates see "Apprentice- ROOFER"

SHEETMETAL WORKER SHEETMETAL WORKERS LOCAL 17 - B	10/01/2023	\$39.74	\$14.43	\$19.04	\$2.20	\$75.41
	04/01/2024	\$41.24	\$14.43	\$19.04	\$2.20	\$76.91
	10/01/2024	\$42.49	\$14.43	\$19.04	\$2.20	\$78.16
	04/01/2025	\$43.99	\$14.43	\$19.04	\$2.20	\$79.66
	10/01/2025	\$45.24	\$14.43	\$19.04	\$2.20	\$80.91
	04/01/2026	\$46.74	\$14.43	\$19.04	\$2.20	\$82.41

**Apprentice - SHEET METAL WORKER - Local 17-B**

**Effective Date - 10/01/2023**

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	40	\$15.90	\$14.27	\$4.18	\$1.06	\$35.41
2	45	\$17.88	\$14.27	\$4.71	\$1.13	\$37.99
3	50	\$19.87	\$14.27	\$11.44	\$1.40	\$46.98
4	55	\$21.86	\$14.27	\$11.44	\$1.46	\$49.03
5	60	\$23.84	\$14.27	\$14.99	\$1.59	\$54.69
6	65	\$25.83	\$14.27	\$15.28	\$1.65	\$57.03
7	70	\$27.82	\$14.27	\$15.58	\$1.72	\$59.39
8	75	\$29.81	\$14.27	\$15.87	\$1.79	\$61.74
9	80	\$31.79	\$14.27	\$16.17	\$1.86	\$64.09
10	85	\$33.78	\$14.27	\$16.46	\$1.92	\$66.43

**Effective Date - 04/01/2024**

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	40	\$16.50	\$14.27	\$4.18	\$1.06	\$36.01
2	45	\$18.56	\$14.27	\$4.71	\$1.13	\$38.67
3	50	\$20.62	\$14.27	\$11.44	\$1.40	\$47.73
4	55	\$22.68	\$14.27	\$11.44	\$1.46	\$49.85
5	60	\$24.74	\$14.27	\$14.99	\$1.59	\$55.59
6	65	\$26.81	\$14.27	\$15.28	\$1.65	\$58.01
7	70	\$28.87	\$14.27	\$15.58	\$1.72	\$60.44
8	75	\$30.93	\$14.27	\$15.87	\$1.79	\$62.86
9	80	\$32.99	\$14.27	\$16.17	\$1.86	\$65.29
10	85	\$35.05	\$14.27	\$16.46	\$1.92	\$67.70

**Notes:**

**Apprentice to Journeyworker Ratio:1:3**

SPECIALIZED EARTH MOVING EQUIP < 35 TONS TEAMSTERS JOINT COUNCIL NO. 10 ZONE B	01/01/2024	\$39.24	\$15.07	\$18.67	\$0.00	\$72.98
	06/01/2024	\$40.24	\$15.07	\$18.67	\$0.00	\$73.98
	12/01/2024	\$40.24	\$15.07	\$20.17	\$0.00	\$75.48
	01/01/2025	\$40.24	\$15.57	\$20.17	\$0.00	\$75.98
	06/01/2025	\$41.24	\$15.57	\$20.17	\$0.00	\$76.98
	12/01/2025	\$41.24	\$15.57	\$21.78	\$0.00	\$78.59
	01/01/2026	\$41.24	\$16.17	\$21.78	\$0.00	\$79.19
	06/01/2026	\$42.24	\$16.17	\$21.78	\$0.00	\$80.19
	12/01/2026	\$42.24	\$16.17	\$23.52	\$0.00	\$81.93
	01/01/2027	\$42.24	\$16.77	\$23.52	\$0.00	\$82.53

<b>Classification</b>	<b>Effective Date</b>	<b>Base Wage</b>	<b>Health</b>	<b>Pension</b>	<b>Supplemental Unemployment</b>	<b>Total Rate</b>
SPECIALIZED EARTH MOVING EQUIP > 35 TONS <i>TEAMSTERS JOINT COUNCIL NO. 10 ZONE B</i>	01/01/2024	\$39.53	\$15.07	\$18.67	\$0.00	\$73.27
	06/01/2024	\$40.53	\$15.07	\$18.67	\$0.00	\$74.27
	12/01/2024	\$40.53	\$15.07	\$20.17	\$0.00	\$75.77
	01/01/2025	\$40.53	\$15.57	\$20.17	\$0.00	\$76.27
	06/01/2025	\$41.53	\$15.57	\$20.17	\$0.00	\$77.27
	12/01/2025	\$41.53	\$15.57	\$21.78	\$0.00	\$78.88
	01/01/2026	\$41.53	\$16.17	\$21.78	\$0.00	\$79.48
	06/01/2026	\$42.53	\$16.17	\$21.78	\$0.00	\$80.48
	12/01/2026	\$42.53	\$16.17	\$23.52	\$0.00	\$82.22
	01/01/2027	\$42.53	\$16.77	\$23.52	\$0.00	\$82.82
SPRINKLER FITTER <i>SPRINKLER FITTERS LOCAL 550 - (Section B) Zone 2</i>	10/01/2023	\$61.16	\$10.90	\$23.20	\$0.00	\$95.26
	03/01/2024	\$62.78	\$10.90	\$23.20	\$0.00	\$96.88
	10/01/2024	\$64.40	\$10.90	\$23.20	\$0.00	\$98.50
	03/01/2025	\$66.02	\$10.90	\$23.20	\$0.00	\$100.12

**Classification**

**Effective Date    Base Wage    Health    Pension    Supplemental Unemployment    Total Rate**

**Apprentice - SPRINKLER FITTER - Local 550 (Section B) Zone 2**

**Effective Date - 10/01/2023**

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	35	\$21.41	\$10.90	\$12.80	\$0.00	\$45.11
2	40	\$24.46	\$10.90	\$13.60	\$0.00	\$48.96
3	45	\$27.52	\$10.90	\$14.40	\$0.00	\$52.82
4	50	\$30.58	\$10.90	\$15.20	\$0.00	\$56.68
5	55	\$33.64	\$10.90	\$16.00	\$0.00	\$60.54
6	60	\$36.70	\$10.90	\$16.80	\$0.00	\$64.40
7	65	\$39.75	\$10.90	\$17.60	\$0.00	\$68.25
8	70	\$42.81	\$10.90	\$18.40	\$0.00	\$72.11
9	75	\$45.87	\$10.90	\$19.20	\$0.00	\$75.97
10	80	\$48.93	\$10.90	\$20.00	\$0.00	\$79.83

**Effective Date - 03/01/2024**

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	35	\$21.97	\$10.90	\$12.80	\$0.00	\$45.67
2	40	\$25.11	\$10.90	\$13.60	\$0.00	\$49.61
3	45	\$28.25	\$10.90	\$14.40	\$0.00	\$53.55
4	50	\$31.39	\$10.90	\$15.20	\$0.00	\$57.49
5	55	\$34.53	\$10.90	\$16.00	\$0.00	\$61.43
6	60	\$37.67	\$10.90	\$16.80	\$0.00	\$65.37
7	65	\$40.81	\$10.90	\$17.60	\$0.00	\$69.31
8	70	\$43.95	\$10.90	\$18.40	\$0.00	\$73.25
9	75	\$47.09	\$10.90	\$19.20	\$0.00	\$77.19
10	80	\$50.22	\$10.90	\$20.00	\$0.00	\$81.12

**Notes:** Apprentice entered prior 9/30/10:  
40/45/50/55/60/65/70/75/80/85  
Steps are 850 hours

**Apprentice to Journeyworker Ratio:1:3**

STEAM BOILER OPERATOR	12/01/2023	\$54.43	\$15.00	\$16.40	\$0.00	\$85.83
OPERATING ENGINEERS LOCAL 4	06/01/2024	\$55.71	\$15.00	\$16.40	\$0.00	\$87.11
	12/01/2024	\$57.15	\$15.00	\$16.40	\$0.00	\$88.55
	06/01/2025	\$58.43	\$15.00	\$16.40	\$0.00	\$89.83
	12/01/2025	\$59.87	\$15.00	\$16.40	\$0.00	\$91.27
	06/01/2026	\$61.15	\$15.00	\$16.40	\$0.00	\$92.55
	12/01/2026	\$62.59	\$15.00	\$16.40	\$0.00	\$93.99

For apprentice rates see "Apprentice- OPERATING ENGINEERS"

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
TAMPERS, SELF-PROPELLED OR TRACTOR DRAWN <i>OPERATING ENGINEERS LOCAL 4</i>	12/01/2023	\$54.43	\$15.00	\$16.40	\$0.00	\$85.83
	06/01/2024	\$55.71	\$15.00	\$16.40	\$0.00	\$87.11
	12/01/2024	\$57.15	\$15.00	\$16.40	\$0.00	\$88.55
	06/01/2025	\$58.43	\$15.00	\$16.40	\$0.00	\$89.83
	12/01/2025	\$59.87	\$15.00	\$16.40	\$0.00	\$91.27
	06/01/2026	\$61.15	\$15.00	\$16.40	\$0.00	\$92.55
	12/01/2026	\$62.59	\$15.00	\$16.40	\$0.00	\$93.99
For apprentice rates see "Apprentice- OPERATING ENGINEERS"						
TELECOMMUNICATION TECHNICIAN <i>ELECTRICIANS LOCAL 223</i>	09/01/2023	\$39.40	\$11.50	\$13.91	\$0.00	\$64.81
	09/01/2024	\$40.69	\$11.75	\$14.53	\$0.00	\$66.97

**Apprentice - TELECOMMUNICATION TECHNICIAN - Local 223**

**Effective Date - 09/01/2023**

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	0	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00

**Notes:** See Electrician Apprentice Wages

Telecom Apprentice Wages shall be the same as the Electrician Apprentice Wages

**Apprentice to Journeyworker Ratio:2:3\*\*\***

TERRAZZO FINISHERS <i>BRICKLAYERS LOCAL 3 - MARBLE &amp; TILE</i>	02/01/2024	\$61.34	\$11.49	\$23.59	\$0.00	\$96.42
	08/01/2024	\$63.44	\$11.49	\$23.59	\$0.00	\$98.52
	02/01/2025	\$64.74	\$11.49	\$23.59	\$0.00	\$99.82
	08/01/2025	\$66.89	\$11.49	\$23.59	\$0.00	\$101.97
	02/01/2026	\$68.24	\$11.49	\$23.59	\$0.00	\$103.32
	08/01/2026	\$70.44	\$11.49	\$23.59	\$0.00	\$105.52
	02/01/2027	\$71.84	\$11.49	\$23.59	\$0.00	\$106.92



**Classification**

**Effective Date    Base Wage    Health    Pension    Supplemental Unemployment    Total Rate**

**Apprentice - TERRAZZO FINISHER - Local 3 Marble & Tile**

**Effective Date - 02/01/2024**

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	\$30.67	\$11.49	\$23.59	\$0.00	\$65.75
2	60	\$36.80	\$11.49	\$23.59	\$0.00	\$71.88
3	70	\$42.94	\$11.49	\$23.59	\$0.00	\$78.02
4	80	\$49.07	\$11.49	\$23.59	\$0.00	\$84.15
5	90	\$55.21	\$11.49	\$23.59	\$0.00	\$90.29

**Effective Date - 08/01/2024**

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	\$31.72	\$11.49	\$23.59	\$0.00	\$66.80
2	60	\$38.06	\$11.49	\$23.59	\$0.00	\$73.14
3	70	\$44.41	\$11.49	\$23.59	\$0.00	\$79.49
4	80	\$50.75	\$11.49	\$23.59	\$0.00	\$85.83
5	90	\$57.10	\$11.49	\$23.59	\$0.00	\$92.18

**Notes:**

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**Apprentice to Journeyworker Ratio:1:3**

TEST BORING DRILLER <i>LABORERS - FOUNDATION AND MARINE</i>	12/01/2023	\$48.33	\$9.65	\$18.22	\$0.00	\$76.20
	06/01/2024	\$49.81	\$9.65	\$18.22	\$0.00	\$77.68
	12/01/2024	\$51.28	\$9.65	\$18.22	\$0.00	\$79.15
	06/01/2025	\$52.78	\$9.65	\$18.22	\$0.00	\$80.65
	12/01/2025	\$54.28	\$9.65	\$18.22	\$0.00	\$82.15
	06/01/2026	\$55.83	\$9.65	\$18.22	\$0.00	\$83.70
	12/01/2026	\$57.33	\$9.65	\$18.22	\$0.00	\$85.20

For apprentice rates see "Apprentice- LABORER"

TEST BORING DRILLER HELPER <i>LABORERS - FOUNDATION AND MARINE</i>	12/01/2023	\$44.45	\$9.65	\$18.22	\$0.00	\$72.32
	06/01/2024	\$45.93	\$9.65	\$18.22	\$0.00	\$73.80
	12/01/2024	\$47.40	\$9.65	\$18.22	\$0.00	\$75.27
	06/01/2025	\$48.90	\$9.65	\$18.22	\$0.00	\$76.77
	12/01/2025	\$50.40	\$9.65	\$18.22	\$0.00	\$78.27
	06/01/2026	\$51.95	\$9.65	\$18.22	\$0.00	\$79.82
	12/01/2026	\$53.45	\$9.65	\$18.22	\$0.00	\$81.32

For apprentice rates see "Apprentice- LABORER"

TEST BORING LABORER <i>LABORERS - FOUNDATION AND MARINE</i>	12/01/2023	\$44.33	\$9.65	\$18.22	\$0.00	\$72.20
	06/01/2024	\$45.81	\$9.65	\$18.22	\$0.00	\$73.68
	12/01/2024	\$47.28	\$9.65	\$18.22	\$0.00	\$75.15
	06/01/2025	\$48.78	\$9.65	\$18.22	\$0.00	\$76.65
	12/01/2025	\$50.28	\$9.65	\$18.22	\$0.00	\$78.15
	06/01/2026	\$51.83	\$9.65	\$18.22	\$0.00	\$79.70
	12/01/2026	\$53.33	\$9.65	\$18.22	\$0.00	\$81.20

For apprentice rates see "Apprentice- LABORER"

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
TRACTORS/PORTABLE STEAM GENERATORS <i>OPERATING ENGINEERS LOCAL 4</i>	12/01/2023	\$54.43	\$15.00	\$16.40	\$0.00	\$85.83
	06/01/2024	\$55.71	\$15.00	\$16.40	\$0.00	\$87.11
	12/01/2024	\$57.15	\$15.00	\$16.40	\$0.00	\$88.55
	06/01/2025	\$58.43	\$15.00	\$16.40	\$0.00	\$89.83
	12/01/2025	\$59.87	\$15.00	\$16.40	\$0.00	\$91.27
	06/01/2026	\$61.15	\$15.00	\$16.40	\$0.00	\$92.55
	12/01/2026	\$62.59	\$15.00	\$16.40	\$0.00	\$93.99
For apprentice rates see "Apprentice- OPERATING ENGINEERS"						
TRAILERS FOR EARTH MOVING EQUIPMENT <i>TEAMSTERS JOINT COUNCIL NO. 10 ZONE B</i>	01/01/2024	\$39.82	\$15.07	\$18.67	\$0.00	\$73.56
	06/01/2024	\$40.82	\$15.07	\$18.67	\$0.00	\$74.56
	12/01/2024	\$40.82	\$15.07	\$20.17	\$0.00	\$76.06
	01/01/2025	\$40.82	\$15.57	\$20.17	\$0.00	\$76.56
	06/01/2025	\$41.82	\$15.57	\$20.17	\$0.00	\$77.56
	12/01/2025	\$41.82	\$15.57	\$21.78	\$0.00	\$79.17
	01/01/2026	\$41.82	\$16.17	\$21.78	\$0.00	\$79.77
	06/01/2026	\$42.82	\$16.17	\$21.78	\$0.00	\$80.77
	12/01/2026	\$42.82	\$16.17	\$23.52	\$0.00	\$82.51
	01/01/2027	\$42.82	\$16.77	\$23.52	\$0.00	\$83.11
TUNNEL WORK - COMPRESSED AIR <i>LABORERS (COMPRESSED AIR)</i>	12/01/2023	\$56.56	\$9.65	\$18.67	\$0.00	\$84.88
	06/01/2024	\$58.04	\$9.65	\$18.67	\$0.00	\$86.36
	12/01/2024	\$59.51	\$9.65	\$18.67	\$0.00	\$87.83
	06/01/2025	\$61.01	\$9.65	\$18.67	\$0.00	\$89.33
	12/01/2025	\$62.51	\$9.65	\$18.67	\$0.00	\$90.83
	06/01/2026	\$64.06	\$9.65	\$18.67	\$0.00	\$92.38
	12/01/2026	\$65.56	\$9.65	\$18.67	\$0.00	\$93.88
For apprentice rates see "Apprentice- LABORER"						
TUNNEL WORK - COMPRESSED AIR (HAZ. WASTE) <i>LABORERS (COMPRESSED AIR)</i>	12/01/2023	\$58.56	\$9.65	\$18.67	\$0.00	\$86.88
	06/01/2024	\$60.04	\$9.65	\$18.67	\$0.00	\$88.36
	12/01/2024	\$61.51	\$9.65	\$18.67	\$0.00	\$89.83
	06/01/2025	\$63.01	\$9.65	\$18.67	\$0.00	\$91.33
	12/01/2025	\$64.51	\$9.65	\$18.67	\$0.00	\$92.83
	06/01/2026	\$66.06	\$9.65	\$18.67	\$0.00	\$94.38
	12/01/2026	\$67.56	\$9.65	\$18.67	\$0.00	\$95.88
For apprentice rates see "Apprentice- LABORER"						
TUNNEL WORK - FREE AIR <i>LABORERS (FREE AIR TUNNEL)</i>	12/01/2023	\$48.63	\$9.65	\$18.67	\$0.00	\$76.95
	06/01/2024	\$50.11	\$9.65	\$18.67	\$0.00	\$78.43
	12/01/2024	\$51.58	\$9.65	\$18.67	\$0.00	\$79.90
	06/01/2025	\$53.08	\$9.65	\$18.67	\$0.00	\$81.40
	12/01/2025	\$54.58	\$9.65	\$18.67	\$0.00	\$82.90
	06/01/2026	\$56.13	\$9.65	\$18.67	\$0.00	\$84.45
	12/01/2026	\$57.63	\$9.65	\$18.67	\$0.00	\$85.95
For apprentice rates see "Apprentice- LABORER"						

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
TUNNEL WORK - FREE AIR (HAZ. WASTE) <i>LABORERS (FREE AIR TUNNEL)</i>	12/01/2023	\$50.63	\$9.65	\$18.67	\$0.00	\$78.95
	06/01/2024	\$52.11	\$9.65	\$18.67	\$0.00	\$80.43
	12/01/2024	\$53.58	\$9.65	\$18.67	\$0.00	\$81.90
	06/01/2025	\$55.08	\$9.65	\$18.67	\$0.00	\$83.40
	12/01/2025	\$56.58	\$9.65	\$18.67	\$0.00	\$84.90
	06/01/2026	\$58.13	\$9.65	\$18.67	\$0.00	\$86.45
	12/01/2026	\$59.63	\$9.65	\$18.67	\$0.00	\$87.95
For apprentice rates see "Apprentice- LABORER"						
VAC-HAUL <i>TEAMSTERS JOINT COUNCIL NO. 10 ZONE B</i>	01/01/2024	\$39.24	\$15.07	\$18.67	\$0.00	\$72.98
	06/01/2024	\$40.24	\$15.07	\$18.67	\$0.00	\$73.98
	12/01/2024	\$40.24	\$15.07	\$20.17	\$0.00	\$75.48
	01/01/2025	\$40.24	\$15.57	\$20.17	\$0.00	\$75.98
	06/01/2025	\$41.24	\$15.57	\$20.17	\$0.00	\$76.98
	12/01/2025	\$41.24	\$15.57	\$21.78	\$0.00	\$78.59
	01/01/2026	\$41.24	\$16.17	\$21.78	\$0.00	\$79.19
	06/01/2026	\$42.24	\$16.17	\$21.78	\$0.00	\$80.19
	12/01/2026	\$42.24	\$16.17	\$23.52	\$0.00	\$81.93
	01/01/2027	\$42.24	\$16.77	\$23.52	\$0.00	\$82.53
WAGON DRILL OPERATOR <i>LABORERS - ZONE 2</i>	12/01/2023	\$38.11	\$9.65	\$17.14	\$0.00	\$64.90
For apprentice rates see "Apprentice- LABORER"						
WAGON DRILL OPERATOR (HEAVY & HIGHWAY) <i>LABORERS - ZONE 2 (HEAVY &amp; HIGHWAY)</i>	12/01/2023	\$38.11	\$9.65	\$17.14	\$0.00	\$64.90
	06/01/2024	\$39.44	\$9.65	\$17.14	\$0.00	\$66.23
	12/01/2024	\$40.77	\$9.65	\$17.14	\$0.00	\$67.56
	06/01/2025	\$42.16	\$9.65	\$17.14	\$0.00	\$68.95
	12/01/2025	\$43.54	\$9.65	\$17.14	\$0.00	\$70.33
	06/01/2026	\$44.98	\$9.65	\$17.14	\$0.00	\$71.77
	12/01/2026	\$46.42	\$9.65	\$17.14	\$0.00	\$73.21
For apprentice rates see "Apprentice- LABORER (Heavy and Highway)"						
WASTE WATER PUMP OPERATOR <i>OPERATING ENGINEERS LOCAL 4</i>	12/01/2023	\$55.03	\$15.00	\$16.40	\$0.00	\$86.43
	06/01/2024	\$56.33	\$15.00	\$16.40	\$0.00	\$87.73
	12/01/2024	\$57.78	\$15.00	\$16.40	\$0.00	\$89.18
	06/01/2025	\$59.08	\$15.00	\$16.40	\$0.00	\$90.48
	12/01/2025	\$60.53	\$15.00	\$16.40	\$0.00	\$91.93
	06/01/2026	\$61.83	\$15.00	\$16.40	\$0.00	\$93.23
	12/01/2026	\$63.28	\$15.00	\$16.40	\$0.00	\$94.68
For apprentice rates see "Apprentice- OPERATING ENGINEERS"						
WATER METER INSTALLER <i>PLUMBERS &amp; PIPEFITTERS LOCAL 51</i>	08/28/2023	\$51.99	\$10.15	\$19.95	\$0.00	\$82.09
	08/26/2024	\$54.74	\$10.15	\$19.95	\$0.00	\$84.84
	08/25/2025	\$57.49	\$10.15	\$19.95	\$0.00	\$87.59
For apprentice rates see "Apprentice- PLUMBER/PIPEFITTER" or "PLUMBER/GASFITTER"						
<b>Marine Drilling</b>						
BLASTER <i>MARINE DRILLING</i>	01/01/2018	\$41.82	\$7.63	\$3.60	\$0.00	\$53.05
BOAT CAPTAIN <i>MARINE DRILLING</i>	01/01/2018	\$33.87	\$7.63	\$3.30	\$0.00	\$44.80

<b>Classification</b>	<b>Effective Date</b>	<b>Base Wage</b>	<b>Health</b>	<b>Pension</b>	<b>Supplemental Unemployment</b>	<b>Total Rate</b>
BOAT CAPTAIN / Over 1,000 hp <i>MARINE DRILLING</i>	01/01/2018	\$38.06	\$7.63	\$3.60	\$0.00	\$49.29
CORE DRILLER <i>MARINE DRILLING</i>	01/01/2018	\$31.43	\$7.63	\$2.90	\$0.00	\$41.96
CORE DRILLER HELPER <i>MARINE DRILLING</i>	01/01/2018	\$28.47	\$7.63	\$3.00	\$0.00	\$39.10
DRILLER <i>MARINE DRILLING</i>	01/01/2018	\$39.70	\$7.63	\$3.60	\$0.00	\$50.93
ENGINEER <i>MARINE DRILLING</i>	01/01/2018	\$39.69	\$7.63	\$3.50	\$0.00	\$50.82
HELPER <i>MARINE DRILLING</i>	01/01/2018	\$34.24	\$7.63	\$3.00	\$0.00	\$44.87
MACHINIST <i>MARINE DRILLING</i>	01/01/2018	\$38.88	\$7.63	\$3.30	\$0.00	\$49.81
OILER - MARINE DRILLING <i>MARINE DRILLING</i>	01/01/2018	\$34.24	\$7.63	\$3.00	\$0.00	\$44.87
TUG DECKHAND <i>MARINE DRILLING</i>	01/01/2018	\$27.61	\$7.63	\$3.00	\$0.00	\$38.24
WELDER <i>MARINE DRILLING</i>	01/01/2018	\$38.88	\$7.63	\$3.30	\$0.00	\$49.81
<b>Op Eng Marine (Dredging Work)</b>						
BOAT OPERATOR <i>OPERATING ENGINEERS - MARINE DIVISION</i>	10/01/2017	\$29.26	\$7.63	\$3.30	\$0.00	\$40.19
CERTIFIED WELDER <i>OPERATING ENGINEERS - MARINE DIVISION</i>	10/01/2017	\$31.09	\$7.63	\$3.60	\$0.00	\$42.32
CHIEF WELDER/ CHIEF MATE <i>OPERATING ENGINEERS - MARINE DIVISION</i>	10/01/2017	\$33.02	\$7.63	\$3.60	\$0.00	\$44.25
DERRICK / SPIDER / SPILLBARGE OPERATOR <i>OPERATING ENGINEERS - MARINE DIVISION</i>	10/01/2017	\$33.02	\$7.63	\$3.60	\$0.00	\$44.25
DRAG BARGE OPERATOR / WELDER / MATE <i>OPERATING ENGINEERS - MARINE DIVISION</i>	10/01/2017	\$30.24	\$7.63	\$3.30	\$0.00	\$41.17
ENGINEER / ELECTRICIAN <i>OPERATING ENGINEERS - MARINE DIVISION</i>	10/01/2017	\$33.02	\$7.63	\$3.60	\$0.00	\$44.25
LICENSED BOAT OPERATOR <i>OPERATING ENGINEERS - MARINE DIVISION</i>	10/01/2017	\$33.02	\$7.63	\$3.60	\$0.00	\$44.25
LICENSED TUG OPERATOR OVER 1000HP <i>OPERATING ENGINEERS - MARINE DIVISION</i>	10/01/2017	\$38.18	\$7.63	\$3.60	\$0.00	\$49.41
MAINTENANCE ENGINEER <i>OPERATING ENGINEERS - MARINE DIVISION</i>	10/01/2017	\$33.03	\$7.63	\$3.60	\$0.00	\$44.26
OILER - MARINE DIVISION <i>OPERATING ENGINEERS - MARINE DIVISION</i>	10/01/2017	\$24.30	\$7.63	\$3.00	\$0.00	\$34.93
OPERATOR / LEVERMAN <i>OPERATING ENGINEERS - MARINE DIVISION</i>	10/01/2017	\$38.18	\$7.63	\$3.60	\$0.00	\$49.41
RODMAN / SCOWMAN <i>OPERATING ENGINEERS - MARINE DIVISION</i>	10/01/2017	\$24.30	\$7.63	\$3.00	\$0.00	\$34.93
SHOREMAN / DECKHAND <i>OPERATING ENGINEERS - MARINE DIVISION</i>	10/01/2017	\$24.30	\$7.63	\$3.00	\$0.00	\$34.93
<b>Outside Electrical - East</b>						
CABLE TECHNICIAN (Power Zone) <i>OUTSIDE ELECTRICAL WORKERS - EAST LOCAL 104</i>	08/30/2020	\$29.67	\$9.25	\$1.89	\$0.00	\$40.81

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
For apprentice rates see "Apprentice- LINEMAN"						
CABLEMAN (Underground Ducts & Cables) <i>OUTSIDE ELECTRICAL WORKERS - EAST LOCAL 104</i>	08/30/2020	\$42.03	\$9.25	\$10.27	\$0.00	\$61.55
For apprentice rates see "Apprentice- LINEMAN"						
DRIVER / GROUNDMAN CDL <i>OUTSIDE ELECTRICAL WORKERS - EAST LOCAL 104</i>	08/30/2020	\$34.62	\$9.25	\$10.07	\$0.00	\$53.94
For apprentice rates see "Apprentice- LINEMAN"						
DRIVER / GROUNDMAN -Inexperienced (<2000 Hrs) <i>OUTSIDE ELECTRICAL WORKERS - EAST LOCAL 104</i>	08/30/2020	\$27.20	\$9.25	\$1.82	\$0.00	\$38.27
For apprentice rates see "Apprentice- LINEMAN"						
EQUIPMENT OPERATOR (Class A CDL) <i>OUTSIDE ELECTRICAL WORKERS - EAST LOCAL 104</i>	08/30/2020	\$42.03	\$9.25	\$14.35	\$0.00	\$65.63
For apprentice rates see "Apprentice- LINEMAN"						
EQUIPMENT OPERATOR (Class B CDL) <i>OUTSIDE ELECTRICAL WORKERS - EAST LOCAL 104</i>	08/30/2020	\$37.09	\$9.25	\$10.87	\$0.00	\$57.21
For apprentice rates see "Apprentice- LINEMAN"						
GROUNDMAN <i>OUTSIDE ELECTRICAL WORKERS - EAST LOCAL 104</i>	08/30/2020	\$27.20	\$9.25	\$1.82	\$0.00	\$38.27
For apprentice rates see "Apprentice- LINEMAN"						
GROUNDMAN -Inexperienced (<2000 Hrs.) <i>OUTSIDE ELECTRICAL WORKERS - EAST LOCAL 104</i>	08/30/2020	\$22.25	\$9.25	\$1.82	\$0.00	\$33.32
For apprentice rates see "Apprentice- LINEMAN"						
JOURNEYMAN LINEMAN <i>OUTSIDE ELECTRICAL WORKERS - EAST LOCAL 104</i>	08/30/2020	\$49.45	\$9.25	\$17.48	\$0.00	\$76.18

**Apprentice - LINEMAN (Outside Electrical) - East Local 104**

**Effective Date - 08/30/2020**

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	60	\$29.67	\$9.25	\$3.39	\$0.00	\$42.31
2	65	\$32.14	\$9.25	\$3.46	\$0.00	\$44.85
3	70	\$34.62	\$9.25	\$3.54	\$0.00	\$47.41
4	75	\$37.09	\$9.25	\$5.11	\$0.00	\$51.45
5	80	\$39.56	\$9.25	\$5.19	\$0.00	\$54.00
6	85	\$42.03	\$9.25	\$5.26	\$0.00	\$56.54
7	90	\$44.51	\$9.25	\$7.34	\$0.00	\$61.10

**Notes:**

**Apprentice to Journeyworker Ratio:1:2**

TELEDATA CABLE SPLICER <i>OUTSIDE ELECTRICAL WORKERS - EAST LOCAL 104</i>	02/04/2019	\$30.73	\$4.70	\$3.17	\$0.00	\$38.60
TELEDATA LINEMAN/EQUIPMENT OPERATOR <i>OUTSIDE ELECTRICAL WORKERS - EAST LOCAL 104</i>	02/04/2019	\$28.93	\$4.70	\$3.14	\$0.00	\$36.77
TELEDATA WIREMAN/INSTALLER/TECHNICIAN <i>OUTSIDE ELECTRICAL WORKERS - EAST LOCAL 104</i>	02/04/2019	\$28.93	\$4.70	\$3.14	\$0.00	\$36.77

Additional Apprentices Information:

Minimum wage rates for apprentices employed on public works projects are listed above as a percentage of the pre-determined hourly wage rate established by the Commissioner under the provisions of the M.G.L. c. 149, ss. 26-27D. Apprentices ratios are established by the Division of Apprenticeship Training pursuant to M.G.L. c. 23, ss. 11E-11L.

All apprentices must be registered with the Division of Apprenticeship Training in accordance with M.G.L. c. 23, ss. 11E-11L.

All steps are six months (1000 hours.)

Ratios are expressed in allowable number of apprentices to journeymen or fraction thereof, unless otherwise specified.

\*\* Multiple ratios are listed in the comment field.

\*\*\* APP to JM; 1:1, 2:2, 2:3, 3:4, 4:4, 4:5, 4:6, 5:7, 6:7, 6:8, 6:9, 7:10, 8:10, 8:11, 8:12, 9:13, 10:13, 10:14, etc.

\*\*\*\* APP to JM; 1:1, 1:2, 2:3, 2:4, 3:5, 4:6, 4:7, 5:8, 6:9, 6:10, 7:11, 8:12, 8:13, 9:14, 10:15, 10:16, etc.

**ATTACHMENT D**

**HISTORIC RECORD INFORMATION**

**MA DPW DIVISION OF WATERWAYS  
RECORD CONTRACT DOCUMENTS**

CONTRACT #1867  
CONTRACT #2140

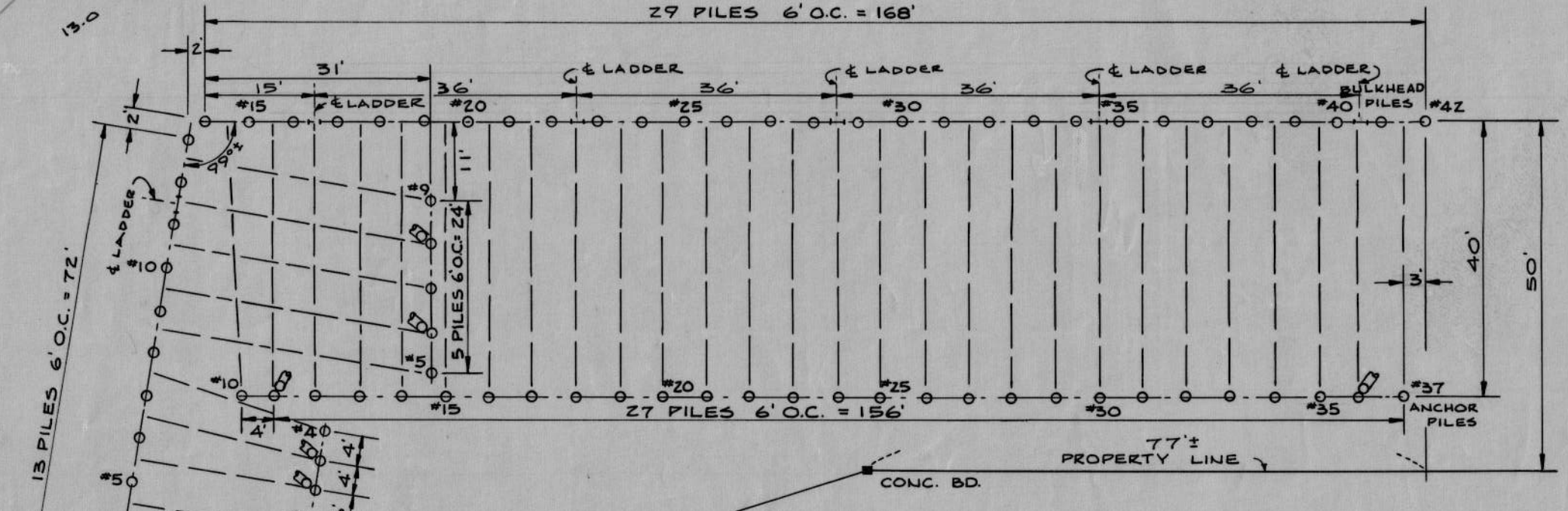
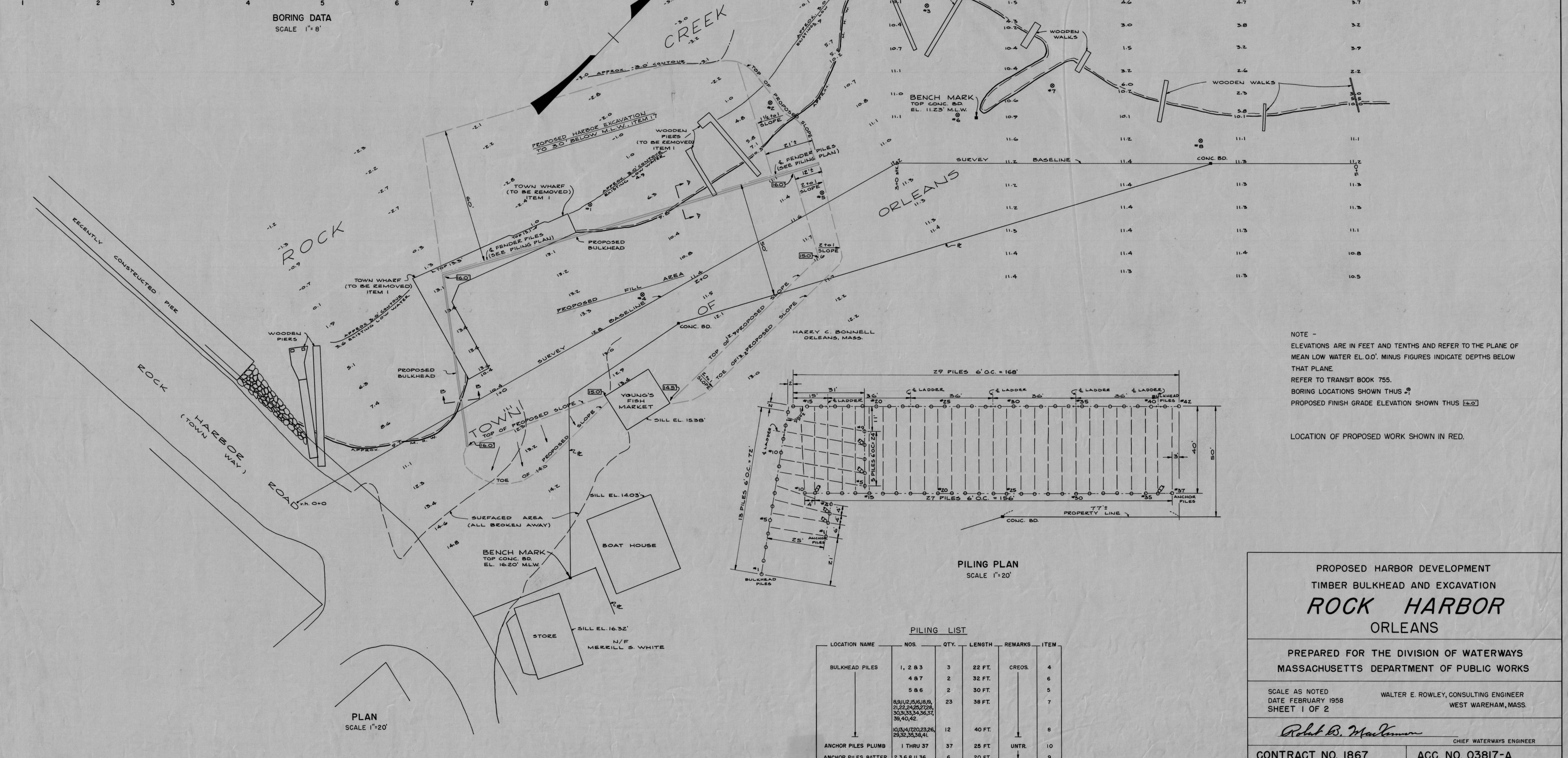
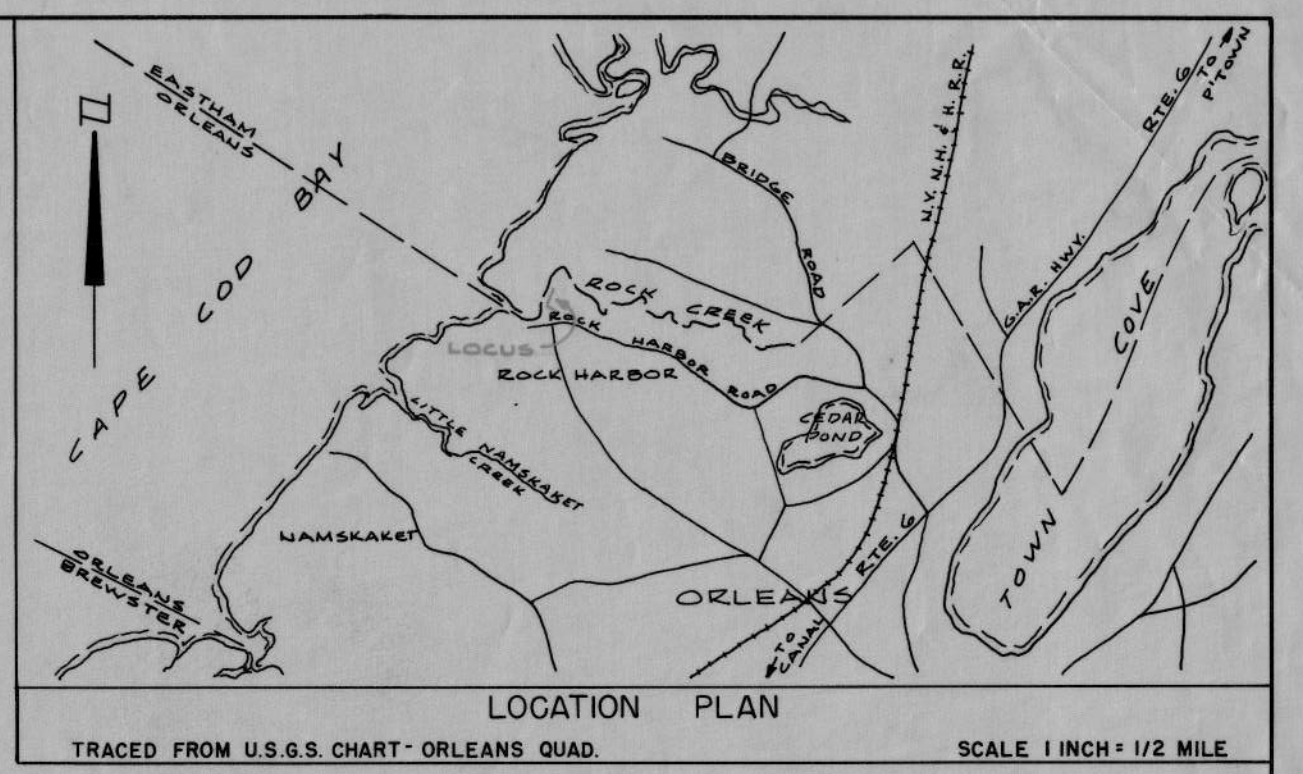
ISSUED FEBRUARY 1958  
ISSUED JULY 1960



BORING NO.	DEPTH (FEET)	SOIL DESCRIPTION
1	4.1	GROUND
1	6.0	MUD & SAND
1	11.0	GRAY SAND TO SAND & HEAVY GRAVEL
1	18.5	PEAT
1	21.0	SAND & GRAVEL
1	22.5	HARD PACKED RED GRAVEL
1	25.0	SAND GRAVEL & CLAY
2	4.5	GROUND
2	10.0	MUD & SAND
2	15.0	GRAY SAND
2	17.5	SAND & HEAVY GRAVEL
2	22.0	HARD PACKED HEAVY GRAVEL & SAND
2	25.0	BROWN SAND GRAVEL & CLAY
3	10.6	GROUND
3	7.0	MUD & CLAY
3	10.0	GRAY SAND
3	14.0	SAND & GRAVEL
3	17.5	BROWN SAND GRAVEL & CLAY
3	23.0	CLAY
4	11.6	GROUND
4	6.0	BROWN & GREY SAND
4	12.0	GREY SAND
4	14.0	RED SAND
4	18.4	CLAY & SAND
4	23.0	CLAY & SAND
5	11.7	GROUND
5	6.7	MUD & SAND
5	10.0	GREY SAND
5	13.0	RED SAND
5	18.3	FINE SAND
5	23.0	FINE SAND
6	11.2	GROUND
6	6.2	MUD & SAND
6	12.0	GREY SAND
6	15.0	BROWN SAND
6	20.0	COARSE GREY SAND
6	25.0	GREY SAND
7	10.8	GROUND
7	6.5	MUD & CLAY
7	10.0	GREY SAND
7	15.0	COARSE GRAVEL
7	20.0	BROWN SAND & GRAVEL
7	25.0	SAND & GRAVEL
8	11.2	GROUND
8	6.2	MUD & CLAY
8	10.0	GREY SAND
8	15.0	COARSE GRAVEL & CLAY
8	20.0	CLAY & SAND
8	25.0	GRAVEL & SAND

BORING DATA  
SCALE 1" = 8'

**BORING NOTES -**  
BORINGS TAKEN FOR PURPOSE OF DESIGN ONLY AND SHOW CONDITIONS AT BORING POINTS ONLY BUT DO NOT NECESSARILY SHOW THE NATURE OF MATERIALS TO BE ENCOUNTERED DURING CONSTRUCTION.  
FIGURES IN COLUMNS INDICATE BLOWS PER FOOT ON TWO INCH CASING PRODUCED BY THIRTY INCH FALL OF 140 POUND HAMMER.  
BORING SAMPLES MAY BE SEEN AT THE OFFICES OF THE DIVISION OF WATERWAYS, DEPARTMENT OF PUBLIC WORKS, 100 NASHUA STREET, BOSTON, MASS.  
BORINGS TAKEN OCTOBER 1957 BY PORTER & DESMOND, 2 GARDEN STREET, WOBURN, MASS.



PILING PLAN  
SCALE 1" = 20'

LOCATION NAME	NOS.	QTY.	LENGTH	REMARKS	ITEM
BULKHEAD PILES	1, 2, 8, 3	3	22 FT.	CREOS.	4
	4, 8, 7	2	32 FT.		6
	5, 8, 6	2	30 FT.		5
	8, 9, 11, 12, 15, 16, 18, 19, 21, 22, 24, 25, 27, 28, 30, 33, 34, 36, 37, 38, 40, 42	23	38 FT.		7
ANCHOR PILES PLUMB	10, 13, 14, 17, 20, 23, 26, 29, 32, 35, 38, 41	12	40 FT.		8
	1 THRU 37	37	25 FT.	UNTR.	10
ANCHOR PILES BATTER	2, 3, 6, 8, 11, 36	6	20 FT.		9

NOTE -  
ELEVATIONS ARE IN FEET AND TENTHS AND REFER TO THE PLANE OF MEAN LOW WATER EL. 0.0'. MINUS FIGURES INDICATE DEPTHS BELOW THAT PLANE.  
REFER TO TRANSIT BOOK 755.  
BORING LOCATIONS SHOWN THUS  $\odot$   
PROPOSED FINISH GRADE ELEVATION SHOWN THUS  $\square$

LOCATION OF PROPOSED WORK SHOWN IN RED.

PROPOSED HARBOR DEVELOPMENT  
TIMBER BULKHEAD AND EXCAVATION  
**ROCK HARBOR**  
ORLEANS

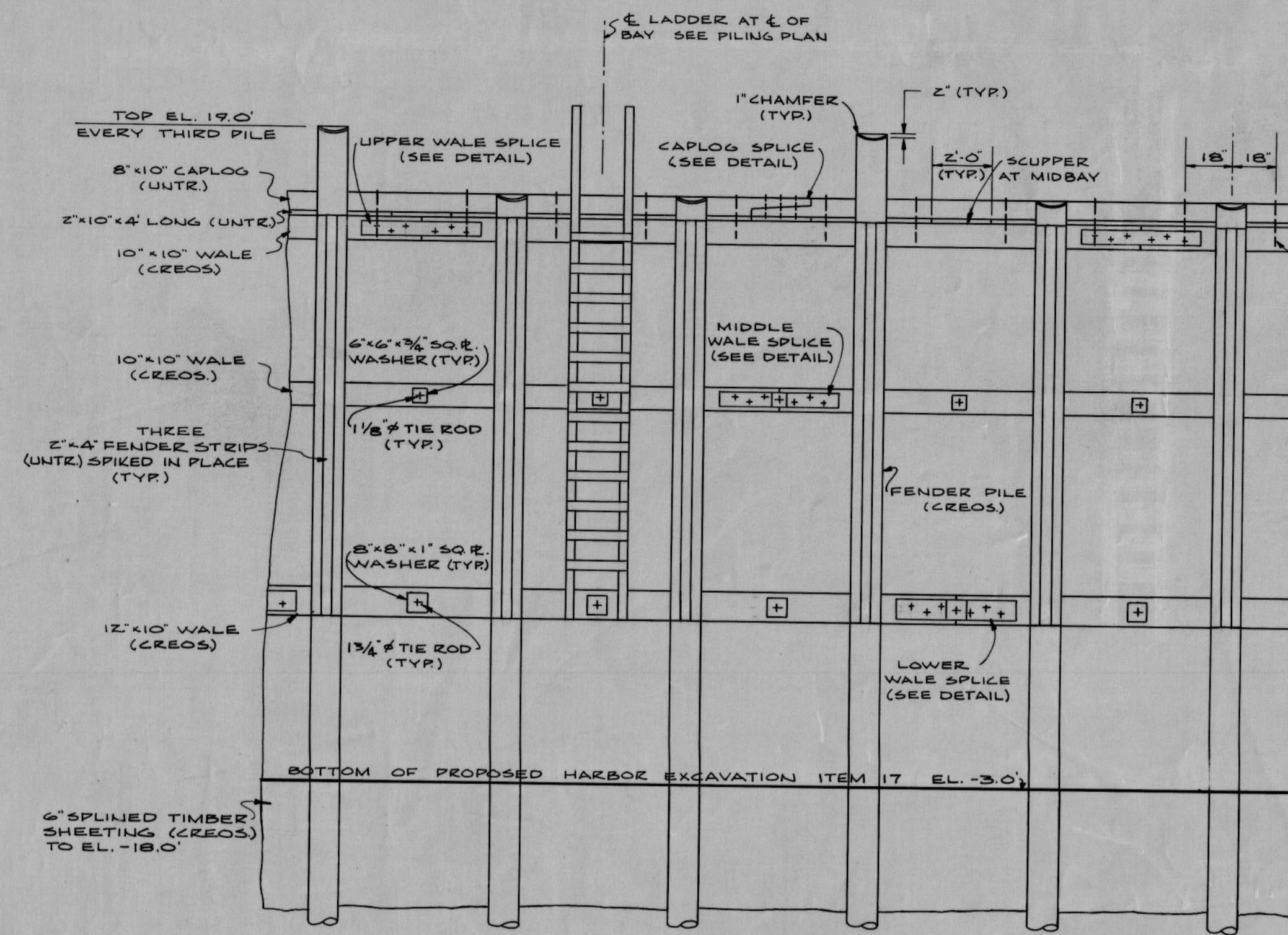
PREPARED FOR THE DIVISION OF WATERWAYS  
MASSACHUSETTS DEPARTMENT OF PUBLIC WORKS

SCALE AS NOTED  
DATE FEBRUARY 1958  
SHEET 1 OF 2

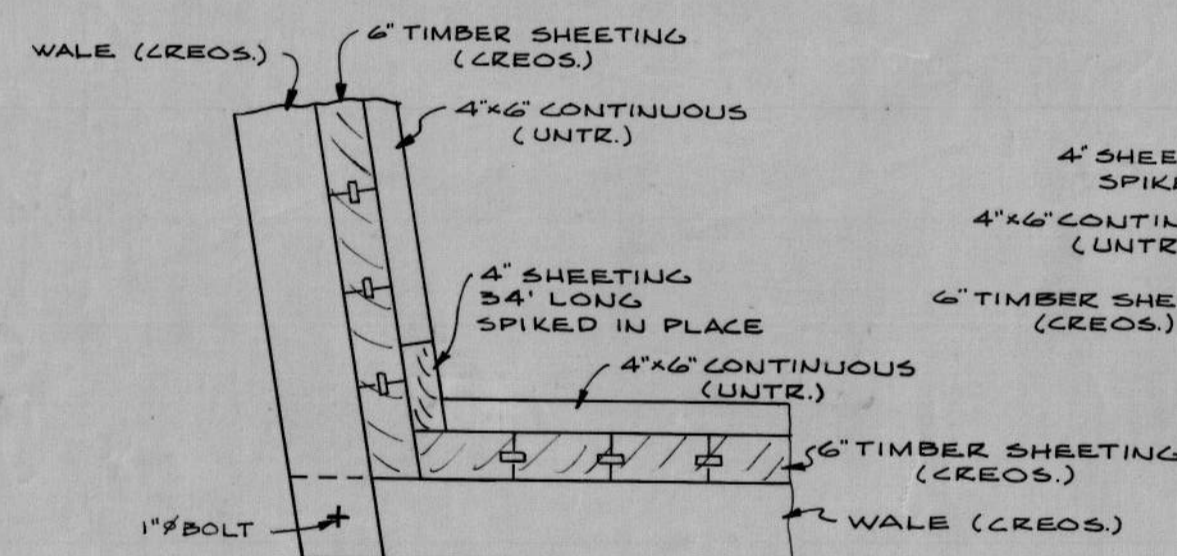
WALTER E. ROWLEY, CONSULTING ENGINEER  
WEST WAREHAM, MASS.

*Robert B. MacLennan*  
CHIEF WATERWAYS ENGINEER

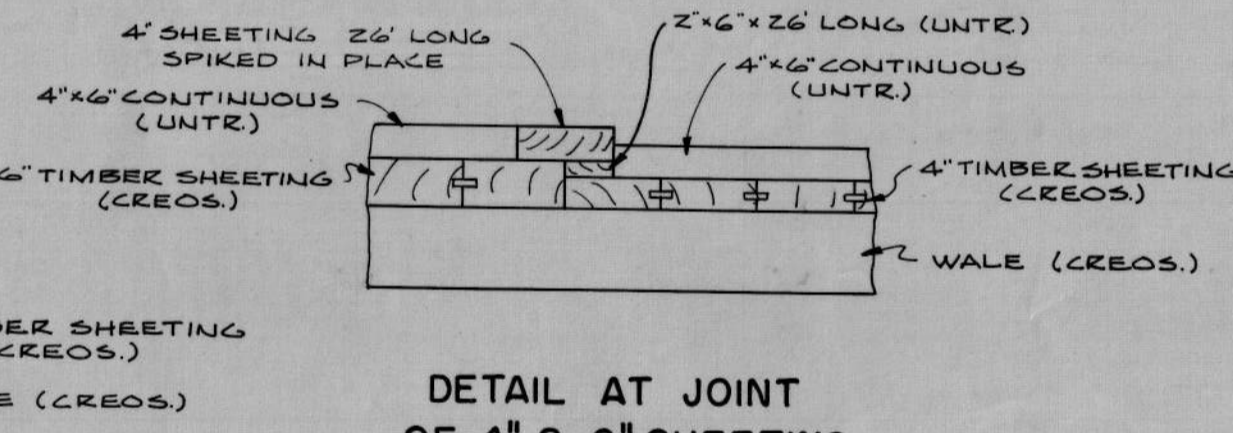
CONTRACT NO. 1867  
ACC. NO. 03817-A



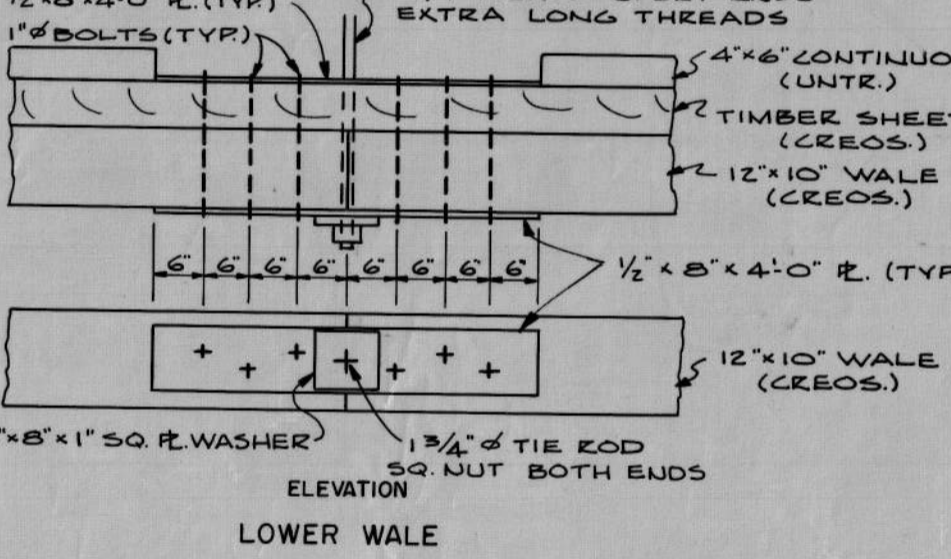
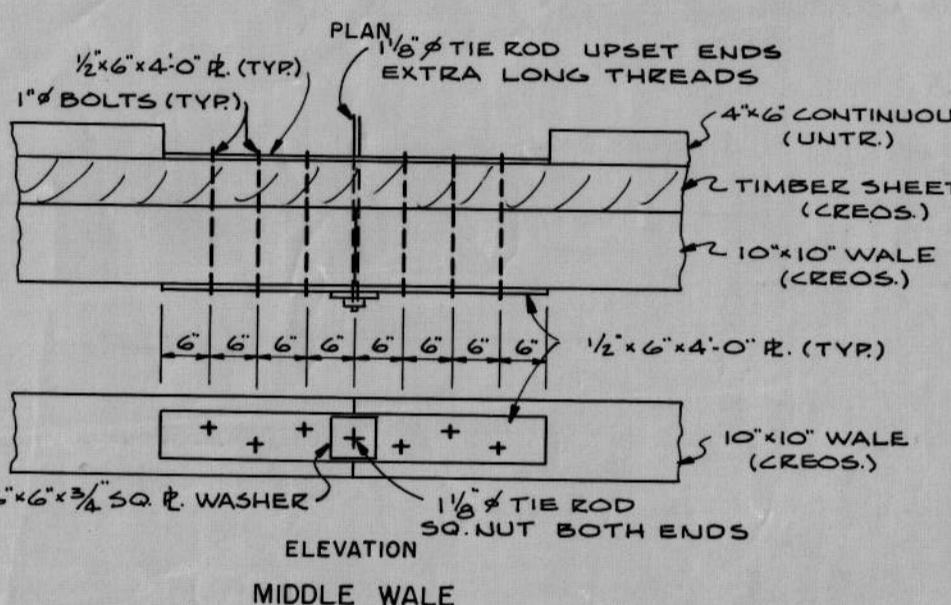
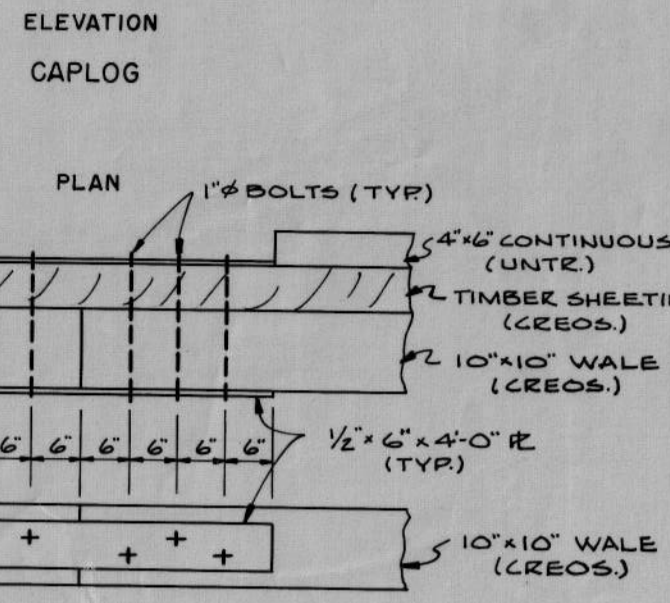
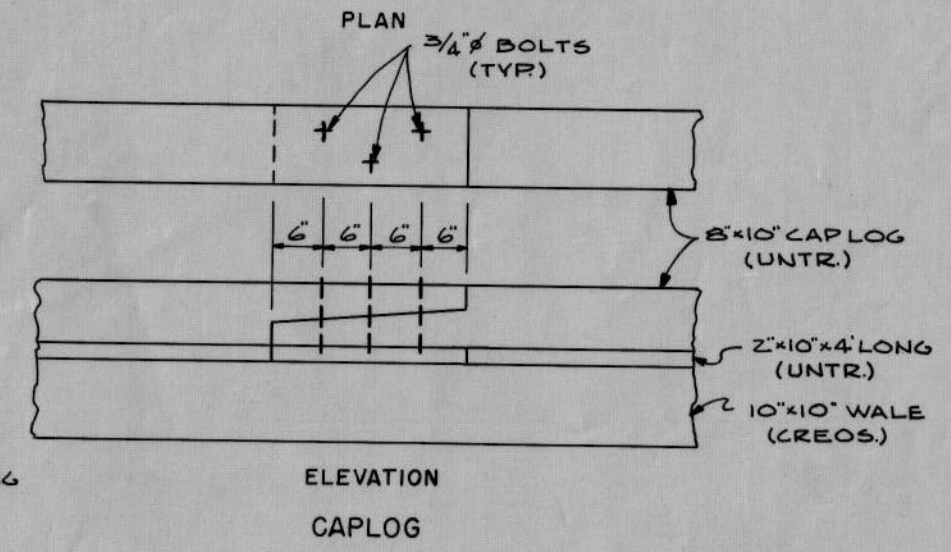
TYPICAL ELEVATION OF FRONT BULKHEAD  
SCALE 1/4"=1'-0"



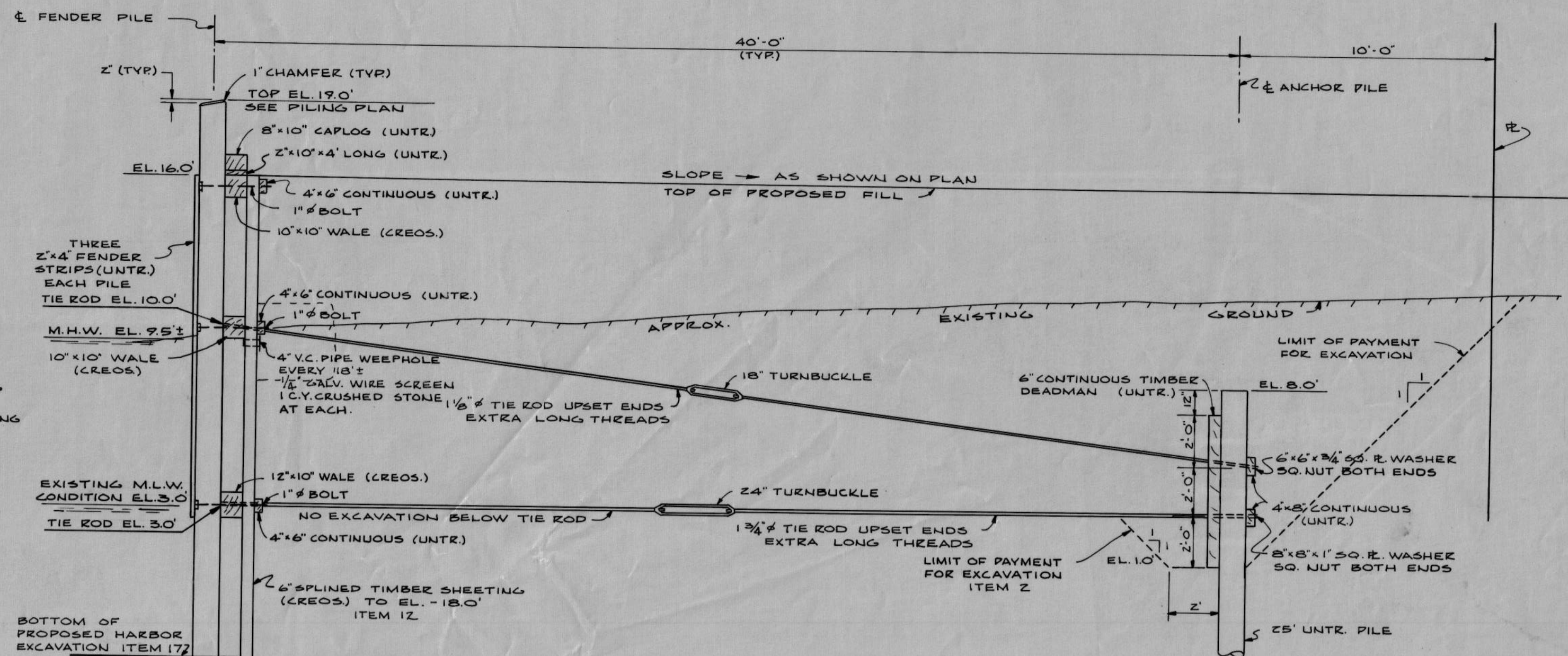
DETAIL AT CORNER OF BULKHEAD  
SCALE 1/2"=1'-0"



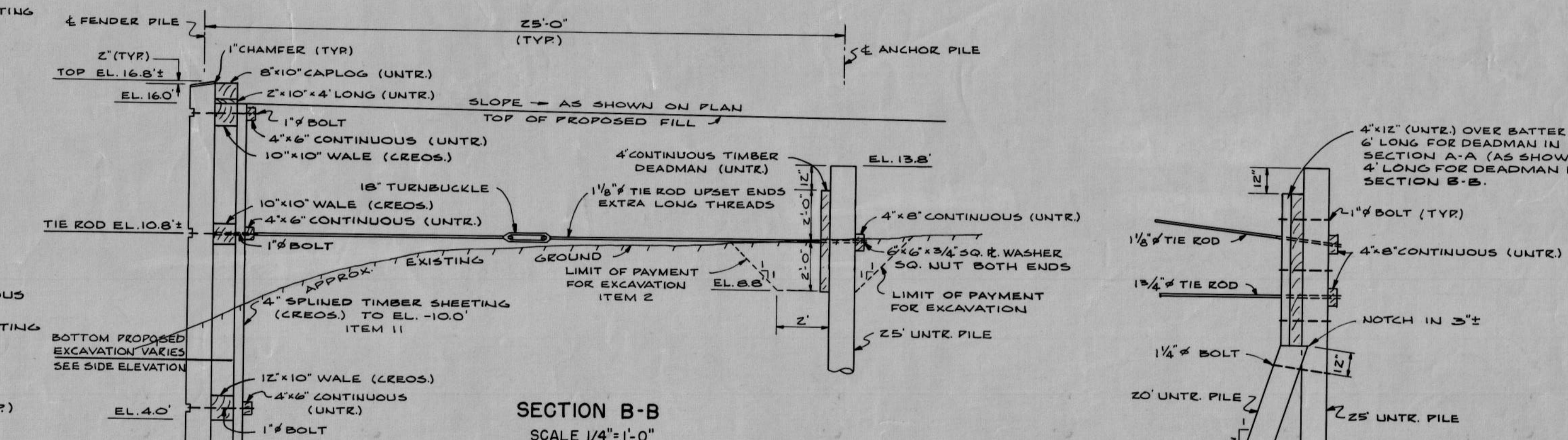
DETAIL AT JOINT  
OF 4" & 6" SHEETING  
SCALE 1/2"=1'-0"



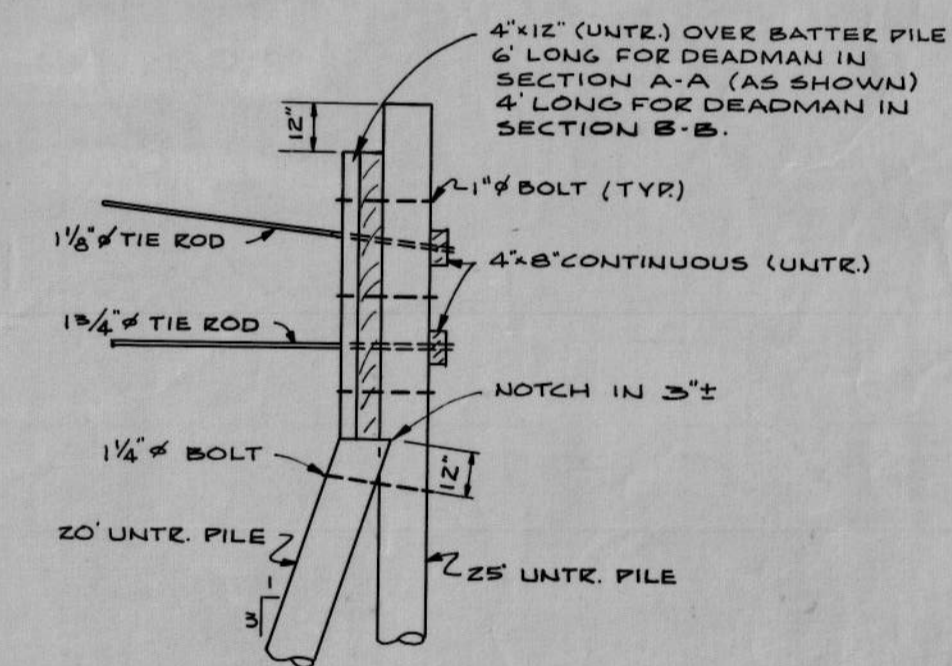
SPLICE DETAILS  
SCALE 1/2"=1'-0"



SECTION A-A  
SCALE 1/4"=1'-0"

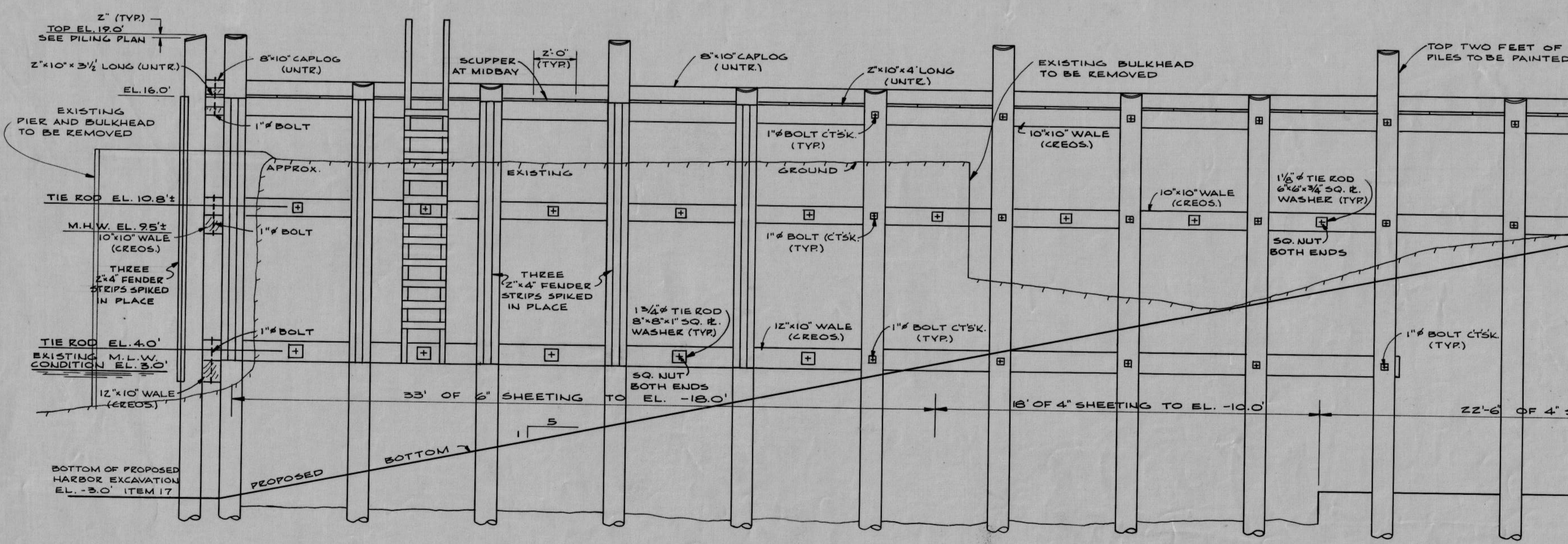


SECTION B-B  
SCALE 1/4"=1'-0"

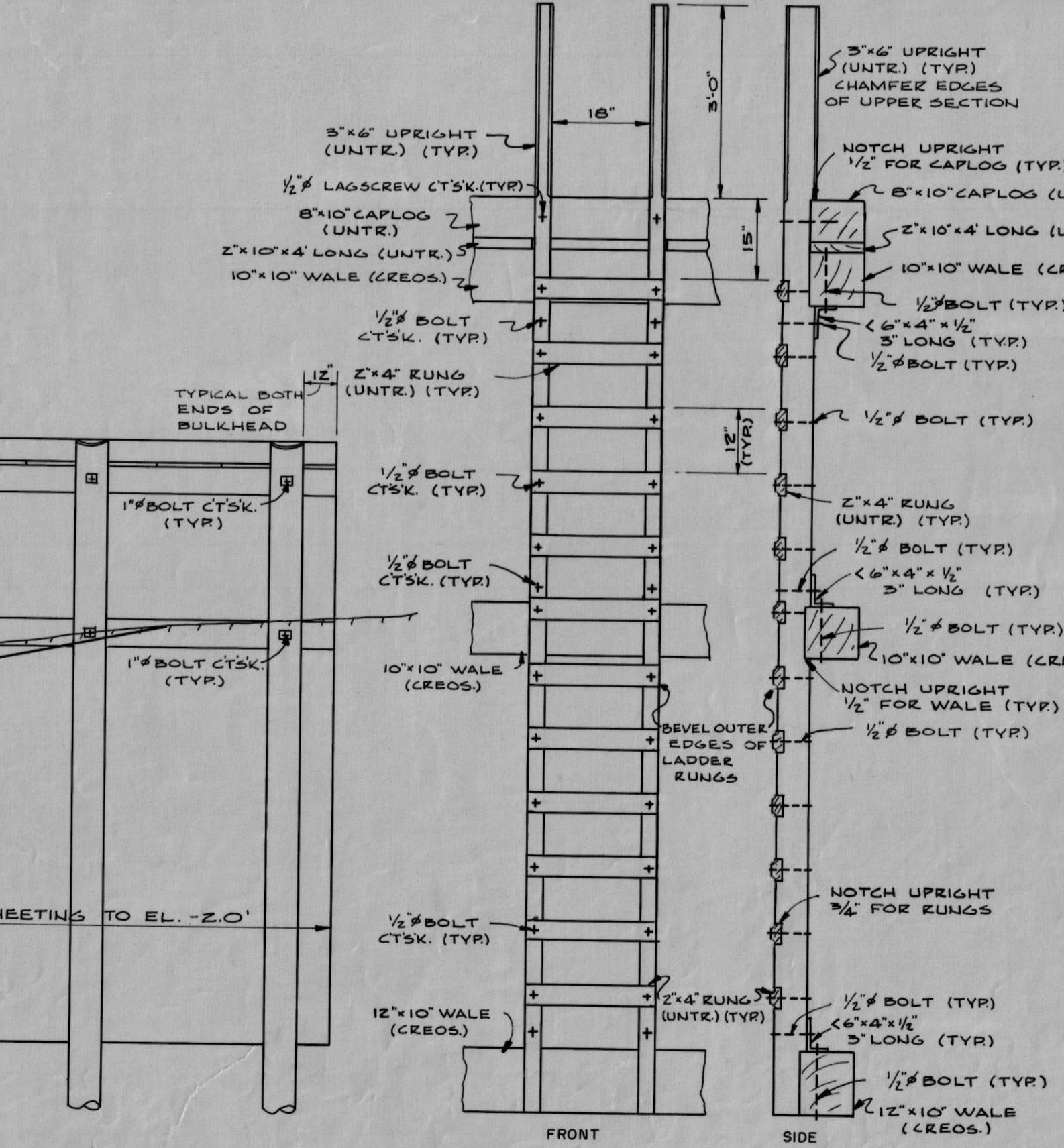


SPECIAL ANCHOR STRUCTURE  
SCALE 1/4"=1'-0"  
6 REQUIRED

NOTE - ALL BOLTS ON OUTSIDE FACES OF PILES AND LADDERS ARE TO BE COUNTERSUNK.



ELEVATION OF SIDE BULKHEAD  
SCALE 1/4"=1'-0"



LADDER DETAILS  
SCALE 1/2"=1'-0"  
6 REQUIRED

PROPOSED HARBOR DEVELOPMENT  
TIMBER BULKHEAD AND EXCAVATION  
**ROCK HARBOR**  
ORLEANS

PREPARED FOR THE DIVISION OF WATERWAYS  
MASSACHUSETTS DEPARTMENT OF PUBLIC WORKS

SCALE AS NOTED  
DATE FEBRUARY 1958  
SHEET 2 OF 2

WALTER E. ROWLEY, CONSULTING ENGINEER  
WEST WAREHAM, MASS.

*Robert B. Maden*  
CHIEF WATERWAYS ENGINEER

CONTRACT NO. 1867  
ACC. NO. 03817-B



**MA DPW, MADEQE & MADEP  
CHAPTER 91 WATERWAYS RECORD LICENSES/PERMITS**

MADPW LIC. #1394	ISSUED 03/22/1932
MADEQE LIC. #362	ISSUED 08/19/1977
MADEP LIC. #7262	ISSUED 04/02/1998

# The Commonwealth of Massachusetts



No. 1394.

Whereas, the Town of Orleans, by its Board of Selectmen, -

of -----, in the County of Barnstable----- and Commonwealth  
aforesaid, has applied to the Department of Public Works for license to build and maintain  
a timber wharf, to fill solid and to lay and maintain a water  
pipe in Rock Harbor in the town of Orleans,-----

and has submitted plans of the same; and whereas due notice of said application, and of the time and  
place fixed for a hearing thereon, has been given, as required by law, to the -----  
Selectmen----- of the town--- of Orleans----- ;

Now, said Department, having heard all parties desiring to be heard, and having fully considered said  
application, hereby, ~~subject to the approval of the Governor and Council,~~ authorizes and licenses the said

Town of Orleans-----, subject to the provisions of the ninety-  
first chapter of the General Laws, and of all laws which are or may be in force applicable thereto, to  
build and maintain a timber wharf, to fill solid and to lay and  
maintain a water pipe in Rock Harbor in the town of Orleans, in  
conformity with the accompanying plan No. 1394.

Said timber wharf may be built within lines described as  
follows: Beginning at a point marked B on said plan in the  
mean high water line, and running northwesterly 4 feet, more

or less, to a point marked C; thence running southwesterly, at right angles with said line B-C, 48 feet to a point marked D; thence running southeasterly 54 feet, more or less, to a point marked E in the mean high water line. The outer piling of said wharf shall be planked, as shown in section on said plan, to provide a bulkhead adequate to prevent the escape into tide water of material used as filling.

The area of tide water enclosed by said lines B-C-D-E may be filled solid.

A 6-inch suction water pipe may be extended into tide water southwesterly from said line D-E for a distance of approximately 50 feet, in the location shown on said plan and in accordance with the details there indicated.

This license is granted subject to the laws of the United States.-----

The plan of said work, numbered -----1 3 9 4,----- is on file in the office of said Department, and duplicate of said plan accompanies this License, and is to be referred to as a part hereof.

~~The amount of tide water displaced by the work hereby authorized shall be ascertained by said Department, and compensation therefor shall be made by the said~~

~~heirs, successors~~

and assigns, by paying into the treasury of the Commonwealth  
cents for each cubic yard so displaced, being the amount hereby assessed  
by said Department.

Nothing in this License shall be so construed as to impair the legal rights of any person.

This License shall be void unless the same and the accompanying plan are recorded within  
one year from the date hereof, in the Registry of Deeds for the -----  
District of the County of Barnstable.

In Witness Whereof, said Department of Public Works have hereunto set their hands this  
twenty-second----- day of March,----- in the  
year nineteen hundred and thirty-two.

F E Lyman	} Department of Public Works
Richard K Hale	
H A MacDonald	

~~THE COMMONWEALTH OF MASSACHUSETTS~~

~~This license is approved in consideration of the payment into the treasury of the Commonwealth by the  
said  
of the further sum of  
the amount determined by the Governor and Council as a just and equitable charge for rights and privileges  
hereby granted in land of the Commonwealth.~~

~~Boston,-----~~

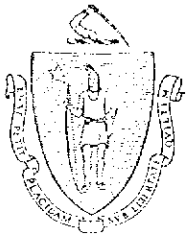
~~Approved by the Governor and Council.~~

~~Executive Secretary.~~

A true copy. Attest: *Mary A. Kelly* Secretary.







*The Commonwealth of Massachusetts*

EXECUTIVE OFFICE OF ENVIRONMENTAL AFFAIRS  
DEPARTMENT OF ENVIRONMENTAL QUALITY ENGR.  
DIVISION OF WATERWAYS

*100 Nashua Street, Boston 02114*

August 26, 1977

Board of Selectmen  
Town Offices  
Orleans, MA 02653

Dear Sirs:

The Department of Environmental Quality Engineering has approved License No. 362, authorizing the Town of Orleans to construct and maintain bulkhead, fill, rock revetment, pile and timber piers, ramps, pile held floats, finger floats and dredging in Rock Harbor in the town of Orleans. The said License No. 362 is enclosed.

A copy of this license is being forwarded to the United States Army, Corps of Engineers, 424 Trapelo Road, Waltham, MA 02154, for their information and records.

Please notify this Department of the date this license is recorded in the Barnstable County Registry of Deeds, and the date the authorized work is completed.

Very truly yours,

A handwritten signature in cursive script, appearing to read "John J. Hannon".

JOHN J. HANNON, P.E.  
Chief Engineer

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# The Commonwealth of Massachusetts

No. 362.



Whereas, the Town of Orleans -----

of-----, in the County of Barnstable ----- and Commonwealth  
aforesaid, has applied to the Department of Public Works ~~for license to~~ Environmental  
Quality Engineering for license to construct and maintain general boating  
facilities, rock revetment, dredging and fill in Rock Harbor in Rock Harbor  
Creek in the Town of Orleans, -----

and has submitted plans of the same; and whereas due notice of said application, and of  
the time and place fixed for a hearing thereon, has been given, as required by law, to the  
Board of Selectmen -----of the Town ----- of Orleans -----;

Now said Department, having heard all parties desiring to be heard, and having fully  
considered said application, hereby, ~~subject to the approval of the Governor,~~ authorizes  
and licenses the said Town of Orleans -----

-----, subject to the provisions of the ninety-  
first chapter of the General Laws, and of all laws which are or may be in force applicable  
thereto, to construct and maintain bulkhead, fill, rock revetment, pile and timber  
piers, ramps, pile held floats, finger floats and dredging in Rock Harbor in  
the town of Orleans, in conformity with the accompanying plan no. 362 (two sheets).

An area may be dredged having a length of approximately 450 feet and an average width of approximately 65 feet, to an elevation of 4 feet below the mean low water datum. A portion of the upland will be included in said dredged area, creating a new mean high water line. Dredged material, if suitable, may be used as filled for proposed parking area on the upland and behind proposed bulkhead.

A pile and timber bulkhead may be constructed and maintained in said harbor commencing at the northerly end of an existing bulkhead, extending in an easterly direction to the uplands, for a distance of approximately 40 feet, having a top elevation of 12 feet above mean low water datum. Area between said bulkhead and existing mean high water line may be filled with clean, suitable fill.

Riprap rock revetment may be placed and maintained, commencing at said proposed bulkhead, extending in a northeasterly direction along new dredged slope having a ratio of 1.5:1, for a distance of approximately 450 feet thence continuing on the uplands, having a top elevation of 13 feet above mean water datum. Three 6 by 9 foot pile and timber piers may be constructed and maintained, extending into said harbor a distance of 8 feet from the top of said riprap. A pile held main float, reached by three 4 by 22 foot ramps from said pier may be placed and maintained in said harbor, extending in a northerly direction and being approximately parallel to said riprap slope, having a total length of 395 feet more or less, with a width of 6 feet, and having six 4 by 30 foot and twelve 4 by 20 foot pile held floats on the northwesterly side.

Three 10 inch reinforced concrete pipes with flap valve on the out-let end, may be placed and maintained, extending from gas traps and drain on the upland and protruding through said riprap. All work authorized hereby shall be in the location shown and in accordance with the details shown on license plan no. 362.

The plan of said work, numbered ----- 3 6 2 ----- is on file in the office of said Department, and duplicate of said plan accompanies this License, and is to be referred to as a part hereof.

The amount of tide-water displaced by the work hereby authorized shall be ascertained by said Department, and compensation therefor shall be made by the said

heirs, successors

Nothing in this license shall be construed as authorizing encroachment on or over property not owned or controlled by the licensee, except with the consent of the owner or owners thereof.

Acceptance of this license shall constitute an agreement by the licensee, to conform to all terms and conditions herein stated.

This license is granted subject to all applicable Federal, State, County and Municipal laws, ordinances and regulations.

This license is granted upon the express condition that use by boats or otherwise of the structures hereby licensed shall involve no discharge of sewage or other polluting matter into the adjacent tidewaters, except in strict conformity with the requirements of the local and State health departments and the Division of Water Pollution Control.

This license is granted upon the further express condition that any other authorizations necessitated due to the provisions hereof shall be secured prior to the commencement of any work under this license.

This license is granted upon the further express condition that the authorization contained herein may be modified or may be revoked in whole or in part in the event of the licensee, its successors and assigns, failing to comply with said authorization or any provisions of the license or failing to maintain all authorized structures and installations in good condition, to the satisfaction of the Department of Environmental Quality Engineering or its successors. This condition permitting modification or revocation of the license shall also apply in the event of the failure of the licensee, its successors and assigns, to secure approval under all other applicable laws, ordinances or regulations or failure to adhere to the conditions of such approvals upon receipt of such failure provided by an agency having jurisdiction. Revocation or modification of this license as provided herein shall be without liability to the Commonwealth or claim for compensation by the licensee, its successors and assigns.

This license is granted upon the further express condition that the licensee, its successors and assigns, shall upon request in writing by the Department of Environmental Quality Engineering or its successors, change the location of said ~~lower it to such depth, or raise it to such height, as said~~ Department may prescribe or remove it entirely from said waters, and said licensee, by accepting this license shall be deemed to consent and agree to the condition herein set forth, and in case of any refusal or neglect on the part of the licensee, its successors and assigns, to comply with this condition, then this license shall be wholly void and the Commonwealth, by its proper officers, may proceed to remove or to cause the removal of said at the expense of said licensee, its successors and assigns, as an unauthorized and unlawful structure in said waters.

and assigns, by paying into the treasury of the Commonwealth

cents for each cubic yard so displaced, being the amount hereby assessed by said Department.

Nothing in this License shall be so construed as to impair the legal rights of any person.

This License shall be void unless the same and the accompanying plan are recorded within one year from the date hereof, in the Registry ----- of Deeds for the ----- District-of-the County of Barnstable.

Environmental Quality Engineering

In Witness Whereof, said Department of ~~Public Works~~ have hereunto set their hands this nineteenth ----- day of August ----- in the year nineteen hundred and seventy-seven.

*[Handwritten signature]*

Department of  
~~Public Works~~  
Environmental  
Quality  
Engineering

THE COMMONWEALTH OF MASSACHUSETTS

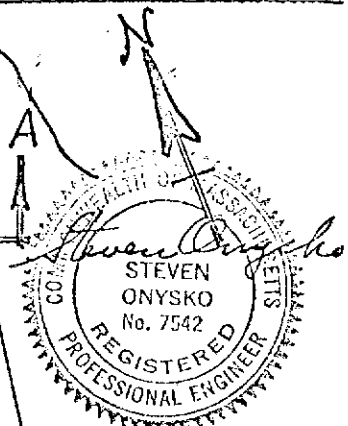
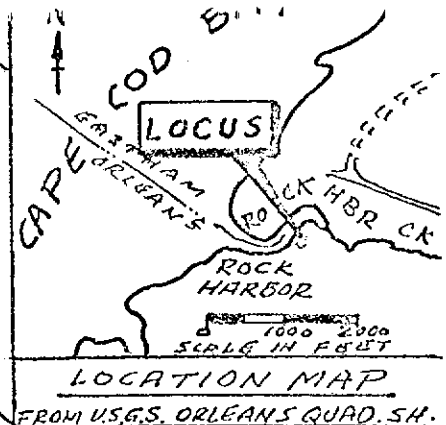
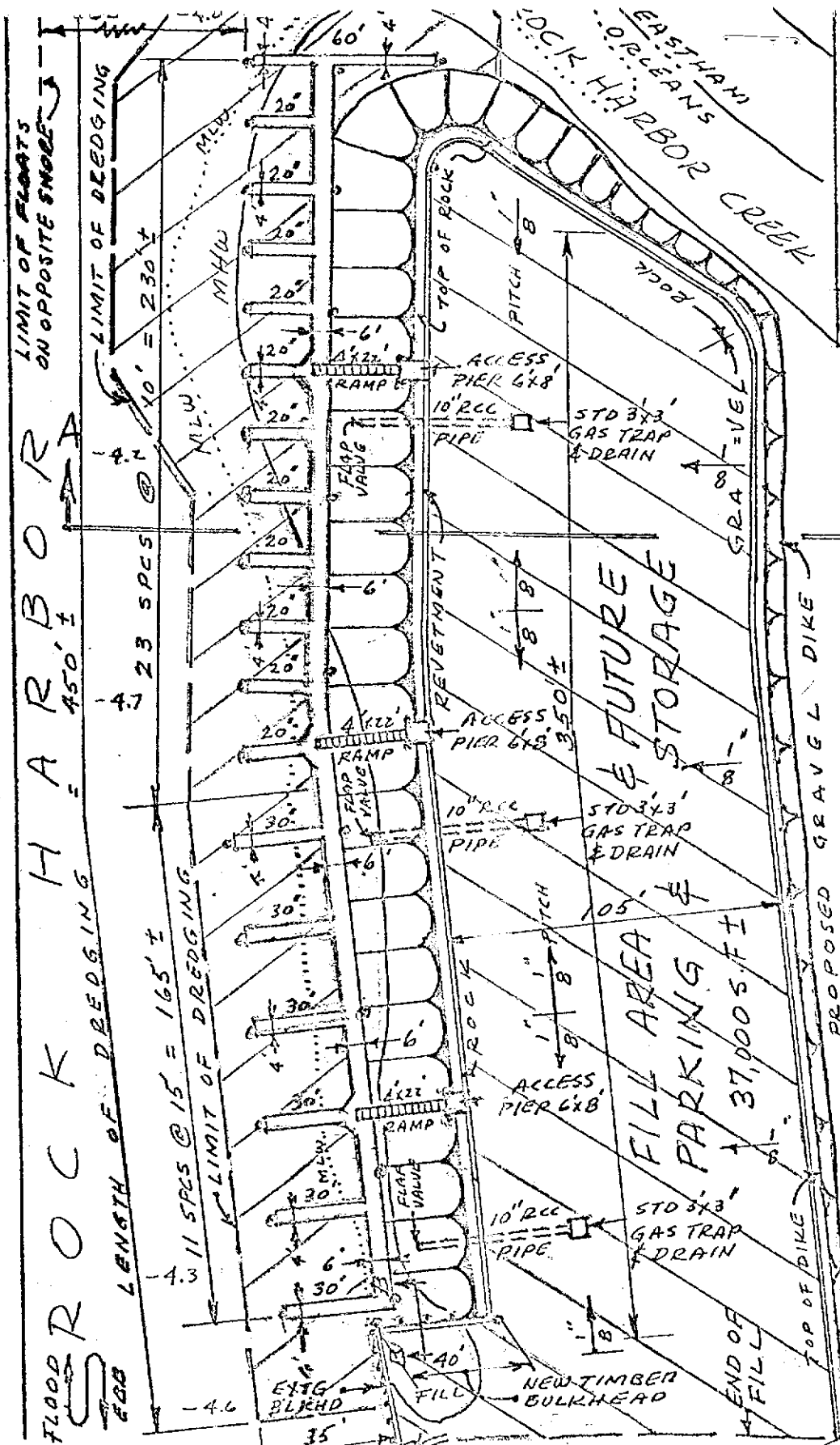
This license is approved in consideration of the payment into the treasury of the Commonwealth by the said  
of the further sum of  
the amount determined by the Governor as a just and equitable charge for rights and privileges hereby granted in land of the Commonwealth.

Approved by the Governor.

BOSTON, -----

-----  
Governor

A TRUE COPY — ATTEST  
*[Handwritten signature]*  
DEPARTMENT OF ENVIRONMENTAL  
QUALITY ENGINEERING  
Commonwealth of Massachusetts

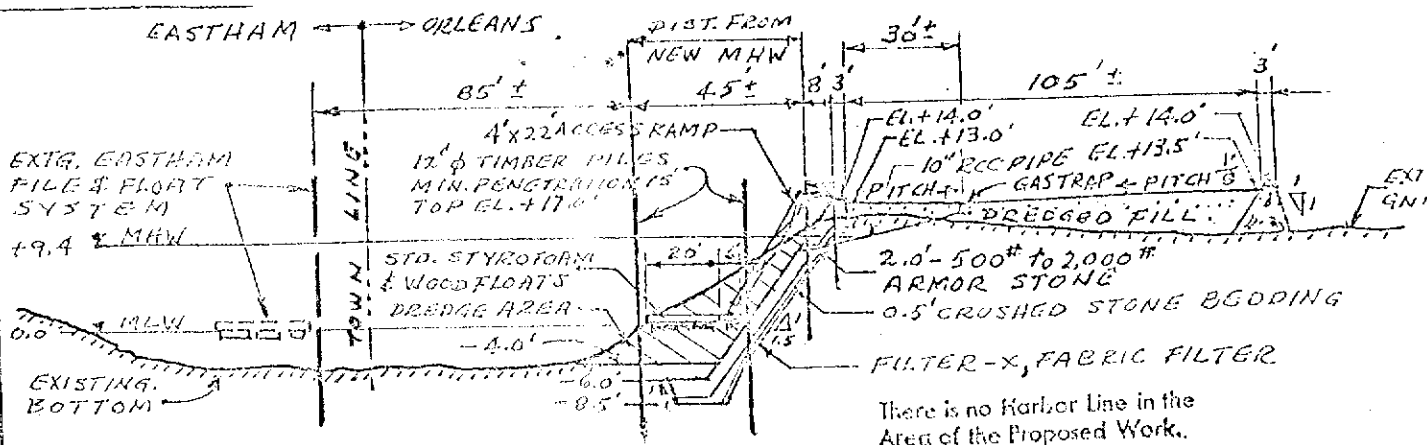


- NOTES:**
- (1.) PROPOSED WORK TO BE ENTIRELY ON LAND OWNED BY THE TOWN OF ORLEANS.
  - (2.) SEE ORIGINAL PETITION PLAN DATED 10 OCT. 1975 FOR ABUTTING PROPERTY OWNERS & ADDRESSES.
  - (3.) DREDGED MATERIAL (2,200 C.Y.) TO BE USED AS FILL FOR PARKING AREA. ADDITIONAL 4,000 C.Y. OF FILL TO BE OBTAINED FROM SELECTED LAND SOURCES.
  - (4.) SEE SHEET 2 FOR ADDITIONAL NOTES & DETAILS.

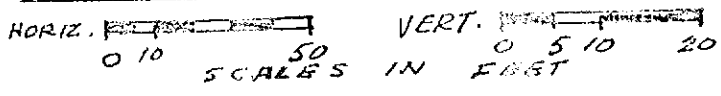
**PLAN**

Plan to Accompany Petition of The  
**TOWN OF ORLEANS**  
 To Construct and Maintain a Bulkhead, Rock Revetment, Fill, Pile and Timber Piers, Ramps, Pile Held Floats & Fingers, and Dredging in  
**ROCK HARBOR, ORLEANS, MA.**  
 Barnstable County, MA.

LIC. PLAN NO. 362  
 Approved by Department of Environmental Quality Engineering of Massachusetts August 19, 1977  
 COMMISSIONER  
 CHIEF ENGINEER

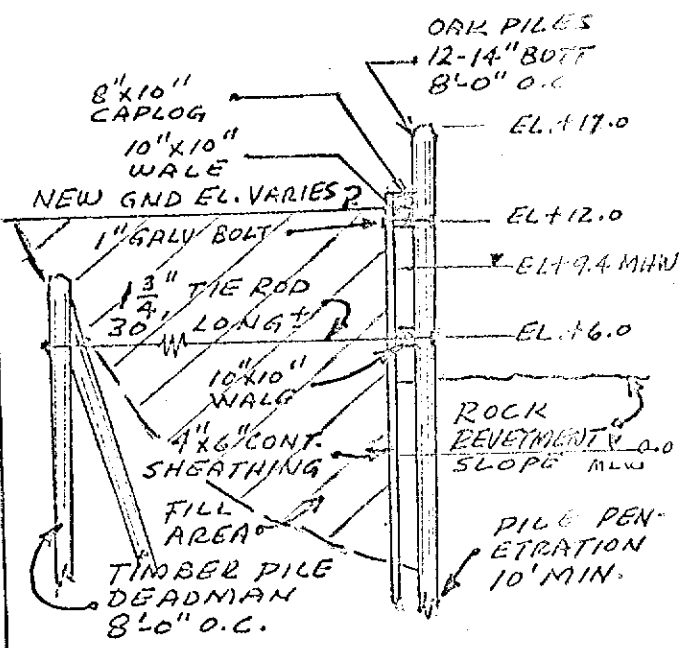
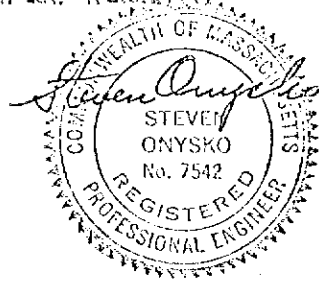


**SECTION A-A, TYPICAL**



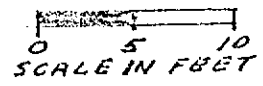
There is no Harbor Line in the Area of the Proposed Work.

Soundings and Elevations are in Feet and refer to Mean Low Water.



**SECTION B-B, TYPICAL**

**TIMBER BULKHEAD DETAIL**



**NOTES - CONT'D**

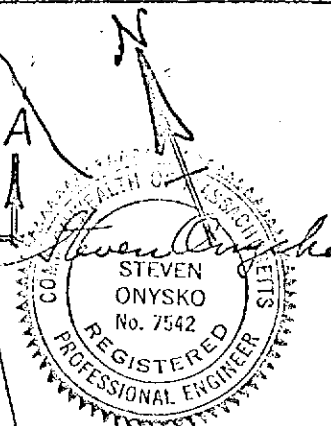
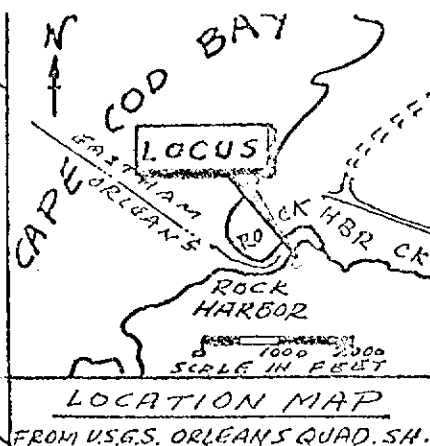
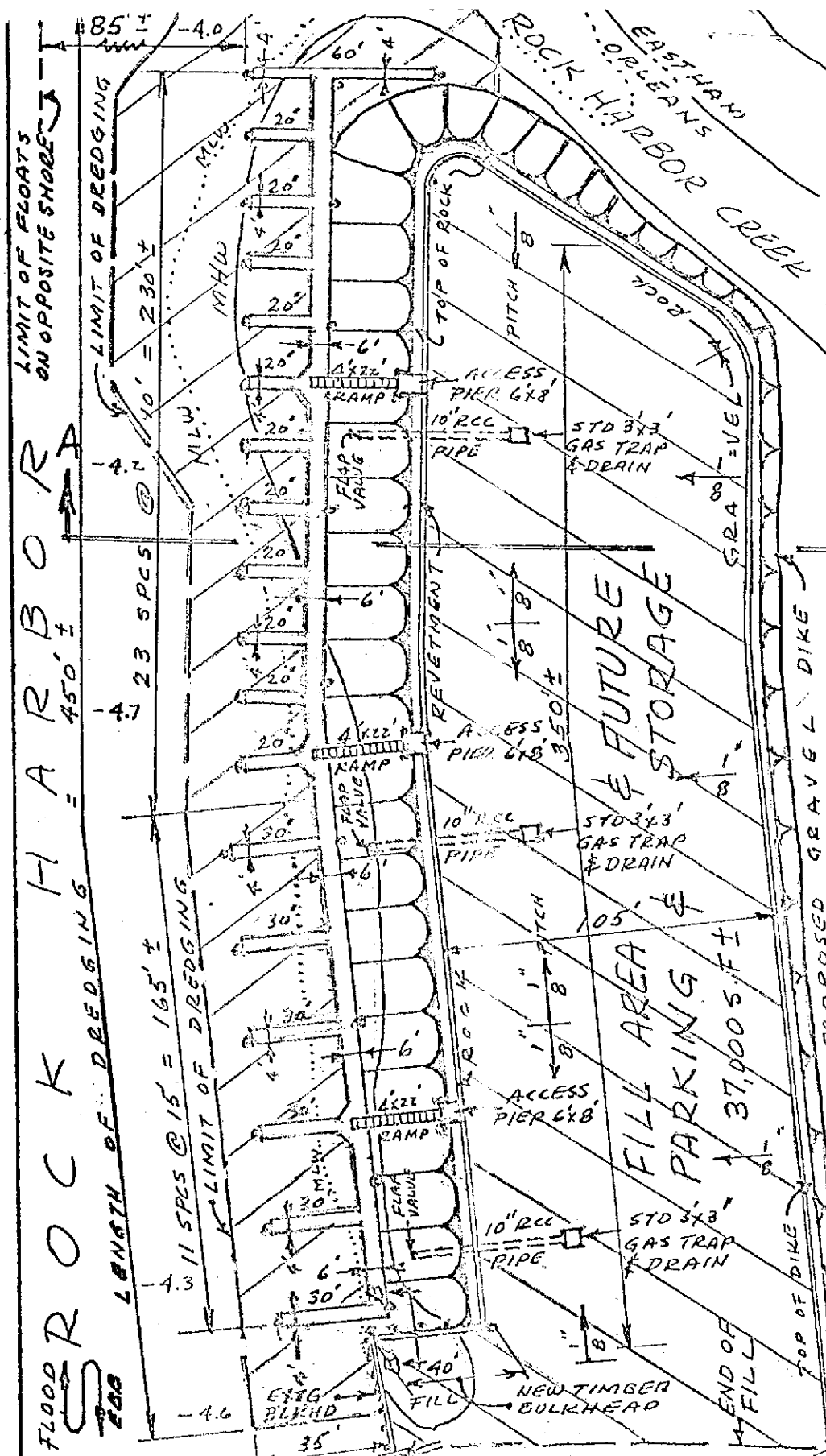
- (5.) ELEVATIONS ON THIS PLAN SUPERSEDE THOSE SHOWN ON 10 OCT. 1975 PLAN, TO COMPLY WITH DEQE REQUIREMENTS OF 22 JULY 77
- (6.) PARKING AREA TO BE TEMPORARILY SURFACED WITH COARSE GRAVEL BEDDING BITUMINOUS PAVEMENT TO BE DEFERRE A MAXIMUM OF TWO YEARS. SIZE OF THE AREA IS IN ACCORDANCE WITH DEQE MODIFICATION OF 22 JULY 77
- (7.) GAS TRAPS, BACK FLOW FLAP VALVE AND CONCRETE PIPE TO MEET MASS. D.P. STANDARD SPECIFICATIONS OR EQUAL.
- (8.) ALL PILING, PIERS, AND FLOAT TIMBERS TO BE COATED WITH NON-LEACHABLE PERMANENT PRESERVATIVES.
- (9.) ALL FEATURES AND STRUCTURES SHOWN IN RED INDICATES THE PROPOSED WORK.

ROCK HARBOR, ORLEANS, MA.  
Barnstable County, MA.

**LICENSE PLAN NO. 362**

Approved By Department of Environmental Quality Engineering

DATE 10-19-1977

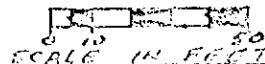


- NOTES:**
- (1) PROPOSED WORK TO BE ENTIRELY ON LAND OWNED BY THE TOWN OF ORLEANS.
  - (2) SEE ORIGINAL PETITION PLAN DATED 10 OCT. 1975 FOR ABUTTING PROPERTY OWNERS & ADDRESSES.
  - (3) DREDGED MATERIAL (2,200 C.Y.) TO BE USED AS FILL FOR PARKING AREA. ADDITIONAL 4,000 C.Y. OF FILL TO BE OBTAINED FROM SELECTED LAND SOURCES.
  - (A) SEE SHEET 2 FOR ADDITIONAL NOTES & DETAILS.

**PLAN**

Plan to Accompany Petition of The  
**TOWN OF ORLEANS**  
 To Construct and Maintain a Bulkhead, Rock Revetment, Fill, Pile and Timber Piers, Ramps, Pile Held Floats & Fingers, and Dredging in  
**ROCK HARBOR, ORLEANS, MA.**  
 Barnstable County, MA.

License Plan No. 362  
 Approved by Department of Environmental Quality Engineering  
 of Massachusetts August 19, 1977  
 [Signature]  
 COMMISSIONER  
 CHIEF ENGINEER





# The Commonwealth of Massachusetts

No. 7262



Whereas,

Town of Orleans

of -- Orleans, -- in the County of -- Barnstable -- and Commonwealth aforesaid, has applied to the Department of Environmental Protection for license to -- replace, extend and maintain a bulkhead -----

and has submitted plans of the same; and whereas due notice of said application, ~~and of the time and place fixed for a hearing thereon,~~ has been given, as required by law, to the -- Board of Selectmen -- of the Town of -- Orleans. -----

NOW, said Department, having heard all parties desiring to be heard, and having fully considered said application, hereby, subject to the approval of the Governor, authorizes and licenses the said -----

Town of Orleans -- subject to the provisions of the ninety-first chapter of the General Laws, and of all laws which are or may be in force applicable thereto, to -- replace, extend and maintain a bulkhead -----

in and over the waters of -- Rock Harbor -- in the -- Town -- of -- Orleans -- and in accordance with the locations shown and details indicated on the accompanying DEP License Plan No. 7262, (4 sheets)

The structures hereby authorized shall be limited to the following use: to provide shoreline stabilization for the protection of existing structures. -----

Please see page 3 for additional conditions to this license. -----

---

Duplicate of said plan, number 7262 is on file in the office of said Department, and original of said plan accompanies this License, and is to be referred to as a part hereof.

STANDARD WATERWAYS LICENSE CONDITIONS

1. Acceptance of this Waterways License shall constitute an agreement by the Licensee to conform with all terms and conditions stated herein.

2. This License is granted upon the express condition that any and all other applicable authorizations necessitated due to the provisions hereof shall be secured by the Licensee prior to the commencement of any activity or use authorized pursuant to this License.

3. Any change in use or any substantial structural alteration of any structure or fill authorized herein shall require the issuance by the Department of a new Waterways License in accordance with the provisions and procedures established in Chapter 91 of the Massachusetts General Laws. Any unauthorized substantial change in use or unauthorized substantial structural alteration of any structure or fill authorized herein shall render this Waterways License void.

4. This Waterways License shall be revocable by the Department for noncompliance with the terms and conditions set forth herein. This license may be revoked after the Department has given written notice of the alleged noncompliance to the Licensee and those persons who have filed a written request for such notice with the Department and afforded them a reasonable opportunity to correct said noncompliance. Failure to correct said noncompliance after the issuance of a written notice by the Department shall render this Waterways License void and the Commonwealth may proceed to remove or cause removal of any structure or fill authorized herein at the expense of the Licensee, its successors and assigns as an unauthorized and unlawful structure and/or fill.

5. The structures and/or fill authorized herein shall be maintained in good repair and in accordance with the terms and conditions stated herein and the details indicated on the accompanying license plans.

6. Nothing in this Waterways License shall be construed as authorizing encroachment in, on or over property not owned or controlled by the Licensee, except with the written consent of the owner or owners thereof.

7. This Waterways License is granted subject to all applicable Federal, State, County, and Municipal laws, ordinances and regulations including but not limited to a valid final Order of Conditions issued pursuant to the Wetlands Protection Act, G.L. Chapter 131, s.40.

8. This Waterways License is granted upon the express condition that the use of the structures and/or fill authorized hereby shall be in strict conformance with all applicable requirements and authorizations of the DEP, Division of Water Pollution Control.

9. This License authorizes structure(s) and/or fill on:

Private Tidelands. In accordance with the public easement that exists by law on private tidelands, the licensee shall allow the public to use and to pass freely upon the area of the subject property lying between the high and low water marks, for the purposes of fishing, fowling, navigation, and the natural derivatives thereof.

Commonwealth Tidelands. The Licensee shall not restrict the public's right to use and to pass freely, for any lawful purpose, upon lands lying seaward of the low water mark. Said lands are held in trust by the Commonwealth for the benefit of the public.

a Great Pond of the Commonwealth. The Licensee shall not restrict the public's right to use and to pass freely upon lands lying seaward of the high water mark for any lawful purpose.

No restriction on the exercise of these public rights shall be imposed unless otherwise expressly provided in this license.

10. Unless otherwise expressly provided by this license, the licensee shall not limit the hours of availability of any areas of the subject property designated for public passage, nor place any gates, fences, or other structures on such areas in a manner that would impede or discourage the free flow of pedestrian movement thereon.

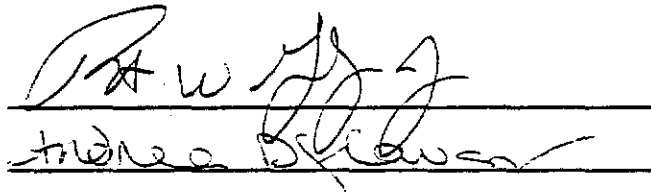
The amount of tide-water displaced by the work hereby authorized has been ascertained by said Department, and compensation thereof has been made by the said -- Town of Orleans -- by paying into the treasury of the Commonwealth -- zero dollars and zero cents (\$0.00) -- for each cubic yard so displaced, being the amount hereby assessed by said Department.-----

Nothing in this License shall be so construed as to impair the legal rights of any person. -----

This License shall be void unless the same and the accompanying plan are recorded within 60 days from the date hereof, in the Registry of Deeds for the County of Barnstable. -----

IN WITNESS WHEREAS, said Department of Environmental Protection have hereunto set their hands this second day of April in the year nineteen hundred and ninety-eight.

*Fol* Commissioner  
*Fol* Program Chief

  
\_\_\_\_\_  
Thomas Sullivan

Department of  
Environmental  
Protection

THE COMMONWEALTH OF MASSACHUSETTS

-----  
This license is approved in consideration of the payment into the treasury of the Commonwealth by the said -- Town of Orleans -----

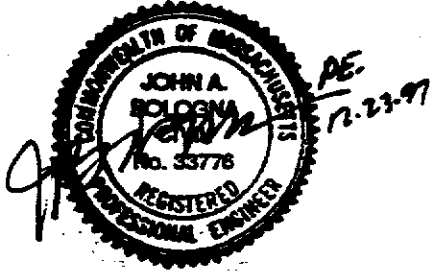
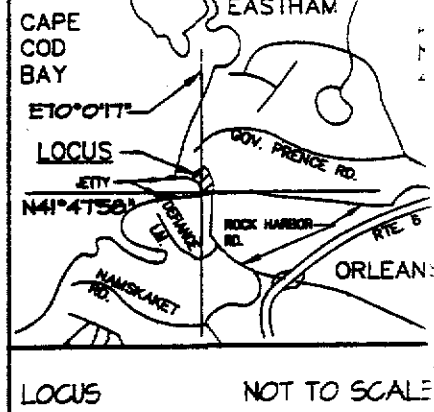
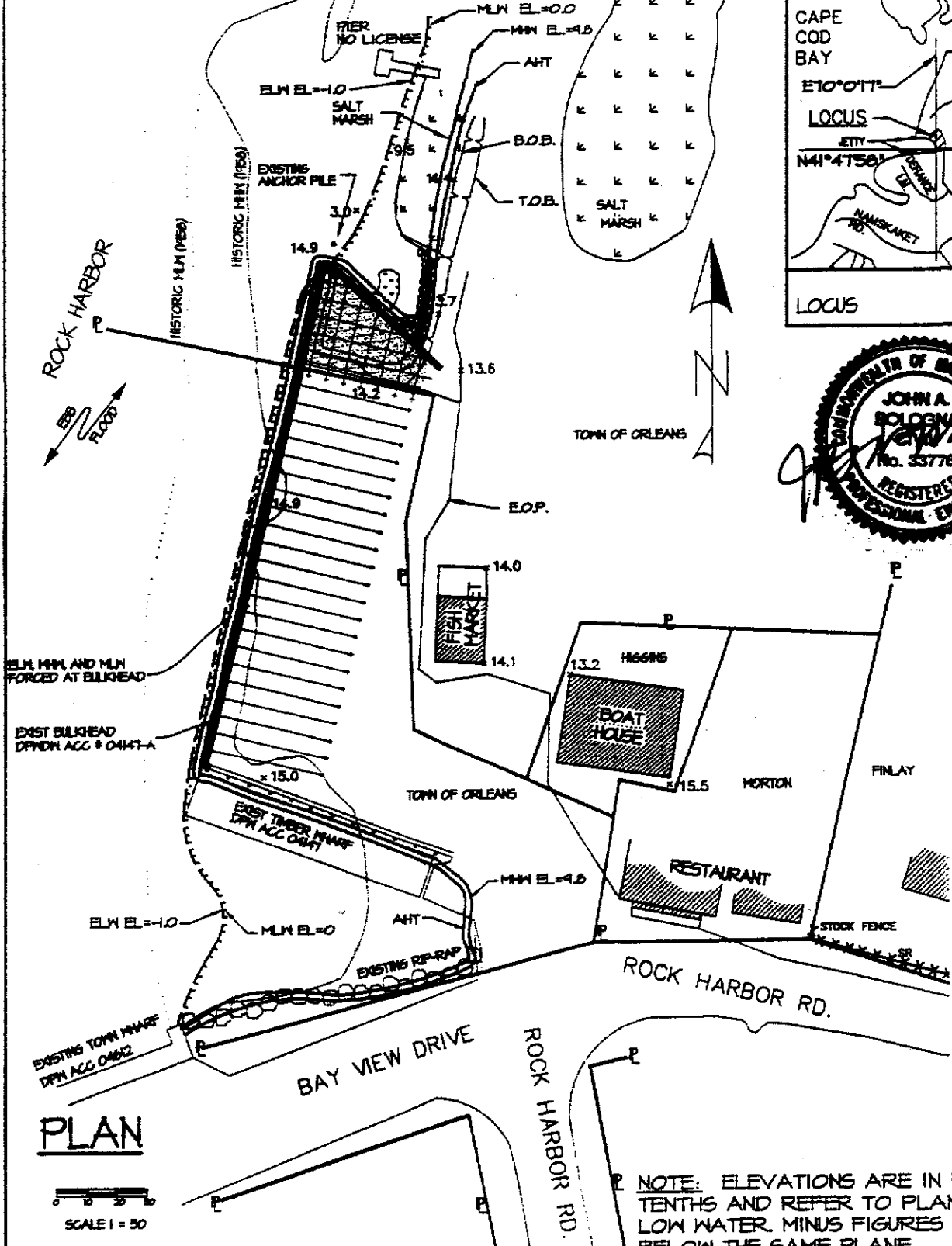
of the further sum of -- zero dollars and zero cents (\$0.00) -----

the amount determined by the Governor as a just and equitable charge for rights and privileges hereby granted in the land of the Commonwealth.

BOSTON,

Approved by the Governor.

  
\_\_\_\_\_  
Acting Governor



**PLAN**



NOTE: ELEVATIONS ARE IN FEET AND TENTHS AND REFER TO PLANE OF MEAN LOW WATER. MINUS FIGURES SHOW DEPTHS BELOW THE SAME PLANE.

PLAN TO ACCOMPANY THE PETITION OF  
 TOWN OF ORLEANS  
 ROCK HARBOR LANDING  
 TO REPLACE AND EXTEND EXISTING BULKHEAD  
 IN ROCK HARBOR  
 TOWN OF ORLEANS  
 BARNSTABLE COUNTY, MA

SEE DPW WATERWAY PROJECT ACC 0414  
 AND ACC 04147-A

PREPARED BY  
 COASTAL ENGINEERING CO., INC.  
 260 CRANBERRY HIGHWAY  
 ORLEANS, MA 02655

LICENSE PLAN NO. 7262  
 Approved by Department of Environmental Protection  
 of Massachusetts  
 APR 02 1998  
*Andrea Bologna*

HISTORIC MLW(1950)

HISTORIC MHW(1950)

EXIST ELW  
MLW

PROPOSED STONE  
RIP-RAP

EXIST AHT  
EXIST MHW  
B.O.B.  
T.O.B.

SALT  
MARSH

EXISTING ANCHOR PILE

14.9

3.0x

PROPOSED MHW (FORCED)

PROPOSED AHT (FORCED)

EXIST MHW

EXIST AHT

PROPOSED NEW  
BULKHEAD RETURN



ROCK HARBOR

EBB  
FLOOD

EXISTING BULKHEAD TO BE REPLACED WITH NEW STEEL SHEET PILING  
EXIST CAP LOS & SPACERS TO BE REMOVED & REPLACED WITH  
NEW CAP LOS & SPACERS. ALL FENDER PILES TO BE REMOVED &  
REPLACED WITH NEW FENDER PILES.

15 TIMBER FENDER PILES @ 12' O.C.  
66'

PROPOSED AREA  
TO BE FILLED 5q2

TOWN OF ORLEANS

6' ANCHOR PILING  
AND TIE BACKS @ 6' O.C.

E.O.P.

EXISTING TIE RODS AND  
DEAD MAN ANCHORS REMAIN.

FISH  
MARKET

14.0

14.1

13.2 HIGGINS

BOAT  
HOUSE

x15.5

EXIST BULKHEAD  
TO BE REPAIRED

TOWN OF ORLEANS

x15.0

ELW = -10'

MHW = 9.0'

PLAN

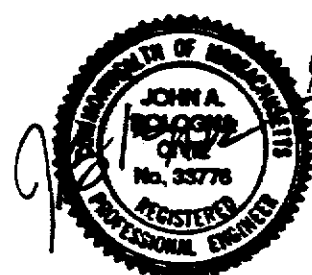
0 10 20 30

LICENSE PLAN NO. 7262

Approved by Department of Environmental Protection

DATE: APR 02 1998

TOWN OF ORLEANS  
ROCK HARBOR LANDING  
TO REPLACE AND EXTEND EXISTING BULKHEAD

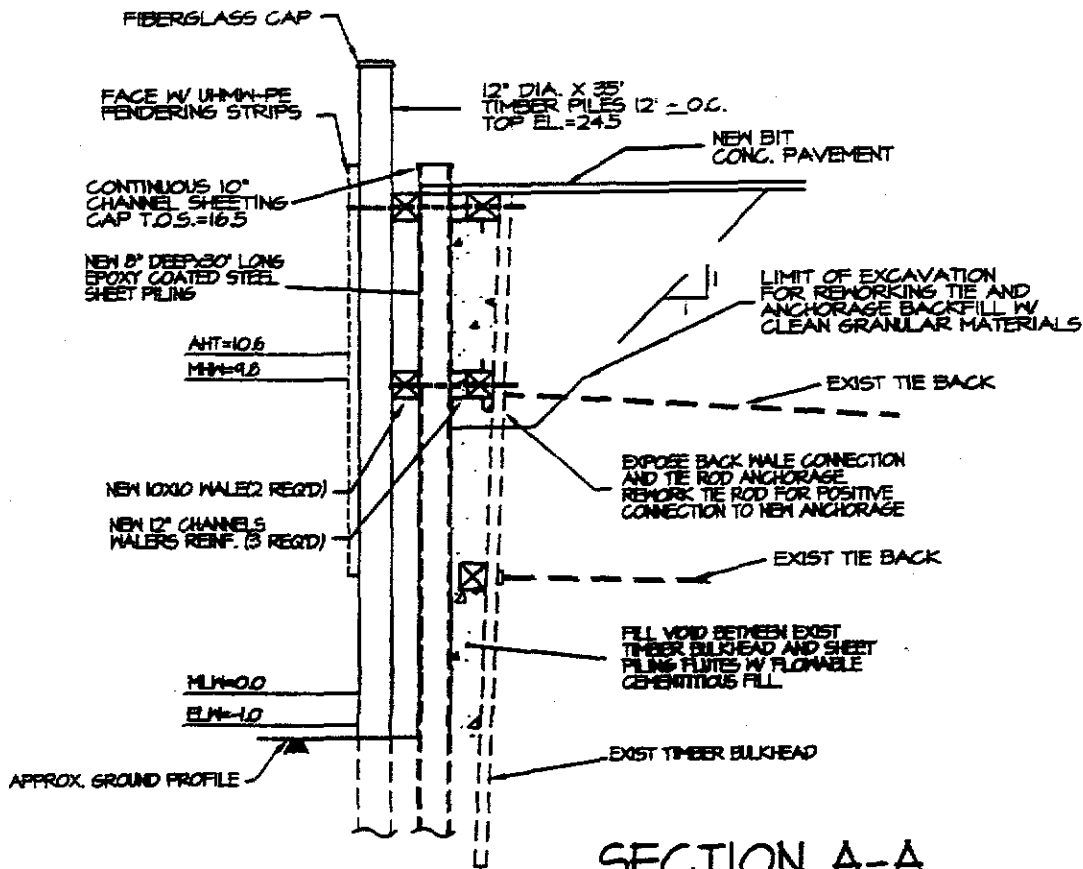


COASTAL ENGINEERING 260 CRANBERRY HWY. ORLEANS, MA 02653

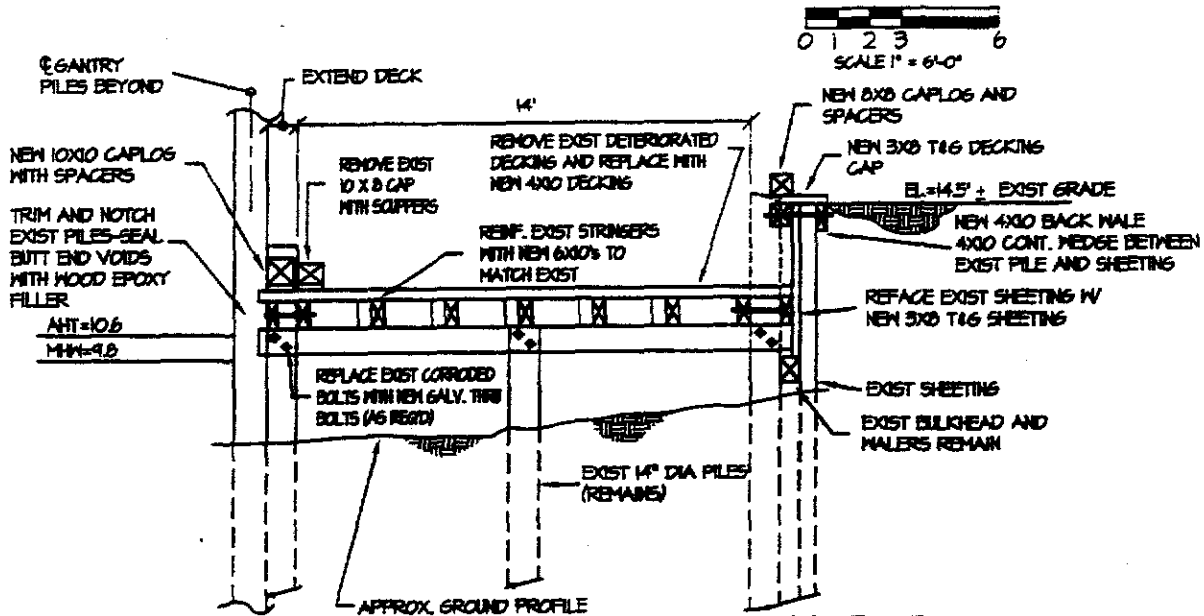
SHEET 2 OF 4

DECEMBER 23 1997

C-14-130



**SECTION A-A**  
**REPAIR TO EXIST BULKHEAD**

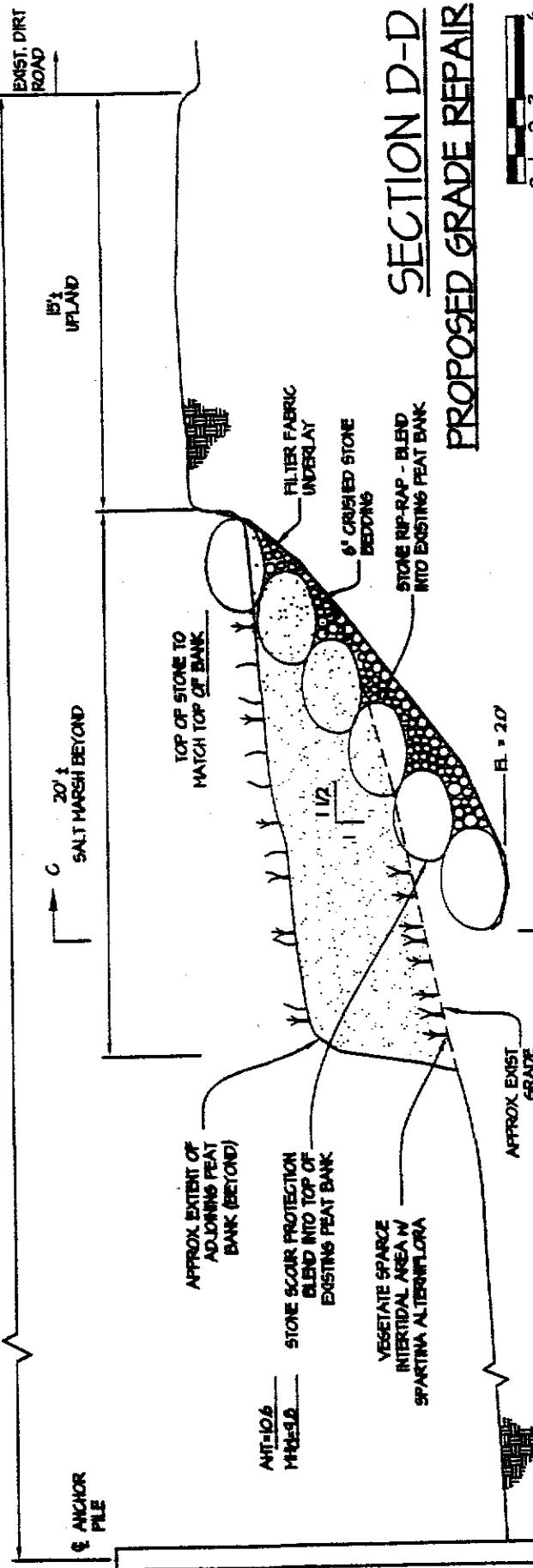


**SECTION B-B**  
**REPAIR TO EXIST BULKHEAD**

**LICENSE PLAN NO. 7262**  
 Approved by Department of Environmental Protection  
 Date: **APR 22 1998**

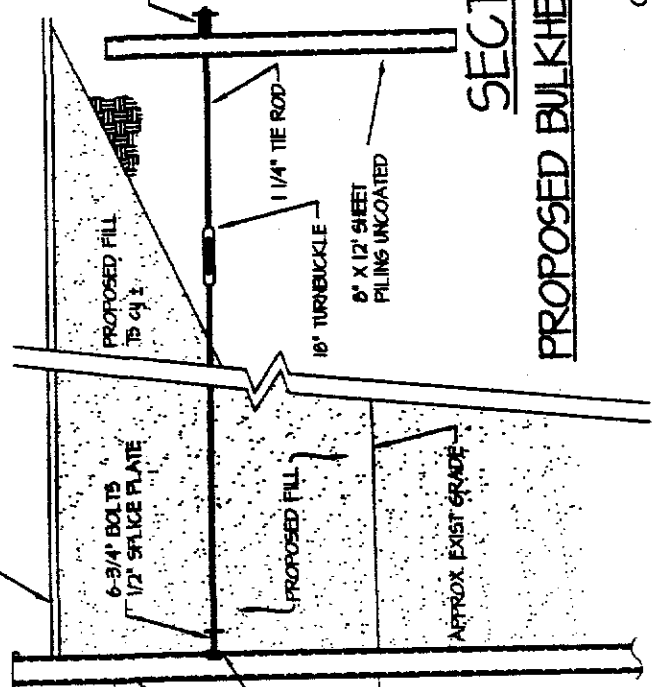
**TOWN OF ORLEANS**  
**ROCK HARBOR LANDING**  
**TO REPLACE AND EXTEND EXISTING BULKHEAD**





**SECTION D-D**  
**PROPOSED GRADE REPAIR**

SCALE 1" = 6'-0"



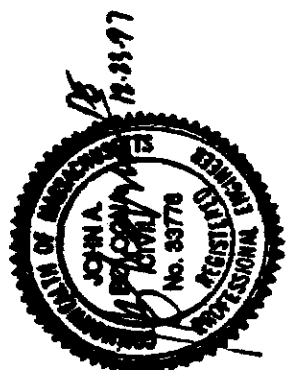
**SECTION C-C**  
**PROPOSED BULKHEAD RETURN**

SCALE 1" = 6'-0"

**TOWN OF ORLEANS**  
**ROCK HARBOR LANDING**  
**TO REPLACE AND EXTEND EXISTING BULKHEAD**

COASTAL ENGINEERING 260 CRANBERRY HWY. ORLEANS, MA 02653

**LICENSE PLAN NO. 7262**  
Approved by Department of Environmental Protection  
Date: **APR 02 1998**



MLK-00  
ELK-10



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