BOARD OF CONTRACT AND SUPPLY
CITY OF PROVIDENCE, RHODE ISLAND

REQUEST FOR PROPOSALS

Item Description: WESTERN JOHNSTON HIGH SERVICE EXPANSION - CONTRACT 3

Date to be opened: MONDAY, MARCH 27, 2023

Issuing Department: **PROVIDENCE WATER**

QUESTIONS

- Please direct questions relative to the bidding process, how to fill out forms, and how to submit a bid (Pages 1-8) to the Purchasing Department.
    - Email: purchasing@providenceri.gov
        - Please use the subject line "**RFP Question**"
- Please direct questions relative to the Minority and Women's Business Enterprise Program and the corresponding forms (Pages 9-13) to the MBE/WBE Outreach Director for the City of Providence, Grace Diaz
    - Phone: (401) 680-5766
    - Email: gdiaz@providenceri.gov
        - Please use subject line "**MBE WBE Forms**"
- Please direct questions relative to the specifications outlined (beginning on page 14) to the issuing department's subject matter expert:
    - Peter DiLorenzo – Division Manager, 401-521-6300 ex. 7230 or peterd@provwater.com

Pre-bid Conference

A Non-Mandatory Pre-bid has been scheduled for March 10, 2023 at 10:00 am at the Philip J. Holton Purification Plant Located at 61 North Road Scituate, RI. This meeting will be followed up with a site visit to the Water Main Alignment.

BOARD OF CONTRACT AND SUPPLY
CITY OF PROVIDENCE, RHODE ISLAND

INSTRUCTIONS FOR SUBMISSION

Bids may be submitted up to **2:15 P.M.** on the above meeting date at the **Department of the City Clerk. Room 311, City Hall. 25 Dorrance Street, Providence.** At 2:15 P.M. all bids will be publicly opened and read at the Board of Contract Meeting in the City Council Chambers, on the 3rd floor of City Hall.

- Bidders must submit **2 copies** of their bid in sealed envelopes or packages labeled with the captioned **Item Description** and the **City Department to which the RFP and bid are related and must include the company name and address on the envelope as well**. (On page 1).
- If required by the Department, please keep the original bid bond and check in only one of the envelopes.
- Communications to the Board of Contract and Supply that are not competitive sealed bids (i.e. product information/samples) should have "**NOT A BID**" written on the envelope or wrapper.
- Only use form versions and templates included in this RFP. If you have an old version of a form do not recycle it for use in this bid.
- The bid envelope and information relative to the bid must be addressed to:

Board of Contract and Supply
Department of the City Clerk – City Hall, Room 311
25 Dorrance Street
Providence, RI 02903

****PLEASE NOTE: This bid may include details regarding information that you will need to provide (such as proof of licenses) to the issuing department before the formalization of an award.**

This information is NOT requested to be provided in your initial bid by design.

All bids submitted to the City Clerk become public record. Failure to follow instructions could result in information considered private being posted to the city's Open Meetings Portal and made available as a public record. The City has made a conscious effort to avoid the posting of sensitive information on the City's Open Meetings Portal, by requesting that such sensitive information be submitted to the issuing department only at their request.

BOARD OF CONTRACT AND SUPPLY
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BID PACKAGE CHECKLIST

Digital forms are available in the City of Providence Purchasing Department Office or online at **http://www.providenceri.gov/purchasing/how-to-submit-a-bid/**

The bid package **MUST** include the following, in this order:

- Bid Form 1: Bidder's Blank as the cover page/ 1st page (s*ee page **6** of this document*)
- Bid Form 2: Certification of Bidder as 2nd page (s*ee page **7** of this document*)
- Bid Form 3: Certificate Regarding Public Records (s*ee page **8** of this document)*
- Forms from the Minority and Women Business Enterprise Program: Based on Bidder Category. S*ee forms and instructions enclosed (pages **9-13**) or on: https://www.providenceri.gov/purchasing/minority-women-owned-business-mbewbe-procurement-program/*

***Please note: MBE/WBE forms must be completed for EVERY bid submitted and must be inclusive of ALL required signatures. Forms without all required signatures will be considered incomplete.**

- Bidder's Proposal/Packet: Formal response to the specifications outlined in this RFP, including pricing information and details related to the good(s) or service(s) being provided. Please be mindful of formatting responses as requested to ensure clarity.
- Financial Assurance, *if requested* (a*s indicated on page 5 of this document under "Bid Terms")*

All of the above listed documents are REQUIRED. (With the exception of financial assurances, which are only required if specified on page 5.)

******Failure to meet specified deadlines, follow specific submission instructions, or enclose all required documents with all applicable signatures will result in disqualification, or in an inability to appropriately evaluate bids.***

BOARD OF CONTRACT AND SUPPLY
CITY OF PROVIDENCE, RHODE ISLAND

NOTICE TO VENDORS

1. The Board of Contract and Supply will make the award to the lowest qualified and responsible bidder.
2. In determining the lowest responsible bidder, cash discounts based on preferable payment terms will not be considered.
3. Where prices are the same, the Board of Contract and Supply reserves the right to award to one bidder, or to split the award.
4. No proposal will be accepted if the bid is made in collusion with any other bidder.
5. Bids may be submitted on an "equal in quality" basis. The City reserves the right to decide equality. Bidders must indicate brand or the make being offered and submit detailed specifications if other than brand requested.
6. A bidder who is an out-of-state corporation shall qualify or register to transact business in this State, in accordance with the Rhode Island Business Corporation Act, RIGL Sec. 7-1.2-1401, et seq.
7. The Board of Contract and Supply reserves the right to reject any and all bids.
8. Competing bids may be viewed in person at the Department of the City Clerk, City Hall, Providence, immediately upon the conclusion of the formal Board of Contract and Supply meeting during which the bids were unsealed/opened. Bids may also be accessed electronically on the internet via the City's Open Meetings Portal.
9. As the City of Providence is exempt from the payment of Federal Excise Taxes and Rhode Island Sales Tax, prices quoted are not to include these taxes.
10. In case of error in the extension of prices quoted, the unit price will govern.
11. The contractor will **NOT** be permitted to: a) assign or underlet the contract, or b) assign either legally or equitably any monies or any claim thereto without the previous written consent of the City Purchasing Director.
12. Delivery dates must be shown in the bid. If no delivery date is specified, it will be assumed that an immediate delivery from stock will be made.
13. A certificate of insurance will normally be required of a successful vendor.
14. For many contracts involving construction, alteration and/or repair work, State law provisions concerning payment of prevailing wage rates apply (RIGL Sec. 37-13-1 et seq.)
15. No goods should be delivered, or work started without a Purchase Order.
16. **Submit 2 copies of the bid to the City Clerk, unless the specification section of this document indicates otherwise.**
17. Bidder must certify that it does not unlawfully discriminate on the basis of race, color, national origin, gender, gender identity or expression, sexual orientation and/or religion in its business and hiring practices and that all of its employees are lawfully employed under all applicable federal, state and local laws, rules and regulations. (See Bid Form 2.)

BOARD OF CONTRACT AND SUPPLY
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BID TERMS

1. Financial assurances may be required in order to be a successful bidder for Commodity or Construction and Service contracts. If either of the first two checkboxes below is checked, the specified assurance **must accompany** a bid, or the bid will not be considered by the Board of Contract and Supply. The third checkbox indicates the lowest responsible bidder will be contacted and required to post a bond to be awarded the contract.

   a) ☒ A certified check for **$**25,000 must be deposited with the City Clerk as a guarantee that the Contract will be signed and delivered by the bidder, or

   b) ☒ A bid bond in the amount of **5** per centum (%) of the proposed total price, must be deposited with the City Clerk as a guarantee that the contract will be signed and delivered by the bidder; and the amount of such bid bond shall be retained for the use of the City as liquidated damages in case of default.

   c) ☒ A performance and payment bond with a satisfactory surety company will be posted by the bidder in a sum equal to one hundred per centum (100%) of the awarded contract.

   d) ☐ No financial assurance is necessary for this item.

2. Awards will be made within **sixty (60) days of bid opening**. All bid prices will be considered firm, unless qualified otherwise. Requests for price increases will not be honored.
3. Failure to deliver within the time quoted or failure to meet specifications may result in default in accordance with the general specifications. It is agreed that deliveries and/or completion are subject to strikes, lockouts, accidents and Acts of God.

The following entry applies only for COMMODITY BID TERMS:

4. Payment for partial delivery will not be allowed except when provided for in blanket or term contracts.

The following entries apply only for CONSTRUCTION AND SERVICE BID TERMS:

5. Only one shipping charge will be applied in the event of partial deliveries for blanket or term contracts.
6. Prior to commencing performance under the contract, the successful bidder shall attest to compliance with the provisions of the Rhode Island Worker's Compensation Act, RIGL 28-29-1, et seq. If exempt from compliance, the successful bidder shall submit a sworn Affidavit by a corporate officer to that effect, which shall accompany the signed contract.
7. Prior to commencing performance under the contract, the successful bidder shall, submit a certificate of insurance, in a form and in an amount satisfactory to the City.

BOARD OF CONTRACT AND SUPPLY
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BID FORM 1: Bidders Blank

1. Bids must meet the attached specifications. Any exceptions or modifications must be noted and fully explained.
2. Bidder's responses must be in ink or typewritten, and all blanks on the bid form should be completed.
3. The price or prices proposed should be stated both in **WRITING** and in **FIGURES**, and any proposal not so stated may be rejected. **Contracts exceeding twelve months must specify annual costs for each year.**
4. Bids **SHOULD BE TOTALED** so that the final cost is clearly stated (unless submitting a unit price bid), however **each item should be priced individually**. Do not group items. Awards may be made on the basis of ***total*** bid or by ***individual items***.
5. All bids **MUST BE SIGNED IN INK.**

Name of Bidder (Firm or Individual): _____

Contact Name: _____

Business Address: _____

Business Phone #: _____

Contact Email Address: _____

Agrees to bid on (Write the "Item Description" here): _____

If the bidder's company is based in a state *other than Rhode Island*, list name and contact information for a local agent for service of process that ***is located within Rhode Island*** _____

Delivery Date (if applicable): _____

Name of Surety Company (if applicable): _____

Total Amount in Writing*: _____

Total Amount in Figures*: _____

**** If you are submitting a unit price bid, please insert "Unit Price Bid"***

Use additional pages if necessary for additional bidding details.

_____

Signature of Representation

_____

Title

BOARD OF CONTRACT AND SUPPLY
CITY OF PROVIDENCE, RHODE ISLAND

BID FORM 2: Certification of Bidder
(Non-Discrimination/Hiring)

Upon behalf of_____ (Firm or Individual Bidding),

I,_____(Name of Person Making Certification),

being its_____(Title or "Self"), hereby certify that:

1. Bidder does not unlawfully discriminate on the basis of race, color, national origin, gender, sexual orientation and/or religion in its business and hiring practices.
2. All of Bidder's employees have been hired in compliance with all applicable federal, state and local laws, rules and regulations.

I affirm by signing below that I am duly authorized on behalf of Bidder, on

this_____day of_____20____.

_____

Signature of Representation

_____

Printed Name

BOARD OF CONTRACT AND SUPPLY
CITY OF PROVIDENCE, RHODE ISLAND

BID FORM 3: Certificate Regarding Public Records

Upon behalf of_____ (Firm or Individual Bidding),

I,_____(Name of Person Making Certification),

being its_____(Title or "Self"), hereby certify an

understanding that:

1. All bids submitted in response to Requests for Proposals (RFP's) and Requests for Qualification (RFQ's), documents contained within, and the details outlined on those documents become public record upon receipt by the City Clerk's office and opening at the corresponding Board of Contract and Supply (BOCS) meeting.
2. The Purchasing Department and the issuing department for this RFP/RFQ have made a conscious effort to request that sensitive/personal information be submitted directly to the issuing department and only at request if verification of specific details is critical the evaluation of a vendor's bid.
3. The requested supplemental information may be crucial to evaluating bids. Failure to provide such details may result in disqualification, or an inability to appropriately evaluate bids.
4. If sensitive information that has not been requested is enclosed or if a bidder opts to enclose the defined supplemental information prior to the issuing department's request in the bidding packet submitted to the City Clerk, the City of Providence has no obligation to redact those details and bears no liability associated with the information becoming public record.
5. The City of Providence observes a public and transparent bidding process. Information required in the bidding packet may not be submitted directly to the issuing department at the discretion of the bidder in order to protect other information, such as pricing terms, from becoming public. Bidders who make such an attempt will be disqualified.

I affirm by signing below that I am duly authorized on behalf of Bidder, on

this_____day of_____20____.

_____

Signature of Representation

_____

Printed Name

WBE/MBE Form Instructions

The City of Providence actively seeks Minority and Women business enterprises to participate in bids to meet the City's procurement needs. Pursuant to the City of Providence Code of Ordinances, Chapter 21, Article II, Sec. 21-52 (Minority and Women's Business Enterprise) and Rhode Island General Laws (as amended), Chapter 31-14, et seq. (Minority Business Enterprise), Minority Business Enterprise (MBE) and Women's Business Enterprise (WBE) participation goals apply to contracts.

The goal for Minority Business Enterprise (MBE) participation is **10%** of the total bid value.
The goal for Women's Business Enterprise (WBE) participation is **10%** of the total bid value.
The goal for combined MBE/WBE participation is **20%** of the total bid value.

Only businesses certified with the State of Rhode Island as minority and/or women business enterprises are counted towards the City's goals. Eligible minority or women-owned businesses are encouraged to seek certification from the State of Rhode Island Minority Business Enterprise Compliance Office at: http://odeo.ri.gov/offices/mbeco/

Note: MBE certification with the State of Rhode Island on the basis of Portuguese heritage is not currently recognized by the City of Providence's MBE program.

Bid Requirements:

All Bidders: All bidders **must complete and submit the *MBE/WBE Participation Affidavit*** indicating whether or not they are a state-certified MBE/WBE and acknowledging the City's participation goals. Submission of this form is **required with every bid**. **Your bid will not be accepted without an affidavit**.

Bidders who will be subcontracting: In addition to the MBE/WBE Participation Affidavit, Bidders who will be subcontracting must submit the ***Subcontractor Disclosure Form*** as part of their bid submission. All subcontractors, regardless of MBE/WBE status, must be listed on this form. Business NAICS codes can be found at https://www.naics.com/search/. Awarded bidders are required to submit

Subcontractor Utilization and Payment Reports with each invoice.

Waiver Requests:

a) If the percentage of the total amount of the bid being awarded to MBE or WBE vendors is less than 20% (Box F on the Subcontractor Disclosure Form) and the prime contractor is not a Rhode Island State-certified MBE or WBE, the Bidder must complete the *MBE/WBE Waiver Request Form* for review.

b) If the prime contractor company has the capacity to perform the whole project, the City of Providence requires the contractor to meet the city's goal of a combined 20% of MBE and WBE participation.

c) If the contractor is a nonprofit organization, the City of Providence requires the nonprofit organization to provide the *MBE/WBE Participation Affidavit Form* and proof of its nonprofit status.

d) If the contractor has researched the RI Certified minority list (http://odeo.ri.gov/offices/mbeco/mbe-wbe.php) and the state does not have any companies in the desired trade, the City of Providence requires the contractor to provide the *MBE/WBE Participation Affidavit Form*.

e) Waivers will be considered for approval on a case-by-case basis.

Verifying MBE/WBE Certification

It is the responsibility of the bidder to confirm that every MBE or WBE named in a proposal and included on a contract is certified by the Rhode Island Minority Business Enterprise Compliance Office. The current MBE/WBE directory is available at the State of RI MBE Office, One Capitol Hill, 2nd Floor, Providence, RI, or online at http://odeo.ri.gov/offices/mbeco/mbe-wbe.php. You can also call (401) 574-8670 to verify certification, expiration dates, and services that the MBE/WBE is certified to provide. Note: MBE certification with the State of Rhode Island on the basis of Portuguese heritage is not currently recognized by the City of Providence's MBE program.

Form Instructions:

Access all bid forms from http://www.providenceri.gov/oeo/ or http://www.providenceri.gov/purchasing/minority-women-owned-business-mbewbe-procurement-program/. Download the forms as blank PDFs. Once saved on your computer, fill them out using the Adobe program. The fillable PDFs must be completed in Adobe in order to be saved property. Google Chrome and similar platforms do not allow for the forms to be saved as filled PDFs. Therefore, please download the blank forms to your computer, then fill them out and save.

Assistance with Form Requirements

Examples of completed forms can be found on the City of Providence website at http://www.providenceri.gov/oeo/ or http://www.providenceri.gov/purchasing/minority-women-owned-business-mbewbe-procurement-program/.

Contract Requirements:

Prime contractors engaging subcontractors must submit the ***Subcontractor Utilization and Payment Report*** to the City Department's Fiscal Agent with every invoice and request for final payment. A copy of all forms should be sent to the MBE/WBE Outreach Director Office, Grace Diaz at gdiaz@providenceri.gov. This form is not submitted as a part of the initial bid package.

For contracts with durations of less than 3 months, this form must be submitted along with the contractor's request for final payment. The form must include all subcontractors utilized on the contract, both MBE/WBE and non- MBE/WBE, the total amount paid to each subcontractor for the given period and to date, A copy of all forms should be sent to the MBE/WBE Outreach Director Office, Grace Diaz at gdiaz@providenceri.gov. During the term of the contract, any unjustified failure to comply with the MBE/WBE participation requirements is a material breach of contract.

Questions?

For more information or for assistance with MBE/WBE Forms, contact the City of Providence MBE/WBE Outreach Director, Grace Diaz, at gdiaz@providenceri.gov or (401) 680-5766.

BOARD OF CONTRACT AND SUPPLY
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MBE/WBE PARTICIPATION AFFIDAVIT

Project /Item Description (as seen on RFP):

_____
_____
_____

Prime Bidder: _____Contact Email and Phone_____
Company Name, Address and Trade: _____
_____
_____

Which one of the following describes your business' status in terms of Minority and/or Woman-Owned Business Enterprise certification with the State of Rhode Island? _____MBE _____WBE _____Neither MBE nor WBE

By initialing the following sections and signing the bottom of this document in my capacity as the contractor or an authorized representative of contractor, I make this Affidavit:
It is the policy of the City of Providence that minority business enterprises (MBEs) and women business enterprises (WBEs) should have the maximum opportunity to participate in procurements and projects as prime contractors and vendors. Pursuant to Sec. 21-52 of the Providence Code of Ordinances and Chapter 31-14 *et seq*. of the Rhode Island General Laws (as amended), MBE and WBE participation goals apply to contracts.

The goal for Minority Business Enterprise (MBE) participation is 10% of the total bid value.
The goal for Women's Business Enterprise (WBE) participation is 10% of the total bid value.
The goal for combined MBE/WBE participation is 20% of the total bid value.

I acknowledge the City of Providence's goals of supporting MBE/WBE certified businesses. Initial _____
If awarded the contract, I understand that my company must submit to the Minority and Women's Business Coordinator at the City of Providence (MBE/WBE Office), copies of all executed agreements with the subcontractor(s) being utilized to achieve the participation goals and other requirements of the RI General Laws. **I understand that these documents must be submitted prior to the issuance of a notice to proceed**. Initial _____

I understand that, if awarded the contract, my firm must submit to the MBE/WBE Office canceled checks and reports required by the MBE/WBE Office on a quarterly basis verifying payments to the subcontractors(s) utilized on the contract. Initial _____

If I am awarded this contract and find that I am unable to utilize the subcontractor(s) identified in my Statement of Intent, I understand that I must substitute another certified MBE and WBE firm(s) to meet the participation goals. **I understand that I may not make a substitution until I have obtained the written approval of the MBE/WBE Office**.
Initial _____
If awarded this contract, I understand that authorized representatives of the City of Providence may examine the books, records and files of my firm from time to time, to the extent that such material is relevant to a determination of whether my firm is complying with the City's MBE/WBE participation requirements.
Initial _____
I do solemnly declare and affirm under the penalty of perjury that the contents of the foregoing Affidavit are true and correct to the best of my knowledge, information, and belief.

_____ _____
Signature of Bidder Printed Name

_____ _____
Company Name Date

BOARD OF CONTRACT AND SUPPLY
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SUBCONTRACTOR DISCLOSURE FORM

Fill out this form only if you WILL SUBCONTRACT with other parties. If you will not subcontract any portion of the proposed bid, do not fill out this form.

Prime Bidder: _____ Primary NAICS_____
Code:_____

Item Description (as seen on RFP): _____

_____

Please list all Subcontractors below. Include the total dollar value that you propose to share with each subcontractor and the dollar amount to be subcontracted. Please check off MBE and WBE where applicable. The directory of all state-certified MBE/WBE firms is located at www.mbe.ri.gov. Business NAICS codes can be found at https://www.naics.com/search/

Proposed Subcontractor	MBE	WBE	Primary NAICS Code	Date of Mobilization	$ Value of Subcontract
					$
					$
					$
					$
					$
					$
A. MBE SUBCONTRACTED AMOUNT:					$
B. WBE SUBCONTRACTED AMOUNT:					$
C. NON-MBE WBE SUBCONTRACTED AMOUNT:					$
D. DOLLAR AMOUNT OF WORK DONE BY THE PRIME CONTRACTOR:					$
E. TOTAL AMOUNT OF BID (SUM OF A, B, C, & D):					$
F. PERCENTAGE OF BID SUBCONTRACTED TO MBEs AND WBEs. (Divide the sum of A and B by E and multiply result by 100).					%

Please read and initial the following statement acknowledging you understand. If the percentage of the total amount of the bid being awarded to MBE or WBE vendors is less than 20% (Box (F) and the prime contractor is NOT a Rhode Island State-certified MBE or WBE, **you must fill out the MBE/WBE WAIVER REQUEST FORM for consideration by City of Providence MBE/WBE Outreach Director**. Initial _____ Required

_____ _____
Signature of Bidder Printed Name

BOARD OF CONTRACT AND SUPPLY
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MBE/WBE Waiver Request Form

Fill out this form only if you did not meet the 20% MBE/WBE participation goal.
State-certified MBE or WBE Prime Bidders are NOT REQUIRED to fill out this form.

Submit this form to the City of Providence MBE/WBE Outreach Director, Grace Diaz, at mbe-wbe@providenceri.gov, for review **prior to bid submission.** This waiver applies only to the current bid which you are submitting to the City of Providence and does not apply to other bids your company may submit in the future. **In case a waiver is need it City Department Directors should not** recommend a bidder for award if this form is not included, absent or is not signed by the city of Providence MBE/WBE director**.**

Prime Bidder: _____ Contact Email and Phone_____
Company Name, Address: _____ Trade _____
Project /Item Description (as seen on RFP):
_____
_____

To receive a waiver, you must list the certified MBE and/or WBE companies you contacted, the name of the primary individual with whom you interacted, and the reason the MBE/WBE company could not participate on this project.

MBE/WBE Company Name	Individual's Name	Company Name	Why did you choose not to work with this company?

I acknowledge the City of Providence's goal of a combined MBE/WBE participation is 20% of the total bid value. I am requesting a waiver of _____ % MBE/WBE (20% minus the value of **Box F** on the Subcontractor Disclosure Form). If an opportunity is identified to subcontract any task associated with the fulfillment of this contract, a good faith effort will be made to select MBE/WBE certified businesses as partners.

_____ _____ _____
Signature of Prime Contractor / or Duly Authorized Representative Printed Name
Date Signed

_____ _____ _____
Signature of City of Providence (or Designee (Only) Printed Name of City of Providence Date Signed
MBE/WBE Outreach Director MBE/WBE Outreach Director

BID PACKAGE SPECIFICATIONS

SUPPLEMENTAL INFORMATION

If the issuing department for this RFP determines that your firm's bid is best suited to accommodate their need, you will be asked to provide proof of the following prior to formalizing an award.

An inability to provide the outlined items at the request of the department may lead to the disqualification of your bid.

This information is <u>NOT</u> requested to be provided in your initial bid that you will submit to the City Clerk's office by the "date to be opened" noted on page 1. This list only serves as a list of items that your firm should be ready to provide on request.

<u>All bids submitted to the City Clerk become public record</u>. Failure to follow instructions could result in information considered private being posted to the city's Open Meetings Portal and made available as a public record.

You must be able to provide:

- Business Tax ID will be requested after an award is approved by the Board of Contract and Supply.
- PROOF OF INSURANCE

BOARD OF CONTRACT AND SUPPLY
CITY OF PROVIDENCE, RHODE ISLAND

CITY OF PROVIDENCE STANDARD TERMS & CONDITIONS

1. The terms "you" and "your" contained herein refer to the person or entity that is a party to the agreement with the City of Providence ("the City") and to such person's or entity's employees, officers, and agents.
2. The Request For Proposals ("RFP") and these Standard Terms and Conditions together constitute the entire agreement of the parties ("the Agreement") with regard to any and all matters. By your submission of a bid proposal or response to the City's RFP, you accept these Standard Terms & Conditions and agree that they supersede any conflicting provisions provided by bid or in any terms and conditions contained or linked within a bid and/or response. Changes in the terms and conditions of the Agreement, or the scope of work thereunder, may only be made by a writing signed by the parties.
3. You are an independent contractor and in no way does this Agreement render you an employee or agent of the City or entitle you to fringe benefits, workers' compensation, pension obligations, retirement or any other employment benefits. The City shall not deduct federal or state income taxes, social security or Medicare withholdings, or any other taxes required to be deducted by an employer, and this is your responsibility to yourself and your employees and agents.
4. You shall not assign your rights and obligations under this Agreement without the prior written consent of the City. Any assignment without prior written consent of the City shall be voidable at the election of the City. The City retains the right to refuse any and all assignments in the City's sole and absolute discretion.
5. Invoices submitted to the City shall be payable sixty (60) days from the time of receipt by the City. Invoices shall include support documentation necessary to evidence completion of the work being invoiced. The City may request any other reasonable documentation in support of an invoice. The time for payment shall not commence, and invoices shall not be processed for payment, until you provide reasonably sufficient support documentation. In no circumstances shall the City be obligated to pay or shall you be entitled to receive interest on any overdue invoice or payment. In no circumstances shall the City be obligated to pay any costs associated with your collection of an outstanding invoice.
6. For contracts involving construction, alteration, and/or repair work, the provisions of applicable state labor law concerning payment of prevailing wage rates (R.I. Gen. Laws §§ 37-13-1 et seq., as amended) and the City's First Source Ordinance (Providence Code of Ordinances §§ 21-91 et seq., as amended) apply.
7. With regard to any issues, claims, or controversies that may arise under this Agreement, the City shall not be required to submit to dispute resolution or mandatory/binding arbitration. Nothing prevents the parties from mutually agreeing to settle any disputes using mediation or non-binding arbitration.
8. To the fullest extent permitted by law, you shall indemnify, defend, and hold harmless the City, its employees, officers, agents, and assigns from and against any and all claims, damages, losses, allegations, demands, actions, causes of action, suits, obligations, fines, penalties, judgments, liabilities, costs and expenses, including but not limited to attorneys' fees, of any nature whatsoever arising out of, in connection with, or resulting from the performance of the work provided in the Agreement.
9. You shall maintain throughout the term of this Agreement the insurance coverage that is required by the RFP or, if none is required in the RFP, insurance coverage that is considered in your industry to be commercially reasonable, and you agree to name the City as an additional insured on your general liability policy and on any umbrella policy you carry.
10. The City shall not subject itself to any contractual limitations on liability. The City shall have the time permitted within the applicable statute of limitations, and no less, to bring or assert any and all causes of action, suits, claims or demands the City may have arising out of, in connection with, or resulting from the performance of the work provided in the Agreement, and in no event does the City agree to limit your liability to the price of the Agreement or any other monetary limit.
11. The City may terminate this Agreement upon five (5) days' written notice to you if you fail to observe any of the terms and conditions of this Agreement, or if the City believes your ability to perform the

terms and conditions of this Agreement has been materially impaired in any way, including but in no way limited to loss of insurance coverage, lapsing of a surety bond, if required, declaration of bankruptcy, or appointment of a receiver. In the event of termination by the City, you shall be entitled to just and equitable compensation for any satisfactory work completed and expenses incurred up to the date of termination.

12. Written notice hereunder shall be deemed to have been duly served if delivered in person to the individual or member of the firm or entity or to an officer of the entity for whom it was intended, or if delivered at or sent by registered or certified mail to the last business address known by the party providing notice.
13. In no event shall the Agreement automatically renew or be extended without a writing signed by the parties.
14. You agree that products produced or resulting from the performance of the Agreement are the sole property of the City and may not be used by you without the express written permission of the City.
15. For any Agreement involving the sharing or exchange of data involving potentially confidential and/or personal information, you shall comply with any and all state and/or federal laws or regulations applicable to confidential and/or personal information you receive from the City, including but not limited to the Rhode Island Identity Theft Protection Act, R.I. Gen. Laws § 11-49.3-1, during the term of the Agreement. You shall implement and maintain appropriate physical, technical, and administrative security measures for the protection of, and to prevent access to, use, or disclosure of, confidential and/or personal information. In the event of a breach of such information, you shall notify the City of such breach immediately, but in no event later than twenty-four (24) hours after discovery of such breach.
16. The Agreement is governed by the laws of the State of Rhode Island. You expressly submit yourself to and agree that any and all actions arising out of, in connection with, or resulting from the performance of the Agreement or relationship between the parties shall occur solely in the venue and jurisdiction of the State of Rhode Island or the federal court located in Rhode Island.
17. The failure of the City to require performance of any provision shall not affect the City's right to require performance at any time thereafter, nor shall a waiver of any breach or default of this Agreement constitute a waiver of any subsequent breach or default or a waiver of the provision itself.
18. If any term or provision of this Agreement, or the application thereof to any person or circumstance shall, in any extent, be invalid or unenforceable, the remainder of this Agreement shall not be affected thereby, and each term and provision shall be valid and enforceable to the fullest extent permitted by law.

Providence Water Supply Board
Western Johnston HSA Expansion
Contract 3 - Central Avenue Transmission Main Installation
Johnston, Rhode Island

Owner

PROVIDENCE WATER

PROVIDENCE WATER SUPPLY BOARD
125 DUPONT DRIVE
PROVIDENCE, RI 02907

Civil Engineer

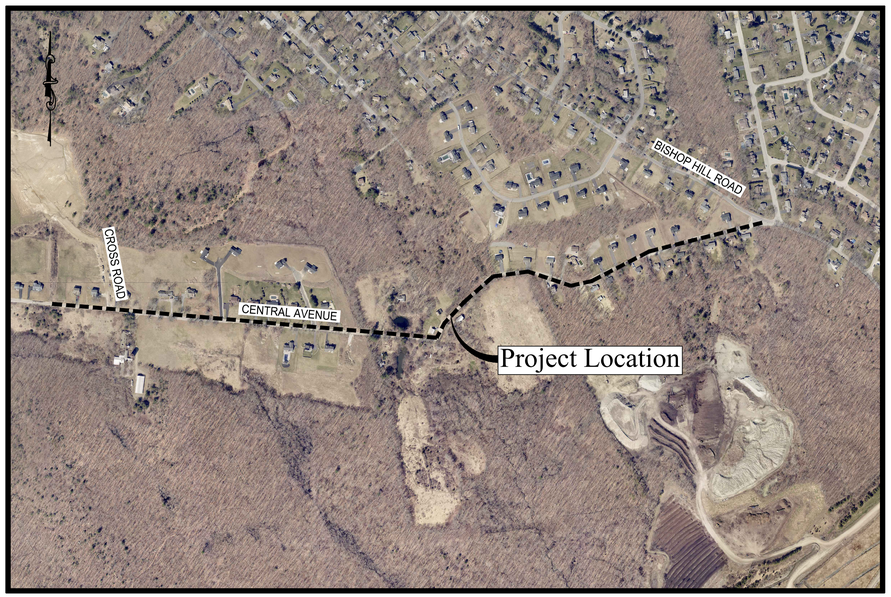
PARE

PARE CORPORATION
ENGINEERS - SCIENTISTS - PLANNERS

8 BLACKSTONE VALLEY PLACE
LINCOLN, RI 02865
401-334-4100

10 LINCOLN ROAD, SUITE 210
FOXBORO, MA 02035
508-543-1755

14 BOBALA ROAD, SUITE 2B
HOLYOKE, MA 01040
413.507.3448



Locus Plan
SCALE: 1"=500'

Index of Drawings

Sheet No.	Dwg. No.	Description
1	C0.0	COVER SHEET
2	C1.0	NOTES AND LEGEND
3 - 8	C2.1 - C2.6	SITE PLAN 1 - 6
9 - 11	C3.1 - C3.3	DETAILS 1 - 3
12 - 13	C4.1 - C4.2	TEMPORARY TRAFFIC CONTROL PLAN 1 - 2

FEBRUARY 2023

ISSUED FOR BIDDING

Pare Project No. 14256.32
Providence Water Project No. 3-0848-20216

PROJECT INFORMATION:

THE PRIMARY WORK OF THIS PROJECT INCLUDES:

1. INSTALLATION OF APPROXIMATELY 5,165 FEET OF NEW 16 INCH CLASS 52 ZINC COATED DUCTILE IRON (DI) TRANSMISSION WATER MAIN ALONG CENTRAL AVENUE CONNECTING TO THE EXISTING HIGH PRESSURE WATER MAIN ON BISHOP HILL ROAD IN JOHNSTON, RI, INCLUDING ALL SPECIFIED VALVES, FITTINGS, AND OTHER APPURTENANCES.

GENERAL NOTES:

1. BASE MAP USED IN SHEET C2.1 - C2.6 IS BASED ON FIELD SURVEYS PERFORMED BY PARE CORPORATION ON SEPTEMBER 8 AND 29, 2022. THIS PLAN REFLECTS ON-THE-GROUND CONDITIONS AS OF THOSE DATES. CONTRACTOR SHALL FIELD VERIFY EXISTING CONDITIONS PRIOR TO CONSTRUCTION AND REPORT ANY DISCREPANCIES BETWEEN FIELD CONDITIONS AND DRAWINGS TO THE OWNER AND ENGINEER IMMEDIATELY. BASE MAP DRAWINGS WERE PREPARED USING BEST COLLECTION OF DATA WITH NO CLAIMS TO THEIR ACCURACY OR COMPLETENESS.
2. ELEVATIONS SHOWN IN THESE PLANS ARE IN U.S. SURVEY FEET AND ARE REFERENCED TO THE NAVD 88 (VERTICAL) AND R.I. STATE PLANE NAD 83 (HORIZONTAL) DATUM.
3. NORTH ARROW DIRECTION SHOWN IS APPROXIMATE.
4. ALL EXISTING UTILITIES SHOWN ARE APPROXIMATE. THE CONTRACTOR SHALL VERIFY THE LOCATION OF ALL EXISTING UTILITIES. CONTRACTOR SHALL NOTIFY DIG SAFE AT LEAST 72 HOURS IN ADVANCE, EXCLUDING WEEKENDS AND HOLIDAYS, PRIOR TO ANY EXCAVATION. CONTRACTOR SHALL ALSO NOTIFY THE TOWN OF JOHNSTON DEPARTMENT OF PUBLIC WORKS AND ANY UTILITY COMPANIES IN THE AREA NOT INCLUDED IN DIG SAFE PRIOR TO COMMENCEMENT OF CONSTRUCTION ACTIVITIES AND ADHERE TO ALL REGULATIONS OF THE UTILITIES INVOLVED.
5. THE CONTRACTOR SHALL COMPLY WITH ALL APPLICABLE REGULATIONS OF THE OCCUPATIONAL SAFETY AND HEALTH ADMINISTRATION (OSHA).
6. THE CONTRACTOR SHALL RESTORE ALL PUBLIC AND PRIVATE PROPERTY TO ITS PRE-CONSTRUCTION CONDITION AT THE CONTRACTOR'S EXPENSE. THE CONTRACTOR IS TO TAKE SPECIAL CARE NOT TO DAMAGE TREES, BUSHES, PLANTS, FLOWERS, STONE WALLS, FENCES, ETC. WITHIN THE CONSTRUCTION AREA. CONTRACTOR SHALL REPLACE, AT NO COST TO OWNER, ALL DAMAGED ITEMS.
7. IT SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO OBTAIN AND PAY FOR ALL REQUIRED PERMITS, POST REQUIRED BONDS, AND SUPPLY THE NECESSARY NOTICES, REGARDING CONSTRUCTION, UTILITIES, AND INCIDENTAL WORK WITH THE OWNER AND APPLICABLE UTILITY COMPANIES.
8. ALL EXISTING UTILITY LINES ENCOUNTERED DURING CONSTRUCTION ARE TO REMAIN IN SERVICE. THE CONTRACTOR SHALL REPAIR ANY EXISTING SEWERS, STORM DRAIN LINES, GAS MAINS, ELECTRICAL LINES, TRAFFIC SIGNALS, OR CULVERTS DAMAGED DURING CONSTRUCTION AT THE CONTRACTOR'S EXPENSE.
9. IN THOSE INSTANCES WHERE UTILITY POLE SUPPORT IS REQUIRED, THE CONTRACTOR SHALL PROVIDE A MINIMUM 48-HOUR NOTIFICATION TO THE RESPECTIVE UTILITY COMPANY. NO ADDITIONAL PAYMENT WILL BE PROVIDED FOR TEMPORARY BRACING OF UTILITIES.
10. ALL STRUCTURES AND PIPELINES LOCATED ADJACENT TO THE TRENCH EXCAVATION SHALL BE PROTECTED AND FIRMLY SUPPORTED BY THE CONTRACTOR UNTIL THE TRENCH IS BACKFILLED. DAMAGE TO ANY SUCH STRUCTURE CAUSED BY, OR RESULTING FROM, THE CONTRACTOR'S OPERATIONS SHALL BE REPAIRED AT THE CONTRACTOR'S EXPENSE. ALL UTILITIES REQUIRING REPAIR, RELOCATION, OR ADJUSTMENT AS A RESULT OF THE PROJECT SHALL BE COORDINATED THROUGH THE RESPECTIVE UTILITY AND THE OWNER.
11. ALL VALVES INSTALLED BY THE CONTRACTOR SHALL OPEN RIGHT.
12. ALL VERTICAL/HORIZONTAL BENDS AND FITTINGS REQUIRE CAST-IN-PLACE THRUST BLOCKS (REFER TO DETAILS).
13. CONTRACTOR SHALL REMOVE AND REPLACE, OR REPAIR, ALL CURBS, SIDEWALKS, PAVEMENT, AND OTHER ITEMS DAMAGED BY THEIR CONSTRUCTION ACTIVITIES TO AT LEAST THEIR ORIGINAL CONDITION, AND TO THE SATISFACTION OF THE TOWN, THE OWNER, AND THE ENGINEER.
14. ANY TRAFFIC SIGNAL EQUIPMENT (LIGHTS, CONDUITS, LOOP DETECTORS DISTURBED SHALL BE REPLACED OR REPAIRED TO PRE-CONSTRUCTION CONDITION OR BETTER, BY THE CONTRACTOR AS DIRECTED BY THE TOWN, THE OWNER, OR ENGINEER AT THE CONTRACTOR'S EXPENSE.
15. THE CONTRACTOR SHALL INSTALL AND MAINTAIN TRAFFIC CONTROL DEVICES AS NECESSARY AND IN ACCORDANCE WITH THE MOST RECENT MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES.
16. THE CONTRACTOR SHALL BE REQUIRED TO FURNISH AND MAINTAIN A TELEPHONE NUMBER WHERE THE CONTRACTOR CAN BE REACHED 24 HOURS A DAY, 7 DAYS A WEEK.
17. DO NOT SCALE DRAWINGS UNLESS OTHERWISE NOTED. WRITTEN DIMENSIONS SHALL PREVAIL. REPORT ANY DISCREPANCIES TO THE ENGINEER IMMEDIATELY. IN THE EVENT OF A DISCREPANCY BETWEEN THE PLANS AND THE SPECIFICATIONS, THE SPECIFICATIONS SHALL GOVERN.
18. NORMAL WORKING HOURS SHALL BE IN ACCORDANCE WITH THE TOWN OF JOHNSTON ORDINANCE CHAPTER 224 ARTICLE 16.
19. ALL PAVED SURFACES SHALL BE SWEPT CLEAN AT THE END OF EACH WORK DAY.
20. THE CONTRACTOR SHALL NOT STORE ANY APPARATUS, MATERIALS, SUPPLIES, OR EQUIPMENT ON PRIVATE PROPERTY.
21. THE CONTRACTOR SHALL BE RESPONSIBLE FOR ALL FIELD LAYOUT SURVEY AND AS-BUILT SURVEY DRAWINGS.

EROSION & SEDIMENTATION CONTROL NOTES:

1. SEDIMENT CONTROL BARRIERS ARE TO BE INSTALLED BY THE CONTRACTOR PER THE CONTRACT DOCUMENTS PRIOR TO THE COMMENCEMENT OF ANY EARTHWORK IN THOSE AREAS. CONTRACTOR SHALL ALSO PROVIDE TEMPORARY SEDIMENT PROTECTION FOR ALL EXISTING CATCH BASIN OR DRAINAGE INLET STRUCTURES ALONG ROUTE OF THE WATER MAIN CONSTRUCTION.
2. ALL CONSTRUCTION-PHASE EROSION CONTROLS SHALL BE INSPECTED BY THE CONTRACTOR AT LEAST ONCE EVERY SEVEN (7) CALENDAR DAYS AND WITHIN TWENTY-FOUR (24) HOURS AFTER ANY STORM EVENT WHICH GENERATES AT LEAST 0.25 INCHES OF RAIN IN A TWENTY-FOUR (24) HOUR PERIOD. THE CONTRACTOR SHALL NOTE AREAS OF EROSION AND SEDIMENT MIGRATION, AS WELL AS THE CONDITION AND EFFECTIVENESS OF THE STORMWATER CONTROLS.
3. ACCUMULATED SEDIMENTS SHALL BE EXCAVATED AND BE PROPERLY DISPOSED WHEN THE HEIGHT OF THE SEDIMENT EXCEEDS ONE HALF (1/2) THE HEIGHT OF THE FILTER SOCKS.
4. FILTER SOCKS/SILT SACKS SHALL BE REPLACED EVERY SIX (6) MONTHS, AT A MINIMUM, AND MORE FREQUENTLY IF NECESSARY. ANY DAMAGED FILTER SOCKS/SILT SACKS SHALL BE PROMPTLY REPLACED.
5. UPON COMPLETION OF EARTHWORK OUTSIDE OF THE PAVED LIMITS, PERMANENT VEGETATION SHALL BE RE-ESTABLISHED.
6. UPON COMPLETION OF THE PROJECT AND PERMANENT STABILIZATION OF THE GROUND SURFACE, ALL SEDIMENT CONTROL BARRIERS SHALL BE REMOVED SO AS NOT TO IMPEDE STORM FLOW OR DRAINAGE AND DISPOSED OF IN AN APPROPRIATE FASHION.
7. CONTRACTOR SHALL BE RESPONSIBLE FOR DEWATERING THE WATER MAIN TRENCH IN THE EVENT OF GROUNDWATER INTRUSION. ALL PUMPED GROUNDWATER SHALL BE TREATED TO REMOVE SUSPENDED SOLIDS PRIOR TO DISCHARGE INTO ANY STORMWATER COLLECTION SYSTEM. TREATMENT SHALL BE DONE VIA HALE BALE CORRALS, FILTER BAGS, PORTABLE SEDIMENT TANK, OR OTHER MEANS AS APPROVED BY THE ENGINEER.

RECOMMENDED CONSTRUCTION SEQUENCING:

1. PRIOR TO COMMENCEMENT OF CONSTRUCTION ACTIVITIES, THE CONTRACTOR SHALL PRODUCE A LEVEL 4 CONTROL PHASING SCHEDULE TO CONTROL THE WORK OF THIS CONTRACT AND TO PROVIDE A DEFINITIVE BASIS FOR DETERMINING JOB PROGRESS. THE CONSTRUCTION SCHEDULE AND UPDATES SHALL BE PREPARED BY THE CONTRACTOR. ALL WORK SHALL BE DONE IN ACCORDANCE WITH THE ESTABLISHED SCHEDULE AND THE CONTRACTOR, AND HIS SUBCONTRACTORS SHALL BE RESPONSIBLE FOR COOPERATING FULLY WITH THE ENGINEER AND THE OWNER IN EFFECTIVELY UTILIZING THE SCHEDULE.
2. THE CONSTRUCTION AND PHASING SCHEDULE SHALL INCLUDE LINE ITEMS FOR COORDINATION WITH APPLICABLE PUBLIC AGENCIES AND PUBLIC/PRIVATE UTILITIES, WHEN NECESSARY.
3. CONTRACTOR TO INSTALL 12 X 12" TAPPING SLEEVE AND VALVE, CONNECTING TO THE EXISTING 12" DUCTILE IRON WATER ON BISHOP HILL ROAD.
4. CONTRACTOR TO PROVIDE An 8" BACKFLOW SUPPLY LINE FOR THIS PROJECT. PER AWWA C651, A VELOCITY OF 3.0 FEET PER SECOND MUST BE MAINTAINED IN THE PIPE DURING FLUSHING AND DISINFECTION PROCESSES. 8" OR GREATER WILL PROVIDE ADEQUATE FLOW TO THE 16" SYSTEM.
5. CONTRACTOR TO INSTALL 16" CLASS 52 ZINC COATED DI WATER MAIN ALONG CENTRAL AVENUE WITH THE APPROPRIATE VALVES AND APPURTENANCES.
6. LAY OUT CROSS-CONNECTIONS WITH APPROPRIATE VALVES AND APPURTENANCES AS SHOWN ON THE PLANS TO EXISTING 8" DI WATER MAIN ON CENTRAL AVENUE. PHYSICAL CONNECTION TO BE MADE AFTER DISINFECTION OF 16" WATER MAIN HAS BEEN PERFORMED.

LEGEND

EXISTING		PROPOSED
W	WATER MAIN	W
	WATER VALVE	
	HYDRANT	
	DI PLUG	
	TRANSITION COUPLING	
	CURB STOP	
	DRAINAGE MANHOLE (DMH)	
	CATCH BASIN	
D	DRAINAGE LINE	
	PROPERTY LINE	
	STONE WALL	
	GUARDRAIL	
	UTILITY POLE	

ABBREVIATIONS

1.	DI	DUCTILE IRON
2.	GV	GATE VALVE
3.	PVC	POLYVINYL CHLORIDE
4.	RC	REINFORCED CONCRETE
5.	TYP.	TYPICAL
6.	UP	UTILITY POLE
7.	EL.	ELEVATION
8.	EOP	EDGE OF PAVEMENT

STREET INDEX

THIS PLAN IS TO BE INDEXED UNDER THE FOLLOWING STREETS
BISHOP HILL ROAD
CROSS ROAD

PARE

SCALE ADJUSTMENT GUIDE
0" 1"
BAR IS ONE INCH ON ORIGINAL DRAWING

WESTERN JOHNSTON HSA EXPANSION
CONTRACT 3 - CENTRAL AVE TRANSMISSION MAIN

Johnston, Rhode Island

REVISIONS:

PROJECT NO.:	14256.32
DATE:	FEBRUARY 2023
SCALE:	NONE
DESIGNED BY:	MDD
CHECKED BY:	MGM
DRAWN BY:	MDD
APPROVED BY:	SPD

DRAWING TITLE:

NOTES AND LEGEND

DRAWING NO.:

C1.0

SHEET NO. 2 OF 13

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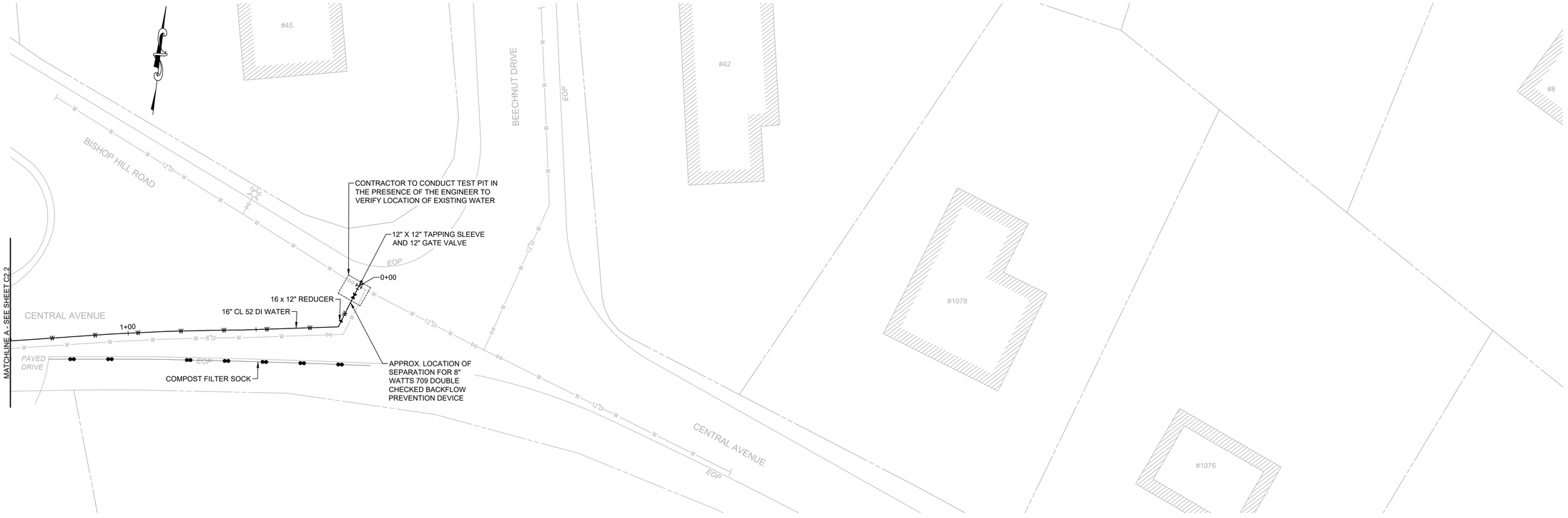

NOTE:

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Scale: 1"=20'
0 10' 20' 40'

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APPROVED BY:	SPD

DRAWING TITLE:

SITE PLAN 1

DRAWING NO.:

C2.1

SHEET NO. 3 OF 13

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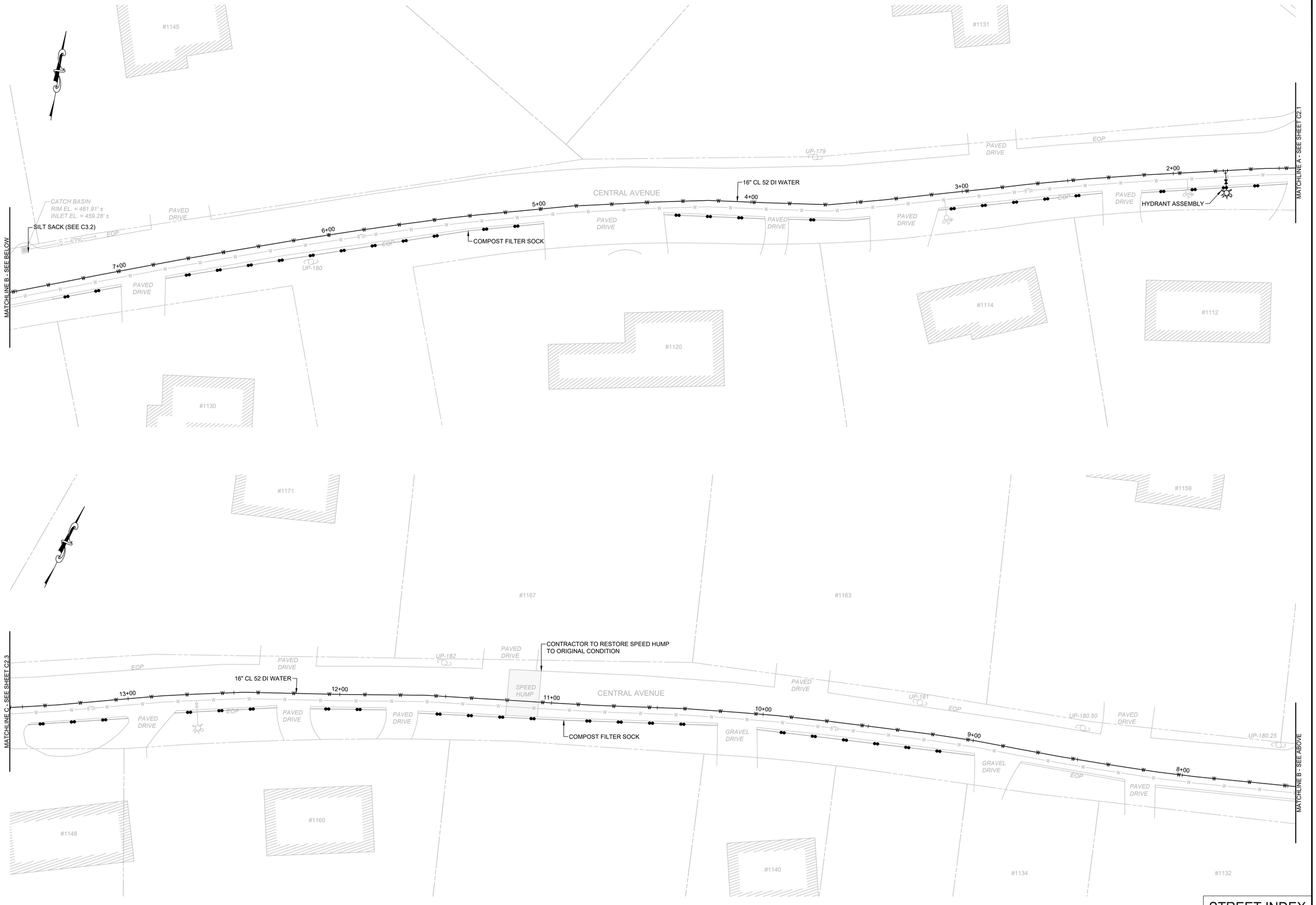

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CONTRACT 3 - CENTRAL AVE TRANSMISSION MAIN

Johnston, Rhode Island

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APPROVED BY:	SPD

DRAWING TITLE:

SITE PLAN 2

DRAWING NO.:

C2.2

SHEET NO. 4 OF 13

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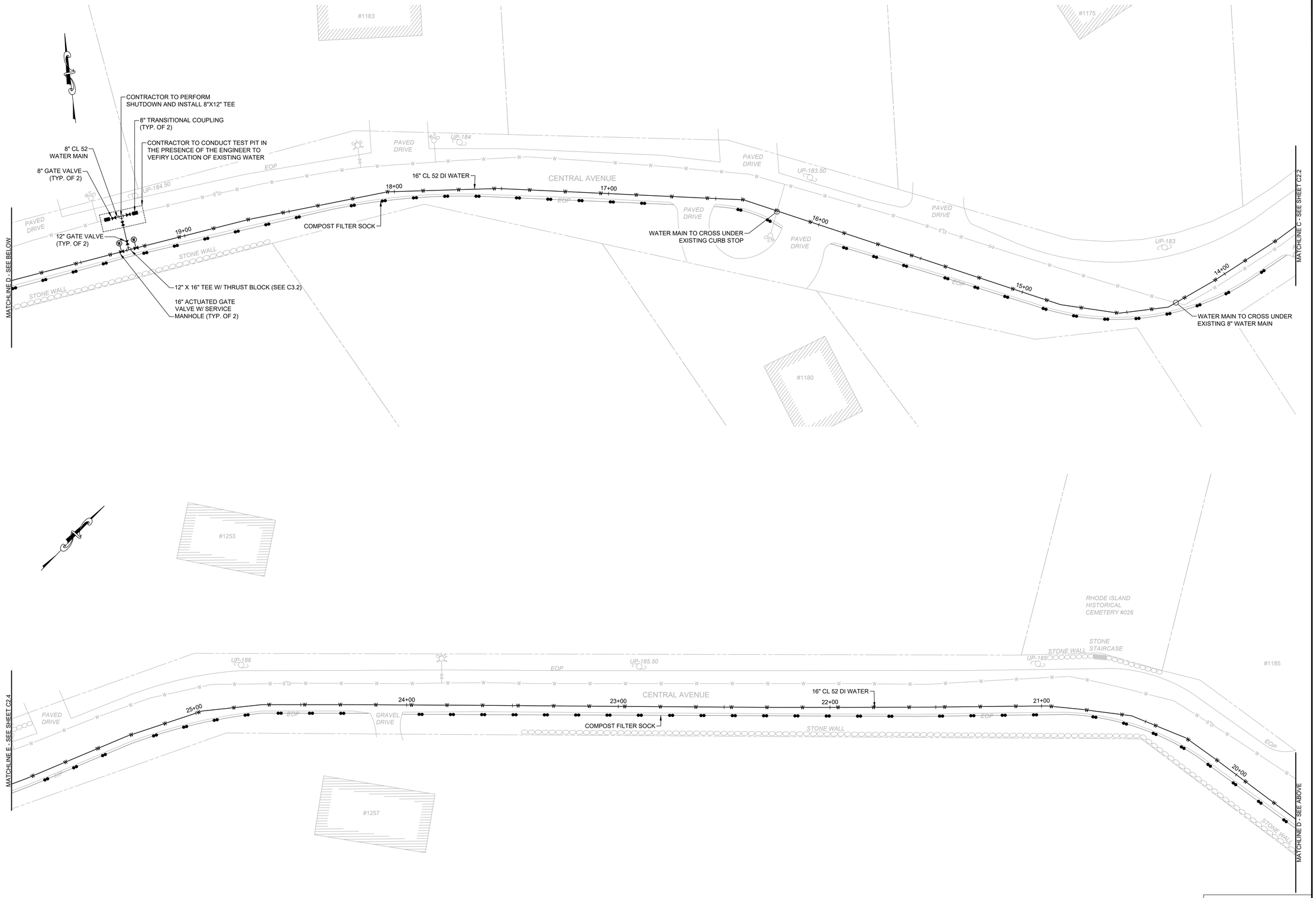

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APPROVED BY:	SPD

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SITE PLAN 3

DRAWING NO.:

C2.3

SHEET NO. 5 OF 13

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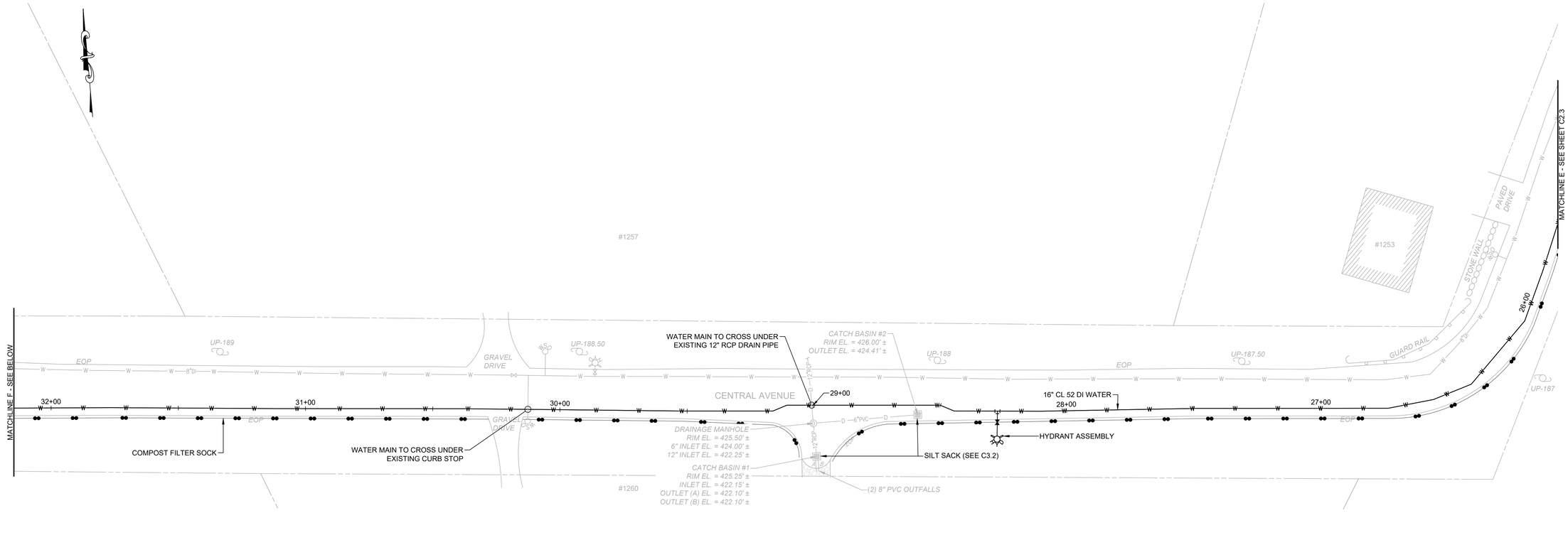

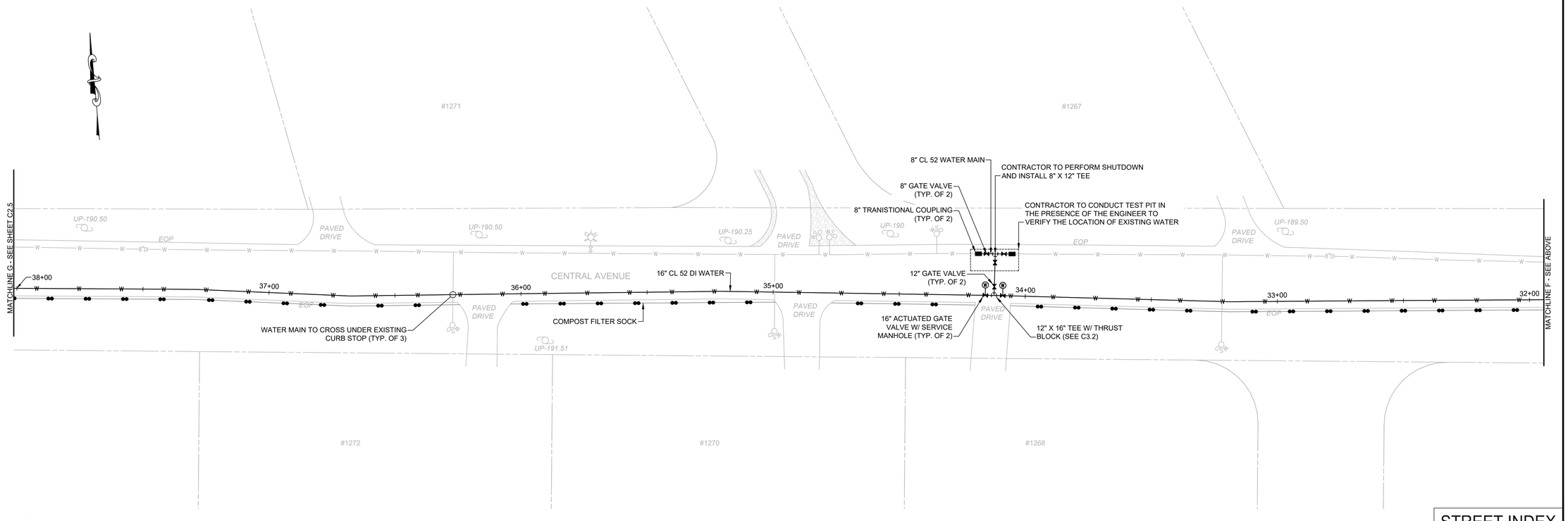

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Johnston, Rhode Island

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APPROVED BY:	SPD

DRAWING TITLE:

SITE PLAN 4

DRAWING NO.:

C2.4

SHEET NO. 6 OF 13

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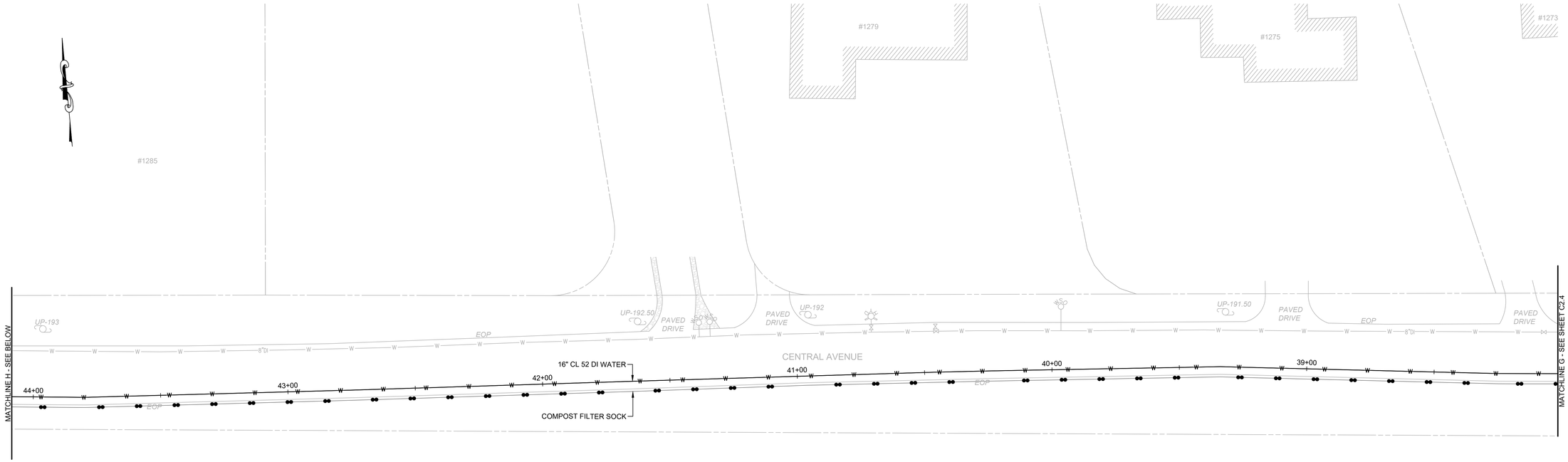

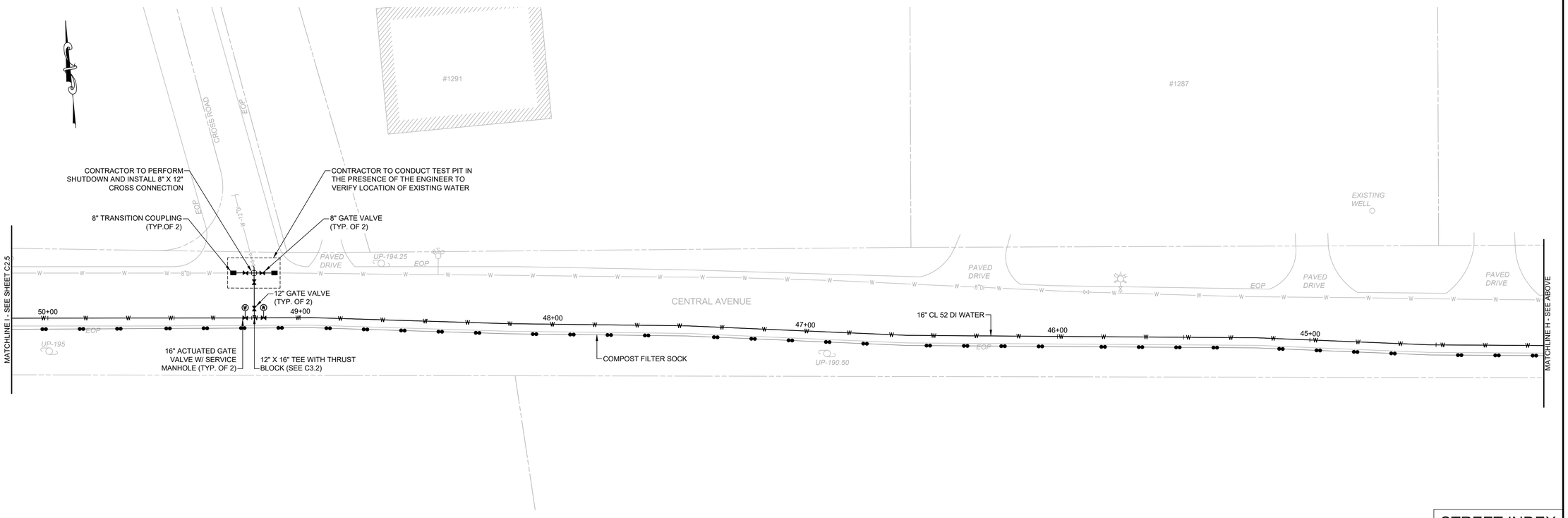

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WESTERN JOHNSTON HSA EXPANSION
CONTRACT 3 - CENTRAL AVE TRANSMISSION MAIN

Johnston, Rhode Island

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DRAWN BY:	MDD
APPROVED BY:	SPD

DRAWING TITLE:

SITE PLAN 5

DRAWING NO.:

C2.5

SHEET NO. 7 OF 13

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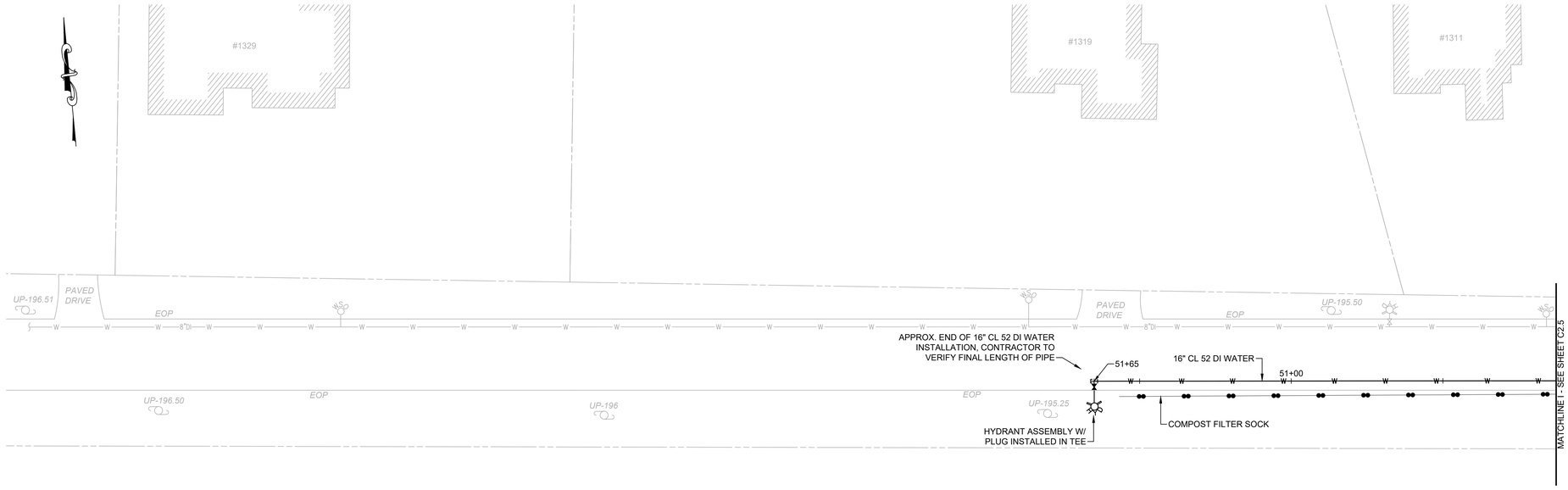

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Johnston, Rhode Island

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APPROVED BY:	SPD

DRAWING TITLE:

SITE PLAN 6

DRAWING NO.:

C2.6

SHEET NO. 8 OF 13

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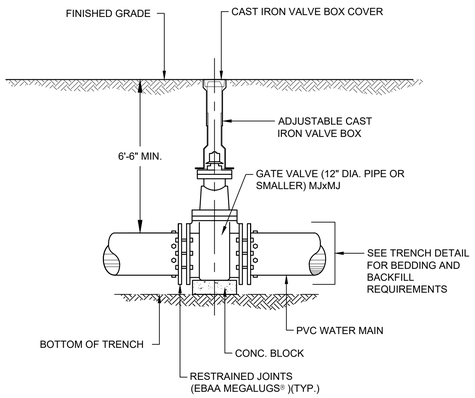
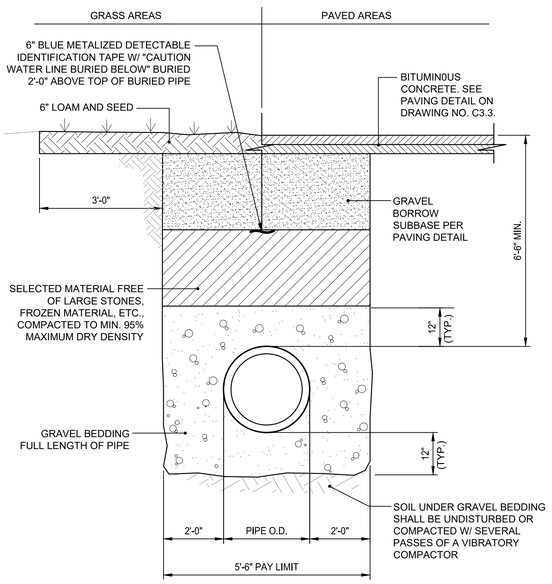


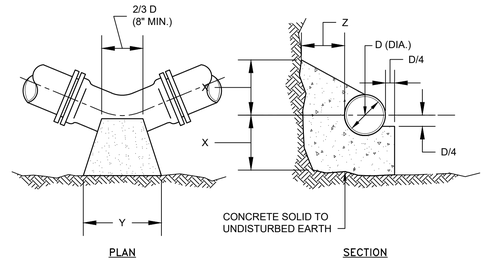
VALVE BOX DETAIL

NOT TO SCALE

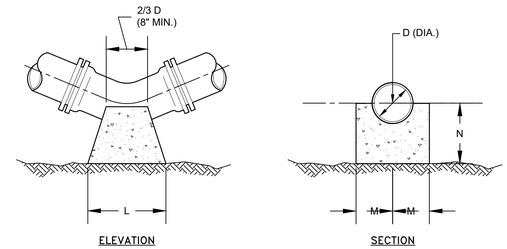


WATER TRENCH DETAIL

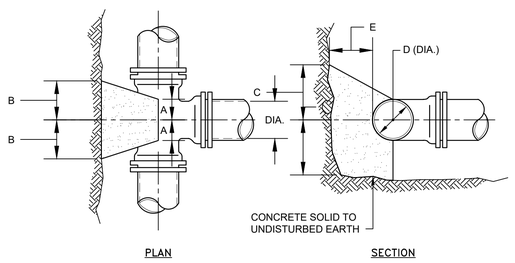
NOT TO SCALE



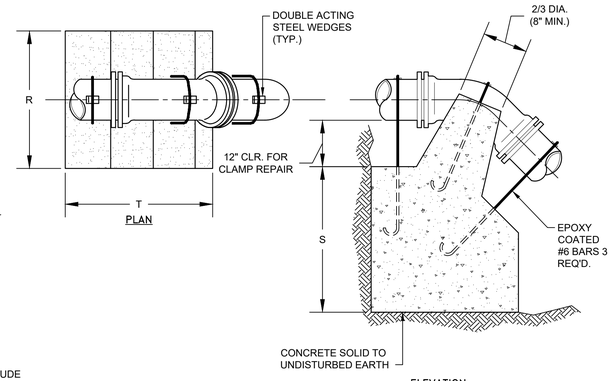
HORIZONTAL BENDS



VERTICAL BENDS



TEES



CONC. ANCHORAGE

NOTES:

1. ALL CONCRETE SHALL BE 5,000 PSI AND SHALL NOT CONTAIN CHLORIDES.
2. CONCRETE THRUST BLOCKS SHALL BEAR AGAINST UNDISTURBED EARTH AND SHALL INCLUDE RESTRAINED JOINTS.
3. ALL BENDS, TEES, MAIN TAPS, AND END CAPS SHALL REQUIRE A CONCRETE THRUST BLOCK.

TEES		PIPE SIZE–D (DIA.)				
		6"	8"	12"	16"	20"
A		8"	10"	1'–0"	1'–3"	1'–6"
B		8"	10"	1'–2"	1'–4"	1'–6"
C		10"	1'–0"	1'–3"	1'–6"	1'–8"
E		8"	10"	1'–2"	1'–6"	1'–10"

HORIZONTAL BENDS		PIPE SIZE–D (DIA.)				
BEND		6"	8"	12"	16"	20"
1/8	X	1'–0"	1'–0"	1'–0"	1'–3"	1'–6"
	Y	1'–0"	1'–6"	2'–0"	2'–6"	3'–0"
	Z	8"	10"	1'–2"	1'–4"	1'–6"
1/16	X	1'–0"	1'–0"	1'–0"	1'–3"	1'–6"
	Y	1'–0"	1'–4"	1'–6"	1'–9"	2'–6"
	Z	8"	10"	1'–2"	1'–4"	1'–6"
1/32	X	1'–0"	1'–0"	1'–0"	1'–2"	1'–4"
	Y	1'–0"	1'–0"	1'–2"	1'–4"	1'–6"
	Z	8"	10"	1'–2"	1'–4"	1'–6"

VERTICAL BENDS		PIPE SIZE–D (DIA.)				
BEND		6"	8"	12"	16"	20"
1/8	L	1'–3"	1'–8"	2'–6"	3'–6"	4'–8"
	M	7"	8"	11"	1'–4"	1'–6"
	N	7"	8"	11"	1'–4"	1'–6"
1/16	L	9"	1'–0"	1'–9"	2'–6"	3'–0"
	M	7"	7"	10"	1'–0"	1'–2"
	N	7"	7"	8"	10"	1'–0"
1/32	L	6"	8"	1'–0"	1'–4"	1'–9"
	M	7"	7"	10"	1'–0"	1'–2"
	N	7"	7"	8"	10"	1'–0"

ANCHORAGES		PIPE SIZE–D (DIA.)				
BEND		6"	8"	12"	16"	20"
1/8	R	2'–6"	3'–0"	4'–6"	5'–4"	6'–0"
	S	2'–6"	2'–9"	3'–6"	2'–6"	5'–6"
	T	3'–0"	4'–0"	4'–9"	7'–0"	9'–6"
1/16	R	2'–0"	2'–8"	4'–0"	4'–6"	5'–0"
	S	1'–9"	2'–3"	2'–6"	3'–2"	3'–8"
	T	2'–6"	3'–4"	4'–0"	6'–0"	8'–6"
1/32	R	1'–6"	2'–0"	3'–0"	3'–8"	4'–3"
	S	1'–3"	1'–9"	2'–0"	2'–4"	2'–6"
	T	2'–0"	2'–6"	3'–0"	4'–6"	5'–9"

THRUST BLOCK DETAILS

NOT TO SCALE

STREET INDEX

THIS PLAN IS TO BE INDEXED UNDER THE FOLLOWING STREETS
BISHOP HILL ROAD
CROSS ROAD

PARE

SCALE ADJUSTMENT GUIDE
0" 1"
BAR IS ONE INCH ON ORIGINAL DRAWING

WESTERN JOHNSTON HSA EXPANSION
CONTRACT 3 - CENTRAL AVE TRANSMISSION MAIN

Johnston, Rhode Island

REVISIONS:

PROJECT NO.:	14256.32
DATE:	FEBRUARY 2023
SCALE:	AS NOTED
DESIGNED BY:	MDD
CHECKED BY:	MGM
DRAWN BY:	MDD
APPROVED BY:	SPD

DRAWING TITLE:

DETAILS 1

DRAWING NO.:

C3.1

SHEET NO. 9 OF 13

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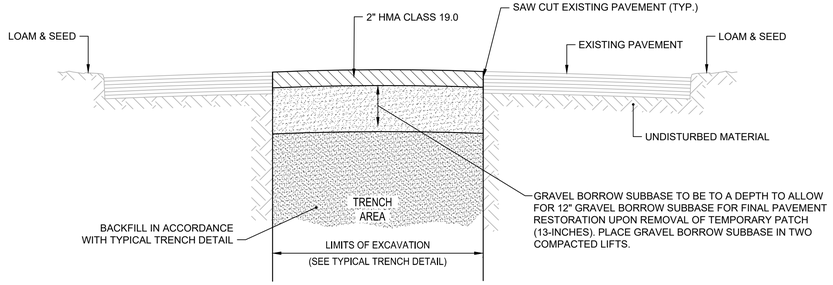
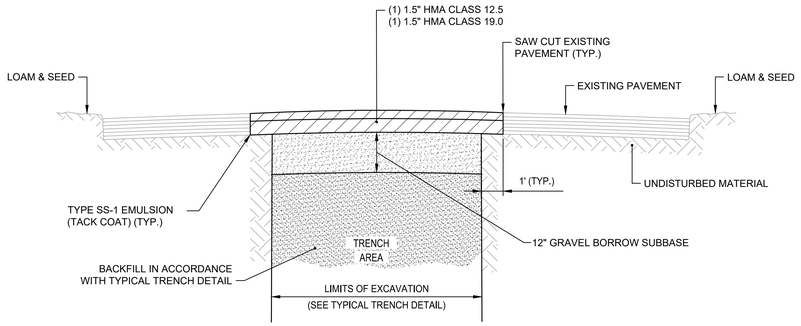


NOTES:

1. THE TEMPORARY TRENCH PATCH SHALL BE EXPOSED TO TRAFFIC A MINIMUM OF 30 DAYS BEFORE PERMANENT TRENCH PATCH INSTALLATION.

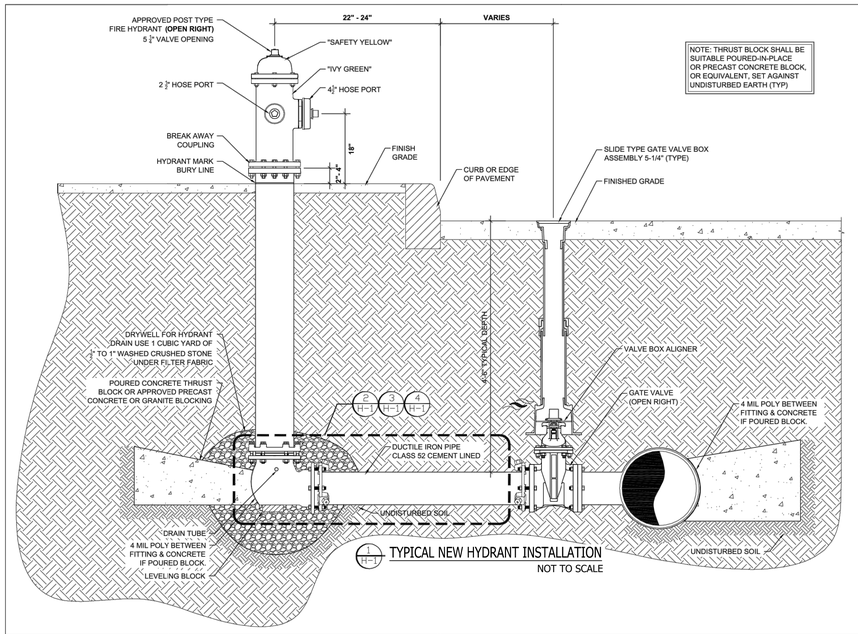
TEMPORARY TRENCH PATCH DETAIL

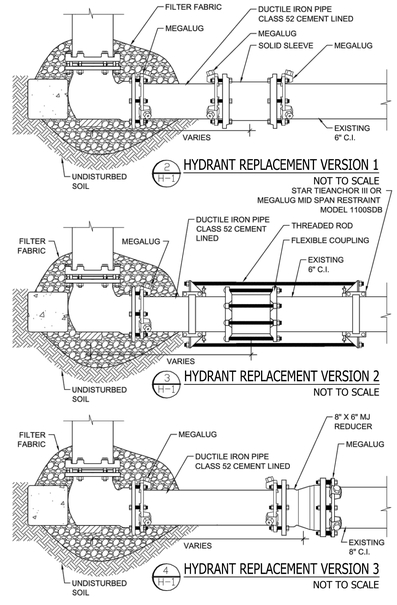
NOT TO SCALE



PERMANENT TRENCH PATCH DETAIL

NOT TO SCALE





GENERAL NOTES

1. OTHER UTILITIES ARE NOT SHOWN. CONTRACTOR SHALL NOTIFY "DIG-SAFE" & PWSB PRIOR TO COMMENCING WORK.
2. NEW WATER PIPE SHALL BE TESTED AND CHLORINATED IN ACCORDANCE WITH PROVIDENCE WATER STANDARDS AND AS DIRECTED BY PROVIDENCE WATER.
3. NEW WATER PIPE SHALL BE CEMENT-LINED DUCTILE IRON PIPE, CLASS 52, CONFORMING TO THE LATEST AWWA STANDARDS.
4. PIPE FITTINGS SHALL BE CEMENT-LINED DUCTILE IRON, CLASS 350, WITH MECHANICAL JOINT ENDS.
5. UNLESS OTHERWISE NOTED, EARTH COVER OVER PIPE SHALL NOT BE LESS THAN 4'-6".
6. GATE VALVES SHALL BE RESILIENT SEAT TYPE WITH MECHANICAL JOINT ENDS AND SHALL OPEN "RIGHT" (CLOCKWISE).
7. METALLIZED, DETECTABLE, IDENTIFICATION TAPE SHALL BE 2-INCHES WIDE, BLUE IN COLOR, AND IMPRINTED WITH THE WORDS "CAUTION - WATER LINE BURIED BELOW", AND SHALL BE INSTALLED OVER ALL MAINS AND HYDRANT RUN-OUTS AT A DEPTH OF 12-INCHES BELOW FINISHED GRADE.
8. UNLESS OTHERWISE NOTED, BREAKAWAY TYPE HYDRANTS, SHALL BE INSTALLED WITH OPERATING NUT POSITIONED 22-24 INCHES BEHIND FACE OF CURB OR EDGE OF PAVEMENT. THE BREAKAWAY FLANGE SHALL BE SET 2-INCHES TO 4-INCHES ABOVE FINISHED GRADE. HYDRANTS SHALL OPEN "RIGHT" (CLOCKWISE).
9. PROPERLY SIZED CONCRETE THRUST BLOCKS SHALL BE INSTALLED AT CHANGES OF PIPE DIRECTION (TEES, BENDS, ETC) AND/OR DEAD ENDS IN ACCORDANCE WITH PROVIDENCE WATER STANDARDS. FURTHERMORE, MECHANICAL JOINT THRUST RESTRAINTS SHALL BE PLACED ON EACH SIDE OF FITTINGS AND AT PIPE JOINTS TO SUFFICIENTLY RESTRAIN AN ADEQUATE LENGTH OF PIPE AWAY FROM FITTINGS AT 1-1/2 TIMES THE STATIC PRESSURE, OR NOT LESS THAT 150 PSI.

GENERAL NOTES

APPROVED HYDRANTS

- KENNEDY GUARDIAN HYDRANT - K81D
- MUELLER SUPER CENTURION - A423

HYDRANTS MUST BE "HYDRA-SHIELD CUSTODIAN" READY.

HYDRANT EXTENSION KITS AND TRAFFIC REPAIR KITS MUST BE AVAILABLE FROM THE MANUFACTURER BY THE ORIGINAL HYDRANT MANUFACTURER & CONSIDERED "ORIGINAL EQUIPMENT", SUBSTITUTES ARE NOT ALLOWED.

TYPICAL LOW SERVICE HYDRANT WOULD HAVE A DEPTH OF 5 FEET

TYPICAL HIGH SERVICE HYDRANT WOULD HAVE A DEPTH OF 5 FEET 6 INCHES

NOTE: FOR REPLACEMENT OF EXISTING HYDRANTS THE DEPTH SHOULD BE DETERMINED PRIOR TO INSTALLATION TO ASSURE THAT NEW HYDRANT IS OF PROPER DEPTH

FOR NEW HYDRANTS WITH A LATERAL LONGER THAN 10 FT, THE HYDRANT ASSEMBLY SHALL INCLUDE 8" DI PIPE LATERAL, AN 8" GATE VALVE, AND AN 8" X 6" REDUCER

Providence Water

PWSB NEW HYDRANT INSTALLATION & REPLACEMENTS

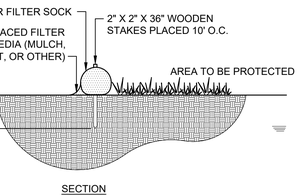
DRAWN BY _____ CHECKED BY _____

SCALE _____ DATE _____

DIRECTOR OF ENGINEERING _____

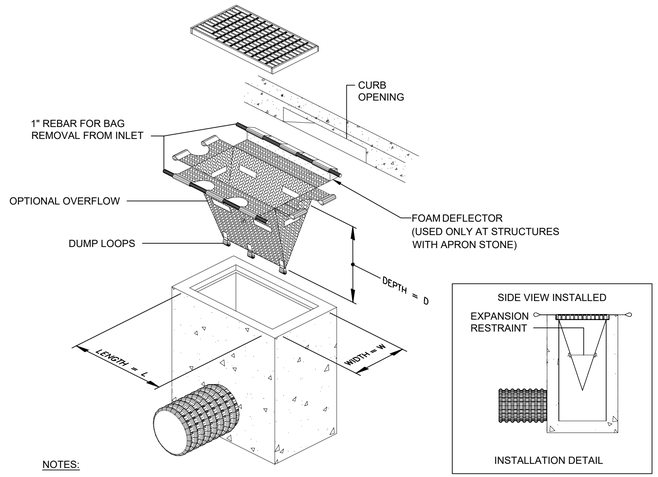
TYPICAL DETAILS

H-1
SHEET NUMBER
1 of 1



FILTER SOCK SEDIMENTATION CONTROLS

NOT TO SCALE



NOTES:

1. INLET SEDIMENT CONTROL DEVICES SHALL BE INSTALLED IN EACH CATCH BASIN WITHIN THE PROJECT LIMITS AND ANY OTHER CATCH BASIN AS DIRECTED BY THE ENGINEER.

INLET SEDIMENT CONTROL DEVICE

(WITH OPTIONAL CURB DEFLECTOR) NOT TO SCALE

STREET INDEX

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BISHOP HILL ROAD
CROSS ROAD

PARE

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0" 1"
BAR IS ONE INCH ON ORIGINAL DRAWING

WESTERN JOHNSTON HSA EXPANSION
CONTRACT 3 - CENTRAL AVE TRANSMISSION MAIN

Johnston, Rhode Island

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CHECKED BY:	MGM
DRAWN BY:	MDD
APPROVED BY:	SPD

DRAWING TITLE:

DETAILS 2

DRAWING NO.:
C3.2

SHEET NO. 10 OF 13

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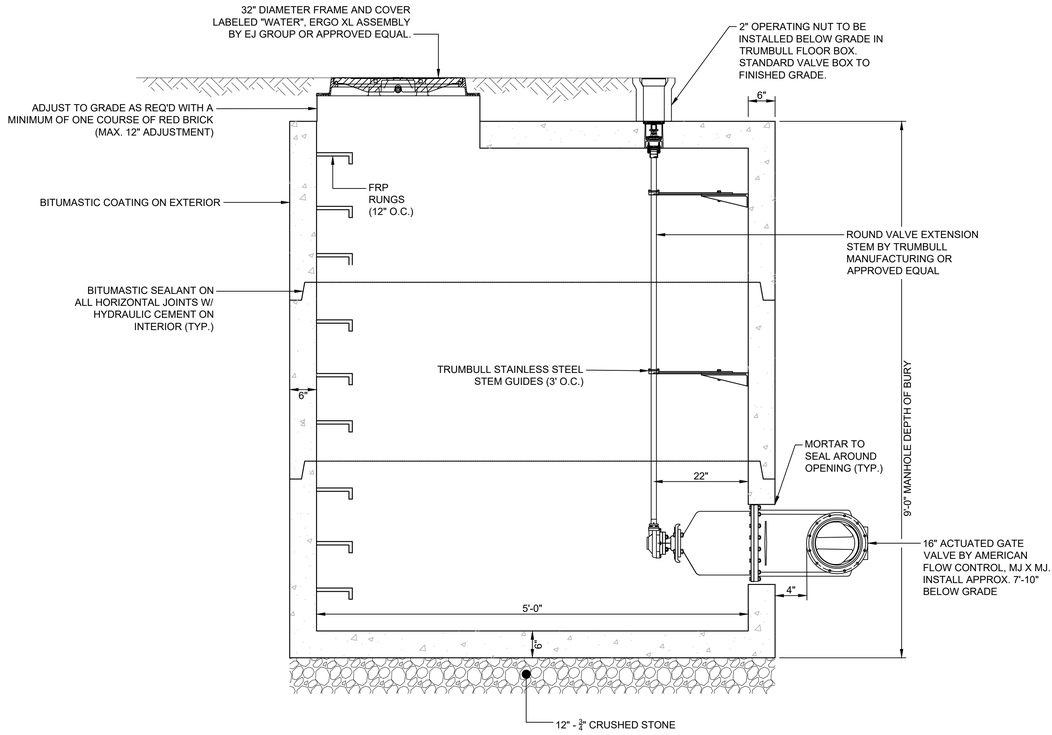
RESTRAINED PIPE LENGTHS FOR RESTRAINED JOINTS	
FITTING	FEET OF PIPE REQUIRING RESTRAINT
6" 22° BEND	2 FEET PLUS ONE JOINT ON BOTH SIDES OF BEND
6" 45° BEND	4 FEET PLUS ONE JOINT ON BOTH SIDES OF BEND
6" BRANCH ON TEE	18 FEET PLUS ONE JOINT ON TEE BRANCH
6" DEAD END	18 FEET PLUS ONE JOINT
8" X 6" REDUCER	10 FEET PLUS ONE JOINT ON THE 8" SIDE
8" 22° BEND	2 FEET PLUS ONE JOINT ON BOTH SIDES OF BEND
8" 45° BEND	4 FEET PLUS ONE JOINT ON BOTH SIDES OF BEND
8" BRANCH ON TEE	23 FEET PLUS ONE JOINT ON TEE BRANCH
8" DEAD END	23 FEET PLUS ONE JOINT
12" X 8" REDUCER	18 FEET PLUS ONE JOINT ON THE 8" SIDE
12" 22° BEND	3 FEET PLUS ONE JOINT ON BOTH SIDES OF BEND
12" 45° BEND	6 FEET PLUS ONE JOINT ON BOTH SIDES OF BEND
12" 90° BEND	14 FEET PLUS ONE JOINT ON BOTH SIDES OF BEND
12" BRANCH ON TEE	33 FEET PLUS ONE JOINT ON TEE BRANCH
12" DEAD END	33 FEET PLUS ONE JOINT
16" X 12" REDUCER	18 FEET PLUS ONE JOINT ON THE 8" SIDE
16" 22° BEND	4 FEET PLUS ONE JOINT ON BOTH SIDES OF BEND
16" 45° BEND	8 FEET PLUS ONE JOINT ON BOTH SIDES OF BEND
16" BRANCH ON TEE	43 FEET PLUS ONE JOINT ON TEE BRANCH
16" DEAD END	43 FEET PLUS ONE JOINT
20" X 16" REDUCER	19 FEET PLUS ONE JOINT ON THE 8" SIDE
20" 22° BEND	5 FEET PLUS ONE JOINT ON BOTH SIDES OF BEND
20" 45° BEND	9 FEET PLUS ONE JOINT ON BOTH SIDES OF BEND
20" BRANCH ON TEE	52 FEET PLUS ONE JOINT ON TEE BRANCH
20" DEAD END	150 FEET (POLY WRAP) OR 52 FEET (BARE), PLUS ONE JOINT
30" 22° BEND	6 FEET PLUS ONE JOINT ON BOTH SIDES OF BEND
30" 45° BEND	13 FEET PLUS ONE JOINT ON BOTH SIDES OF BEND
30" BRANCH ON TEE	74 FEET PLUS ONE JOINT ON TEE BRANCH
30" DEAD END	74 FEET PLUS ONE JOINT

NOTES:

1. RESTRAINED JOINTS SHALL BE MECHANICAL OR PUSH ON WITH FIELD LOCK GASKET. TIE RODS AND FRICTION CLAMPS SHALL ONLY BE USED WHEN APPROVED BY ENGINEER.
2. TABLE ASSUMES BARE DUCTILE IRON PIPE IN A TYPE 5 TRENCH TESTED AT 150 PSI, IF CONTRACTOR SHOULD INSTALL A DIFFERNT SYTLE TRENCH, POLY WRAP DUCTILE IRON, C-900 SLEEVE, ETC. CONTRACTOR SHALL RECEIVE DIRECTION FROM THE ENGINEER ON RESTRAINED LENGTHS.

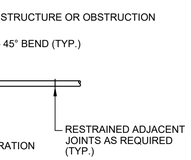


NOTE:

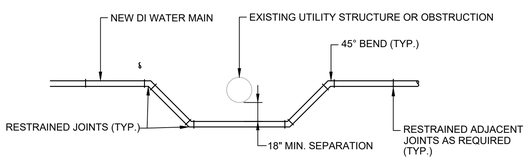
1. CONCRETE: 5,000 PSI MINIMUM @ 28 DAYS.
2. MANHOLE SHALL BE DESIGNED TO MEET HS-20 LOADING.

WATER SERVICE MANHOLE

NOT TO SCALE



HORIZONTAL OFFSET PLAN VIEW



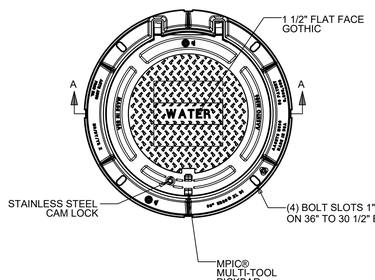
VERTICAL OFFSET PROFILE VIEW

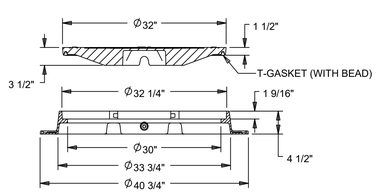
NOTES:

1. ALL JOINTS WITHIN OFFSET SHALL BE RESTRAINED MECHANICAL JOINT.
2. OFFSET CAN BE ABOVE OR BELOW CONFLICT UTILITY OR ON EITHER SIDE OF HORIZONTAL OBSTRUCTION.

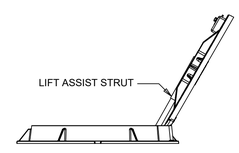
UTILITY OFFSET

NOT TO SCALE





SECTION A-A



COVER IN 120° RESTING POSITION

MANHOLE COVER DETAIL

NOT TO SCALE

STREET INDEX

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CROSS ROAD

PARE

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0" 1"
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WESTERN JOHNSTON HSA EXPANSION
CONTRACT 3 - CENTRAL AVE TRANSMISSION MAIN

Johnston, Rhode Island

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APPROVED BY:	SPD

DRAWING TITLE:

DETAILS 3

DRAWING NO.:

C3.3

SHEET NO. 11 OF 13

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NOTES:

1. ALL TEMPORARY TRAFFIC CONTROL SET-UPS AND DEVICES AND THEIR INSTALLATION, MAINTENANCE, AND REMOVAL SHALL CONFORM TO THE LATEST EDITION OF THE "MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES" (MUTCD) WITH ALL REVISIONS, AND THE LATEST EDITION OF THE "RIDOT STANDARD SPECIFICATIONS FOR ROAD AND BRIDGE CONSTRUCTION" WITH ALL REVISIONS.
2. ALL TEMPORARY TRAFFIC CONTROL DEVICES SHALL BE IN PLACE PRIOR TO THE START OF WORK.
3. ALL TEMPORARY TRAFFIC CONTROL DEVICES SHALL BE REMOVED AS SOON AS PRACTICAL WHEN THEY ARE NO LONGER NEEDED. WHEN WORK IS SUSPENDED FOR SHORT PERIODS OF TIME, TEMPORARY TRAFFIC CONTROL DEVICES THAT ARE NO LONGER APPROPRIATE SHALL BE REMOVED OR COVERED.
4. DISTANCES ARE A GUIDE AND MAY BE ADJUSTED IN THE FIELD BY THE ENGINEER.
5. THE BUFFER SPACES SHOULD BE EXTENDED IF NECESSARY SO THAT THE 100' MAX. TWO-WAY TRAFFIC TAPERS ARE PLACED BEFORE THE HORIZONTAL (OR CREST VERTICAL) CURVES TO PROVIDE ADEQUATE SIGHT DISTANCE FOR THE FLAGGERS AND QUEUES OF STOPPED VEHICLES.
6. THE MAXIMUM SPACING BETWEEN THE FLUORESCENT TRAFFIC CONES FOR TAPER AND TANGENT SECTIONS ON CENTRAL AVENUE SHALL BE TWENTY-FIVE (25) FEET. ON SIDE STREETS, THE MAXIMUM SHALL BE TWENTY-FIVE (25) FEET.
7. MINIMUM LANE WIDTH IS TO BE 10 FEET UNLESS OTHERWISE SHOWN. MINIMUM LANE WIDTH TO BE MEASURED FROM THE EDGE OF THE CHANNELIZATION DEVICES.
8. ACCESS TO ALL BUSINESSES AND RESIDENCES WITHIN THE WORK AREA SHALL BE MAINTAINED AT ALL TIMES.
9. TEMPORARY CONSTRUCTION SIGNS SHALL BE PLACED BEHIND THE BACK OF SIDEWALK, OR BEHIND THE EDGE OF PAVEMENT WHERE THERE IS NO SIDEWALK. THE CONTRACTOR SHALL ENSURE THAT A 36" UNOBSTRUCTED MINIMUM CLEARANCE IS PROVIDED AT ALL TIMES AT SIDEWALKS OPEN TO PEDESTRIANS. WHERE THERE IS INSUFFICIENT WIDTH, THE CONTRACTOR SHALL COORDINATE WITH THE ENGINEER TO PROVIDE MOUNTED SIGNS WITH THE BOTTOM OF THE SIGN OVERHANG NO LESS THAN 84" HIGH IN ORDER TO MEET ADA STANDARDS.
10. TEMPORARY CONSTRUCTION ADVANCED WARNING SIGNS POSTED ON MINOR INTERSECTING STREETS SHOWN IN THE "TYPICAL CLOSURE AT SIDE OF INTERSECTION" DETAIL, MAY BE PLACED 100 FT APART.
11. PLASTIC PIPE BARRICADES SHALL BE EQUIPPED WITH TYPE A WARNING LIGHTS IN ACCORDANCE WITH SECTION 6F.83 OF THE MOST RECENT EDITION OF THE MUTCD, INCLUDING ALL REVISIONS AND ADDENDA. PLASTIC PIPE BARRICADES SHOULD NOT BE SPACED MORE THAN 5 FEET APART WHEN REQUIRED FOR ROAD CLOSURES.
12. THE CONTRACTOR SHALL UTILIZE DRUM BARRICADES FOR TEMPORARY TRAFFIC CONTROL SETUPS WHEN NO WORKERS ARE PRESENT. FLUORESCENT TRAFFIC CONES SHALL BE USED DURING CONSTRUCTION OPERATION WHEN WORKERS ARE PRESENT.
13. THE SIZES OF ALL DIAMOND SHAPED ADVANCED WARNING SIGNS SHALL BE 36"x36".
14. WHERE A SIDE STREET INTERSECTS THE WORK ZONE, ADDITIONAL TEMPORARY TRAFFIC CONTROL DEVICES SHALL BE INSTALLED IN ACCORDANCE WITH PART 6 OF THE MUTCD.
15. THE CONTRACTOR SHALL PROVIDE NECESSARY ACCESS FOR FIRE APPARATUS AND OTHER EMERGENCY VEHICLES THROUGH THE WORK ZONE AT ALL TIMES.

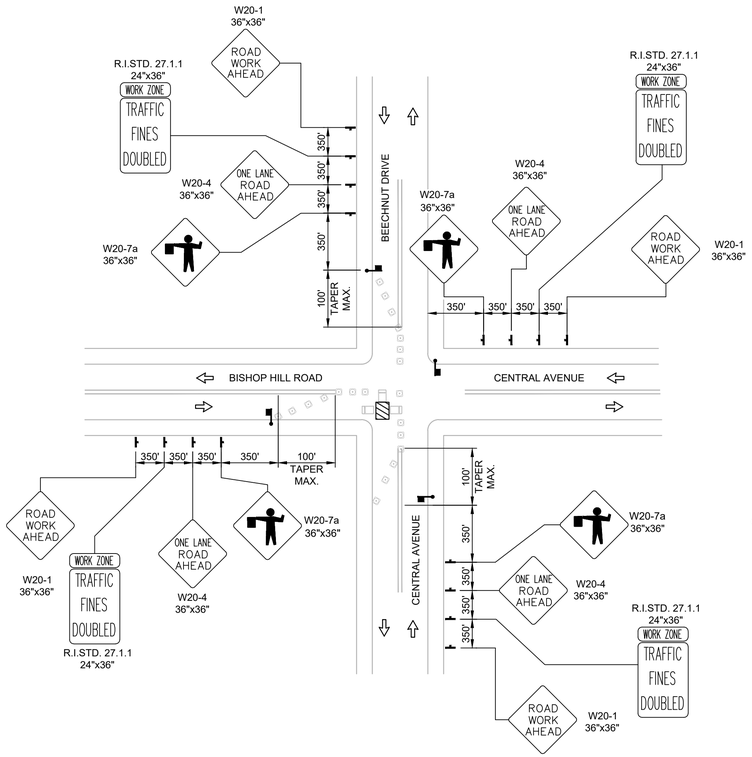
DETOUR NOTES:

1. SEE "TEMPORARY TRAFFIC CONTROL PLAN 2" FOR DETOUR PLAN
2. THE DETOUR MUST BE IN PLACE PRIOR TO THE CLOSING OF THE WORK AREA.
3. ALL SIGNS MAY BE FIELD ADJUSTED AS DIRECTED BY THE ENGINEER.
4. THE CONTRACTOR SHALL COVER ALL SIGNS WHEN THE DETOUR IS NOT IN PLACE.
5. CONTRACTOR TO REMOVE BARRIES AS NECESSARY TO GAIN ACCESS TO THE SITE. THIS WORK SHALL BE CONSIDERED INCIDENTAL TO TRAFFIC MANAGEMENT.
6. TRAFFIC POLICE OFFICERS SHALL BE POSITIONED AT ALL SIGNALIZED INTERSECTIONS AS DIRECTED BY THE ENGINEER.
7. DETOUR SHALL NOT BE IMPLEMENTED UNLESS WRITTEN PRIOR APPROVAL HAS BEEN COORDINATED WITH TOWN. THE CONTRACTOR SHALL NOTIFY THE TOWN 48 HOURS IN ADVANCE OF THE ANTICIPATED CLOSURE.
8. THE PROPOSED DETOUR SHALL ONLY BE IMPLEMENTED FOR THE SECTION OF CENTRAL AVE SHOWN ON TEMPORARY TRAFFIC CONTROL PLAN NO. 2 . ALL OTHER WORK IS EXPECTED TO BE COMPLETED USING DAILY SET-UPS. IF ADDITIONAL DETOURS ARE NEEDED, THE CONTRACTOR SHALL RECEIVE WRITTEN APPROVAL FROM THE TOWN OF JOHNSTON 48 HOURS IN ADVANCE OF ANY CLOSURE.
9. THE PROPOSED DETOUR SHALL ONLY BE IMPLEMENTED DURING THE HOURS OF 7:00 AM TO 6:00 PM. THE ROADWAY SHALL BE OPEN TO NORMAL TRAFFIC FLOWS DURING NON-WORKING HOURS.

PORTABLE CHANGEABLE MESSAGE SIGNS

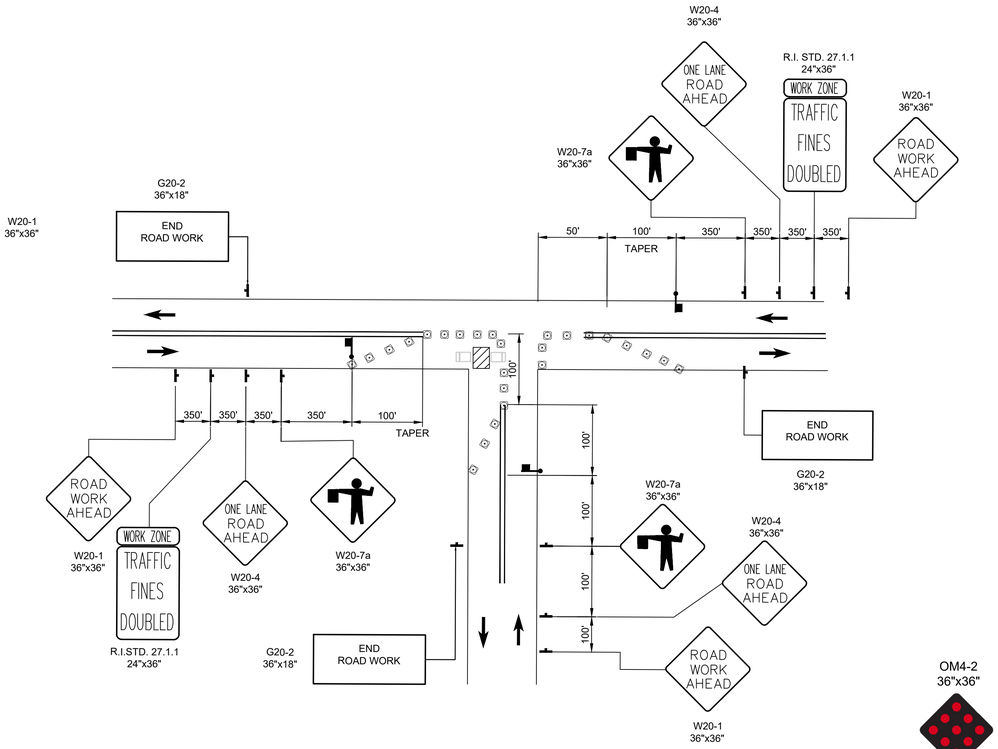
1. PORTABLE CHANGEABLE MESSAGE SIGNS (PCMS) SHALL BE PLACED ON THE SHOULDER OF THE ROADWAY OR, IF PRACTICAL, SET WELL AWAY FROM THE TRAVEL LANE. MESSAGE SIGNS SHOULD BE PROTECTED WITH RETROREFLECTIVE TEMPORARY TRAFFIC CONTROL DEVICES WHEN PLACED WITHIN THE AVAILABLE CLEAR ZONE OR ELSE SHIELDED WITH BARRIER OR CRASH CUSHION. THE LOCATION AND USE OF THE PCMS SHALL BE DETERMINED DURING THE PRE-CONSTRUCTION MEETING OR AS DIRECTED BY THE RESIDENT ENGINEER. THE SUGGESTED MESSAGE SHALL BE DISPLAYED TWO WEEKS IN ADVANCED OF CONSTRUCTION AND SHOULD READ AS FOLLOWS:

PCMS-A	MESSAGE 1	MESSAGE 2
	ROAD	FROM
	CLOSED	TIME TO
	DATE	TIME



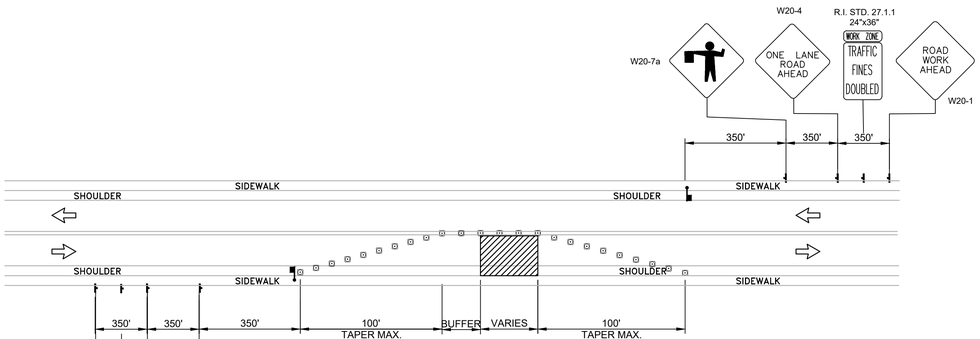
TYPICAL CLOSURE AT SIDE OF INTERSECTION

NOT TO SCALE



TYPICAL CLOSURE AT SIDE OF "T" INTERSECTION

NOT TO SCALE

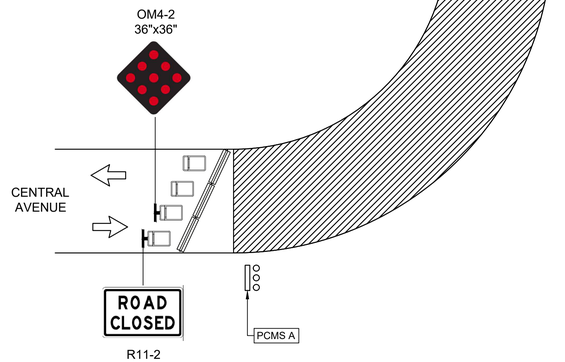


TYPICAL LANE CLOSURE DETAIL ON TWO-LANE ROADWAY

NOT TO SCALE

LEGEND:

- DRUM, R.I. STD. 26.2.0 OR FLUORESCENT TRAFFIC CONE R.I. STD. 26.1.0
- DIRECTION OF TRAFFIC
- TEMPORARY SIGN
- WORK AREA
- PLASTIC PIPE BARRICADE R.I. STD. 26.3.0
- FLAG PERSON
- UNANCHORED BARRIER FOR TEMPORARY TRAFFIC CONTROL (TL-3)
- PCMS — PORTABLE CHANGEABLE MESSAGE SIGN (PMCS)



TYPICAL ROAD CLOSURE

NOT TO SCALE

STREET INDEX

THIS PLAN IS TO BE INDEXED UNDER THE FOLLOWING STREETS
BISHOP HILL ROAD
CROSS ROAD

PARE

SCALE ADJUSTMENT GUIDE
0" 1"
BAR IS ONE INCH ON ORIGINAL DRAWING

WESTERN JOHNSTON HSA EXPANSION
CONTRACT 3 - CENTRAL AVE TRANSMISSION MAIN
Johnston, Rhode Island

REVISIONS:

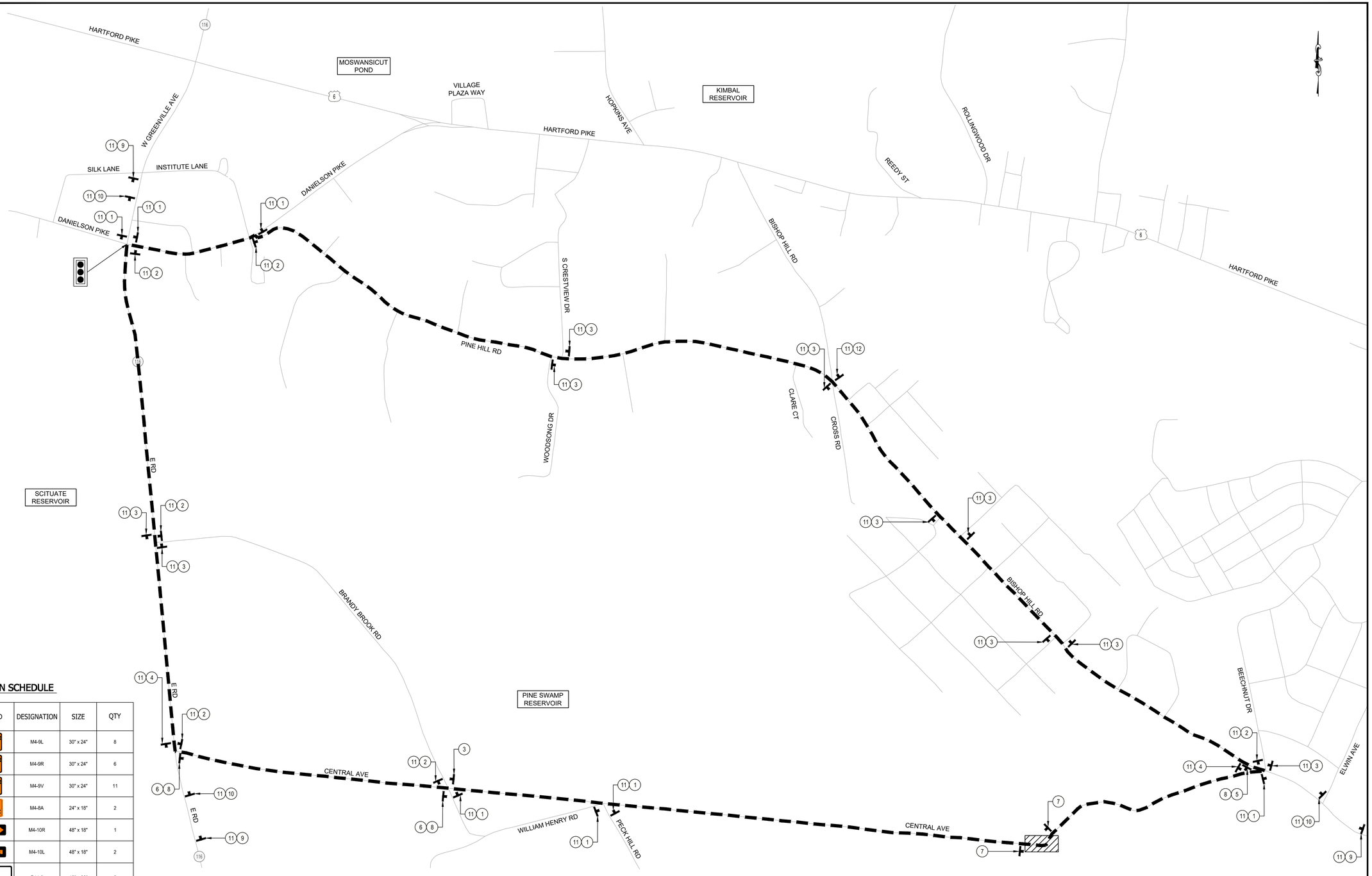
PROJECT NO.:	14256.32
DATE:	FEBRUARY 2023
SCALE:	AS NOTED
DESIGNED BY:	MDD
CHECKED BY:	MGM
DRAWN BY:	MDD
APPROVED BY:	SPD

DRAWING TITLE:
TEMPORARY TRAFFIC CONTROL PLAN 1

DRAWING NO.:
C4.1

SHEET NO. 12 OF 13

z:\JOBS\14_Jobs\14256.32_pare\water_johnston_base_r1\DWGS\watermain\TTCP_1.dwg



DETOUR SIGN SCHEDULE

SYM.	LEGEND	DESIGNATION	SIZE	QTY
1	DETOUR	M4-9L	30" x 24"	8
2	DETOUR	M4-9R	30" x 24"	6
3	DETOUR	M4-9V	30" x 24"	11
4	END DETOUR	M4-8A	24" x 18"	2
5	DETOUR	M4-10R	48" x 18"	1
6	DETOUR	M4-10L	48" x 18"	2
7	ROAD CLOSED	R11-2	48" x 30"	2
8	ROAD CLOSED AHEAD LOCAL TRAFFIC ONLY	R11-3A	60" x 30"	3
9	ROAD CLOSED AHEAD	W20-3	36" x 36"	3
10	FOLLOW DETOUR	SP-1	36" x 36"	3
11	CENTRAL AVE	SP-2	30" x 18"	32
12	DETOUR	SP-3	30" x 24"	1

NOTES:

1. SEE "TEMPORARY TRAFFIC CONTROL PLAN 1" FOR NOTES PERTAINING TO THIS SHEET.
2. SEE "TEMPORARY TRAFFIC CONTROL PLAN 1" FOR "TYPICAL ROAD CLOSURE" DETAIL.

LEGEND:

- TEMPORARY SIGN
- WORK ZONE
- SIGNALIZED INTERSECTION
- DETOUR ROUTE

Scale: 1"=500'
0 250' 500' 1000'

STREET INDEX

THIS PLAN IS TO BE INDEXED UNDER THE FOLLOWING STREETS
BISHOP HILL ROAD
CROSS ROAD

PARE

SCALE ADJUSTMENT GUIDE
0" 1"
BAR IS ONE INCH ON ORIGINAL DRAWING

WESTERN JOHNSTON HSA EXPANSION
CONTRACT 3 - CENTRAL AVE TRANSMISSION MAIN

Johnston, Rhode Island

REVISIONS:

PROJECT NO.:	14256.32
DATE:	FEBRUARY 2023
SCALE:	1" = 500'
DESIGNED BY:	MDD
CHECKED BY:	MGM
DRAWN BY:	MDD
APPROVED BY:	SPD

DRAWING TITLE:

TEMPORARY TRAFFIC CONTROL PLAN 2

DRAWING NO.:
C4.2

SHEET NO. 13 OF 13

z:\JOBS\14 Jobs\14256.32 prowatter-johnston tank-rr\DWGS\watermain\TCP 2.dwg

PROJECT MANUAL AND SPECIFICATIONS

Contract 3

Central Avenue Transmission Main Installation

Johnston, Rhode Island

Prepared for:

PROVIDENCE WATER

Providence Water
125 Dupont Drive
Providence, RI 02907

Project No. 3-0848-20216

Prepared by:

PARE CORPORATION

Pare Corporation
8 Blackstone Valley Place
Lincoln, RI 02865

FEBRUARY 2023

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DIVISION 0

BIDDING AND CONTRACT REQUIREMENTS

SECTION 00200 SPECIAL INSTRUCTIONS TO BIDDERS

ARTICLES

1. AWARD & CONTRACT
2. CONDITION OF WORK
3. INFORMATION SUPPLIED TO BIDDERS
4. METHOD OF AWARD
5. EXECUTION OF THE AGREEMENT
6. NOTICE TO PROCEED
7. POWER OF ATTORNEY
8. UNCERTAINTY OF QUANTITIES
9. ITEMS NOT LISTED IN THE BID
10. BALANCED BIDDING
11. NOTICE OF SPECIAL CONDITIONS
12. JOB CONDITIONS
13. PRE-CONSTRUCTION CONFERENCE

SPECIAL INSTRUCTIONS TO BIDDERS

ARTICLE 1: AWARD AND CONTRACT

Unless otherwise specified, the Providence Water Supply Board (Providence Water, also referred to as OWNER) reserves the right to make award by item or items, or by total, as may be in the best interest of the OWNER. A written award (or acceptance of Bid) mailed (or otherwise furnished) to the successful Bidder followed by a Purchase Order shall, unless otherwise specified, be deemed to result in a binding Contract without further action by either party.

ARTICLE 2: CONDITION OF WORK

Insofar as possible, the CONTRACTOR, in carrying out his Work, must employ such methods or means as will not cause any interruption of or interference with traffic, with the use of existing facilities and utilities, with the use of municipally or State or privately-owned lands, or with the Work being performed by others. The CONTRACTOR must satisfy himself by his own investigation and research as to the nature and location of the Work, the general and local conditions, including, but not restricted to those bearing upon the transportation, disposal, handling, and storage of materials, water, electric power, roads, means of access, the construction and making of connections of the Work to existing facilities and utilities, or other similar conditions at the site, the character of equipment and facilities needed preliminary to and during the prosecution of the Work, requirements of owners and controlling authorities having jurisdiction over the various lands, existing structures, facilities and utilities, and all other conditions affecting the Work to be done and labor and materials needed.

ARTICLE 3: INFORMATION SUPPLIED TO BIDDERS

The OWNER shall provide to bidders prior to bidding all information, which is pertinent to, and delineates and describes, the land owned and rights-of-way acquired or to be acquired.

The Contract Documents contain the provisions required for the construction of the Project. Information obtained from any officer, agent, or employee of the OWNER or any other person shall not affect the risks or obligations assumed by the CONTRACTOR or relieve him from fulfilling any of the conditions of the Contract.

ARTICLE 4: METHOD OF AWARD

If, at the time this Contract is to be awarded, the lowest base bid submitted by a responsible bidder does not exceed the amount of funds then estimated by the OWNER as available to finance the Contract, the Contract may be awarded on the base bid. If such bid exceeds such amount, the OWNER expressly reserves the right to increase or decrease any class, item, or part of the Work, and this reservation includes the omission of any such item, items, class or part of the Work as may be decided by the OWNER at the unit prices submitted by the bidder to bring the Contract within available funds; or the OWNER may reject all bids.

ARTICLE 5: EXECUTION OF THE AGREEMENT

A Contract in the form set forth hereinafter will be required to be executed by the successful bidder and the OWNER. The attention of all bidders, therefore, is called to the form of the Agreement and the provisions thereof. The party to whom the Contract is awarded will be required to obtain the performance bond and payment bond within fifteen (15) calendar days from the date when the Notice of Award is

delivered to the bidder. The Notice of Award shall be accompanied by the necessary Agreement and bond forms. The CONTRACTOR shall furnish a Performance Bond and a Payment Labor and Material Bond, each in the amount of one hundred percent (100%) of the Contract Price, with a corporate surety approved by the OWNER, as security for faithful performance of Contract.

The OWNER, within thirty (30) days of receipt of an acceptable performance bond, payment bond, and Agreement signed by the party to whom the Agreement was awarded, shall sign the Agreement and return to such party an executed duplicate of the Agreement. Should the OWNER not execute the Agreement within such period, the bidder may, by written notice, withdraw his signed Agreement. Such notice by withdrawal shall be effective upon receipt of the notice by the OWNER.

ARTICLE 6: NOTICE TO PROCEED

The Notice to Proceed shall be issued within thirty (30) days of the execution of the Agreement by the OWNER. Should there be reasons why the Notice to Proceed cannot be issued within such period, the time may be extended by mutual agreement between the OWNER and CONTRACTOR. If the Notice to Proceed has not been issued within the thirty (30) day period or within the period mutually agreed upon, the CONTRACTOR might terminate the agreement without further liability on the part of either party.

ARTICLE 7: POWER OF ATTORNEY

Attorney-in-fact who sign bid bonds or Contract bonds must file with each bond a certified and effectively dated copy of their power of attorney.

ARTICLE 8: UNCERTAINTY OF QUANTITIES

The quantities listed in the Bid (proposal) are approximate and are given only for use in comparing Bids and to indicate approximately the total amount of the Contract; and the OWNER does not expressly or by implication represent that the actual amounts of Work will even approximately correspond therewith, but does call particular attention to the uncertainty of the quantities of the Work involved, which cannot be predicted in advance. The Work under certain items may be materially greater or less than that given in the Bid, as may be necessary in the judgment of the OWNER to complete the Work contemplated in the Contract.

Under the Contract, the OWNER reserves the right to increase or decrease the approximate quantities for, or to omit entirely, any of the items as listed in the Bid.

Only such quantities of the respective items of Work actually performed and accepted will be paid for. An increase or decrease in the quantity for any item shall not be regarded as grounds for an increase or decrease in the bid prices.

ARTICLE 9: ITEMS NOT LISTED IN THE BID

Appurtenant items of Work shown on the Drawings or specified or required to complete the Work, but not listed separately under the list of items in the Bid, shall be included in the cost of payment under the various applicable Bid Items. It shall be the responsibility of the CONTRACTOR to verify any missing or incomplete items.

ARTICLE 10: BALANCED BIDDING

Minus bidding on any item or items of the Specification is prohibited. Bids should be made on each separate item of Work shown in the Bid (proposal) with reasonable relation to the probable cost of doing the Work included in such item, and the right is reserved to reject wholly any bid in case any item or items thereof are obviously unbalanced or appear to the OWNER to be so unbalanced as to affect or to be liable to affect adversely any interests of the OWNER. The attention of the Bidder is called to the fact that unbalancing of bids may adversely affect the CONTRACTOR, if certain portions of the Work are increased or decreased as provided in the Contract Documents.

ARTICLE 11: NOTICE OF SPECIAL CONDITIONS

Attention is particularly called to those parts of the Contract Documents and Specifications, which deal with the following:

a. inspection and testing of materials;
b. insurance requirements;
c. wage rates;
d. interpretation of Drawings and Specifications; and
e. the use of explosives and protection.

ARTICLE 12: JOB CONDITIONS

The Bidder is advised that free vehicular and pedestrian access must be maintained to the major streets. The method of construction must be therefore compatible with this requirement of free access.

ARTICLE 13: PRE-CONSTRUCTION CONFERENCE

The CONTRACTOR shall be prepared to attend a pre-construction conference scheduled by the OWNER after award of the Contract, but prior to the actual commencement of Work at the site. The main items of discussion will include the CONTRACTOR's construction schedule, proposed Superintendent, Professional Engineer or Land Surveyor, etc.

END OF SECTION

SECTION 00310 BID FORM

To: Providence Water Supply Board
125 Dupont Drive
Providence, RI 02907

Project: Providence Water Supply Board
Central Avenue Transmission Main Installation
February 2023
Pare Project No. 14256.32

Date: _____

Submitted by:

_____
(Full name)

_____
(Full address)

1.00 OFFER

Having examined the Place of the Work and the Contract Documents prepared by Pare Corporation, Engineer for the abovementioned project, we, the undersigned, hereby offer to enter into a Contract to perform the Work in the Base Bid (Items 1 through 18, inclusive) for the Price of:

$ _____
(Figures)

_____
(Total price in words) dollars, in lawful money of the United States of America.

The Owner hereby reserves the right to reject any or all Bids and to select the Bid that best serves the interest of the Owner.

All Cash and Contingency Allowances are included in the Bid Price.

2.00 EXPERIENCE/SUBMITTALS

A. The Owner may make such investigations as deemed necessary to determine the ability of the Bidder to perform the Work, and the Bidder shall furnish to the Owner all such information and data for this purpose as the Owner may request. The Owner reserves the right to reject any Bid if the evidence submitted by, or investigation of, such Bidder fails to satisfy the Owner that such Bidder is properly qualified to carry out the obligations of the Contract and to complete the Work contemplated therein.

B. It shall be noted that the quantities on the Bid Form shall in no way constitute a minimum or maximum quantity to be expected. The Owner reserves the right to remove items from the Bid and to add or subtract quantities from the Bid after awarding of the Contract has been completed.

C. Unbalanced Bidding (e.g., bidding that does not reflect reasonable actual costs plus a reasonable proportionate share of the bidder's anticipated profit, overhead costs, and other indirect costs, which the bidder anticipates for the performance of the items in question) shall not be allowed and may be cause for rejection of the Bid, at the discretion of the Owner. The Owner reserves the right to make all necessary inquiries as to the balanced nature of a Bid. Bidders may be required to submit information upon opening of their Bid with their Bid. The submission of supporting documentation on Bid Items shall in no way constitute acceptance of that bid item as balanced. The Owner reserves the right to make the final determination of balanced or unbalanced bids.

D. The Contractor shall utilize Providence Water's project management software for all project submittals.

3.00 UNIT PRICES

BID FORM

Central Ave Tranmisison Main Installation

Bid Item	Description	Quantity	Unit Bid Price	Unit	Total Cost	Total Price in Words
NOTE: THE UNIT PRICE FOR EACH ITEM MUST BE WRITTEN IN WORDS AND FIGURES. IN CASE OF DISCREPANCY, THE AMOUNT SHOWN IN WORDS WILL GOVERN.						
1.	Site Mobilization and Demobilization (up to 5% of construction cost)	1	$	LS	$	
2.	Payment and Performance Bond (up to 1.5% of construction cost)	1	$	LS	$	
3.	Erosion and Sedimentation Controls	4,500	$	LF	$	
4.	Test Pits	5	$	EA	$	
5.	Furnish and Install 12x12-inch Tapping Sleeve and Valve	1	$	EA	$	
6.	Furnish and Install 8-inch Zinc-coated Class 52 Water Main and Fittings	50	$	LF	$	
7.	Furnish and Install 12-inch Zinc-coated Class 52 Water Main and Fittings	50	$	LF	$	
8.	Install 16-inch Class 52 Water Main and Furnish and Install Fittings	5,300	$	LF	$	
9.	Furnish and Install 8-inch Gate Valve and Box	6	$	EA	$	
10.	Furnish and Install 12-inch Gate Valve and Box	6	$	EA	$	
11.	Furnish and Install 16-inch Resilient Wedge Gate Valve w/ Gear Actuator, Extension Stem and Box	6	$	EA	$	
12.	Furnish and Install 5x5-foot Precast Water Service Manhole	6	$	EA	$	
13.	Furnish and Install Hydrant Assembly	3	$	EA	$	
14.	Rock Removal	500	$	CY	$	
15.	Unsuitable Material and Replacement w/ Processed Gravel	500	$	TON	$	
16.	2-inch Temporary Trench Pavement	700	$	TON	$	
17.	3-inch Permanent Trench Pavement	1,050	$	TON	$	
18.	Loam and Seed	1	$	LS	$	
19.	Uniformed Officer Traffic Control	1	$ 60,000.00	ALLOW	$ 60,000.00	Sixty Thousands Dollars and Zero Cents
20.	Traffic Mangament	1	$ 120,000.00	ALLOW	$ 120,000.00	One Hundred and Twenty Thousand Dollars and Zero Cents
	TOTAL				**$**	

4.00 ACCEPTANCE

This offer shall be open to acceptance and is irrevocable for ninety (90) days from the Bid closing date.

If this Bid is accepted by the Owner within the time period stated above, we will:

Execute the Agreement within fifteen (15) days of receipt of Notice of Award.

Furnish the required bonds within fifteen (15) days of receipt of Notice of Award.

Commence work within fifteen (15) days after written Notice to Proceed.

5.00 CONTRACT TIME

If this Bid is accepted, the Bidder hereby agrees to commence WORK under this Contract on or before a date to be specified in the NOTICE TO PROCEED and to substantially complete the PROJECT such that the tank is operational and substantially completed in 360 calendar days, and to fully complete the PROJECT in 450 calendar days.

6.00 ADDENDA

The following Addenda have been received. The modifications to the Bid Documents noted therein have been considered and all costs thereto are included in the Bid Price.

Addendum # _____ Dated _____

Addendum # _____ Dated _____

Addendum # _____ Dated _____

Addendum # _____ Dated _____

7.00 BID FORM SIGNATURE(S)

The Corporate Seal of

_____

(Bidder - please print the full name of your Proprietorship, Partnership, or Corporation)

was hereunto affixed in the presence of:

_____

(Authorized signing officer Title)

(Seal)

_____

(Authorized signing officer Title)

If the Bid is a joint venture or partnership, add additional forms of execution for each member of the joint venture in the appropriate form or forms as above.

END OF SECTION

SECTION 00400 SUPPLEMENTS TO BID FORM

To: Providence Water Supply Board
125 Dupont Drive
Providence, RI 02907

Project: Providence Water Supply Board
Central Avenue Transmission Main Installation
February 2023
Pare Project No. 14256.32

Date: _____

Submitted by:

_____

(Full name)

_____

(Full address)

In accordance with the Instructions to Bidders, and Bid Form, we include the Supplements to Bid Form appendices listed below. The information provided shall be considered an integral part of the Bid Form. These appendices are as follows:

Appendix A: Subcontractors: Include the names of all subcontractors, including qualifications and experience and the portions of the work they will perform.

Appendix B: Qualifications of Bidder

Appendix C: Worker's Compensation Experience Modification Rate (EMR)

APPENDIX A

Herewith is the list of Subcontractors referenced in the Bid submitted by:

_____

(Bidder)

Providence Water Supply Board

(Owner)

dated _____ and, which is an integral part of the Bid Form.

The following work will be performed (or provided) by the following Subcontractors, and coordinated by us:

SECTION OF WORK	NAME

Attach a listing of relevant qualifications and experience on similar projects.

APPENDIX B

List additional Relevant Experience of firm bidding the project as it relates to projects of similar nature and complexities as that proposed by the Providence Water Supply Board. Include: project time frame, contact personnel, description, bid cost, final project cost (minimum 5 projects).

APPENDIX C

To be considered qualified to bid on this project, bidding firms must demonstrate that they have a Workers Compensation Experience Modification Rating (EMR) of less than 1.0. If 1.0 or greater, firms must provide an explanation of why the company's rating is greater than 1.0.

Providence Water holds the right to determine if a company holding a rating greater than 1.0 is qualified to perform the work associated with this project.

Include additional sheets if necessary.

SECTION 00500 CONTRACT AGREEMENT

THIS AGREEMENT is dated as of the _____day of_____in the year 2022, and executed in the City of Johnston in the State of Rhode Island;

BETWEEN the OWNER: The Providence Water Supply Board, hereinafter called OWNER.

and the CONTRACTOR: _____
(*Name and Address)* _____
_____

The PROJECT is: Central Avenue Transmission Main Installation

The ARCHITECT/
ENGINEER is: Pare Corporation
(Name and Address) 8 Blackstone Valley Place
Lincoln, RI 02865

OWNER and CONTRACTOR, in consideration of the contract sum and the mutual covenants hereinafter set forth, agree as follows:

ARTICLE 1. WORK.

1.1. The CONTRACTOR agrees to furnish all equipment, machinery, tools, and labor; to furnish and deliver all materials required to be furnished and delivered in and about the improvement; and to perform all work required for the Providence Water Supply Board, Central Avenue Transmission Main Installation, in strict conformity with the provisions of this Contract Agreement.

ARTICLE 2. CONTRACT DOCUMENTS.

2.1. The Contract Documents consist of the "Project Manual and Contract Documents for the Central Avenue Transmission Main Installation". The Project Manual includes this Agreement, Conditions of the Contract (General, Supplementary, and other Conditions), Technical Specifications, Appendices, Addenda issued prior to execution of this Agreement, Invitation To Bid (Notice to Contractors), Bid Proposal, Summary of Work, Bonds and Insurance requirements, all drawings and all documents contained within this Agreement, and all Modifications issued after execution of this Agreement. These documents form the Contract, and are as fully a part of the Contract as if attached to this Agreement or incorporated herein. The Contract represents the entire and integrated agreement between the parties hereto and supersedes prior negotiations, representations or agreements, either written or oral.

ARTICLE 3. CONTRACT TIME.

3.1. The CONTRACTOR shall be prepared to begin the Work to be performed under this contract within fifteen (15) calendar days of the date indicated in the Notice to Proceed. The Work shall be prosecuted from as many different points, in such part or parts and at such time as necessary and shall be conducted in such a manner and with such materials, equipment, and labor as are necessary to ensure completion within the time set forth below. Should the prosecution of the Work for any reason be discontinued, the CONTRACTOR shall notify the OWNER at least twenty-four (24) hours before resuming operations.

3.2. Work shall be substantially completed within Three Hundred Sixty (360) calendar days from the date specified in the Notice to Proceed. Work shall be completed in Four Hundred Fifty (450) calendar days from the Notice to Proceed.

3.3. The Contractor shall pay to the OWNER for each and every calendar day that they shall be in default in completing the entire work within the time and specifications stipulated, the sum of one thousand dollars ($1,000.00) per calendar day unless the time and/or specifications are modified in writing by the OWNER. This sum is hereby agreed upon, not as a penalty, but as liquidated damages, which the OWNER will suffer by reason of such default. The OWNER shall have the right to deduct the amount of any such damages from any moneys due the Contractor under this Contract.

ARTICLE 4. CONTRACT SUM

4.1. The OWNER shall pay the CONTRACTOR in current funds for the CONTRACTOR's performance of the Contract the Contract Sum of _____Dollars ($ ___), subject to additions and deductions as provided in the Contract Documents.

ARTICLE 5. PAYMENT PROCEDURES.

5.1. CONTRACTOR shall submit Applications for Payment in accordance with the General Conditions. Applications for Payment will be processed by the ENGINEER as provided in the General and Supplementary Conditions.

5.2. *Progress Payments.* OWNER shall make progress payments on account of the Contract Price on the basis of CONTRACTOR's monthly Applications for Payment as certified by the ENGINEER. All progress payments shall be on the basis of the progress of the Work measured by the schedule of values established in the General Conditions (and in the case of Unit Price Work based on the number of units completed) or, in the event there is no schedule of values, as provided in the General Requirements. The OWNER shall retain five percent (5%) of the progress or monthly payments claimed and pay the Contractor on or before the last day of the following month. Retainage will be released within 90 days after final inspection and acceptance of the Work.

5.3. *Final Payment.* Upon final completion and acceptance of the Work in accordance with the General Conditions, OWNER shall pay the remainder of the Contract Price as certified by the ENGINEER as provided in said General Conditions.

ARTICLE 6. SURETY.

6.1. As security for the full and faithful performance of this contract and all the incidents thereto, the CONTRACTOR has made and furnished a contract bond with _____ as surety. Said Performance and Payment Bonds shall be equal to one hundred percent (100%) of the Contract Sum, with a Surety company registered and licensed in the State of Rhode Island.

6.2. An original, executed copy of the surety instruments shall be submitted to the OWNER.

ARTICLE 7. MISCELLANEOUS PROVISIONS.

7.1. Terms used in this Agreement are defined in the General Conditions and Supplementary Conditions and shall have the meanings as set forth in the General Conditions and Supplementary Conditions.

7.2. No assignment by a party hereto of any rights under or interests in the Contract Documents will be binding on another party hereto without the prior written consent of the party sought to be bound; and specifically but without limitation moneys that may become due and moneys that are due may not be assigned without prior written consent (except to the extent that the effect of this restriction may be limited by law), and 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 the Contract Documents.

7.3. OWNER and CONTRACTOR each binds itself, its partners, successors, assigns, and legal representatives to the other party hereto, its partners, successors, assigns, and legal representatives in respect of all covenants, agreements, and obligations contained in the Contract Documents.

7.4. The CONTRACTOR shall be responsible for the maintenance of all erosion and sediment controls shown on the drawings. The erosion and sediment controls shown on the drawing represent the minimum required controls. If more erosion and sediment control measures are needed on site, the CONTRACTOR shall furnish and install these additional controls at no additional cost to the OWNER.

ARTICLE 8. TERMINATION OR SUSPENSION.

The Contract may be terminated by the OWNER or the CONTRACTOR as provided in the General Conditions. The Work may be suspended by the OWNER as provided in the General Conditions.

IN WITNESS WHEREOF, the parties of the presents have hereunto set their names this_____day of ___A.D. 20____.

Providence Water Supply Board

In the presence of: _____ By: _____
Providence Water Supply Board

CONTRACTOR _____ By: _____
Title

END OF SECTION

Engineers Joint Documents Committee
Design and Construction Related Documents
Instructions and License Agreement

Instructions

Before you use any EJCDC document:

1. Read the License Agreement. You agree to it and are bound by its terms when you use the EJCDC document.

2. Make sure that you have the correct version for your word processing software.

How to Use:

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2. Similarly, your software may change the font specification if the font is not available in your system. It will choose a font that is close in appearance. In this event, the pagination may not match the control set.

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This Agreement shall be governed by the laws of the State of Virginia. Should you have any questions concerning this Agreement, you may contact EJCDC by writing to:

Arthur Schwartz, Esq.
General Counsel
National Society of Professional Engineers
1420 King Street
Alexandria, VA 22314

Phone: (703) 684-2845
Fax: (703) 836-4875
e-mail: aschwartz@nspe.org

You acknowledge that you have read this agreement, understand it and agree to be bound by its terms and conditions. You further agree that it is the complete and exclusive statement of the agreement between us which supersedes any proposal or prior agreement, oral or written, and any other communications between us relating to the subject matter of this agreement.

This document has important legal consequences; consultation with an attorney is encouraged with respect to its use or modification. This document should be adapted to the particular circumstances of the contemplated Project and the Controlling Law.

STANDARD GENERAL CONDITIONS OF THE CONSTRUCTION CONTRACT

Prepared by

ENGINEERS JOINT CONTRACT DOCUMENTS COMMITTEE

and

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These General Conditions have been prepared for use with the Suggested Forms of Agreement Between Owner and Contractor Nos. C-520 or C-525 (2002 Editions). Their provisions are interrelated and a change in one may necessitate a change in the other. Comments concerning their usage are contained in the EJCDC Construction Documents, General and Instructions (No. C-001) (2002 Edition). For guidance in the preparation of Supplementary Conditions, see Guide to the Preparation of Supplementary Conditions (No. C-800) (2002 Edition).

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GENERAL CONDITIONS

ARTICLE 1 - DEFINITIONS AND TERMINOLOGY

1.01 *Defined Terms*

A. Wherever used in the Bidding Requirements or Contract Documents and printed with initial capital letters, the terms listed below will have the meanings indicated which are applicable to both the singular and plural thereof. In addition to terms specifically defined, terms with initial capital letters in the Contract Documents include references to identified articles and paragraphs, and the titles of other documents or forms.

1. *Addenda*--Written or graphic instruments issued prior to the opening of Bids which clarify, correct, or change the Bidding Requirements or the proposed Contract Documents.

2. *Agreement*--The written instrument which is evidence of the agreement between Owner and Contractor covering the Work.

3. *Application for Payment*--The form acceptable to Engineer which is to be used by Contractor during the course of the Work in requesting progress or final payments and which is to be accompanied by such supporting documentation as is required by the Contract Documents.

4. *Asbestos*--Any material that contains more than one percent asbestos and is friable or is releasing asbestos fibers into the air above current action levels established by the United States Occupational Safety and Health Administration.

5. *Bid*--The offer or proposal of a Bidder submitted on the prescribed form setting forth the prices for the Work to be performed.

6. *Bidder*--The individual or entity who submits a Bid directly to Owner.

7. *Bidding Documents*--The Bidding Requirements and the proposed Contract Documents (including all Addenda).

8. *Bidding Requirements*--The Advertisement or Invitation to Bid, Instructions to Bidders, bid security of acceptable form, if any, and the Bid Form with any supplements.

9. *Change Order*--A document recommended by Engineer which is signed by Contractor and Owner and authorizes an addition, deletion, or revision in the Work or an adjustment in the Contract Price or the Contract Times, issued on or after the Effective Date of the Agreement.

10. *Claim*--A demand or assertion by Owner or Contractor seeking an adjustment of Contract Price or Contract Times, or both, or other relief with respect to the terms of the Contract. A demand for money or services by a third party is not a Claim.

11. *Contract*--The entire and integrated written agreement between the Owner and Contractor concerning the Work. The Contract supersedes prior negotiations, representations, or agreements, whether written or oral.

12. *Contract Documents*-- Those items so designated in the Agreement. Only printed or hard copies of the items listed in the Agreement are Contract Documents. Approved Shop Drawings, other Contractor's submittals, and the reports and drawings of subsurface and physical conditions are not Contract Documents.

13. *Contract Price*--The moneys payable by Owner to Contractor for completion of the Work in accordance with the Contract Documents as stated in the Agreement (subject to the provisions of Paragraph 11.03 in the case of Unit Price Work).

14. *Contract Times*--The number of days or the dates stated in the Agreement to: (i) achieve Milestones, if any, (ii) achieve Substantial Completion; and (iii) complete the Work so that it is ready for final payment as evidenced by Engineer's written recommendation of final payment.

15. *Contractor*--The individual or entity with whom Owner has entered into the Agreement.

16. *Cost of the Work*--See Paragraph 11.01.A for definition.

17. *Drawings*--That part of the Contract Documents prepared or approved by Engineer which graphically shows the scope, extent, and character of the Work to be performed by Contractor. Shop Drawings and other Contractor submittals are not Drawings as so defined.

18. *Effective Date of the Agreement*--The date indicated in the Agreement on which it becomes effective, but if no such date is indicated, it means the date on which the Agreement is signed and delivered by the last of the two parties to sign and deliver.

19. *Engineer*--The individual or entity named as such in the Agreement.

20. *Field Order*--A written order issued by Engineer which requires minor changes in the Work but which does not involve a change in the Contract Price or the Contract Times.

21. *General Requirements*--Sections of Division 1 of the Specifications. The General Requirements pertain to all sections of the Specifications.

22. *Hazardous Environmental Condition*--The presence at the Site of Asbestos, PCBs, Petroleum, Hazardous Waste, or Radioactive Material in such quantities or circumstances that may present a substantial danger to persons or property exposed thereto in connection with the Work.

23. *Hazardous Waste*--The term Hazardous Waste shall have the meaning provided in Section 1004 of the Solid Waste Disposal Act (42 USC Section 6903) as amended from time to time.

24. *Laws and Regulations; Laws or Regulations*--Any and all applicable laws, rules, regulations, ordinances, codes, and orders of any and all governmental bodies, agencies, authorities, and courts having jurisdiction.

25. *Liens*--Charges, security interests, or encumbrances upon Project funds, real property, or personal property.

26. *Milestone*--A principal event specified in the Contract Documents relating to an intermediate completion date or time prior to Substantial Completion of all the Work.

27. *Notice of Award*--The written notice by Owner to the Successful Bidder stating that upon timely compliance by the Successful Bidder with the conditions precedent listed therein, Owner will sign and deliver the Agreement.

28. *Notice to Proceed*--A written notice given by Owner to Contractor fixing the date on which the Contract Times will commence to run and on which Contractor shall start to perform the Work under the Contract Documents.

29. *Owner*--The individual or entity with whom Contractor has entered into the Agreement and for whom the Work is to be performed.

30. *PCBs*--Polychlorinated biphenyls.

31. *Petroleum*--Petroleum, including crude oil or any fraction thereof which is liquid at standard conditions of temperature and pressure (60 degrees Fahrenheit and 14.7 pounds per square inch absolute), such as oil, petroleum, fuel oil, oil sludge, oil refuse, gasoline, kerosene, and oil mixed with other non-Hazardous Waste and crude oils.

32. *Progress Schedule*--A schedule, prepared and maintained by Contractor, describing the sequence and duration of the activities comprising the Contractor's plan to accomplish the Work within the Contract Times.

33. *Project*--The total construction of which the Work to be performed under the Contract Documents may be the whole, or a part.

34. *Project Manual*--The bound documentary information prepared for bidding and constructing the Work. A listing of the contents of the Project Manual, which may be bound in one or more volumes, is contained in the table(s) of contents.

35. *Radioactive Material*--Source, special nuclear, or byproduct material as defined by the Atomic Energy Act of 1954 (42 USC Section 2011 et seq.) as amended from time to time.

36. *Related Entity* -- An officer, director, partner, employee, agent, consultant, or subcontractor.

37. *Resident Project Representative*--The authorized representative of Engineer who may be assigned to the Site or any part thereof.

38. *Samples*--Physical examples of materials, equipment, or workmanship that are representative of some portion of the Work and which establish the standards by which such portion of the Work will be judged.

39. *Schedule of Submittals*--A schedule, prepared and maintained by Contractor, of required submittals and the time requirements to support scheduled performance of related construction activities.

40. *Schedule of Values*--A schedule, prepared and maintained by Contractor, allocating portions of the Contract Price to various portions of the Work and used as the basis for reviewing Contractor's Applications for Payment.

41. *Shop Drawings*--All drawings, diagrams, illustrations, schedules, and other data or information which are specifically prepared or assembled by or for Contractor and submitted by Contractor to illustrate some portion of the Work.

42. *Site*--Lands or areas indicated in the Contract Documents as being furnished by Owner upon which the Work is to be performed, including rights-of-way and easements for access thereto, and such other lands furnished by Owner which are designated for the use of Contractor.

43. *Specifications*--That part of the Contract Documents consisting of written requirements for materials, equipment, systems, standards and workmanship as applied to the Work, and certain

administrative requirements and procedural matters applicable thereto.

44. *Subcontractor*--An individual or entity having a direct contract with Contractor or with any other Subcontractor for the performance of a part of the Work at the Site.

45. *Substantial Completion*--The time at which the Work (or a specified part thereof) has progressed to the point where, in the opinion of Engineer, the Work (or a specified part thereof) is sufficiently complete, in accordance with the Contract Documents, so that the Work (or a specified part thereof) can be utilized for the purposes for which it is intended. The terms "substantially complete" and "substantially completed" as applied to all or part of the Work refer to Substantial Completion thereof.

46. *Successful Bidder*--The Bidder submitting a responsive Bid to whom Owner makes an award.

47. *Supplementary Conditions*--That part of the Contract Documents which amends or supplements these General Conditions.

48. *Supplier*--A manufacturer, fabricator, supplier, distributor, materialman, or vendor having a direct contract with Contractor or with any Subcontractor to furnish materials or equipment to be incorporated in the Work by Contractor or any Subcontractor.

49. *Underground Facilities*--All underground pipelines, conduits, ducts, cables, wires, manholes, vaults, tanks, tunnels, or other such facilities or attachments, and any encasements containing such facilities, including those that convey electricity, gases, steam, liquid petroleum products, telephone or other communications, cable television, water, wastewater, storm water, other liquids or chemicals, or traffic or other control systems.

50. *Unit Price Work*--Work to be paid for on the basis of unit prices.

51. *Work*--The entire construction or the various separately identifiable parts thereof required to be provided under the Contract Documents. Work includes and is the result of performing or providing all labor, services, and documentation necessary to produce such construction, and furnishing, installing, and incorporating all materials and equipment into such construction, all as required by the Contract Documents.

52. *Work Change Directive*--A written statement to Contractor issued on or after the Effective Date of the Agreement and signed by Owner and recommended by Engineer ordering an addition, deletion, or revision in the Work, or responding to differing or unforeseen subsurface or physical conditions under which the Work is to be performed or to emergencies. A Work Change Directive will not change the Contract Price or the Contract Times but is evidence that the parties expect that the change ordered or documented by a Work Change Directive will be incorporated in a subsequently issued Change Order following negotiations by the parties as to its effect, if any, on the Contract Price or Contract Times.

1.02 *Terminology*

A. The following words or terms are not defined but, when used in the Bidding Requirements or Contract Documents, have the following meaning.

B. *Intent of Certain Terms or Adjectives*

1. The Contract Documents include the terms "as allowed," "as approved," "as ordered", "as directed" or terms of like effect or import to authorize an exercise of professional judgment by Engineer. In addition, the adjectives "reasonable," "suitable," "acceptable," "proper," "satisfactory," or adjectives of like effect or import are used to describe an action or determination of Engineer as to the Work. It is intended that such exercise of professional judgment, action or determination will be solely to evaluate, in general, the Work for compliance with the requirements of and information in the Contract Documents and conformance with the design concept of the completed Project as a functioning whole as shown or indicated in the Contract Documents (unless there is a specific statement indicating otherwise). The use of any such term or adjective is not intended to and shall not be effective to assign to Engineer any duty or authority to supervise or direct the performance of the Work or any duty or authority to undertake responsibility contrary to the provisions of Paragraph 9.09 or any other provision of the Contract Documents.

C. *Day*

1. The word "day" means a calendar day of 24 hours measured from midnight to the next midnight.

D. *Defective*

1. The word "defective," when modifying the word "Work," refers to Work that is unsatisfactory, faulty, or deficient in that it:

a. does not conform to the Contract Documents, or

b. does not meet the requirements of any applicable inspection, reference standard, test, or approval referred to in the Contract Documents, or

c. has been damaged prior to Engineer's - recommendation of final payment (unless responsibility for the protection thereof has been assumed by Owner at Substantial Completion in accordance with Paragraph 14.04 or 14.05).

E. *Furnish, Install, Perform, Provide*

1. The word "furnish," when used in connection with services, materials, or equipment, shall mean to supply and deliver said services, materials, or equipment to the Site (or some other specified location) ready for use or installation and in usable or operable condition.

2. The word "install," when used in connection with services, materials, or equipment, shall mean to put into use or place in final position said services, materials, or equipment complete and ready for intended use.

3. The words "perform" or "provide," when used in connection with services, materials, or equipment, shall mean to furnish and install said services, materials, or equipment complete and ready for intended use.

4. When "furnish," "install," "perform," or "provide" is not used in connection with services, materials, or equipment in a context clearly requiring an obligation of Contractor, "provide" is implied.

F. Unless stated otherwise in the Contract Documents, words or phrases which have a well-known technical or construction industry or trade meaning are used in the Contract Documents in accordance with such recognized meaning.

ARTICLE 2 - PRELIMINARY MATTERS

2.01 *Delivery of Bonds and Evidence of Insurance*

A. When Contractor delivers the executed counterparts of the Agreement to Owner, Contractor shall also deliver to Owner such bonds as Contractor may be required to furnish.

B. *Evidence of Insurance:* Before any Work at the Site is started, Contractor and Owner shall each deliver to the other, with copies to each additional insured identified in the Supplementary Conditions, certificates of insurance (and other evidence of insurance which either of them or any additional insured may reasonably request) which Contractor and Owner respectively are required to purchase and maintain in accordance with Article 5.

2.02 *Copies of Documents*

A. Owner shall furnish to Contractor up to ten printed or hard copies of the Drawings and Project Manual. Additional copies will be furnished upon request at the cost of reproduction.

2.03 *Commencement of Contract Times; Notice to Proceed*

A. The Contract Times will commence to run on the thirtieth day after the Effective Date of the Agreement or, if a Notice to Proceed is given, on the day indicated in the Notice to Proceed. A Notice to Proceed may be given at any time within 30 days after the Effective Date of the Agreement. In no event will the Contract Times commence to run later than the sixtieth day after the day of Bid opening or the thirtieth day after the Effective Date of the Agreement, whichever date is earlier.

2.04 *Starting the Work*

A. Contractor shall start to perform the Work on the date when the Contract Times commence to run. No Work shall be done at the Site prior to the date on which the Contract Times commence to run.

2.05 *Before Starting Construction*

A. *Preliminary Schedules:* Within 10 days after the Effective Date of the Agreement (unless otherwise specified in the General Requirements), Contractor shall submit to Engineer for timely review**:**

1. a preliminary Progress Schedule; indicating the times (numbers of days or dates) for starting and completing the various stages of the Work, including any Milestones specified in the Contract Documents;

2. a preliminary Schedule of Submittals; and

3. a preliminary Schedule of Values for all of the Work which includes quantities and prices of items which when added together equal the Contract Price and subdivides the Work into component parts in sufficient detail to serve as the basis for progress payments during performance of the Work. Such prices will include an appropriate amount of overhead and profit applicable to each item of Work.

2.06 *Preconstruction Conference*

A. Before any Work at the Site is started, a conference attended by Owner, Contractor, Engineer, and others as appropriate will be held to establish a working understanding among the parties as to the Work and to discuss the schedules referred to in Paragraph 2.05.A, procedures for handling Shop Drawings and other submittals, processing Applications for Payment, and maintaining required records.

2.07 *Initial Acceptance of Schedules*

A. At least 10 days before submission of the first Application for Payment a conference attended by Contractor, Engineer, and others as appropriate will be held to review for acceptability to Engineer as provided below the schedules submitted in accordance with Paragraph 2.05.A. Contractor shall have an additional 10 days to make corrections and adjustments and to complete and resubmit the schedules. No progress payment shall be made to Contractor until acceptable schedules are submitted to Engineer.

1. The Progress Schedule will be acceptable to Engineer if it provides an orderly progression of the Work to completion within the Contract Times. Such acceptance will not impose on Engineer responsibility for the Progress Schedule, for sequencing, scheduling, or progress of the Work nor interfere with or relieve Contractor from Contractor's full responsibility therefor.

2. Contractor's Schedule of Submittals will be acceptable to Engineer if it provides a workable arrangement for reviewing and processing the required submittals.

3. Contractor's Schedule of Values will be acceptable to Engineer as to form and substance if it provides a reasonable allocation of the Contract Price to component parts of the Work.

ARTICLE 3 - CONTRACT DOCUMENTS: INTENT, AMENDING, REUSE

3.01 *Intent*

A. The Contract Documents are complementary; what is required by one is as binding as if required by all.

B. It is the intent of the Contract Documents to describe a functionally complete Project (or part thereof) to be constructed in accordance with the Contract Documents. Any labor, documentation, services, materials, or equipment that may reasonably be inferred from the Contract Documents or from prevailing custom or trade usage as being required to produce the intended result will be provided whether or not specifically called for at no additional cost to Owner.

C. Clarifications and interpretations of the Contract Documents shall be issued by Engineer as provided in Article 9.

3.02 *Reference Standards*

A. Standards, Specifications, Codes, Laws, and Regulations

1. Reference to standards, specifications, manuals, or codes of any technical society, organization, or association, or to Laws or Regulations, whether such reference be specific or by implication, shall mean the standard, specification, manual, code, or Laws or Regulations in effect at the time of opening of Bids (or on the Effective Date of the Agreement if there were no Bids), except as may be otherwise specifically stated in the Contract Documents.

2. No provision of any such standard, specification, manual or code, or any instruction of a Supplier shall be effective to change the duties or responsibilities of Owner, Contractor, or Engineer, or any of their subcontractors, consultants, agents, or employees from those set forth in the Contract Documents. No such provision or instruction shall be effective to assign to Owner, or Engineer, or any of, their Related Entities, any duty or authority to supervise or direct the performance of the Work or any duty or authority to undertake responsibility inconsistent with the provisions of the Contract Documents.

3.03 *Reporting and Resolving Discrepancies*

A. Reporting Discrepancies

1. *Contractor's Review of Contract Documents Before Starting Work*: Before undertaking each part of the Work, Contractor shall carefully study and compare the Contract Documents and check and verify pertinent figures therein and all applicable field measurements. Contractor shall promptly report in writing to Engineer any conflict, error, ambiguity, or discrepancy which Contractor may discover and shall obtain a written interpretation or clarification from Engineer before proceeding with any Work affected thereby.

2. *Contractor's Review of Contract Documents During Performance of Work*: If, during the performance of the Work, Contractor discovers any conflict, error, ambiguity, or discrepancy within the Contract Documents or between the Contract Documents and any provision of any Law or Regulation applicable to the performance of the Work or of any standard, specification, manual or code, or of any instruction of any Supplier, Contractor shall promptly report it to Engineer in writing. Contractor shall not proceed with the Work affected thereby (except in an emergency as required by Paragraph 6.16.A) until an amendment or supplement to the Contract Documents has been issued by one of the methods indicated in Paragraph 3.04.

3. Contractor shall not be liable to Owner or Engineer for failure to report any conflict, error, ambiguity, or discrepancy in the Contract Documents unless Contractor knew or reasonably should have known thereof.

B. Resolving Discrepancies

1. Except as may be otherwise specifically stated in the Contract Documents, the provisions of the Contract Documents shall take precedence in resolving any conflict, error, ambiguity, or discrepancy between the provisions of the Contract Documents and:

a. the provisions of any standard, specification, manual, code, or instruction (whether or not specifically incorporated by reference in the Contract Documents); or

b. the provisions of any Laws or Regulations applicable to the performance of the Work

(unless such an interpretation of the provisions of the Contract Documents would result in violation of such Law or Regulation).

3.04 *Amending and Supplementing Contract Documents*

A. The Contract Documents may be amended to provide for additions, deletions, and revisions in the Work or to modify the terms and conditions thereof by either a Change Order or a Work Change Directive.

B. The requirements of the Contract Documents may be supplemented, and minor variations and deviations in the Work may be authorized, by one or more of the following ways:

1. A Field Order;

2. Engineer's approval of a Shop Drawing or Sample; (Subject to the provisions of Paragraph 6.17.D.3); or

3. Engineer's written interpretation or clarification.

3.05 *Reuse of Documents*

A. Contractor and any Subcontractor or Supplier or other individual or entity performing or furnishing all of the Work under a direct or indirect contract with Contractor, shall not:

1. have or acquire any title to or ownership rights in any of the Drawings, Specifications, or other documents (or copies of any thereof) prepared by or bearing the seal of Engineer or Engineer's consultants, including electronic media editions; or

2. reuse any of such Drawings, Specifications, other documents, or copies thereof on extensions of the Project or any other project without written consent of Owner and Engineer and specific written verification or adaption by Engineer.

B. The prohibition of this Paragraph 3.05 will survive final payment, or termination of the Contract. Nothing herein shall preclude Contractor from retaining copies of the Contract Documents for record purposes.

3.06 *Electronic Data*

A. Copies of data furnished by Owner or Engineer to Contractor or Contractor to Owner or Engineer that may be relied upon are limited to the printed copies (also known as hard copies). Files in electronic media format of text, data, graphics, or other types are furnished only for the convenience of the receiving party. Any conclusion or information obtained or derived from such electronic files will be at the user's sole risk. If there is a discrepancy between the electronic files and the hard copies, the hard copies govern.

B. Because data stored in electronic media format can deteriorate or be modified inadvertently or otherwise without authorization of the data's creator, the party receiving electronic files agrees that it will perform acceptance tests or procedures within 60 days, after which the receiving party shall be deemed to have accepted the data thus transferred. Any errors detected within the 60-day acceptance period will be corrected by the transferring party..

C. When transferring documents in electronic media format, the transferring party makes no representations as to long term compatibility, usability, or readability of documents resulting from the use of software application packages, operating systems, or computer hardware differing from those used by the data's creator.

ARTICLE 4 - AVAILABILITY OF LANDS; SUBSURFACE AND PHYSICAL CONDITIONS; HAZARDOUS ENVIRONMENTAL CONDITIONS; REFERENCE POINTS

4.01 *Availability of Lands*

A. Owner shall furnish the Site. Owner shall notify Contractor of any encumbrances or restrictions not of general application but specifically related to use of the Site with which Contractor must comply in performing the Work. Owner will obtain in a timely manner and pay for easements for permanent structures or permanent changes in existing facilities. If Contractor and Owner are unable to agree on entitlement to or on the amount or extent, if any, of any adjustment in the Contract Price or Contract Times, or both, as a result of any delay in Owner's furnishing the Site or a part thereof, Contractor may make a Claim therefor as provided in Paragraph 10.05.

B. Upon reasonable written request, Owner shall furnish Contractor with a current statement of record legal title and legal description of the lands upon which the Work is to be performed and Owner's interest therein as necessary for giving notice of or filing a mechanic's or construction lien against such lands in accordance with applicable Laws and Regulations.

C. Contractor shall provide for all additional lands and access thereto that may be required for temporary construction facilities or storage of materials and equipment.

4.02 *Subsurface and Physical Conditions*

A. *Reports and Drawings:* The Supplementary Conditions identify:

1. those reports of explorations and tests of subsurface conditions at or contiguous to the Site that Engineer has used in preparing the Contract Documents; and

2. those drawings of physical conditions in or relating to existing surface or subsurface structures at or contiguous to the Site (except Underground Facilities) that Engineer has used in preparing the Contract Documents.

B. *Limited Reliance by Contractor on Technical Data Authorized:* Contractor may rely upon the general accuracy of the "technical data" contained in such reports and drawings, but such reports and drawings are not Contract Documents. Such "technical data" is identified in the Supplementary Conditions. Except for such reliance on such "technical data," Contractor may not rely upon or make any claim against Owner or Engineer, or any of their Related Entities with respect to:

1. the completeness of such reports and drawings for Contractor's purposes, including, but not limited to, any aspects of the means, methods, techniques, sequences, and procedures of construction to be employed by Contractor, and safety precautions and programs incident thereto; or

2. other data, interpretations, opinions, and information contained in such reports or shown or indicated in such drawings; or

3. any Contractor interpretation of or conclusion drawn from any "technical data" or any such other data, interpretations, opinions, or information.

4.03 *Differing Subsurface or Physical Conditions*

A. *Notice:* If Contractor believes that any subsurface or physical condition at or contiguous to the Site that is uncovered or revealed either:

1. is of such a nature as to establish that any "technical data" on which Contractor is entitled to rely as provided in Paragraph 4.02 is materially inaccurate; or

2. is of such a nature as to require a change in the Contract Documents; or

3. differs materially from that shown or indicated in the Contract Documents; or

4. is of an unusual nature, and differs materially from conditions ordinarily encountered and generally recognized as inherent in work of the character provided for in the Contract Documents;

then Contractor shall, promptly after becoming aware thereof and before further disturbing the subsurface or physical conditions or performing any Work in connection therewith (except in an emergency as required by Paragraph 6.16.A), notify Owner and Engineer in writing about such condition. Contractor shall not further disturb such condition or perform any Work in connection therewith (except as aforesaid) until receipt of written order to do so.

B. *Engineer's Review*: After receipt of written notice as required by Paragraph 4.03.A, Engineer will promptly review the pertinent condition, determine the necessity of Owner's obtaining additional exploration or tests with respect thereto, and advise Owner in writing (with a copy to Contractor) of Engineer's findings and conclusions.

C. Possible Price and Times Adjustments

1. The Contract Price or the Contract Times, or both, will be equitably adjusted to the extent that the existence of such differing subsurface or physical condition causes an increase or decrease in Contractor's cost of, or time required for, performance of the Work; subject, however, to the following:

a. such condition must meet any one or more of the categories described in Paragraph 4.03.A; and

b. with respect to Work that is paid for on a Unit Price Basis, any adjustment in Contract Price will be subject to the provisions of Paragraphs 9.07 and 11.03.

2. Contractor shall not be entitled to any adjustment in the Contract Price or Contract Times if:

a. Contractor knew of the existence of such conditions at the time Contractor made a final commitment to Owner with respect to Contract Price and Contract Times by the submission of a Bid or becoming bound under a negotiated contract; or

b. the existence of such condition could reasonably have been discovered or revealed as a result of any examination, investigation, exploration, test, or study of the Site and contiguous areas required by the Bidding Requirements or Contract Documents to be conducted by or for Contractor prior to Contractor's making such final commitment; or

c. Contractor failed to give the written notice as required by Paragraph 4.03.A.

3. If Owner and Contractor are unable to agree on entitlement to or on the amount or extent, if any, of any adjustment in the Contract Price or Contract Times, or both, a Claim may be made therefor as provided in Paragraph 10.05. However, Owner and Engineer, and any of their Related Entities shall not be liable to Contractor for any claims, costs, losses, or damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) sustained by Contractor on or in connection with any other project or anticipated project.

4.04 *Underground Facilities*

A. *Shown or Indicated:* The information and data shown or indicated in the Contract Documents with respect to existing Underground Facilities at or contiguous to the Site is based on information and data furnished to Owner or Engineer by the owners of such Underground Facilities, including Owner, or by others. Unless it is otherwise expressly provided in the Supplementary Conditions:

1. Owner and Engineer shall not be responsible for the accuracy or completeness of any such information or data; and

2. the cost of all of the following will be included in the Contract Price, and Contractor shall have full responsibility for:

a. reviewing and checking all such information and data,

b. locating all Underground Facilities shown or indicated in the Contract Documents,

c. coordination of the Work with the owners of such Underground Facilities, including Owner, during construction, and

d. the safety and protection of all such Underground Facilities and repairing any damage thereto resulting from the Work.

B. *Not Shown or Indicated*

1. If an Underground Facility is uncovered or revealed at or contiguous to the Site which was not shown or indicated, or not shown or indicated with reasonable accuracy in the Contract Documents, Contractor shall, promptly after becoming aware thereof and before further disturbing conditions affected thereby or performing any Work in connection therewith (except in an emergency as required by Paragraph 6.16.A), identify the owner of such Underground Facility and give written notice to that owner and to Owner and Engineer. Engineer will promptly review the Underground Facility and determine the extent, if any, to which a change is required in the Contract Documents to reflect and document the consequences of the existence or location of the Underground Facility. During such time, Contractor shall be responsible for the safety and protection of such Underground Facility.

2. If Engineer concludes that a change in the Contract Documents is required, a Work Change Directive or a Change Order will be issued to reflect and document such consequences. An equitable adjustment shall be made in the Contract Price or Contract Times, or both, to the extent that they are attributable to the existence or location of any Underground Facility that was not shown or indicated or not shown or indicated with reasonable accuracy in the Contract Documents and that Contractor did not know of and could not reasonably have been expected to be aware of or to have anticipated. If Owner and Contractor are unable to agree on entitlement to or on the amount or extent, if any, of any such adjustment in Contract Price or Contract Times, Owner or Contractor may make a Claim therefor as provided in Paragraph 10.05.

4.05 *Reference Points*

A. Owner shall provide engineering surveys to establish reference points for construction which in Engineer's judgment are necessary to enable Contractor to proceed with the Work. Contractor shall be responsible for laying out the Work, shall protect and preserve the established reference points and property monuments, and shall make no changes or relocations without the prior written approval of Owner. Contractor shall report to Engineer whenever any reference point or property monument is lost or destroyed or requires relocation because of necessary changes in grades or locations, and shall be responsible for the accurate replacement or relocation of such reference points or property monuments by professionally qualified personnel.

4.06 *Hazardous Environmental Condition at Site*

A. *Reports and Drawings:* Reference is made to the Supplementary Conditions for the identification of those reports and drawings relating to a Hazardous Environmental Condition identified at the Site, if any, that have been utilized by the Engineer in the preparation of the Contract Documents.

B. *Limited Reliance by Contractor on Technical Data Authorized:* Contractor may rely upon the general accuracy of the "technical data" contained in such reports and drawings, but such reports and drawings are not Contract Documents. Such "technical data" is identified in the Supplementary Conditions. Except for such reliance on such "technical data," Contractor may not rely upon or make any claim against Owner or Engineer, or any of their Related Entities with respect to:

1. the completeness of such reports and drawings for Contractor's purposes, including, but not limited to, any aspects of the means, methods, techniques, sequences and procedures of construction to be employed by Contractor and safety precautions and programs incident thereto; or

2. other data, interpretations, opinions and information contained in such reports or shown or indicated in such drawings; or

3. any Contractor interpretation of or conclusion drawn from any "technical data" or any such other data, interpretations, opinions or information.

C. Contractor shall not be responsible for any Hazardous Environmental Condition uncovered or revealed at the Site which was not shown or indicated in Drawings or Specifications or identified in the Contract Documents to be within the scope of the Work. Contractor shall be responsible for a Hazardous Environmental Condition created with any materials brought to the Site by Contractor, Subcontractors, Suppliers, or anyone else for whom Contractor is responsible.

D. If Contractor encounters a Hazardous Environmental Condition or if Contractor or anyone for whom Contractor is responsible creates a Hazardous Environmental Condition, Contractor shall immediately: (i) secure or otherwise isolate such condition; (ii) stop all Work in connection with such condition and in any area affected thereby (except in an emergency as required by Paragraph 6.16.A); and (iii) notify Owner and Engineer (and promptly thereafter confirm such notice in writing). Owner shall promptly consult with Engineer concerning the necessity for Owner to retain a qualified expert to evaluate such condition or take corrective action, if any.

E. Contractor shall not be required to resume Work in connection with such condition or in any affected area until after Owner has obtained any required permits related thereto and delivered to Contractor written notice: (i) specifying that such condition and any affected area is or has been rendered safe for the resumption of Work; or (ii) specifying any special conditions under which such Work may be resumed safely. If Owner and Contractor cannot agree as to entitlement to or on the amount or extent, if any, of any adjustment in Contract Price or Contract Times, or both, as a result of such Work stoppage or such special conditions under which Work is agreed to be resumed by Contractor, either party may make a Claim therefor as provided in Paragraph 10.05.

F. If after receipt of such written notice Contractor does not agree to resume such Work based on a reasonable belief it is unsafe, or does not agree to resume such Work under such special conditions, then Owner may order the portion of the Work that is in the area affected by such condition to be deleted from the Work. If Owner and Contractor cannot agree as to entitlement to or on the amount or extent, if any, of an adjustment in Contract Price or Contract Times as a result of deleting such portion of the Work, then either party may make a Claim therefor as provided in Paragraph 10.05. Owner may have such deleted portion of the Work performed by Owner's own forces or others in accordance with Article 7.

G. To the fullest extent permitted by Laws and Regulations, Owner shall indemnify and hold harmless Contractor, Subcontractors, and Engineer, and the officers, directors, partners, employees, agents, consultants, and subcontractors of each and any of them from and against all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to a Hazardous Environmental Condition, provided that such Hazardous Environmental Condition: (i) was not shown or indicated in the Drawings or Specifications or identified in the Contract Documents to be included within the scope of the Work, and (ii) was not created by Contractor or by anyone for whom Contractor is responsible. Nothing in this Paragraph 4.06. G shall obligate Owner to indemnify any individual or entity from and against the consequences of that individual's or entity's own negligence.

H. To the fullest extent permitted by Laws and Regulations, Contractor shall indemnify and hold harmless Owner and Engineer, and the officers, directors, partners, employees, agents, consultants, and subcontractors of each and any of them from and against all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to a Hazardous Environmental Condition created by Contractor or by anyone for whom Contractor is responsible. Nothing in this Paragraph 4.06.H shall obligate Contractor to indemnify any individual or entity from and against the consequences of that individual's or entity's own negligence.

I. The provisions of Paragraphs 4.02, 4.03, and 4.04 do not apply to a Hazardous Environmental Condition uncovered or revealed at the Site.

ARTICLE 5 - BONDS AND INSURANCE

5.01 *Performance, Payment, and Other Bonds*

A. Contractor shall furnish performance and payment bonds, each in an amount at least equal to the Contract Price as security for the faithful performance and payment of all of Contractor's obligations under the Contract Documents. These bonds shall remain in effect until one year after the date when final payment becomes due or until completion of the correction period specified

in Paragraph 13.07, whichever is later, except as provided otherwise by Laws or Regulations or by the Contract Documents. Contractor shall also furnish such other bonds as are required by the Contract Documents.

B. All bonds shall be in the form prescribed by the Contract Documents except as provided otherwise by Laws or Regulations, and shall be executed by such sureties as are named in the current list of "Companies Holding Certificates of Authority as Acceptable Sureties on Federal Bonds and as Acceptable Reinsuring Companies" as published in Circular 570 (amended) by the Financial Management Service, Surety Bond Branch, U.S. Department of the Treasury. All bonds signed by an agent must be accompanied by a certified copy of the agent's authority to act.

C. If the surety on any bond furnished by Contractor is declared bankrupt or becomes insolvent or its right to do business is terminated in any state where any part of the Project is located or it ceases to meet the requirements of Paragraph 5.01.B, Contractor shall promptly notify Owner and Engineer and shall, within 20 days after the event giving rise to such notification, provide another bond and surety, both of which shall comply with the requirements of Paragraphs 5.01.B and 5.02.

5.02 *Licensed Sureties and Insurers*

A. All bonds and insurance required by the Contract Documents to be purchased and maintained by Owner or Contractor shall be obtained from surety or insurance companies that are duly licensed or authorized in the jurisdiction in which the Project is located to issue bonds or insurance policies for the limits and coverages so required. Such surety and insurance companies shall also meet such additional requirements and qualifications as may be provided in the Supplementary Conditions.

5.03 *Certificates of Insurance*

A. Contractor shall deliver to Owner, with copies to each additional insured identified in the Supplementary Conditions, certificates of insurance (and other evidence of insurance requested by Owner or any other additional insured) which Contractor is required to purchase and maintain.

B. Owner shall deliver to Contractor, with copies to each additional insured identified in the Supplementary Conditions, certificates of insurance (and other evidence of insurance requested by Contractor or any other additional insured) which Owner is required to purchase and maintain.

5.04 *Contractor's Liability Insurance*

A. Contractor shall purchase and maintain such liability and other insurance as is appropriate for the Work being performed and as will provide protection from claims set forth below which may arise out of or result from Contractor's performance of the Work and Contractor's other obligations under the Contract Documents, whether it is to be performed by Contractor, any Subcontractor or Supplier, or by anyone directly or indirectly employed by any of them to perform any of the Work, or by anyone for whose acts any of them may be liable:

1. claims under workers' compensation, disability benefits, and other similar employee benefit acts;

2. claims for damages because of bodily injury, occupational sickness or disease, or death of Contractor's employees;

3. claims for damages because of bodily injury, sickness or disease, or death of any person other than Contractor's employees;

4. claims for damages insured by reasonably available personal injury liability coverage which are sustained:

a. by any person as a result of an offense directly or indirectly related to the employment of such person by Contractor, or

b. by any other person for any other reason;

5. claims for damages, other than to the Work itself, because of injury to or destruction of tangible property wherever located, including loss of use resulting therefrom; and

6. claims for damages because of bodily injury or death of any person or property damage arising out of the ownership, maintenance or use of any motor vehicle.

B. The policies of insurance required by this Paragraph 5.04 shall:

1. with respect to insurance required by Paragraphs 5.04.A.3 through 5.04.A.6 inclusive, include as additional insured (subject to any customary exclusion regarding professional liability) Owner and Engineer, and any other individuals or entities identified in the Supplementary Conditions, all of whom shall be listed as additional insureds, and include coverage for the respective officers, directors, partners, employees, agents, consultants and subcontractors of each and any of all such additional insureds, and the insurance afforded to these additional insureds shall provide primary coverage for all claims covered thereby;

2. include at least the specific coverages and be written for not less than the limits of liability provided in the Supplementary Conditions or required by Laws or Regulations, whichever is greater;

3. include completed operations insurance;

4. include contractual liability insurance covering Contractor's indemnity obligations under Paragraphs 6.11 and 6.20;

5. contain a provision or endorsement that the coverage afforded will not be canceled, materially changed or renewal refused until at least 30 days prior written notice has been given to Owner and Contractor and to each other additional insured identified in the Supplementary Conditions to whom a certificate of insurance has been issued (and the certificates of insurance furnished by the Contractor pursuant to Paragraph 5.03 will so provide);

6. remain in effect at least until final payment and at all times thereafter when Contractor may be correcting, removing, or replacing defective Work in accordance with Paragraph 13.07; and

7. with respect to completed operations insurance, and any insurance coverage written on a claims-made basis, remain in effect for at least two years after final payment.

a. Contractor shall furnish Owner and each other additional insured identified in the Supplementary Conditions, to whom a certificate of insurance has been issued, evidence satisfactory to Owner and any such additional insured of continuation of such insurance at final payment and one year thereafter.

5.05 *Owner's Liability Insurance*

A. In addition to the insurance required to be provided by Contractor under Paragraph 5.04, Owner, at Owner's option, may purchase and maintain at Owner's expense Owner's own liability insurance as will protect Owner against claims which may arise from operations under the Contract Documents.

5.06 *Property Insurance*

A. Unless otherwise provided in the Supplementary Conditions, Owner shall purchase and maintain property insurance upon the Work at the Site in the amount of the full replacement cost thereof (subject to such deductible amounts as may be provided in the Supplementary Conditions or required by Laws and Regulations). This insurance shall:

1. include the interests of Owner, Contractor, Subcontractors, and Engineer, and any other individuals or entities identified in the Supplementary Conditions, and the officers, directors, partners, employees, agents, consultants and subcontractors of each and any of them, each of whom is deemed to have an insurable interest and shall be listed as an insured or additional insured;

2. be written on a Builder's Risk "all-risk" or open peril or special causes of loss policy form that shall at least include insurance for physical loss or damage to the Work, temporary buildings, false work, and materials and equipment in transit, and shall insure against at least the following perils or causes of loss: fire, lightning, extended coverage, theft, vandalism and malicious mischief, earthquake, collapse, debris removal, demolition occasioned by enforcement of Laws and Regulations, water damage, (other than caused by flood) and such other perils or causes of loss as may be specifically required by the Supplementary Conditions;

3. include expenses incurred in the repair or replacement of any insured property (including but not limited to fees and charges of engineers and architects);

4. cover materials and equipment stored at the Site or at another location that was agreed to in writing by Owner prior to being incorporated in the Work, provided that such materials and equipment have been included in an Application for Payment recommended by Engineer;

5. allow for partial utilization of the Work by Owner;

6. include testing and startup; and

7. be maintained in effect until final payment is made unless otherwise agreed to in writing by Owner, Contractor, and Engineer with 30 days written notice to each other additional insured to whom a certificate of insurance has been issued.

B. Owner shall purchase and maintain such boiler and machinery insurance or additional property insurance as may be required by the Supplementary Conditions or Laws and Regulations which will include the interests of Owner, Contractor, Subcontractors, and Engineer, and any other individuals or entities identified in the Supplementary Conditions, and the officers, directors, partners, employees, agents, consultants and subcontractors of each and any of them, each of whom is deemed to have an insurable interest and shall be listed as an insured or additional insured.

C. All the policies of insurance (and the certificates or other evidence thereof) required to be purchased and maintained in accordance with Paragraph 5.06 will contain a provision or endorsement that the coverage afforded will not be canceled or materially changed or renewal refused until at least 30 days prior written notice has been given to Owner and Contractor and to each other additional insured to whom a certificate of insurance has been issued and will contain waiver provisions in accordance with Paragraph 5.07.

D. Owner shall not be responsible for purchasing and maintaining any property insurance specified in this Paragraph 5.06 to protect the interests of Contractor, Subcontractors, or others in the Work to the extent of any

deductible amounts that are identified in the Supplementary Conditions. The risk of loss within such identified deductible amount will be borne by Contractor, Subcontractors, or others suffering any such loss, and if any of them wishes property insurance coverage within the limits of such amounts, each may purchase and maintain it at the purchaser's own expense.

E. If Contractor requests in writing that other special insurance be included in the property insurance policies provided under Paragraph 5.06, Owner shall, if possible, include such insurance, and the cost thereof will be charged to Contractor by appropriate Change Order. Prior to commencement of the Work at the Site, Owner shall in writing advise Contractor whether or not such other insurance has been procured by Owner.

5.07 *Waiver of Rights*

A. Owner and Contractor intend that all policies purchased in accordance with Paragraph 5.06 will protect Owner, Contractor, Subcontractors, and Engineer, and all other individuals or entities identified in the Supplementary Conditions to be listed as insureds or additional insureds (and the officers, directors, partners, employees, agents, consultants and subcontractors of each and any of them) in such policies and will provide primary coverage for all losses and damages caused by the perils or causes of loss covered thereby. All such policies shall contain provisions to the effect that in the event of payment of any loss or damage the insurers will have no rights of recovery against any of the insureds or additional insureds thereunder. Owner and Contractor waive all rights against each other and their respective officers, directors, partners, employees, agents, consultants and subcontractors of each and any of them for all losses and damages caused by, arising out of or resulting from any of the perils or causes of loss covered by such policies and any other property insurance applicable to the Work; and, in addition, waive all such rights against Subcontractors, and Engineer, and all other individuals or entities identified in the Supplementary Conditions to be listed as insured or additional insured (and the officers, directors, partners, employees, agents, consultants and subcontractors of each and any of them) under such policies for losses and damages so caused. None of the above waivers shall extend to the rights that any party making such waiver may have to the proceeds of insurance held by Owner as trustee or otherwise payable under any policy so issued.

B. Owner waives all rights against Contractor, Subcontractors, and Engineer, and the officers, directors, partners, employees, agents, consultants and subcontractors of each and any of them for:

1. loss due to business interruption, loss of use, or other consequential loss extending beyond direct physical loss or damage to Owner's property or the Work caused by, arising out of, or resulting from fire or other perils whether or not insured by Owner; and

2. loss or damage to the completed Project or part thereof caused by, arising out of, or resulting from fire or other insured peril or cause of loss covered by any property insurance maintained on the completed Project or part thereof by Owner during partial utilization pursuant to Paragraph 14.05, after Substantial Completion pursuant to Paragraph 14.04, or after final payment pursuant to Paragraph 14.07.

C. Any insurance policy maintained by Owner covering any loss, damage or consequential loss referred to in Paragraph 5.07.B shall contain provisions to the effect that in the event of payment of any such loss, damage, or consequential loss, the insurers will have no rights of recovery against Contractor, Subcontractors, or Engineer, and the officers, directors, partners, employees, agents, consultants and subcontractors of each and any of them.

5.08 *Receipt and Application of Insurance Proceeds*

A. Any insured loss under the policies of insurance required by Paragraph 5.06 will be adjusted with Owner and made payable to Owner as fiduciary for the insureds, as their interests may appear, subject to the requirements of any applicable mortgage clause and of Paragraph 5.08.B. Owner shall deposit in a separate account any money so received and shall distribute it in accordance with such agreement as the parties in interest may reach. If no other special agreement is reached, the damaged Work shall be repaired or replaced, the moneys so received applied on account thereof, and the Work and the cost thereof covered by an appropriate Change Order .

B. Owner as fiduciary shall have power to adjust and settle any loss with the insurers unless one of the parties in interest shall object in writing within 15 days after the occurrence of loss to Owner's exercise of this power. If such objection be made, Owner as fiduciary shall make settlement with the insurers in accordance with such agreement as the parties in interest may reach. If no such agreement among the parties in interest is reached, Owner as fiduciary shall adjust and settle the loss with the insurers and, if required in writing by any party in interest, Owner as fiduciary shall give bond for the proper performance of such duties.

5.09 *Acceptance of Bonds and Insurance; Option to Replace*

A. If either Owner or Contractor has any objection to the coverage afforded by or other provisions of the bonds or insurance required to be purchased and maintained by the other party in accordance with Article 5 on the basis of non-conformance with the Contract

Documents, the objecting party shall so notify the other party in writing within 10 days after receipt of the certificates (or other evidence requested) required by Paragraph 2.01.B. Owner and Contractor shall each provide to the other such additional information in respect of insurance provided as the other may reasonably request. If either party does not purchase or maintain all of the bonds and insurance required of such party by the Contract Documents, such party shall notify the other party in writing of such failure to purchase prior to the start of the Work, or of such failure to maintain prior to any change in the required coverage. Without prejudice to any other right or remedy, the other party may elect to obtain equivalent bonds or insurance to protect such other party's interests at the expense of the party who was required to provide such coverage, and a Change Order shall be issued to adjust the Contract Price accordingly.

5.10 *Partial Utilization, Acknowledgment of Property Insurer*

A. If Owner finds it necessary to occupy or use a portion or portions of the Work prior to Substantial Completion of all the Work as provided in Paragraph 14.05, no such use or occupancy shall commence before the insurers providing the property insurance pursuant to Paragraph 5.06 have acknowledged notice thereof and in writing effected any changes in coverage necessitated thereby. The insurers providing the property insurance shall consent by endorsement on the policy or policies, but the property insurance shall not be canceled or permitted to lapse on account of any such partial use or occupancy.

ARTICLE 6 - CONTRACTOR'S RESPONSIBILITIES

6.01 *Supervision and Superintendence*

A. Contractor shall supervise, inspect, and direct the Work competently and efficiently, devoting such attention thereto and applying such skills and expertise as may be necessary to perform the Work in accordance with the Contract Documents. Contractor shall be solely responsible for the means, methods, techniques, sequences, and procedures of construction. Contractor shall not be responsible for the negligence of Owner or Engineer in the design or specification of a specific means, method, technique, sequence, or procedure of construction which is shown or indicated in and expressly required by the Contract Documents.

B. At all times during the progress of the Work, Contractor shall assign a competent resident superintendent who shall not be replaced without written notice to Owner and Engineer except under extraordinary circumstances. The superintendent will be Contractor's representative at the Site and shall have authority to act on behalf of Contractor. All communications given to or received from the superintendent shall be binding on Contractor.

6.02 *Labor; Working Hours*

A. Contractor shall provide competent, suitably qualified personnel to survey and lay out the Work and perform construction as required by the Contract Documents. Contractor shall at all times maintain good discipline and order at the Site.

B. Except as otherwise required for the safety or protection of persons or the Work or property at the Site or adjacent thereto, and except as otherwise stated in the Contract Documents, all Work at the Site shall be performed during regular working hours. Contractor will not permit the performance of Work on a Saturday, Sunday, or any legal holiday without Owner's written consent (which will not be unreasonably withheld) given after prior written notice to Engineer.

6.03 *Services, Materials, and Equipment*

A. Unless otherwise specified in the Contract Documents, Contractor shall provide and assume full responsibility for all services, materials, equipment, labor, transportation, construction equipment and machinery, tools, appliances, fuel, power, light, heat, telephone, water, sanitary facilities, temporary facilities, and all other facilities and incidentals necessary for the performance, testing, start-up, and completion of the Work.

B. All materials and equipment incorporated into the Work shall be as specified or, if not specified, shall be of good quality and new, except as otherwise provided in the Contract Documents. All special warranties and guarantees required by the Specifications shall expressly run to the benefit of Owner. If required by Engineer, Contractor shall furnish satisfactory evidence (including reports of required tests) as to the source, kind, and quality of materials and equipment.

C. All materials and equipment shall be stored, applied, installed, connected, erected, protected, used, cleaned, and conditioned in accordance with instructions of the applicable Supplier, except as otherwise may be provided in the Contract Documents.

6.04 *Progress Schedule*

A. Contractor shall adhere to the Progress Schedule established in accordance with Paragraph 2.07 as it may be adjusted from time to time as provided below.

1. Contractor shall submit to Engineer for acceptance (to the extent indicated in Paragraph 2.07) proposed adjustments in the Progress Schedule that will not result in changing the Contract Times. Such adjustments will comply with any provisions of the General Requirements applicable thereto.

2. Proposed adjustments in the Progress Schedule that will change the Contract Times shall be submitted in accordance with the requirements of Article 12. Adjustments in Contract Times may only be made by a Change Order.

6.05 *Substitutes and "Or-Equals"*

A. Whenever an item of material or equipment is specified or described in the Contract Documents by using the name of a proprietary item or the name of a particular Supplier, the specification or description is intended to establish the type, function, appearance, and quality required. Unless the specification or description contains or is followed by words reading that no like, equivalent, or "or-equal" item or no substitution is permitted, other items of material or equipment or material or equipment of other Suppliers may be submitted to Engineer for review under the circumstances described below.

1. *"Or-Equal" Items:* If in Engineer's sole discretion an item of material or equipment proposed by Contractor is functionally equal to that named and sufficiently similar so that no change in related Work will be required, it may be considered by Engineer as an "or-equal" item, in which case review and approval of the proposed item may, in Engineer's sole discretion, be accomplished without compliance with some or all of the requirements for approval of proposed substitute items. For the purposes of this Paragraph 6.05.A.1, a proposed item of material or equipment will be considered functionally equal to an item so named if:

a. in the exercise of reasonable judgment Engineer determines that:

1) it is at least equal in materials of construction, quality, durability, appearance, strength, and design characteristics;

2) it will reliably perform at least equally well the function and achieve the results imposed by the design concept of the completed Project as a functioning whole,

3) it has a proven record of performance and availability of responsive service; and

b. Contractor certifies that, if approved and incorporated into the Work:

1) there will be no increase in cost to the Owner or increase in Contract Times, and

2) it will conform substantially to the detailed requirements of the item named in the Contract Documents.

2. Substitute Items

a. If in Engineer's sole discretion an item of material or equipment proposed by Contractor does not qualify as an "or-equal" item under Paragraph 6.05.A.1, it will be considered a proposed substitute item.

b. Contractor shall submit sufficient information as provided below to allow Engineer to determine that the item of material or equipment proposed is essentially equivalent to that named and an acceptable substitute therefor. Requests for review of proposed substitute items of material or equipment will not be accepted by Engineer from anyone other than Contractor.

c. The requirements for review by Engineer will be as set forth in Paragraph 6.05.A.2.d, as supplemented in the General Requirements and as Engineer may decide is appropriate under the circumstances.

d. Contractor shall make written application to Engineer for review of a proposed substitute item of material or equipment that Contractor seeks to furnish or use. The application:

1) shall certify that the proposed substitute item will:

a) perform adequately the functions and achieve the results called for by the general design,

b) be similar in substance to that specified, and

c) be suited to the same use as that specified;

2) will state:

a) the extent, if any, to which the use of the proposed substitute item will prejudice Contractor's achievement of Substantial Completion on time;

b) whether or not use of the proposed substitute item in the Work will require a change in any of the Contract Documents (or in the provisions of any other direct contract with Owner for other work on the Project) to adapt the design to the proposed substitute item; and

c) whether or not incorporation or use of the proposed substitute item in connection with the Work is subject to payment of any license fee or royalty;

3) will identify:

a) all variations of the proposed substitute item from that specified , and

b) available engineering, sales, maintenance, repair, and replacement services;

4) and shall contain an itemized estimate of all costs or credits that will result directly or indirectly from use of such substitute item, including costs of redesign and claims of other contractors affected by any resulting change,

B. *Substitute Construction Methods or Procedures:* If a specific means, method, technique, sequence, or procedure of construction is expressly required by the Contract Documents, Contractor may furnish or utilize a substitute means, method, technique, sequence, or procedure of construction approved by Engineer. Contractor shall submit sufficient information to allow Engineer, in Engineer's sole discretion, to determine that the substitute proposed is equivalent to that expressly called for by the Contract Documents. The requirements for review by Engineer will be similar to those provided in Paragraph 6.05.A.2.

C. *Engineer's Evaluation:* Engineer will be allowed a reasonable time within which to evaluate each proposal or submittal made pursuant to Paragraphs 6.05.A and 6.05.B. Engineer may require Contractor to furnish additional data about the proposed substitute item. Engineer will be the sole judge of acceptability. No "or equal" or substitute will be ordered, installed or utilized until Engineer's review is complete, which will be evidenced by either a Change Order for a substitute or an approved Shop Drawing for an "or equal." Engineer will advise Contractor in writing of any negative determination.

D. *Special Guarantee:* Owner may require Contractor to furnish at Contractor's expense a special performance guarantee or other surety with respect to any substitute.

E. *Engineer's Cost Reimbursement*: Engineer will record Engineer's costs in evaluating a substitute proposed or submitted by Contractor pursuant to Paragraphs 6.05.A.2 and 6.05.B Whether or not Engineer approves a substitute item so proposed or submitted by Contractor, Contractor shall reimburse Owner for the charges of Engineer for evaluating each such proposed substitute. Contractor shall also reimburse Owner for the charges of Engineer for making changes in the Contract Documents (or in the provisions of any other direct contract with Owner) resulting from the acceptance of each proposed substitute.

F. *Contractor's Expense*: Contractor shall provide all data in support of any proposed substitute or "or-equal" at Contractor's expense.

6.06 *Concerning Subcontractors, Suppliers, and Others*

A. Contractor shall not employ any Subcontractor, Supplier, or other individual or entity (including those acceptable to Owner as indicated in Paragraph 6.06.B), whether initially or as a replacement, against whom Owner may have reasonable objection. Contractor shall not be required to employ any Subcontractor, Supplier, or other individual or entity to furnish or perform any of the Work against whom Contractor has reasonable objection.

B. If the Supplementary Conditions require the identity of certain Subcontractors, Suppliers, or other individuals or entities to be submitted to Owner in advance for acceptance by Owner by a specified date prior to the Effective Date of the Agreement, and if Contractor has submitted a list thereof in accordance with the Supplementary Conditions, Owner's acceptance (either in writing or by failing to make written objection thereto by the date indicated for acceptance or objection in the Bidding Documents or the Contract Documents) of any such Subcontractor, Supplier, or other individual or entity so identified may be revoked on the basis of reasonable objection after due investigation. Contractor shall submit an acceptable replacement for the rejected Subcontractor, Supplier, or other individual or entity, and the Contract Price will be adjusted by the difference in the cost occasioned by such replacement, and an appropriate Change Order will be issued . No acceptance by Owner of any such Subcontractor, Supplier, or other individual or entity, whether initially or as a replacement, shall constitute a waiver of any right of Owner or Engineer to reject defective Work.

C. Contractor shall be fully responsible to Owner and Engineer for all acts and omissions of the Subcontractors, Suppliers, and other individuals or entities performing or furnishing any of the Work just as Contractor is responsible for Contractor's own acts and omissions. Nothing in the Contract Documents:

1. shall create for the benefit of any such Subcontractor, Supplier, or other individual or entity any contractual relationship between Owner or Engineer and any such Subcontractor, Supplier or other individual or entity, nor

2. shall anything in the Contract Documents create any obligation on the part of Owner or Engineer to pay or to see to the payment of any moneys due any such Subcontractor, Supplier, or other individual

or entity except as may otherwise be required by Laws and Regulations.

D. Contractor shall be solely responsible for scheduling and coordinating the Work of Subcontractors, Suppliers, and other individuals or entities performing or furnishing any of the Work under a direct or indirect contract with Contractor.

E. Contractor shall require all Subcontractors, Suppliers, and such other individuals or entities performing or furnishing any of the Work to communicate with Engineer through Contractor.

F. The divisions and sections of the Specifications and the identifications of any Drawings shall not control Contractor in dividing the Work among Subcontractors or Suppliers or delineating the Work to be performed by any specific trade.

G. All Work performed for Contractor by a Subcontractor or Supplier will be pursuant to an appropriate agreement between Contractor and the Subcontractor or Supplier which specifically binds the Subcontractor or Supplier to the applicable terms and conditions of the Contract Documents for the benefit of Owner and Engineer. Whenever any such agreement is with a Subcontractor or Supplier who is listed as an additional insured on the property insurance provided in Paragraph 5.06, the agreement between the Contractor and the Subcontractor or Supplier will contain provisions whereby the Subcontractor or Supplier waives all rights against Owner, Contractor, and Engineer,, and all other individuals or entities identified in the Supplementary Conditions to be listed as insureds or additional insureds (and the officers, directors, partners, employees, agents, consultants and subcontractors of each and any of them) for all losses and damages caused by, arising out of, relating to, or resulting from any of the perils or causes of loss covered by such policies and any other property insurance applicable to the Work. If the insurers on any such policies require separate waiver forms to be signed by any Subcontractor or Supplier, Contractor will obtain the same.

6.07 *Patent Fees and Royalties*

A. Contractor shall pay all license fees and royalties and assume all costs incident to the use in the performance of the Work or the incorporation in the Work of any invention, design, process, product, or device which is the subject of patent rights or copyrights held by others. If a particular invention, design, process, product, or device is specified in the Contract Documents for use in the performance of the Work and if to the actual knowledge of Owner or Engineer its use is subject to patent rights or copyrights calling for the payment of any license fee or royalty to others, the existence of such rights shall be disclosed by Owner in the Contract Documents.

B. To the fullest extent permitted by Laws and Regulations, Contractor shall indemnify and hold harmless Owner and Engineer, and the officers, directors, partners, employees, agents, consultants and subcontractors of each and any of them from and against all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to any infringement of patent rights or copyrights incident to the use in the performance of the Work or resulting from the incorporation in the Work of any invention, design, process, product, or device not specified in the Contract Documents.

6.08 *Permits*

A. Unless otherwise provided in the Supplementary Conditions, Contractor shall obtain and pay for all construction permits and licenses. Owner shall assist Contractor, when necessary, in obtaining such permits and licenses. Contractor shall pay all governmental charges and inspection fees necessary for the prosecution of the Work which are applicable at the time of opening of Bids, or, if there are no Bids, on the Effective Date of the Agreement. Owner shall pay all charges of utility owners for connections for providing permanent service to the Work.

6.09 *Laws and Regulations*

A. Contractor shall give all notices required by and shall comply with all Laws and Regulations applicable to the performance of the Work. Except where otherwise expressly required by applicable Laws and Regulations, neither Owner nor Engineer shall be responsible for monitoring Contractor's compliance with any Laws or Regulations.

B. If Contractor performs any Work knowing or having reason to know that it is contrary to Laws or Regulations, Contractor shall bear all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to such Work. However, it shall not be Contractor's primary responsibility to make certain that the Specifications and Drawings are in accordance with Laws and Regulations, but this shall not relieve Contractor of Contractor's obligations under Paragraph 3.03.

C. Changes in Laws or Regulations not known at the time of opening of Bids (or, on the Effective Date of the Agreement if there were no Bids) having an effect on the cost or time of performance of the Work shall be the subject of an adjustment in Contract Price or Contract Times. If Owner and Contractor are unable to agree on entitlement to or on the amount or extent, if any, of any such adjustment, a Claim may be made therefor as provided in Paragraph 10.05.

6.10 *Taxes*

A. Contractor shall pay all sales, consumer, use, and other similar taxes required to be paid by Contractor in accordance with the Laws and Regulations of the place of the Project which are applicable during the performance of the Work.

6.11 *Use of Site and Other Areas*

A. Limitation on Use of Site and Other Areas

1. Contractor shall confine construction equipment, the storage of materials and equipment, and the operations of workers to the Site and other areas permitted by Laws and Regulations, and shall not unreasonably encumber the Site and other areas with construction equipment or other materials or equipment. Contractor shall assume full responsibility for any damage to any such land or area, or to the owner or occupant thereof, or of any adjacent land or areas resulting from the performance of the Work.

2. Should any claim be made by any such owner or occupant because of the performance of the Work, Contractor shall promptly settle with such other party by negotiation or otherwise resolve the claim by arbitration or other dispute resolution proceeding or at law.

3. To the fullest extent permitted by Laws and Regulations, Contractor shall indemnify and hold harmless Owner and Engineer, and the officers, directors, partners, employees, agents, consultants and subcontractors of each and any of them from and against all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to any claim or action, legal or equitable, brought by any such owner or occupant against Owner, Engineer, or any other party indemnified hereunder to the extent caused by or based upon Contractor's performance of the Work.

B. *Removal of Debris During Performance of the Work:* During the progress of the Work Contractor shall keep the Site and other areas free from accumulations of waste materials, rubbish, and other debris. Removal and disposal of such waste materials, rubbish, and other debris shall conform to applicable Laws and Regulations.

C. *Cleaning:* Prior to Substantial Completion of the Work Contractor shall clean the Site and the Work and make it ready for utilization by Owner. At the completion of the Work Contractor shall remove from the Site all tools, appliances, construction equipment and machinery, and surplus materials and shall restore to original condition all property not designated for alteration by the Contract Documents.

D. *Loading Structures:* Contractor shall not load nor permit any part of any structure to be loaded in any manner that will endanger the structure, nor shall Contractor subject any part of the Work or adjacent property to stresses or pressures that will endanger it.

6.12 *Record Documents*

A. Contractor shall maintain in a safe place at the Site one record copy of all Drawings, Specifications, Addenda, Change Orders, Work Change Directives, Field Orders, and written interpretations and clarifications in good order and annotated to show changes made during construction. These record documents together with all approved Samples and a counterpart of all approved Shop Drawings will be available to Engineer for reference. Upon completion of the Work, these record documents, Samples, and Shop Drawings will be delivered to Engineer for Owner.

6.13 *Safety and Protection*

A. Contractor shall be solely responsible for initiating, maintaining and supervising all safety precautions and programs in connection with the Work. Contractor shall take all necessary precautions for the safety of, and shall provide the necessary protection to prevent damage, injury or loss to:

1. all persons on the Site or who may be affected by the Work;

2. all the Work and materials and equipment to be incorporated therein, whether in storage on or off the Site; and

3. other property at the Site or adjacent thereto, including trees, shrubs, lawns, walks, pavements, roadways, structures, utilities, and Underground Facilities not designated for removal, relocation, or replacement in the course of construction.

B. Contractor shall comply with all applicable Laws and Regulations relating to the safety of persons or property, or to the protection of persons or property from damage, injury, or loss; and shall erect and maintain all necessary safeguards for such safety and protection. Contractor shall notify owners of adjacent property and of Underground Facilities and other utility owners when prosecution of the Work may affect them, and shall cooperate with them in the protection, removal, relocation, and replacement of their property.

C. All damage, injury, or loss to any property referred to in Paragraph 6.13.A.2 or 6.13.A.3 caused, directly or indirectly, in whole or in part, by Contractor, any Subcontractor, Supplier, or any other individual or entity directly or indirectly employed by any of them to perform any of the Work, or anyone for whose acts any of them may be liable, shall be remedied by Contractor (except damage or loss attributable to the fault of Draw-

ings or Specifications or to the acts or omissions of Owner or Engineer or , or anyone employed by any of them, or anyone for whose acts any of them may be liable, and not attributable, directly or indirectly, in whole or in part, to the fault or negligence of Contractor or any Subcontractor, Supplier, or other individual or entity directly or indirectly employed by any of them).

D. Contractor's duties and responsibilities for safety and for protection of the Work shall continue until such time as all the Work is completed and Engineer has issued a notice to Owner and Contractor in accordance with Paragraph 14.07.B that the Work is acceptable (except as otherwise expressly provided in connection with Substantial Completion).

6.14 *Safety Representative*

A. Contractor shall designate a qualified and experienced safety representative at the Site whose duties and responsibilities shall be the prevention of accidents and the maintaining and supervising of safety precautions and programs.

6.15 *Hazard Communication Programs*

A. Contractor shall be responsible for coordinating any exchange of material safety data sheets or other hazard communication information required to be made available to or exchanged between or among employers at the Site in accordance with Laws or Regulations.

6.16 *Emergencies*

A. In emergencies affecting the safety or protection of persons or the Work or property at the Site or adjacent thereto, Contractor is obligated to act to prevent threatened damage, injury, or loss. Contractor shall give Engineer prompt written notice if Contractor believes that any significant changes in the Work or variations from the Contract Documents have been caused thereby or are required as a result thereof. If Engineer determines that a change in the Contract Documents is required because of the action taken by Contractor in response to such an emergency, a Work Change Directive or Change Order will be issued.

6.17 *Shop Drawings and Samples*

A. Contractor shall submit Shop Drawings and Samples to Engineer for review and approval in accordance with the acceptable Schedule of Submittals (as required by Paragraph 2.07). Each submittal will be identified as Engineer may require.

1. Shop Drawings

a. Submit number of copies specified in the General Requirements.

b. Data shown on the Shop Drawings will be complete with respect to quantities, dimensions, specified performance and design criteria, materials, and similar data to show Engineer the services, materials, and equipment Contractor proposes to provide and to enable Engineer to review the information for the limited purposes required by Paragraph 6.17.D.

2. *Samples:* Contractor shall also submit Samples to Engineer for review and approval in accordance with the acceptable schedule of Shop Drawings and Sample submittals.

a. Submit number of Samples specified in the Specifications.

b. Clearly identify each Sample as to material, Supplier, pertinent data such as catalog numbers, the use for which intended and other data as Engineer may require to enable Engineer to review the submittal for the limited purposes required by Paragraph 6.17.D.

B. Where a Shop Drawing or Sample is required by the Contract Documents or the Schedule of Submittals , any related Work performed prior to Engineer's review and approval of the pertinent submittal will be at the sole expense and responsibility of Contractor.

C. Submittal Procedures

1. Before submitting each Shop Drawing or Sample, Contractor shall have determined and verified:

a. all field measurements, quantities, dimensions, specified performance and design criteria, installation requirements, materials, catalog numbers, and similar information with respect thereto;

b. the suitability of all materials with respect to intended use, fabrication, shipping, handling, storage, assembly, and installation pertaining to the performance of the Work;

c. all information relative to Contractor's responsibilities for means, methods, techniques, sequences, and procedures of construction, and safety precautions and programs incident thereto; and

d. shall also have reviewed and coordinated each Shop Drawing or Sample with other Shop Drawings and Samples and with the requirements of the Work and the Contract Documents.

2. Each submittal shall bear a stamp or specific written certification that Contractor has satisfied Contractor's obligations under the Contract Documents

with respect to Contractor's review and approval of that submittal.

3. With each submittal, Contractor shall give Engineer specific written notice of any variations, that the Shop Drawing or Sample may have from the requirements of the Contract Documents. This notice shall be both a written communication separate from the Shop Drawing's or Sample Submittal; and, in addition, by a specific notation made on each Shop Drawing or Sample submitted to Engineer for review and approval of each such variation.

D. *Engineer's Review*

1. Engineer will provide timely review of Shop Drawings and Samples in accordance with the Schedule of Submittals acceptable to Engineer. Engineer's review and approval will be only to determine if the items covered by the submittals will, after installation or incorporation in the Work, conform to the information given in the Contract Documents and be compatible with the design concept of the completed Project as a functioning whole as indicated by the Contract Documents.

2. Engineer's review and approval will not extend to means, methods, techniques, sequences, or procedures of construction (except where a particular means, method, technique, sequence, or procedure of construction is specifically and expressly called for by the Contract Documents) or to safety precautions or programs incident thereto. The review and approval of a separate item as such will not indicate approval of the assembly in which the item functions.

3. Engineer's review and approval shall not relieve Contractor from responsibility for any variation from the requirements of the Contract Documents unless Contractor has complied with the requirements of Paragraph 6.17.C.3 and Engineer has given written approval of each such variation by specific written notation thereof incorporated in or accompanying the Shop Drawing or Sample. Engineer's review and approval shall not relieve Contractor from responsibility for complying with the requirements of Paragraph 6.17.C.1.

E. *Resubmittal Procedures*

1. Contractor shall make corrections required by Engineer and shall return the required number of corrected copies of Shop Drawings and submit, as required, new Samples for review and approval. Contractor shall direct specific attention in writing to revisions other than the corrections called for by Engineer on previous submittals.

6.18 *Continuing the Work*

A. Contractor shall carry on the Work and adhere to the Progress Schedule during all disputes or disagreements with Owner. No Work shall be delayed or postponed pending resolution of any disputes or disagreements, except as permitted by Paragraph 15.04 or as Owner and Contractor may otherwise agree in writing.

6.19 *Contractor's General Warranty and Guarantee*

A. Contractor warrants and guarantees to Owner that all Work will be in accordance with the Contract Documents and will not be defective. Engineer and its Related Entities shall be entitled to rely on representation of Contractor's warranty and guarantee.

B. Contractor's warranty and guarantee hereunder excludes defects or damage caused by:

1. abuse, modification, or improper maintenance or operation by persons other than Contractor, Subcontractors, Suppliers, or any other individual or entity for whom Contractor is responsible; or

2. normal wear and tear under normal usage.

C. Contractor's obligation to perform and complete the Work in accordance with the Contract Documents shall be absolute. None of the following will constitute an acceptance of Work that is not in accordance with the Contract Documents or a release of Contractor's obligation to perform the Work in accordance with the Contract Documents:

1. observations by Engineer;

2. recommendation by Engineer or payment by Owner of any progress or final payment;

3. the issuance of a certificate of Substantial Completion by Engineer or any payment related thereto by Owner;

4. use or occupancy of the Work or any part thereof by Owner;

5. any review and approval of a Shop Drawing or Sample submittal or the issuance of a notice of acceptability by Engineer;

6. any inspection, test, or approval by others; or

7. any correction of defective Work by Owner.

6.20 *Indemnification*

A. To the fullest extent permitted by Laws and Regulations, Contractor shall indemnify and hold harmless Owner and Engineer, and the officers, directors, partners, employees, agents, consultants and subcontractors of each and any of them from and against all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or

arbitration or other dispute resolution costs) arising out of or relating to the performance of the Work, provided that any such claim, cost, loss, or damage is attributable to bodily injury, sickness, disease, or death, or to injury to or destruction of tangible property (other than the Work itself), including the loss of use resulting therefrom but only to the extent caused by any negligent act or omission of Contractor, any Subcontractor, any Supplier, or any individual or entity directly or indirectly employed by any of them to perform any of the Work or anyone for whose acts any of them may be liable .

B. In any and all claims against Owner or Engineer or any of their respective consultants, agents, officers, directors, partners, or employees by any employee (or the survivor or personal representative of such employee) of Contractor, any Subcontractor, any Supplier, or any individual or entity directly or indirectly employed by any of them to perform any of the Work, or anyone for whose acts any of them may be liable, the indemnification obligation under Paragraph 6.20.A shall not be limited in any way by any limitation on the amount or type of damages, compensation, or benefits payable by or for Contractor or any such Subcontractor, Supplier, or other individual or entity under workers' compensation acts, disability benefit acts, or other employee benefit acts.

C. The indemnification obligations of Contractor under Paragraph 6.20.A shall not extend to the liability of Engineer and Engineer's officers, directors, partners, employees, agents, consultants and subcontractors arising out of:

1. the preparation or approval of, or the failure to prepare or approve, maps, Drawings, opinions, reports, surveys, Change Orders, designs, or Specifications; or

2. giving directions or instructions, or failing to give them, if that is the primary cause of the injury or damage.

6.21 *Delegation of Professional Design Services*

A. Contractor will not be required to provide professional design services unless such services are specifically required by the Contract Documents for a portion of the Work or unless such services are required to carry out Contractor's responsibilities for construction means, methods, techniques, sequences and procedures. Contractor shall not be required to provide professional services in violation of applicable law.

B. If professional design services or certifications by a design professional related to systems, materials or equipment are specifically required of Contractor by the Contract Documents, Owner and Engineer will specify all performance and design criteria that such services must satisfy. Contractor shall cause such services or certifications to be provided by a properly licensed professional, whose signature and seal shall appear on all drawings, calculations, specifications, certifications, Shop Drawings and other submittals prepared by such professional. Shop Drawings and other submittals related to the Work designed or certified by such professional, if prepared by others, shall bear such professional's written approval when submitted to Engineer.

C. Owner and Engineer shall be entitled to rely upon the adequacy, accuracy and completeness of the services, certifications or approvals performed by such design professionals, provided Owner and Engineer have specified to Contractor all performance and design criteria that such services must satisfy.

D. Pursuant to this Paragraph 6.21, Engineer's review and approval of design calculations and design drawings will be only for the limited purpose of checking for conformance with performance and design criteria given and the design concept expressed in the Contract Documents. Engineer's review and approval of Shop Drawings and other submittals (except design calculations and design drawings) will be only for the purpose stated in Paragraph 6.17.D.1.

E. Contractor shall not be responsible for the adequacy of the performance or design criteria required by the Contract Documents.

ARTICLE 7 - OTHER WORK AT THE SITE

7.01 *Related Work at Site*

A. Owner may perform other work related to the Project at the Site with Owner's employees, or via other direct contracts therefor, or have other work performed by utility owners. If such other work is not noted in the Contract Documents, then:

1. written notice thereof will be given to Contractor prior to starting any such other work; and

2. if Owner and Contractor are unable to agree on entitlement to or on the amount or extent, if any, of any adjustment in the Contract Price or Contract Times that should be allowed as a result of such other work, a Claim may be made therefor as provided in Paragraph 10.05.

B. Contractor shall afford each other contractor who is a party to such a direct contract, each utility owner and Owner, if Owner is performing other work with Owner's employees, proper and safe access to the Site, a reasonable opportunity for the introduction and storage of materials and equipment and the execution of such other work, and shall properly coordinate the Work with theirs. Contractor shall do all cutting, fitting, and patching of the Work that may be required to properly connect or otherwise make its several parts come together and

properly integrate with such other work. Contractor shall not endanger any work of others by cutting, excavating, or otherwise altering their work and will only cut or alter their work with the written consent of Engineer and the others whose work will be affected. The duties and responsibilities of Contractor under this Paragraph are for the benefit of such utility owners and other contractors to the extent that there are comparable provisions for the benefit of Contractor in said direct contracts between Owner and such utility owners and other contractors.

C. If the proper execution or results of any part of Contractor's Work depends upon work performed by others under this Article 7, Contractor shall inspect such other work and promptly report to Engineer in writing any delays, defects, or deficiencies in such other work that render it unavailable or unsuitable for the proper execution and results of Contractor's Work. Contractor's failure to so report will constitute an acceptance of such other work as fit and proper for integration with Contractor's Work except for latent defects and deficiencies in such other work.

7.02 *Coordination*

A. If Owner intends to contract with others for the performance of other work on the Project at the Site, the following will be set forth in Supplementary Conditions:

1. the individual or entity who will have authority and responsibility for coordination of the activities among the various contractors will be identified;

2. the specific matters to be covered by such authority and responsibility will be itemized; and

3. the extent of such authority and responsibilities will be provided.

B. Unless otherwise provided in the Supplementary Conditions, Owner shall have sole authority and responsibility for such coordination.

7.03 *Legal Relationships*

A. Paragraphs 7.01.A and 7.02 are not applicable for utilities not under the control of Owner.

B. Each other direct contract of Owner under Paragraph 7.01.A shall provide that the other contractor is liable to Owner and Contractor for the reasonable direct delay and disruption costs incurred by Contractor as a result of the other contractor's actions or inactions.

C. Contractor shall be liable to Owner and any other contractor for the reasonable direct delay and disruption costs incurred by such other contractor as a result of Contractor's action or inactions.

ARTICLE 8 - OWNER'S RESPONSIBILITIES

8.01 *Communications to Contractor*

A. Except as otherwise provided in these General Conditions, Owner shall issue all communications to Contractor through Engineer.

8.02 *Replacement of Engineer*

A. In case of termination of the employment of Engineer, Owner shall appoint an engineer to whom Contractor makes no reasonable objection, whose status under the Contract Documents shall be that of the former Engineer.

8.03 *Furnish Data*

A. Owner shall promptly furnish the data required of Owner under the Contract Documents.

8.04 *Pay When Due*

A. Owner shall make payments to Contractor when they are due as provided in Paragraphs 14.02.C and 14.07.C.

8.05 *Lands and Easements; Reports and Tests*

A. Owner's duties in respect of providing lands and easements and providing engineering surveys to establish reference points are set forth in Paragraphs 4.01 and 4.05. Paragraph 4.02 refers to Owner's identifying and making available to Contractor copies of reports of explorations and tests of subsurface conditions and drawings of physical conditions in or relating to existing surface or subsurface structures at or contiguous to the Site that have been utilized by Engineer in preparing the Contract Documents.

8.06 *Insurance*

A. Owner's responsibilities, if any, in respect to purchasing and maintaining liability and property insurance are set forth in Article 5.

8.07 *Change Orders*

A. Owner is obligated to execute Change Orders as indicated in Paragraph 10.03.

8.08 *Inspections, Tests, and Approvals*

A. Owner's responsibility in respect to certain inspections, tests, and approvals is set forth in Paragraph 13.03.B.

8.09 *Limitations on Owner's Responsibilities*

A. The Owner shall not supervise, direct, or have control or authority over, nor be responsible for, Contractor's means, methods, techniques, sequences, or procedures of construction, or the safety precautions and programs incident thereto, or for any failure of Contractor to comply with Laws and Regulations applicable to the performance of the Work. Owner will not be responsible for Contractor's failure to perform the Work in accordance with the Contract Documents.

8.10 *Undisclosed Hazardous Environmental Condition*

A. Owner's responsibility in respect to an undisclosed Hazardous Environmental Condition is set forth in Paragraph 4.06.

8.11 *Evidence of Financial Arrangements*

A. If and to the extent Owner has agreed to furnish Contractor reasonable evidence that financial arrangements have been made to satisfy Owner's obligations under the Contract Documents, Owner's responsibility in respect thereof will be as set forth in the Supplementary Conditions.

ARTICLE 9 - ENGINEER'S STATUS DURING CONSTRUCTION

9.01 *Owner's Representative*

A. Engineer will be Owner's representative during the construction period. The duties and responsibilities and the limitations of authority of Engineer as Owner's representative during construction are set forth in the Contract Documents and will not be changed without written consent of Owner and Engineer.

9.02 *Visits to Site*

A. Engineer will make visits to the Site at intervals appropriate to the various stages of construction as Engineer deems necessary in order to observe as an experienced and qualified design professional the progress that has been made and the quality of the various aspects of Contractor's executed Work. Based on information obtained during such visits and observations, Engineer, for the benefit of Owner, will determine, in general, if the Work is proceeding in accordance with the Contract Documents. Engineer will not be required to make exhaustive or continuous inspections on the Site to check the quality or quantity of the Work. Engineer's efforts will be directed toward providing for Owner a greater degree of confidence that the completed Work will conform generally to the Contract Documents. On the basis of such visits and observations, Engineer will keep Owner informed of the progress of the Work and will endeavor to guard Owner against defective Work.

B. Engineer's visits and observations are subject to all the limitations on Engineer's authority and responsibility set forth in Paragraph 9.09. Particularly, but without limitation, during or as a result of Engineer's visits or observations of Contractor's Work Engineer will not supervise, direct, control, or have authority over or be responsible for Contractor's means, methods, techniques, sequences, or procedures of construction, or the safety precautions and programs incident thereto, or for any failure of Contractor to comply with Laws and Regulations applicable to the performance of the Work.

9.03 *Project Representative*

A. If Owner and Engineer agree, Engineer will furnish a Resident Project Representative to assist Engineer in providing more extensive observation of the Work. The authority and responsibilities of any such Resident Project Representative and assistants will be as provided in the Supplementary Conditions, and limitations on the responsibilities thereof will be as provided in Paragraph 9.09. If Owner designates another representative or agent to represent Owner at the Site who is not Engineer's consultant, agent or employee, the responsibilities and authority and limitations thereon of such other individual or entity will be as provided in the Supplementary Conditions.

9.04 *Authorized Variations in Work*

A. Engineer may authorize minor variations in the Work from the requirements of the Contract Documents which do not involve an adjustment in the Contract Price or the Contract Times and are compatible with the design concept of the completed Project as a functioning whole as indicated by the Contract Documents. These may be accomplished by a Field Order and will be binding on Owner and also on Contractor, who shall perform the Work involved promptly. If Owner or Contractor believes that a Field Order justifies an adjustment in the Contract Price or Contract Times, or both, and the parties are unable to agree on entitlement to or on the amount or extent, if any, of any such adjustment , a Claim may be made therefor as provided in Paragraph 10.05.

9.05 *Rejecting Defective Work*

A. Engineer will have authority to reject Work which Engineer believes to be defective, or that Engineer believes will not produce a completed Project that conforms to the Contract Documents or that will prejudice the integrity of the design concept of the completed Project as a functioning whole as indicated by the Contract Documents. Engineer will also have authority to require special inspection or testing of the Work as provided in Paragraph 13.04, whether or not the Work is fabricated, installed, or completed.

9.06 *Shop Drawings, Change Orders and Payments*

A. In connection with Engineer's authority, and limitations thereof, as to Shop Drawings and Samples, see Paragraph 6.17.

B. In connection with Engineer's authority, and limitations thereof, as to design calculations and design drawings submitted in response to a delegation of professional design services, if any, see Paragraph 6.21.

C. In connection with Engineer's authority as to Change Orders, see Articles 10, 11, and 12.

D. In connection with Engineer's authority as to Applications for Payment, see Article 14.

9.07 *Determinations for Unit Price Work*

A. Engineer will determine the actual quantities and classifications of Unit Price Work performed by Contractor. Engineer will review with Contractor the Engineer's preliminary determinations on such matters before rendering a written decision thereon (by recommendation of an Application for Payment or otherwise). Engineer's written decision thereon will be final and binding (except as modified by Engineer to reflect changed factual conditions or more accurate data) upon Owner and Contractor, subject to the provisions of Paragraph 10.05.

9.08 *Decisions on Requirements of Contract Documents and Acceptability of Work*

A. Engineer will be the initial interpreter of the requirements of the Contract Documents and judge of the acceptability of the Work thereunder. All matters in question and other matters between Owner and Contractor arising prior to the date final payment is due relating to the acceptability of the Work, and the interpretation of the requirements of the Contract Documents pertaining to the performance of the Work, will be referred initially to Engineer in writing within 30 days of the event giving rise to the question

B. Engineer will, with reasonable promptness, render a written decision on the issue referred. If Owner or Contractor believe that any such decision entitles them to an adjustment in the Contract Price or Contract Times or both, a Claim may be made under Paragraph 10.05. The date of Engineer's decision shall be the date of the event giving rise to the issues referenced for the purposes of Paragraph 10.05.B.

C. Engineer's written decision on the issue referred will be final and binding on Owner and Contractor, subject to the provisions of Paragraph 10.05.

D. When functioning as interpreter and judge under this Paragraph 9.08, Engineer will not show partiality to Owner or Contractor and will not be liable in connection with any interpretation or decision rendered in good faith in such capacity.

9.09 *Limitations on Engineer's Authority and Responsibilities*

A. Neither Engineer's authority or responsibility under this Article 9 or under any other provision of the Contract Documents nor any decision made by Engineer in good faith either to exercise or not exercise such authority or responsibility or the undertaking, exercise, or performance of any authority or responsibility by Engineer shall create, impose, or give rise to any duty in contract, tort, or otherwise owed by Engineer to Contractor, any Subcontractor, any Supplier, any other individual or entity, or to any surety for or employee or agent of any of them.

B. Engineer will not supervise, direct, control, or have authority over or be responsible for Contractor's means, methods, techniques, sequences, or procedures of construction, or the safety precautions and programs incident thereto, or for any failure of Contractor to comply with Laws and Regulations applicable to the performance of the Work. Engineer will not be responsible for Contractor's failure to perform the Work in accordance with the Contract Documents.

C. Engineer will not be responsible for the acts or omissions of Contractor or of any Subcontractor, any Supplier, or of any other individual or entity performing any of the Work.

D. Engineer's review of the final Application for Payment and accompanying documentation and all maintenance and operating instructions, schedules, guarantees, bonds, certificates of inspection, tests and approvals, and other documentation required to be delivered by Paragraph 14.07.A will only be to determine generally that their content complies with the requirements of, and in the case of certificates of inspections, tests, and approvals that the results certified indicate compliance with the Contract Documents.

E. The limitations upon authority and responsibility set forth in this Paragraph 9.09 shall also apply to, the Resident Project Representative, if any, and assistants, if any.

ARTICLE 10 - CHANGES IN THE WORK; CLAIMS

10.01 *Authorized Changes in the Work*

A. Without invalidating the Contract and without notice to any surety, Owner may, at any time or from time to time, order additions, deletions, or revisions in the Work by a Change Order, or a Work Change Directive. Upon receipt of any such document, Contractor shall

promptly proceed with the Work involved which will be performed under the applicable conditions of the Contract Documents (except as otherwise specifically provided).

B. If Owner and Contractor are unable to agree on entitlement to, or on the amount or extent, if any, of an adjustment in the Contract Price or Contract Times, or both, that should be allowed as a result of a Work Change Directive, a Claim may be made therefor as provided in Paragraph 10.05.

10.02 *Unauthorized Changes in the Work*

A.Contractor shall not be entitled to an increase in the Contract Price or an extension of the Contract Times with respect to any work performed that is not required by the Contract Documents as amended, modified, or supplemented as provided in Paragraph 3.04, except in the case of an emergency as provided in Paragraph 6.16 or in the case of uncovering Work as provided in Paragraph 13.04.B.

10.03 *Execution of Change Orders*

A. Owner and Contractor shall execute appropriate Change Orders recommended by Engineer covering:

1. changes in the Work which are: (i) ordered by Owner pursuant to Paragraph 10.01.A, (ii) required because of acceptance of defective Work under Paragraph 13.08.A or Owner's correction of defective Work under Paragraph 13.09, or (iii) agreed to by the parties;

2. changes in the Contract Price or Contract Times which are agreed to by the parties, including any undisputed sum or amount of time for Work actually performed in accordance with a Work Change Directive; and

3. changes in the Contract Price or Contract Times which embody the substance of any written decision rendered by Engineer pursuant to Paragraph 10.05; provided that, in lieu of executing any such Change Order, an appeal may be taken from any such decision in accordance with the provisions of the Contract Documents and applicable Laws and Regulations, but during any such appeal, Contractor shall carry on the Work and adhere to the Progress Schedule as provided in Paragraph 6.18.A.

10.04 *Notification to Surety*

A. If notice of any change affecting the general scope of the Work or the provisions of the Contract Documents (including, but not limited to, Contract Price or Contract Times) is required by the provisions of any bond to be given to a surety, the giving of any such notice will be Contractor's responsibility. The amount of each applicable bond will be adjusted to reflect the effect of any such change.

10.05 *Claims*

A. *Engineer's Decision Required*: All Claims, except those waived pursuant to Paragraph 14.09, shall be referred to the Engineer for decision. A decision by Engineer shall be required as a condition precedent to any exercise by Owner or Contractor of any rights or remedies either may otherwise have under the Contract Documents or by Laws and Regulations in respect of such Claims.

B. *Notice:* Written notice stating the general nature of each Claim, shall be delivered by the claimant to Engineer and the other party to the Contract promptly (but in no event later than 30 days) after the start of the event giving rise thereto. The responsibility to substantiate a Claim shall rest with the party making the Claim. Notice of the amount or extent of the Claim, with supporting data shall be delivered to the Engineer and the other party to the Contract within 60 days after the start of such event (unless Engineer allows additional time for claimant to submit additional or more accurate data in support of such Claim). A Claim for an adjustment in Contract Price shall be prepared in accordance with the provisions of Paragraph 12.01.B. A Claim for an adjustment in Contract Time shall be prepared in accordance with the provisions of Paragraph 12.02.B. Each Claim shall be accompanied by claimant's written statement that the adjustment claimed is the entire adjustment to which the claimant believes it is entitled as a result of said event. The opposing party shall submit any response to Engineer and the claimant within 30 days after receipt of the claimant's last submittal (unless Engineer allows additional time).

C. *Engineer's Action*: Engineer will review each Claim and, within 30 days after receipt of the last submittal of the claimant or the last submittal of the opposing party, if any, take one of the following actions in writing:

1. deny the Claim in whole or in part,

2. approve the Claim, or

3. notify the parties that the Engineer is unable to resolve the Claim if, in the Engineer's sole discretion, it would be inappropriate for the Engineer to do so. For purposes of further resolution of the Claim, such notice shall be deemed a denial.

D. In the event that Engineer does not take action on a Claim within said 30 days, the Claim shall be deemed denied.

E. Engineer's written action under Paragraph 10.05.C or denial pursuant to Paragraphs 10.05.C.3 or 10.05.D will be final and binding upon Owner and Contractor, unless Owner or Contractor invoke the dispute resolution procedure set forth in Article 16 within 30 days of such action or denial.

F. No Claim for an adjustment in Contract Price or Contract Times will be valid if not submitted in accordance with this Paragraph 10.05.

ARTICLE 11 - COST OF THE WORK; ALLOWANCES; UNIT PRICE WORK

11.01 *Cost of the Work*

A. *Costs Included:* The term Cost of the Work means the sum of all costs, except those excluded in Paragraph 11.01.B, necessarily incurred and paid by Contractor in the proper performance of the Work. When the value of any Work covered by a Change Order or when a Claim for an adjustment in Contract Price is determined on the basis of Cost of the Work, the costs to be reimbursed to Contractor will be only those additional or incremental costs required because of the change in the Work or because of the event giving rise to the Claim. Except as otherwise may be agreed to in writing by Owner, such costs shall be in amounts no higher than those prevailing in the locality of the Project, shall include only the following items, and shall not include any of the costs itemized in Paragraph 11.01.B.

1. Payroll costs for employees in the direct employ of Contractor in the performance of the Work under schedules of job classifications agreed upon by Owner and Contractor. Such employees shall include, without limitation, superintendents, foremen, and other personnel employed full time at the Site. Payroll costs for employees not employed full time on the Work shall be apportioned on the basis of their time spent on the Work. Payroll costs shall include, but not be limited to, salaries and wages plus the cost of fringe benefits, which shall include social security contributions, unemployment, excise, and payroll taxes, workers' compensation, health and retirement benefits, bonuses, sick leave, vacation and holiday pay applicable thereto. The expenses of performing Work outside of regular working hours, on Saturday, Sunday, or legal holidays, shall be included in the above to the extent authorized by Owner.

2. Cost of all materials and equipment furnished and incorporated in the Work, including costs of transportation and storage thereof, and Suppliers' field services required in connection therewith. All cash discounts shall accrue to Contractor unless Owner deposits funds with Contractor with which to make payments, in which case the cash discounts shall accrue to Owner. All trade discounts, rebates and refunds and returns from sale of surplus materials and equipment shall accrue to Owner, and Contractor shall make provisions so that they may be obtained.

3. Payments made by Contractor to Subcontractors for Work performed by Subcontractors. If required by Owner, Contractor shall obtain competitive bids from subcontractors acceptable to Owner and Contractor and shall deliver such bids to Owner, who will then determine, with the advice of Engineer, which bids, if any, will be acceptable. If any subcontract provides that the Subcontractor is to be paid on the basis of Cost of the Work plus a fee, the Subcontractor's Cost of the Work and fee shall be determined in the same manner as Contractor's Cost of the Work and fee as provided in this Paragraph 11.01.

4. Costs of special consultants (including but not limited to Engineers, architects, testing laboratories, surveyors, attorneys, and accountants) employed for services specifically related to the Work.

5. Supplemental costs including the following:

a. The proportion of necessary transportation, travel, and subsistence expenses of Contractor's employees incurred in discharge of duties connected with the Work.

b. Cost, including transportation and maintenance, of all materials, supplies, equipment, machinery, appliances, office, and temporary facilities at the Site, and hand tools not owned by the workers, which are consumed in the performance of the Work, and cost, less market value, of such items used but not consumed which remain the property of Contractor.

c. Rentals of all construction equipment and machinery, and the parts thereof whether rented from Contractor or others in accordance with rental agreements approved by Owner with the advice of Engineer, and the costs of transportation, loading, unloading, assembly, dismantling, and removal thereof. All such costs shall be in accordance with the terms of said rental agreements. The rental of any such equipment, machinery, or parts shall cease when the use thereof is no longer necessary for the Work.

d. Sales, consumer, use, and other similar taxes related to the Work, and for which Contractor is liable, imposed by Laws and Regulations.

e. Deposits lost for causes other than negligence of Contractor, any Subcontractor, or anyone directly or indirectly employed by any of them or for whose acts any of them may be liable, and royalty payments and fees for permits and licenses.

f. Losses and damages (and related expenses) caused by damage to the Work, not compensated by insurance or otherwise, sustained by Contractor in connection with the performance of the Work (except losses and damages within the deductible amounts of property insurance established in accordance with Paragraph 5.06.D), provided such losses and damages have

resulted from causes other than the negligence of Contractor, any Subcontractor, or anyone directly or indirectly employed by any of them or for whose acts any of them may be liable. Such losses shall include settlements made with the written consent and approval of Owner. No such losses, damages, and expenses shall be included in the Cost of the Work for the purpose of determining Contractor's fee.

g. The cost of utilities, fuel, and sanitary facilities at the Site.

h. Minor expenses such as telegrams, long distance telephone calls, telephone service at the Site, expresses, and similar petty cash items in connection with the Work.

i. The costs of premiums for all bonds and insurance Contractor is required by the Contract Documents to purchase and maintain.

B. *Costs Excluded:* The term Cost of the Work shall not include any of the following items:

1. Payroll costs and other compensation of Contractor's officers, executives, principals (of partnerships and sole proprietorships), general managers, safety managers, engineers, architects, estimators, attorneys, auditors, accountants, purchasing and contracting agents, expediters, timekeepers, clerks, and other personnel employed by Contractor, whether at the Site or in Contractor's principal or branch office for general administration of the Work and not specifically included in the agreed upon schedule of job classifications referred to in Paragraph 11.01.A.1 or specifically covered by Paragraph 11.01.A.4, all of which are to be considered administrative costs covered by the Contractor's fee.

2. Expenses of Contractor's principal and branch offices other than Contractor's office at the Site.

3. Any part of Contractor's capital expenses, including interest on Contractor's capital employed for the Work and charges against Contractor for delinquent payments.

4. Costs due to the negligence of Contractor, any Subcontractor, or anyone directly or indirectly employed by any of them or for whose acts any of them may be liable, including but not limited to, the correction of defective Work, disposal of materials or equipment wrongly supplied, and making good any damage to property.

5. Other overhead or general expense costs of any kind and the costs of any item not specifically and expressly included in Paragraphs 11.01.A and 11.01.B.

C. *Contractor's Fee:* When all the Work is performed on the basis of cost-plus, Contractor's fee shall be determined as set forth in the Agreement. When the value of any Work covered by a Change Order or when a Claim for an adjustment in Contract Price is determined on the basis of Cost of the Work, Contractor's fee shall be determined as set forth in Paragraph 12.01.C.

D. *Documentation:* Whenever the Cost of the Work for any purpose is to be determined pursuant to Paragraphs 11.01.A and 11.01.B, Contractor will establish and maintain records thereof in accordance with generally accepted accounting practices and submit in a form acceptable to Engineer an itemized cost breakdown together with supporting data.

11.02 *Allowances*

A. It is understood that Contractor has included in the Contract Price all allowances so named in the Contract Documents and shall cause the Work so covered to be performed for such sums and by such persons or entities as may be acceptable to Owner and Engineer.

B. *Cash Allowances*

1. Contractor agrees that:

a. the cash allowances include the cost to Contractor (less any applicable trade discounts) of materials and equipment required by the allowances to be delivered at the Site, and all applicable taxes; and

b. Contractor's costs for unloading and handling on the Site, labor, installation , overhead, profit, and other expenses contemplated for the cash allowances have been included in the Contract Price and not in the allowances, and no demand for additional payment on account of any of the foregoing will be valid.

C. Contingency Allowance

1. Contractor agrees that a contingency allowance, if any, is for the sole use of Owner to cover unanticipated costs.

D. Prior to final payment, an appropriate Change Order will be issued as recommended by Engineer to reflect actual amounts due Contractor on account of Work covered by allowances, and the Contract Price shall be correspondingly adjusted.

11.03 *Unit Price Work*

A. Where the Contract Documents provide that all or part of the Work is to be Unit Price Work, initially the Contract Price will be deemed to include for all Unit Price Work an amount equal to the sum of the unit price for each separately identified item of Unit Price Work times the estimated quantity of each item as indicated in the Agreement.

B. The estimated quantities of items of Unit Price Work are not guaranteed and are solely for the purpose of comparison of Bids and determining an initial Contract Price. Determinations of the actual quantities and classifications of Unit Price Work performed by Contractor will be made by Engineer subject to the provisions of Paragraph 9.07.

C. Each unit price will be deemed to include an amount considered by Contractor to be adequate to cover Contractor's overhead and profit for each separately identified item.

D. Owner or Contractor may make a Claim for an adjustment in the Contract Price in accordance with Paragraph 10.05 if:

1. the quantity of any item of Unit Price Work performed by Contractor differs materially and significantly from the estimated quantity of such item indicated in the Agreement; and

2. there is no corresponding adjustment with respect any other item of Work; and

3. Contractor believes that Contractor is entitled to an increase in Contract Price as a result of having incurred additional expense or Owner believes that Owner is entitled to a decrease in Contract Price and the parties are unable to agree as to the amount of any such increase or decrease.

ARTICLE 12 - CHANGE OF CONTRACT PRICE; CHANGE OF CONTRACT TIMES

12.01 *Change of Contract Price*

A. The Contract Price may only be changed by a Change Order. Any Claim for an adjustment in the Contract Price shall be based on written notice submitted by the party making the Claim to the Engineer and the other party to the Contract in accordance with the provisions of Paragraph 10.05.

B. The value of any Work covered by a Change Order or of any Claim for an adjustment in the Contract Price will be determined as follows:

1. where the Work involved is covered by unit prices contained in the Contract Documents, by application of such unit prices to the quantities of the items involved (subject to the provisions of Paragraph 11.03); or

2. where the Work involved is not covered by unit prices contained in the Contract Documents, by a mutually agreed lump sum (which may include an allowance for overhead and profit not necessarily in accordance with Paragraph 12.01.C.2); or

3. where the Work involved is not covered by unit prices contained in the Contract Documents and agreement to a lump sum is not reached under Paragraph 12.01.B.2, on the basis of the Cost of the Work (determined as provided in Paragraph 11.01) plus a Contractor's fee for overhead and profit (determined as provided in Paragraph 12.01.C).

C. *Contractor's Fee:* The Contractor's fee for overhead and profit shall be determined as follows:

1. a mutually acceptable fixed fee; or

2. if a fixed fee is not agreed upon, then a fee based on the following percentages of the various portions of the Cost of the Work:

a. for costs incurred under Paragraphs 11.01.A.1 and 11.01.A.2, the Contractor's fee shall be 15 percent;

b. for costs incurred under Paragraph 11.01.A.3, the Contractor's fee shall be five percent;

c. where one or more tiers of subcontracts are on the basis of Cost of the Work plus a fee and no fixed fee is agreed upon, the intent of Paragraph 12.01.C.2.a is that the Subcontractor who actually performs the Work, at whatever tier, will be paid a fee of 15 percent of the costs incurred by such Subcontractor under Paragraphs 11.01.A.1 and 11.01.A.2 and that any higher tier Subcontractor and Contractor will each be paid a fee of five percent of the amount paid to the next lower tier Subcontractor;

d. no fee shall be payable on the basis of costs itemized under Paragraphs 11.01.A.4, 11.01.A.5, and 11.01.B;

e. the amount of credit to be allowed by Contractor to Owner for any change which results in a net decrease in cost will be the amount of the actual net decrease in cost plus a deduction in Contractor's fee by an amount equal to five percent of such net decrease; and

f. when both additions and credits are involved in any one change, the adjustment in Contractor's fee shall be computed on the basis of the net change in accordance with Paragraphs 12.01.C.2.a through 12.01.C.2.e, inclusive.

12.02 *Change of Contract Times*

A. The Contract Times may only be changed by a Change Order. Any Claim for an adjustment in the Contract Times shall be based on written notice submitted

by the party making the Claim to the Engineer and the other party to the Contract in accordance with the provisions of Paragraph 10.05.

B. Any adjustment of the Contract Times covered by a Change Order or any Claim for an adjustment in the Contract Times will be determined in accordance with the provisions of this Article 12.

12.03 *Delays*

A. Where Contractor is prevented from completing any part of the Work within the Contract Times due to delay beyond the control of Contractor, the Contract Times will be extended in an amount equal to the time lost due to such delay if a Claim is made therefor as provided in Paragraph 12.02.A. Delays beyond the control of Contractor shall include, but not be limited to, acts or neglect by Owner, acts or neglect of utility owners or other contractors performing other work as contemplated by Article 7, fires, floods, epidemics, abnormal weather conditions, or acts of God.

B. If Owner, Engineer, or other contractors or utility owners performing other work for Owner as contemplated by Article 7, or anyone for whom Owner is responsible, delays, disrupts, or interferes with the performance or progress of the Work, then Contractor shall be entitled to an equitable adjustment in the Contract Price or the Contract Times , or both. Contractor's entitlement to an adjustment of the Contract Times is conditioned on such adjustment being essential to Contractor's ability to complete the Work within the Contract Times.

C If Contractor is delayed in the performance or progress of the Work by fire, flood, epidemic, abnormal weather conditions, acts of God, acts or failures to act of utility owners not under the control of Owner, or other causes not the fault of and beyond control of Owner and Contractor, then Contractor shall be entitled to an equitable adjustment in Contract Times, if such adjustment is essential to Contractor's ability to complete the Work within the Contract Times. Such an adjustment shall be Contractor's sole and exclusive remedy for the delays described in this Paragraph 12.03.C.

D. Owner, Engineer and the Related Entities of each of them shall not be liable to Contractor for any claims, costs, losses, or damages (including but not limited to all fees and charges of Engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) sustained by Contractor on or in connection with any other project or anticipated project.

E. Contractor shall not be entitled to an adjustment in Contract Price or Contract Times for delays within the control of Contractor. Delays attributable to and within the control of a Subcontractor or Supplier shall be deemed to be delays within the control of Contractor.

ARTICLE 13 - TESTS AND INSPECTIONS; CORRECTION, REMOVAL OR ACCEPTANCE OF DEFECTIVE WORK

13.01 *Notice of Defects*

A. Prompt notice of all defective Work of which Owner or Engineer has actual knowledge will be given to Contractor. All defective Work may be rejected, corrected, or accepted as provided in this Article 13.

13.02 *Access to Work*

A. Owner, Engineer, their consultants and other representatives and personnel of Owner, independent testing laboratories, and governmental agencies with jurisdictional interests will have access to the Site and the Work at reasonable times for their observation, inspecting, and testing. Contractor shall provide them proper and safe conditions for such access and advise them of Contractor's Site safety procedures and programs so that they may comply therewith as applicable.

13.03 *Tests and Inspections*

A. Contractor shall give Engineer timely notice of readiness of the Work for all required inspections, tests, or approvals and shall cooperate with inspection and testing personnel to facilitate required inspections or tests.

B. Owner shall employ and pay for the services of an independent testing laboratory to perform all inspections, tests, or approvals required by the Contract Documents except:

1. for inspections, tests, or approvals covered by Paragraphs 13.03.C and 13.03.D below;

2. that costs incurred in connection with tests or inspections conducted pursuant to Paragraph 13.04.B shall be paid as provided in said Paragraph 13.04.C; and

3. as otherwise specifically provided in the Contract Documents.

C. If Laws or Regulations of any public body having jurisdiction require any Work (or part thereof) specifically to be inspected, tested, or approved by an employee or other representative of such public body, Contractor shall assume full responsibility for arranging and obtaining such inspections, tests, or approvals, pay all costs in connection therewith, and furnish Engineer the required certificates of inspection or approval.

D. Contractor shall be responsible for arranging and obtaining and shall pay all costs in connection with any inspections, tests, or approvals required for Owner's and Engineer's acceptance of materials or equipment to

be incorporated in the Work; or acceptance of materials, mix designs, or equipment submitted for approval prior to Contractor's purchase thereof for incorporation in the Work. Such inspections, tests, or approvals shall be performed by organizations acceptable to Owner and Engineer.

E. If any Work (or the work of others) that is to be inspected, tested, or approved is covered by Contractor without written concurrence of Engineer, it must, if requested by Engineer, be uncovered for observation.

F. Uncovering Work as provided in Paragraph 13.03.E shall be at Contractor's expense unless Contractor has given Engineer timely notice of Contractor's intention to cover the same and Engineer has not acted with reasonable promptness in response to such notice.

13.04 *Uncovering Work*

A. If any Work is covered contrary to the written request of Engineer, it must, if requested by Engineer, be uncovered for Engineer's observation and replaced at Contractor's expense.

B. If Engineer considers it necessary or advisable that covered Work be observed by Engineer or inspected or tested by others, Contractor, at Engineer's request, shall uncover, expose, or otherwise make available for observation, inspection, or testing as Engineer may require, that portion of the Work in question, furnishing all necessary labor, material, and equipment.

C. If it is found that the uncovered Work is defective, Contractor shall pay all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to such uncovering, exposure, observation, inspection, and testing, and of satisfactory replacement or reconstruction (including but not limited to all costs of repair or replacement of work of others); and Owner shall be entitled to an appropriate decrease in the Contract Price. If the parties are unable to agree as to the amount thereof, Owner may make a Claim therefor as provided in Paragraph 10.05.

D. If, the uncovered Work is not found to be defective, Contractor shall be allowed an increase in the Contract Price or an extension of the Contract Times, or both, directly attributable to such uncovering, exposure, observation, inspection, testing, replacement, and reconstruction. If the parties are unable to agree as to the amount or extent thereof, Contractor may make a Claim therefor as provided in Paragraph 10.05.

13.05 *Owner May Stop the Work*

A. If the Work is defective, or Contractor fails to supply sufficient skilled workers or suitable materials or equipment, or fails to perform the Work in such a way that the completed Work will conform to the Contract Documents, Owner may order Contractor to stop the Work, or any portion thereof, until the cause for such order has been eliminated; however, this right of Owner to stop the Work shall not give rise to any duty on the part of Owner to exercise this right for the benefit of Contractor, any Subcontractor, any Supplier, any other individual or entity, or any surety for, or employee or agent of any of them.

13.06 *Correction or Removal of Defective Work*

A. Promptly after receipt of notice, Contractor shall correct all defective Work, whether or not fabricated, installed, or completed, or, if the Work has been rejected by Engineer, remove it from the Project and replace it with Work that is not defective. Contractor shall pay all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to such correction or removal (including but not limited to all costs of repair or replacement of work of others).

B. When correcting defective Work under the terms of this Paragraph 13.06 or Paragraph 13.07, Contractor shall take no action that would void or otherwise impair Owner's special warranty and guarantee, if any, on said Work.

13.07 *Correction Period*

A. If within one year after the date of Substantial Completion (or such longer period of time as may be prescribed by the terms of any applicable special guarantee required by the Contract Documents) or by any specific provision of the Contract Documents, any Work is found to be defective, or if the repair of any damages to the land or areas made available for Contractor's use by Owner or permitted by Laws and Regulations as contemplated in Paragraph 6.11.A is found to be defective, Contractor shall promptly, without cost to Owner and in accordance with Owner's written instructions:

1. repair such defective land or areas; or

2. correct such defective Work; or

3. if the defective Work has been rejected by Owner, remove it from the Project and replace it with Work that is not defective, and

4. satisfactorily correct or repair or remove and replace any damage to other Work, to the work of others or other land or areas resulting therefrom.

B. If Contractor does not promptly comply with the terms of Owner's written instructions, or in an emergency where delay would cause serious risk of loss or damage, Owner may have the defective Work corrected or repaired or may have the rejected Work removed and replaced. All claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to such correction or repair or such removal and replacement (including but not limited to all costs of repair or replacement of work of others) will be paid by Contractor.

C. In special circumstances where a particular item of equipment is placed in continuous service before Substantial Completion of all the Work, the correction period for that item may start to run from an earlier date if so provided in the Specifications .

D. Where defective Work (and damage to other Work resulting therefrom) has been corrected or removed and replaced under this Paragraph 13.07, the correction period hereunder with respect to such Work will be extended for an additional period of one year after such correction or removal and replacement has been satisfactorily completed.

E. Contractor's obligations under this Paragraph 13.07 are in addition to any other obligation or warranty. The provisions of this Paragraph 13.07 shall not be construed as a substitute for or a waiver of the provisions of any applicable statute of limitation or repose.

13.08 *Acceptance of Defective Work*

A. If, instead of requiring correction or removal and replacement of defective Work, Owner (and, prior to Engineer's recommendation of final payment, Engineer) prefers to accept it, Owner may do so. Contractor shall pay all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) attributable to Owner's evaluation of and determination to accept such defective Work (such costs to be approved by Engineer as to reasonableness) and the diminished value of the Work to the extent not otherwise paid by Contractor pursuant to this sentence. If any such acceptance occurs prior to Engineer's recommendation of final payment, a Change Order will be issued incorporating the necessary revisions in the Contract Documents with respect to the Work, and Owner shall be entitled to an appropriate decrease in the Contract Price, reflecting the diminished value of Work so accepted. If the parties are unable to agree as to the amount thereof, Owner may make a Claim therefor as provided in Paragraph 10.05. If the acceptance occurs after such recommendation, an appropriate amount will be paid by Contractor to Owner.

13.09 *Owner May Correct Defective Work*

A. If Contractor fails within a reasonable time after written notice from Engineer to correct defective Work or to remove and replace rejected Work as required by Engineer in accordance with Paragraph 13.06.A, or if Contractor fails to perform the Work in accordance with the Contract Documents, or if Contractor fails to comply with any other provision of the Contract Documents, Owner may, after seven days written notice to Contractor, correct or remedy any such deficiency.

B. In exercising the rights and remedies under this Paragraph 13.09, Owner shall proceed expeditiously. In connection with such corrective or remedial action, Owner may exclude Contractor from all or part of the Site, take possession of all or part of the Work and suspend Contractor's services related thereto, take possession of Contractor's tools, appliances, construction equipment and machinery at the Site, and incorporate in the Work all materials and equipment stored at the Site or for which Owner has paid Contractor but which are stored elsewhere. Contractor shall allow Owner, Owner's representatives, agents and employees, Owner's other contractors, and Engineer and Engineer's consultants access to the Site to enable Owner to exercise the rights and remedies under this Paragraph.

C. All claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) incurred or sustained by Owner in exercising the rights and remedies under this Paragraph 13.09 will be charged against Contractor, and a Change Order will be issued incorporating the necessary revisions in the Contract Documents with respect to the Work; and Owner shall be entitled to an appropriate decrease in the Contract Price. If the parties are unable to agree as to the amount of the adjustment, Owner may make a Claim therefor as provided in Paragraph 10.05. Such claims, costs, losses and damages will include but not be limited to all costs of repair, or replacement of work of others destroyed or damaged by correction, removal, or replacement of Contractor's defective Work.

D. Contractor shall not be allowed an extension of the Contract Times because of any delay in the performance of the Work attributable to the exercise by Owner of Owner's rights and remedies under this Paragraph 13.09.

ARTICLE 14 - PAYMENTS TO CONTRACTOR AND COMPLETION

14.01 *Schedule of Values*

A. The Schedule of Values established as provided in Paragraph 2.07.A will serve as the basis for progress

payments and will be incorporated into a form of Application for Payment acceptable to Engineer. Progress payments on account of Unit Price Work will be based on the number of units completed.

14.02 *Progress Payments*

A. Applications for Payments

1. At least 20 days before the date established in the Agreement for each progress payment (but not more often than once a month), Contractor shall submit to Engineer for review an Application for Payment filled out and signed by Contractor covering the Work completed as of the date of the Application and accompanied by such supporting documentation as is required by the Contract Documents. If payment is requested on the basis of materials and equipment not incorporated in the Work but delivered and suitably stored at the Site or at another location agreed to in writing, the Application for Payment shall also be accompanied by a bill of sale, invoice, or other documentation warranting that Owner has received the materials and equipment free and clear of all Liens and evidence that the materials and equipment are covered by appropriate property insurance or other arrangements to protect Owner's interest therein, all of which must be satisfactory to Owner.

2. Beginning with the second Application for Payment, each Application shall include an affidavit of Contractor stating that all previous progress payments received on account of the Work have been applied on account to discharge Contractor's legitimate obligations associated with prior Applications for Payment.

3. The amount of retainage with respect to progress payments will be as stipulated in the Agreement.

B. *Review of Applications*

1. Engineer will, within 10 days after receipt of each Application for Payment, either indicate in writing a recommendation of payment and present the Application to Owner or return the Application to Contractor indicating in writing Engineer's reasons for refusing to recommend payment. In the latter case, Contractor may make the necessary corrections and resubmit the Application.

2. Engineer's recommendation of any payment requested in an Application for Payment will constitute a representation by Engineer to Owner, based on Engineer's observations on the Site of the executed Work as an experienced and qualified design professional and on Engineer's review of the Application for Payment and the accompanying data and schedules, that to the best of Engineer's knowledge, information and belief:

a. the Work has progressed to the point indicated;

b. the quality of the Work is generally in accordance with the Contract Documents (subject to an evaluation of the Work as a functioning whole prior to or upon Substantial Completion, to the results of any subsequent tests called for in the Contract Documents, to a final determination of quantities and classifications for Unit Price Work under Paragraph 9.07, and to any other qualifications stated in the recommendation); and

c. the conditions precedent to Contractor's being entitled to such payment appear to have been fulfilled in so far as it is Engineer's responsibility to observe the Work.

3. By recommending any such payment Engineer will not thereby be deemed to have represented that:

a. inspections made to check the quality or the quantity of the Work as it has been performed have been exhaustive, extended to every aspect of the Work in progress, or involved detailed inspections of the Work beyond the responsibilities specifically assigned to Engineer in the Contract Documents; or

b. that there may not be other matters or issues between the parties that might entitle Contractor to be paid additionally by Owner or entitle Owner to withhold payment to Contractor.

4. Neither Engineer's review of Contractor's Work for the purposes of recommending payments nor Engineer's recommendation of any payment, including final payment, will impose responsibility on Engineer:

a. to supervise, direct, or control the Work, or

b. for the means, methods, techniques, sequences, or procedures of construction, or the safety precautions and programs incident thereto, or

c. for Contractor's failure to comply with Laws and Regulations applicable to Contractor's performance of the Work, or

d. to make any examination to ascertain how or for what purposes Contractor has used the moneys paid on account of the Contract Price, or

e. to determine that title to any of the Work, materials, or equipment has passed to Owner free and clear of any Liens.

5. Engineer may refuse to recommend the whole or any part of any payment if, in Engineer's opinion, it would be incorrect to make the representations to Owner stated in Paragraph 14.02.B.2. Engineer may also refuse to recommend any such payment or, because of subsequently discovered evidence or the results of subsequent

inspections or tests, revise or revoke any such payment recommendation previously made, to such extent as may be necessary in Engineer's opinion to protect Owner from loss because:

a. the Work is defective, or completed Work has been damaged, requiring correction or replacement;

b. the Contract Price has been reduced by Change Orders;

c. Owner has been required to correct defective Work or complete Work in accordance with Paragraph 13.09; or

d. Engineer has actual knowledge of the occurrence of any of the events enumerated in Paragraph 15.02.A.

C. *Payment Becomes Due*

1. Ten days after presentation of the Application for Payment to Owner with Engineer's recommendation, the amount recommended will (subject to the provisions of Paragraph 14.02.D) become due, and when due will be paid by Owner to Contractor.

D. *Reduction in Payment*

1. Owner may refuse to make payment of the full amount recommended by Engineer because:

a. claims have been made against Owner on account of Contractor's performance or furnishing of the Work;

b. Liens have been filed in connection with the Work, except where Contractor has delivered a specific bond satisfactory to Owner to secure the satisfaction and discharge of such Liens;

c. there are other items entitling Owner to a set-off against the amount recommended; or

d. Owner has actual knowledge of the occurrence of any of the events enumerated in Paragraphs 14.02.B.5.a through 14.02.B.5.c or Paragraph 15.02.A.

2. If Owner refuses to make payment of the full amount recommended by Engineer, Owner will give Contractor immediate written notice (with a copy to Engineer) stating the reasons for such action and promptly pay Contractor any amount remaining after deduction of the amount so withheld. Owner shall promptly pay Contractor the amount so withheld, or any adjustment thereto agreed to by Owner and Contractor, when Contractor corrects to Owner's satisfaction the reasons for such action.

3. If it is subsequently determined that Owner's refusal of payment was not justified, the amount wrongfully withheld shall be treated as an amount due as determined by Paragraph 14.02.C.1.

14.03 *Contractor's Warranty of Title*

A. Contractor warrants and guarantees that title to all Work, materials, and equipment covered by any Application for Payment, whether incorporated in the Project or not, will pass to Owner no later than the time of payment free and clear of all Liens.

14.04 *Substantial Completion*

A. When Contractor considers the entire Work ready for its intended use Contractor shall notify Owner and Engineer in writing that the entire Work is substantially complete (except for items specifically listed by Contractor as incomplete) and request that Engineer issue a certificate of Substantial Completion.

B. Promptly after Contractor's notification, , Owner, Contractor, and Engineer shall make an inspection of the Work to determine the status of completion. If Engineer does not consider the Work substantially complete, Engineer will notify Contractor in writing giving the reasons therefor.

C. If Engineer considers the Work substantially complete, Engineer will deliver to Owner a tentative certificate of Substantial Completion which shall fix the date of Substantial Completion. There shall be attached to the certificate a tentative list of items to be completed or corrected before final payment. Owner shall have seven days after receipt of the tentative certificate during which to make written objection to Engineer as to any provisions of the certificate or attached list. If, after considering such objections, Engineer concludes that the Work is not substantially complete, Engineer will within 14 days after submission of the tentative certificate to Owner notify Contractor in writing, stating the reasons therefor. If, after consideration of Owner's objections, Engineer considers the Work substantially complete, Engineer will within said 14 days execute and deliver to Owner and Contractor a definitive certificate of Substantial Completion (with a revised tentative list of items to be completed or corrected) reflecting such changes from the tentative certificate as Engineer believes justified after consideration of any objections from Owner.

D. At the time of delivery of the tentative certificate of Substantial Completion, Engineer will deliver to Owner and Contractor a written recommendation as to division of responsibilities pending final payment between Owner and Contractor with respect to security, operation, safety, and protection of the Work, maintenance, heat, utilities, insurance, and warranties and guarantees. Unless Owner and Contractor agree otherwise in writing and so inform Engineer in writing prior to Engineer's issuing the definitive certificate of Substantial

Completion, Engineer's aforesaid recommendation will be binding on Owner and Contractor until final payment.

E. Owner shall have the right to exclude Contractor from the Site after the date of Substantial Completion subject to allowing Contractor reasonable access to complete or correct items on the tentative list.

14.05 *Partial Utilization*

A. Prior to Substantial Completion of all the Work, Owner may use or occupy any substantially completed part of the Work which has specifically been identified in the Contract Documents, or which Owner, Engineer, and Contractor agree constitutes a separately functioning and usable part of the Work that can be used by Owner for its intended purpose without significant interference with Contractor's performance of the remainder of the Work, subject to the following conditions.

1. Owner at any time may request Contractor in writing to permit Owner to use or occupy any such part of the Work which Owner believes to be ready for its intended use and substantially complete. If and when Contractor agrees that such part of the Work is substantially complete, Contractor will certify to Owner and Engineer that such part of the Work is substantially complete and request Engineer to issue a certificate of Substantial Completion for that part of the Work.

2. Contractor at any time may notify Owner and Engineer in writing that Contractor considers any such part of the Work ready for its intended use and substantially complete and request Engineer to issue a certificate of Substantial Completion for that part of the Work.

3. Within a reasonable time after either such request, Owner, Contractor, and Engineer shall make an inspection of that part of the Work to determine its status of completion. If Engineer does not consider that part of the Work to be substantially complete, Engineer will notify Owner and Contractor in writing giving the reasons therefor. If Engineer considers that part of the Work to be substantially complete, the provisions of Paragraph 14.04 will apply with respect to certification of Substantial Completion of that part of the Work and the division of responsibility in respect thereof and access thereto.

4. No use or occupancy or separate operation of part of the Work may occur prior to compliance with the requirements of Paragraph 5.10 regarding property insurance.

14.06 *Final Inspection*

A. Upon written notice from Contractor that the entire Work or an agreed portion thereof is complete, Engineer will promptly make a final inspection with Owner and Contractor and will notify Contractor in writing of all particulars in which this inspection reveals that the Work is incomplete or defective. Contractor shall immediately take such measures as are necessary to complete such Work or remedy such deficiencies.

14.07 *Final Payment*

A. Application for Payment

1. After Contractor has, in the opinion of Engineer, satisfactorily completed all corrections identified during the final inspection and has delivered, in accordance with the Contract Documents, all maintenance and operating instructions, schedules, guarantees, bonds, certificates or other evidence of insurance certificates of inspection, marked-up record documents (as provided in Paragraph 6.12), and other documents, Contractor may make application for final payment following the procedure for progress payments.

2. The final Application for Payment shall be accompanied (except as previously delivered) by:

a. all documentation called for in the Contract Documents, including but not limited to the evidence of insurance required by Paragraph 5.04.B.7;

b. consent of the surety, if any, to final payment;

c. a list of all Claims against Owner that Contractor believes are unsettled; and

d. complete and legally effective releases or waivers (satisfactory to Owner) of all Lien rights arising out of or Liens filed in connection with the Work.

3. In lieu of the releases or waivers of Liens specified in Paragraph 14.07.A.2 and as approved by Owner, Contractor may furnish receipts or releases in full and an affidavit of Contractor that: (i) the releases and receipts include all labor, services, material, and equipment for which a Lien could be filed; and (ii) all payrolls, material and equipment bills, and other indebtedness connected with the Work for which Owner or Owner's property might in any way be responsible have been paid or otherwise satisfied. If any Subcontractor or Supplier fails to furnish such a release or receipt in full, Contractor may furnish a bond or other collateral satisfactory to Owner to indemnify Owner against any Lien.

B. *Engineer's Review of Application and Acceptance*

1. If, on the basis of Engineer's observation of the Work during construction and final inspection, and Engineer's review of the final Application for Payment and accompanying documentation as required by the Contract Documents, Engineer is satisfied that the Work has been completed and Contractor's other obligations

under the Contract Documents have been fulfilled, Engineer will, within ten days after receipt of the final Application for Payment, indicate in writing Engineer's recommendation of payment and present the Application for Payment to Owner for payment. At the same time Engineer will also give written notice to Owner and Contractor that the Work is acceptable subject to the provisions of Paragraph 14.09. Otherwise, Engineer will return the Application for Payment to Contractor, indicating in writing the reasons for refusing to recommend final payment, in which case Contractor shall make the necessary corrections and resubmit the Application for Payment.

C. Payment Becomes Due

1. Thirty days after the presentation to Owner of the Application for Payment and accompanying documentation, the amount recommended by Engineer, less any sum Owner is entitled to set off against Engineer's recommendation, including but not limited to liquidated damages, will become due and , will be paid by Owner to Contractor.

14.08 *Final Completion Delayed*

A. If, through no fault of Contractor, final completion of the Work is significantly delayed, and if Engineer so confirms, Owner shall, upon receipt of Contractor's final Application for Payment (for Work fully completed and accepted) and recommendation of Engineer, and without terminating the Contract, make payment of the balance due for that portion of the Work fully completed and accepted. If the remaining balance to be held by Owner for Work not fully completed or corrected is less than the retainage stipulated in the Agreement, and if bonds have been furnished as required in Paragraph 5.01, the written consent of the surety to the payment of the balance due for that portion of the Work fully completed and accepted shall be submitted by Contractor to Engineer with the Application for such payment. Such payment shall be made under the terms and conditions governing final payment, except that it shall not constitute a waiver of Claims.

14.09 *Waiver of Claims*

A. The making and acceptance of final payment will constitute:

1. a waiver of all Claims by Owner against Contractor, except Claims arising from unsettled Liens, from defective Work appearing after final inspection pursuant to Paragraph 14.06, from failure to comply with the Contract Documents or the terms of any special guarantees specified therein, or from Contractor's continuing obligations under the Contract Documents; and

2. a waiver of all Claims by Contractor against Owner other than those previously made in accordance with the requirements herein and expressly acknowledged by Owner in writing as still unsettled.

ARTICLE 15 - SUSPENSION OF WORK AND TERMINATION

15.01 *Owner May Suspend Work*

A. At any time and without cause, Owner may suspend the Work or any portion thereof for a period of not more than 90 consecutive days by notice in writing to Contractor and Engineer which will fix the date on which Work will be resumed. Contractor shall resume the Work on the date so fixed. Contractor shall be granted an adjustment in the Contract Price or an extension of the Contract Times, or both, directly attributable to any such suspension if Contractor makes a Claim therefor as provided in Paragraph 10.05.

15.02 *Owner May Terminate for Cause*

A. The occurrence of any one or more of the following events will justify termination for cause:

1. Contractor's persistent failure to perform the Work in accordance with the Contract Documents (including, but not limited to, failure to supply sufficient skilled workers or suitable materials or equipment or failure to adhere to the Progress Schedule established under Paragraph 2.07 as adjusted from time to time pursuant to Paragraph 6.04);

2. Contractor's disregard of Laws or Regulations of any public body having jurisdiction;

3. Contractor's disregard of the authority of Engineer; or

4. Contractor's violation in any substantial way of any provisions of the Contract Documents.

B. If one or more of the events identified in Paragraph 15.02.A occur, Owner may, after giving Contractor (and surety) seven days written notice of its intent to terminate the services of Contractor:

1. exclude Contractor from the Site, and take possession of the Work and of all Contractor's tools, appliances, construction equipment, and machinery at the Site, and use the same to the full extent they could be used by Contractor (without liability to Contractor for trespass or conversion),

2. incorporate in the Work all materials and equipment stored at the Site or for which Owner has paid Contractor but which are stored elsewhere, and

3. complete the Work as Owner may deem expedient.

C. If Owner proceeds as provided in Paragraph 15.02.B, Contractor shall not be entitled to receive any further payment until the Work is completed. If the unpaid balance of the Contract Price exceeds all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) sustained by Owner arising out of or relating to completing the Work, such excess will be paid to Contractor. If such claims, costs, losses, and damages exceed such unpaid balance, Contractor shall pay the difference to Owner. Such claims, costs, losses, and damages incurred by Owner will be reviewed by Engineer as to their reasonableness and, when so approved by Engineer, incorporated in a Change Order. When exercising any rights or remedies under this Paragraph Owner shall not be required to obtain the lowest price for the Work performed.

D. Notwithstanding Paragraphs 15.02.B and 15.02.C, Contractor's services will not be terminated if Contractor begins within seven days of receipt of notice of intent to terminate to correct its failure to perform and proceeds diligently to cure such failure within no more than 30 days of receipt of said notice.

E. Where Contractor's services have been so terminated by Owner, the termination will not affect any rights or remedies of Owner against Contractor then existing or which may thereafter accrue. Any retention or payment of moneys due Contractor by Owner will not release Contractor from liability.

F. If and to the extent that Contractor has provided a performance bond under the provisions of Paragraph 5.01.A, the termination procedures of that bond shall supersede the provisions of Paragraphs 15.02.B, and 15.02.C.

15.03 *Owner May Terminate For Convenience*

A. Upon seven days written notice to Contractor and Engineer, Owner may, without cause and without prejudice to any other right or remedy of Owner, terminate the Contract. In such case, Contractor shall be paid for (without duplication of any items):

1. completed and acceptable Work executed in accordance with the Contract Documents prior to the effective date of termination, including fair and reasonable sums for overhead and profit on such Work;

2. expenses sustained prior to the effective date of termination in performing services and furnishing labor, materials, or equipment as required by the Contract Documents in connection with uncompleted Work, plus fair and reasonable sums for overhead and profit on such expenses;

3. all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) incurred in settlement of terminated contracts with Subcontractors, Suppliers, and others; and

4. reasonable expenses directly attributable to termination.

B. Contractor shall not be paid on account of loss of anticipated profits or revenue or other economic loss arising out of or resulting from such termination.

15.04 *Contractor May Stop Work or Terminate*

A. If, through no act or fault of Contractor, (i) the Work is suspended for more than 90 consecutive days by Owner or under an order of court or other public authority, or (ii) Engineer fails to act on any Application for Payment within 30 days after it is submitted, or (iii) Owner fails for 30 days to pay Contractor any sum finally determined to be due, then Contractor may, upon seven days written notice to Owner and Engineer, and provided Owner or Engineer do not remedy such suspension or failure within that time, terminate the Contract and recover from Owner payment on the same terms as provided in Paragraph 15.03.

B. In lieu of terminating the Contract and without prejudice to any other right or remedy, if Engineer has failed to act on an Application for Payment within 30 days after it is submitted, or Owner has failed for 30 days to pay Contractor any sum finally determined to be due, Contractor may, seven days after written notice to Owner and Engineer, stop the Work until payment is made of all such amounts due Contractor, including interest thereon. The provisions of this Paragraph 15.04 are not intended to preclude Contractor from making a Claim under Paragraph 10.05 for an adjustment in Contract Price or Contract Times or otherwise for expenses or damage directly attributable to Contractor's stopping the Work as permitted by this Paragraph.

ARTICLE 16 - DISPUTE RESOLUTION

16.01 *Methods and Procedures*

A. Either Owner or Contractor may request mediation of any Claim submitted to Engineer for a decision under Paragraph 10.05 before such decision becomes final and binding. The mediation will be

governed by the Construction Industry Mediation Rules of the American Arbitration Association in effect as of the Effective Date of the Agreement. The request for mediation shall be submitted in writing to the American Arbitration Association and the other party to the Contract. Timely submission of the request shall stay the effect of Paragraph 10.05.E.

B. Owner and Contractor shall participate in the mediation process in good faith. The process shall be concluded within 60 days of filing of the request. The date of termination of the mediation shall be determined by application of the mediation rules referenced above.

C. If the Claim is not resolved by mediation, Engineer's action under Paragraph 10.05.C or a denial pursuant to Paragraphs 10.05.C.3 or 10.05.D shall become final and binding 30 days after termination of the mediation unless, within that time period, Owner or Contractor:

1. elects in writing to invoke any dispute resolution process provided for in the Supplementary Conditions, or

2. agrees with the other party to submit the Claim to another dispute resolution process, or

3. gives written notice to the other party of their intent to submit the Claim to a court of competent jurisdiction.

ARTICLE 17 - MISCELLANEOUS

17.01 *Giving Notice*

A. Whenever any provision of the Contract Documents requires the giving of written notice, it will be deemed to have been validly given if:

1. delivered in person to the individual or to a member of the firm or to an officer of the corporation for whom it is intended, or

2. delivered at or sent by registered or certified mail, postage prepaid, to the last business address known to the giver of the notice.

17.02 *Computation of Times*

A. When any period of time is referred to in the Contract Documents by days, it will be computed to exclude the first and include the last day of such period. If the last day of any such period falls on a Saturday or Sunday or on a day made a legal holiday by the law of the applicable jurisdiction, such day will be omitted from the computation.

17.03 *Cumulative Remedies*

A. The duties and obligations imposed by these General Conditions and the rights and remedies available hereunder to the parties hereto are in addition to, and are not to be construed in any way as a limitation of, any rights and remedies available to any or all of them which are otherwise imposed or available by Laws or Regulations, by special warranty or guarantee, or by other provisions of the Contract Documents. The provisions of this Paragraph will be as effective as if repeated specifically in the Contract Documents in connection with each particular duty, obligation, right, and remedy to which they apply.

17.04 *Survival of Obligations*

A. All representations, indemnifications, warranties, and guarantees made in, required by, or given in accordance with the Contract Documents, as well as all continuing obligations indicated in the Contract Documents, will survive final payment, completion, and acceptance of the Work or termination or completion of the Contract or termination of the services of Contractor.

17.05 *Controlling Law*

A. This Contract is to be governed by the law of the state in which the Project is located.

17.06 *Headings*

A. Article and paragraph headings are inserted for convenience only and do not constitute parts of these General Conditions.

PART 1 DESCRIPTION

A. The General Conditions of the contract shall be EJCDC C-700 Standard General Conditions of the Construction Contract, latest edition, a copy of which is included.

END OF SECTION

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PART II - STATE GOVERNMENT PROVISIONS

Article Number	Title
1.0	STATE OF RHODE ISLAND PROVISIONS

SUPPLEMENTARY CONDITIONS

These Supplementary Conditions amend or supplement the Standard General Conditions of the Construction Contract and other provisions of the Contract Documents as indicated below. All provisions, which are not so amended or supplemented, remain in full force and effect.

PRELIMINARY MATTERS

In all instances where authority is given to the Engineer to make decisions, those decisions shall be subject to the review and approval of the OWNER.

ARTICLE 1 - DEFINITIONS

General

The terms "Plans" and "Project Plans" used in various locations throughout these Specifications shall have the same meaning as "Drawings" as defined in the General Conditions. The word "site" shall mean the specific area adjacent to and including the area upon which the construction work is performed. The words "as directed", "as permitted", "as required", or words of like effect shall mean the direction, permission, requirement of the OWNER is intended and similarly the words, "approved", "acceptable", "satisfactory", or words of like effect shall mean approved by, or acceptable, or satisfactory to the OWNER, unless otherwise provided herein. The words "necessary", "suitable" "equal", or words of like effect shall mean necessary, suitable, or equal in the opinion of the OWNER.

The terms used in these Supplementary Conditions which are defined in the Standard General Conditions of the Construction Contract have the meanings assigned to them in the General Conditions.

SC-1.01. SPECIFIC CHANGES

Include following sections under paragraph 1.01.

SC-1.19. Engineer - Delete paragraph 1.19 in its entirety and replace with the following:

1.19. Engineer - Owner or Owner's representative as defined by the Owner.

SC-1.41. Delete paragraph 1.41 in its entirety and replace with the following:

1.41. Specifications - Sections included under Division 1 through Division 16 of the Project Manual.

SC-1.45. Insert the following at the beginning of the definition.

Substantial completion shall mean either that the Work required by the Contract has been completed except for work having a Contract Price of less than one per cent of the then adjusted total contract price, or...

SC-1.52. Add the following new definitions after paragraph 1.50 of the General Conditions:

1.53. Conditions of the Contract - The combined General Conditions and Supplementary Conditions.

1.54. Project Manual - Invitation to Bid, Instructions to Bidders, Special Conditions, Bid Form, Supplements to Bid Form, Agreement, Bonds, General Conditions, Supplementary Conditions, Specifications, and Appendices.

ARTICLE 2 - PRELIMINARY MATTERS

SC-2.03. Delete paragraph 2.03 of the General Conditions in its entirety and insert the following in its place:

2.03. The Contract Time will commence at the issuance of the Notice to Proceed or within fifteen days of contract execution.

SC-2.05C. Delete paragraph 2.05C of the General Conditions in its entirety and insert the following in its place:

2.05C. Before any Work at the site is started, CONTRACTOR shall deliver to OWNER, with copies to ENGINEER and each additional insured identified in Article 5 of the Supplementary Conditions, certificates of insurance (and other evidence requested by OWNER) which CONTRACTOR is required to purchase and maintain in accordance with the requirements of Article 5.

ARTICLE 3 - CONTRACT DOCUMENTS: INTENT, AMENDING, REUSE

SC-3.01. Add a new paragraph immediately after Paragraph 3.01. of the General Conditions which is to read as follows:

3.01 D. Each and every provision of law and clause required by law to be inserted in these Contract Documents shall be deemed to be inserted herein, and they shall be read and enforced as though it were included herein, and if through mistake or otherwise, any such provision is not inserted, or if not correctly inserted, then upon the application of either party, the Contract Documents shall forthwith be physically amended to make such insertion.

ARTICLE 4 - AVAILABILITY OF LANDS; SUBSURFACE AND PHYSICAL CONDITIONS; HAZARDOUS ENVIRONMENTAL CONDITIONS; REFERENCE POINTS

SC-4.01. Add a new paragraph immediately after Paragraph 4.01. of the General Conditions which is to read as follows:

4.01D. If all lands and rights-of-way are not obtained as herein contemplated before construction begins, CONTRACTOR shall begin the work upon such land and rights-of-way as OWNER has previously acquired.

ARTICLE 5 - BONDS AND INSURANCE

Amend paragraph 5.01. by adding the following sections:

D. The Contractor shall furnish bonds covering faithful performance of the Contract and payment of obligations arising thereunder. Bonds shall be in a form acceptable to the Owner and shall be issued by companies licensed to issue such Bonds in the State of R.I., and the cost thereof shall be included in the Contract Sum. Bonding companies shall be approved by the OWNER and shall be listed on the U.S. Treasuries Circular 570 of approved bonding companies. The amount of each bond shall be equal to 100 percent of the Contract Sum, as amended.

Insurance companies shall be approved by the Owner and shall be rated A- or better.

E. The Contractor shall deliver the required bonds to the OWNER on or before the date the Agreement is entered into.

F. The Contractor shall require the attorney-in-fact who executes the required bonds on behalf of the surety to affix thereto a certified and current copy of the power of attorney.

Amend 5.04 as follows:

SC-5.04. The limits of liability for the insurance required by paragraph 5.04 of the General Conditions shall provide coverage for not less than the following amounts or greater where required by Law:

5.04A.1. and 5.04A.2. Worker's Compensation

(1) Worker's Compensation Statutory Coverage

5.04A.3., 5.04A.4., and 5.04A.5. Comprehensive General Liability including Premise/Operations; Explosion, Collapse and Underground Property Damage; Products/Completed Operations, Broad Form Contractual, Independent Contractors; Broad Form Property Damage; and Personal Injury liabilities. Carrier shall be "A-" rated or higher.

(1)	Bodily Injury:	$1,000,000	Each Occurrence
		$2,000,000	Annual Aggregate
(2)	Property Damage:	$1,000,000	Each Occurrence
		$2,000,000	Annual Aggregate
(3)	Personal Injury, with employment exclusion deleted	$2,000,000	Annual Aggregate

5.04A.6. Comprehensive Automobile Liability including all owned (private and others), hired and non-owned vehicles: Carrier shall be A- rated or higher.

(1)	Bodily Injury: & Property Damage	$1,000,000	Each Person, combined single limit

SC-5.04. Add a new paragraph immediately after Paragraph 5.04B.7. of the General Conditions which is to read as follows:

5.04B.8. CONTRACTOR may purchase and maintain excess liability insurance in the umbrella form in order to satisfy the limits of liability required for the insurance to be purchased and maintained in accordance with paragraph 5.04. Evidence of such excess liability shall be delivered to OWNER in the form of a certificate indicating the policy numbers and limits of liability of all underlying insurance.

SC-5.04. ADD paragraph 5.04C of the General Conditions:

5.04C. If OWNER has any objection to the coverage afforded by or other provisions of the insurance required to be purchased and maintained by CONTRACTOR in accordance with this Article 5 on the basis of its not complying with the Contract Documents, OWNER will notify CONTRACTOR in writing thereof within ten days of the date of delivery of such certificates to OWNER in accordance with Paragraph 2.05C. CONTRACTOR will provide such additional information in respect of insurance provided by him/her as OWNER may reasonably request.

SC-5.05. DELETE paragraph 5.05 of the General Conditions in its entirety.

SC-5.06B. DELETE paragraph 5.06 of the General Conditions in its entirety.

SC-5.07B and 5.07C. DELETE paragraph 5.07B and 5.07C of the General Conditions in its entirety.

SC-5.08. DELETE paragraph 5.08 of the General Conditions in its entirety.

SC-5.09. DELETE paragraph 5.09 of the General Conditions in its entirety and replace with the following:

5.09. If OWNER has any objection to the coverage afforded by, or other provisions of, the insurance required to be purchased and maintained by CONTRACTOR in accordance with Article 5.0 on the basis of its not complying with the Contract Documents, OWNER shall notify CONTRACTOR thereof in writing. CONTRACTOR shall provide to the OWNER such additional information in respect of insurance provided by as the OWNER may reasonably request.

ARTICLE 6 - CONTRACTOR'S RESPONSIBILITIES

Amend Article 6.0 by adding the following:

SC 6.0. Equal Opportunity

The Contractor and the Contractor's Subcontractors shall not discriminate against any employee or applicant for employment because of race, religion, color, sex or national origin. The Contractor shall take affirmative action to ensure that applicants are employed, and that employees are treated during employment without regard to their race, religion, color, sex or national origin.

Such action shall include, but not be limited to, the following: employment, upgrading, demotion or transfer, recruitment or recruitment advertising.

SC-6.02. Add the following new paragraphs immediately after Paragraph 6.02B of the General Conditions:

6.02C. This Agreement is subject to the applicable provisions of the Contract Work Hours and Safety Standards Act, Public Law 87-581, 87th Congress, as amended. No Contractor or Subcontractor contracting for any part of the work shall require or permit any laborer or mechanic to be employed on the Work in excess of forty hours in any work week unless such laborer or mechanic receives compensation at a rate not less than one and one-half times his/her basic rate of pay for all hours worked in excess of forty hours in such work week.

6.02D. CONTRACTOR shall employ only competent persons to do the work and whenever OWNER shall notify CONTRACTOR, in writing, that any person on the Work appears to be incompetent, disorderly, or otherwise unsatisfactory, such person shall be removed from the Project and shall not again be employed on it except with the consent of OWNER.

6.02E. Except as may be otherwise required by law, all claims and disputes pertaining to the classification of labor employed on the project under this Contract shall be decided by the governing body having jurisdiction.

SC-6.06. DELETE Paragraphs 6.06A and 6.06B of the General Conditions in their entirety and insert the following in its place:

6.06A. CONTRACTOR shall not employ any subcontractor, supplier or other person or organization, (including those who are to furnish the principal items of materials or equipment), whether initially or as a substitute, against whom OWNER may have reasonable objection. Acceptance of any Subcontractor, other

person or organization by OWNER does not waive OWNER's rights to reject defective Work. CONTRACTOR shall not be required to employ any Subcontractor, other person or organization against which CONTRACTOR has reasonable objection.

SC-6.06. Add a new sentence at the end of Section 6.06. to read as follows:

6.06H. OWNER or ENGINEER may furnish to any Subcontractor, Supplier or other person or organization, to the extent practicable, information about amounts paid on their behalf to CONTRACTOR in accordance with CONTRACTOR's Applications for Payment.

SC-6.20. Add two sentences at the end of Paragraph 6.20A.2. to read as follows:

If through the acts of neglect on the part of the CONTRACTOR, any other Contractor or any Subcontractor shall suffer loss or damage on the Work, CONTRACTOR shall settle with such other Contractor or Subcontractor by agreement or arbitration if such other Contractor or Subcontractor will so settle. If such other Contractor or Subcontractor shall assert any claim against OWNER on account of any damage alleged to have sustained, OWNER shall notify CONTRACTOR, who shall indemnify and safe harmless OWNER against any such claims.

ARTICLE 8 – OWNER'S RESPONSIBILITIES

SC 8.02. DELETE Section 8.02 in its entirety, and replace with the following:

8.02. In case of termination of the employment of Engineer, Owner shall appoint an engineer. Whose status under the Contract Documents shall be that of the former Engineer.

ARTICLE 9 - ENGINEER'S STATUS DURING CONSTRUCTION

SC-9.03. Add a new paragraph immediately after Paragraph 9.03. of the General Conditions which is to read as follows:

9.03B. OWNER will designate an agent to represent him/her at the Site who is not ENGINEER's agent or employee. The duties and responsibilities of the agent will be as enumerated in the agent's agreement with OWNER, a copy of which will be furnished to CONTRACTOR upon written request.

ARTICLE 11 – COST OF THE WORK; ALLOWANCES; UNIT PRICE WORK

SC-11.03.C. DELETE Paragraph 11.03D. in its entirety and replace with the following:

11.03D. The unit price of an item of Unit Price Work shall be subject to re-evaluation and adjustment under the following conditions:

11.03D.1. If there is no corresponding adjustment with respect to any other item of Work; and

11.03D.2. If CONTRACTOR believes that CONTRACTOR has incurred additional expense as a result thereof; or if OWNER believes that the quantity variation entitles OWNER to an adjustment in the unit price, either OWNER or CONTRACTOR may make a claim for an adjustment in the Contract Price in accordance with Article 12 if the parties are unable to agree as to the effect of any such variations in the quantity of Unit Price Work performed.

ARTICLE 13 - TESTS AND INSPECTIONS; CORRECTION, REMOVAL OR ACCEPTANCE OF DEFECTIVE WORK

SC-13.05. Add a new paragraph immediately after paragraph 13.05 of the General Conditions to read as follows:

13.05B. If the OWNER stops Work under Paragraph 13.05 CONTRACTOR shall be entitled to no extension of Contract Time or increase in Contract Price.

ARTICLE 14 - PAYMENTS TO THE CONTRACTOR AND COMPLETION

SC-14.02.

Add a new sentence immediately after paragraph 14.02A.1 of the General Conditions, which is to read as follows:

The CONTRACTOR shall furnish evidence that payment received on the basis of materials and equipment not incorporated and suitably stored, has in fact been paid to the respective supplier(s) within sixty days of payment by OWNER. Failure to provide such evidence of payment may result in the withdrawal or previous approval(s) and removal of the cost of related materials and equipment from the next submitted Application for Payment.

Replace the words “Ten days” in the first sentence of paragraph 14.02C.1 of the General Conditions with “Thirty days”.

SC-14.03.

Add two new paragraphs immediately after paragraph 14.03 of the General Conditions, which are to read as follows:

14.03.B. No materials or supplies for the Work shall be purchased by CONTRACTOR or Subcontractor subject to any chattel mortgage or under a conditional sale contract or other agreement by which an interest is retained by the seller. CONTRACTOR warrants that he/she has good title to all materials and supplies used by him/her in the Work, free from all liens, claims or encumbrances.

14.03.B. CONTRACTOR shall indemnify and save OWNER harmless from all claims growing out of the lawful demands of Subcontractors, laborers, workmen, mechanics, material, men, and furnishers of machinery and parts thereof, equipment, power tools, and all supplies, including commissary, incurred in the furtherance of the performance of this Contract. CONTRACTOR shall at OWNER's request, furnish satisfactory evidence that all obligations of the nature hereinabove designated have been paid, discharged, or waived. If CONTRACTOR fails to do so, then OWNER may, after having served written notice on the said CONTRACTOR either pay unpaid bills, of which OWNER has written notice, direct, or withhold from the CONTRACTOR's unpaid compensation a sum of money deemed reasonable sufficient to pay any and all such lawful claims until satisfactory evidence is furnished that all liabilities have been fully discharged whereupon payment to CONTRACTOR shall be resumed, in accordance with the terms of this Contract, but in no event shall the provisions of this section be construed to impose any obligations upon OWNER to either CONTRACTOR or his/her Surety.

SC-14.02.

Add four new paragraphs immediately after paragraph 14.2.5. of the General Conditions, which are to read as follows:

A. 14.02.6. Should CONTRACTOR neglect to pay any undisputed claims, made in writing to OWNER within thirty days after completion of the Work, but continuing unsatisfied for a period of ninety days, OWNER may pay such claim and deduct the amount thereof from the balance due CONTRACTOR. OWNER may also, with the written consent of CONTRACTOR, use any monies retained, due, or to become due under this Contract for the purpose of payment for both labor and materials for the Work, for which claims have not been filed.

B. Security is provided both by the Payment Bond and the power of OWNER to retain any monies for claims, but payment by one shall in no way impair or discharge the liability of the other.

C. Any and all liens for work and materials may be paid off by OWNER within a reasonable time after filing for record in accordance with State and local laws, notice of such liens except where the claim on which the lien is filed is being litigated by CONTRACTOR, and in such case OWNER may pay the amount of any final judgement or decree or any such claim within a reasonable time after such final judgement or decree shall be rendered.

D. All monies paid by OWNER in settlement of liens as aforesaid, with the costs and expenses incurred by OWNER in connection therewith, shall be charged to CONTRACTOR, shall bear interest at the rate of one and a half percent per month, and shall be deducted from the next payment due CONTRACTOR under the terms of this Contract.

SC-14.07. DELETE Section 14.07 B. Review of Application and Acceptance and Replace with the following:

14.07B. Within 30 days of satisfactory completion of the work and receipt by OWNER of Contractor's final application for payment, Owner will make final payment to the Contractor.
Payment hereunder is subject to satisfactory evidence of payment to all subcontractors and resolution of any and all claims and/or liens.

SC-14.08. DELETE Sections 14.08. Final Completion Delayed.

ARTICLE 15 - SUSPENSION OF WORK AND TERMINATION

SC-15.02.

Add a new paragraph immediately after paragraph 15.02A.4. of the General Conditions which is to read as follows:

15.02A.5 If CONTRACTOR abandons the Work, or sublets this Contract or any part thereof, without the previous written consent of OWNER, or if the Contact or any claim there under shall be assigned by CONTRACTOR otherwise than as herein specified;

Delete Section 15.03A.3 and 15.03A.4 in its entirety.

ARTICLE 16 - DISPUTE RESOLUTION

SC-16.

Add a new sentence at the end of Article 16.01 of the General Conditions, which is to read as follows:

CONTRACTOR shall carry on the Work and maintain the progress schedule during the dispute resolution proceedings, unless otherwise agreed by him/her and OWNER in writing.

Delete all references to arbitration in "General Conditions", 16.1-16.6. Arbitration shall be in accordance with the provisions of the State Arbitration Laws (State of Rhode Island, General Laws, Title 37, Chapter 16), which shall take precedence and shall govern.

Every contract for the construction, alteration, repair or painting or demolition of any public building, sewer, water treatment or disposal project, highway, or bridge one party to which is the state, a city, a town, or an authority, a board, a public corporation, or any similar body created by statute or ordinance or any committee, agency, or subdivision of any of them which has a contract price of ten thousand dollars ($10,000) or more and which is executed on or after July 1, 1967, out of, or concerning the performance or interpretation of, the contract as follows:

“All claims, disputes, and other matters in question arising out of or relating to this contract or the performance or interpretation thereof shall be submitted to arbitration. Arbitration shall be commenced by a demand in writing made by one party to the contract upon the other within a reasonable time after the dispute, claim, or other matter in question arose but in no event after payment in full of the contract price has been made and accepted. The written demand shall contain a statement of the question to be arbitrated and a detailed statement of each time or matter in dispute and the name of the arbitrator appointed by that party. The other party to the contract within (10) days of the receipt of the written demand shall appoint an arbitrator and give notice in writing thereof to the party who commenced arbitration. The two (2) arbitrators appointed by the parties shall within ten (10) days of the date of the appointment of the second arbitrator select a third arbitrator who shall be designated as chairperson and who immediately shall give written notice to the parties of his or her appointment. The third arbitrator shall select a time, date and place for hearing and give each party five (5) days notice in writing thereof. The date for hearing shall not be more than fifteen (15) days after the date of appointment of the third arbitrator. The arbitrators shall render their award in writing to each of the parties not more than thirty (30) days after the date hearing shall commence unless the parties shall otherwise agree in writing. In the event the party of whom arbitration is demanded shall fail to appoint his or her arbitrator within the time specified or the two (2) arbitrators appointed by the parties are unable to agree on an appointment of the third arbitrator within the time specified, either party may petition the residing justice of the superior court to appoint a single arbitrator who shall hear the parties and make an award as provided herein. The petitioner shall give five (5) days notice in writing to the other party before filing his or her petition.”

ARTICLE 17 - MISCELLANEOUS

SC-17.07.

Add a new paragraph immediately after paragraph 17.06 of the General Conditions, which is to read as follows:

17.07. Both the address given in the Bid Form upon which this Agreement is founded, and CONTRACTOR's office at or near the site of the Work are hereby designated as places to either of which notices, letters, and other communications to CONTRACTOR shall be certified, mailed, or delivered. The

delivering at the above named place, or depositing in a postpaid wrapper directed to the first-named place, in any post office box regularly maintained by the post office department, of any notice, letter or other communication to Contractor shall be deemed sufficient service thereof upon CONTRACTOR; and the date of said service shall be the date of such delivery or mailing. The first-named address may be changed at any time by an instrument in writing, executed and acknowledged by CONTRACTOR, and delivered to OWNER and ENGINEER. Nothing herein contained shall be deemed to preclude or render inoperative the service of any notice, letter, or other communication upon CONTRACTOR personally.

WAGE RATES:

SC-17.08.

Add the following new paragraphs immediately after paragraph 17.07. of the Supplementary Conditions:

17.08. The requirements and provisions of all applicable laws and any amendments thereof or additions thereto as to the employment of labor, and to the schedule of minimum wage rates established in compliance with laws shall be a part of these Contract Documents. Copies of the wage schedules are included in Section 00800, if applicable under this Contract. If, after the Notice of Award, it becomes necessary to employ any person in a trade or occupation not classified in the wage determinations, such person shall be paid at not less than such rates as shall be determined by the officials administrating the laws mentioned above. Such approved minimum rate shall be retroactive to the time of the initial employment of such person in such trade or occupation. CONTRACTOR shall notify OWNER of his/her intention to employ persons in trades or occupations not classified in sufficient time for OWNER to obtain approved rates for such trades or occupations.

17.08.1. The schedules of wages referred to above are minimum rates only, and OWNER will not consider any claims for additional compensation made by CONTRACTOR because of payment by CONTRACTOR of any wage rate in excess of the applicable rate contained in these Contract Documents. All disputes in regard to the payment of wages in excess of these specified in the schedules shall be resolved by CONTRACTOR.

17.08.2. The said schedules of wages shall continue to be the minimum rates to be paid during the life of this Agreement and a legible copy of said schedules shall be kept posted in a conspicuous place at the site of the work.

PART II - STATE GOVERNMENT PROVISIONS

Each and every other provision of law or clause required by law to be inserted in this Contract shall be deemed to be also inserted herein in accordance with paragraph SC-3.1.1. of Supplementary Conditions.

1.0 STATE OF RHODE ISLAND PROVISIONS

1.1. The OWNER and CONTRACTOR agree that all applicable State of Rhode Island Provisions which apply to the work to be performed under this Contract will be followed. The CONTRACTOR must inform him/herself of all pertinent State of Rhode Island Provisions with performing this work. The most recent revisions of any State Provisions will apply in this Contract. The most recent provisions supersede any conflicting provisions of this Contract.

1.2. State Wage Rates, As Applicable.

END OF SECTION

PART 1 DESCRIPTION

A. Minimum wage rates shall be in accordance with the Rhode Island Department of Labor Laws (reference General Laws of Rhode Island, revised 1956, Chapter 37-12 and Chapter 37-13, as amended).

END OF SECTION

PERFORMANCE BOND

Any singular reference to Contractor, Surety, Owner, or other party shall be considered plural where applicable.

CONTRACTOR (Name and Address):

SURETY (Name and Address of Principal Place of Business):

OWNER (Name and Address):

CONTRACT
Date:
Amount:
Description (Name and Location):

BOND
Bond Number:
Date (Not earlier than Contract Date):
Amount:
Modifications to this Bond Form:

Surety and Contractor, intending to be legally bound hereby, subject to the terms printed on the reverse side hereof, do each cause this Performance Bond to be duly executed on its behalf by its authorized officer, agent, or representative.

CONTRACTOR AS PRINCIPAL
Company:

Signature: _____ (Seal)
Name and Title:

SURETY

_____ (Seal)
Surety's Name and Corporate Seal

By: _____
Signature and Title
(Attach Power of Attorney)

(Space is provided below for signatures of additional parties, if required.)

Attest: _____
Signature and Title

CONTRACTOR AS PRINCIPAL
Company:

Signature: _____ (Seal)
Name and Title:

SURETY

_____ (Seal)
Surety's Name and Corporate Seal

By: _____
Signature and Title
(Attach Power of Attorney)

Attest: _____
Signature and Title:

EJCDC No. C-610 (2002 Edition)
Originally prepared through the joint efforts of the Surety Association of America, Engineers Joint Contract Documents Committee, the Associated General Contractors of America, and the American Institute of Architects.

PAYMENT BOND

Any singular reference to Contractor, Surety, Owner, or other party shall be considered plural where applicable.

CONTRACTOR (Name and Address):

SURETY (Name and Address of Principal Place of Business):

OWNER (Name and Address):

CONTRACT
Date:
Amount:
Description (Name and Location):

BOND
Bond Number:
Date (Not earlier than Contract Date):
Amount:
Modifications to this Bond Form:

Surety and Contractor, intending to be legally bound hereby, subject to the terms printed on the reverse side hereof, do each cause this Payment Bond to be duly executed on its behalf by its authorized officer, agent, or representative.

CONTRACTOR AS PRINCIPAL
Company:

Signature: _____ (Seal)
Name and Title:

SURETY

_____ (Seal)
Surety's Name and Corporate Seal

By: _____
Signature and Title
(Attach Power of Attorney)

(Space is provided below for signatures of additional parties, if required.)

Attest: _____
Signature and Title

CONTRACTOR AS PRINCIPAL
Company:

Signature: _____ (Seal)
Name and Title:

SURETY

_____ (Seal)
Surety's Name and Corporate Seal

By: _____
Signature and Title
(Attach Power of Attorney)

Attest: _____
Signature and Title:

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Originally prepared through the joint efforts of the Surety Association of America, Engineers Joint Contract Documents Committee, the Associated General Contractors of America, the American Institute of Architects, the American Subcontractors Association, and the Associated Specialty Contractors.

Notice of Award

Dated _____

Project:	Owner:	Owner's Contract No.:
Contract:		Engineer's Project No.:

Bidder:

Bidder's Address: (send Certified Mail, Return Receipt Requested)

You are notified that your Bid dated _____ for the above Contract has been considered. You are the Successful Bidder and are awarded a Contract for _____

_____

_____

(Indicate total Work, alternates or sections or Work awarded.)

The Contract Price of your Contract is _____

_____ Dollars ($_____).

(Insert appropriate data if Unit Prices are used. Change language for Cost-Plus contracts.)

_____ copies of each of the proposed Contract Documents (except Drawings) accompany this Notice of Award.

_____ sets of the Drawings will be delivered separately or otherwise made available to you immediately.

You must comply with the following conditions precedent within [15] days of the date you receive this Notice of Award.

1. Deliver to the Owner [_____] fully executed counterparts of the Contract Documents.

2. Deliver with the executed Contract Documents the Contract security [Bonds] as specified in the Instructions to Bidders (Article 20), [and] General Conditions (Paragraph 5.01) [and Supplementary Conditions (Paragraph SC-5.01).]

3. Other conditions precedent:

   The Providence Water Supply Board and Pare Corporation shall be named as additional insured for coverage per the requirements of Specification Section 00800 – Supplementary Conditions, which includes Worker's Compensation, Comprehensive General Liability, and Comprehensive Automobile Liability. In addition, the Providence Water Supply Board must receive 30-day notification prior to policy cancellation.

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

Within ten days after you comply with the above conditions, Owner will return to you one fully executed counterpart of the Contract Documents.

_____
Owner

By:_____
Authorized Signature

_____
Title

Copy to Engineer

Notice to Proceed

Dated _____

Project:	Owner:	Owner's Contract No.:
Contract:		Engineer's Project No.:
Contractor:		
Contractor's Address: [send Certified Mail, Return Receipt Requested]		

You are notified that the Contract Times under the above contract will commence to run on_____. On or before that date, you are to start performing your obligations under the Contract Documents. In accordance with Article 4 of the Agreement, the date of Substantial Completion is_____, and the date of readiness for final payment is _____ [(or) the number of days to achieve Substantial Completion is _____, and the number of days to achieve readiness for final payment is _____].

Before you may start any Work at the Site, Paragraph 2.01.B of the General Conditions provides that you and Owner must each deliver to the other (with copies to Engineer and other identified additional insureds) certificates of insurance which each is required to purchase and maintain in accordance with the Contract Documents.

Also, before you may start any Work at the Site, you must [add other requirements]:

_____

_____

_____

_____
Owner

Given by: _____
Authorized Signature

_____
Title

_____
Date

Copy to Engineer

DIVISION 1

GENERAL REQUIREMENTS

SECTION 01010 GENERAL DESCRIPTION OF THE WORK

PART 1 GENERAL

1.1 DESCRIPTION

A. The Contractor shall furnish and install approximately 5,000 feet of new 16-inch CL 52 DI transmission water main along Central Avenue, connecting to the existing high pressure water main on Bishop Hill Road in Johnston, RI. The work includes all specified valves, fittings, and other appurtenances.

B. Upon completion of the work, all disturbed areas shall be restored to a condition equivalent to or better than that which existed prior to construction.

1.2 LIMITS OF WORK/COORDINATION

A. The Contractor shall access the site from abutting rights-of-way as required to facilitate construction. Areas for construction staging, storage, and construction shall be coordinated with the Owner or the Engineer.

1.3 CONSTRUCTION SEQUENCE/SCHEDULE

A. Contractor shall be responsible for submitting a preliminary progress schedule and a preliminary schedule of values to the Engineer for approval ten (10) days prior to the commencement of any work and in accordance with Article 2 of the General Conditions.

B. The sequence and schedule, submitted by the Contractor shall be acceptable to the Engineer as providing for an orderly progression of the work to completion. Acceptance of such will neither impose on Engineer or Owner, responsibility for construction sequencing, schedule, or progress of work nor interfere with or relieve Contractor for Contractor's full responsibility thereof.

C. Following the initial approved schedule, the Contractor shall provide updated weekly schedules to the Engineer for review and approval.

D. Schedule of work shall be coordinated by Contractor such that:

1. Contractor shall be responsible for scheduling and for integrity of partially completed work during performance of other work on site.
2. It shall be the Contractor's responsibility for damage or disruption to partially completed work, and for repair thereof, during performance of all project work.
3. Prior to commencement of construction activities, the contractor shall submit a detailed construction and phasing schedule.
4. Construction and phasing schedule shall include line items for coordination with applicable public agencies and public/private utilities, when necessary.

PART 2 PRODUCTS

2.1 MATERIALS

A. All materials, supplies, or equipment incorporated into the work shall be new and shall conform to the requirements of the applicable sections of these specifications.

PART 3 EXECUTION

3.1 The General Contractor and subcontractors performing work under this contract shall execute such work in a professional manner, consistent with the industry's standards for quality workmanship.

3.2 The General Contractor shall provide a representative to be present at all tests required by these Specifications.

END OF SECTION

PART 1 GENERAL

1.1 DESCRIPTION

A. Extent of Work: This Section applies to situations in which the Contractor or their representatives including, but not necessarily limited to, suppliers, subcontractors, employees, and field engineers, enter upon the Owner's property or occupy the public rights-of-way.

B. Related Work Specified Elsewhere:

Documents affecting work of this Section include, but are not necessarily limited to, General Conditions, Supplementary Conditions, Special Conditions and sections of these Specifications.

1.2 QUALITY ASSURANCE

A. Promptly upon award of the Contract, notify all pertinent personnel regarding requirements of this section.

B. Require that all personnel who will enter upon the Owner's property certify their awareness and familiarity with the requirements of this Section.

1.3 TRANSPORTATION FACILITIES

A. Truck and Equipment Access:

1. Where materials are transported in the execution of the Work, vehicles shall not be loaded beyond the loading capacity recommended by the manufacturer for the vehicle or prescribed by any Federal, State, or Local law or regulation.
2. Provide adequate protection for curbs and sidewalks over which trucks and equipment pass to reach the job site. Any damaged roads, bridges, structures, curbing, or sidewalks shall be repaired by, or at the expense of the Contractor.

B. Contractor's Vehicles:

1. Require Contractor's vehicles and vehicles belonging to employees of the Contractor or leased by the Contractor or subcontractor, and all other vehicles entering upon the Owner's property in performance of the Work of the Contract, to use only the access routes designated by the Owner or the Engineer.

1.4 NONEXCLUSIVE USE

A. Nothing herein contained or shown on the Drawings shall be construed as giving the Contractor exclusive occupancy of the work area. The Owner or any other contractors employed by the Owner, the various utility companies, contractors, or subcontractors employed by State or Federal agencies, or any other agencies involved in the general

project or upon public rights-of-way, may enter upon or cross the area of work or occupy portions of the area as is directed or necessary.

B. The Owner reserves the right to do any other work that may be connected with, or become a part of, or be adjacent to the work embraced by this Contract, at any time, by contractor or otherwise. The Contractor shall not interfere with the work of such others as the Owner may employ, and shall execute their own work in such a manner as to aid in the execution of the work of others as may be required. No backfilling of trenches or excavations will be permitted until such work by the Owner is completed.

C. When the territory of one contract is the convenient means of access to the other, the Contractor shall arrange their working in such a manner as to permit such access to the other and prevent unnecessary delay to the work as a whole.

1.5 WORKING HOURS

A. Regular working hours shall consist of a period established between 7 a.m. and 6 p.m., Monday through Friday, excluding holidays. The Contractor shall make application for work outside regular working hours five (5) calendar days prior to such work in accordance with the paragraph entitled "Work Outside Regular Hours".

1.6 WORK OUTSIDE REGULAR HOURS

A. If the Contractor desires to carry on work outside regular hours, including Saturdays, Sundays, and holidays; an application shall be delivered to the Owner and Engineer. The Contractor shall allow ample time to enable satisfactory arrangements to be made by the Engineer for inspecting the work in progress. During periods of darkness, the different parts of the work shall be lighted in a manner approved by the Engineer. All utility cutovers shall be made through coordination with Owner’s on-site representative.

1.7 ORDER OF WORK

A. The Contractor shall schedule their work so as to cause the least amount of interference with traffic. Permission to interrupt any roads, and/or utility service shall be requested in writing a minimum of five (5) calendar days prior to the desired date of interruption.

1.8 EXISTING WORK

A. The removal or altering in any way of existing work shall be carried out in such a manner as to prevent injury or damage to any portion(s) of the existing work which remain(s).

B. All portions of existing work, which have been altered in any way during construction operations shall be repaired or replaced in kind and in a manner to match existing or adjoining work, as, approved by the Engineer. All work of this nature shall be performed by the Contractor at the Contractor’s expense and shall be performed as directed by the Engineer. At the completion of all operations, existing work shall be in a condition equivalent to or better than that which existed before the new work started.

1.9 SANITATION

A. Adequate sanitary conveniences of a type approved for the use of persons employed on the work shall be constructed, properly secluded from public observation, and maintained by the Contractor in such a manner as required or approved by the Engineer. These conveniences shall be maintained at all times without nuisance. Upon completion of the work, the conveniences shall be removed by the Contractor from the premises, leaving the premises clean and free from nuisance.

1.10 SAFETY

A. Contractor is solely responsible for site safety on all project related matters. Contractor shall comply with all applicable Federal, State, and local laws, ordinances, rules and regulations and lawful orders of all authorities having jurisdiction for the safety of persons and protection of property.

1.11 TEMPORARY UTILITIES AND SERVICES

A. Contractor is responsible and shall pay all fees required for any temporary services required to complete the scope of work for this project. All connections shall be performed in accordance with applicable codes.

END OF SECTION

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Inspection and Testing

B. Application for Payment

C. Change Procedures

1.2 INSPECTION AND TESTING

A. The Contractor shall pay all costs of engaging an inspection or testing firm, execution of inspection or tests, and reporting results.

B. Costs Included:

1. Incidental labor and facilities required to assist inspection or testing firm.
2. Costs of testing laboratory services required by the Contractor separate from Contract Document requirements.
3. Costs of retesting upon failure of previous tests as determined by Engineer.

C. Payment Procedures:

1. Submit a copy of the inspection or testing firm's invoice with next application for payment.
2. Pay invoice on approval by Engineer.

1.3 APPLICATIONS FOR PAYMENT

A. Submit three copies of each application on EJCDC C-620. See Section 01152 - Application for Payment Form.

B. For each item, provide a column listing: Item Number; Description of Work; Scheduled Value; Previous Applications; Work in Place and Stored Materials under this Application; Authorized Change Orders; Total Completed and Stored to Date of Application; Percentage of Completion; Balance to Finish; and Retainage.

C. Present required information in typewritten form.

D. Execute certification by signature of authorized officer.

E. Use data from approved Schedule of Values. Provide dollar value in each column for each line item for portion of work performed and for stored products.

F. List each authorized Change Order as an extension on continuation sheet, listing Change Order number and dollar amount as for an original item of work.

1.4 CHANGE ORDER PROCEDURES

A. The Engineer will advise of minor changes in the work not involving an adjustment to Contract Sum/Price or Contract Time, as authorized by the Engineer, by issuing written supplemental instructions.

B. The Engineer may issue a Notice of Change which includes a detailed description of a proposed change with supplementary or revised drawings and specifications, a change in Contract Time for executing the change with a stipulation of any overtime work required and the period of time during which the requested price will be considered valid. Contractor will prepare and submit an estimate within seven (7) days.

C. The Contractor may propose a change by submitting request for change to the Engineer, describing the proposed change and its full effect on the work. Include a statement describing the reason for the change, and the effect on the Contract Sum/Price and Contract Time with full documentation and a statement describing the effect on work by separate or other contractors. No change will be allowed except under written approval and Notice of Change of the Engineer, verbal orders are not binding.

D. Stipulated Sum/Price Change Order: Based on Notice of Change and Contractor's estimated price quotation.

E. Unit Price Change Order: For pre-determined unit prices and quantities, the Change Order will be executed on a fixed unit price basis. For unit costs or quantities of units of work, which are not pre-determined, execute work under a Work Directive Change. Changes in Contract Sum/Price or Contract Time will be computed as specified for Time and Material Change Order.

F. Time and Material Change Order: Submit itemized account and supporting data after completion of change, within time limits indicated in the Conditions of the Contract. The Engineer will determine the change allowable in Contract Sum/Price and Contract Time as provided in the Contract Documents.

G. Maintain detailed records of work done on Time and Material basis. Provide full information required for evaluation of proposed changes, and to substantiate costs for changes in the work.

H. Execution of Change Orders: The Engineer will issue Change Orders for signatures of parties as provided in the Conditions of the Contract.

PART 2 PRODUCTS

2.1 PROJECT MANAGEMENT SOFTWARE

A. The Contractor shall utilize Providence Water's Project Management Software for change orders. All submittals and approvals shall be performed via that software. Email and/or paper submissions will not be allowed.

PART 3 EXECUTION

NOT USED

END OF SECTION

SECTION 01045 CUTTING, CORING, AND PATCHING

PART 1 GENERAL

1.01 SCOPE OF WORK

A. This Section covers the cutting, coring, and rough and finish patching of holes and openings in existing and proposed structures (manholes, pipes, etc.).

B. The Contractor shall see that all such cuts, cores, and openings are located accurately and are of proper size and shape and shall consult with the Engineer and the contractors and subcontractors concerned in reference to this work.

C. In case of his failure to leave or cut all such openings or have all such sleeves provided and set in proper time, he shall cut them or set them afterwards at his own expense, but in so doing he shall confine the cutting to the smallest extent possible consistent with the work to be done. In no case shall piers or structural members be cut without the written consent of the Engineer.

D. The Contractor shall not cut or alter the work of any subcontractor or any other contractor, nor permit any of his subcontractors to cut or alter the work of any other contractor or subcontractor, except with the written consent of the contractor or subcontractor whose work is to be cut or altered or with the written consent of the Engineer. All cutting and patching or repairing made necessary by the negligence, carelessness, or incompetence of the Contractor or any of his subcontractors shall be done by or at the expense of the Contractor and shall be the responsibility of the Contractor.

PART 2 PRODUCTS

2.01 MATERIALS

A. Concrete rough patching shall be as specified in Division 3.

PART 3 EXECUTION

3.01 GENERAL

A. All cutting and coring shall be performed in such a manner as to limit the extent of patching.

B. All holes cut through concrete, existing or proposed manholes, and existing or proposed pipes shall be core drilled unless otherwise approved. No structural members shall be cut without approval of the Engineer. No holes may be drilled in/through structural members or supports without obtaining prior approval. All work shall be performed by mechanics skilled in this type of work.

C. Rough patching shall be such as to bring the cut or cored area flush with existing construction unless otherwise shown. Finish patching shall match existing surfaces as approved.

D. Prior to coring and cutting, rebar shall be located using a Rebar Locator. If possible, relocate to avoid rebar.

3.02 CORING

A. Coring shall be performed with an approved non-impact rotary tool with diamond core drills. Size of holes shall be suitable for pipe, conduit, sleeves, equipment, or mechanical seals to be installed.

B. All equipment shall conform to OSHA standards and specifications pertaining to plugs, noise and fume pollution, wiring and maintenance.

C. Provide protection for existing equipment, utilities and critical areas against water or other damage caused by drilling operation.

D. Slurry or tailings resulting from coring operations shall be vacuumed or otherwise removed from the area following drilling.

3.03 CUTTING

A. Cutting shall be performed with a concrete wall saw and diamond saw blades of proper size.

B. Provide for control of slurry generated by sawing operation on both sides of wall.

C. When cutting a reinforced concrete wall, the cutting shall be done so as not damage bond between the concrete and reinforcing steel left in structure. Cut shall be made so that steel neither protrudes nor is recessed from face of the cut.

D. Adequate bracing of area to be cut shall be installed prior to start of cutting. Check area during sawing operations for partial cracking and provide additional bracing as required to prevent a partial release of cut area during sawing operations.

E. Provide equipment of adequate size to remove cut panel.

END OF SECTION

PART 1 GENERAL

1.1 EXTENT OF WORK

A. Measurement. The quantities to be measured under the various items in the proposal will be those quantities of work completed in accordance with the Drawings and Specifications. The methods of measurement will be as stated hereinafter for the individual items.

B. Prices. The unit or lump sum prices for all items in the schedule of prices shall be full compensation for the work of the Contractor specified and shall include the cost of furnishing all materials, labor, tools and equipment and all work and expense incidental to and necessary to complete the work in accordance with the Drawings and Specifications.

1.2 WORK NOT PAID FOR SEPARATELY

A. Stripping Topsoil. Payment for stripping topsoil, including stockpiling, is included in the prices for the various items of work in the Schedule of Prices and no separate payment will be made thereof.

B. Clearing and Grubbing. Payment for clearing and grubbing, including disposal, is included in the prices for the various items of work in the Schedule of Prices and no separate payment will be made thereof.

C. Earth Excavation. Payment for earth excavation to the depths indicated on the Drawings or authorized by the Engineer for the construction of all structures, pipelines, and appurtenances, including disposal of the excavated materials in fills, backfills, embankments, designated stockpiles, or as spoil, as approved by the Engineer, is included in the prices for the various items of work in the Schedule of Prices and no separate payment will be made thereof.

D. Filling, Backfilling, Embankment, and Disposal of Surplus Materials. Payment for filling, backfilling for all structures, underground electric conduits and pipelines, including appurtenances, construction of embankments, and disposal of surplus material is included in the prices for the various items of work in the Schedule of Prices and no separate payment will be made thereof, except for selected material if needed to complete the work.

E. Sheeting, Shoring and Bracing. Payment for all necessary sheeting, shoring, and bracing is included in the prices for the various items in the Schedule of Prices and no separate payment shall be made thereof.

F. Pumping, Draining, and Bailing. Payment for all necessary pumping, draining, bailing, etc., including the use of underdrains or well points, is included in the prices for the various items in the Schedule of Prices and no separate payment will be made thereof.

G. Preparation of Site. Payment for preparation of site is included in the Lump Sum Price Bid for Item 1 in the Schedule of Prices and no separate payment will be made thereof.

Preparation of site includes setting up construction plant, offices, shops, storage areas, sanitary and other facilities required by the specifications or state law or regulations; providing access to the site; obtaining necessary permits and licenses; and payment of fees; general protection, temporary heat and utilities; providing shop and working drawings, certificates and schedules; sampling and testing materials; providing required insurance; cleaning up, and all other work regardless of its nature which may not be specifically referred to in the Schedule of Prices but is necessary for the complete construction of the project set forth by the contract.

H. Bonds. Payment for bonds required by the contract is included in the prices bid for the various items of work in the Schedule of Prices and no separate payment will be made thereof.

I. Environmental Protection. Payment for work under this section is included in the prices for the various items in the Schedule of Bid Items and no separate payment will be made thereof.

J. Signage. Payment for all signage required for this project is included in the prices for the various items in the Schedule of Bid Items and no separate payment will be made thereof.

K. Pavement Removal. Payment for bituminous concrete pavement excavation and disposal is included in the prices for the various items in the Schedule of Bid Items and no separate payment will be made thereof.

L. No separate payments will be made for cleaning up. Such cleanup shall be considered incidental to the item to which it applies and shall be included in the price for that item.

M. All existing work removed or damaged by the Contractor's operations shall be replaced to the satisfaction of the Owner at no additional expense to the Owner.

N. No separate payment will be made for Division 1 - General Requirements. Contractor shall incorporate the cost for these items into the Bid Items listed in the Bid Form.

O. All disturbed areas outside the limits of disturbance shall be restored at the Contractor's expense.

1.3 BID ITEMS

A. Appurtenant items of work shown on the Drawings or specified which are required to complete the work but are not listed separately under the various applicable bid items of work, shall have no separate payment for such items. It shall be the responsibility of the Contractor to verify any missing or incomplete items.

1.4 MEASUREMENT

A. The measurement of all quantities of items listed in the Bid Form shall be done by the Contractor. The measurement will include proper and complete documentation of all items to the satisfaction of the Owner and Engineer prior to the submission for payment. The measurement submitted shall be in the same unit description listed in the Bid Form.

1.5 PAYMENT

A. Payments shall be made to the Contractor only after proper documentation of the unit quantity provided or percentage of work completed, and in accordance with the contract terms and conditions regarding payment.

B. Payment for bid items shall include full compensation for all incidentals required for the complete installation of the completed product.

C. Payment shall be made only for that work which is performed within the pay limits shown on the Drawings or detailed in the Specifications. No payment shall be made for work beyond these limits unless the work has been authorized by the Engineer in writing.

PART 2 PRODUCTS

2.01 SITE MOBILIZATION AND DEMOBILIZATION (BID ITEM NO. 1)

A. Measurement

1. The Work of this section shall be measured as specified at the Lump Sum price provided on the Bid Form. The payable quantity will be for the preparatory work and operations, which must be performed or for costs which must be incurred prior to beginning work, final cleanup and demobilization of temporary facilities and equipment, restoration of impacted areas disturbed due to construction of all temporary facilities, preparation of as-built drawings, and the cost of payment and performance bonds as well as fees for all permits and Federal, State, and local approvals. Mobilization shall include but is not limited to movement of personnel, equipment, supplies, and incidentals to the project site for the establishment of all Contractor's field offices, utilities, temporary fencing, installation, maintenance, and removal of tracking pads, and other facilities necessary for work on the project. Demobilization shall include but is not limited to moving out of personnel and equipment, cleaning entire site, and removing debris and rubbish.
2. The Lump Sum price provided on the Bid Form for Bid Item No. 1 - Site Mobilization and Demobilization shall not exceed 10% of the total amount of this bid.
3. Should the Contractor install a field office, there shall be no separate payment associated with furnishing, installing, maintaining, and removing a temporary field office for the Contractor's field office.

B. Payment

1. Payment for this item shall be made as a percentage of the Lump Sum price listed on the Bid Form.

2.02 PAYMENT AND PERFORMANCE BOND (BID ITEM NO. 2)

A. Measurement

1. The Work for this section shall be measured as specified at the Lump Sum Price for furnishing Providence Water with a Performance Bond and a Labor and Material Payment Bond, each in the amount of 100% of the contact price, as security for

faithful performance of the Contract and executed by a surety company licensed to do business in the State of Rhode Island and approved by Providence Water.

B. Payment

1. Payment for this item shall be made as a percentage of the Lump Sum price listed on the Bid Form.

2.03 EROSION AND SEDIMENTATION CONTROLS (BID ITEM NO. 3)

B. Measurement

1. The Work of this section shall be measured as specified at the Linear Foot price for installation, maintenance, removal, and disposal of erosion and sedimentation controls where shown on the Contract Drawings and as required by the Engineer. Work shall include all necessary equipment, materials, workmen, and all incidental work required for completion of the work specified herein and included on the Contract Drawings and in these Specifications.
2. This work shall include installation, maintenance, removal, and disposal of all tree protection where shown on the Contract Drawings and as required by the Engineer.

B. Payment

1. Payment for this item shall be made at the per Linear Foot price listed on the Bid Form.

2.04 TEST PITS (BID ITEM NO. 4)

A. Measurement

1. Payment for this work shall be measured as specified at the per Each price for the performance of each test pit, up to a maximum of 12 cubic yards in volume, as required by the Engineer. Work shall include, but is not necessarily limited to, saw cutting, removal and disposal of concrete/bituminous pavement and excess soil, excavation to depths required by the Engineer, dewatering, shoring, providing means of egress for the Engineer to safely access the test pit, traffic protection, furnishing and installing bedding material for utilities or structures encountered in the test pit, and furnishing, installing, and properly compacting backfill.

B. Payment

1. Payment for this item shall be made at the per Each price listed on the Bid Form.

2.05 FURNISH AND INSTALL 12x12-INCH TAPPING SLEEVE AND VALVE (BID NO. 5)

A. Measurement

1. The Work of this section shall be measured as specified at the Unit Price provided on the Bid Form for each tapping sleeve and valve furnished and installed by Contractor. The number of tapping sleeves and valves with boxes to be paid for under this Item will be measured as the number of each actually installed in the completed project and accepted by the Engineer. The work shall include all necessary trench work, dewatering, support of excavations, furnishing and installing of the valve and valve box with aligner, furnishing and installing required bedding material, backfilling with crushed stone, furnishing and installing required leveling blocks, furnishing and installing thrust blocks where required by the Engineer, providing traffic control, pavement/concrete saw cutting, removing and disposing of pavement/concrete and removing excess soil.

A. Payment

1. Payment for this item shall be made at the per Each price listed on the bid form.

2.06 FURNISH AND INSTALL 8-INCH CLASS 52 DUCTILE IRON WATER MAIN AND FITTINGS (BID ITEM NO. 6)

A. Measurement

1. The Work of this section shall be measured as specified at the Unit Price per Linear Foot provided on the Bid Form to furnish and install new 8", zinc-coated Class 52, double cement lined ductile iron (DI) water main pipe where shown on the Drawings and as required. The work shall include all necessary trench work, dewatering, support of excavations, furnishing and installation of the water pipe, furnishing and installing required bedding material, backfilling with suitable common borrow, furnishing and installing insulation material as required by the Engineer or as shown on the Drawings, furnishing and installing restrained joints as required by the Engineer and as shown on the Drawings, making connections between new and existing water mains where shown on the Drawings including furnishing and installing transitional couplings, fittings, removing and disposing of existing water piping and appurtenances as necessary and where called for on the Drawings, providing traffic control, pavement/concrete saw cutting, removing and disposing of pavement/concrete, and removing excess soil. Required disinfection and testing of the water main shall also be included for payment under this item.
2. New pipe that is furnished but not installed shall not be considered for payment.

B. Payment

1. Payment for this item shall be made at the per Linear Foot price listed on the Bid Form.

2.07 FURNISH AND INSTALL 12-INCH CLASS 52 DUCTILE IRON WATER MAIN AND FITTINGS (BID ITEM NO. 7)

A. Measurement

1. The Work of this section shall be measured as specified at the Unit Price per Linear Foot provided on the Bid Form to furnish and install new 12", zinc-coated Class 52, double cement lined ductile iron (DI) water main pipe where shown on the Drawings and as required. The work shall include all necessary trench work, dewatering, support of excavations, furnishing and installation of the water pipe, furnishing and installing required bedding material, backfilling with suitable common borrow, furnishing and installing insulation material as required by the Engineer or as shown on the Drawings, furnishing and installing restrained joints as required by the Engineer and as shown on the Drawings, making connections between new and existing water mains where shown on the Drawings including furnishing and installing transitional couplings, fittings, removing and disposing of existing water piping and appurtenances as necessary and where called for on the Drawings, providing traffic control, pavement/concrete saw cutting, removing and disposing of pavement/concrete, and removing excess soil. Required disinfection and testing of the water main shall also be included for payment under this item.
2. New pipe that is furnished but not installed shall not be considered for payment.

B. Payment

1. Payment for this item shall be made at the per Linear Foot price listed on the Bid Form.

2.08 INSTALL 16-INCH CLASS 52 DUCTILE IRON WATER MAIN AND FURNISH AND INSTALL FITTINGS (BID ITEM NO. 8)

A. Measurement

1. The Work of this section shall be measured as specified at the Unit Price per Linear Foot provided on the Bid Form to install new 16", Class 52, double cement lined ductile iron (DI) water main pipe where shown on the Drawings and as required. The work shall include all necessary trench work, dewatering, support of excavations, installation of the water pipe, furnishing and installing required bedding material, backfilling with suitable common borrow , furnishing and installing insulation material as required by the Engineer or as shown on the Drawings, furnishing and installing restrained joints as required by the Engineer and as shown on the Drawings, making connections between new and existing water mains where shown on the Drawings including furnishing and installing transitional couplings, fittings, removing and disposing of existing water piping and appurtenances as necessary and where called for on the Drawings, providing traffic control, pavement/concrete saw cutting, removing and disposing of pavement/concrete, and removing excess soil. Required disinfection and testing of the water main shall also be included for payment under this item.

2. New pipe and gaskets to be furnished by Owner. Pipe and fittings installation to be performed by the Contractor.

B. Payment

1. Payment for this item shall be made at the per Linear Foot price listed on the Bid Form.

2.09 FURNISH AND INSTALL 8-INCH GATE VALVE AND BOX (BID ITEM NO. 9)

A. Measurement

1. The Work of this section shall be measured as specified at the Unit Price provided on the Bid Form for each 8" gate valve and valve box furnished and installed where shown on the Drawings and as required. The work shall include all necessary trench work, dewatering, support of excavations, furnishing and installing the gate valve and valve box with aligner, furnishing and installing required bedding material, backfilling with suitable common borrow, furnishing and installing required leveling blocks, making connections between new and existing water mains where shown on the Drawings and as necessary, furnishing and installing thrust blocks where required by the Engineer, furnishing and installing tie rods where required by the Engineer, pavement/concrete saw cutting, removing and disposing of pavement/concrete and removing excess soil. Required testing of the water main shall be paid for under other bid items.

B. Payment

1. Payment for this item shall be made at the per Each price listed on the Bid Form.

2.10 FURNISH AND INSTALL 12-INCH GATE VALVE AND BOX (BID ITEM NO. 10)

A. Measurement

1. The Work of this section shall be measured as specified at the Unit Price provided on the Bid Form for each 12" gate valve and valve box furnished and installed where shown on the Drawings and as required. The work shall include all necessary trench work, dewatering, support of excavations, furnishing and installing the gate valve and valve box with aligner, furnishing and installing required bedding material, backfilling with suitable common borrow, furnishing and installing required leveling blocks, making connections between new and existing water mains where shown on the Drawings and as necessary, furnishing and installing thrust blocks where required by the Engineer, furnishing and installing tie rods where required by the Engineer, pavement/concrete saw cutting, removing and disposing of pavement/concrete and removing excess soil. Required testing of the water main shall be paid for under other bid items.

B. Payment

1. Payment for this item shall be made at the per Each price listed on the Bid Form.

2.11 FURNISH AND INSTALL 16-INCH RESILIENT WEDGE GATE VALVE WITH GEAR ACTUATOR, EXTENSION STEM AND BOX (BID ITEM NO. 11)

A. Measurement

1. The Work of this section shall be measured as specified at the Unit Price provided on the Bid Form for each 16" resilient wedge gate valve, extension stem and valve

box furnished and installed where shown on the Drawings and as required. The work shall include all necessary trench work, dewatering, support of excavations, furnishing and installing the gate valve and valve box with aligner, furnishing and installing required bedding material, backfilling with suitable common borrow, furnishing and installing required leveling blocks, making connections between new and existing water mains where shown on the Drawings and as necessary, furnishing and installing thrust blocks where required by the Engineer, furnishing and installing tie rods where required by the Engineer, pavement/concrete saw cutting, removing and disposing of pavement/concrete and removing excess soil. Required testing of the water main shall be paid for under other bid items.

B. Payment

1. Payment for this item shall be made at the per Each price listed on the Bid Form.

2.12 FURNISH AND INSTALL 5x5-FEET PRECAST WATER SERVICE MANHOLE (BID ITEM NO. 12)

A. Measurement

1. The Work of this section shall be measured as specified at the Unit Price provided on the Bid Form for furnishing and installing manholes of reinforced precast concrete sections, complete, including concrete bases, riser sections, cones or top slabs, landing platforms, and coring. The Contractor shall perform all excavation and backfill, removing excess material from the job, furnishing and placing ¾-inch crushed stone bedding, furnishing and installing crushed stone backfill, repair and/or relocation of any utility lines broken and/or conflicting with construction, dewatering, support of excavations, furnishing and applying damp proofing, testing for leakage, clean up, and raising manholes to grade under the unit price for this Item.

B. Payment

1. Payment for this item shall be made at the per Each price listed on the Bid Form.

2.13 FURNISH AND INSTALL HYDRANT ASSEMBLY (BID ITEM NO. 13)

A. Measurement

2. The Work of this section shall be measured as specified at the Unit Price provided on the Bid Form for furnishing and installing each new hydrant assembly under this Bid Item. The payable quantity will be for the materials and labor necessary to install the hydrant assembly, including hydrant, valve, valve box and cover, tee, 6” branch piping, ¾” crushed stone, geotextile fabric, removal and disposal of existing hydrant (if being replaced), and thrust restraint as specified herein and included in the Contract Drawings. This work shall include all labor, equipment, materials, and services required or incidental for the satisfactory completion of the work.

B. Payment

1. Payment for this item shall be made at the per Each price listed on the Bid Form.

2.14 ROCK REMOVAL (BID ITEM NO. 14)

A. Measurement

1. When rock is encountered, the material shall be uncovered and the Engineer notified. The Engineer shall determine quantities by volumetric computation determined from surveys performed before rock excavation begins and surveys performed after completion of rock excavation. If the Contractor fails to uncover the rock and notify the Engineer to allow ample time for cross sectioning the undisturbed material, the Contractor shall have no right-of-claim to any classification other than that allowed by the Engineer.
2. Measurements of rock excavation will extend to the dimensions specified in Section 02211. Trench widths will be as indicated on the Contract Documents.
3. The quantity of rock and boulder excavation to be paid for will be the number of cubic yards of rock or boulders measured in place. Boulders 1 CY or greater shall be considered rock for the purpose of estimating rock removal.

B. Payment

1. Payment for rock and boulder excavation will be made for the quantities as above determined, measured in cubic yards, at the unit price bid on the Bid Form, which price and payment will be full compensation for excavation, drilling, blasting or otherwise breaking (mechanical removal) and hauling of rock off site and legal disposal in accordance with the requirements of Section 02211, backfilling and providing screened gravel, for any deficiency of trench backfill and all work incidental thereto, for which payment is not provided under other items.

2.15 UNSUITABLE MATERIAL REMOVAL AND REPLACEMENT WITH PROCESSED GRAVEL (BID ITEM NO. 15)

A. Measurement

1. Additional excavation for removal of unsuitable material and replacement with processed gravel will be measured in Tons as determined in the field by the Engineer.
2. Processed gravel used for unspecified purposes and incorporated in the work will be measured, by truck count, in tons. The Contractor shall acquire Providence Water approval for payment of processed gravel not shown on drawings or described herein, prior to placement.
3.
4. Processed gravel used in accordance with the Specifications, to replace unspecified excavation outside pay limits with specific direction by the Engineer will not be measured for separate payment under any other Bid Item specified.

B. Payment

1. Payment for this item shall be made on a per Ton basis as listed on the bid form, furnished and installed to the satisfaction of the Engineer and Owner.

2.16 2-INCH TEMPORARY TRENCH PAVEMENT (BID ITEM NO. 16)

A. Measurement

1. Temporary trench patching shall be measured per Ton as specified at the Unit Price provided on the Bid Form to furnish and install a temporary trench. Only temporary trench patches that are installed to their specified thickness as indicated on the Contract Drawings shall be considered for payment. The work shall include all labor, materials, equipment, and for all other incidentals required to finish the work, complete and accepted by the Engineer. The work shall include maintenance of the temporary patch prior to placement of the permanent trench patch in accordance with the Contract Drawings. This work item shall include all necessary dust control and trench maintenance measures including but not limited to, application of calcium chloride and water to inhibit dust and mechanical street sweeping performed on a weekly basis during construction.

B. Payment

1. Payment for this item shall be made at the per Ton price listed on the Bid Form.

2.17 3-INCH PERMANENT TRENCH PAVEMENT (BID ITEM NO. 17)

A. Measurement

1. The Work of this section shall be measured per Ton as specified at the Unit Price provided on the Bid Form to furnish and install a permanent trench. Only temporary trench patches that are installed to their specified thickness as indicated on the Contract Drawings shall be considered for payment. This work shall also include raising or lowering of all castings, whether existing or installed as part of this project, to finish grade with either courses of brick and mortar or raising or lowering of valve boxes and covers. Installation of extensions on valve boxes shall not be allowed. The total quantity of the permanent pavement placed shall be verified by the Engineer prior to payment.

B. Payment

1. Payment for this item shall be made at the per Ton price listed on the Bid Form.

2.18 LOAM AND SEED (BID ITEM NO. 18)

A. Measurement

1. The work for this section shall be measured as specified at the Square Yard price in the Bid Form of Loaming and Seeding completed. This work shall include restoration of lawned areas with 6-inches of loam and seed, in-kind replacing of all disturbed plantings (including shrubbery and trees), disconnecting, reconnecting and/or repairing all disturbed lawn sprinkler systems, and in-kind replacement and/or repairing of all disturbed landscaping including but not limited to stone walls, decorative crushed stone, mulch, signs, and other landscaping objects disturbed during this project.
2. This work shall include all necessary maintenance of new plantings and newly seeded areas, including but not limited to watering, mowing, and fertilizing.

3. There shall be a one (1) year warrantee on all new plantings and newly seeded areas, to start on the date of acceptance by the owner. In the case of newly seeded areas, the date of acceptance shall be the date the owner believes acceptable grass coverage, per the specifications, has been achieved.

B. Payment

1. Payment for this item shall be made at the per Square Yard price listed on the Bid Form.

2.19 UNIFORMED OFFICER TRAFFIC CONTROL (BID ITEM NO. 19)

A. Measurement

1. The amount to be paid for under this Bid Item shall be the submitted invoice of traffic police service furnished for the purpose of directing traffic. Traffic police service shall be furnished as required by the Town of Johnston for the purpose of directing traffic.
2. The quantity to be paid for under this Bid Item shall be full compensation for the expense involved in furnishing the required services including all administrative costs. Abnormal and unreasonable expenses incurred by the Owner may be charged against the amount owed to the Contractor under this contract and are detailed as follows:

    a. Contractor caused delays in the prosecution of work that result in hiring traffic police for more hours than would have been required during normal prosecution of work.
    b. Reconstruction and/or reinstallation of any portions of the work, as a result of improper initial installation, for which traffic police is required.
    c. Traffic police required at a site where the Contractor is not working or outside of the Contractor's standard workday as a result of obstructions to traffic that remain in the traveled way.
    d. All other incidents resulting from the Contractor's operations requiring traffic police that would not normally be encountered during the progress of a well-organized project employing proper construction methods.

B. Payment

1. Payment for this item will be made from the Allowance amount specified on the Bid Form, subject to approval by Owner and Engineer. If the total cost for such charges is greater or less than the allowance amount stated under this Bid Item of the Bid, a debit or credit of the difference in cost shall be to the Owner.

2.20 TRAFFIC MANAGEMENT (BID ITEM NO. 20)

A. Measurement

1. The Work for this section shall be the submitted invoice for any work associated with coordinating, installing, and maintaining detours.

B. Payment

1. Payment for this item will be made from the Allowance amount specified on the Bid Form, subject to approval by Owner and Engineer. If the total cost for such charges is greater or less than the allowance amount stated under this Bid Item of the Bid, a debit or credit of the difference in cost shall be to the Owner.

PART 3 EXECUTION

3.1 BID ITEMS

A. Appurtenant items of work shown on the Drawings or described in the Specifications are required to complete the work but are not listed separately under the various applicable bid items of work, and no separate payment will be made for such items. It shall be the responsibility of the Contractor to verify any missing or incomplete items.

3.2 MEASUREMENT

A. The measurement of all quantities of items listed in the Bid Form shall be done by the Contractor. The measurement will include proper and complete documentation of all items to the satisfaction of the Owner and Engineer prior to the submission for payment. The measurement submitted shall be in the same unit description listed in the Bid Form.

3.3 PAYMENT

A. Payments shall be made to the Contractor only after proper documentation of the unit quantity provided and in accordance with the contract terms and conditions regarding payment.

B. Payment for Bid Items shall include full compensation for the complete installation of the complete product.

END OF SECTION

Engineers Joint Documents Committee
Design and Construction Related Documents
Instructions and License Agreement

Instructions

Before you use any EJCDC document:

1. Read the License Agreement. You agree to it and are bound by its terms when you use the EJCDC document.

2. Make sure that you have the correct version for your word processing software.

How to Use:

1. While EJCDC has expended considerable effort to make the software translations exact, it can be that a few document controls (e.g., bold, underline) did not carry over.

2. Similarly, your software may change the font specification if the font is not available in your system. It will choose a font that is close in appearance. In this event, the pagination may not match the control set.

3. If you modify the document, you must follow the instructions in the License Agreement about notification.

4. Also note the instruction in the License Agreement about the EJCDC copyright.

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The license is effective until terminated. You may terminate it at any time by destroying **EJCDC Design and Construction Related Documents** altogether with all copies, modifications and merged portions in any form. It will also terminate upon conditions set forth elsewhere in this Agreement or if you fail to comply with any term or condition of this Agreement. You agree upon such termination to destroy **EJCDC Design and Construction Related Documents** along with all copies, modifications and merged portions in any form.

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EJCDC warrants the CDs and diskettes on which **EJCDC Design and Construction Related Documents** is furnished to be free from defects in materials and workmanship under normal use for a period of ninety (90) days from the date of delivery to you as evidenced by a copy of your receipt.

There is no other warranty of any kind, either expressed or implied, including, but not limited to the implied warranties of merchantability and fitness for a particular purpose. Some states do not allow the exclusion of implied warranties, so the above exclusion may not apply to you. This warranty gives you specific legal rights and you may also have other rights which vary from state to state.

EJCDC does not warrant that the functions contained in **EJCDC Design and Construction Related Documents** will meet your requirements or that the operation of **EJCDC Design and Construction Related Documents** will be uninterrupted or error free.

Limitations of Remedies:

EJCDC's entire liability and your exclusive remedy shall be:

1. the replacement of any document not meeting EJCDC's "Limited Warranty" which is returned to EJCDC's selling agent with a copy of your receipt, or

2. if EJCDC's selling agent is unable to deliver a replacement CD or diskette which is free of defects in materials and workmanship, you may terminate this Agreement by returning EJCDC Document and your money will be refunded.

In no event will EJCDC be liable to you for any damages, including any lost profits, lost savings or other incidental or consequential damages arising out of the use or inability to use **EJCDC Design and Construction Related Documents** even if EJCDC has been advised of the possibility of such damages, or for any claim by any other party.

Some states do not allow the limitation or exclusion of liability for incidental or consequential damages, so the above limitation or exclusion may not apply to you.

General:

You may not sublicense, assign, or transfer this license except as expressly provided in this Agreement. Any attempt otherwise to sublicense, assign, or transfer any of the rights, duties, or obligations hereunder is void.

This Agreement shall be governed by the laws of the State of Virginia. Should you have any questions concerning this Agreement, you may contact EJCDC by writing to:

Arthur Schwartz, Esq.
General Counsel
National Society of Professional Engineers
1420 King Street
Alexandria, VA 22314

Phone: (703) 684-2845
Fax: (703) 836-4875
e-mail: aschwartz@nspe.org

You acknowledge that you have read this agreement, understand it and agree to be bound by its terms and conditions. You further agree that it is the complete and exclusive statement of the agreement between us which supersedes any proposal or prior agreement, oral or written, and any other communications between us relating to the subject matter of this agreement.

Contractor's Application For Payment No. _____

	Application Period:	Application Date:
To (Owner):	From (Contractor):	Via (Engineer)
Project:	Contract:	
Owner's Contract No.:	Contractor's Project No.:	Engineer's Project No.:

APPLICATION FOR PAYMENT

Change Order Summary

Approved Change Orders		
Number	Additions	Deductions
TOTALS		
NET CHANGE BY CHANGE ORDERS		

1. ORIGINAL CONTRACT PRICE	$	
2. Net change by Change Orders	$	
3. CURRENT CONTRACT PRICE (Line 1 ± 2)	$	
4. TOTAL COMPLETED AND STORED TO DATE (Column F on Progress Estimate)	$	
5. RETAINAGE:		
a. _____ % x $_____ Work Completed	$	
b. _____ % x $_____ Stored Material	$	
c. Total Retainage (Line 5a + Line 5b)	$	
6. AMOUNT ELIGIBLE TO DATE (Line 4 - Line 5c)	$	
7. LESS PREVIOUS PAYMENTS (Line 6 from prior Application)	$	
8. AMOUNT DUE THIS APPLICATION	$	
9. BALANCE TO FINISH, PLUS RETAINAGE (Column G on Progress Estimate + Line 5 above)	$	

CONTRACTOR'S CERTIFICATION

The undersigned Contractor certifies that: (1) all previous progress payments received from Owner on account of Work done under the Contract have been applied on account to discharge Contractor's legitimate obligations incurred in connection with Work covered by prior Applications for Payment; (2) title of all Work, materials and equipment incorporated in said Work or otherwise listed in or covered by this Application for Payment will pass to Owner at time of payment free and clear of all Liens, security interests and encumbrances (except such as are covered by a Bond acceptable to Owner indemnifying Owner against any such Liens, security interest or encumbrances); and (3) all Work covered by this Application for Payment is in accordance with the Contract Documents and is not defective.

By:	Date:

Payment of: $_____
(Line 8 or other - attach explanation of other amount)

is recommended by: _____ _____
(Engineer) (Date)

Payment of: $_____
(Line 8 or other - attach explanation of other amount)

is approved by: _____ _____
(Owner) (Date)

Approved by: _____ _____
Funding Agency (if applicable) (Date)

Progress Estimate

Contractor's Application

For (contract):	Application Number:
Application Period:	Application Date:

A		B	Work Completed		E	F		G
Item			C	D		Total Completed and Stored to Date (C + D + E)	% (F) B	Balance to Finish (B - F)
Specification Section No.	Description	Scheduled Value	From Previous Application (C + D)	This Period	Materials Presently Stored (not in C or D)			
	Totals							

Progress Estimate

Contractor's Application

For (contract):	Application Number:
Application Period:	Application Date:

A				B	C	D	E	F		G
Item		Bid Quantity	Unit Price	Bid Value	Estimated Quantity Installed	Value	Materials Presently Stored (not in C)	Total Completed and Stored to Date (D + E)	% (F) B	Balance to Finish (B - F)
Bid Item No.	Description									
	Totals									

Stored Material Summary

Contractor's Application

For (contract):							Application Number:		
Application Period:							Application Date:		
A	B	C	D		E		F		G
Invoice No.	Shop Drawing Transmittal No.	Materials Description	Stored Previously		Stored this Month		Incorporated in Work		Materials Remaining in Storage ($) (D + E - F)
			Date (Month/Year)	Amount ($)	Amount ($)	Subtotal	Date (Month/Year)	Amount ($)	
		Totals							

Change Order

No. _____

Date of Issuance: _____ Effective Date: _____

Project:	Owner:	Owner's Contract No.:
Contract:		Date of Contract:
Contractor:		Engineer's Project No.:

The Contract Documents are modified as follows upon execution of this Change Order:

Description:

Attachments: (List documents supporting change):

CHANGE IN CONTRACT PRICE:	**CHANGE IN CONTRACT TIMES:**
Original Contract Price: $_____	Original Contract Times: ☐ Working days ☐ Calendar days Substantial completion (days or date): _____ Ready for final payment (days or date): _____
[Increase] [Decrease] from previously approved Change Orders No._____ to No._____: $_____	[Increase] [Decrease] from previously approved Change Orders No._____ to No._____: Substantial completion (days): _____ Ready for final payment (days): _____
Contract Price prior to this Change Order: $_____	Contract Times prior to this Change Order: Substantial completion (days or date): _____ Ready for final payment (days or date): _____
[Increase] [Decrease] of this Change Order: $_____	[Increase] [Decrease] of this Change Order: Substantial completion (days or date): _____ Ready for final payment (days or date): _____
Contract Price incorporating this Change Order: $_____	Contract Times with all approved Change Orders: Substantial completion (days or date): _____ Ready for final payment (days or date): _____

RECOMMENDED:	ACCEPTED:	ACCEPTED:
By: _____ Engineer (Authorized Signature)	By: _____ Owner (Authorized Signature)	By: _____ Contractor (Authorized Signature)
Date: _____	Date: _____	Date: _____

Approved by Funding Agency (if applicable): _____ Date: _____

Certificate of Substantial Completion

Project:	Owner:	Owner's Contract No.:
Contract:		Date of Contract:
Contractor:		Engineer's Project No.:

This [tentative] [definitive] Certificate of Substantial Completion applies to:

☐ All Work under the Contract Documents: ☐ The following specified portions:

_____

_____

_____

_____

_____
Date of Substantial Completion

The Work to which this Certificate applies has been inspected by authorized representatives of Owner, Contractor and Engineer, and found to be substantially complete. The Date of Substantial Completion of the Project or portion thereof designated above is hereby declared and is also the date of commencement of applicable warranties required by the Contract Documents, except as stated below.

A [tentative] [revised tentative] [definitive] list of items to be completed or corrected, is attached hereto. This list may not be all-inclusive, and the failure to include any items on such list does not alter the responsibility of the Contractor to complete all Work in accordance with the Contract Documents.

The responsibilities between OWNER and CONTRACTOR for security, operation, safety, maintenance, heat, utilities, insurance and warranties shall be as provided in the Contract Documents except as amended as follows:

☐ Amended Responsibilities ☐ Not Amended

Owner's Amended Responsibilities:

_____

_____

_____

Contractor's Amended Responsibilities:

_____

_____

_____

The following documents are attached to and made part of this Certificate:

_____

_____

_____

This Certificate does not constitute an acceptance of Work not in accordance with the Contract Documents nor is it a release of Contractor's obligation to complete the Work in accordance with the Contract Documents.

_____ _____
Executed by Engineer Date

_____ _____
Accepted by Contractor Date

_____ _____
Accepted by Owner Date

SECTION 01200
MEETINGS

PART 1 GENERAL

1.1 PRECONSTRUCTION CONFERENCE

A. After the bids have been opened but prior to the start of the construction there will be a preconstruction conference to discuss the phasing and scheduling of the construction project. The specific time and place of the conference will be arranged by the Engineer after the Contract has been awarded.

1.2 PROGRESS MEETINGS

A. During the course of the construction project, the Contractor shall attend weekly meetings as scheduled by the Engineer at the field office of the Engineer. The attendance of subcontractors and suppliers may be required during the progress of the work. The Contractor's delegate to the meeting shall be prepared and authorized to discuss the following items:

1. Progress of Work in relation to Contract Schedule.
2. Proposed Work activities for forthcoming period.
3. Resources committed to Contract.
4. Coordination of Work with others.
5. Status of procurement of equipment and materials.
6. Status of Submittals.
7. Outstanding actions, decisions, or approvals that affect Work activities.
8. Security issues.
9. Quality Issues
10. Potential Claims
11. Contract Changes
12. Costs & Budget
13. Mitigation Measures

1.3 CPM MEETINGS

A. CPM meetings will be scheduled as detailed in Section 01311.

PART 2 PRODUCTS (Not Used)

PART 3 EXECUTION (Not Used)

END OF SECTION

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Submittal Procedures

B. Construction Progress Schedules

C. Proposed Products List

D. Shop Drawings

E. Product Data

F. Manufacturers' Instructions

G. Manufacturers' Certificates

1.2 SUBMITTAL PROCEDURES

A. Transmit each submittal through Providence Water's Project Management software.

B. Sequentially number the transmittal forms. Re-submittals to have original number with an alphabetic suffix.

C. Identify Project, Contractor, subcontractor or supplier; pertinent drawing sheet and detail number(s), and specification section number, as appropriate.

D. Apply Contractor's stamp, signed or initialed certifying that review, verification of products required, field dimensions, adjacent construction work, and coordination of information, is in accordance with the requirements of the work and Contract Documents.

E. Schedule submittals to expedite the Project, and deliver to Engineer at business address. Coordinate submission of related items.

F. Identify variations from Contract Documents and product or system limitations, which may be detrimental to successful performance of the completed work.

G. Provide space for Contractor and Engineer review stamps.

H. Revise and resubmit submittals as required, identify all changes made since previous submittal.

I. Distribute copies of reviewed submittals to concerned parties. Instruct parties to promptly report any inability to comply with provisions.

1.3 CONSTRUCTION PROGRESS SCHEDULES

A. Transmit each submittal through Providence Water's Project Management software.

B. Submit initial progress schedule in duplicate within ten (10) days after date established in Notice to Proceed for Engineer review.

C. Revise and resubmit as required.

D. Submit revised schedules with each Application for Payment, identifying changes since previous version.

E. Submit a horizontal bar chart with separate line for each major section of work or operation identifying first workday of each week.

F. Show complete sequence of construction by activity, identifying work of separate stages and other logically grouped activities. Indicate the early and late start, early and late finish, float dates, and duration.

G. Indicate estimated percentage of completion for each item of work at each submission.

H. Indicate submittal dates required for shop drawings, product data, samples, and product delivery dates, including those furnished by Owner and under Allowances.

1.4 PROPOSED PRODUCTS LIST

A. Transmit each submittal through Providence Water's Project Management software.

B. Within ten (10) days after date of Notice to Proceed, submit complete list of major products proposed for use, with name of manufacturer, trade name, and model number of each product.

C. For products specified only by reference standards, give manufacturer, trade name, model or catalog designation and reference standards.

1.5 SHOP DRAWINGS

A. Transmit each submittal through Providence Water's Project Management software.

B. Submit the number of opaque reproductions, which Contractor requires, plus copies which will be retained by Architect/Engineer.

1.6 PRODUCT DATA

A. Transmit each submittal through Providence Water's Project Management software.

B. Submit the number of copies, which the Contractor requires, plus copies which will be retained by the Engineer.

C. Mark each copy to identify applicable products, models, options, and other data. Supplement manufacturers' standard data to provide information unique to this project.

1.7 SAMPLES

A. Submit samples to illustrate functional and aesthetic characteristics of the product, with integral parts and attachment devices. Coordinate sample submittals for interfacing work.

B. Submit samples of finish from the full range of manufacturers' standard colors, textures and patterns for Engineer's selection.

C. Include identification on each sample, with full project information.

D. Submit the number of samples specified in individual specification sections.

E. Reviewed samples, which may be used in the work, are indicated in individual specification sections.

1.8 MANUFACTURERS' INSTRUCTIONS

A. When specified in individual specification sections, submit manufacturers' printed instructions for delivery, storage, assembly, installation, start-up, adjusting, and finishing, in quantities specified for product data.

B. Identify conflicts between manufacturers' instructions and Contract Documents.

1.9 MANUFACTURERS' CERTIFICATES

A. When specified in individual specification sections, submit manufacturers' certificate to Engineer for review, in quantities specified for product data.

B. Indicate material or product conforms to or exceeds specified requirements. Submit supporting reference data, affidavits, and certifications as appropriate.

C. Certificates may be recent or previous test results on material or product, but must be acceptable to Architect/Engineer.

PART 2 PRODUCTS

NOT USED

PART 3 EXECUTION

NOT USED

END OF SECTION

SECTION 01311 CONSTRUCTION
SCHEDULING

PART 1 GENERAL

1.1 PROGRAM DESCRIPTION

A. This project is part of a multi-contract project which requires close collaboration between the various contractors performing work. As such it is the intent of Providence Water to closely monitor the schedule between the various contracts to avoid conflicts where feasible.

B. The Contractor shall produce **Level 4 Control Level Schedules** to control the work of this Contract and to provide a definitive basis for determining job progress. The construction schedule and updates shall be prepared by the Contractor. All work shall be done in accordance with the established schedule and the Contractor, and his subcontractors shall be responsible for cooperating fully with the Engineer and the Owner in effectively utilizing the schedule.

C. Approval of the schedule by the Engineer is advisory only and shall not relieve the Contractor of responsibility for accomplishing the work within the contract completion date. Omissions and errors in the approved schedule shall not excuse performance less than that required by the Contract. Approval by the Engineer in no way makes the Engineer an insurer of the schedule's success or liable for time or cost overruns flowing from its shortcomings.

PART 2 PRODUCTS

2.1 PROJECT MANAGEMENT SOFTWARE

A. The Contractor shall be issued a license to utilize Providence Water's Project Management Software for this project. All schedule submittals shall be performed via that software. Email and/or paper submissions will not be allowed.

2.2 SCHEDULE SOFTWARE

A. The Contractor shall utilize industry standard scheduling software to produce the construction schedule. Software shall be at least MS Project, latest edition or equivalent.

PART 3 EXECUTION

3.1 SCHEDULE REVIEW PROCESS

A. Contractor shall be responsible for submitting a preliminary progress schedule and a preliminary schedule of values to the Engineer for approval ten (10) days prior to the commencement of any work and in accordance with Article 2 of the General Conditions.

B. Following the initial approved schedule, the Contractor shall provide updated weekly schedules to the Engineer for review and approval.

C. Failure of the Contractor to provide weekly schedules will result in liquated damages of $1000/week, which is the anticipated cost for the Engineer to produce the Contractor's schedule.

3.2 ENGINEER COORDINATION

A. The Engineer shall maintain a **Level 2 Master Schedule** for this contract and the related contracts for this project.

B. As noted previously, this project consists of multiple contracts with competing schedules, deadlines, and resource requirements. To that end the Engineer shall review each contract's schedule and compare the schedules against each other to identify potential conflicts. When a conflict is identified the Engineer shall bring the conflict to the attention of the concerned parties to attempt to negotiate in good faith for a period of not more than seven (7) calendar days a solution to the conflict. If a solution is not achieved through good faith negotiations within the time frame stated above, the Engineer shall have the authority to adjust the Contractor's schedule to eliminate the conflict. The Contractor shall not be entitled to additional money due to the schedule adjustment, but the Contractor may be entitled to additional contract time which will be addressed per the contract.

END OF SECTION

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Quality Assurance and Control of Installation

B. References

C. Field samples

D. Inspection and testing laboratory services

E. Manufacturers' field services and reports

1.2 RELATED SECTIONS

A. Section 01300 - Submittals

B. Section 01600 - Material and Equipment

1.3 QUALITY ASSURANCE AND CONTROL OF INSTALLATION

A. Monitor quality control over suppliers, manufacturers, products, services, site conditions, and workmanship to produce work of specified quality.

B. Comply fully with manufacturers' instructions, including each step in sequence.

C. Should manufacturers' instructions conflict with Contract Documents, request clarification from Engineer before proceeding.

D. Comply with specified standards as a minimum quality for the work except when more stringent tolerances, codes or specified requirements indicate higher standards or more precise workmanship.

E. Perform work by persons qualified to produce workmanship of specified quality.

F. Secure products in place with positive anchorage devices designed and sized to withstand stresses, vibration, physical distortion or disfigurement.

1.4 REFERENCES

A. Conform to reference standard by date of issue current on date of Contract Documents.

B. Obtain copies of standards when required by Contract Documents.

C. Should specified reference standards conflict with Contract Documents, request clarification from Engineer before proceeding.

D. The contractual relationship of the parties to the Contract shall not be altered from the Contract Documents by mention of inference otherwise in any reference document.

1.5 FIELD SAMPLES

A. Install field samples at the site for review, as required by individual specification sections.

B. Acceptable samples represent a quality level for the work.

C. Where field sample is specified in individual sections to be removed, clear area after field sample has been accepted by Engineer.

1.6 INSPECTION AND TESTING LABORATORY SERVICES

A. The Contractor shall submit names of all the firms to be utilized for testing and analytical services for approval by the Engineer. No results or observations will be accepted unless performed by an approved testing firm.

B. The testing firm will perform inspections, tests and other services specified in individual specification sections and as required by the Engineer.

C. Reports will be submitted by the testing firm to the Engineer, in duplicate, indicating observations and results of tests, and compliance or non-compliance with Contract Documents.

D. Cooperate with testing firm, furnish samples of materials, design mix, equipment, tools, storage, access, and assistance as requested.

1. Notify Engineer and testing firm seven (7) days prior to expected time for operations requiring services.
2. All costs associated with testing will be paid by the Contractor.

E. Re-testing required due to non-conformance to specified requirements, shall be performed by the same testing firm per instructions by the Engineer. Payment for re-testing will be paid by the Contractor with no additional cost to the Owner.

1.7 MANUFACTURER'S FIELD SERVICES AND REPORTS

A. Submit qualifications of observer to Engineer thirty (30) days in advance of required observations. Observer subject to approval of Engineer.

B. When specified in individual specification sections, require material or product suppliers or manufacturers to provide qualified staff personnel to observe site conditions, conditions of surfaces and installation, quality of workmanship, startup of equipment, testing, adjusting and balance of equipment as applicable, and to initiate

instructions when necessary.

C. Individuals to report observations and site decisions or instructions given to applicators or installers that are supplemental or contrary to manufacturers' written instructions.

D. Submit report in duplicate to Engineer for review via Providence Water's Project Management software within twenty-four (24) hours of observation.

PART 2 PRODUCTS

NOT USED

PART 3 EXECUTION

NOT USED

END OF SECTION

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Temporary Controls: Fencing, Barriers

B. Control and Diversion of Water and Dewatering

C. Erosion and Sediment Control

D. Dust Control

E. Noise Control

F. Pollution Control

G. Traffic Control

H. Progressive Cleaning

1.2 BARRIERS AND FENCING

A. Provide barriers to prevent unauthorized entry to construction areas to allow for owner's use of site and to protect existing facilities and adjacent properties from damage from construction operations.

B. Provide barricades and covered walkways required by governing authorities for public rights-of-way and for public access to existing buildings.

C. Provide protection for plant life designated to remain. Replace damaged plant life.

D. Protect non-owned vehicular traffic, stored materials, site and structure from damage and to minimize hazards to general public (i.e., curious nuisance).

1.3 CONTROL AND DIVERSION OF WATER AND DEWATERING

A. The Contractor shall be responsible for providing and maintaining all ditching, grading, sheeting and bracing, pumping and appurtenant work for the temporary diversion of water courses and protection from flooding as necessary to permit the construction of work in the dry.

1.4 EROSION AND SEDIMENT CONTROL

A. Baled hay shall be placed as shown on the plans or as directed by the Owner or the Engineer. They shall be held in place by two wooden stakes in each bale. Baled hay shall be maintained or replaced as they are disturbed, or until they are no longer necessary for the purpose intended, or are ordered removed by the Owner or the

Engineer.

B. The Contractor shall be responsible for installing and maintaining erosion and sedimentation control measures in accordance with applicable sections of the Rhode Island Soil Erosion and Sediment Control Handbook.

1.5 DUST CONTROL

A. Execute work by methods to minimize raising dust from construction operations.

B. Provide positive means to prevent airborne dust from dispersing into atmosphere, such as spraying water and/or calcium chloride.

1.6 NOISE CONTROL

A. The Contractor shall coordinate and schedule all work, which will contribute to increased noise levels in residential areas with the Owner. This shall be done with sufficient time to allow the Owner to notify the residents.

B. The Contractor shall work utilizing methods to minimize excess background noise whenever possible.

C. In no case shall work resulting in increased noise levels be performed prior to 7:00 a.m. or after 6:00 p.m., without written authorization of the Owner.

1.7 POLLUTION CONTROL

A. Provide methods, means, and facilities to prevent contamination of soil, water, and atmosphere from discharge of noxious, toxic substances, and pollutants produced by construction operations.

1.8 TRAFFIC CONTROL

A. The Contractor shall be responsible for the procurement of traffic people to control and protect pedestrians and traffic during the construction of the Contractor Work when so directed by the Engineer or when working on public rights-of-way.

B. The Contractor shall not be compensated for traffic people when the requirement for such has been made by the Owner, Engineer, or local public safety official. This shall be included in the Contractor's bid price.

C. Traffic control shall be provided in accordance with the Rhode Island Department of Transportation Manual on Uniform Traffic Control Devices.

1.9 PROGRESSIVE CLEANING

A. As project progresses, maintain areas free of waste materials, debris and rubbish. Interim measures shall be undertaken to maintain a clean site while work progresses.

B. Sweep all paved surfaces disturbed by construction activity daily and prior to opening to vehicular or pedestrian traffic.

PART 2 PRODUCTS

NOT USED

PART 3 EXECUTION

NOT USED

END OF SECTION

PART 1 GENERAL

1.1 DESCRIPTION

A. The Contractor shall provide all temporary facilities necessary for the proper completion of the work, as necessary and as specified.

1.2 CONTRACTOR'S FIELD OFFICE

A. The Contractor may maintain a temporary field office near the work for use during the period of construction at which readily accessible copies of all contract documents shall be kept. The office shall be located where it will not interfere with the progress of the work as approved by the Engineer. In charge of this office there shall be a competent superintendent of the Contract as specified in the Agreement, under Article CA 5.

1.4 WATER FOR CONSTRUCTION PURPOSES

A. The Contractor shall make arrangements with the Owner of the Utility to use available water supplies for construction purposes. Potable water is not currently available at the site, the Contractor shall coordinate with Providence Water on how to obtain Potable Water to the site.

B. The express approval of the Owner shall be obtained before water is used. Waste of water by the Contractor shall be sufficient cause for withdrawing the privilege of unrestricted use. Hydrants shall only be operated under the supervision of the Owner's personnel.

C. The Contractor is required to meter all water use and the Contractor will be charged for this use.

D. If a water ban is instituted, the Owner reserves the right to discontinue the Contractor's use of City water.

1.5 TEMPORARY HEAT

A. If temporary heat is required for the protection of the Work, the Contractor shall provide and install suitable heating apparatus, shall provide adequate and proper fuel, and shall maintain heat as required.

1.6 TEMPORARY ELECTRICAL

A. The Contractor shall make all necessary applications and arrangements and pay all fees and charges for electrical energy for power and light necessary for the proper completion of the Work and during its entire progress. The Contractor shall provide and pay for all temporary wiring, switches, connections, and meters.

B. The Contractor shall provide sufficient electric lighting so that all work may be done in a workmanlike manner when there is not sufficient daylight.

1.7 TEMPORARY FENCING

A. Provide commercial grade chain link fence to prevent trespass by workmen and suppliers onto private property and the public from the construction site. The contractor shall provide the Owner and the Engineer with copies of keys to enter the site.

1.8 PROJECT SIGNS

A. The Contractor shall provide signs constructed in accordance with other portions of the specifications (i.e. RIDEM permit signs). These signs shall be erected in a location selected by the Engineer. The Contractor shall maintain the signs throughout the duration of the project and remove them from the site when the Contract has been completed.

1.9 FIRE EXTINGUISHERS

A. Provide portable UL-rated, Class A fire extinguishers for all temporary offices and similar spaces. In other locations, provide portable UL-rated Class ABC dry chemical extinguishers a combination of NEPA recommended Classes for the exposure. Comply with NEPA 10 and 241 for classification, extinguishing agent and size required by location and class of fire exposure.

PART 2 PRODUCTS (Not Used)

PART 3 EXECUTION (Not Used)

END OF SECTION

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Products

B. Transportation and Handling

C. Storage and Protection

D. Product Options

E. Substitutions

1.2 PRODUCTS

A. Means new material, machinery, components, equipment, fixtures, and systems forming the work. Does not include machinery and equipment used for preparation, fabrication, conveying, and erection of the work. Products may also include existing materials or components required for reuse.

B. Do not use materials and equipment removed from existing premises, except as specifically permitted by the Contract Documents.

C. Provide interchangeable components of the same manufacturer for similar components.

1.3 TRANSPORTATION AND HANDLING

A. Transport and handle products in accordance with manufacturers' instructions.

B. Promptly inspect shipments to assure that products comply with requirements, quantities are correct, and products are undamaged.

C. Provide equipment and personnel to handle products by methods to prevent soiling, disfigurement, or damage.

1.4 STORAGE AND PROTECTION

A. Store and protect products in accordance with manufacturers' instructions, with seals and labels intact and legible. Store sensitive products in weather-tight climate-controlled enclosures.

B. For exterior storage of fabricated products, place on sloped supports, above ground.

C. Provide off-site storage and protection when site does not permit on-site storage or protection.

D. Cover products subject to deterioration with impervious sheet covering. Provide

ventilation to avoid condensation.

E. Store loose granular materials on solid flat surfaces in a well-drained area. Prevent mixing with foreign matter.

F. Provide equipment and personnel to store products by methods to prevent soiling, disfigurement, or damage.

G. Arrange storage of products to permit access for inspection. Periodically inspect to assure products are undamaged and are maintained under specified conditions.

H. All pipe shall be stored with both ends covered with plastic sheeting, secured in place against wind and precipitation.

1.5 PRODUCT OPTIONS

A. Products specified by reference standards or by description only shall mean any product meeting those standards or description.

B. Products specified by naming one or more manufacturers shall mean products of manufacturers named and meeting specifications; no options or substitutions allowed.

C. Products specified by naming one or more manufacturers, with a provision for substitutions, means that the Contractor shall submit a request for substitution for any manufacturer not named.

1.6 SUBSTITUTIONS

A. Instructions to Bidders specifies time restrictions for submitting requests for substitutions to requirements specified in this section, during the bidding period.

B. Substitutions may be considered when a product becomes unavailable through no fault of the Contractor.

C. Document each request with complete data, substantiating compliance of proposed substitution with Contract Documents.

D. A request constitutes a representation that the Contractor:

1. has investigated proposed product and determined that it meets or exceeds the quality level of the specified product;
2. will provide the same warranty for the substitution as for the specified product;
3. will coordinate installation and make changes to other work which may be required for the work to be complete, with no additional cost to the Owner;
4. waives claims for additional costs or time extension which may subsequently become apparent; and
5. will reimburse Owner for review or redesign services associated with re-approval by authorities.

E. Substitutions will not be considered when they are indicated or implied on shop

drawings or product data submittals, without separate written request, or when acceptance will require revision to the Contract Documents.

F. Substitution Submittal Procedure:

1. Transmit each submittal through Providence Water's Project Management software.
2. Submit copies or request for substitution for consideration. Limit each request to one proposed substitution.
3. Submit shop drawings, product data, and certified test results attesting to the proposed product equivalence.
4. The Engineer will notify Contractor, using Providence Water's project Management Software, of decision to accept or reject request.

PART 2 PRODUCTS

NOT USED

PART 3 EXECUTION

NOT USED

END OF SECTION

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Closeout Procedures

B. Final Cleaning

C. Adjusting

D. Project Record Documents

E. Warranties

F. Waiver & Release of Liens

G. Consent of Surety to Final Payment

H Spare Parts and Maintenance Materials

1.2 RELATED SECTIONS

A. Section 01400 - Quality Control

1.3 CLOSEOUT PROCEDURES

A. Using Providence Water's Project Management software, submit certification that Contract Documents have been reviewed, work has been inspected, and that work is complete in accordance with Contract Documents and ready for Engineer's inspection.

B. Provide submittals to Engineer that are required by governing, or other authorities.

C. Submit final Application for Payment identifying total adjusted Contract Sum, previous payments, and sum remaining due.

1.4 FINAL CLEANING

A. The Contractor shall leave all project areas in a condition equivalent to that prior to construction.

B. Clean debris from storage and staging.

C. Clean site, sweep paved areas, rake clean landscaped surfaces.

D. Remove waste and surplus materials, rubbish, and construction facilities from the site.

E. Remove erosion control material upon complete surface stabilization as determined by the Engineer.

1.5 ADJUSTING

A. Adjust operating products and equipment to ensure smooth and unhindered operation.

1.6 PROJECT RECORD DOCUMENTS

A. Specifications: Contractor shall legibly record at each product section, description of actual products installed, including the following:

1. Manufacturer's name and product model and number.
2. Product substitutions or alternates utilized.
3. Changes made by addenda and modifications.

B. Contractor shall provide as-builts using Providence Water's Project Management software, with but not limited to the following information:

1. Measured depths of structures in relation to datum on drawings.
2. Measured horizontal and vertical locations of underground utilities and appurtenances, referenced to permanent surface improvements.
3. Measured locations of internal utilities and appurtenances concealed in construction, referenced to visible and accessible features of the work.
4. Field changes of dimension and detail.
5. Details not on original Contract Drawings.

1.7 WARRANTIES

A. Provide all documents using Providence Water's Project Management software.

B. Execute and assemble documents from subcontractors, suppliers, and manufacturers.

C. Provide Table of Contents and assemble in order of specification section numbers.

D. Submit prior to final Application for Payment.

E. For items of work delayed beyond date of Substantial Completion, provide updated submittal within ten (10) days after acceptance, listing date of acceptance as start of warranty period.

1.8 WAIVER AND RELEASE OF LIENS

A. Contractor shall furnish to the Owner a Final Waiver and Release of Liens statement for the contract upon payment of the amount due for the Final Payment Application. The Final Waiver and Release of Liens shall accompany the final payment application upon submittal to the Owner.

1.9 CONSENT OF SURETY TO FINAL PAYMENT

A. The Contractor's surety shall provide a completed and executed "Consent of Surety to Final Payment" form as part of the contract closeout documents.

B. Deliver to the Owner with the Final Payment Application.

1.10 SPARE PARTS AND MAINTENANCE MATERIALS

A. Provide products, spare parts, maintenance and extra materials in quantities specified in individual specification sections.

B. Deliver to the Owner; obtain receipt prior to Final Payment.

PART 2 PRODUCTS

NOT USED

PART 3 EXECUTION

NOT USED

END OF SECTION

DIVISION 2

SITE CONSTRUCTION

PART 1 GENERAL

1.01 WORK INCLUDED

A. Furnish all labor, equipment, materials, and services necessary to excavate, remove, and legally dispose of any and all water mains encountered during progress of the work, including, but not limited to, asbestos cement, cast iron, ductile iron, and PVC mains; and coordination with Providence Water for the removal and legal disposal of all demolished materials from the project site as shown on the Contract Drawings and as specified herein.

B. Furnish all labor, equipment, materials, and services necessary to excavate, remove, and legally dispose of all piping and associated materials, including but not limited to, existing valves, valve boxes, hydrants, and other items to be removed and/or abandoned as shown on the Contract Drawings and as specified herein.

C. The work also includes removing and legally disposing of equipment, piping, valves, tanks, and appurtenances as shown and indicated on the drawings and as otherwise necessary to construct the work of this project, at no additional cost to the Owner.

1.02 RELATED SECTIONS

Section 02200 – Earthwork

1.03 QUALIFICATIONS

A. Disposal Firm: Company specializing in performing the work of this section with minimum 10 years' experience.

1.04 EXISTING CONDITIONS

A. Existing underground piping to be encountered may be a variety of materials including, but not limited to: asbestos cement, lead, copper, brass, cast iron, ductile iron, and PVC.

1.05 REGULATORY REQUIREMENTS

A. Safety and Health: Contractor shall acquaint itself and shall be responsible for all aspects of job site safety and health relating to the work of this section and shall be responsible for the safety and health of its employees. Hazards associated with this project may include, but may not be limited to corroded components, fire potential from cutting and welding, proximity of overhead electrical lines and other utilities, residences, businesses, streets, etc. Hazards may also include the potential presence of petroleum-impacted soils and of other hazardous substances including, but may not be limited to, lead pipe, lead impacted soil, and asbestos cement pipe.

B. Contractor shall prepare and submit to the Owner a site-specific Health and Safety Plan prior to the start of construction. Contractor shall be responsible for implementing all aspects of the Health and Safety Plan in accordance with local, State, and Federal regulations that may govern the work of this section. Contractor shall be responsible for providing appropriately trained employees to conduct the work and to address all site-specific health and safety

issues.

C. Compliance with Environmental Regulations: Contractor shall comply with all Federal, State, and local regulations concerning emissions, collection and disposal of all materials. Contractor shall furnish the Engineer and/or Owner verification in the form of manifest, weight tickets, and invoices of waste materials being properly transported and disposed.

D. Protection of Employees During Exposure Assessment: Until the exposure assessment has been completed and a final determination has been made, the following interim protective measures shall be implemented:

- Appropriate respiratory protection in accordance with OSHA respiratory requirements CFR 1910.134
- Appropriate protective clothing in accordance with OSHA requirements CFR 1926.62
- Change area, hand washing and decontamination facilities for the period during the exposure assessment, and until a final determination is made as to the exposure potential of employees to lead concentrations in excess of the Permissible Exposure Limit (PEL)

E. Contractor shall legally remove the steel from the site and reclaim or reuse the steel in accordance with all Federal, State, and local laws including United States Environmental Protection Agency (US EPA) and any applicable State and local regulations.

F. The Contractor is required to monitor working conditions at all times during construction and to provide appropriate protective clothing, equipment and facilities for personnel, and to establish workplace procedures to ensure their safety, and to enforce the use of these procedures, equipment and facilities in accordance with the requirements listed in the Contractor's Health and Safety Plan.

G. Site Cleanup: Contractor shall effectively clean up all miscellaneous debris and residue in and around the work area. This shall include, but is not limited to paint chips, tank clean out, and slag from cutting operations.

1.06 APPLICABLE CODES AND STANDARDS

A. As a minimum standard of quality and workmanship, demolition work is to comply with the latest edition of the following codes and standards insofar as they are applicable.

1. American Water Works Association (AWWA) Standards
2. American Institute of Steel Construction (AISC)
3. American Society for Testing and Materials (ASTM) Standards
4. Occupational Safety and Health Administration (OSHA) Standards
5. American National Standards Institute (ANSI) Standards
6. United States Environmental Protection Agency (US EPA)
7. United States Resource Conservation and Recovery Act (US RCRA)
8. American Society of Civil Engineers (ASCE)

1.07 SEQUENCING/SCHEDULING

A. Prior to any work being performed the Contractor shall initially coordinate with the Owner and Engineer and submit a plan and narrative sequence of work for review and approval.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION

A. The Contractor shall protect from damage and/or settlement all equipment, pipes, and appurtenances that are to remain or to be abandoned in, around, and adjacent to the demolition area. The means and methods of protection shall be provided by the Contractor at no additional expense to the Owner.

END OF SECTION

PART 1 GENERAL

1.01 DESCRIPTION

A. Clearing work is indicated on the Drawings and includes, but is not necessarily limited to:

1. Protection of existing trees to remain.
2. Removal and disposal of all surface debris and trash.
3. The felling of all trees, removal of stumps, roots, trees and branches, shrubs, and other vegetation in the area to be totally cleared.
4. Brush and tree trimmings shall be chipped and either dispersed into the area to remain or stockpiled for use during landscaping.

B. Related Work Described Elsewhere:

02200 – Earthwork
02900 – Landscaping

1.02 REFERENCES

A. Within this section the State of Rhode Island Standard Specifications for Road and Bridge Construction, latest revision, shall be referred to as the State Standards. All reference to measurement and payment are deleted.

1.03 QUALITY ASSURANCE

A. In addition to complying with all pertinent codes and regulations, comply with the requirements of those insurance carriers providing coverage for this work.

1.04 JOB CONDITIONS

A. Use all means necessary to prevent the spread of dust during performance of the work of this section; thoroughly moisten, with water only, all surfaces as required to prevent dust from being a nuisance to the public, traffic, neighbors and to the concurrent performance of other work on the site.

B. On-site burning will not be permitted.

PART 2 MATERIALS

2.01 FILL MATERIAL

A. Fill material for excavations, if required, shall be clean, dry sand as described in Section 02200, Earthwork.

2.02 OTHER MATERIALS

A. All other materials not specifically described but required for proper completion of the work of this section shall be as selected by the Contractor.

PART 3 EXECUTION

3.01 PREPARATION

A. Notify the Owner at least two (2) full working days prior to commencing the work of this section.

B. Site Inspection:

1. Prior to all work of this section, carefully inspect the entire site and all objects designated to be removed and to be preserved, and verify with the Owner.
2. Locate all existing active utility lines traversing the work areas and determine the requirements for their protection.

C. Protection of Existing Trees:

1. Provide temporary fencing or barricades as approved by the Owner to the nearest edge of trees to remain and be preserved.
2. Do not store construction materials, debris or excavated material within the protected areas at any time.
3. Do not permit vehicles within the protected areas.

3.02 TOTAL CLEARING

A. All trees that are to remain adjacent to the construction area shall be protected as noted above.

B. All trees, shrubs, and stumps shall be cleared and grubbed from the area within the work limits.

C. Felling of Trees: Immediately after felling a tree, cut branches, trunk and limbs, chip trimmings and remove from site.

3.03 CLEANUP

A. Remove all debris from the work areas and leave the site in a neat and orderly condition to the approval of the Owner.

B. Maintain all barriers protecting the areas to remain until immediately prior to the grassing operations.

END OF SECTION

PART 1 GENERAL

1.01 SUMMARY

A. Section Includes:

1. Requirements for designing, furnishing, installing, maintaining, operating and removal of temporary dewatering systems required to lower and control water levels and hydrostatic pressures during construction.
2. Requirements for disposing of pumped water.

1.02 DEFINITIONS

A. Dewatering: Lowering the zone of saturation and intercepting groundwater seepage, which would otherwise emerge from the slopes or bottom of the excavations. The purposes of dewatering are to increase the stability of excavated slopes; prevent loss of material from beneath the slopes or bottom of the excavation; improve the excavating and hauling characteristics of on site soil; prevent rupture or heaving of the bottom of an excavation; and dispose of pumped water. In addition, dewatering is required to place and compact structural fill.

1.03 DESIGN REQUIREMENTS

A. The Contractor is responsible for the adequacy of the dewatering system.

B. Design dewatering systems to:

1. Effectively reduce the hydrostatic pressure and lower the groundwater levels to a minimum of 2 feet below the bottom of excavation in soil;
2. Develop a substantially dry and stable subgrade for the protection of subsequent operations;
3. Result in no damage to adjacent buildings, structures, utilities and other work, included in this contract.
4. Depressurize stratified layers of sand that may be confined by silt layers so that a stable excavation bottom is maintained.

C. Methods may include sump pumping, single or multiple stage well point or jet eductor well point systems, deep wells, or combinations thereof.

D. Locate dewatering facilities where they will not interfere with existing utilities, facilities and/or construction work to be done under this Contract.

E. Contractor is responsible to obtain all necessary permits from state and local authorities regarding the operation and discharge of the dewatering system, and to conduct all necessary sampling and testing that may be required by those authorities.

1.04 SUBMITTALS

A. Shop Drawings

1. Submit the following prior to dewatering system installation:

a. Proposed system components.
b. Operational plan to include locations and depth of components.
c. Method of disposal of pumped water, including method of insuring proper sediment removal should an upset in the dewatering system occur.

B. Quality Assurance/Control Submittals – Dewatering Operation Plan

1. Submit the following:

a. Dewatering systems to be designed under the direct supervision of a professional Civil Engineer registered in the state which the work is to be done.
b. Complete the Certificate of Design at the end of this section.
c. Provide documentation demonstrating ability and experience of installing contractor for the type of conditions under this contract.
d. Names, addresses, and telephone numbers of supervisory personnel actively involved in at least five successful projects requiring dewatering that are similar to this project.

1.05 PROJECT/SITE CONDITIONS

A. Environmental Requirements

1. Dispose of all pumped water in accordance with local agencies having jurisdiction.

B. Existing Conditions

1. Groundwater Measurements have been made previously and are noted in the boring logs.
2. Groundwater surface is subject to fluctuations during periods of heavy precipitation.
3. Groundwater elevations from observation wells at the site are noted in the boring logs

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION

3.01 SITE PREPARATION

A. Surface Drainage

1. Construct dikes, ditches, pipelines, sumps or other means to intercept and divert precipitation and surface water away from excavations.

B. Drainage of Excavated Areas

1. Construct dikes, ditches, pipe lines, sumps or other means to collect surface and seepage water which may enter the excavation.

2. Discharge water through settling basins or method approved by Engineer when water is to be deposited into an existing watercourse.

3.02 INSTALLATION

A. Advise Engineer of changes made to Operation Plan as submitted under Article 1.4 of this section, made to accommodate field conditions.

3.03 MONITORING

A. Observe and record daily the elevation of the groundwater during the length of the dewatering operation and provide data to Engineer on daily basis.

3.04 OPERATION

A. Operate dewatering systems to lower the groundwater level in excavations allowing all subsequent work to be done on a stable dry subgrade.

B. Modify dewatering procedures, which cause, or threaten to cause, damage to new or existing facilities, to prevent further damage. Modifications made at no additional expense to the Owner.

F. Maintain the water level a minimum of two (2) feet below subgrade or at lower elevation to eliminate hydrostatic pressure on structures.

G. Prevent disturbance of foundation soils and loss of ground as water is removed.

H. Notify the Engineer of disturbance to the foundation soils caused by an interruption or inadequacy of the dewatering system.

I. Maintain on site, auxiliary equipment to operate the dewatering system continuously while excavations are opened below elevation of final grade.

3.05 DISPOSAL OF WATER

A. Discharge water in a manner that will not cause erosion, flooding, damage to existing facilities, completed Work or adjacent property, improved or otherwise.

3.06 REMOVAL

A. Remove all material and equipment from the site upon completion of dewatering operations.

B. Seal all dewatering wells upon completion of the dewatering by pressure injecting a grout capable of sealing the wells and preventing leakage.

END OF SECTION

CERTIFICATE OF DESIGN

Re: Contract Between

OWNER: _____
(Name)
and
CONTRACTOR: _____
(Name)
on
CONTRACT: _____
(Title)

_____ Dated:_____
(Number)

Contractor hereby certifies that_____
(Designer)

1. Is licensed or registered to perform professional engineering work in the state of

_____
(Location of Project)

2. Is qualified to design the_____
(Item)
specified in Section_____ of the subject contract;

3. Has designed_____before;

4. Has prepared the design in full compliance with the applications and requirements of Section_____ of subject contract including all applicable laws, regulations, rules and codes; and

5. The work has been signed and sealed pursuant to the applicable state law.

FOR: _____
(Contractor)

BY: _____
(Signature)

_____ Dated:_____
(Name and Title)

PART 1 GENERAL

1.01 DESCRIPTION

A. The Contractor shall properly design and furnish all labor and materials and shall construct complete, all sheeting, bracing supports, trench boxes, and appurtenances required to perform the Work including sheet piling for construction of structures and buildings, trench support and cofferdams, permanent and temporary alike, as indicated on the Drawings and specified or as otherwise directed by the Engineer or required by agencies having jurisdiction over the Work.

B. Wood timber or steel sheeting shall be used except where a trench box is used or where otherwise indicated, specified or directed by the Engineer and agencies having jurisdiction over the work.

1.02 DESIGN RESPONSIBILITY

A. The Contractor shall be fully responsible for providing complete and adequately designed sheeting as required and/or directed by the Engineer in accordance with the provisions set forth herein. The sheeting shall be designed to resist hydrostatic pressures in accordance with the Contractor’s dewatering design.

B. The Contractor shall engage, at no additional expense to the Owner, the services of a fully competent and qualified Professional Engineer, hereinafter referred to as the "Contractor's Engineer", registered in the State in which the Work is being constructed, for the design of all sheeting requirements to accomplish the Work specified, and for supervising the proper on-site installation associated therewith. The Contractor's Engineer shall be acceptable to the Engineer and demonstrate a minimum of ten (10) years documented experience in the field of sheeting design and implementation. Prior to the actual employment of the Contractor's Engineer, the Contractor shall submit to the Engineer, to the full extent deemed necessary, a detailed resume stating the Contractor's Engineer's professional qualifications, related experience and references, and if requested, examples of work similar to that required for the Work specified, for a general review by the Engineer and a means of documenting the requisite experience hereinbefore specified. Only after a satisfactory review of the Contractor's Engineer's overall qualifications by the Engineer in fulfillment of the requisite experience hereinbefore specified shall the Contractor finalize such employment and begin the design aspects of the Work.

C. The Contractor's attention is directed to the fact the acceptance of the Contractor's Engineer and/or his/her qualifications by the Owner and/or Engineer shall not be an overall approval of the Contractor's Engineer nor the sheeting designs and methods of installation employed during the Work. It being understood that all sheeting requirements necessary to accomplish the Work specified and/or indicated on the Drawings shall be designed by and installed under the direct supervision of the Contractor's Engineer who shall ultimately and fully bear the responsibility for that Work.

1.03 QUALITY ASSURANCE

A. The Contractor shall arrange and provide the services of the Contractor's Engineer to provide and maintain throughout the sheeting installation and/or Work sufficient supervision and technical guidance to the Contractor for proper sheeting materials, equipment, operations and methods to the extent necessary to assure strict compliance with the Contractor's Engineer's design, all safety procedures and standard requirements for such Work, and the successful completion of the Work. Failure to provide and/or maintain such supervision and/or technical guidance during the Work shall in no way relieve the Contractor from its overall responsibilities and obligations under the Contract, nor shall it be a basis for any claim against the Owner and/or Engineer.

B. The Contractor shall fully indemnify and save harmless the Owner and Engineer and their agents, employees and representatives, from and against any and all claims as stipulated under the Agreement, whether directly or indirectly arising out of, relating to or in connection with the Work of this section.

C. Quality assurances and proper safety procedures must be maintained at all times and be in strict accordance with the Contractor's Engineer's requirements and consistent with all federal, state and local regulatory agencies having jurisdiction over the Work. Should any conflict in requirements, regulations, restrictions or codes exist between that which is specified by the Contractor's Engineer and any federal, state or local agency, the more stringent application shall prevail.

1.04 PRODUCTS AND DESIGN CRITERIA

A. The overall sheeting design, quality of materials and methods of installation for all sheeting applications to accomplish the Work specified shall be consistent with the established standards of the construction industry and must, as a minimum, comply with the requirements for earth support systems for excavations as defined by current US Department of Labor, Occupational Safety and Health Act (OSHA) regulation applicable thereto, and any other federal, state and local agencies having jurisdiction and/or requirements pertaining thereto including Building Code requirements for the State in which the work is being performed. The design and implementation thereof shall be in accordance with sound engineering practice and modern accepted principles of soil mechanics, and shall include the effects of hydrostatic forces and all surcharge loads which may be reasonable anticipated. The methods employed shall be to the extent necessary to permit the proper and satisfactory installation and construction of the Work specified; to withstand all loads and forces encountered; to provide soil restraint and control of water as required; to insure the safety of the workers and all other personnel on or near the site; to prevent injurious caving or erosion, or loss of ground; to maintain at all times proper and safe pedestrian, vehicular traffic on public and private streets, property and rights-of-way; and to stabilize unforeseen areas of work encountered during the execution of the Work as deemed necessary by the Owner and/or Engineer.

B. The Contractor's attention is directed to the fact that should any additional investigations, subsurface explorations and/or other appurtenant information be required to fulfill the needs of this design, as determined by the Contractor's Engineer above and beyond that which is already provided under these Contract Documents, the Contractor shall obtain all such information and data required at his own expense.

1.05 SHOP DRAWINGS AND/OR DESCRIPTIVE LITERATURE

A. Prior to the installation of any sheeting, the Contractor shall submit to the Engineer for documentation ONLY, complete sheeting layout and detail drawings and sheeting descriptions bearing the Contractor's Engineer's State of **Rhode Island** Professional Seal and signature. Said submission shall be for informational purposes only as a means of documenting the work to be performed and will not be considered an approval or disapproval of the design and/or the implementation thereof. This submission will not relieve the Contractor of the sole responsibility for the adequacy of the system nor shall it be construed as an approval or guarantee that the Contractor's proposed equipment, materials and methods for the sheeting, bracing or appurtenances will be adequate for the work required at the locations of and for the Work required by this Contract.

B. Included as part of this submission, the Contractor's Engineer must provide a complete listing of all references, codes and specifications used by the Contractor's Engineer and required by any federal, state or local agency having jurisdiction, and to which the sheeting design conforms.

C. Specific design calculations are not to be submitted to the Engineer. In the event design calculations are submitted to the Engineer, they shall be returned to the Contractor without review nor checking by the Engineer.

1.06 CERTIFICATE OF DESIGN

A. The Contractor's special attention is directed to the required "Certificate of Design", the form of which is provided at the end of this Section. The Contractor and Contractor's Engineer shall complete this "Certificate" in its entirety for each location of work to be done, and any revisions associated there with, and submit it simultaneously with, as an integral part thereof, the sheeting submission. Any submission made without the completed "Certificate", appropriately signed and sealed, shall be returned to the Contractor. The Owner and/or Engineer hereby reserves the right to delay sheeting work and/or any work associated with, or dependent upon, the proper implementation of sheeting, without cause for claim against the Owner or Engineer, until a complete and appropriate submission is rendered. This Certification shall indicate that the sheeting, bracing and all appurtenances related thereto are designed to withstand the required loads, forces to be encountered, and to provide soil and water control, and are in compliance with these specifications and all federal, state or local agencies having jurisdiction over the Work to be performed.

PART 2 PRODUCTS (Not Used)

PART 3 EXECUTION

3.01 INSTALLATION

A. The Contractor shall be fully responsible for ensuring adequate safety measures are provided at all times and shall comply with all safety requirements of federal, state and local agencies having jurisdiction over the Work. Installation of the sheeting including all bracing, supports and appurtenances, shall be adequate to permit the performance of the Work and be in accordance with the requirements of the Contractor's Engineer and the sheeting design associated therewith.

B. Any movements of sheeting and/or appurtenances which prevent the proper completion of the work shall be corrected by the Contractor at no additional expense to the Owner.

C. Sheeting shall be installed in a manner which will prevent the disturbance of the surrounding surface, subsurface conditions and/or structures. Any such disturbances shall be corrected at the Contractor's expense and to the satisfaction of the Engineer.

3.02 REMOVAL

A. All excavation support to be permanently removed from the site when construction is complete. No sheeting shall be removed during construction except with specific written approval by the Engineer.

B. Sheeting shall be cut-off as directed by the Engineer.

C. All sheeting approved for removal by the Engineer shall become the property of the Contractor.

CERTIFICATE OF DESIGN

_____(Owner)

Contract Reference: _____

_____, dated _____.

In accordance with the provisions of the above referenced Contract, as the designated Contractor,

_____

_____
(Contractor's Name and Address)

hereby certifies that _____

_____
(Contractor's Engineer's Name and Address)

(1) Is properly licensed and currently registered as a Professional Engineer in the State (or Commonwealth) of _____;

(2) Is fully qualified to design and supervise the _____

_____
(Item of work and location)

In accordance with the provision specified under the appropriate Section and/or Subsections of the Contract Documents:

(3) Has successfully designed and supervised _____

_____
(Item of work)

before and demonstrates a minimum of ten (10) documented years of proven experience in such field;

(4) Has personally examined the type(s) and locations(s) of the Work required under this Contract, and the overall conditions associated therewith, to the extent necessary to fully satisfy his or her professional responsibilities for designing and supervising the above referenced work;

(5) Has prepared the attached design in full compliance with the applications and requirements of the Contract Documents, sound engineering practice, modern accepted principles of construction, and all applicable federal, state and local laws, regulations, rules and codes having jurisdiction over the Work;

(6) Will provide sufficient supervision and technical guidance to the Contractor throughout the Work to ensure compliance with the design and all quality assurances necessary to successfully complete the Work;

(7) Hereby indemnifies and holds harmless the_____

_____,
(name of owner)

and their agents, employees and representatives, from and against any and all claims, whether directly or indirectly, arising out of, relating to or in connection with the Work; and

(8) This "Certificate of Design" together with all applicable designs, drawings, details, specifications on other related documents necessary to complete the Work as specified, have been signed and sealed pursuant to applicable state law.

In recognition and observance of the above referenced statements, the undersigned parties hereby acknowledge and accept the responsibilities and obligations associated therewith.

CONTRACTOR:	CONTRACTOR'S ENGINEER:
_____	_____
(Contractor's Name)	(Engineer's Name)
_____	_____
By: _____	By: _____
_____	_____
(Name and Title)	(Name and Title)
Date: _____	Date: _____
(SEAL)	(P.E. STAMP)

(Note: Contractor to fully reference all attachments below)

_____

_____

_____

_____

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_____

_____

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_____

END OF SECTION

PART 1 GENERAL

1.01 WORK INCLUDED

A. The work under this section includes providing approved earth borrow, sand, bank run gravel, and gravel bedding, when directed for backfills and refills of excavations; excavation and disposal at approved locations of pavements, surplus and unsuitable materials; installation of underground water main piping; protection of new work; compaction of trench bottom, backfills and subgrades; excavation and backfilling of all other appurtenant work as required or as directed.

B. This work also includes the furnishing of all labor, equipment and materials, and performing all operations in connection with excavating rock/ledge less than 1 c.y. in volume.

C. The work also includes excavation and backfill relating to demolition work.

1.02 REFERENCES

A. Within this section, the State of Rhode Island Department of Transportation "Standard Specifications for Road and Bridge Construction", latest edition, shall be referred to as the State Standards.

B. American Society for Testing and Materials (ASTM) publications:

C136-76	Sieve or Screen Analysis of Fine and Coarse Aggregates
D422-63 (R 1972)	Particle Size Analysis of Soils
D1140-54 (R 1971)	Amount of Material in Soils Finer than No. 200 (74 micrometer) sieve
D1556-82	Density of Soil in Place by the Sand Cone Method
D1557-78	Moisture Density Relations of Soils and Soil-Aggregate Mixtures Using 10-lb (4.54 kg) Rammer and 18-in (457mm) Drop
D2167-66 (R1977)	Density of Soil in Place by the Rubber Balloon Method
D2419-74 (1979)	Test for Sand Equivalent Value of Soils and Fine Aggregates
D2487-83	Classification of Soils for Engineering Purposes
D2922-81	Density of Soil and Soil-Aggregate in Place by Nuclear Methods (Shallow Depth)

D3017-78 Moisture Content of Soil and Soil-Aggregate in Place by Nuclear Methods (Shallow Depth)

1.03 RELATED WORK SPECIFIED ELSEWHERE

Section 02060 – Demolition
Section 02211 – Rock Removal
Section 02616 – Ductile Iron Pipe and Fittings
Section 02640 – Valves and Appurtenances

1.04 LAWS AND REGULATIONS

A. All work under this Contract shall be accomplished in accordance with regulations of local, county, and State and Federal agencies, and national or utility company standards as they apply.

1.05 SUBSURFACE DATA

A. Test pits have been performed and the information is available to the Bidders. Upon notification to the Owner, the Bidders will be allowed the right to make any subsurface explorations they deem necessary to satisfy themselves of the existing ground conditions. Any subsurface investigation made by the Bidder shall be at their expense.

1.06 QUALITY ASSURANCE

A. Qualification of Workmen

Provide at least one person who shall be thoroughly trained and experienced in the skills required, who shall be completely familiar with the design and application of work described for this section, and who shall be present at all times during progress of the work of this section, and who shall direct all work performed under this section.

1.07 JOB CONDITIONS

A. All excavated earth materials approved by the Owner or the Engineer as suitable for reuse shall be used for backfilling excavations and for rough grading as necessary for the completion of the contract work. All surplus or unsuitable materials, rock from rock excavation, and boulders and pavement materials, shall be removed and legally disposed of off-site by the Contractor at no additional expense to the Owner.

B. Unsuitable Materials:

1. Unsuitable materials are herein defined as organic material, peat, organic silt or combinations thereof; and any existing materials of such gradation that more than 40% of its total weight passes the No. 200 sieve in a standard gradation analysis (ASTM D422). All materials of whatever description, which are too loose or saturated for use as backfill to provide satisfactory bearing, shall also be considered as unsuitable. Tests required to evaluate such conditions shall be made at the Contractor's expense. If unsuitable material is encountered at the depths indicated on the drawings for bottom limit of excavation, the Contractor shall immediately notify the Owner or the Engineer and shall not proceed further until instructions are given.

2. The Contractor shall satisfactorily excavate and remove all unsuitable material to lines, grades and limits indicated on the drawings or as directed in writing by the Owner or the Engineer, and shall legally dispose of such material off-site. All resulting below grade excavations shall be refilled with compacted common earth borrow.

C. Disposition of Existing Utilities:

1. Call Dig Safe seventy-two (72) hours before commencing with any excavation, in order that all pertinent utility companies become informed of such work.
2. If active utilities existing on the site are encountered they shall be carefully protected from damage. When an active utility line is exposed during construction, the Contractor shall document its location and elevation and notify in writing both the Engineer and the utility Owner notified in writing.
3. Active utility lines damaged in the course of construction operations shall be repaired or replaced at no additional cost to the Owner.

1.8 SUBMITTALS

A. Certified Laboratory Test Reports: Before delivery of materials, five (5) certified copies of the reports of all tests required herein, under materials and in referenced publications, shall be submitted to the Owner. These reports shall be submitted a minimum of ten (10) working days prior to the intended use of the materials on-site. The testing shall have been performed in an independent laboratory retained by the Contractor and approved by the Owner or the Engineer. Additional testing shall be submitted when the source of materials is changed.

PART 2 PRODUCTS

2.01 MATERIALS

A. Common borrow shall be a well-graded granular material of which at least 80 percent by weight shall be retained on the No. 200 sieve. It shall be free from peat, organic matter and debris, and shall not contain any stones or clay lumps in excess of 8 inches in their greatest dimensions. The Contractor shall submit a sample of the material he proposes to use as borrow backfill, together with results from an approved laboratory showing grain size analysis and proctor density relationships for those soils. Any materials of whatever description, are too uniformly graded or saturated to be readily compactable, shall be not utilized for earth borrow.

B. Structural backfill shall be composed of hard, durable stone and coarse to fine sand, free of peat, vegetable or organic matter, clay lumps and other debris. The gravel refill shall be readily compactable and shall not contain any stones that are in excess of two-thirds of the depth of the layer to be compacted. Structural backfill shall conform to the following gradation requirements:

U.S. Standard Sieve Size	Percent Passing by Weight
1"	55 – 100
No. 4	20 – 95

No. 40	0 – 50
No. 200	0 – 10

C. Pipe bedding shall conform to the requirements for State Standard "Gravel Borrow" with the exception that 100 percent shall pass the 1-1/2 inch mesh sieve or shall be approved 1-inch commercial grade crushed stone or gravel. Filter stone shall conform to all requirements of the State Standards for filter stone. Filter stone shall conform to the following gradation limits:

U.S. Standard Sieve Size	Percent Passing by Weight
1"	100
3/4"	75 – 85
1/2"	10 – 40
3/8"	0 – 20
No. 4	0 – 5

D. Crushed stone for pipe bedding shall consist of clean, hard, durable fragments of crushed rock and shall be free from clay, organic matter, or other objectionable material. Crushed stone shall conform to the following gradation limits:

U.S. Standard Sieve Size	Percent Passing by Weight
1"	100
3/4"	90 - 100
1/2"	20 – 50
3/8"	0 – 20
No. 4	0 – 5

E. Sand shall consist of clean, hard, durable particles not frozen, and conform to the following gradation requirements:

U.S. Standard Sieve Size	Percent Passing by Weight
3/8"	100
No. 4	80 – 100
No. 10	30 – 50
No. 40	5 – 25
No. 100	0 – 5

F. Except as otherwise specified, all fills, refills, and backfills within the project area, and for utilities and appurtenances, shall be made with gravel borrow or structural fill as hereinafter specified.

Gravel borrow sub-base for gravel roadways, utilities and pipe backfill, shall be composed of hard, durable stone and coarse to fine sand, not frozen and free from loam and undesirable organic matter, containing no stone having any dimension greater than two-thirds of the depth of layer to be compacted. Gravel borrow or bank-run gravel shall conform to the following gradation requirements:

U.S. Standard Sieve Size	Percent Passing by Weight
1"	55 – 100
No. 4	20 – 95
No. 40	0 – 50
No. 200	0 – 10

G. Initial backfill over pipes shall consist of a well-graded granular material of up to 1 inch in size. All material is to be devoid of stones (greater than 1 in.), sharp stones and crushed rock (larger than ¾ in.), lumps or frozen ground, and clayey materials that can be sensitive to water. Initial backfill material is to be placed to a minimum depth of 12 inches over the top of the pipe.

H. Final backfill over pipes shall be of good quality and be free of cinders, frozen materials, ashes, refuse, boulders, rocks, or organic material. Excavated native granular material free from perishable and objectionable objects and containing no stones larger than 6 inches in diameter shall be used for backfilling the trench as required.

I. Gravel for under structure base slabs shall conform to the following gradation:

U.S. Standard Sieve Size	Percent Passing by Weight
3/4"	100
3/8"	50 – 85
No. 4	25 – 75
No. 10	5 – 35
No. 40	0 – 10
No. 100	0 – 5

J. All refills and fills not supporting or influencing structures, pavement or utilities, shall be made with approved granular material containing sound stone, gravel and sand, free of frozen materials, silt, clay, vegetation, roots, peat, muck or other unsuitable matter.

K. The use of on-site materials for fills, refills or backfills within the building area will not be permitted unless representative samples have been tested and material meets the above gradation requirements. Additional material required for structure fill shall be provided from off-site sources and shall meet the above gradation requirements.

L. Cost for sampling, transporting and making all laboratory tests required to obtain characteristics of materials proposed to be used for fills, refills, backfills, including gradation tests and determination of moisture density relationships, will be borne by the Contractor.

PART 3 EXECUTION

3.01 GENERAL

A. All topsoil and unsuitable or excess materials shall be stripped to their entire depths from areas of new construction or regrading. Materials suitable for reuse shall be stored in approved locations that will not interfere with construction operations. Topsoil shall be stripped and stored before any underlying excavating is begun. Stripped topsoil to be reused shall be free from clay, large stones and debris. All unsuitable materials shall be excavated and legally disposed of off-site by the Contractor.

B. Earth excavation shall include the excavation, removal and satisfactory disposal of all materials of whatever nature encountered from within the limits indicated or specified or as directed by the Engineer or Owner in writing. It shall include, but not be limited to, earth materials such as peats, organic or inorganic silts, clay, sand and gravel, cobbles and boulders less than 1 cubic yard in volume, soft or disintegrated rock which, in the opinion of the Owner or the Engineer, can be removed without blasting or drilling, pavement, and all obstructions not specifically included in another section.

C. Slope sides of excavations to comply with local codes and ordinances having jurisdiction. Shore and brace, if required, to ensure the safety of workers and the general public. Dewater as needed for construction. Barricade all open excavations when not actively working in

them.

D. All excavation operations shall be accomplished to prevent the undermining or disturbance of existing pipelines, utilities and structures, of any completed construction.

E. All excavations shall be backfilled as specified.

3.02 EXCAVATION FOR STRUCTURES

A. Excavation under slabs shall be to the exact elevations required except as otherwise indicated on the drawings.

B. Additional Excavation. When excavation has reached required subgrade elevations, notify Engineer who will make an inspection of conditions.

1. If the "assumed" bearing materials, as shown on the drawings and specifications, are not encountered at the subgrade elevations indicated, carry excavations deeper and replace excavated material as directed by the Engineer.
2. Removal of unsuitable material and its replacement as directed will be paid on the basis of contract conditions relative to changes in work.

C. Excavation for Structures - Conform to elevations and dimensions shown within a tolerance of plus or minus 0.10 feet, and extending a sufficient distance from footings to permit placing and removal of concrete formwork, other construction and for inspection.

1. In excavating for footings, take care not to disturb bottom of excavation. Excavate by hand to final grade just before concrete reinforcement is placed. Trim bottoms to required lines and grades to leave solid base to receive other work.

D. Frost Protection:

1. Make no excavations to full depth indicated when freezing temperature may be expected. Protect the bottom so excavated areas remain free from frost if progress is delayed. Protect the subgrade of in-place footings from frost. Should protection fail, remove frozen materials and replace with concrete or gravel fill as directed, at no cost to the Owner.

3.03 EXCAVATION FOR UTILITIES

A. Excavation shall be made to the alignment, invert and finish grades shown on the drawings, or as modified by the Owner or the Engineer. Excavations shall be accurately graded to allow satisfactory construction of the contract work.

B. The bottoms of excavations shall be thoroughly compacted and in approved condition prior to placing gravel bedding. Gravel bedding shall be placed in layers not exceeding 6 inches in loose depth and each layer shall be compacted by at least two (2) passes of an approved plate-type vibratory compactor. The moisture content of the gravel shall be adjusted by moistening or drying so that proper compaction will be obtained. Where crushed stone bedding is used for pipe bedding, the Owner or the Engineer may waive the compaction requirement.

C. Bell holes and depressions for joints shall be dug after the trench bottom has been graded and

compacted, and after gravel bedding, if required, has been placed and compacted. The bottom quadrant of each pipe barrel shall have complete and uniform bearing for the full length of each pipe. The trench bottom shall again be thoroughly compacted just prior to final shaping for bedding and installation of pipe.

D. Excavation operations adjacent to and below existing structures and utilities shall be done manually and in a manner to prevent disturbance of, or damage to, the existing structures and utilities.

E. The Contractor shall be responsible for keeping all excavated and construction material a safe distance back from the edge of excavations to avoid overloading the sides of excavations and to prevent slides or cave-ins.

F. If an excavation is made deeper or wider than that shown on the drawings, there will be no extra payment for such unauthorized excavation, unless directed in writing by the Owner or the Engineer. Backfill of all unauthorized excavations shall be made by the Contractor with either selected materials from excavations or from borrow, as directed by the Owner or the Engineer, and at no expense to the Owner.

G. If a pipe is to be placed in fill, or the top of the pipe is within 2 feet of existing ground surface, the fill shall first be placed as specified herein to a height of not less than 2 feet over the top of the pipe and for a width of 5 feet beyond each side of the pipeline. Following placement of such fill, excavation and backfill shall proceed as specified herein.

H. Where the Contractor elects to use shoring installed as the excavation progresses, to maintain or otherwise protect the sides of the excavation from cave-ins or loss of ground, shoring shall be adequately braced to prevent cave-ins or loss of ground, and portions of the shoring or bracing shall be left in place as directed by the Engineer to maintain stability as backfilling progresses.

I. No excessive trench widths will be allowed to avoid the use of sheeting or shoring and bracing. The trench width for unbraced excavations at, and below, a level 1-foot above the top of the pipe, shall not exceed the maximum trench width indicated on the drawings for the size pipe being installed.

J. Where existing subsurface utilities, structures or other facilities adjacent to or crossing through the excavation require temporary support or protection, such temporary support or protection shall be satisfactorily provided by the Contractor at no additional expense to the owner. All necessary measures shall be taken by the Contractor to prevent lateral movement or settlement of existing facilities or of work in progress.

K. Grading shall be done as necessary to prevent surface water from flowing into excavations and, any water accumulating therein shall be removed by pumping or other approved method. The pipelines shall not, at any time, be used for trench drainage.

L. Excavations shall be adequately sheeted, shored and braced, as required, to permit proper excavation of the work and to protect all slopes and earth banks. Sheeting shall be installed as required to prevent cave-ins or settlement and to protect workmen, adjacent structures and utilities. Shoring and sheeting may be removed as the backfilling progresses, but only when banks are safe against caving. The Engineer may direct that sheeting, shoring and bracing be left in place at any time during the progress of the work, and direct that timber be used for

sheeting and bracing and authorized to be left in place and cut off at a specified elevation. In removing sheeting or bracing, care shall be taken to prevent voids. Voids, if formed, shall immediately be filled with sand. The installation of sheeting, shoring and bracing shall comply with the safety precautions as outlined in the Associated General Contractors of America, Manual of Accident Prevention in Construction, and all local, county, state and federal regulations. Dewatering shall be performed, as required, for all excavations below groundwater level.

3.04 ROCK EXCAVATION (over 1 c.y.)

A. All rock encountered with the limits of excavation shall be removed as may be required by the Owner or the Engineer to complete the work of this contract as shown on the drawings and as specified herein. No blasting will be permitted. Excavate for and remove rock by mechanical means.

B. Rock excavation shall include the excavation, removal and disposal of all boulders, 1 cubic yard or more in volume, and shall be in accordance with Section 02211, Rock Removal.

C. No separate or additional compensation shall be allowed for over breakage in rock excavation, nor for excavations in rock carried below the depths or beyond the lines indicated and/or specified, unless such additional excavation is specifically directed by the Engineer.

D. Where rock is encountered, it will be measured in cubic yards in its original position, prior to excavation, computed to the payment lines indicated or directed by the Owner or the Engineer.

E. When rock is encountered, the Contractor shall then notify the Engineer that the rock surface is ready for measurement. If the Contractor fails to give such notice, the Engineer will assume that the measurements taken at the time he first sees the material in questions will give the true quantity of excavation.

3.05 DEWATERING

A. Excavations may, to some extent, be below existing groundwater levels, causing the site to be subject to surface water and groundwater flow during the course of construction.

B. The Contractor shall control and pitch the grading to prevent water from running into the excavated areas of the structures or to prevent damage to other structures or work already accomplished.

C. The Contractor shall furnish all pumping and other dewatering equipment to keep excavated areas dry during construction. The groundwater shall be pumped adequately so that it is maintained a minimum of two (2) feet below the bottom of the excavation at all times. Filters shall be used on the dewatering devices to prevent the removal of fines from the soil. Water shall not be directed onto adjacent property.

D. Operation and Performance: Operate the dewatering system continuously, 24 hours per day, 7 days per week, until such time as construction work below existing water levels is complete, unless directed otherwise by the Engineer or Owner. Measure and record the performance of the dewatering system at the same time each day by use of suitable observation wells or piezometers installed in conjunction with the dewatering system. After placement of initial

slabs and backfill, the water level may be allowed to rise, but at no time is it to be higher than one (1) foot below the prevailing level of excavation or backfill.

3.06 BACKFILLING OF UTILITY TRENCHES

A. Unless directed otherwise by the Engineer, excavations shall not be backfilled until all work has been satisfactorily performed, and not until the work as installed conforms to all requirements specified in these sections. Each layer of backfill material shall be compacted in such a manner as to permit the proper and desired compaction of the filled excavation.

B. All excavations shall be backfilled as soon as practicable with approved excavated material. If suitable material as approved by the Engineer is not available from the excavations in the quantities required for proper backfilling of excavations, the Contractor shall provide approved bank-run gravel or earth borrow for backfills from off-site sources, as required.

C. Placement of gravel bedding shall be done in accordance with the following procedure:

1. The bottoms of excavations shall be thoroughly compacted and in approved conditions prior to placing gravel bedding. Gravel bedding shall be placed in layers not exceeding 4 inches in loose depth and each layer shall be compacted by at least two (2) passes of an approved plate-type vibratory compactor. The moisture content of the gravel bedding shall be adjusted by moistening or drying so that proper compaction will be obtained.
2. Gravel bedding shall be graded, compacted and shaped so that the full length of pipe barrel has complete and uniform bearing for the bottom quadrant of each pipe. Bell holes and depressions for joints shall be dug after the gravel bedding has been graded and compacted, and shall be the proper clearance for joining of pipes.
3. The Contractor shall exercise care in all operations to prevent disturbing joints, displacement of or damage to the pipes already installed. As the work progresses, the pipelines will be checked by the Engineer to determine whether any disturbance, displacement or damage has occurred. If inspection shows poor alignment, displaced or damaged pipe, disturbed joints or other defects, the Engineer shall require that all designated defects be remedied in a satisfactory manner by the Contractor at no additional expense to the Owner.

D. All other backfill placed in trenches below a level 12 inches above the top of pipe shall consist of selected backfill placed in layers not exceeding 4 inches in loose depths. Selected backfill shall be compatible materials as approved by the Engineer, not frozen, and free of clods or earth, stones larger than 2 inches in diameter, or unsuitable materials. The selected backfill shall be deposited uniformly on both sides of the pipe and shall be thoroughly compacted by tamping under and on each side of the pipe to provide uniform support around the pipe, free from voids.

E. The balance of backfill in trenches shall be compatible materials as approved by the Engineer, not frozen, and without any stones larger than 8 inches in their greatest dimension. All trench backfilling shall be carefully placed to avoid disturbance of new work and of existing utilities or structures. The moisture content of backfill shall be such that proper compaction will be obtained. Trench backfill shall be compacted to the minimum densities specified hereinafter. Unless otherwise approved by the Engineer in writing, the trench backfill shall be spread in layers not exceeding 12 inches in loose depth, and each layer shall be compacted by at least four (4) passes of an approved plate-type vibratory compactor. It is the responsibility of the

Contractor to assure that the minimum specified densities are obtained. Puddling or jetting of backfill with water will not be permitted.

F. During filling and backfilling operations, pipelines will be checked by the Engineer to determine whether any displacement of the pipe has occurred. If the inspection of the pipelines shows poor alignment, displaced pipe or any other defects, the defects designated by the Engineer shall be remedied in a satisfactory manner by the Contractor at no additional expense to the Owner.

G. Any backfill that fails to comply with the minimum density requirements specified hereinafter shall be re-compacted or, if necessary, removed to the limits directed by the Engineer. The trench shall then be refilled with approved materials and by approved methods. The backfill shall be compacted by approved methods to the minimum requirements specified hereinafter. The Contractor at no additional expense to the Owner shall perform all of this work.

H. After backfilling trenches the Contractor shall maintain the filled surfaces in good condition, with a smooth surface level with adjacent undisturbed surfaces. Any subsequent settling shall be immediately repaired by the Contractor in a manner satisfactory to the Owner and the Engineer, and such maintenance shall be provided by the Contractor for the remainder of this contract at no additional expense to the Owner.

I. The finished surfaces of filled excavations shall be compacted and reasonably smooth, and free from surface irregularities. Subgrade upon which either topsoil is to be placed, or pavements are to be constructed, shall be maintained in a satisfactory condition until the finish courses are placed. The storage or stockpiling of materials on finished subgrade will not be permitted.

J. Prior to placing base course material in areas to be paved, all soft or unsuitable material shall be removed and replaced with suitable material from excavation or earth borrow, as approved by the Engineer. All low sections, holes or depressions shall be brought to the required grade with material approved by the Engineer. The entire surface shall be shaped to line, grade and cross-section and thoroughly compacted.

3.07 COMPACTION

A. Fills placed under pavements such as roadways, parking lot subbase and utilities, shall be compacted to not less than 95 percent of the ASTM maximum dry density.

B. Backfill material shall be placed in lifts no greater than 6 inches and compacted to 95 percent of maximum density under slabs and 95 percent of maximum density under footings. Maximum density will be determined by AASHTO T-180 Method A or D. Density of soil in place will be determined by AASHTO T-191 or by a nuclear moisture density gauge approved by the Engineer. The method of correcting for oversize particles in soil compaction test results shall conform to AASHTO T-224-671.

C. All disturbed in-situ material shall be compacted to 95 percent of maximum density under slabs and footings. Maximum density will be determined by AASHTO - T-180 Method A or D. Density of soil in place will be determined by AASHTO T-191 or by a nuclear moisture density gauge approved by the Engineer.

D. All percentages of compaction specified herein shall be related to the maximum dry density as established by Method D, ASTM D1557-70, and verified in the field by ASTM D1556-68, D2167-66 or an approved nuclear density testing device. Prior to placing, at least one (1) laboratory test shall be made on a representative sample of each of the fill and backfill materials proposed to be furnished for the earthwork operations to determine gradation and moisture density characteristics. The Contractor shall arrange and provide the services of a geotechnical engineer, approved by the Engineer, to perform laboratory tests on samples of fill an backfill material proposed to be used by the Contractor for earthwork operations, and to perform field density tests.

E. Field density tests to determine the actual in-place densities being attained will be made at no additional expense to the Owner and in sufficient quantity to determine that the required compaction is being attained, but in no case less than the following frequency:

1. Trench bedding and backfill: One test for each compacted backfill layer in each section of trench. For trenches greater than 50 feet in length, provide one test every 50 feet for each compacted backfill layer.
2. Under foundation slabs or paved areas: One test per 5,000 square feet but no less than 3 tests per lift.

All retesting necessitated due to failure of the backfill to comply with the minimum percent of compaction shall be performed at no additional expense to the Owner.

F. Where vibratory compaction equipment is specified herein, or is directed to be used by the Engineer, all such equipment whether plate-type or roller shall be furnished with a vibrating surface at least 24-inches in width and capable of operating at a minimum of 2,000 blows per minute. Equipment not specifically designed as vibrating compaction equipment shall not be permitted for compaction of either existing in-place materials or of fills, refills and backfills. Jackhammers, rubber-tired vehicles and similar equipment not specifically designed and manufactured for the compaction of granular materials will not be approved for use.

G. Surfaces to be compacted, unless otherwise specified, shall be compacted by not less than six (6) complete passes of the approved vibratory compactors in order to obtain the required percentage of compaction. A complete pass shall consist of the entire coverage of the surface area to be compacted with one trip of the equipment. Each trip of the equipment shall overlap the previous trip by at least one (1) foot.

H. Dumping, spreading, preparing and compacting of several layers of fill material across the site may be performed simultaneously, providing there is sufficient total area to permit these operations to proceed in a systematic manner.

I. No rolling equipment shall be used to compact fill, refill or backfill material within four (4) feet of the vertical faces of any concrete walls or utility pipes. Plate vibratory tampers shall be used in these restricted areas and in other areas too confined to satisfactorily use rolling equipment.

J. It is the intent of these compaction requirements that the minimum in-place dry density of the compacted materials resulting from the specified minimum number of passes of the compaction equipment will be equal to or greater than the minimum percentages specified herein. Additional passes of the specified equipment shall be required if the minimum in-

place dry densities, as specified, are not obtained with the minimum passes indicated.

3.08 PROTECTION OF EXISTING UTILITIES AND STRUCTURES

A. Excavation and backfill operations shall be done in such a manner to prevent cave-ins of excavations or the undermining, damage or disturbing of existing utilities and structures or of new work. Backfill shall be placed and compacted so as to prevent future settlement or damage to existing utilities and structures and new work.

B. Any excavations improperly backfilled or where settlement occurs shall be reopened to the depth required then refilled with approved materials and compacted, and the surface restored to the required grade and condition, at no additional expense to the Owner.

C. Any damage due to excavation, backfilling or settlement of the backfill, or injury to persons or damage to property occurring as a result of such damage shall be the responsibility of the Contractor. All costs to repair such damage, in a manner satisfactory to the Owner and the Engineer, shall be borne by the Contractor at no additional expense to the Owner.

3.09 TEST PITS

A. Test pits shall be dug by the Contractor at the locations selected, and to the dimensions directed by the Engineer, for compaction testing or to establish locations of existing pipelines or any other buried item for which the exact location is to be determined. The excavation, protection and backfilling of test pits shall be in accordance with the provisions of this section. Test pits shall be backfilled with approved materials and compacted to the densities specified.

END OF SECTION

PART 1 GENERAL

1.01 WORK INCLUDED

A. Removal and disposal of identified rock, ledge, and boulders previously identified and discovered during excavation for utilities and structures.

B. Mechanical trench rock removal.

1.02 RELATED WORK

A. Section 02200 – Earthwork

1.03 SHOP DRAWINGS

A. Submit shop drawings under provisions of Section 01300, Submittals.

1.04 UNIT PRICES

A. Rock Measurement: Volume of rock actually removed, measured in original position, but not to exceed the following:

1. 24 inches outside of concrete forms other than at footings.
2. 12 inches outside of concrete forms at footings.
3. 12 inches outside of minimum required dimensions of concrete cast against grade.
4. 6 inches beneath bottom of concrete slabs on grade.
5. 12 inches beneath water mains.

B. Unit prices for rock excavation include replacement with approved materials.

C. Rock and Boulders less than one (1) cubic yard in size that require removal and replacement with common borrow and/or imported material shall not be considered for payment. The cost for removal and replacement of rock and boulders less than one (1) cubic yard in size is considered incidential to the work.

PART 2 PRODUCTS

2.01 MATERIALS

A. Rock: Rock material in beds, ledges, unstratified masses, and conglomerate deposits and boulders of rock material exceeding 1 c.y. for bulk excavation, footing, trench, and pit excavation that cannot be removed by rock excavating equipment equivalent to the following in size and performance ratings, without systematic drilling, ram hammering, ripping or blasting:

1. Excavation of Footings, Trenches, and Pits: Late-model, track-mounted hydraulic excavator; equipped with a 42-inch wide, short-tip-radius rock bucket; rated at not less than 120-hp flywheel power with bucket-curling force of not less than 25,000 lbf and stick-crowd force of not less than 18,700 lbf; measured according to SAE J-1179.

2. Bulk Excavation: Late-model, track-mounted loader; rated at not less than 210-hp flywheel power and developing a minimum of 45,000-lbf breakout force; measured according to SAE J-732.

PART 3 EXECUTION

3.01 INSPECTION

A. Verify site conditions and note irregularities affecting work of this section.

B. Beginning work of this section means acceptance of existing conditions.

3.02 ROCK AND BOULDER REMOVAL

A. Where rock or boulders are exposed on the sides, or in the bottom, of excavations, they shall be wholly or partially removed as specified or directed. Rock and boulders shall be removed to not less than the trench width payment lines indicated, to not less than two (2) feet outside structure walls, and to not less than twelve (12) inches below the underside of pipes or six (6) inches below the underside structure foundation slabs.

B. Depressions resulting from the removal of boulders shall be refilled with approved compacted gravel bedding, earth borrow or other excavated material as directed. Unauthorized excavations in rock or excavations made beyond the indicated or directed limits, shall be refilled with approved compacted gravel bedding or earth borrow as directed by, and at no expense to, the Owner.

3.03 ROCK REMOVAL – MECHANICAL METHOD

A. Excavate for and remove rock by the mechanical method.

B. Cut away rock at excavation bottom to form level bearing.

C. Remove shaled layers to provide sound and unshattered base for footings and base slabs.

D. In utility trenches, excavate to 6 inches below invert elevation of pipe and 24 inches wider than pipe diameter.

E. Remove excavated material from site and stockpile at location determined by Owner.

F. Correct unauthorized rock removal in accordance with backfilling and compaction requirements of Section 02200.

3.05 FIELD QUALITY CONTROL

A. Provide for visual inspection of bearing surfaces and cavities formed by removed rock.

B. The Contractor is to notify the Engineer prior to construction of any structures within the rock excavation for approval.

END OF SECTION

PART 1 - GENERAL

1.1 WORK INCLUDED

A. The work included for erosion control shall include but not necessarily be limited to:

1. Furnishing and installing straw bales, silt fence, swales, soil berms, mulches, grasses, channels, crushed stone, rip-rap, filter fabric drainage inlet protection, grading to control runoff and all other devices required to control erosion from the limits of the contract areas onto adjacent downgradient areas.
2. Continual maintenance of all installed devices to control erosion.
3. Removal and clean-up.

1.2 RELATED SECTIONS

Section 02200 – Earthwork

1.3 SUBMITTALS

A. Implementation Plan

Prior to commencement of the Work, the Contractor shall:

1. Meet with the Engineer to develop mutual understandings relative to compliance with the provisions of this Section and administration of the erosion and sedimentation control program.
2. Should the Contractor desire to change or modify the specified erosion controls, Contractor shall submit in writing his plans to the Owner and Engineer for implementing erosion and sediment control including, but not limited to, placement of straw bales, silt fence, containment berms, temporary channels, and settling ponds, as well as a description of all construction techniques intended to minimize erosion and sedimentation, and a program for maintenance of these facilities throughout the performance of construction activities.
3. The Contractor, should he desire to modify the specified plan, shall submit to the Owner and Engineer a detailed erosion and sedimentation plan for approval at least two weeks prior to initiation of work.

1.4 APPLICABLE REGULATIONS

A. In order to prevent erosion and sedimentation from construction activities related to the performance of this project, the Contractor and his subcontractors shall comply with all permits issued for this project, all applicable Federal, State, and local laws and regulations concerning erosion and sediment control, as well as the specific requirements stated in this Section and elsewhere in the Specifications.

1.5 DESIGN CRITERIA

A. Conduct all construction in a manner and sequence that causes the least practical disturbance of the physical environment.

B. Stabilize disturbed earth surfaces in the shortest practical time and employ any and all such temporary erosion control devices as may be necessary until such time as adequate soil stabilization has been achieved or permanent erosion control devices are operational.

C. The erosion control devices specified herein represent the minimum required work for erosion control. The Contractor shall add to these minimum devices any and all measures to effectively prevent migration of sediment from the limits of the work area.

D. Within this section, the Rhode Island Soil Erosion and Sediment Control Handbook prepared by the U.S. Department of Agriculture Soil Conservation Service and the R.I. Department of Environmental Management shall be the guideline of analysis and the standard source for control measures.

PART 2 - PRODUCTS

2.1 STRAW BALES

A. Bales shall be made of straw or hay with forty pounds minimum weight and one hundred and twenty pounds maximum weight. They should be either wire bound or string tied. Wood stakes shall be a minimum of 2 inches by 2 inches nominal size by a minimum of 3 feet long. As an alternate, 1-inch diameter steel rods or steel reinforcing bars may be used.

2.2 SILT FENCE

A. Silt fences or sedimentation barriers shall consist of wood posts with industrial support netting and sediment control filter fabric attached. It shall be placed as shown on the Contract Drawings. The cost of this work shall include the periodic maintenance of these materials and the ultimate removal upon completion of the project.

B. The filter fabric material shall be type #3401, as manufactured by R.I. Dupont de Nemours & Co., Mirafi #100 as manufactured by Celanese Fibers Marketing Co. Inc., Bidim C-28 or C-34 manufactured by Monsanto Co., or an approved equivalent. The posts shall be at least 4.5 feet long and control fabric shall be at least 3 feet minimum to 8 feet maximum wide.

2.3 EROSION NETTING

A. Erosion netting of erosion control blanket shall be a machine-produced 100% biodegradable mat with an agricultural straw fiber matrix with a typical functional longevity of approximately 12 months. The blanket shall be of consistent thickness with the straw evenly distributed over the entire area of the mat. The blanket shall be covered on the top and bottom sides with 100% biodegradable natural woven fiber netting.

B. The straw erosion control blanket shall be S150BN as manufactured by North American Green or approved equivalent.

2.4 COMPOST FILTER TUBES

A. A compost-filled filter tube for filtering suspended sediments from storm water flow. Material for the filter tubes shall be compost per the manufacturer's recommendations, except no manure or bio-solids shall be used. In addition, no kiln-dried wood or construction debris shall be allowed. Tubes shall be a minimum of 12" and a maximum of 18" in diameter. Tube Material shall be a knitted mesh with 1/8" – 3/8" openings and shall be made of biodegradable materials. Photodegradable (HDPE or polypropylene) fabric may be used. All material must be removed and disposed of by the contractor, at his expense, at the end of the contract. Additional tubes shall be used at the direction of the Engineer. Filter tubes shall be Filtrexx Siltsoxx or approved equivalent.

PART 3 - EXECUTION

3.1 GENERAL EROSION CONTROL REQUIREMENTS

A. All materials and installation shall be in accordance with the Contract Drawings. In the event that the Contract Drawings do not show all erosion controls required by applicable Federal, State, or local regulations, the Contractor shall install all said erosion controls to comply with applicable regulations. Additional controls installed in this manner, which are not shown on the Contract Drawings, shall not be a basis for additional monies for the Contractor.

B. The Owner has the authority to control the surface area of each material exposed by construction operations and to direct the Contractor to immediately provide permanent or temporary erosion control measures to prevent contamination of adjacent streams, watercourses, lakes, ponds, or other areas of water impoundment. Every effort shall be made by the Contractor to prevent erosion on the site and abutting properties.

C. All slopes shall be stabilized by mulching, seeding, erosion netting, or otherwise protected as the work progresses to comply with the intent of this specification. All damaged slopes shall be repaired as soon as possible. The Owner shall limit the surface area of earth material exposed if the Contractor fails to sufficiently protect the slopes to prevent erosion.

D. The Contractor shall have the necessary materials and equipment on hand at all times to provide for early slope stabilization and corrective measures to damaged slopes.

E. Erosion controls installed by the Contractor shall be maintained by the Contractor, and such installations shall be removed upon completion of the work or if ordered by the Owner or Engineer.

F. The Contractor shall operate all equipment and perform all construction operations so as to minimize erosion. The Contractor shall cease any operations which will increase erosion during rainstorms.

G. The Contractor shall place additional erosion and sedimentation controls as required by laws and regulations.

3.2 STRAW BALE INSTALLATION

A. Bales shall be set lengthwise on the contour for sheet flow applications. They shall be held in place by two wooden stakes in each bale as detailed on the Contract Drawings. Bales shall be maintained or replaced until they are no longer necessary for the purpose intended or are ordered removed by the Owner or Engineer.

B. Bales shall be set with bindings parallel to grade and entrenched to a minimum depth of 4 inches. Stakes shall be driven a minimum of 12 inches into the ground and cut off flush with the top of the bale.

C. After the bale lines are staked, the end joints shall be chinked with loose straw to close any gaps. Excavated soil shall then be backfilled against the uphill side of the barrier to a depth of 4 inches above the downhill grade.

D. Following compaction of the backfill, loose straw shall be scattered over the surface directly behind the barrier.

E. Straw bale checks should be placed in diversions generally at 50-foot intervals and in accordance with the detail on the Contract Drawings. Sediment shall be removed from behind the checks when it has accumulated to one-half the original height of the bale check measured at the low point.

3.3 SILT FENCE INSTALLATION

A. Silt fence shall be installed utilizing posts a minimum of 4.5 feet long, staked at least 8 feet on center. Prior to installation, a 6-inch by 6-inch anchor trench shall be installed at the base of the fence and the final height will be a minimum of 2 feet.

3.4 COMPOST FILTER TUBES

A. Compost filter tubes shall be installed and filled in accordance with project details and manufacturer’s recommendations.

3.5 DIVERSIONS

A. Diversions for directing surface runoff away from and/or around trenching and other construction operations shall be installed and stabilized in advance of new work. The Contractor shall select the cross-section shape (parabolic, vee-shaped, or trapezoidal) such that the equipment on-site will be available for as needed maintenance.

B. The minimum capacity of the diversion shall be sized to accommodate a 2-year design storm.

C. Periodic cleaning shall be done to maintain capacity.

3.6 REMOVAL AND CLEAN-UP

A. All temporary erosion control facilities and accumulated sediments shall be removed in a neat and workmanlike manner when all disturbed areas have been satisfactorily stabilized.

B. All debris removed, sediments, and other earth materials shall not leave the project site, but shall be hauled to and stockpiled at a location approved by the Owner. All loading, hauling, and stockpiling shall be performed by the Contractor at no additional expense to the Owner.

3.6 DEWATERING DISCHARGES

A. All pumped discharges and surface water flow from work areas shall be passed through a filter barrier of straw bales before being discharged into gutters, ditches, drainage swales, storm sewer systems, wetlands, natural water bodies, streams, or rivers. The method of all such discharges shall be subject to the approval of the Owner. The sizing of sedimentation basins, if required, shall provide for a maximum velocity of 1 ft/s.

END OF SECTION

PART 1 GENERAL

1.01 SCOPE

A. The work specified in this section includes the installation, maintenance, and removal of perimeter erosion controls, check dams, temporary dewatering basins, storm drain protection, stilling basins for water pollution control, and construction accesses. Soil erosion and sediment controls shown on the Plans shall be installed by the Contractor. Some soil erosion and sediment controls specified herein may or may not be shown or detailed on the Drawings, but may be utilized by the Contractor. Soil erosion and sediment controls not detailed on the Plans shall be in accordance with this specification and the Rhode Island Department of Environmental Management Regulations. The methods described in this section are approved means for soil erosion and sediment control, the actual means and methods shall be determined by the Contractor. The Contractor shall be responsible for preparing and establishing a stormwater pollution prevention plan at each work site for approval by the Engineer.

B. Related Work Described Elsewhere:

1. Section 02200 - Earthwork

1.02 GENERAL REQUIREMENTS

A. Perimeter Erosion Controls: Work shall consist of the provision of perimeter erosion controls in conformance with the dimensions and details indicated on the Drawings, all in accordance with these Specifications. Perimeter erosion controls consist of the following two types:

1. Baled Hay Erosion Checks. Baled hay erosion checks shall consist of baled hay or straw, each bale of which is embedded and attached to the ground with wood stakes, and are constructed as indicated on the Drawings.
2. Silt Fence. Silt fencing shall consist of oak fence posts to which are attached industrial support netting and sediment control filter fabric, and are constructed as indicated on the Drawings.

B. Check Dams: Work shall consist of the provision of check dams and dikes in conformance with the RIDEM Regulations. Check dams shall consist of the following three types:

1. Baled Hay Ditch and Swale Erosion Checks. Baled hay ditch and swale erosion checks shall consist of baled hay or straw, each bale of which is embedded and attached to the ground with wood stakes.
2. Sand Bag Erosion Dikes. This work shall consist of the placement of sand bags across either riprap or earth ditches, thereby forming a dike, to create temporary stilling basins for pollution control.
3. Stone Check Dams. This work shall consist of the placement of stone in ditches or drainage swales to reduce flow velocities, and to prevent soil erosion.

C. Temporary Dewatering Basins: Work shall consist of the provision of temporary dewatering basins for the purpose of controlling water pollution caused by sediment-laden discharge

from excavation sites. The basins shall be constructed in conformance to means and methods of the RIDEM Regulations. Temporary dewatering basins shall consist of the following two types:

1. Dewatering Basin. The basin shall consist of a rectangular concrete barrier enclosure, the bottom and sides of which are lined with filter fabric. The bottom fabric is stabilized with filter stone. The basin is divided into the required number of 12-foot sections by stone berms approximately 18-inches high.
2. Filter Fabric Retention Basin. The basin consists of a rectangular enclosure formed by a 2-foot high chain link fence. Both the fence and the bottom of the enclosure are lined with filter fabric, which is stabilized by a layer of rock riprap.

D. Storm Drain Protection: Work shall consist of the provision of temporary storm drain protection facilities. Storm drain protection facilities shall consist of the following three types:

1. Sandbag Gutter Inlet Sediment Barrier. This work consists of placing a sandbag barrier upstream of a gutter inlet prior to the placement of roadway pavement.
2. Silt Fence Catch Basin Inlet Protection. This work consists placing a temporary filter fabric fence around inlet grates.
3. Baled Hay Catch Basin Inlet Protection. This work consists of placing baled hay around catch basin inlets. Baled hay inlet protection shall be constructed as indicated on the Drawings.

E. Stilling Basins for Water Pollution Control: Work shall consist of the provision of temporary and/or permanent stilling basins in accordance with the RIDEM Regulations.

1.03 QUALITY CONTROL

A. Provide Quality Assurance/Quality Control services in accordance with Section 01400, Quality Control.

PART 2 PRODUCTS

2.01 MATERIALS

A. Perimeter Erosion Controls:

1. Baled Hay Erosion Checks. Baled hay or straw shall be baled within twelve months of use. Bindings shall be sufficiently strong to act as handles when placing bales in position by hand. The minimum dimension of any bale shall be 18-inches. Wood stakes shall be oak, 1-inch by 1-inch in section, and at least 3.0 feet in length.
2. Silt Fence. The filter fabric shall be a material suitable for erosion control applications. The filter fabric material shall be type #3401, as manufactured by R.I. Dupont de Nemours & Co., Mirafi #100 as manufactured by Celanese Fibers Marketing Co. Inc., Bidim C-28 or C-34 manufactured by Monsanto Co., or an approved equivalent. Wood posts shall be oak, 2-inch by 2-inch in section, and at least 4.5 feet in length. Support netting shall be heavy-duty plastic mesh. For prefabricated silt fence, 1-inch by 1-inch wood posts will be permitted.

B. Check Dams:

1. Baled Hay Ditch and Swale Erosion Checks. Baled hay or straw shall be baled within twelve months of use. Bindings shall be sufficiently strong to act as handles when placing bales in position by hand. The minimum dimension of any bale shall be 18-inches. Wood stakes shall be oak, 1-inch by 1-inch in section, and at least 3.0 feet in length.
2. Sand Bag Erosion Dikes. The sand bags and the sand material shall be of a quality acceptable to the Engineer. Dumped stone, when required, shall meet the requirements for Modified NSA Class R-4 riprap in Table II. The filled sand bags will weigh a minimum of 60 pounds.
3. Stone Check Dams. The stone shall meet the requirements for Filter Stone under RIDOT Requirements.

C. Temporary Dewatering Basins:

1. Dewatering Basins. Precast concrete barrier units, filter fabric and filter stone shall conform to RIDEM and RIDOT requirements. Sand bags shall be of a quality acceptable to the Engineer. Hay bales and wood stakes shall conform to the requirements of Article 2.01, Item A, Para. 1 of these Specifications.

D. Storm Drain Protection:

1. Sandbag Gutter Inlet Sediment Barrier. The sandbags and the sand material shall be of a quality acceptable to the Engineer.
2. Silt Fence Catch Basin Inlet Protection. The filter fabric shall be a material suitable for erosion control applications utilized. Wood posts shall be oak, 2-inch by 2-inch in section, and at least 4.5 feet in length. Support netting shall be heavy-duty plastic mesh. For prefabricated silt fence, 1-inch by 1-inch wood posts will be permitted.
3. Baled Hay Catch Basin Inlet Protection. Baled hay or straw and wood stakes shall conform to the requirements of Article 2.01, Item A, Para. 1 of these Specifications.

E. Stilling Basins for Water Pollution Control: The various materials required for the construction of stilling basins will be determined by the Contractor and provided in the Soil Erosion and Sediment Control Plan for approval by the Engineer.

PART 3 EXECUTION

3.01 GENERAL

A. Construction Methods: Those erosion and pollution controls indicated on the Drawings shall be installed to the satisfaction of the Engineer before the commencement of any construction.

3.02 INSTALLATION

A. Perimeter Erosion Controls:

1. Baled Hay Erosion Checks. Baled hay erosion checks shall be constructed at the locations, and in accordance with the details indicated on the Drawings to the satisfaction of the Engineer. The following stipulations also apply:

   a. Bales shall be placed in a single row, lengthwise on the contour, with ends of adjacent bales tightly abutting one another.
   b. The erosion check shall be entrenched and backfilled. The trench shall be excavated the width of the bale and the length of the check to a minimum depth of 3-inches. After the bales are staked and chinked, the excavated soil shall be backfilled against the check. Backfill shall conform to the ground level on the downhill side and shall be built up to 4-inches against the uphill side.
   c. The bales are to be installed so that the bindings are oriented around the sides of the bales rather than along their tops and bottoms.
   d. Each bale shall be securely anchored by at least two stakes driven through the bale. The first stake in each bale should be driven toward the previously laid bale to force the bales together.
   e. The gaps between bales shall be chinked (filled by wedging) with straw to prevent water from escaping between bales. Loose straw shall be scattered over the area immediately uphill from the bale erosion check to increase efficiency.
   f. At approximate intervals of 100 feet, one bale is to be placed against those bales positioned along the limit of clearing. This bale is to be placed at a right angle to the line of the toe of slope.

2. Silt Fence. Silt fence shall be constructed at the locations, and in accordance with the details indicated on the Drawings, to the satisfaction of the Engineer. The following stipulations also apply:

   a. A 6-inch x 6-inch minimum trench shall be dug where the fence is to be installed.
   b. The fence shall be positioned in the trench with the fence posts set at 8-feet on center (maximum).
   c. The sedimentation control fabric and the industrial netting shall be stapled to each post. When joints are necessary, filter fabric shall be spliced together only at support posts. Splices shall consist of a 6-inch overlap, and shall be securely sealed.
   d. Each wood post with industrial support netting and filter fabric attached shall be driven into the undisturbed soil in the trench as indicated on the Drawings.
   e. The trench shall be backfilled and the soil compacted over the filter fabric.
   f. The installed height of the fence shall be 2.5 feet (minimum). However, height shall not exceed 36-inches since higher barriers impound volumes of water sufficient to cause failure of the fence structure.

B. Check Dams:

1. Baled Hay Ditch and Swale Erosion Checks. Erosion checks shall consist of two or more bales placed and staked perpendicular to the flow line of a ditch formed by the intersection of its slopes. The following stipulations also apply:
   a. A pair of erosion checks shall be placed a minimum of 12 feet apart at each location.

b. The ditch erosion checks shall be entrenched and backfilled. The trench shall be excavated the width of the bale(s) and the length of the check to a minimum depth of 3-inches. After the bales are staked and chinked, the excavated soil shall be backfilled against the check. Backfill shall conform to the ground level on the downhill side and shall be built up to 4-inches against the uphill side.
c. The bales are to be installed so that the bindings are oriented around the sides of the bales rather than their tops and bottoms.
d. The edges of overlapped bales shall overlap in such a manner that there will be no opening between the bales. Where bales butt together the gap between bales shall be chinked with loose straw to prevent water from escaping.
e. Each bale shall be securely anchored by a least two stakes driven through the bale. The first stake in each bale should be driven toward the previously laid bale to force the bales together.
f. All earth ditch areas are required to have the protection of baled hay ditch erosion checks prior to their outfall onto existing ground, or natural or man-made water courses.
g. The haybale barrier shall be extended such a length that the bottoms of the end bales are higher in elevation than the top of the lowest middle bale. This configuration will insure that the sediment-laden runoff will flow either through or over the barrier, but not around it.

2. Sand Bag Erosion Dikes. Sand bags will be placed a minimum of four layers high. Over the center of the ditch the top layer of sand bags will have a weir opening equal to one half the bottom ditch width. The sand bags shall be extended such a length that the bottom of the end sand bags are higher in elevation than the top of the lowest middle sand bag. When the sand bag dike is constructed across an earth ditch, the down stream side of the dike at the weir opening is to be protected with Modified NSA Class R-4 dumped riprap.
3. Stone Check Dams. Stone shall be placed across the ditch or swale to achieve complete coverage and shaped to the required configuration by the use of hand tools. The stone shall be sloped from the sides of the ditch/swale towards the center such that the center is 6-inches lower than the stone at the sides of the ditch/swale. The check dam shall have 2-horizontal to 1-vertical side slopes and shall not exceed 2-feet in height.

C. Temporary Dewatering Basins:

1. Dewatering Basin. The following stipulations shall apply:

a. The precast concrete barrier units shall be placed on level, or nearly level, ground.
b. Filter fabric shall be placed on the bottom of the entire area enclosed by the concrete barrier units. If more than one sheet of fabric is required, the adjacent section shall be overlapped a minimum of 12-inches to insure full coverage. Filter fabric shall be turned up along the inside face of the concrete barriers to the top of same, there to be folded across the top of the barriers. The fabric will be maintained in position by the placement of sand bags, end-to-end, along the top of the concrete barrier enclosure.
c. A minimum layer of 6-inches of filter stone shall be spread over the bottom of the basin. Stone berms shall be constructed at 12-foot intervals along the length of the basin.

2. Filter Fabric Retention Basin. The following stipulations shall apply:

a. The filter fabric retention basin will be placed on stabilized and level, or nearly level, ground to prevent erosion by water exiting the basin.
b. A 6-inch by 6-inch minimum trench shall be dug where the basin is to be constructed.
c. The filter fabric and wire backing shall be 3-feet wide (minimum) positioned in the trench and secured to metal posts positioned 4-feet on center (maximum).
d. The metal posts shall be driven into undisturbed soil next to the trench to a minimum depth of 12-inches.
e. Fill material shall be placed in the trench and compacted.
f. The installed height of the fence shall be 2-feet (minimum).
g. A minimum layer of 6-inches of filter stone (Modified NSA Class R-4 riprap) shall be spread evenly over the bottom of the basin.

D. Storm Drain Protection:

1. Sandbag Gutter Inlet Sediment Barrier. The following stipulations shall apply:

a. The sandbags shall be placed in a curved row extending from the curb or berm. The row shall be at least 6-feet upstream of the inlet and should overlap the curb or berm.
b. Several layers of sandbags shall be placed over the first layer to a minimum height of 1-foot. The bags shall be overlayed and packed tightly together.
c. A gap of one sandbag should be left in the middle of the top row to serve as a spillway. The spillway shall be a least 8-inches high.
d. Additional sediment storage capacity can be obtained by constructing a series of these barriers along the gutter upstream of the inlet.

2. Silt Fence Catch Basin Inlet Protection. The following stipulations shall apply:

a. Posts shall extend at least 1 foot below grade.
b. The filter fabric shall extend to a height at least 12-inches above the top of the inlet grate, but shall not exceed 3 feet in height.
c. The support netting shall extend to the full height of the filter fabric.
d. A trench shall be excavated approximately 6-inches wide and 6-inches deep around the outside perimeter of the stakes. The filter fabric and support netting shall extend at least 6-inches into the trench. After the fabric and support netting are fastened to the stakes the trench should be backfilled and compacted to original grade.
e. The filter fabric and support netting fence shall be securely fastened to the stakes using heavy duty wire staples at least 1-inch long. Ends of the filter fabric must meet at a stake, be overlapped, folded and stapled to the stake.

3. Baled Hay Catch Basin Inlet Protection. The baled hay inlet protection shall be constructed as indicated on the Drawings. The following stipulations shall also apply:

a. The bales shall be entrenched and backfilled. The trench shall be excavated the width of the bale and the length of the check to a minimum depth of 3-inches. After the bales are staked and chinked, the excavated soil shall be backfilled against the check. Backfill shall conform to the ground level on the inside and shall be built up to 4-inches around the outside.
b. The bales are to be installed so that the bindings are oriented around the sides of the bales rather than along their tops and bottoms.

c. Each bale shall be securely anchored by at least two stakes driven through the bale. The first stake in each bale should be driven toward the previously laid bale to force the bales together.
d. The gaps between bales shall be chinked (filled by wedging) with straw to prevent water from escaping between bales.

E. Stilling Basins for Water Pollution Control:

1. The stilling basins will be constructed in such a manner to allow any material which may cause a natural water course or the surrounding environment to be damaged to be retained in the basin. During the life of the Contract, the Contractor will be required to periodically clean the pool and to maintain the basin to the satisfaction of the Engineer. If the basin is temporary, the Contractor will be required to fill the basin with suitable material and to restore the area in which the basin was located to either its original condition or to the requirements of the Contract.
2. In all cases the stilling basins are to be constructed immediately after the clearing and grubbing operation and before commencement of any excavation and/or embankment. The single exception to this requirement is the construction of a leveling course to create a work platform. Excavation for stilling basins is to take place from the downstream end of the basin and to proceed upstream. Prior to the start of excavation, temporary baled hay ditch erosion checks are to be constructed immediately beyond the downstream end of the basin. When the basin is complete the above temporary erosion control measures are to be removed.

3.03 MAINTENANCE AND CLEANING

A. Definitions:

1. Cleaning consists of removing debris and accumulated sediment-laden deposits from the upstream side of perimeter controls, check dams and temporary drainage protection and from the bottom of temporary dewatering basins and stilling basins. All material so-removed shall be legally disposed of in accordance with Federal, State, and Local Regulations.
2. Maintenance consists of the repair and restoration to original configuration of damage sustained by erosion and pollution controls caused by "normal" rainfall events. (Abnormal weather events are defined in Article 3.03, Item I)

B. Methods:

1. Erosion and pollution controls shall be maintained by the Contractor to the satisfaction of the Engineer. Erosion and pollution controls must be able to prevent, under normal weather conditions, both the movement of soil materials and the intrusion of sediment-laden discharges into environmentally sensitive areas.
2. Construction shall not commence or continue until all specified erosion and pollution controls are in place, properly installed and accepted by the Engineer.
3. Erosion and pollution controls shall be routinely inspected by the Engineer. The Engineer shall notify the Contractor immediately if problems develop. The Contractor shall commence cleaning and maintenance measures no later than the next consecutive calendar day after receiving a directive from the Engineer to perform such measures. The Contractor shall aggressively and expeditiously perform such cleaning and maintenance

work until the original problem is remedied to the complete satisfaction of the Engineer. In the event of a weekend storm, the Contractor must have resources available to restore, and, if necessary, to replace any damaged controls.

C. Applicable Controls:

1. The specific erosion and pollution control facilities to be cleaned and maintained under this Section are outlined in Article 1.02 and consist of the following:

   a. Perimeter Controls:
      1) Baled Hay Erosion Checks
      2) Silt Fence
   b. Check Dams:
      1) Baled Hay Ditch and Swale Erosion Checks
      2) Sand Bag Erosion Dikes
      3) Stone Check Dams
   c. Temporary Dewatering Basins:
      1) Dewatering Basins
      2) Filter Fabric Retention Basins
   d. Storm Drain Protection:
      1) Sandbag Gutter Inlet Sediment Barrier
      2) Silt Fence Catch Basin Inlet Protection
      3) Baled Hay Catch Basin Inlet Protection
   e. Stilling Basins

D. Materials:

1. Materials required to repair and restore damaged erosion and pollution controls shall meet the applicable requirements of Article 2.01, Items A thru E; for Perimeter Erosion Controls, Check Dams, Temporary Dewatering Basins, Storm Drain Protection, and Stilling Basins, respectively, of these Specifications.

E. Threshold for Cleaning Erosion Controls:

1. Erosion and pollution controls will be cleaned when directed by the Engineer, after a rainstorm, and when sediment deposits reach the heights indicated in the following table:

	Height
a. Perimeter Controls	
1) Baled Hay Erosion Checks	1/2 Bale Height
2) Silt Fence	6-inches
b. Check Dams	
1) Baled Hay Erosion Checks	1/2 Bale Height
2) Sand Bag Erosion Dike	1/2 Dike Height
3) Stone Check Dam	1/2 Dam Height
c. Temporary Dewatering Basins	
1) Dewatering Basins	1/2 Original Basin Height
2) Filter Fabric Retention Basin	1/2 Original Basin Height
d. Storm Drain Protection	
1) Sandbag Gutter Inlet Sediment Barrier	1/2 Dike Height

2) Silt Fence Catch Basin Inlet Protection	6-inches
3) Baled Hay Catch Basin Inlet Protection	1/2 Bale Height
e. Stilling Basins	1/2 Depth Below Outlet Elevation

F. Other Requirements:

1. Perimeter Controls, Check Dams and Storm Drain Protection. The following requirements apply:

    1) Damaged controls will be repaired or replaced after each storm events.
    2) Before controls are removed all accumulated sediment on the upstream side shall be removed and legally disposed of.
    3) Erosion controls shall not be removed until the adjacent exposed areas are relatively free from future uncontrolled discharges.
    4) The Engineer has the authority to verify, enforce, and to specify maintenance activities and to ensure that erosion and pollution controls have been properly maintained.

2. Temporary Dewatering Basins and Stilling Basins. The following requirements apply:

    a. The basins will be periodically inspected for signs of erosion around the basin and downslope area.
    b. Repairs will be promptly carried.
    c. The Engineer has the authority to verify, enforce, and to specify maintenance activities and to ensure that controls have been properly maintained.

G. Failure of Erosion and Pollution Controls:

1. This Article 3.03; Maintenance and Cleaning, is based on the concept that erosion and pollution controls will essentially remain intact under normal rainfall events and that any damage sustained by said controls under normal rainfall may be repaired under the maintenance provisions set forth herein.
2. However, under abnormal weather events it is possible that erosion and pollution controls may be damaged to the extent that the Engineer may direct that they be replaced in their entirety. Under such abnormal conditions the Contractor will replace the particular facilities, and be compensated for same, under the applicable provisions set forth in regarding PERIMETER CONTROLS, CHECK DAMS, TEMPORARY DEWATERING BASINS, STORM DRAIN PROTECTION, and STILLING BASINS, respectively, of these Specifications.

H. Definition of Abnormal Weather Conditions:

1. For the purposes of Article 3.03, Item G, abnormal weather events are defined as follows:

    a. For a duration of 1-hour; rainfall equal to or greater than 1/2-inch.
    b. For a duration of 12-hours; rainfall equal to or greater than 2-inches.
    c. For a duration of 24-hours; rainfall equal to or greater than 3-inches.
    d. Extreme weather conditions such as hurricanes, tornadoes, floods, blizzards, etc. Daily rainfall records may be obtained from the National Weather Service.

3.04 REMOVAL

A. Perimeter Erosion Controls:

1. Baled Hay Erosion Checks. All stakes must be removed from the haybales at a time designated by the Engineer. In general, the bales will be allowed to rot in place. If the Contract requires the haybales to be removed, they may be removed only when the adjacent exposed area has been stabilized, i.e., the area has an established grass or stone cover or has been paved, and is free from future uncontrolled discharges. Prior to such removal, however, all silt, mud, and debris entrapped by the haybales shall be removed and the area cleaned up in accordance with the applicable provisions of Article 3.03 of these Specifications. Immediately upon removal of the bales the remaining exposed areas (under the bales) will be backfilled, raked, and graded as necessary to match the surrounding grade and then seeded.
2. Silt Fence. This work will include the removal of the silt fence erosion checks and posts. Silt fence will not be left to rot in place. The silt fence may be removed only when the adjacent exposed area is stabilized, i.e., the area has an established grass or stone cover or has been paved, and is free from future uncontrolled discharges. Prior to such removal, however, all silt, mud, and debris entrapped by the silt fence shall be removed and the area cleaned up in accordance with the applicable provisions of Article 3.03 of these Specifications. Immediately upon removal of the bales the remaining exposed areas (under the bales) will be backfilled, raked, and graded as necessary to match the surrounding grade and then seeded.

B. Check Dams:

1. Baled Hay Ditch and Swale Erosion Checks. Bales of hay used in this work will not normally be left to rot in place. The bales may be removed only when the adjacent exposed area is stabilized, i.e., the area has an established grass or stone cover or has been paved, and is free from future uncontrolled discharges. Prior to such removal, however, all silt, mud, and debris entrapped by the respective erosion checks shall be removed and the area cleaned up in accordance with the applicable provisions of Article 3.03 of these Specifications. Immediately upon removal of the bales, the remaining exposed areas (under the bales) will be backfilled, raked, and graded as necessary to match the surrounding grade and then seeded.
2. Sand Bag Erosion Dikes. Sand bag erosion dikes will be removed prior to the completion of the project at a time designated by the Engineer. Prior to such removal, however, all silt, mud, and debris entrapped by the erosion dike shall be removed and the area cleaned up in accordance with the applicable provisions of Article 3.03 of these Specifications.
3. Stone Check Dams. Stone check dams will be removed prior to the completion of the project at a time designated by the Engineer. Prior to such removal, however, all silt, mud and debris entrapped by the check dam shall be removed and the area cleaned up in accordance with the applicable provisions of Article 3.03 of these Specifications.

C. Temporary Dewatering Basins:

1. Dewatering Basin. The dewatering basin will not be removed until all dewatering operations are complete. Prior to such removal, however, all accumulated sediment within the basin shall be removed and legally disposed of in accordance with the applicable requirements of Article 3.03 of these Specifications. The area covered by the basin shall be seeded and mulched immediately after the basin is removed.
2. Filter Fabric Retention Basin. Removal requirements for the filter fabric retention basin are the same as set forth above for the dewatering basin.

D. Storm Drain Protection:

1. Sandbag Gutter Inlet Sediment Barrier. The sandbag sediment barrier will be removed prior to the completion of the project at a time designated by the Engineer. Prior to such removal, however, all silt, mud, and debris entrapped by the sediment barrier shall be removed and the area cleaned up in accordance with the applicable provisions of Article 3.03 of these Specifications.
2. Silt Fence Catch Basin Inlet Protection. The silt fence inlet protection shall be removed and the area prepared for pavement construction once the contributing drainage area is free from future uncontrolled discharges. Prior to such removal, however, all silt, mud, and debris entrapped by the silt fence shall be removed and the area cleaned up in accordance with the applicable provisions of Article 3.03 of these Specifications.
3. Baled Hay Catch Basin Inlet Protection. The baled hay inlet protection shall be removed and the area prepared for pavement construction the contributing drainage area is free from future uncontrolled discharges. Prior to such removal, however, all silt, mud, and debris entrapped by the baled hay shall be removed and the area cleaned up in accordance with the applicable provisions of Article 3.03 of these Specifications.

END OF SECTION

PART l - GENERAL

1.1 SCOPE

A. Work under this section includes installation of bituminous concrete pavements, curbing and pavement markings for roadways and parking areas as shown on the Drawings. All trench excavations through roadways shall be restored according to this Section. Also, all existing pavement to remain but damaged as a result of the construction operations shall be restored in accordance with the requirements of this Section.

1.2 REFERENCES

A. All work specified in this Section shall conform to "Standard Specifications for Road and Bridge Construction" of the Rhode Island Department of Transportation, latest revision, herein referred to as "State Standards". All references to measurement and payment are deleted.

1.3 PRODUCT HANDLING

A. Use all means necessary to protect bituminous concrete pavement materials before, ongoing, and after installation, and to protect the installed work and materials of all other trades.

B. In the event of damage, immediately make all repairs and replacements necessary as directed by the Owner or Engineer.

1.4 SUBMITTALS

A. The Contractor shall submit to the Owner and Engineer, data showing gradation and composition of materials proposed.

1.5 QUALITY CONTROL

A. For actual finishing of bituminous concrete surfaces and operation of the required equipment, use only personnel who are thoroughly trained and experienced in the skills required and whose prime occupation is this type of work.

PART 2 - PRODUCTS

2.1 HOT MIX ASPHALT SURFACE COURSE

A. Class 12.5, conform to Subsection 401.02 and Item M.03 of the State Standards.

2.2 HOT MIX ASPHALT BASE COURSE

A. Conform to Subsection 401.02 and Item M.03. of the State Standards.

2.3 GRAVEL SUB-BASE COURSE

A. Conform to Gravel Borrow as specified in Section 02200, EARTHWORK.

2.4 SUBGRADE

A. Reuse suitable on-site material, or Common Borrow, as specified in Section 02200, EARTHWORK.

2.5 CURBING

A. Precast concrete curbing shall conform to Subsection 905.01.2 and 905.02.2, and Item M.09.03 of the State Standards.

B. Granite curbing shall conform to Subsection 905.01.1 and 905.02.1, and Item M.09.01 of the State Standards.

C. Bituminous berm shall conform to Subsection 905.01.4 and 905.02.4, and Items M.03.01 and M.03.03.4 of the State Standards.

2.6 PAVEMENT MARKINGS

A. Pavement markings shall be composed of epoxy resin conforming to the State Standards.

B. Pavement markings shall be “yellow” and “white” in color, as applicable.

C. Pavement marking stripes shall measure 4 inches in width.

PART 3 - EXECUTION

3.1 GENERAL REQUIREMENTS

A. Contractor Requirements:

1. The Contractor shall perform and complete the construction work within the limits indicated in a continuous manner so that the pavement placement work may proceed without delay.
2. The Contractor shall, at all times, prior to acceptance of the work by the Owner and Engineer, maintain the completed work in a safe and satisfactory condition. All maintenance and repairs to the completed work shall be subject to the approval of the Owner and Engineer and the controlling municipal and State authorities. All maintenance and repairs of the completed work shall be provided by the Contractor at no additional cost to the Owner.
3. Equipment used in the work will be subject to approval by the Owner and Engineer and shall be maintained in a satisfactory condition at all times. Unless otherwise permitted, compaction shall be performed by use of suitable power rollers. Finished surfaces of new asphaltic surface courses shall finish even with adjacent existing pavement surfaces and be free from surface irregularities.
4. It shall be the responsibility of the Contractor to obtain from the controlling authorities all required permits for cutting roadway pavements and to perform the work in accordance

with all customs and requirements of the controlling authorities, in addition to those specified herein, and at no additional expense to the Owner.

5. Existing pavements outside of the indicated work limits which are damaged as a result of the Contractor's operations, including base courses, bituminous tack coats and surface courses, shall be replaced by the Contractor in accordance with the requirements specified herein for the respective type of pavement; in a satisfactory manner and at no additional cost to the Owner.
6. In case of settlement or other defects in new or replaced pavements, the Contractor shall cut out, replace, restore or repair the damaged pavements at no additional expense to the Owner. This requirement shall remain in effect for 2 years after the acceptance of the work by the Owner and Engineer. The pavement area to be replaced, repaired or restored, shall extend from edge of pavement to edge of pavement, a minimum of 20 feet on either side of the defect; final pavement course shall be feathered to provide a smooth finish detail.
7. This contract shall not be considered complete until the replacement, restoration and repair of pavements has been provided in a manner satisfactory to the Owner and Engineer, and in accordance with the requirements specified herein.

3.2 SUBGRADE PREPARATION

A. Prepare subgrade by shaping and compacting to proper grade. Remove all soft and yielding material from the subgrade and replace with suitable material. Compact thoroughly using approved types of rollers or tampers. Ensure that all areas are stable and dry.

B. Saw cut edges of existing pavement along even lines to obtain undisturbed, clean and sound vertical edges of original pavement.

C. Do not store or stockpile materials on the subgrade.

3.3 COLD PLANING

A. Cold planing shall be performed in accordance with State Standards, Section 935.

B. Contactor shall be responsible for dust control, sweeping, and traffic maintenance over the cold-planed surface.

3.4 GRAVEL SUB-BASE COURSE PLACEMENT

A. Place materials in the proper lift depths and perform compaction as specified in Section 02200, EARTHWORK. Make proper allowance for bituminous courses.

B. All compaction shall be performed with approved equipment well suited to location and material being compacted. Use heavy vibratory rollers where heavy equipment is authorized.

C. Do not operate heavy equipment closer to a foundation than a horizontal distance equal to height of backfill above bottom of foundation. Compact remaining area with hand tampers suitable for material being compacted. Place and compact backfill around pipes with care to avoid damage.

3.5 BITUMINOUS CONCRETE BASE COURSE

A. Provide a Bituminous Concrete HMA Class 19 Base Course on the Road Subbase in compacted thickness as shown on the Drawings. The Bituminous Concrete Base Course shall be provided in accordance with the applicable requirements of the State Standards, Section 401, Subsection 401.02 and Item M.03 for materials; and Item 401.03 for construction methods.

3.6 BITUMINOUS CONCRETE SURFACE COURSE

A. Place Bituminous Concrete HMA Class 12.5 Surface Course in compacted thickness as shown on the Drawings. The finished pavement surface shall conform to the proposed grades of the roadway or as directed, and shall be flush with all existing pavements unless otherwise indicated.

B. The Bituminous Concrete Surface Course shall be provided in accordance with the applicable requirements of the State Standards, Section 401, Subsection 401.02, and Item M.03 for materials, and Subsection 401.03 for construction methods.

C. Asphalt emulsion tack coat shall be applied in accordance with State Standards, Section 403.

3.7 COMPACTION

A. The Contractor shall conform to the State Standards for pavement operations, including compaction (401.03.10).

B. Immediately after the bituminous mixture has been spread, struck off, and surface irregularities adjusted, it shall be thoroughly and uniformly compacted by rolling. The surface shall be rolled when the mixture is in the proper condition and when rolling does not cause undue displacement, cracking and shoving.

C. The number, weight and type of rollers furnished shall be sufficient to obtain the required compaction while the mixture is in a workable condition. Rolling shall be continued until all roller marks are eliminated and the minimum densities have been obtained based upon 95 percent of laboratory Marshall Densities made in the proportions of the job-mix formula, AASHTO T-245.

D. Steel-Tired, Static Weight Rollers: The maximum roller speeds for steel-tired static-weight rollers for various operations shall not exceed three miles per hour. The wheels of steel-wheel rollers shall be kept moist and clean to prevent adhesion of the fresh material, but an excess of water will not be permitted.

E. Vibratory Rollers: The maximum roller speed for vibratory rollers shall be that which provides impact spacing less than the compacted lift thickness. When vibratory rollers are used in the static mode, roller speed shall not exceed three miles per hour.

1. When an approved vibratory roller is used for breakdown rolling in a vibratory mode, intermediate rolling will not be required. When the vibratory roller is used for finish rolling it shall be used in the static mode. Rolling shall progress continuously until the specified density of the corresponding daily plant Marshall Density, AASHTO T-245 has been attained. Finish rolling shall continue until all roller marks are eliminated.

F. Unless otherwise directed, rolling shall start longitudinally at the sides and gradually progress toward the center of the pavement except on super-elevated curves where the rolling shall begin on the low side and progress to the high side, overlapping on successive trips by at least one-half the width of tandem rollers and uniformly lapping each preceding track.

G. The motion of the rollers shall be slow enough at all times to avoid displacement of the hot mixture. Any displacement resulting from reversing the direction of the rollers or from any other cause shall be satisfactorily corrected.

H. When the base course, binder course, or wearing course fails to comply with the density requirements herein specified, additional compaction may be applied when permitted and as directed, to attain the required density. If satisfactory density cannot be attained the Contractor shall be required to remove and replace, at his own expense, any affected area, which is proven to be structurally inadequate and/or incapable of maintaining material integrity.

I. Any mixture that becomes loose and broken, mixed with dirt, or is in any way defective, shall be removed and replaced with fresh hot mixture, which shall be compacted to conform with the surrounding area. Any area showing an excess or deficiency of bituminous material shall be removed and replaced.

J. In the event of dispute as to the creditability of the results, density shall be determined from cores taken from the pavement.

END OF SECTION

PART 1 - GENERAL

1.1. SUMMARY

A. The work covered in this section of the Specifications includes construction and placement of all precast reinforced concrete sewer, drain, and water manholes, castings for covers and frames, rungs and all appurtenant and incidental work, complete, in strict accordance with the Specifications and the applicable Drawings.

1.2 REFERENCES

A. All work specified in this Section shall conform to "Standard Specifications for Road and Bridge Construction" of the Rhode Island Department of Transportation, latest revision (herein referred to as "State Standards"), excluding the provisions of Part 100 – General Requirements and Covenants and any references to measurement and payment.

1. All gray iron castings shall conform to the requirements of AASHTO Designation M105, Class 30 and ASTM A48-74. Test both cover and frame for H-20 Highway Loading.
2. Ductile iron castings shall conform to ASTM A 536. Grade 60-40-18 unless otherwise specified.
3. Cast steel shall conform to ASTM A27. Grade 70-36 and shall be thoroughly annealed.

1.3 SUBMITTALS

A. Submittals shall be made in accordance with Section 01300 – SUBMITTALS. Submittals for the following items shall be required:

1. The Drawings shall show the setting plans, exact profile of each unit, openings required, all inserts and other items which are to be embedded in the units.
2. Shop drawings showing details of manhole cover and frame and manhole step castings, construction details, tolerances and other information as required.
3. Conformance Certificate: Each shipment of castings and concrete manholes shall be accompanied with the manufacturer’s notarized certification that materials meet specified requirements.

1.4 QUALITY CONTROL

A. All precast concrete shall be the product of a manufacturer who has demonstrated capability to produce precast concrete products of the quality specified. A manufacturer must be able to show that he has experienced personnel, physical facilities, established quality control procedures, and a management capability sufficient to execute the work of this contract. When requested by Owner or Engineer, the Contractor shall submit written evidence of the above requirements.

B. Experienced plant personnel shall closely supervise the manufacturing process, and daily records of concrete strength shall be kept and submitted to the Engineer for control.

C. Provide at least one person who shall be present at all times during execution of this portion of the work and who shall be thoroughly trained and experienced in the installation of the precast concrete structures and shall direct all work performed under this Section.

D. Where exploratory test holes have been required at specific locations shown on the drawings that may impact horizontal and/or vertical alignment of proposed sewer. Contractor shall perform these test holes in the Engineer's presence prior to authorizing fabrication of manholes.

1.5 PRODUCT HANDLING

A. Avoid damage to castings from impact, abrasion, or corrosion during handling and storage.

B. Use all means necessary to protect precast concrete units and materials before, during and after installation and to protect the installed work and materials for all other trades.

C. In case of damage, immediately make all repairs and replacements necessary to the approval of Engineer, at the Contractor's sole expense.

PART 2 - PRODUCTS

2.1. PRECAST CONCRETE SECTIONS

A. All gravity sewer and drain manholes shall have an interior diameter of 48-inches unless otherwise indicated. Water manholes shall have an interior diameter of 60-inches.

B. All materials used for work of this Section shall be new, unused and purchased specifically for this Contract. All materials shall be manufactured in the United States. All precast concrete sections shall conform to ASTM C478 with the following exceptions and additional requirements specified herein.

C. Cement shall be Portland cement conforming to ASTM C150, Type II, except as otherwise approved.

D. Aggregate: shall conform to ASTM C330 and shall be graded, crushed stone with a resulting unit weight of concrete of up to one hundred fifty five (155) pounds per cubic foot, and a minimum unit weight of not less than one hundred forty-eight (148) pounds per cubic foot.

E. Water: shall be clear and free of injurious and deleterious substances.

F. The wall thickness of precast sections shall be as designated on the drawings, meeting the following minimum requirements:

Section Diameter (Inches)	Minimum Wall Thickness (Inches)
48	5
60	6
72	7
84	8

G. Concrete: shall have a minimum strength of 4000 psi at twenty eight (28) days and a strength of 3000 psi at the time of form release.

1. During the process of manufacturing of the units not less than two (2) test cylinders shall be tested at time of release of the form and two (2) at age twenty-eight (28) days.
2. All compression test cylinders shall be made, cured and stored in accordance with ASTM C31. Cylinders shall be tested in accordance with ASTM C39.
3. All concrete shall contain three (3) to five (5) percent air entrainment.

H. Admixtures shall only be used after prior approval of the Engineer.

I. All reinforcing bars shall conform to requirements of ASTM designation: A615, Grade 60.

J. Welded wire fabric shall conform to the requirements of ASTM designation: A185.

K. Sections shall be steam cured and shall not be shipped until at least five days after having been cast.

L. No more than two lift holes may be cast or drilled in each section.

M. The date of manufacture and the name or trademark of the manufacturer shall be clearly marked on the inside of each precast section.

N. Acceptance of the sections will be on the basis of material tests and inspection of the completed product.

O. Circumferential steel reinforcement in walls and bases shall be a minimum of 0.12 sq. in./lin. ft. for 4-foot diameter sections and 0.15 sq. in./lin. ft. for 5- and 6-foot diameter sections. Reinforcing shall extend into tongue and groove.

P. Conical reducing sections shall have a wall thickness not less than 5 inches at the bottom and wall thickness of 8 inches at the top. Conical sections shall taper from a minimum of 48 inches diameter to 30 inches diameter at the top, as shown on the Drawings.

Q. Except where insufficient depth of cover dictates the use of a shorter base, bases shall be a minimum of 4 feet in height.

R. Slab top sections and flat riser sections (Grade Rings) shall conform to the contract drawings, with particular attention focused upon the reinforcing steel and be designed to meet or exceed an H-20 loading requirement.

S. The tops of the bases shall be suitably shaped by means of accurate ring forms to receive the riser sections.

T. Precast sections shall be manufactured to contain wall openings of the minimum size to receive the ends of the pipes, such openings being accurately set to conform with line and grade of the sewer or drain. Subsequent cutting or tampering in the field, for the purpose of creating new openings or altering existing openings, will not be permitted except as directed by the Engineer.

U. "Drop-over" manholes shall be placed where indicated on the drawings. The Contractor shall accurately measure the diameter of the existing outlet pipe and inform the manufacturer of its size, so that the "Drop-over" type opening can be cut into the precast manhole base. The bottom shall be cast in place by the Contractor. The invert channel shall be formed of brick and mortar, as specified in this section.

V. The exterior surfaces of all precast manhole bases, walls, and cones shall be given a minimum of one shop coat of bituminous waterproofing compound.

W. The Engineer reserves the right to reject any unsatisfactory precast section and the rejected unit shall be tagged and removed from the job site immediately.

X. The Engineer may also require the testing of concrete sections as outlined under Physical Requirements in ASTM C478 with the Contractor bearing all testing costs.

2.2. BRICK MATERIALS

A. Brick shall be sound, hard, and uniformly burned brick, regular and uniform in shape and size, of compact texture, and satisfactory to the Engineer. Bricks shall comply with ASTM C32, for Grade SS, hard brick, except that the mean of five tests for absorption shall not exceed 8 percent by weight.

B. Rejected brick shall be immediately removed from the work and brick satisfactory to the Engineer substituted.

C. Mortar shall be composed of Portland cement, hydrated lime, and sand in which the volume of sand shall not exceed three times the sum of the volumes of cement and lime. The proportions of cement and lime shall be as directed and may vary from l:l/4 for dense hard-burned brick to l:3/4 for softer brick. In general, mortar for Grade SS Brick shall be mixed in the volume proportions of 1:1/2:4-1/2; portland cement to hydrated lime to sand.

D. Cement shall be Type II Portland cement as specified for concrete masonry.

E. Hydrated lime shall be Type S conforming to ASTM C207.

F. The sand shall comply with ASTM C144 specifications for "Fine Aggregate," except that all of the sand shall pass a No. 8 sieve.

2.3 MANHOLE FRAMES AND COVERS

A. Manhole Frames and Covers shall have a hot-dipped bituminous coating and form to the details on the Drawings. Cast iron shall conform to ASTM A-48, Class 25. The underside of the cover and upper side of lip frame must present parallel plane surfaces, and at these points of contact, the frames and covers shall be machined to prevent covers from rocking in the frames under traffic.

B. Castings shall be of good quality, strong, tough, even-grained cast iron, smooth, free from scale, lumps, blisters, sandholes, and defects of every nature which would render

them unfit for the service for which they are intended. Contact surfaces of covers and frame seats shall be machined to prevent rocking of covers.

C. All castings shall be thoroughly cleaned and may be subject to a careful hammer inspection at the Engineer's discretion.

D. Castings shall be ASTM A48 Class 30B or better.

E. The surface of sewer manhole covers shall be in accordance with Narragansett Bay Commission standards, as depicted on project details. The surface of drain manhole covers shall have a diamond pattern with the cast words in 2" letters, "DRAIN". The surface of water manhole covers, and valve boxes shall be in accordance with Providence Water's standard, as shown on project details.

F. Manhole frames with 30-inch diameter covers shall be 425 pounds minimum and shall be East Jordan Iron Works or approved equal in accordance with the Drawings.

G. Covers shall bear evenly in the frame and both frame seats and covers shall be accurately fabricated so that covers are interchangeable for use with any and all frames. Where indicated, frames and covers shall be watertight and locked. The sizes and weights (medium duty, heavy duty, etc.) are shown on the detail sheets for special manholes.

H. Frames and covers shall be installed on the manholes as indicated on the Drawings. They shall be well bedded and encased in cement mortar and accurately set to the grades indicated or as directed. Red clay brick with cement mortar shall be used to adjust the grade of frame and cover. One half inch of cement mortar plaster cast shall be applied to exterior of red clay bricks.

2.4. WATER PROOFING

A. Asphalt for waterproofing manhole structures shall conform to ASTM D449, Type A. Asphaltic prime coat shall conform to ASTM D41.

2.5. MANHOLE STEPS

A. Manhole steps shall be manufactured of either extruded aluminum or Copolymer Polypropylene plastic with ½-inch, grade 50 steel reinforcement.

B. Steps shall conform to ASTM C-478 and Fed. Spec. FS RR-F-621.

C. The capacity of each step shall be 1,000 lb. at 6-inch distance from wall, and 1,500 lb. at a 4-inch distance from wall.

D. Steps shall measure 12 inches wide (min.) and extend 6 inches from wall.

E. Manhole steps shall be provided in each base, riser and top section and shall be integrally cast in each; 12 inches O.C.

2.6 SEWER MANHOLE ACCESSORIES

A. Gasket materials shall be top grade (100% solids, vulcanized) butyl rubber and shall meet or exceed AASHTO M-198.

B. Couplings at the manhole-pipe interface shall be made with a rubber seal system (with or without stainless steel straps) meeting the requirements of ASTM C923 and recommended for this type of connection.

C. Stubs installed as specified and indicated on the Drawings shall be short pieces of the same class pipe as that entering the manhole and shall have either stoppers or end caps as shown on the Drawings. Stoppers or end caps shall be especially designed for that application.

PART 3 – EXECUTION

3.1 INSPECTION

A. Examine the substrate and conditions under which work of this Section is to be performed, and correct unsatisfactory conditions that would prevent proper and timely completion of the work. Do not proceed until satisfactory conditions have been corrected.

1. Examine castings for blowholes, porosity, hard spots, shrinkage, distortion or other defects. Check coating for smoothness and tenacity.

3.2. GENERAL

A. Excavation and backfilling requirements for installation of manhole structures shall be in accordance with the requirements as specified in Section 02200, EARTHWORK.

B. Manhole barrel and cone sections shall be set so as to be vertical and in true alignment.

3.3. CONSTRUCTION AND INSTALLATION

A. Concrete Base Slabs for manholes shall conform to the requirements of Section 2.1 of this specification. The full thickness of the base slab shall extend 6 inches beyond the outside walls.

B. Bottom riser sections of reinforced concrete manholes may be either cast-in-place or precast concrete. The top edges of cast-in-place bottom sections shall be formed with a removable steel ring template designed to fit the tongue end of the precast riser sections.

C. Inverts: Inverts shall be constructed of brick and mortar with a smooth flow line and an even curve in accordance with the Drawings.

D. Pipe Penetrations: Pipe joints into manholes shall be constructed in accordance with the details shown on the Drawings. Complete details of the pipe boot manufacture and installation shall be submitted for approval. All areas around pipes passing through walls of manholes shall be completely filled with non-shrink waterproof cement mortar to tightly fill any space through which water can pass.

E. Manhole Joints: All joints between manhole sections shall be sealed with bitumastic sealant, and all exterior joints shall be parged.

F. Bricks shall be laid in a workmanlike manner, true to line, and the joints shall be carefully struck and pointed on the inside. Bricks shall be thoroughly wet when laid and each brick shall be laid in mortar so as to form full bed, end and side joints in one operation. The outside of the brickwork shall be neatly plastered with ½-inch layer of cement mortar as the work progresses. The brickwork shall be satisfactorily bonded to the concrete and cast-iron frame. No brick masonry shall be laid in water, or any water allowed to rise on the brickwork until the masonry has set for at least 24 hours.

G. Waterproofing: All exterior surfaces of manholes shall receive at least one coat of asphalt water-proofing.

H. Exterior Drop Connection: Construct exterior drop into new and existing sewer manholes at the locations shown on the Drawings, in accordance with project details, and using the materials specified.

3.4. TESTING MANHOLES

A. Vacuum testing shall be performed at each manhole. The initial test pressure shall be ten inches (10") of mercury, and the vacuum drop shall not exceed one inch (1") of mercury over the time period as follows:

<10' Deep Manholes:	2 minutes
10' – 15' Deep Manholes:	2.5 minutes
>15' Deep Manholes:	3 minutes

B. The Contractor must explicitly identify what repairs or modifications he makes, at his expense, to the Engineer if need be. This test must be performed before the manhole is backfilled.

C. If the manhole experiences any groundwater infiltration or leakage, the Contractor shall make proper repairs or replace the manhole and re-test at no additional compensation.

END OF SECTION

PART 1 GENERAL

1.01 SCOPE

A. This section specifies requirements for furnishing and installing ductile iron pipelines complete and in place for water distribution systems.

B. All materials to come in contact with potable water shall be NSF 60 or 61 certified as appropriate.

1.02 REFERENCES

A. American Water Works Association (AWWA):

1. AWWA C104: Standard for Cement Mortar Lining
2. AWWA C110: Standard for Ductile Iron and Gray Iron Fittings for Water
3. AWWA C111: Standard for Rubber Gasket Joints
4. AWWA C150: Standard for the Thickness Design of Ductile Iron Pipe
5. AWWA C151: Standard for Ductile Iron Pipe, Centrifugally Cast
6. AWWA C153: Standard for Ductile Iron Compact Fittings
7. AWWA C600: Standard for Installation of Ductile Iron Water Mains and Their Appurtenances
8. AWWA C651: Standard for Disinfecting Water Mains
9. Providence Water – Requirements for Water Mains, Services, and Appurtenances (Latest Edition)

1.03 MARKING

A. Marking of all pipe shall conform to the requirements of AWWA C151, latest revision, and marking of all fittings shall conform to the requirements of AWWA C153 or C110, latest revision.

1.04 MANUFACTURER'S REPRESENTATIVE

A. The Contractor shall furnish at no additional expense to the Owner, the services of pipe manufacturer's representatives for instruction of the Contractor's personnel who will be installing the pipe. The instruction shall include proper handling, installation, and jointing and other construction areas, and shall be for such lengths of time required to fully familiarize the Contractor's personnel with the proper techniques.

1.05 QUALITY CONTROL

A. Manufacturers' Recommendations:

1. Using Providence Water’s Project Management software, The Contractor shall submit for approval of the manufacturer's recommendations for the storage, protection, handling and installation of the ductile iron pipe, pipe fittings and appurtenances, which shall be strictly adhered to by the Contractor.

B. Certificate of Compliance:

1. Each shipment of pipe, pipe fittings, and appurtenances, shall be accompanied by the manufacturer's notarized certificate certifying conformance with all requirements of these specifications.

PART 2 PRODUCTS

2.01 GENERAL

A. All materials to be incorporated into the work shall be new and purchased specifically for this contract.

B. All hardware shall be Corten as manufactured by Romac Industries.

2.02 DUCTILE IRON PIPE

A. Buried ductile iron pipe shall be Class 52 or 53, as indicated on the Contract Drawings, and shall conform to AWWA specifications C150 and C151, latest revision. Ductile iron pipe shall have push-on type joints. Push-on type joints shall be used with the exception that mechanical joints shall be used at all fittings and along straight pipe sections where mechanical joint restraint is required. Ductile iron pipe shall be restrained with Field Lok 350 Gaskets as manufactured by US Pipe or approved equivalent, where required by the drawings or as required by the Engineer. All mechanical type joints shall be restrained with MEGALUGS Series 1100. All pipe shall have a double bituminous seal coating on all exterior surfaces.

B. All buried ductile iron pipe shall be zinc coated in conformance with ISO 8179-1 “Ductile Iron Pipes – External Zinc-based coating - Part 1” Metallic Zinc with Finishing Layer, latest edition.

D. Interior ductile iron pipe shall be Class 53, with flanged joints, and shall conform to AWWA specifications C150 and C151, latest revision.

2.03 FITTINGS

A. Fittings shall be ductile iron, mechanical joint, class 350 cement-mortar lined and provided with an asphaltic coating 1 mil +/- thick on the exterior. Buried fittings shall be zinc coated. Fittings and plugs for use with the ductile iron pipe specified shall be ductile iron, with a working pressure rating of not less than 350 psi, class 350 conforming to AWWA C153, for buried ductile iron pipe.

B. Sleeve couplings and accessories shall be pressure rated to at least equal to that of the pipe. Couplings shall be ductile iron.

2.04 JOINTS

A. Push-on and mechanical type joints for pipe as specified above shall conform to AWWA C111, latest revision. Gasket material for all jointing requirements shall be styrene butadiene (SBR). All lubricants shall be certified NSF approved for use in potable water systems. All mechanical joint types shall be restrained by the Megalug restraining system.

2.05 CEMENT MORTAR LINING

A. The interior of all ductile iron pipe shall be covered with a double cement-mortar continuous lining not less than 1/8" thick for 12" pipe and smaller, and applied in accordance with AWWA/ANSI C104/A21.4, latest revision.

2.06 STORAGE OF MATERIALS

A. Pipe and related materials shall be stored in locations and in a manner approved by the Owner or the Engineer. The locations and manner of storage shall be as to minimize handling of the materials.

B. All pipe shall be stored with a plastic covering over each end of the pipe. The purpose of the covering is to prevent deleterious material from entering the pipe during storage. The covering shall be secured in-place with a cord or cable and each pipe opening shall be provided with its own covering.

C. The Contractor shall, at all times, be solely responsible for the safe storage of all materials.

2.07 TESTING

A. Manufacturer Testing:

1. Testing of ductile iron pipe shall be done in accordance with AWWA C151, latest revision.
2. Testing of ductile iron fittings shall be done in accordance with AWWA C153 or C110, latest revision.
3. Testing of jointing material shall be done in accordance with AWWA C111, latest revision.
4. Testing of the interior coating shall be done in accordance with AWWA C104, latest revision.
5. Certified test reports shall be submitted by the pipe manufacturer.
6. The Owner and the Engineer shall be notified at least ten (10) days in advance of the date and location of the testing in order to witness the tests.
7. The Contractor shall furnish to the Owner and the Engineer notarized test reports by an independent testing laboratory, which show compliance of all materials furnished to the requirements specified herein. The test reports shall indicate results and methods employed.

B. Field Testing

1. Field-testing of ductile iron pipe installed for water service shall be performed according to the requirements as specified in Technical Specification 02704, Pipeline Pressure, Leakage, and Disinfection.

2.08 IDENTIFICATION

A. Provide 6" blue metalized detection tape with white printing reading "CAUTION WATER LINE BURIED BELOW" for water pipes, as manufactured by Seton.

2.09 BURIED PIPE INSULATION

A. Insulation to be installed as directed by the engineer.

PART 3 EXECUTION

3.01 PIPE INSTALLATION

A. General:

1. All pipe shall be installed in accordance with AWWA C151, latest revision and manufacturer requirements.
2. All pipe and accessories shall be carefully inspected by the Contractor for defects before installation and all defective unsound or damaged materials shall be rejected.
3. The Engineer will make such additional inspections as he deems necessary and the Contractor shall furnish all necessary assistance for such inspection.
4. Proper implements, tools, and facilities satisfactory to the Owner and the Engineer shall be provided by the Contractor for the proper and satisfactory execution of the work.
5. At no time will work be allowed to proceed without the Owner's representative present to inspect the work.

B. Pipe, accessories, and appurtenances shall be new and unused, and shall be of the types and materials specified, as indicated or as directed.

C. The interior of pipe and fittings shall be thoroughly cleaned of foreign matter before being lowered into the trench and shall be kept clean during laying operations.

D. Pipelines shall be constructed in dry trenches and shall not be laid when the conditions of the trench or the weather is unsuitable for such work.

E. The trench bottom and gravel bedding shall be shaped and compacted to give substantially uniform unyielding circumferential support to the lower fourth of the full length of each pipe.

F. Holes for the bells shall be excavated so that after placement the pipe and coupling receive uniform bearing pressure from the trench bottom. No blocking shall be allowed.

G. Each pipe shall be laid to the line and grade and in such a manner as to form a close concentric joint with the adjoining pipe and to prevent sudden offsets of the flow line.

H. As the work progresses, the interior and exterior of the pipes and couplings shall be cleaned of all dirt and superfluous material of every description.

I. When required to keep interior of pipe clean, a suitable drag shall be kept in the pipe and pulled forward past each joint immediately after the jointing has been completed.

J. At times when work is not in progress, open ends of pipe and fittings shall be securely closed so that no trench water, earth or other substance will enter the pipe or fitting.

K. Any pipe that has been disturbed after laying shall be taken up and re-laid at no additional expense to the owner.

L. All materials found to be defective during the progress of the work will be rejected by the Engineer and the Contractor shall promptly remove such defective material from the site of the work and replace with new material at no additional expense to the Owner.

M. The Contractor shall be responsible for the safe storage and proper handling of all materials.

N. No shims or mounds of earth shall be used to raise the pipe to grade.

O. All pipe shall be maintained accurately to the required line and grade.

P. No pipe shall be covered until the Engineer has inspected the joints.

Q. The pipeline shall not be used to convey trench drainage during construction.

R. Pipes shall be protected at all times during construction against flotation. They shall be thoroughly secured, properly supported and bedded to prevent settlement or disturbance. Compaction of bedding and backfill material shall be in strict accordance with Section 02200, Earthwork.

S. Bends, crosses, tees, caps, plugs, valves, and other appurtenances shall be strapped and clamped where indicated and/or as directed. Steel bars, rods and plates shall be of structural steel. Straps, bridle rods, clamps, anchors and such other parts shall be provided to the details as directed and as approved. After installation, all parts of the strapping and clamping devices shall be given two (2) heavy coats of an approved coal-tar base protective coating.

3.02 JOINTING

A. No pipes shall be jointed until couplings and ends of pipe have been inspected to determine that the joint surfaces are free from any defects in materials or workmanship, and free from dirt or other foreign matter.

B. Pipe, pipe fittings and accessories shall be stored, installed, joined and protected by the Contractor in strict accordance with the printed recommendations of the manufacturer of the piping material, and as approved.

C. Field assembled joints shall be checked with a suitable gauge as recommended by the manufacturer to ensure that the rubber rings are properly located.

D. Jointing by pushing the pipe home with a backhoe bucket or other heavy equipment will not be permitted. Utilizing the backhoe and a sling to suspend pipe while pushed home by bar or jack is permitted.

E. Protect the end of the pipe from damage at all times by using a timber header between the end of the pipe and the bar or jack.

F. If inspection indicates that the rings are improperly located, the Contractor shall disassemble, and properly reinstall the pipe.

G. Pipe stoppers shall be installed, sealed and blocked in such a manner as to prevent any leakage and so as to withstand an internal hydrostatic pressure of not less than 5 psi.

1. Timber blocking shall be of adequate size and arrangement to prevent the stopper from being blown off the line.
2. Timber bracing shall extend back to the undisturbed end of the trench.

H. Ductile iron pipe and fittings shall be provided with two brass wedges for 12" and smaller diameter pipe and four brass wedges for larger diameter pipe at each joint.

I. Bolts and nuts used with all mechanical joints shall be tightened to the manufactures specified torque with a torque wrench to verify that all bolts and nuts receive the same tightening. Under no conditions shall extension wrenches or pipe over handle of ordinary ratchet or wrench be used to secure greater leverage.

3.03 PIPE REMOVAL

A. Where old pipe conflicts with new pipe, old pipe shall be cut and capped on both ends and the caps shall be secured. No fitting or pipe deflections will be allowed on new pipe to go over or under old pipe. In areas where water mains are to be removed, the contractor shall disconnect each service lateral from the main at the corporation prior to removal of the main. The contractor shall be responsible for the legal disposal of the removed water main pipe.

3.04 IDENTIFICATION MARKERS

A. The line markers shall be installed two feet above the top of the buried pipeline. Where this is not possible, line markers shall be installed as close to two feet above the top of the buried pipeline as possible.

END OF SECTION

SECTION 02640 VALVES, TAPPING SLEEVES, & APPURTENANCES

PART 1 GENERAL

1.01 DESCRIPTION

A. Work Included:

The work under this Section includes the furnishing, installation and testing of all valves, tapping sleeves, transition couplings, hydrants, and appurtenances as indicated on the Drawings or as may be required by the Owner or the Engineer.

B. All materials included in this section that are to come into contact with potable water shall be either NSF 61 or NSF 60 approved as applicable.

C. Related Work Described Elsewhere:

02200 – Earthwork
02616 – Ductile Iron Pipe and Fittings

D. Reference Providence Water – Requirements for Water Mains, Services, and Appurtenances

1.02 QUALITY ASSURANCE

1. Manufacturer's Recommendations:

Using Providence Water's Project Management software, The Contractor shall submit for approval of the manufacturer's recommendations for the storage, protection, handling and installation of the valves, hydrants and appurtenances, which shall be strictly adhered to by the Contractor.

2. Certificate of Compliance:

Each shipment of valves, tapping sleeves, transition couplings, hydrants and appurtenances shall be accompanied with the manufacturer's notarized certificate certifying conformance with all requirements of the Specifications.

1.03 MARKING

A. Marking of all tapping sleeves shall conform to the requirements of AWWA 110 latest revision, marking of all valves shall conform to the requirements of AWWA 515 latest revision, and marking of all hydrants shall conform to the requirements of AWWA 502 latest revision.

1.04 MANUFACTURER'S REPRESENTATIVE

A. The Contractor shall furnish at no additional expense to the Owner, the services of the manufacturer's representative for instruction of the Contractor personnel who will be installing the tapping sleeves, transition couplings, valves and hydrants. The instruction shall include proper handling, installation and jointing, and other construction areas and

shall be for such lengths of time required to fully familiarize the Contractor's personnel with proper techniques. This information shall be bound and indexed for each type of unit as herein specified.

PART 2 PRODUCTS

2.01 GENERAL

A. All materials to be incorporated into the work shall be new and purchased specifically for this Contract. All material shall be made in the United States of America and shall be provided with documentation indicating the location of the foundry and/or place of origin, unless otherwise approved.

B. All coatings and/or protective oils used on materials that will eventually be in contact with potable water must be ANSI/NSF approved.

C. All hardware for valves, tapping sleeves, and appurtenances shall be stainless steel for corrosion resistance.

2.02 TAPPING SLEEVES AND TAPPING VALVES

A. All tapping sleeves shall comply in all respects to AWWA Standard C-110 and the following design standards:

1. Tapping sleeve shall be installed at the locations shown on the plans and details.
2. The tapping sleeve shall be a mechanical type joint to provide pressure-tight installation and be suitable for use with the existing pressurized pipe material. Outlet flange shall be Class 125C, ANSI B16.1.
3. Mechanical joint tapping sleeves shall have totally confined end gaskets and be designed to withstand a minimum of 200 psi working pressure. Nuts and bolts shall be Type 304 stainless steel. Nuts shall be coated per manufacturer’s recommendations to prevent galling.
4. The test plug shall be ¾” NPT, type 304 stainless steel.
5. Mechanical joint tapping sleeve body and outlet shall be thick gauge ASTM A240 type 304/304L stainless steel.
6. Tapping valves shall comply with Section 2.3 - Gate Valves except one end shall be flanged and the other end shall be mechanical.
7. Tapping valves shall be provided with an oversized opening to allow the use of full size cutters.
8. Mechanical tapping sleeves shall be ROMAC Industries, Inc. Model STS420, or approved equivalent.

2.03 BURIED GATE VALVES

A. Resilient seated gate valves shall meet AWWA C-515 and be UL listed and FM approved. Valves shall be ductile iron-body, stainless steel mounted, non-rising stem, 3-inch through 16-inch in diameter as shown on plans. All valves shall OPEN RIGHT. All valves shall be mechanical joint.

B. Sizes 3-inch through 16-inch shall be suitable for 250 psig maximum working pressure and 400 psig test pressure.

C. Manganese bronze stem material shall have a minimum tensile strength of 70,000 psi, yield strength of 35,000 psi and maximum elongation of 15 percent. Valve shall have a minimum of two O-ring stem seals.

D. Operating nuts shall be 2-inch square at the base, tapering to 1-15/16 inches square at the top and shall be manufactured of cast or ductile iron and attached to the stem with a nut or pin at the factory. Nuts shall be painted red and marked with an "arrow" to indicate direction of opening.

E. All hardware shall be Corten as manufactured by Romac Industries.

F. Rubber seats shall be new and of a compound natural or synthetic – designated for water service application. Reclaimed rubber is not acceptable. Seats shall be either bonded or mechanically attached to the gate. When mechanically attached, all exposed hardware shall be 18-8 Type 304 stainless steel.

G. The interior and exterior of valves shall be fully epoxy coated 8 mils thick. Epoxy shall be certified NSF approved for use in potable water systems. Field touch-up of the bonded epoxy within the body of the valve will be allowed; however, touch-up kit must be provided by the manufacturer of the valve and must meet the same NSF approval as the original bonded epoxy.

H. Valves sized 3-inch to 12-inch shall be by Mueller or approved equivalent.

I. Valves sized 16-inch shall be by American Flow Control and shall have a gear actuator with a minimum 2:1 gear ratio.

2.04 STRAIGHT AND TRANSITION PIPE COUPLINGS

A. The center sleeve and end rings of couplings shall be made of ductile iron, meeting or exceeding ASTM A536. The coupling shall accommodate the entire O.D. range in the specified size by use of interchangeable color-coded end rings and gaskets.

B. The coupling gasket shall be made of virgin rubber compound for water use. The SBR shall meet or exceed ASTM D2000-3-BA715. The gasket shall have raised lettering and sizing and state the proper color code for the appropriate end ring.

C. The coupling shall be equipped with stainless steel bolts, washers, and nuts and conform to the latest edition of the AWWA specification designation C-111.

D. Straight couplings shall be as manufactured by Romac style 501, or approved equal.

E. Transitional couplings shall be as manufactured by Romac style 501, or approved equal.

2.05 FLANGED COUPLING ADAPTERS

A. Flanged coupling adapters shall be Romac Restrained Flanged Coupling Adapter or approved equivalent. All nuts, washers and bolts shall be stainless steel.

B. Mechanical restraint shall be an integral part of the follower gland utilizing multiple single

tooth wedges. Each follower gland shall incorporate cam action, independent wedge engagement and meet applicable requirements of ANSI/AWWA C111/A21.11.

2.06 VALVE BOXES AND COVERS

A. A gate valve box shall consist of three pieces – over, upper section, and lower section – all of which are manufactured of cast iron. The lower section shall have an inside diameter of not less than 5 1/4 – inches and a length of at least 36-inches. It shall be designed to telescope into the upper section. Upper section length shall be 26-inches. Covers shall have the word "WATER" cast upon them.

B. An approved operating Key shall be provided.

2.07 THRUST RESTRAINTS

A. Restraining devices shall be utilized on all mains under the following conditions:

1. Pipeline direction changes (tees, bends)
2. Dead end lines (caps or plugs)
3. Transition pieces (reducers)
4. Couplings
5. All mechanical joints

B. Thrust blocks shall be designed to withstand the force imparted by the main with a minimum 1½ times the anticipated working pressure but not less than 150 p.s.i. Maximum lateral bearing capacity shall be 1,500 lb/sf. Sizing guidelines for thrust blocks are detailed on the project Drawings.

C. Thrust restraint shall also be provided via restrained joint, ductile iron pipe meeting AWWA C151/A21.512 and AWWA C111/A21.11. Restrained joint pipe lengths (restrained length) shall be sufficient to restrain thrust imparted by 1½ times the anticipated working pressure but not less than 150 psi. Pipe restrained joints shall be manufactured by EBAA Iron Sales, Inc. Series 1100 Megalug restraining system.

D. Thrust restraint utilizing tie-rods shall not be utilized unless approved by the Engineer or specifically indicated. Tie-rod diameters shall be 2 times the diameter required to restrain the main. All rods, nuts and other appurtenances shall be stainless steel.

2.09 HYDRANTS

A. All fire hydrants shall comply in all respects to AWWA C-502 and the following design standards:

1. Hydrants shall be dry-barrel, post-type. The main hydrant valve shall be of the compression type that opens against pressure in the main and be constructed of solid rubber that may be reinforced with steel. The connecting line or hydrant lateral shall be 6 inches in diameter, as per AWWA Standard M17.
2. The depths of bury shall have a typical bury of 5 feet, but at all times be installed to meet manufacturer's specifications for proper operation of the traffic breakaway feature. Hydrant extensions, which may be required, shall be manufactured by the same manufacturer of the hydrants being installed. Contractor shall field verify exact

bury depths of all proposed hydrants prior to ordering. Should extensions be necessary on new hydrants, the contractor shall not be entitled to additional compensation or time.

3. Hydrant shall be furnished with a sealed reservoir located in the bonnet so that all threaded and bearing surfaces are lubricated each time the hydrant is operated.
4. The bottom nut is to be bronze or fusion-bonded epoxy coasted ductile or cast iron. An O-ring seal shall be provided in the main valve assembly to insure that water cannot leak from the hydrant shoe, or elbow, into the hydrant barrel of drain way. O-ring seals in the main valve area shall seat against bronze or fusion-bonded epoxy coated cast iron. Hydrants shall have a bronze seat ring threaded to a bronze sub-set.
6. Hydrant shall be equipped with 5-¼ inch main valve opening.
7. Hydrants shall have a 150 PSI working pressure. Each hydrant shall be able to deliver 500 gallons per minute through its two hose nozzles when opened together with a loss of not more than 2 psi through hydrant.
8. Hydrant shall have at least two (2) bronze or copper lined drain outlets with a minimum net diameter of ¼-inch. The shoe of the hydrant shall be 6 inch mechanical joint D-150, suitable for use either with centrifugally cast pipe or Class D Pit Cast Pipe. Lugs will be case on either side shoe, securely anchoring the hydrant. Hydrants shall be furnished with a breakable feature that will break cleanly upon impact. This shall consist of a 2-part breakable safety flange with a breakable stem coupling. Hydrant nozzles must be able to be rotated to any position without disassembly of ground-line flange.
9. Hydrants shall open to the RIGHT (clockwise) and shall have a direction-to open arrow with the word "OPEN" imprinted on the hydrant and utilize a breakaway design. Each hydrant shall have two 2 ½ inch nozzles, 180-degrees apart, and one 4 ½ - inch steamer port nozzle. All nozzle threads are to be National Standard Threat. Lead shall not be used to secure nozzles to the hydrant barrel. Nozzle caps shall be cast iron and shall be secured to the hydrant barrel with rustproof steel chains.
10. The above grade stem shall be factory-coated with “Caution” yellow enamel.
11. Hydrant exteriors, above the ground line, shall be painted with on coat of primer and two finish coats of “Ivy Green” paint that will produce a surface to which subsequent coasts of paint, having a linseed oil base, will readily adhere. Bonnets shall be painted, in the same manner, to match existing colors (“Safety Yellow”)
12. Hydrants shall be so arranged that the direction of outlets may be turned 90 degrees without interference with the drip mechanism or obstructing the discharge from any outlet.
13. Hydrants shall be furnished with caps, double galvanized steel hose cap chain, galvanized steel pumper hose cap chain, a galvanized steel chain holder and any other hooks and/or appurtenances required for proper use.
14. All hydrants shall be equipped with a 6" gate valve, or 8” gate valves and 8” lateral when tee to hydrant distances are greater than 10 feet, in accordance with Section 2.3 above, and be fully restrained as shown on the drawings. Restrained joints shall be by Megalug Thrust Restraint Wedge manufactured and sold by EBAA Iron Sales Inc. In the event a bell and spigot joint is located between the tee and hy6drant, the bell and spigot joint shall be restrained with a Field Lok gasket or approved equivalent (from Providence Water’s approved manufacturer’s list)
15. Hydrants shall be Mueller A423 or Kennedy K81D. No substitutions will be allowed.
16. Hydrants shall be installed with sufficient height that when installed a 15-inch hydrant wrench will not contact the ground when making a full 360-degree turn on any nozzle cap.
17. A drainage pit with a volume of 10 cubic feet shall be provided at the base of the fire

hydrant barrel. The pit shall be filled with gravel or crushed stone to a depth of 6 inches above the hydrant drain opening and covered with filter fabric prior to backfilling. The gravel or crushed stone aggregate shall provide void space greater than the volume of the hydrant barrel.

PART 3 EXECUTION

3.01 INSTALLATION

A. General:

1. All tapping sleeves, valves, hydrants, and accessories shall be carefully inspected by the Contractor for defects before installation and all defective, unsound or damaged materials shall be rejected.
2. The Owner or the Engineer will make such additional inspections as deemed necessary and the Contractor shall furnish all necessary assistance for such inspection.
3. Proper implements, tools and facilities satisfactory to the Owner or the Engineer shall be provided by the Contractor for the proper and satisfactory execution of the work.

B. Tapping sleeves, valves, couplings and appurtenances shall be new and unused and shall be of the types and materials specified as indicated or as directed.

C. The interior of tapping sleeves, valves, and fittings shall be thoroughly cleaned of foreign matter before being lowered into the trench and shall be kept clean during laying operation.

D. Tapping sleeves, valves, and fittings shall be constructed in dry trenches and shall not be laid when the conditions of the trench or the weather are unsuitable for such work.

E. Tapping sleeves, valves, and couplings shall be laid to the line and grade in such a manner as to form a close concentric joint with the adjoining pipe and to prevent sudden offsets of the flow line.

F. At times when work is not in progress, open ends of tapping sleeves, valves and fittings shall be securely closed so that no trench water, earth or other substances will enter.

G. Any tapping sleeves, valves or fittings that have been disturbed after laying shall be taken up and re-laid.

H. All materials found to be defective during the progress of the work will be rejected by the Engineer and the Contractor shall promptly remove such defective material from the site of the work and replace with new material at no additional expense to the Owner.

I. The Contractor shall be responsible for the safe storage and proper handling of all materials.

J. No shims or mounds of earth shall be used to raise the equipment to grade.

K. No tapping sleeve, valve, or appurtenance shall be covered until the joints have been inspected.

L. Installed materials shall be protected at all times during construction against flotation; they

shall be thoroughly secured, properly supported and bedded to prevent settlement or disturbance. Compaction of bedding and backfill material shall be in accordance with Section 02200, EARTHWORK.

M. Tapping sleeves shall be installed where indicated or as directed by the Owner or the Engineer and shall be installed according to the manufacturer's recommended procedures.

N. Valves and joint restraints shall be installed where indicated or as directed by the Owner or the Engineer and shall be installed according to the manufacturer's recommended procedures.

3.02 SETTING VALVES AND VALVE BOXES

A. Valves shall be set in the pipelines as directed. Blocking or supports of a permanent nature shall be placed under each valve to ensure against settlement.

B. Each valve shall be tightly closed before being placed in the line and shall remain so until the joints on each side are completely tightened.

C. Valve boxes shall be set for all valves and shall be locking type. They shall be carefully fitted together and to the valve and securely held during backfilling. They shall be centered over the valve-operating nut. The bedding material around them shall be thoroughly tamped in place and the box cover set to the finished grade.

3.3 TESTING

A. All materials shall be tested for tightness as soon after installation as possible in accordance with Section 02704, PIPELINE PRESSURE, LEAKAGE, AND DISINFECTION.

B. All materials found to be defective during testing shall be replaced with new and approved material at no additional expense to the Owner.

3.4 TEST REPORTS AND CERTIFICATES

A. In addition to other requirements specified herein, the Contractor shall furnish to the Engineer notarized test reports and methods of test by an approved independent testing laboratory to show compliance of all materials furnished under this section of the Specifications with all the requirements herein.

A. Each shipment of tapping sleeves, valves, and other appurtenances shall be accompanied by the manufacturer's notarized certificate of conformance certifying that materials to be furnished under these items meet all requirements herein.

B. All testing of materials furnished under this section of the Specifications shall be provided by the Contractor at no additional expense to the Owner.

END OF SECTION

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Requirements for relocating existing utilities which conflict with the proposed Work.

1.02 SUBMITTALS

A. Submit utility relocation plans indicating limits and details of the relocation work.

1.03 PROJECT/SITE CONDITIONS

A. Existing Conditions:

1. The presents of utilities within the streets, roads and right of ways customarily indicate service lines connecting the buildings and structures along the route. Safeguard all utilities and there respective service connections from damage during the performance of the Work.
2. The presents of utility poles indicates overhead wires for electric, telephone and cable TV also exist. Protect all overhead wires, including service lines, from damage caused by equipment used to perform the Work under this Contract.
3. Existing utilities, as indicated on the Drawings are from the best available information. The accuracy of such is not guaranteed.

B. Relocation of Utilities:

1. Relocation of existing utilities will be required when;
   a. The existing utility interferes with the location of a structure or open cut piping installations or;
   b. Realignment of the proposed Work will have detrimental effects on the proposed Work or existing utility.

C. Support of Utilities:

1. Support of existing utilities will be allowed when;
   a. The location of the existing utility does not interfere with the excavation, excavation support, installation of piping, structures or appurtenances.
   b. Support in place will not be detrimental to the utility itself.
   c. Support of utility is in accordance with the requirements of the utility in question.

1.04 SCHEDULING

A. Coordination

1. Coordinate all existing utility relocation work with the appropriate utility company.
2. Notification of "Dig Safe" in accordance with Rhode Island requirements.
3. Conduct test pits to identify utility locations needed to perform the Work only after coordination with the utility company and in time to prevent delay of the Work.
4. Coordinate with the Client to operate water valves.

PART 2 PRODUCTS

2.01 MATERIALS

A. As required by the utility company, or as specified, or as approved by the Engineer.

B. All materials required to be incorporated into the work shall be new, purchased specifically for this contract.

PART 3 EXECUTION

3.01 EXAMINATION

A. After test pit excavations are performed, submit as built information to utility company and the Engineer.

3.02 INSTALLATION

A. In strict accordance with the requirements of the Utility Company responsible for the Work.

3.03 TESTING

A. Perform pressure and leakage testing on water lines relocated and infiltration or exfiltration testing on storm drains and sewers relocated in accordance with local agencies responsible for the utility.

3.04 INSPECTION

A. Allow access to the relocation work for inspections and recording as-built information.

END OF SECTION

PART 1 GENERAL

1.01 SCOPE

A. This section specifies requirements for the testing and disinfections of underground potable water pipelines. The work covered under this section includes, but is not necessarily limited to:

1. Leakage tests
2. Disinfection

NOTE: Testing will be performed prior to connecting new pipeline sections to any existing potable water system piping. No physical connections (temporary or permanent) between new pipe and existing pipe will be allowed during the test without the use of an approved backflow prevention device.

1.02 REFERENCES

A. American Water Works Association (AWWA):

1. AWWA B300: Standards for Hypochlorites
2. AWWA C600: Standard for Installation of Ductile Iron Water Mains and Their Appurtenances
3. AWWA C651: Standard for Disinfecting Water Mains
4. Providence Water: Requirements for Water Mains, Services, and Appurtenances (latest edition).

1.03 SUBMITTALS

A. Certified reports for all required tests shall be provided from an approved, qualified, independent testing laboratory.

B. Shop drawing of temporary connection backflow preventer.

C. Detail of temporary connection between existing and new water pipelines.

PART 2 PRODUCTS

2.01 HYPOCHLORITE

A. Hypochlorite shall conform to AWWA Standard B300, current edition. Hypochlorite shall be NSF 60 certified for potable water use.

2.02 BACKFLOW PREVENTER

A. Backflow prevention device for any connection between the existing water system and new water pipes prior to acceptance of pressure test, disinfections and flushing, shall be of the appropriate size as required and shall be double check type as manufactured by Watts, Febco, Hersey, or approved equivalent.

B. Backflow prevention device shall be NSF-61 certified.

2.03 GAUGES

A. Gauges used by the contractor in performance of the leakage tests shall be NIST certified and certification shall be traceable back to NIST.

PART 3 EXECUTION

3.01 PREPARATION

A. Cleaning and Inspection: The interior of all pipe, fittings, valves and appurtenances shall be thoroughly cleaned of all foreign material and inspected for cracks, flaws, or other defects before installation, and shall be kept clean until the work is accepted.

3.02 FIELD QUALITY CONTROL

A. Alignment Tests: Each section of pipe will be checked by the Owner or the Engineer in order to determine whether any displacement of the pipe has occurred. The Contractor shall provide suitable assistance to the Owner or the Engineer. The Contractor shall repair any poor alignment, displaced pipe or other defects discovered, as directed by the Engineer.

B. Hydrostatic Tests: After the pipe has been laid and the trench has been backfilled, all newly laid pipe or any valve section thereof, shall be subjected to a pressure and leakage test in accordance with AWWA C600-latest edition, Providence Water standards, and as approved by the Engineer. The Contractor shall provide all pumps, pipe, connections, gages, measuring devices, and all other apparatus necessary for the test and shall conduct the test in the presence of and to the satisfaction of the Engineer. The Owner will supply water to the Contractor for testing purposes at no expense to the Contractor.

1. Test Pressure - The required minimum test pressure shall be 1-1/2 times the working pressure measured at the point of lowest elevation of the pipeline and corrected to the elevation of the test gauge, but shall not be less than 150 psi. Test pressures shall not vary by more than plus or minus 5 psi for the duration of the test.
2. Duration of Test - two (2) hours minimum.
3. Air Removal - Prior to performance of the test the pipeline shall be completely filled with water for a period of 72 hours. Expel air by means of air relief valves, hydrants or other means as required. If permanent air vents or taps are not located at all high points, the Contractor shall install corporation stops at such points so air can be expelled. After the tests are completed, plug all temporary taps.
4. Allowable Leakage:
    a. Leakage shall be defined as the quantity of water that must be supplied into the newly laid pipe or any valve section thereof, to maintain pressure within 5 psi of the specified test pressure after the air in the pipeline has been expelled and the pipe has been filled with water. Leakage shall not be measured by a drop in pressure in a test section over a period of time.
    b. No pipe installation will be accepted if the leakage is greater than that determined by the following formula in which "L" is the allowable leakage in gallons per hour; "S" is the length of pipe tested in feet; "P" is the average test pressure during the leakage test in pounds per square inch (gauge); and "D" as the nominal diameter of the pipe in inches.

$$L = \frac{SD\sqrt{P}}{133{,}200}$$

5. Repair of Leaks - If the test discloses leakage greater than the allowable leakage the Contractor shall, at his own expense, locate and repair the defective joints until leakage is within the specified allowable. The Contractor shall repair any specific leaks regardless of the test results if, in the opinion of the Engineer, they are serious enough to endanger the future serviceability of the pipeline.

3.03 DISINFECTIONS OF POTABLE WATER LINES

A. General:

1. Flushing and disinfections of potable waterlines shall be done in accordance with the procedure set forth in AWWA C651 - Disinfecting Water Mains, latest edition, and shall be witnessed by the Engineer unless otherwise approved. The Contractor shall provide all temporary blowoffs, pumps, chlorination equipment, chlorine and all other necessary apparatus required. The Owner will supply water to the Contractor for disinfections purposes at no expense to the Contractor.
2. All valves on the new main shall be operated during the disinfections procedure in order to ensure complete disinfections.
3. The form of chlorine proposed by the Contractor for disinfections shall be approved by the Engineer.
4. The Contractor shall take adequate measures to prevent backflow of flushing water and chlorinated water into the existing water distribution system.
5. Contractor shall not make physical connection to the existing water main prior to satisfactory results of chlorination. An approved backflow prevention device shall be utilized to transfer water from the existing system to the new piping network.
6. Unless precluded by unexpected events, the Contractor shall notify the Owner at least three (3) working days prior to a water main shutdown. The Owner shall determine if the operation of valves will be performed by The Owner’s work forces, the Contractor, or a Owner Subcontractor. The immediacy of water main shutdowns or valve operation is not warranted by the Owner. In the operation of valves, for the purpose of shutting down existing mains, the Owner does not guarantee or imply that shut down will be completely effective in stopping the flow of water to open ends. If so directed by the Owner, the Contractor shall operate all valves required to shut down (and subsequently reopen) existing water mains. If the Contractor is unable to shut down a valve after two (2) hours of attempting to do so, the Owner will direct the Contractor as to how to proceed.

B. Pipe Cleaning:

1. If the pipe contains dirt or heavy encrusted matter that, in the opinion of the Engineer, will not be removed during the flushing operation, the Contractor shall clean and swab the interior of the pipe with a one (1) percent hypochlorite disinfecting solution.
2. The pipeline shall be flushed to remove all remaining foreign material prior to disinfections, except when the tablet method is used. The flushing operation shall develop a minimum velocity of 3.0 ft/sec. It will be the Contractor's responsibility to properly size and locate corporations within test sections to adequately flush all piping

at least 2 times its volume at the desired velocity. A minimum of a six-inch (6") supply line will be required to adequately flush all piping for this project.

3. Main line valves shall not be utilized to fill, flush, test or chlorinate water mains unless authorized and supervised by the Engineer.

C. Chlorine Application:

1. In general, chlorine shall be applied using the continuous feed method, as specified in AWWA C651.
2. Introduce water into the line at a constant rate while adding chlorine to the water at a constant rate, such that the water will have not less than 25 mg/L free chlorine. Maintain the chlorinated water in the pipeline for a minimum of 24 hours, after which period the treated water shall have a free chlorine residual of not less than 10 mg/L throughout the entire length. Repeat the above procedure if the residual, at the end of the 24 hours, fails to meet the minimum concentration. Chlorinated water, above the normal system prevailing concentration, shall not be allowed to remain in the pipeline for a period longer than 5 days.
3. Fire hydrants may not be used for sampling points but may be utilized as a feed source if properly flushed and the Owner's required temporary piping system installed.

D. Final Flushing:

1. After the required retention period, flush all heavily chlorinated water from the main until the chlorine concentration is no higher than that prevailing in the system, or is acceptable for domestic use. The Contractor shall be responsible for satisfactory disposal of all flushing water and chlorinated water at no additional expense to the Owner.
2. Prior to discharging, a reducing agent shall be applied to the water to be wasted, to neutralize thoroughly the chlorine residual remaining in the water. (See Appendix C of AWWA C651 for neutralizing chemicals).

E. Analytical Tests:

1. After completion of the final flushing and prior to placing the pipeline in service, two (2) consecutive sets of acceptable samples taken at least 24 hours apart shall be collected by Providence Water personnel. Each sample shall be analyzed for total coliform and heterotrophic plate count (HPC). Providence Water personnel shall take single samples to be analyzed for pH, chlorine, and iron.
2. No VOC samples will be taken for water mains.
3. All samples must meet Providence Water Standards.

F. Repetition of Procedure - If the original disinfections fails to produce satisfactory samples, repeat the disinfections procedure until satisfactory results are obtained at no additional expense to the Owner. The Owner reserves the right to charge for the cost of additional water and cost to preform additional sampling, should the first round of sampling fail to produce satisfactory results.

END OF SECTION

PART 1 GENERAL

1.01 WORK INCLUDED

A. Work under this section includes furnishing of additional topsoil and its preparation for seeding and mulching areas disturbed by the construction operations.

1.02 RELATED WORK SPECIFIED ELSEWHERE

Section 02200 - Earthwork

1.03 QUALITY ASSURANCE

A. Submittals:

Include certifications of performance for mulch products and analysis of proposed seed products. Submit certification that grass seed has been tested by a recognized laboratory for seed testing, within 6 months prior to delivery. Do not use seed that has become wet or moldy.

PART 2 PRODUCTS

2.01 MATERIALS

A. Topsoil: Loose friable loam, free of stumps, roots, rocks, brush, weeds, subsoil, refuse or other material detrimental to proper development of vegetative growth.

B. Mulch: Wood Cellulose Fiber - commercial product specifically manufactured for use with grass seed. Express application requirements of product in terms of air-dry weight (10% maximum allowance for moisture content).

C. Commercial Fertilizer: Commercial product manufactured for seeded or sodded areas, containing nitrogen derived from natural sources and 10% by weight in available form with 6% phosphoric acid and 4% potash.

D. Lime: Ground limestone to existing State and Federal regulations containing minimum 50% total oxides (calcium and magnesium oxides). Fifty percent passing 100-mesh sieve and 98% passing 20 mesh sieve.

E. Seed Mix: New England Conservation/Wildlife Mix.

PART 3 EXECUTION

3.01 GRASS SEEDING

A. General - plant seed in either spring or fall season as directed by the Owner. Re-seed all newly filled or disturbed areas.

B. Topsoil - place and spread to a compacted thickness of not less than 9 inches where areas

are filled or disturbed as a result of the construction operations. Key to underlying sub grade by means of harrows, rollers or other suitable and approved equipment. Do not begin placement until areas have been properly graded and prepared.

1. Apply water as required, an in a manner that will prevent washing and eroding.

C. Soil Preparation - remove all ground surface irregularities to eliminate low areas where ponding of water will occur.

1. Immediately prior to seeding, lightly till soil into an even and loose seedbed at the specified or directed line and grade.

D. Fertilizing - till lime into the upper 3-inch layer of loam at the rate of 46 pounds per 1,000 square feet of area to be seeded. Repeat procedure for application of fertilizer at the rate of 21 pounds of 10-6-4 commercial fertilizers per 1,000 square feet. Remove sticks, stones and debris from the areas and dispose of as directed.

E. Seeding - apply 1,750 square feet per 1 pound of seed mix with mechanical landscape drill so that seed will have about 1/4" cover. Do not drill seed in windy weather or when ground is frozen. Use broadcast or hydraulic seeding methods only in areas inaccessible to machine methods; or use hydraulic equipment capable of pumping 100 gallons per minute at 100 pounds per square inch. Provide means for estimating volume used or remaining in storage tank.

1. Water and maintain seeded areas for periods of 5 weeks following seeding including mowing. Avoid standing water, surface wash or scour. Protect seeded areas from vehicle and pedestrian traffic by use of barriers and signs.
2. Reseed areas where a satisfactory stand of grass, which has no bare spots larger than 72 square inches covering a maximum of 2 percent of the entire grassed area, has not produces in a 5-week period, repeat seeding until accepted.

F. Mulching - add cellulose fiber mulch in proper proportional quantities of water in a slurry tank and thoroughly mix. Spray mulch uniformly over seeded areas at the rate of 1,000 pounds per acre. Do not mulch in the presence of free surface water resulting from rain, melting snow or similar causes.

END OF SECTION

DIVISION 3

CONCRETE

PART 1 GENERAL

1.01 WORK INCLUDED

A. This section specifies requirements for concrete formwork to produce cast-in-place concrete structures as shown on the Drawings and as specified herein. The work shall consist of designing, furnishing, constructing, and removing formwork for all cast-in-place concrete structures.

B. Use forms, wherever necessary, to confine the concrete and shape it to the required lines, and to provide the specified finish. Construct forms with sufficient strength to structurally support the work, and withstand the pressure resulting from placement and vibration of the concrete, and maintain forms rigidly in position. Construct forms sufficiently tight to prevent loss of mortar from the concrete.

1.02 REFERENCES

A. American Concrete Institute (ACI):

1. ACI 117: Standard Specification for Tolerances for Concrete Construction and Materials.
2. ACI 301: Standard Specification for Structural Concrete.
3. ACI 347: Guide to Formwork for Concrete.
4. Massachusetts State Building Code

1.03 DESIGN REQUIREMENTS

A. Design formwork to support vertical loads and lateral pressures resulting from placement and vibration of concrete in accordance with the requirements of ACI 301 and ACI 347, and as specified herein.

B. Camber the formwork to compensate for anticipated deflections due to the weight and pressure of the fresh concrete and due to construction loads.

C. Provide shores and struts with positive means of adjustment capable of taking up formwork settlement during concrete placing operations. Use wedges or jacks, individually or in combination for adjustment.

D. Design forms and falsework to include assumed values of live loads, dead load, weight of moving equipment operated on formwork, concrete mix, height of drop, vibrator frequency, ambient temperature, lateral stability, and other factors pertinent to the safety of the structure during construction.

E. Provide and design forms to conform with expansion and construction joint locations.

1.04 SUBMITTALS

A. Submittals for the following items shall be made in accordance with the requirements as specified in Section 01300, Submittals.

B. Submit the following at least 30 days before the first concrete placement:

1. Manufacturer's data and installation instructions for proprietary form accessories, form coatings, pipe sleeves and seals, form ties, and manufactured form systems, if used.
2. Certification that form coatings comply with the requirements of this Section.

1.05 QUALITY CONTROL

A. Provide in accordance with the requirements as specified in Section 01400, Quality Control.

B. Tolerances:

1. Permissible surface irregularities for the various classes of concrete surface finish as specified in Section 03300, Cast-in-Place Concrete, are defined as "finishes", and are to be distinguished from tolerances as specified herein. Deviations from the established lines, grades, and dimensions will be permitted to the extent set forth herein.
2. The tolerance limits specified in this Section and the surface finish irregularities permitted in Section 03300, Cast-in-Place Concrete, are not the limits to which forms may be built or by which damaged from sheathing may be used. These limits are provided only for the occasional slight misalignment or irregularity of surface which may occur despite a serious effort to build and maintain the forms accurately and securely with an even surface. These limits will be allowed only for inadvertent or relatively infrequent irregularities of the degree mentioned, but practices and form materials will be prohibited which without doubt will result in the creation of additional irregularities, even though these would be within the limits specified.
3. Where specific tolerances are not stated herein or shown on the Drawings for a structure, portion of a structure, or other feature of the work, permissible deviations will be interpreted conforming to the tolerances stated herein for similar construction. Specific maximum or minimum tolerances as shown on the Drawings in connection with any dimension shall be considered as supplemental to the tolerances specified herein and shall govern. Concrete forms shall be set and maintained within the tolerance limits necessary to ensure that the completed work will be within the tolerances specified. Concrete construction that exceeds the tolerance limits specified or as shown on the Drawings shall be remedied or removed and replaced by the Contractor at no cost to the Owner.
4. Tolerances shall be as specified in ACI 117, Standard Specifications for Tolerances for Concrete and Materials.

PART 2 PRODUCTS

2.01 MATERIALS

A. Forms for Exposed Finish Concrete: Construct formwork for exposed concrete surfaces with smooth faced undamaged plywood or metal, metal-framed plywood faced or other acceptable panel-type facing materials approved by Engineer, to provide continuous, straight, smooth as-cast surfaces, and produce a uniform and consistent texture and

pattern on the surfaces. Metal patches on forms for these surfaces will not be permitted. Furnish in largest practicable sizes to minimize number of joints and to conform to joint system shown on the Drawings.

1. Use overlaid plywood complying with U.S. Product PS-1 "A-C or B-B High Density Overlaid Concrete Form", Class I.
2. Use plywood complying with U.S. Product Standard PS-1 "B-B (Concrete Form) Plywood", Class I, Exterior Grade or better, mill-oiled and edge-sealed, with each piece bearing legible inspection trademark.

B. Forms for Unexposed Finish Concrete: Plywood, lumber, metal, or other acceptable material. Provide lumber dressed on at least 2 edges and one side for tight fit.

C. Tubular Fiber Forms:

1. Provide forms with spirally constructed laminated plies of fiber.
2. Provide forms with wall thickness as recommended by the manufacturer to meet load requirements of the various uses and sizes.
3. Provide forms with wax coated outside surfaces for moisture resistance.
4. Provide forms with inside surface coated with bond-breaker compound.

D. Form Ties:

1. Form Ties: For concrete structures, which will not be in view or buried below finish grade, use carbon steel factory-fabricated, removable or stay in place snap-off type form ties, designed to prevent form deflection and to prevent spalling concrete upon removal. Provide units, which will leave no metal closer than 1-1/2" to surface. Provide ties which, when removed, will leave holes not larger than 1" diameter in concrete surface. Patch all holes with non-shrink grout.
2. Form ties and spreaders for walls in areas exposed to view shall be Stainless Steel Cone–Tight Tyscru by Richmond Screw Anchor Co.; Dayton Sure-Grip and Shore Co.; or substitute approved by Program Manager with Plastic cone-tight type cones having a 1" setback and a taper from 1" to 1-1/4". Tycone holes shall be sealed with plastic set back plugs, color as selected by Engineer from manufacturer's standard color selection or filled with non-shrink grout. Tyscru ties shall be sized to satisfy loading requirements.
3. In lieu of form ties specified above, fiberglass form tie systems shall be used. Fiberglass form ties shall be standard gray color. The concrete structure shall be finished by grinding the fiberglass form tie flush with the finish surface of the concrete structure.

    a. If tapered architectural holes are required, dummy tapered cones having a 1" setback and a taper from 1" to 1-1/4 shall be fastened to the interior of the formwork to achieve the specified pattern on the finish structure.

E. Form Releasing Agents: Provide commercial formulation form-releasing agents that will not bond with, stain, nor adversely affect concrete surfaces requiring bond or adhesion, nor impede the wetting of surfaces to be cured with water or curing compounds. Volatile organic compound emissions of form coating agent shall not exceed 2.09 pounds per gallon (250 grams per liter).

F. Chamfer Strips: Provide ¾-inch triangular fillets to form all exposed concrete corners. Material shall be rubber or polyvinyl chloride type, or smooth clear, sealed softwood.

G. Sleeves: Sleeves for wall and floor penetrations shall be pre-engineered Century-Line sleeves as manufactured by Thunderline Corporation or Engineer approved substitute. Sleeves shall be constructed of high impact thermoplastic with waterstop collar, reinforcing ribs and nailer end caps for positioning forms. Sleeve shall be designed to work with modular mechanical seal for through wall penetrations. Size of sleeves shall be selected according to manufacturer's recommendations for pipe sizes indicated on Drawings.

H. Seals: Sleeve/pipe seals shall be Link-Seal modular mechanical seals as manufactured by Thunderline Corporation or Engineer approved substitute. The seal shall be modular, mechanical; type, consisting of interlocking synthetic rubber links shaped to continuously fill the annular space between the pipe and the wall opening. The elastomeric element shall be sized and selected per manufacturer's recommendations and have the following properties as designated by ASTM:

1. For standard service applications: (-40°F to 250°F) EPDM – ASTM D2000 M3 BA 510.
2. For hydrocarbon service applications: (-40°F to 210°F) Nitrile – ASTM D2000 M1BF510.
3. For high temperature or fire seal applications: (-60°F to 400°F) Silicone – ASTM D2000 M1GE505.

PART 3 EXECUTION

3.01 INSPECTION

A. Examine the substrate and conditions under which work of this Section is to be performed, and correct unsatisfactory conditions, which would prevent proper and timely completion of the work. Do not proceed until unsatisfactory conditions have been corrected.

3.02 FORM CONSTRUCTION

A. General:

1. Construct forms as designed and in accordance with Contractor's approved working Drawings conforming to ACI 347, to the exact sizes, shapes, lines, and dimensions shown, and as required to obtain accurate alignment, location, grades, level, and plumb work in finished structures.
2. Provide for openings, offsets, keyways, recesses, moldings, chamfers, blocking, screeds, bulkheads, anchorages, inserts, and other features required. Use selected materials to obtain required finishes.
3. Forms for concrete which accommodate work of other trades, fabricated before the opportunity exists to verify the measurements of adjacent construction, shall be accurately sized and located as dimensioned on the Drawings. In the event that deviation from the Drawing dimensions results in problems in the field, the Contractor shall be responsible for resolution of the conditions as approved by

the Engineer, at no cost to the Owner.

B. Fabrication:

1. Fabricate forms for easy removal without hammering or prying against concrete surfaces. Provide crush plates or wrecking plates where stripping may damage concrete surfaces.
2. Provide temporary openings where interior area of formwork is inaccessible for cleanout, for inspection before concrete placement, and for placement of concrete. Brace temporary closures and set tightly to temporary openings on forms in as many inconspicuous locations as possible, commensurate with design requirements. Form intersecting planes to provide true, clean cut corners.

C. Falsework:

1. Erect falsework and support, brace, and maintain it to safely support vertical, lateral, and asymmetrical loads applied until complete structure has attained design strength. Construct falsework so that adjustments can be made for take-up and settlement, and access is provided for inspection.
2. Provide wedges, jacks or chamfer strips to facilitate vertical adjustments. Carefully inspect falsework and formwork during and after concrete placement operations to determine abnormal deflection or signs of failure; make necessary adjustments to product work of required dimensions.

D. Forms for Exposed Concrete:

1. Drill forms to suit ties used and to prevent leakage of concrete mortar around tie holes. Do not splinter forms by driving ties through improperly prepared holes
2. Provide sharp clean corners at intersecting planes, without visible edges or offsets. Back joints with extra studs or grits to maintain true, square intersections.
3. Use extra studs, walers, and bracing to prevent bowing of forms between studs and to avoid bowed appearance in concrete. Do not use narrow strips of form material, which will produce bow.

E. Corner Treatment:

1. Unless shown otherwise, form chamfers with ¾-inch by ¾-inch strips, accurately formed and surfaced to produce uniformly straight lines and tight edge joints on exposed concrete. Extend terminal edges to required limit and miter chamfer strips at changes in direction.

F. Control Joints: Locate as indicated on the Drawings.

G. Provision for Other Trades: Provide openings in concrete formwork to accommodate work of other trades. Verify size and location of openings, recesses and sleeves with the trade requiring such items. Accurately place and securely support items to be built into forms.

H. Cleaning and Tightening: Thoroughly clean forms and adjacent surfaces to receive concrete. Remove encrusted mortar and grout, chips, wood, sawdust, dirt, and other

debris just before concrete is placed. Retighten forms immediately after concrete placement as required to eliminate mortar leaks.

3.03 FORM COATINGS

A. Coat form contact surfaces with form-releasing agent before reinforcement is placed. Do not allow excess form coating material to accumulate in the forms or to come into contact with surfaces that will be bonded to fresh concrete. Apply in strict compliance with manufacturer's instructions.

B. Remove surplus coating on form surfaces before placing concrete.

3.04 INSTALLATION OF EMBEDDED ITEMS.

A. Set and build into the forms, anchorage devices and other embedded items required for other work that is attached to, or supported by, cast-in-place concrete. Use setting Drawings, diagrams, instructions and directions provided by suppliers of the items to be attached thereto.

B. Set edge forms or bulkheads and intermediate screed strips for slabs, to obtain required elevation and contours in the finished slab surface. Provide and secure units to support types of screeds required.

3.05 REMOVAL OF FORMS

A. Formwork not supporting concrete, such as sides of walls, columns, and similar parts of the Work, may be removed after cumulatively curing at not less than 50 degrees F for 72 hours after placing concrete, provided concrete is sufficiently hard to not be damaged by form removal operation, and provided that curing and protection operations are maintained.

B. Formwork supporting weight of concrete, such as elevated beams, joists, slabs and other structural elements may not be removed until concrete has attained 70% of its design minimum 28-day compressive strength, and has cumulatively cured for no less than 7 days. Concrete shall have sufficient strength to safely support its own weight and construction live loads and lateral pressures. Determine potential compressive strength of in-place concrete testing field-cured specimens representative of the concrete location or members, as specified in Section 03300, Cast-in-Place Concrete.

C. Form facing material may be removed one day after placement, only if shores and other vertical supports have been arranged to permit removal of form facing material without loosening or disturbing shores and supports.

D. Form ties: The concrete structure shall be finished by grinding the fiberglass form ties flush with the finish surface of the concrete structure.

3.06 REUSE OF FORMS

A. Clean and repair surfaces of forms to be reused in the work. Split, frayed, delaminated or otherwise damaged form facing material will not be acceptable. When forms are reused for successive concrete placement, thoroughly clean surfaces, remove fins and laitance,

and tighten forms to close all joints. Align and secure joints to avoid offsets. Apply new form releasing agent to all form areas that will be in contact with concrete.

B. Do not reuse forms if there is any evidence of surface wear and tear, splits, fraying, delamination or other damage which would impair the quality of the concrete surface or prevent obtaining the specified concrete finish.

END OF SECTION

PART 1 GENERAL

1.1 WORK INCLUDED

A. Furnish and install all pre-stressed, pre-cast concrete structural units; all anchoring and fastening devices; inserts and hangers, or attachments.

B. Provide all labor, plant, and materials.

1.2 RELATED WORK SPECIFIED ELSEWHERE

Section 03200 – Concrete Reinforcement
Section 03300 – Cast-in-Place Concrete

1.3 QUALITY ASSURANCE

A. Standards and Codes: All concrete, pre-stressing steel, reinforcing steel, and the design and construction of the pre-cast concrete units shall meet the latest edition of the following specifications, standards and codes and the modifications as specified herein.

1. American Concrete Institute, ACI 318, Building Code Requirements for Reinforced Concrete.

2. In addition, design of the pre-cast concrete valve pit shall be in accordance with the American Association of State Highway and Transportation Officials (AASHTO) Standard Specifications for Highway Bridges, 1983, including all subsequent revisions.

3. Pre-stressed Concrete Institute:

MNL-118 – Manual for Inspection for Pre-stressed Concrete;

MNL-116 – Manual for Quality Control for Plants and Production for Precast Concrete Products.

B. Fabrications: If required by the Owner, the manufacturer of the pre-cast concrete units shall submit evidence showing that he has successfully completed similar work prior to being approved as the source of members for this Project. The manufacturing process shall be clearly supervised by experienced plant personnel and daily records of concrete strength shall be kept and submitted to the Owner for control.

1.4 DESIGN INFORMATION

A. Prior to fabrication of any pre-cast concrete units, the Contractor shall submit for approval, detailed and complete shop drawings, setting plans, design information, and such other data as the Owner may require.

1. The shop drawings shall bear the Contractor's certification that the work has been coordinated with other related items of construction.

2. The manufacturer's design calculations for all pre-cast concrete units shall be submitted to the Engineer for approval prior to the fabrication of the units.

3. The Contractor shall furnish for the Owner's reference, the manufacturer's printed recommendations and instructions for the storing, handling, protection, and erection of the pre-cast concrete units.

1.5 SHOP DRAWINGS

A. Shop drawings shall be submitted for all units to be used in the contract work. The drawings shall show the setting plans, exact profile of each unit, openings required, all inserts and other items which are to be embedded in the units:

1. Attachments, type, size and location of all reinforcing steel.

2. Initial pre-stress force.

3. Concrete strength bearing and support details.

4. Connection and anchoring methods.

5. All other construction requirements necessary for the proper fitting of the contract work and for receiving the work of other trades.

6. Details shall be submitted and approved, of the jointing system for joints between all pre-cast concrete units and sections.

7. Shop drawings submitted and approved for the jointing system of joints between all pre-cast concrete units and sections. Shop drawings submitted for approval shall also include a detailed listing of all material and installation techniques to be employed to assure watertight joints.

B. The Drawings shall show the identifying setting and other required markings, which are to be legibly, and permanently marked on each pre-cast unit.

1.6 COOPERATION WITH OTHER TRADES

A. The Contractor shall be responsible for coordinating the work of other trades with the work under this section to avoid interferences and unnecessary cutting of the work, and to permit the proper and satisfactory installation of the contract work.

1.7 TEST REPORTS AND CERTIFICATES OF CONFORMANCE

A. In addition to other requirements specified herein, the Contractor shall furnish to the Owner the pre-cast concrete manufacturer's notarized test reports and methods of test to show compliance with all specification requirements.

1.8 SERVICES OF MANUFACTURERS' REPRESENTATIVES

A. If required by the Owner, the Contractor shall furnish at no additional expense to the

Owner, the services of the respective manufacturers' representatives of the pre-cast concrete units, for such lengths of time as may be necessary to properly instruct the Contractor's personnel in the proper handling, installation, and jointing of the pre-cast concrete units in accordance with the printed recommendations of the manufacturer. This service will not be required if all erection of the pre-cast concrete units is performed by the manufacturer.

PART 2 PRODUCTS

2.1 MATERIALS

A. Cement shall be portland cement conforming to ASTM designation: C150, Type III, high early strength.

B. Aggregate shall conform to ASTM C330 and shall be graded, crushed stone with a resulting unit weight of concrete of up to one hundred fifty-five (155) pounds per cubic foot.

C. Water shall be clean and free of injurious and deleterious substances.

D. Concrete shall have a minimum strength of 5,000 psi at 28 days, and strength of 3,000 psi at time of form release.

1. During the process of manufacturing of the units, not less than two (2) test cylinders shall be tested at time of release of the form, and two (2) at age 28 days.

2. All compression test cylinders shall be made, cured, and stored in accordance with ASTM C31. Cylinders shall be tested in accordance with ASTM C39.

3. All concrete shall contain 3-5 percent air entrainment.

E. Admixtures shall only be used after prior approval of the Engineer.

F. All reinforcing bars shall conform to the requirements of ASTM A615, Grade 60.

G. Welded wire fabric shall conform to the requirements of ASTM A185.

2.2 ERECTION TOLERANCES

A. Differences in setting between any two (2) adjacent units, after units are in place, shall not exceed one (1) inch between units without correction by methods approved by the Owner.

B. The joints between all units shall be filled with an approved joint sealing material.

C. All connections shall be done in accordance with the shop drawings and shall be in accordance with the previously mentioned codes and accepted industry standards and best-accepted practice.

PART 3 EXECUTION

3.1 GENERAL

A. All pre-cast concrete units shall be stored, handled, protected and erected in accordance with the printed recommendations of the manufacturer and in a manner to prevent overstressing, marring or damaging of the units.

B. The work shall be performed by workers who are experienced in this type of work.

C. Installation shall be true to the lines and grades indicated on the Drawings.

D. In addition to all other requirements specified, all pre-cast concrete units shall be adequately designed and fabricated to safely withstand all handling stresses without damage and to adequately and safely support all loads imposed by the work of other trades which might affect construction.

3.2 ERECTION

A. Preparation:

1. All units shall be erected true to line and grade, and in the proper sequence as outlined on the approved shop drawings.

2. No holes shall be cut or drilled in the field without the written approval of the Engineer.

3. To avoid damage and stress concentration, lifting devices shall be designed for 100 percent impact loading and shall be sufficiently ductile to ensure obvious deformation before failure.

B. Installation:

1. The concrete units shall be set on clean and properly prepared bearing surfaces, free from any conditions that would interfere with the proper setting of the concrete units.

2. All anchoring and fastening devices shall be provided for the proper and satisfactory installation of the units.

3. All anchoring and fastening devices shall be zinc-coated and of the types, details and arrangements as indicated, and as necessary and required for proper, safe and adequate installation of all pre-cast concrete units.

4. Anchoring and fastening devices to be embedded in other work shall be built-in as the work progresses.

5. No cracked, warped, or broken units, or units which, in the opinion of the Owner, show defects that might adversely affect the serviceability of the units, shall be used in the work. Defective units shall be removed from the site and shall be replaced by the Contractor with new and sound units at no additional expense to

the Owner.

6. Joints between pre-cast sections and units shall be made in an approved manner to guarantee a leak-proof, totally watertight joint. Joint designs incorporating O-rings and cement grout will not be accepted.

3.3 PATCHING

A. Where patching is permitted by the Owner, the patches shall be made using the same materials as used in the unit being patched and using a 2-part epoxy compound of a type to produce proper bonding of the patch to the units.

B. Patching shall match the adjacent surfaces in color and texture.

C. Patching of imperfections at the plant shall require the Owner's approval before the unit is shipped from the manufacturer's plant.

3.4 CURING

A. Units shall be cured by suitable heating, moisture or steam curing until the required strength for release or handling is obtained. During this time, no surface shall be exposed to direct sunlight or direct wind.

3.5 MARKING

A. Each pre-cast concrete unit shall be marked in accordance with the marking and identifying procedure designated on the approved shop drawings and setting plans.

3.6 FLUID APPLIED WATERPROOFING

A. A one component elastomeric waterproofing membrane shall be provided on all exterior underground concrete services. Ensure services are free of cracks and seal as required prior to application of membrane. Clean surfaces and remove any other foreign material that may be detrimental to the proper installation of the membrane. Apply waterproofing membrane in accordance with manufacturer’s recommendations.

END OF SECTION

PART 1 GENERAL

1.01 WORK INCLUDED

A. This Section specifies all work necessary to provide all concrete reinforcement such as reinforcing steel, welded wire fabric, mechanical couplers and concrete inserts as shown on the Drawings and as specified herein.

B. The design requirements, materials, and methods outlined in this specification shall be considered the minimum requirements for the scope of work covered herein.

1.02 RELATED WORK SPECIFIED ELSEWHERE

Section 03100 – Concrete Formwork
Section 03110 – Precast Concrete
Section 03300 – Cast-in-Place Concrete

1.03 REFERENCES

A. American Concrete Institute (ACI):

1. ACI 315: Details and Detailing of Concrete Reinforcement
2. ACI 315R: Manual of Engineering and Placing Drawings for Reinforced Concrete Structures

B. American Society for Testing and Materials (ASTM):

1. A 185: Specification for Steel Welded Wire, Fabric, Plain, for Concrete Reinforcement
2. A 615: Specification for Deformed and Plain Billet-Steel Bars for Concrete Reinforcement
3. A 706/A 706M: Specification for Low-Alloy Steel Deformed Bars for Concrete Reinforcement

C. American Welding Society (AWS):

1. AWS D1.4: American Welding Society, Structural Welding Code, Reinforcing Steel.

D. Massachusetts State Building Code

1.04 QUALITY CONTROL

A. Do not fabricate reinforcement until shop and placement drawings have been approved by the Engineer.

B. Tolerances:

1. Tolerances shall be as specified in ACI 315R.

1.05 SUBMITTALS

A. Shop Drawings:

1. Shop drawings for reinforced concrete structures shall be submitted after the concrete pour sequences, construction joint locations, and placement schedules have been approved by the Engineer.
2. At least 30 days before each scheduled concrete placement, submit shop drawings covering the reinforcing steel details, bar lists, support bars and details, locations of reinforcing bar cut-offs, splices, development lengths and placement details. Prepare shop drawings in accordance with ACI 315 and 315R from reinforcement details shown on the Drawings.
3. Mill Certificates: Accompanying the shop drawings, submit steel producer's certification of mill analysis, tensile, and bend tests for reinforcing steel.
4. Welder's certification in conformance with AWS D1.4, when welding is indicated or specified. Testing of welds shall be conducted and witnessed by an independent testing laboratory prior to welding of reinforcement. Maintain qualification and certification records at the job site, readily available for examination of test results.

B. Samples:

1. Provide one sample of each type of mechanical splicing device.

C. Manufacture's literature including installation instructions for the following:

1. Mechanical splicing devices
2. Supports

1.06 DELIVERY, STORAGE, AND HANDLING

A. Delivery: Deliver reinforcement to the job site bundled, tagged, and marked. Use metal tags indicating bar size, lengths, and other information corresponding to markings shown on shop drawings.

B. Storage: Store reinforcement at the job site in a manner to prevent damage and accumulation of dirt and excessive rust.

PART 2 PRODUCTS

2.01 MATERIALS

A. Reinforcing bars shall be newly rolled deformed bars conforming to ASTM A615 Grade 60, unless otherwise indicated on the Drawings.

1. Bars to be welded shall conform to ASTM A706 deformed, Grade 60.
2. Provide mill bent reinforcing bars, bent cold to the dimensions indicated and conforming to the requirements of ACI SP-66.

B. Welded wire fabric shall conform to ASTM A 185, with a minimum ultimate tensile

strength of 70,000 psi. Provide in sizes indicated. Provide support bars and reinforcing bar supports as specified to obtain the concrete cover.

C. Bar support and accessories shall be galvanized or plastic coated and shall conform to ACI 315. Provide minimum size number 5 support bars.

D. Provide 3-in. by 3-in. plain precast concrete blocks and precast concrete doweled blocks for reinforcing bar supports in foundation mats, base slabs, footings, pile caps, grade beams and slabs on grade. Provide block thickness to produce concrete cover of reinforcement as indicated. Provide blocks of Type II cement with 3,000 psi minimum compressive strength in conformance with the Section 03300, Cast-in-Place Concrete.

E. Wire for tying reinforcement in place shall be No. 16 AWG or heavier black soft-annealed wire.

F. Mechanical splices shall develop 125 percent of the specified yield strength of the reinforcing steel at each spike. Mechanical couplers shall be provided where shown on the Drawings or as submitted to the Engineer.

2.02 FABRICATION

A. Fabricate reinforcement only after shop drawings have been returned by the Engineer marked “Approved”.

B. Provide reinforcing bars that have been cut and bent before shipment. If bars must be bent on site, bend reinforcing steel cold, and do not straighten or re-bend in a manner, which will damage the material. Bend in conformance with requirements of ACI SP-66 or with ASTM A767 when reinforcement is to be galvanized.

C. Splices:

1. Provide standard reinforcement splices by lapping ends, placing bars in contact, and tightly wire tying for the full length of the splice. All lap splices shall be ACI 318, Class B, unless indicated otherwise on the Drawings.
2. Adjacent splices shall be staggered whenever possible.
3. Mechanical splicing devices may be substituted for lap splices with the approval of the Engineer at no additional cost.

PART 3 EXECUTION

3.01 GENERAL

A. General: Comply with Concrete Reinforcing Steel Institute’s recommended Practice for “Placing Reinforcing Bars”, for details and methods of reinforcement placement and supports, and as herein specified.

3.02 PLACEMENT

A. Comply with the specified standards for details and methods of reinforcement placement and supports, and as herein specified.

B. Clean reinforcement to remove loose rust and mill scale, earth, and other materials that would reduce or destroy bond with concrete.

C. Position, support, and secure reinforcement against displacement by formwork, construction, or concrete placement operations. Locate and support reinforcing by metal chairs, runners, bolsters, spacers, and hangers, as required.

D. Place reinforcement to obtain the specified coverage for concrete protection. Arrange, space, and securely tie bars and bar supports together with wire, to hold reinforcement accurately in position during concrete placement operation. Set wire ties so that twisted ends are directed away from exposed concrete surfaces.

E. Install welded wire fabric in lengths as long as practicable. Lap adjoining pieces at least one full mesh.

F. Provide supports of sufficient numbers and strengths to carry reinforcement. Do not place reinforcing bars more than 2 inches beyond the last leg of any continuous bar support. Do not use supports as bases for runways for conveying equipment and similar construction loads.

G. Bars may be moved as necessary to avoid interference with other reinforcing steel, conduits or embedded items. Bars moved more than three inches are subject to approval of Engineer. Place required number of bars.

H. Position dowels accurately. Rigidly support, securely tie. Align dowels normal to concrete surface before concrete placement. Setting dowels into wet concrete is prohibited.

I. Provide and place safety caps on all exposed ends of vertical reinforcement.

J. Tie a minimum of 25 percent of all intersecting bars in foundation mats, base slabs, footings, pile caps, slabs on grade and elevated slabs.

K. Do not splice reinforcement steel in foundation mats, base slabs, beams, girders, slabs and walls at points of maximum stress unless otherwise indicated.

L. Lab splice welded wire fabric reinforcement at least two full meshes. Stagger splices to avoid continuous laps in either direction and wire tightly together. Straighten rolled welded wire fabric reinforcement into flat sheets before use.

M. Provide continuous reinforcement through construction joints.

END OF SECTION

PART 1 GENERAL

1.01 WORK INCLUDED

A. This Section specifies requirements for furnishing, placement, finishing, curing and protecting of all concrete, plain and reinforced as shown on the Drawings and as specified herein. Review and approval of the Contractor's working drawings by the Engineer does not relieve the Contractor of the responsibility for the adequacy of work.

B. The design requirements, materials, and methods outlined in this specification shall be considered the minimum requirements for the scope of work covered herein.

1.02 REFERENCES

A. General: Where the language in any of the documents referred to herein is in the form of a recommendation or suggestion, such recommendations or suggestions shall be deemed to be mandatory for these Specifications.

B. American Concrete Institute (ACI):

1. ACI 117: Standard Tolerances for Concrete Construction and Materials
2. ACI 301: Specifications for Structural Concrete
3. ACI 302: Guide for Concrete Floor and Slab Construction
4. ACI 304R: Guide for Measuring, Mixing, Transporting and Placing Concrete.
5. ACI 305R: Hot Weather Concreting
6. ACI 306: Cold Weather Concreting
7. ACI 308: Standard Practice for Curing Concrete
8. ACI 309R: Guide for Consolidation of Concrete
9. ACI 318: Building Code Requirements for Structural Concrete

C. American Society for Testing and Materials (ASTM):

1. C31: Making and Curing Concrete Compression and Flexural Strength Test-Specimens in the Field.
2. C33: Specification for Concrete Aggregates
3. C39: Test Method for Compressive Strength of Cylindrical Concrete Specimens
4. C94: Specifications for Ready Mixed Concrete
5. C136: Sieve Analysis of Fine and Coarse Aggregate
6. C138: Unit Weight, Yield, and Air Content of Concrete
7. C143: Test for Slump of Portland Cement Concrete
8. C150: Specification for Portland Cement
9. C171: Sheet Materials for Curing Concrete
10. C172: Sampling Fresh Concrete
11. C231: Test for Air Content of Freshly Mixed Concrete by the Pressure Method
12. C260: Specification for Air-Entraining Admixtures for Concrete
13. C309: Specification for Liquid Membrane Forming Compounds for Curing Concrete
14. C494: Specification for Chemical Admixtures for Concrete
15. C827: "Test Method for Change in Height at Early Ages of Cylindrical

Specimens from Cementitious Mixtures

16. C989: Specification for Ground Iron Blast-Furnace Slag for Use in Concrete and Mortars
17. C1064: Test Method for Temperature of Freshly Mixed Portland-Cement Concrete
18. C1107: Specification for Packaged Dry, hydraulic Cement Grout (Non-Shrink)
19. C1240: Standard Specification for Silica Fume for Use in Hydraulic-Cement Concrete
20. D1751: Specification for Preformed Expansion Joint Fillers for Concrete Paving and Structural Construction (Nonextruding and Resilient Bituminous Types).
21. E154: Test Methods for Water Vapor Retarders Used in Contact with Earth Under Concrete Slabs, on Walls, or as Ground Cover

1.03 QUALITY CONTROL

A. Concrete Testing Service: The Contractor shall employ and pay an independent testing laboratory to perform material evaluation tests and to design concrete mixes and provide copies of recently made material tests and mix designs.

B. Materials and installed work may require testing and retesting at any time during progress of work. Allow free access to material stockpiles and facilities. All tests, including retesting of rejected materials and installed work, shall be done at Contractor's expense.

C. Workmanship: The Contractor is responsible for correction of corrected work that does not conform to the specified requirements, including strength, tolerances and finishes. Correct deficient concrete as directed at no additional cost to the Owner.

1.04 DESIGN REQUIREMENTS

A. Codes: Building concrete shall be in conformance with the requirements of ACI 318 and the Massachusetts State Building Code.

B. Air entrain all concrete.

1.05 SUBMITTALS

A. Product Data: Submit design mix as applicable. Submit manufacturer's product data with application and installation instructions for proprietary materials and items, including reinforcement and forming accessories, admixtures, patching compounds, waterstops, joint systems, curing compound, and others as requested by the Engineer.

B. Shop Drawings: Submit working drawings for all work under this Section to the Engineer for approval. Show location of joints, concrete pouring sequence, schedule dates, rate of placement and methods.

C. All concrete mix designs shall conform to ACI-318, Chapter 5 and as specified. All concrete mix designs and concrete material tests shall be signed and sealed by a Professional Engineer in the Commonwealth of Massachusetts.

D. Samples: Submit samples of materials as specified, including names, sources and descriptions.

E. Laboratory Test Reports: Submit laboratory test reports for concrete, concrete materials, and mix design tests.

F. Material Certificates: Provide materials certificates in lieu of materials laboratory test reports when permitted. Material certificates shall be signed by manufacturer and Contractor, certifying that each material item complies with, or exceeds, specified requirements.

G. Submit prior to start of work written reports of each proposed mix for each class of concrete. Do not begin concrete production until mixes have been approved by the Engineer.

H. Batch Ticket Information: Provide concrete delivery tickets showing job name and location, date and time of delivery, quantity of concrete, quality and type of concrete, admixtures, amount of water added, and all other relevant information as described in ASTM C-94. Submit original batch tickets and 2 copies at the end of each week.

1.06 DELIVERY, STORAGE, AND HANDLING

A. Order concrete from batching plant so that trucks arrive at discharge locations when concrete is required. Avoid excessive mixing of concrete or delays in placing successive layers of concrete in forms.

B. Deliver concrete to discharge locations in watertight agitator or mixer trucks without altering the water-cement ratio, slump, air entrainment, temperature and homogeneity.

C. Concrete not conforming to specification, unsuitable for placement, exceeding the time or temperature limitations or not having a complete delivery batch ticket will be rejected.

1.07 JOB SITE CONDITIONS

A. Weather: Protect concrete from damage and reduced strength or performance due to weather extremes during mixing, placing and curing.

B. Cold Weather: Unless special precautions are taken to protect concrete, do not work when temperatures are below 40°F or when temperatures are expected to fall below 40°F within 72 hours after placing concrete.

1. Comply with ACI 306 in cold weather.
2. Maintain concrete temperature of at least 60°F. Reinforcement, forms and ground in contact with concrete shall be free of frost.
3. Keep concrete and formwork at least 50°F for at least 96 hours after placing concrete.
4. The use of calcium chloride in any form is not permitted. Non-chloride accelerator shall be used when ambient temperature is below 50°F.
5. Admixture manufacturer shall provide technical assistance at no additional cost. A manufacturer's representative shall be available for consultation by phone or on site upon 72-hour notice.

C. Hot Weather: Concrete, when deposited, shall be less than 85°F. Cool the mix in a manner acceptable to the Engineer if the concrete temperature is higher.

1. Comply with ACI 305 in hot weather.
2. Retarder shall be used when ambient temperature exceeds 80°F.

PART 2 PRODUCTS

2.01 CONCRETE MATERIALS

A. Portland Cement: ASTM C 150, Type II for all work unless otherwise specified. Use one brand of cement throughout project.

B. Normal Weight Aggregates: ASTM C 33, and as herein specified. Use ¾" maximum size for all concrete, unless otherwise directed or specified. Provide aggregates from a single source for exposed concrete.

C. Water: Clean, potable and free from foreign materials in amounts harmful to concrete and embedded steel. Provide water, which meets ACI/ASTM requirements for concrete mix water.

D. Air-Entraining Admixture: ASTM C 260, certified by manufacturer to be compatible with other required admixtures.

1. Products: Subject to compliance with requirements, products that may be incorporated in the work include the following:

a. "Air-Mix"; Euclid Chemical Co.
b. "Sika Aer"; Sika Corp.
c. "MB-VR or MB-AE"; Master Builders
d. "Darex AEA" or "Daravair"; W.R. Grace
e. Or equivalent.

E. Water Reducing Admixture: ASTM C 494, Type A, and containing not more than 0.1% chloride ions. Follow manufacturer's recommendations for amount of admixture to be added to the concrete. Admixture shall be compatible with air-entraining admixtures.

1. "WRDA Hycol"; W. R. Grace.
2. "Eucon WR-75"; Euclid Chemical Co.
3. "Pozzolith Normal"' Master Builders
4. "Plastocrete 160"; Sika Chemical Corp.
5. Or equivalent.

F. High-Range Water Reducing Admixture (SuperPlasticizer): ASTM C 494, Type F or Type G and containing not more than 0.1% chloride ions. Follow manufacturer's recommendations.

1. Products: Subject to compliance with requirements, products which may be incorporated in the work include the following:

a. "WRDA 10" or "Daracem"; W. R. Grace.
b. "PSP"; Protex Industries Inc.
c. "Super P"; Anit-Hydro.
d. "Sikament"; Sika Chemical Corp.
e. "Rheobuild"; Master Builders.
f. Or equivalent.

G. Water Reducing, Non-Chloride Accelerator Admixture: ASTM C 494, Type E or C, and containing not more than 0.1% chloride ions.

1. Products: Subject to compliance with requirements, provide one of the following:

a. "Accelguard 80"; Euclid Chemical Co.
b. "Pozzutec 20"; Master Builders, Inc.
c. "PolarSet"; Grace Construction Products.
d. Or equivalent.

H. Water Reducing, Retarding Admixture: ASTM C 494 Type D, and containing not more than 0.1% chloride ions.

1. Products: Subject to compliance with requirements, products that may be incorporated in the work include the following:

a. "Edoco 20006"; Edoco Technical Products.
b. "Pozzolith Retarder"; Master Builders.
c. "Eucon Retarder 75"; Euclid Chemical Co.
d. "Daratard"; W. R. Grace.
e. "Plastiment"; Sika Chemical Co.
f. Or equivalent.

I. Prohibited Admixtures: Calcium chloride thyocyanates or admixtures containing more than 0.1% chloride ions are not permitted.

2.02 RELATED MATERIALS

A. Absorptive Cover: Burlap cloth made from jute or kenaf, weighing approximately 9 oz. per sq. yd., complying with AASHTO M 182, Class 2.

B. Moisture-Retaining Cover: One of the following, complying with ASTM C 171.

1. Waterproof paper.
2. Polyethylene film.
3. Polyethylene-coated burlap.

C. Liquid Membrane-Forming Curing Compound: Liquid type membrane-forming curing compound complying with ASTM C 309, Type I, Class A. Moisture loss not more than 0.055 gr./sq. cm. when applied at 200 sq. ft./gal.

1. Products: Subject to compliance with requirements, products which may be incorporated in the work include, but are not limited to, the following:

a. "Masterseal"; Master Builders.
b. "A-H 3 Way Sealer"; Anti-Hydro Waterproofing Co.
c. "Ecocure"; Euclid Chemical Co.
d. "Clear Seal": A.C. Horn, Inc.
e. "Sealco 309"; Gifford-Hill/American Admixtures.
f. "J-20 Acrylic Cure"; Dayton Superior.

D. Underlayment Compound: Free flowing, self-leveling, pumpable cementitious base compound.

1. Products: Subject to compliance with requirements, products which may be incorporated in the work include, but are not limited to, the following:

a. "Ardex K-15"; Ardex Engineered Cements.
b. "Silflo 200"; Silpro Masonry Systems.
c. "Ultra/lPlan"; Mapei.

E. Bonding Compound: Polyvinyl acetate or acrylic base.

1. Products: Subject to compliance with requirements, products that may be incorporated in the work include, but are not limited to, the following:

a. Acrylic or Styrene Butadiene:

i. "J-40 Bonding Agent"; Dayton Superior Corp.
ii. "Everbond"; L & M Construction Chemicals.
iii. "Hornweld"; A. C. Horn, Inc.
iv. "Daraweld C"; W. R. Grace.

F. Adjustable inserts: Adjustable inserts shall be hot-dip galvanized in conformance with ASTM A123 and A153. Adjustable insets shall be:

1. Ductile iron wedges inserts, Type F-7 manufactured by Dayton Sure-Grip & Shore Co.
2. Malleable iron peerless wedge inserts, insert as manufactured by Richmond Screw, Anchor Co., Inc.
3. Malleable iron wedge inserts, Type HW as manufactured by Hohmann & Barnard Inc.

G. Vapor barrier: Provide a 5-ply laminate sheet that combines three layers of high-density polyethylene and two high strength cored grids. The non-woven cord grids shall provide a minimum uniform loading resistance of 1380 pounds per yard in all directions. Cord reinforcement shall be a diamond pattern with a minimum of 96 strands per square foot suspended in a permanently flexible adhesive media to allow fiber slippage. Perm rating of the vapor barrier shall be 0.0350 grains/hr/ft^2 when tested in accordance with ASTM E 96. Other physical properties, minimum values, shall be as follows:

Property	ASTM Test	Test Values
Weight	D2103	41 lb/100 SF

3" Tensile strength	D882	110 lb/4583 psi
3" Elongation	D882	321 percent
PPT Resistance	D2582	21 lb
3 x 8 Tongue tear	D2261	21 lb
Cold crack	D1709 (Mod)	-45°F
Drop dart	D1709	4.5 lb
Hot air shrink	D12-4	-0.25% Total Area

1. Provide double sided asphaltic pressure sensitive mastic tape, 1.5 inches wide by 100 feet in length for field seams between multiple sections and to seal around projections.

2.03 PROPORTIONING AND DESIGN OF MIXES

A. Prepare design mixes for type and strength of concrete by either laboratory trial batch or field experience methods as specified in ACI 301. If trial batch method used, use an independent testing facility acceptable to the Engineer for preparing and reporting proposed mix designs. The testing facility shall not be the same as used for field quality control testing.

B. Submit written reports for review of design mix for specified strength of concrete within 15 days prior to start of work. Do not begin concrete production until mixes have been reviewed.

C. Strength: Provide concrete having the following minimum compressive strength at 28 days:

1. Class 4000 –3/4" aggregates: Use an all concrete, unless otherwise specified.

D. The concrete quality, mixing and placing shall conform to ACI-318, Chapter 5.

E. Design mixes to provide normal weight concrete with the following properties, as indicated:

Design Compressive Strength,	Minimum Strength fc 7 days	Laboratory Testing Age 28 day	Minimum ** Cement Sacks/cu.yd.	Maximum* Net Water Gals/Sack	Maximum* W/C Ratio
4,000 psi	2,800 psi	4,000 psi	6.5	5.5	0.40

*Maximum: Decrease if possible
**Minimum: Increase as necessary to meet all other stated requirements.

F. Adjustment to Concrete Mixes: Mix design adjustments may be requested by Contractor when characteristics of materials, job conditions, weather, test results, or other circumstances warrant; at no additional cost to Owner and as accepted by the Engineer. Laboratory test data for revised mix design and strength results must be submitted to and accepted by the Engineer before using in work.

G. Admixtures:

1. Use water-reducing admixture or high range water reducing admixture (super plasticizer) in all concrete in strict accordance with the manufacturer's printed instructions.
2. Use non-chloride accelerating admixture in concrete slabs placed at ambient temperatures below 50°F in strict accordance with the manufacturer's printed instructions.
3. Use high-range water-reducing admixture in pumped concrete required to be watertight, and concrete with water/cement ratios below 0.40.
4. Use air-entraining admixture in all concrete, unless otherwise indicated. Add air-entraining admixture at manufacturer's prescribed rate to result in concrete at point of placement having total air content of 6.5% with a tolerance of ±1-1/2%.

H. Consistency:

1. The consistency shall be uniformly maintained within the allowable range of slump for the job materials. Ordinarily the slump shall not be less than 1-1/2 nor more than 3 inches, unless in the opinion of the Engineer, job conditions warrant exceeding these limits. The consistency shall be determined by the AASHTO Method T-119. This range of slump is to be maintained for all concrete including pumped concrete.
2. Concrete containing HRWR admixture (super-plasticizer): Not more than 7" after addition of HRWR to site-verified 1-1/2" to 3" slump concrete.

2.04 CONCRETE MIXING

A. Ready-Mix Concrete: Comply with requirements of ASTM C 94, and as herein specified. Delete references for allowing additional water to be added to batch for material with insufficient slump. Addition of water to the batch will not be permitted.

1. During hot weather, or under conditions contributing to rapid setting of concrete, a shorter mixing time than specified in ASTM C94 may be required. When air temperature is between 85°F (30° C) and 90°F (32° C), reduce mixing and delivery time from 1-1/2 hours to 75 minutes, and when air temperature is above 90°F (32°C), reduce mixing and delivery time to 60 minutes.
2. During cold weather heat water, sand and cement materials per recommendations of ACI 306.

PART 3 EXECUTION

3.01 INSTALLATION

A. Batch, mix and deliver Portland cement concrete in conformance with ASTM 94. Batch all constituents at central batching or mixing plant. Produce concrete in conformance with ACI 301 and as specified.

B. Seasonal Conditions:

1. Conform to ACI 305R and as specified for hot weather concreting.
2. Conform to ACI 306R and as specified for cold weather concreting.

3.02 INSTALLATION OF EMBEDDED ITEMS

A. Set and build into work, anchorage devices and other embedded items required for other work that is attached to, or supported by, cast-in-place concrete. Use setting drawings, diagrams, instructions, and directions provided by suppliers of items to be attached thereto.

B. Clean embedded items of oil, ice, dirt and all other foreign items.

C. For embedded pipes, complete all necessary testing requirements prior to placing concrete.

3.03 PLACING CONCRETE

A. General:

1. Concrete formwork shall satisfy the requirements of Section 03100, Concrete Formwork. Do not place concrete until the depth, character and adequacy of forms, falsework, embedments, and the placing of the steel reinforcement have been approved by the Engineer. The method and manner of placing the concrete shall be such as to avoid segregation of aggregate and displacement of the reinforcement. Troughs, pipes and chutes may be used as aids in placing concrete when necessary. Dropping the concrete a distance of more than five feet, or depositing a large quantity at one point, will not be permitted. Concrete shall be placed upon clean, damp surfaces, free from running water, or upon properly consolidated soil.
2. Retempering of concrete by adding water or any other material shall not be permitted.
3. Concrete placement, finishing and curing, and all other pertinent construction practices shall be in accordance with ACI 117 and ACI 301. In addition to the requirements of ACI 117 and ACI 301, the following shall apply:

    a. Concrete shall be placed so that a uniform appearance of surfaces will be obtained.
    b. Concrete shall be placed and consolidated free of rock pockets, honeycombs, and voids.
    c. Concrete shall be deposited as nearly as practicable in its final position, to avoid segregation due to rehandling or flowing, and shall not be subjected to any procedure that will cause segregation.
    d. Concrete shall be placed and consolidated in walls in approximately 18-inch layers, proceeding at a uniform rate or per the form designer's recommendation.

B. Consolidating:

1. Consolidate concrete with suitable mechanical vibrators operating within concrete. When necessary, vibrating shall be supplemented by hand spading with suitable tools to assure proper and adequate consolidation. Vibrators shall be

manipulated so as to work the concrete thoroughly around the reinforcement and embedded fixtures and into corners and angles of the forms. The vibration at any joint shall be of sufficient duration to accomplish consolidation but shall not be prolonged to the point where segregation occurs.

2. Employ as many vibrators and tampers as necessary to secure the desired results. For every two vibrators required for the job, an additional standby vibrator shall be kept on the site. Do not place subsequent layers of concrete until the previous layer has been consolidated as specified. Internal vibrators shall have a minimum frequency of 8000 vibrations per minute when immersed in concrete and shall have sufficient amplitude to effectively consolidate the concrete.
3. Prevent the following practices:

    a. Pushing of concrete with vibrator.
    b. External vibration of forms.
    c. Allowing vibrator to vibrate against reinforcing steel where steel projects into green concrete.
    d. Allowing vibrator to vibrate against the contact faces of forms.

C. Cold Weather: Do not place concrete when the ambient temperature is below 40°F, unless specifically authorized by the Engineer. Conform to the requirements of ACI 306R during cold weather.

D. Hot Weather: Do not place concrete with a mix temperature exceeding 90°F, unless specifically authorized by the Engineer. Conform to the requirements of ACI 305R during hot weather.

E. Construction Joints:

1. When the placing of concrete is suspended, necessary provisions shall be made for joining future work before the placed concrete takes its initial set. For the proper bonding of old and new concrete, such provisions shall be made for grooves, steps, keys, dovetails, reinforcing bars or other devices as may be prescribed. Before depositing new concrete against concrete, which has hardened, the surface of the hardened concrete shall be cleaned by a heavy steel broom, roughened slightly, wetted, and covered with a neat coating of cement paste or grout. Install joint sealant where shown on the Drawings, in accordance with manufacturer's instructions.
2. Joints shall be perpendicular to the main reinforcement.

F. Expansion and Control Joints: Expansion and control joints shall be constructed in the locations and to the dimensions and details shown on the Drawings.

G. Defective Work:

1. All defective work disclosed after the forms have been removed shall be immediately removed and replaced. If dimensions are deficient, or if the surface of the concrete is bulged, uneven, or shows honeycomb, which in the opinion of the Engineer cannot be repaired satisfactorily, the entire section shall be removed and replaced at no cost to the Owner.
2. Other work considered to be defective includes, but is not limited to, the following:

a. Concrete in which defective or inadequate steel reinforcement has been placed.
b. Concrete incorrectly formed, or not conforming to details and dimensions on the Drawings or with the intent of these documents, or the concrete surfaces of which are out of plumb or level beyond specified tolerances.
c. Concrete below specified strength.
d. Concrete containing wood, cloth, or other foreign matter, rock pockets, voids, honeycombs, cracks or cold joints not scheduled or indicated on the Drawings.

3.04 CONCRETE FINISHING

A. Exposed concrete surfaces shall be true, smooth, and free from open or rough spaces, depressions, or projections. The concrete in horizontal plane surfaces shall be brought flush with the finished top surface at the proper elevation and shall be struck off with a straightedge and floated. Mortar finishing will not be permitted, nor shall dry cement or sand-cement mortar be spread over the concrete during the finishing of horizontal plane surfaces.

B. Following placement of concrete for slabs, tamp to force coarse aggregate away from surface, bull float, and steel trowel.

C. The following requirements shall govern concrete finishes so indicated on the Drawings.

1. Float Finish: Force coarse aggregate away from surface; float to a smooth and even surface.

2. Trowel Finish:

a. After floating, begin the first trowel finish operation using a power-driven trowel; begin final troweling when the surface produces a ringing sound as the trowel is moved over the surface.
b. Consolidate the concrete surface by the final hand troweling operation, free from trowel marks, uniform in texture and appearance, and with a surface plane tolerance not exceeding 1/8” in 10’-0” when tested with a 10’-0” straight–edge

3. Broom Finish:

a. Apply nonslip broom finish to exterior concrete as specified, immediately after trowel finishing; roughen the concrete surface by brooming in the direction perpendicular to the main traffic route.

i. Use a fiber bristle broom.
ii. Frequently clean broom to avoid deep brooming.

4. As-Cast Finish:

a. Rough form finish; tie holes and defects shall be patched.

i. Fins exceeding ¼ inch in height shall be chipped off or rubbed off.
ii. Otherwise, surfaces shall be left with the texture imparted by the forms.

b. Smooth form finish: the form facing material shall produce a smooth, hard, uniform texture on concrete.

i. The arrangement of the facing material shall be orderly and symmetrical, and the number of seams kept to the practical minimum.
ii. Forms shall be supported by studs or other backing capable of preventing excessive deflection.
iii. Form-facing material with raised grain, torn surfaces, worn edges, patches, dents, or other defects, which will impair the texture of the concrete surface, shall not be used.

3.05 CURING AND PROTECTION

A. Initial Curing: All concrete shall be properly cured and protected in accordance with ACI 308. Maintain concrete above 50 degrees F during first seven days after placing. The work shall be protected from the elements, flowing water, and from defacement of any nature, during construction. The concrete shall be cured as soon as it has sufficiently hardened, by covering with an approved material. Water-absorptive coverings shall be thoroughly saturated when placed, and kept saturated for a period of at least seven days. Curing mats or blankets shall be sufficiently weighted or tied down to keep the concrete surface covered and to prevent the surface from being exposed to air currents. Where wooden forms are used, they shall be kept wet at all time until removed, to prevent the opening of joints and drying out of the concrete. Membrane curing compounds shall be coordinated with the surface to be painted, covered with plaster, covered with sealer, and other surfaces which curing compound would adversely affect subsequent construction.

B. Duration of Curing: The final curing shall continue until the cumulative number of days or fractions thereof, not necessarily consecutive, during which the temperature of the air in contact with the concrete is above 50°F, has totaled 7 days beyond the initial curing period.

1. Rapid drying at the end of the curing period shall be prevented.

C. Formed Surfaces: Steel forms heated by the sun and all wood forms in contact with the concrete during the curing period shall be kept wet.

1. If forms are to be removed during the curing period, one of the specified curing materials or methods shall be employed immediately.
2. Such curing shall be continued for the remainder of the curing period.

3.06 CONCRETE SURFACE REPAIRS

A. General: Any defective work disclosed after removal of forms shall be immediately removed and replaced. If in the opinion of the Engineer, the surface of the concrete cannot be repaired satisfactorily, the entire section shall be removed and replaced at no

additional expense to the Owner.

B. Patching Defective Areas: Repair and patch defective areas with cement mortar immediately after removal of forms, when acceptable to the Engineer.

1. Cut out honeycomb, rock pockets, voids over 1" in any dimension, and holes left by tie rods and bolts, down to solid concrete but in no case to a depth of less than 1". Make edges of cuts perpendicular to the concrete surface. Thoroughly clean, dampen with water, and brushcoat the area to be patched with specified bonding agent. Place patching mortar after bonding compound has dried.

C. For exposed-to-view surfaces, blend white Portland cement and standard Portland cement so that, when dry, patching mortar will match color surrounding. Provide test areas at inconspicuous location to verify mixture and color match before proceeding with patching. Compact mortar in place and strike-off slightly higher than surrounding surface.

D. Repair of Formed Surfaces: Remove and replace concrete having defective surfaces if defects cannot be repaired to the satisfaction of the Engineer. Surface defects, as such, include color and texture irregularities, bulges, uneven surfaces, air bubbles, honeycomb, rock pockets; fins and other projections on surface; and stains and other discolorations that cannot be removed by cleaning. Flush out form tie holes, fill with dry pack mortar, or precast cement cone plugs secured in place with bonding agent.

E. Repair concealed formed surfaces, where possible, that contain defects that affect the durability of concrete. If defects cannot be repaired, remove and replace concrete.

F. Repair of Unformed Surfaces: Test unformed surfaces, such as monolithic slab, for smoothness and verify surface plane to tolerances specified for each surface and finish. Correct low and high areas as herein specified. Test unformed surfaces sloped to drain for trueness of slope, in addition to smoothness using a template having required slope.

G. Repair defective areas, except random cracks and single holes not exceeding 1" diameter, by cutting out and replacing with fresh concrete. Remove defective areas to sound concrete with clean, square cuts and expose reinforcing steel with at least ¾" clearance all around. Dampen concrete surfaces in contact with patching concrete and apply bonding compound. Mix patching concrete of same materials to provide concrete of same type or class as original concrete. Place, compact, and finish to blend with adjacent finished concrete. Cure in same manner as adjacent concrete.

H. Repair isolated random cracks and single holes not over 1" in diameter by dry-pack method. Groove top of cracks and cutout holes to sound concrete and clean of dust, dirt, and loose particles. Dampen cleaned concrete surfaces and apply bonding compound. Mix dry-pack, consisting of one part Portland cement to 2-1/2 parts fine aggregate passing a No. 16 mesh sieve, using only enough water as required for handling and placing. Place dry pack after bonding compound has dried. Compact dry-pack mixture in place and finish to match adjacent concrete. Keep patched area continuously moist for not less than 72 hours.

I. Perform structural repairs with prior approval of the Engineer for method and procedure, using specified epoxy adhesive and mortar.

J. Repair methods not specified above may be used, subject to acceptance of the Engineer.

3.07 QUALITY CONTROL TESTING DURING CONSTRUCTION.

A. The Contractor shall retain the services of a testing laboratory to perform and to submit test reports.

1. Sampling and testing for quality control during placement of concrete may include the following, as directed by the Engineer.

B. Sampling Fresh Concrete: ASTM C 172, except modified for slump to comply with ASTM C 94.

1. Slump: ASTM C 143; one test at point of discharge for each day's pour of each type of concrete; additional tests when concrete consistency seems to have changed.
2. Air Content: ASTM C 173, volumetric method for lightweight or normal weight concrete; one for each day's pour of each type of air-entrained concrete.

a. Concrete Temperature: Test hourly when air temperature is 40°F and when 80°F and above; and each time a set of compression test specimens are required.
b. Compressive Strength Tests: ASTM C39; one set for each day's pour exceeding 5 cu. yds. plus additional sets for each 50 cu. yds. over and above the first 25 cu. yds. of each concrete class placed in any one day; one specimen tested at 7 days, two specimens tested at 28 days, and one specimen retained in reserve for later testing if required.
c. When frequency of testing will provide less than 5 strength tests for a given class of concrete, conduct testing from at least 5 randomly selected batches if fewer than 5 are used.
d. When total quantity of a given class of concrete is less than 50 cu. yds. strength test may be waived by the Engineer if, in his judgment, adequate evidence of satisfactory strength is provided.
e. When strength of field-cured cylinders is less than 85 percent of companion laboratory-cured cylinders, evaluate current operations and provide corrective procedures for protecting and curing the in-place concrete.
f. Strength level of concrete will be considered satisfactory if averages of sets of three consecutive strength, and no individual strength test results falls below specified compressive strength by more than 500 psi.

C. Test results will be reported in writing to the Engineer and Contractor within 24 hours after tests. Reports of compressive strength tests shall contain the project identification name and number, date of concrete placement, name and location of concrete batch in structure, design compressive strength at 28 days, concrete mix proportions and materials; compressive breaking strength and type of break for both 7-day tests and 28-day tests.

D. Nondestructive Testing: Impact hammer, sonoscope, or other nondestructive device may be permitted but shall not be used as the sole basis for acceptance or rejection.

E. Additional Tests: The Contractor's Independent testing service shall make additional

tests of in-place concrete when test results indicate specified concrete strengths and other characteristics have not been attained in the structure, as directed by the Engineer. Testing service may conduct tests to determine adequacy of concrete by cored cylinders complying with ASTM C42, or by other methods as directed.

END OF SECTION

APPENDIX A

PROVIDENCE WATER
REQUIREMENTS FOR WATER MAINS, SERVICES AND APPURTENANCES

Providence Water

Requirements
for
Water Mains, Services
and
Appurtenances

June 2004
REVISED
January 2013

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SECTION 100

ADMINISTRATIVE PROCEDURES

100.1 Applicable Standards. American Water Works Association (AWWA) standards shall be considered to be part of the *Requirements for Water Mains, Services and Appurtenances*. The Chief Engineer of Providence Water (PW) reserves the right to make exceptions to the *Requirements*. If required, a manufacturer's *Certificate of Compliance* shall be submitted to PW for components incorporated into the water system.

100.2 Approved Materials. Materials used in the construction, repair or maintenance of the water system shall meet the approval of PW. A published *List of Approved Materials/Manufacturers for use in the Providence Water Distribution System*, which appears as "Appendix B" in the *Requirements*, defines specifically approved materials and manufacturers of the same. It is important to note that the "list" is subject to change—without notice—and it is the responsibility of the customer and/or contractor to acquire the latest revision of such list from Providence Water prior to commencing construction.

General material specifications may be found in Chapter 3, Materials, of the *Requirements*.

100.3 Restrictions. Valves, hydrants, meters, blowoffs, curbstops and other appurtenances in the PW system are the property of PW and operation of the same shall be limited to PW personnel who hold, at a minimum, a valid Class I Water System Operator's License, as issued by the R.I. Department of Health, unless otherwise authorized.

100.4 Applications. Water service connection and/or repair, water meters, backflow prevention device installation, and water main extension involve an application process. Application forms are available at the Engineering Office, which is located at 430 Scituate Avenue, Cranston, RI.

Applications involving commercial properties, subdivisions or other major projects shall require the submission of detailed construction plans, details and specifications.

100.5 Fees. Fees for applications and other pertinent items are published in PW's *Terms and Conditions*, as approved by the Rhode Island Public Utilities Commission. A current copy of the *Terms and Conditions* is available at PW offices located at 552 Academy Avenue, Providence, RI or 430 Scituate Avenue, Cranston, RI.

100.6 Time of Review. Time for processing applications will vary depending on project complexity and work load. Applicant shall allow up to 8 weeks for PW to respond to an application submitted for review and approval.

100.7 Duration of Approval. Approvals shall remain valid for one (1) year. PW will not guarantee the access to, or availability of, the water service or main extension beyond this approval period. Installations not begun within one (1) year of approval will require resubmission of the request. An extension to the original approval may be granted, pending review of circumstances provided in writing by the requestor.

100.8 As-Built Drawings. Upon completion of all construction, and prior to connection to the PW system, accurate record ("as-built") drawings of the work shall be provided to PW by the requestor. This applies to commercial properties, subdivisions or other major projects. It shall include locations of all new mains/services showing ties and measurements from street property lines and permanent objects as well as the exact locations of the completed water line. Water service will not be activated without the approval of PW and receipt of "as-built" drawings.

"As-built" drawings shall be prepared on 4-mil, double matte, mylar sepia or other approved reproducible media, marked "AS BUILT," and "wet-stamped" and signed by a professional civil engineer who is registered and certified in the State of Rhode Island. Preferably, or as mandated by Providence Water, "as-builts" shall be submitted in electronic AutoCAD compatible format. "As-built" drawings shall remain the property of PW upon approval and acceptance of the same.

SECTION 200

ENGINEERING REQUIREMENTS

200.1 Professional Certification. Designs and calculations shall be prepared by an engineer who is professionally licensed and authorized to provide engineering services in the State of Rhode Island.

Field grades and measurements, as may be needed for determination of the location of existing and proposed water facilities, shall be provided by a land surveyor who is a licensed professional and authorized to provide surveying services in the State of Rhode Island.

200.2 Base of Levels. Base of levels for determining topographic elevations in the PW system are based upon City of Providence Mean High Water (MHW) Datum. The MHW Datum is 2.35 feet above Mean Sea Level (MSL) elevation. Plans, calculations, reports, etc. shall specify which datum is used.

200.3 Calculations. PW calculates the size of domestic water services and meters based upon a detailed list of water using fixtures (actual and/or proposed) that is supplied by the Applicant for water service. For instances where non-standard fixtures are used, a gallon-per-minute (gpm) value shall be supplied including average day usage, instantaneous peak usage and fire flow requirements. This information will be used to compute the minimum size of water service and meter size.

If the existing system pressure in the water main located in the street where a connection is proposed is such that PW determines that the pressure in the main may not deliver adequate pressure to the interior domestic supply plumbing, an individual pressure booster pump may be required. Regional pump stations will only be allowed in the system when approved by the Chief Engineer and in conformance with PW standards and practices. Installation of this type of facility shall be the sole responsibility of the Owner and dedicated to PW upon satisfactory completion.

200.4 Construction Plans. Project drawings should be prepared on sheets no larger than 24" x 36". Two (2) sets of plans shall be submitted for review and comment. If a project is to be implemented in stages (phases), a master plan showing the entire development shall be submitted for review.

Site plans must display a "north arrow" and be drawn at a scale of not less than 1"=100' and no more than 1"=20'. Contour lines, when included, should be drawn at intervals of no more than two (2) feet. A locus map shall be included on the drawing at a scale of not less than 1"=2000'.

Layout of existing and proposed water mains, valves, fittings, hydrants, services and any other appurtenances to the water system shall be shown, as well as details, notes, sewer lines, septic systems, drainage lines and rights-of-way.

200.5 Fire Flow Testing. Public hydrant fire flow testing shall only be performed by PW personnel. PW charges a fee for each test performed (see Sec. 100.4, *Fees*). Results of the test(s) will be furnished usually within ten (10) working days of completing the test(s).

200.6 Water System Modeling. Some projects may require the Applicant to provide PW with a computerized hydraulic simulation model of the proposed modifications to the existing system. Analysis shall include domestic demands as well as fire flows. Modeling shall be performed using standards acceptable to PW, incorporating aspects of the existing system as needed and required. When proposed system modifications are of such magnitude that a full simulation of the entire system is deemed necessary, PW engineering staff can be made available to assist the Applicant in accomplishing this, at a cost to be borne by the Applicant (see Sec. 100.4, *Fees*).

SECTION 300

MATERIALS

300.1 Pipe. Water pipe, of the push-on or mechanical joint type, shall be manufactured of ductile iron and shall be Class 52. In high pressure applications, or other special conditions, PW may require the use of Class 56 pipe. Pipe is to be furnished with at least one (1) coat of cement mortar on the interior surface and the exterior is to be coated with a 1 mil± thick coating of asphaltic paint.

300.2 Fittings. Fittings shall be ductile iron, mechanical joint (MJ), Class 350 (4" - 24") and Class 250 (30" - 48"), cement-mortar lined and provided with an asphaltic coating 1 mil± thick on the exterior. Ductile iron compact fittings, Class 350, may be used in the 4 to 16-inch size. Components shall conform with the weights, excluding accessories, and dimensions shown in current AWWA standards.

Sleeve couplings and accessories shall be pressure rated to at least equal to that of the pipe. Couplings shall be ductile iron. After assembly, all exterior surfaces, including bolts and nuts, shall be thoroughly coated with two (2) coats of heavy-duty protective asphaltic coating. The interior of the coupling shall be fusion-bonded epoxy coated in accordance with AWWA standards, composed of thermosetting epoxy with a minimum dry film thickness of 10 mils and a maximum of 20 mils.

Bolts and nuts shall be rustproofed steel.

300.3 Valves.

300.3.1 Gate. Valves up to 12-inches in diameter shall be resilient-seated style. Those that are buried shall be non-rising stem (NRS) style, open "RIGHT" (clockwise) and capable of producing a bubble-tight seal at 200 psi (either direction).

Operating nuts shall be 2-inches square at the base, tapering to 1-15/16 inches square at the top and shall be manufactured of cast or ductile iron and attached to the stem with a nut or pin at the factory. Nuts shall be painted red and marked with an "arrow" to indicate direction of opening.

Valves shall have mechanical joint (MJ) ends, complete with all accessories. MJ bolts and nuts shall be rustproofed steel. Valve exteriors shall be coated with fusion-bonded epoxy at the place of manufacture. If required, operating stem extension rods shall be furnished and installed with the valve.

Bronze stem material shall have a minimum tensile strength of 70,000 psi, yield strength of 35,000 psi and maximum elongation of 15 percent. Stem seals shall consist of at least two (2) O-ring seals. One shall function as a dirt seal and the other as a pressure seal and both shall be capable of being replaced with the valve under pressure in the full open position.

A thrust washer of an approved material shall be used between bearing surfaces of the stem collar and valve body. The torque required to open a fully closed valve under 100 psi pressure on one side shall not exceed 100 ft-lbs and the torque required to fully close a valve under the flow conditions of 10 fps shall not exceed 100 ft-lbs. Valves must be able to withstand an input torque of 300 ft-lbs with no distortion of the stem or other damage to the valve.

Gate cross-section shall be symmetrical about its vertical axis.

Rubber seats shall be new and of a compound—natural or synthetic—designated for water service application. Reclaimed rubber is not acceptable. Seats shall be either bonded or mechanically attached to the gate. When mechanically attached, all exposed hardware shall be 18-8 Type 304 stainless steel.

The waterway inside the body of the valve shall be free of pockets, channels, cavities, depressions or obstructions in the seat area.

Interior surfaces of valve bodies shall be fusion-bonded epoxy coated at the place of manufacture in accordance with current AWWA standards. Field coating with epoxy is prohibited. Bonnet bolts, seal plate bolts, stuffing box bolts and other bolts in contact with soil shall be manufactured of stainless steel or low-zinc bronze.

300.3.2 Butterfly. Valves 16-inches and larger shall be butterfly-type and suitable for direct burial. They shall open "RIGHT" (clockwise) and be designed for satisfactory performance involving frequent operation after long periods of inactivity. They shall be capable of maintaining a bubble-tight seal at 150 psi (either direction).

Rubber seats shall be new and of a compound—natural or synthetic—designated for water service application. Reclaimed rubber is not acceptable. Mating seat surfaces shall be Type 304 or 316 stainless

steel.

Actuators shall be either the traveling nut or gear type and. furnished with the valve. Valves up to 24-inches in diameter shall be able to sustain an input torque of 300 ft-lbs measured at the actuator stem. For those with diameters of 30-inches to 48-inches, actuators shall be capable of withstanding a sustained input torque of 450 ft-lbs. If required, extension rods shall be furnished and installed on actuator stems.

Actuator stems shall have at least one (1) O-ring. It shall function as a dirt seal and prevent groundwater from entering the actuator housing. A thrust washer of an approved material shall be used directly above and below the actuator stem collar.

Valves shall have mechanical joint (MJ) ends, complete with all accessories. Bolts and nuts shall be rustproofed steel. Valve interiors and exteriors shall be coated with fusion-bonded epoxy.

300.3.3 Swing-Check. Swing-check valves shall utilize iron-body bronze-mounted (IBBM) design. They may employ metal-to-metal or composition-to-metal seat construction. Working pressure shall be 175 psi for valves up to 12-inches and 150 psi for those 16-inches and larger.

300.3.4 Tapping. Tapping valves shall be full- body, full-port style, with a flanged end on the upstream side and a raised male centering lip to register with the counterbore in the tapping sleeve outlet connecting flange. They shall conform to Sec. 300.3.1, *Gate*, in all other respects.

300.3.4.1 Tapping Sleeve. Tapping sleeves shall be ductile iron or stainless steel rated for at least 150 psi working pressure. Sleeves shall have side flanges with gaskets extending the full length of the sleeve (NOTE: for stainless steel sleeves, gaskets shall cover the entire surface area of each sleeve). Gaskets shall be supplied for flanges, where applicable. Bolts used to assemble the halves of the sleeve shall pass directly through the flanges.
Ductile iron mechanical joint tapping sleeves are to be extra heavy pattern to withstand the severe strains of making the wet tap or machine connections. Connection flanges shall be machined, faced, counterbored and drilled to register with the flanged end on the upstream side of the tapping valve to be installed. NOTE: Fabricated sleeves, which are used for larger pipe sizes, shall be epoxy coated and employ a gasket at the throat.

300.4 Valve Boxes.

300.4.1 Gate Valve Box. A gate valve box shall consist of three (3) pieces—cover, upper section, and lower section—all of which are manufactured of cast iron. The lower section shall have an inside diameter of not less than 5¼-inches and a length of at least 36-inches—it shall be designed to telescope (slide) into the upper section. Upper section length shall be 26-inches. Covers shall have the word "WATER" (in caps) cast upon them.

300.4.2 Gate Valve Roadway Box. A gate valve roadway box shall consist of three (3) pieces—cover, upper section, and lower section—all of which are manufactured of cast iron. The lower section incorporates two (2) diametrically opposed horseshoe-shaped openings, which are designed to straddle service pipes up to 2-inches in diameter. Additionally, the lower section shall have an inside diameter of not less than 4¼-inches and a length of at least 36-inches—it shall be designed to telescope (slide) into the upper section. Upper section length shall be 26-inches. Covers shall have the word "WATER" (in caps) cast upon them.

300.4.3 Gate Valve Box Aligners. Gate valve box aligners shall be used in every gate valve box installation.

300.5 Blow Off Assembly. A 2" blow off assembly shall be used at the terminus of a "dead end" main. It consists of the following 2" diameter components: tapping saddle, brass nipples, brass elbow, curbstop valve (open "RIGHT") with drain, galvanized pipe, ductile iron end cap (MJ) for main, poured concrete thrust block, cast iron 4 1/4" gate valve roadway box, and cast iron 5 1/4" gate valve box. Components shall be joined together with iron pipe threads.

300.6 Fire Hydrants. Hydrants shall be dry-barrel, post-type. The main hydrant valve shall be a compression-type that opens against pressure in the main with a 5¼-inch opening and be constructed of solid rubber that may be reinforced with steel.

The bottom cap nut is to be bronze or fusion-bonded epoxy coated ductile or cast iron. An O-ring seal shall be provided in the main valve assembly to insure that water cannot leak from the hydrant shoe, or elbow, into the hydrant barrel or drainway. O-ring seals in the main valve area shall seat against bronze or fusion-bonded epoxy coated cast iron. Hydrants shall have a bronze seat ring threaded to a bronze sub-set (NOTE: threads of the main valve seat ring shall not be designed as a sealing thread).

Drainways are to be manufactured of nautical brass, bronze, fusion-bonded epoxy coated cast iron, or an approved equal. At least two (2) drain ports are to be provided with a minimum net diameter of ¼-inch. Drain valves shall momentarily force flush each time the hydrant

is operated.

Hydrants shall open "RIGHT" and utilize a breakaway design. Each hydrant shall have two 2½-inch hose nozzles, 180-degrees apart, and one 4½-inch steamer port nozzle. (NOTE: Special High Service hydrants shall have three (3) 2½-inch hose nozzles and no steamer port.) All nozzle threads are to be National Standard Thread (NST). Lead shall not be used to secure nozzles to the hydrant barrel. Nozzle caps shall be cast iron and shall be secured to the hydrant barrel with rustproof steel chains.
Hydrants shall be designed so that no part of the threads of the operating rod will be in contact with water. Two (2) O-rings shall be used to accomplish this. One (1) O-ring shall be used to seal the upper end of the operating mechanism from atmospheric moisture. The operating rod stem shall be sheathed with nautical brass or bronze where it contacts the lower O-rings. All temperature grease shall be used as a lubricant for the operating rod threads - oil is not acceptable. Grease shall be certified by the U.S. Food & Drug Administration (FDA) as "non-toxic" and safe for use in contact with potable water supplies. Changing the main valve and seat shall only require removal of the bonnet and lubrication chamber or bonnet and seal plate.

Hydrant inlet shall be mechanical joint (MJ) with all accessories, and shall accommodate 6-inch ductile iron pipe and cast iron pipe, when requested. All MJ bolts and nuts shall be rustproofed steel. Interior surfaces of the shoe, or elbow, shall be fusion-bonded epoxy coated.

Hydrant exteriors, above the ground line, shall be painted with one (1) coat of primer and two (2) finish coats of "Ivy Green" paint that will produce a surface to which subsequent coats of paint, having a linseed oil base, will readily adhere. Bonnets shall be painted, in the same manner, to match existing colors ("Safety Yellow").

Hydrant extension kits and traffic repair kits must be available from the manufacturer as an off-the-shelf item. Kit components shall only be those manufactured by the original hydrant manufacturer and considered "original equipment." Substitutes are not allowed.

300.7 Service Connections. Service lines up to 2-inches on the customer's side shall be type "K" copper (see *Residential Service Connection Diagram*, Page A-9). Service size will be determined by PW based upon information supplied by the customer. Use of intermediate couplings is not permitted (NOTE: where service lines are excessively long and would require intermediate couplings, PW may allow or direct the use of an approved polyethylene [200 psi] tubing).

Curb boxes shall be installed directly over the curb stop and brought to finished grade. They shall be a "Buffalo" type (sliding), cast iron, 3-3/8-inch inside diameter and of sufficient length for full coverage for stops no more than 1 inch in diameter. Box covers shall be a locking type and have the word "WATER" (in caps) cast upon it. Gate valve roadway boxes shall be used for 1-1/2 and 2-inch curb stops.

SECTION 400

CONSTRUCTION PROCEDURES

400.1 General Requirements

400.1.1 Notification. PW shall be notified at least forty-eight (48) hours prior to any item being installed within the system. Pressure testing and/or chlorination shall require a two (2) business day notification. It is a requirement that a representative of the PW witness *all* testing.

400.1.2 Inspection. Inspection shall be done in accordance with PW standards and practices. PW employees shall be given full access to the project at all times for inspection on an *as needed* basis.

Design drawings and record drawings of the progress of the work shall be maintained at the job site and shall be available for PW inspectors to view at any time. Failure to have these documents available for review or failure to have the documents prepared, may cause cessation of all construction work and disconnection from the PW system until such time that remedial measures to those requirements have been made.

400.1.3 Disposal of Removed Materials. Water pipe and/or appurtenances that are removed shall remain the property of the party whose responsibility it shall be to properly dispose of the same.

Water mains, water services, and hydrant runouts that are disconnected from the system and abandoned in place shall be capped at *ALL* openings. When pipes are severed at tees, the remaining tee shall be removed and replaced with a section of straight pipe, if possible.

400.1.4 Trench Excavation and Backfill. Water mains and services shall be installed with a minimum cover of 4'-6" to the crown of the pipe in an AWWA "Type 5 Trench" (See Fig. 4-1). Where unsuitable material is found at or below the grade of the placement of the pipe or fitting, said material shall be removed to the required width and depth and replaced with thoroughly compacted bank run or processed gravel. Material shall be deposited across the full width and length of the trench in layers of not more than twelve (12) inches in depth, *before* compaction. Each layer shall be compacted to 95% Standard Proctor to a minimum depth of the street subgrade.

Temporary and permanent pavement shall be installed over the freshly backfilled trench in an existing street or sidewalk using hot bituminous concrete. Pavement installation shall be installed in accordance with applicable State and Local Municipal standards and requirements.

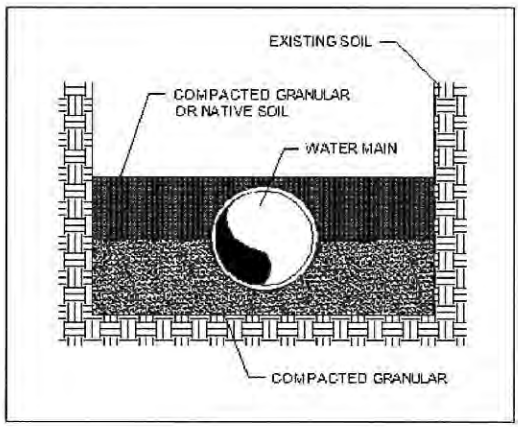


Fig. 4-1 – AWWA TYPE 5 TRENCH

400.2 Specific Components

400.2.1 Pipe and Fittings. Pipes and appur-tenances should be installed with a minimum earth cover of 4'-6" over the crown of the pipe in an AWWA *Type 5 Trench* (see Sec. 400.1.4, *Trench Excavation and Backfill*), or as directed by PW.

Metallized, detectable identification tape, 2-inches wide, blue in color and imprinted with the words "CAUTION – WATER LINE BURIED BELOW," shall be utilized over all mains. The tape shall be buried 12-inches below finished grade.

Maximum changes in alignment (offset or deflection) of each 18-foot length of pipe shall not exceed the values in the following table:

TABLE 4-1

MAXIMUM DEFLECTION
18-FT PIPE SECTION

PIPE SIZE (in.)	PUSH-ON JOINT (in.)	MECH. JOINT (in.)
4	14	23
6	14	20
8-12	14	15
14-16	8	10
18-20	8	8
24-30	8	7
36	8	6
42-48	6	6
54	4	-

Maximum changes in alignment (offset or deflection) of each 20-foot length of pipe shall not exceed the values in the following table:

TABLE 4-2

MAXIMUM DEFLECTION
20-FT PIPE SECTION

PIPE SIZE (in.)	PUSH-ON JOINT (in.)	MECH. JOINT (in.)
4	16	26
6	16	23
8-12	16	17
14-16	9	11
18-20	9	9
24-30	9	8
36	9	7
42-48	6	6
54	5	-

Compacted gravel bedding (12" min) shall be installed under the entire length of the pipe and across the full width of the trench. Firm bearing shall be achieved by tamping selected material at the sides of the pipe/fitting, up to the "spring line" (mid-point height).

Whenever pipe laying operations cease for an extended period of time (over 30 minutes), all openings are to be closed with a watertight plug or other means approved by PW. Water shall be kept out of the trench while the pipe is being installed. If required, fittings, in addition to those shown on the plans, shall be provided when crossing utilities or other immovable obstructions that may be encountered when installing water facilities. At least a 12-inch layer of compacted gravel shall be left between all pipes or other subsurface structures, whether they are installed or relocated.

Adequate temporary provisions shall be made to provide for the flow from sewers or drains interfered with by the work. All necessary measures shall be taken to prevent sewage or other contaminating matter from entering the water main.

At all temporary cul-de-sacs and future streets, the main shall end with a full size line valve followed by a full length of pipe and a 3-foot section of pipe. The 3-foot section of pipe shall be outfitted with a cap (MJ) and a blowoff assembly (see Sec. 300.5, *Blowoff Assembly*). An adequate number of pipe sections shall be restrained before the end cap. A formed constructed-in-place concrete thrust block shall be placed against the cap.

Pipe cuts shall be made so as to leave a smooth end at right angles to the main axis of the pipe and also chamfered to conform to the manufactured spigot end. Particular care shall be exercised to minimize damage to the cement mortar lining when making cuts. Machine field cuts shall be made on pipes that are 16-inches and larger.

Dig-Safe® is to be notified prior to commencement of work. Any broken or damaged utility connection or services (water, sewer, gas, telephone, electric, etc.) shall be fully repaired at the expense of the party responsible for the damage. Underground structures shall be thoroughly supported or otherwise protected to maintain uninterrupted service.

New pipes and fittings shall be subjected to a careful visual inspection just before installation. Any fitting showing a crack or any fitting or pipe that has received a severe blow, which may have caused an incipient fracture even though no such fracture can be seen, or any fitting or pipe discovered to be defective, shall be

marked as "REJECTED" and removed at once from the work site. Pipe showing a crack may be cut off at a point at least 12-inches from the visible limit of the crack before the pipe is installed, provided the remaining portion is perfectly sound as determined by testing. Cut ends, used with push-on joints, shall be chamfered to prevent damage to the gasket when the pipe is assembled. Any defective pipe or fitting discovered after installation shall be removed and replaced at the installer's expense.

Pipes shall be cleaned of all excess asphaltic coating, debris, dirt, or other deleterious material, before installation. Care shall be taken in loading, transporting and unloading, to prevent injury to the coatings on the pipes and/or fittings. Any damage to the coatings shall be repaired as directed by a representative of PW. Pipes or fittings shall not be dropped.

400.2.2 Valves. Each valve that can be operated with a wrench or "key" shall be equipped with a sliding-type cast iron gate valve box (see Sec. 300.4.1, *Gate Valve Box*).

400.2.2.1 Gate. Valves shall be installed at all intersections and in each direction and line valves placed no further apart than 800 feet apart, and/or as directed by PW.

Each valve shall be equipped with a sliding-type cast iron gate valve box (see Sec. 300.4.1, *Gate Valve Box*), unless otherwise directed by PW.

400.2.2.2 Butterfly. Each valve shall be equipped with a sliding-type cast iron gate valve box (see Sec. 300.4.1, *Gate Valve Box*) unless otherwise directed by PW.

400.2.2.3 Swing-Check. Valves are to be mounted in an upright horizontal position. Direct access to the valve shall be accomplished by using a precast concrete manhole (5' I.D. min) with heavy duty cast iron manhole frame and solid 30" dia. (min.) cover. Concrete structure and cover shall be capable of withstanding an AASHTO H-20 load. Covers shall have a diamond check pattern with the word "WATER" (in caps) cast upon it. Corrosion resistant, non-slip steps or ladder shall be permanently affixed to the interior vertical wall of the manhole.

Depending on the pipe diameter, a resilient seated gate or butterfly valve shall be placed on each side of the swing-check valve, exterior of the manhole.

400.2.2.4 Tapping. Each valve shall be equipped with a sliding-type cast iron gate valve box (see Sec. 300.4.1, *Gate Valve Box*), unless otherwise directed by PW.

400.2.3 Valve Boxes.

400.2.3.1 Gate Valve Box. Each valve that can be operated with a wrench or "key" shall be equipped with a sliding-type, cast iron, gate valve box (see Sec. 300.4.1, *Gate Valve Box*).Boxes shall be positioned so that no load is transmitted to the valve body. A gate box aligner, manufactured of high strength plastic, shall be used with each installation to center the valve operating nut within the box.

400.2.3.2 Gate Valve Roadway Box. Gate valve roadway boxes shall be used for 1-1/2 and 2-inch curb stops (see A-7Sec. 300.4.2, *Gate Valve Roadway Box*). Boxes shall be positioned so that no load is transmitted to the stop body or service pipe.

400.2.4 Blowoff Assembly. A 2-inch blowoff assembly shall be used at the terminus of a dead end main. Installation should be on the main at the "spring line" of the pipe within 2-feet of the end cap, or on the end cap itself.

400.2.5 Fire Hydrants. Hydrants shall be located so that they are, at a minimum, no more than 1,000 feet apart, or as required by the local fire department.

They shall be designed and installed so that when properly installed a standard 15-inch hydrant wrench will not contact the ground when making a full 360-degree turn on any nozzle cap.

Hydrants shall be set plumb with the steamer port (or central hose nozzle) facing the roadway. Hydrants shall be positioned with the center of the operating nut 24-inches back from the face of curb, or as required by the local fire chief.

Manufacturer's "bury mark" or ground line shall be set at finished grade. If there is no mark on the hydrant, the bottom of the breaking ring (flange) shall be set at a minimum of 2-inches to a maximum of 4-inches above finished grade. Depth of bury shall be at least 4'-6". The base of the hydrant shall be set on either a flat stone or concrete slab that is at least 14-inches square and 6-inches thick.

Hydrants shall be restrained using poured concrete thrust blocks in conjunction with a mechanical joint

restraining device or strapped back to the hydrant gate valve.

A drainage pit shall be excavated below and around each hydrant and backfilled to a height of at least 6-inches above all drain ports with at least 1 cubic yard of ½ to 1-inch washed crushed stone. Stone shall be compacted prior to backfilling and compaction of the hydrant. Aggregates shall be covered with a layer of non-woven filter fabric to lessen the intrusion of fine soil particles into the stone.

Hydrants shall be fed from the main with a 6 or 8-inch ductile iron lateral (8-inch is used when hydrant laterals exceed a length of 10-feet). A resilient seated gate valve (MJ) shall be installed in the lateral between the tee and the hydrant. Special anchor or swivel tees (MJ) shall be used to connect the hydrant branch to the main.

For the purpose of standardization and the maintenance of reasonable parts inventories and repair capabilities, PW only allows a certain model of fire hydrant in its system.

400.2.6 Service Connections. Each tap to the main shall be made under pressure by PW personnel or, under some circumstances, an approved contractor. Taps shall be made using an approved method and equipped with a bronze corporation stop—compression type— with copper tube size (CTS) on the service side.

Taps should be made so that the service line will extend to the point where the meter will be located at the nearest point in the building at a 90-degree angle to the street.

Direct taps up to 1-inch may be made in the main. Larger taps shall require a service saddle. Ordinarily, taps will be made at the ten o'clock or two-o'clock position on the circumference of the pipe. When more than one tap is to be made in the main in close proximity to one another, they should be staggered around the circumference at least 12-inches apart.

Services up to 2-inches shall be equipped with a curb stop located 1-foot behind the face of curb or edge of pavement. Curb stops shall be bronze, compression fitted, without drip. Direction of opening shall be to the "RIGHT."

Generally speaking, service lines from the main to curb stop are installed by PW. Owners shall provide a marker (painted and/or staked) to indicate where they prefer the service to be located (must be approved by PW). Service from building to curb stop shall be installed by the Owner and inspected by PW (for sizes 2-inches and smaller—use of intermediate couplings is strongly discouraged.).

Depth to the crown of the service pipe shall be a minimum of 4'-6" below finished grade, throughout the installation. Information on this and other aspects of service installation is available on the PW *Service Installation Procedures* sheet.

Metallized detectable identification tape, 2-inches wide, blue in color and imprinted with the words "CAUTION – WATER LINE BURIED BELOW," shall be utilized over all service lines from the main to the curb stop. The tape shall be buried a depth of 12-inches below finished grade.

A full-ported ball valve (2-inch or less) rated for the service pressure, but not less than 150 psi, shall be installed just prior to the location of the meter coupling and one at the effluent side of the second meter coupling.

400.3 Thrust Restraint. The preferred method of counteracting thrust is through the use of a mechanical joint restraint device. Poured concrete thrust blocks are also allowed and may be used as an option or in conjunction with a mechanical joint restraint device.

Thrust blocks shall be designed using a soil bearing strength of 1,500 pounds per square foot (psf). They shall be constructed in place using Portland cement concrete (R.I. Dept. of Transportation Class "B") having a 28-day compressive strength of at least 3,000 psi, and be located in such a way so as to bear against undisturbed earth. They shall be utilized on all water mains for the following conditions (See Table 4-2):

- Pipeline direction changes (tees, bends, etc.)
- Dead end lines (caps, plugs or hydrants)
- Transition pieces (reducers, offsets, etc.)

The sides of thrust blocks shall be formed. Forms shall be removed before backfilling commences. Curing time should be at least forty-eight (48) hours. Minimum bearing shall be that which is depicted on the plans or as directed by PW. Felt roofing paper shall be used to protect pipe joints. Concrete shall not be placed over bolts or nuts, or placed in such a way that will prevent the removal of joints (NOTE: concrete reaction blocks may be used when bearing against undisturbed soil cannot be achieved).

Vertical fittings shall be anchored to thrust blocks using at least two (2) #5 (5/8-inch minimum), Grade 60, deformed steel rebars. Blocks shall be designed by a professional engineer for pipe sizes greater than 12-inches. Anchors shall be bent to match to outside radius of the fitting to be restrained.

Thrust restraint, where concrete blocks cannot be poured against undisturbed earth, shall be via restrained joint as approved by PW. This may be accomplished by using a mechanical joint restraining device.

Restrained joint pipe lengths (restrained length), where required, shall be sufficient to counter the thrust imparted by 1½ times the anticipated working pressure, but not less than 150 psi. Calculations for determining the length of pipe restraint shall be based on, the following assumptions: Trench Configuration - AWWA Type 4; Soil Type - Silt 1; Depth of Bury - 4.0' (min); Working Pressure - 150 psi (min); and Factor of Safety - 1.5 (NOTE: computer software such as that produced and distributed by the Ductile Iron Pipe Research Association [DIPRA] may be used [website www.dipra.org]). A printed copy of detailed calculations shall be submitted to PW for review and approval prior to implementation. Design data shall be displayed on the appropriate plan sheets.

Steel tie rods will be allowed with permission from PW. If allowed, they shall be of sufficient strength to withstand forces imparted to them. A *factor of safety* of 2.0 shall be used for all rod thickness calculations. Rods shall be protected from corrosion with at least two (2) coats of asphaltic paint or fusion-bonded epoxy coating.

400.4 Leakage and Pressure Testing. Completed pipe lines shall be tested (in sections) for strength and for leakage at a pressure of 150 psi in areas where "normal static pressure" is no more than 100 psi. In areas that exceed 100 psi, pressure testing shall be at 1.5x the static pressure. No pipe installation will be accepted if the leakage is greater than that determined by the following formula:

$$L = SD \cdot P \cdot 133{,}200$$

where ....

- **L** = allowable leakage, in gallons per hour
- **S** = length of pipe tested, in feet
- **D** = nominal diameter of pipe, in inches
- **P** = average test pressure during the leakage test, in psi (gauge)

The rate of leakage shall not exceed the values in the following table:

TABLE 4-3

ALLOWABLE PIPELINE LEAKAGE

PIPE DIAMETER (in)	ALLOWABLE LEAKAGE PER 1,000 LF OF PIPELINE (gallons / hour)
4	0.37
6	0.55
8	0.74
10	0.92
12	1.10
14	1.29
16	1.47
18	1.66
20	1.84
24	2.21
30	2.76
36	3.31
42	3.86
48	4.41
54	4.97

Tests for leakage shall be done by the Applicant's contractor and shall be witnessed by a PW representative. Testing shall last for at least 1 hour and pressure shall not vary by more than ±5 psi for the duration of the test. Any additional water needed to maintain the required pressure shall be accurately measured in a manner approved by PW. During this test all hydrant laterals shall be in the "OPEN" position. Methods of testing and plans showing sections to be tested shall be submitted to PW for approval.

All apparatus, material, and labor necessary for making the tests, including caps temporarily set to accommodate pressure testing, shall be furnished by the installer. Leaks discovered during testing shall be repaired by the installer.

Arrangements for securing water for test purposes and the expense of the same shall be borne by the installer. Water utilized for this purpose, which is obtained directly from the PW system, must flow through an approved backflow prevention device that has been tested and certified to be in working condition at the time it is used for this purpose.

400.5 Disinfection. Upon completion of the pipeline installation and all the pressure testing thereof, the interior of the pipe shall be flushed and then thoroughly disinfected in all parts. This disinfection must result in eliminating, from the various parts of the new pipeline, all evidence of the existence, therein, of bacteria indicative of any contamination, as determined by tests of the bacterial content of samples of water taken from the new water main. The disinfection shall be accomplished in the following manner:

A. Pipes shall be completely filled with water, all air released, and then thoroughly flushed out in the amount of twice the capacity of the section to be treated. Chlorine liquid/gas, or other approved disinfection agents, shall be introduced into the main near the point of water supply with PW approved Chlorine injection equipment, in the concentration required (not less than 100 parts of available Chlorine per million parts of water [ppm]) to maintain residual concentrations at the end of the disinfection period, as specified. The main shall be wasted or bled from the extreme end opposite the point of application of the disinfection agent until the solution has fully reached the end opposite to the point of application.

B. The disinfecting solution shall be left in the mains under full pressure for a period of not less than 24 hours. Prior to flushing the main, a sample shall be obtained from the main to verify that a minimum Chlorine residual concentration of 50 ppm is present. The entire section shall then be flushed through a neutralizing agent until all traces of Chlorine are removed. NOTE: under special circumstances approved by PW, a 3 hour disinfection period may be allowed with the requirement that a minimum Chlorine residual concentration of 100 ppm is present in the main at the end of the disinfection period.

C. Samples of water shall then be taken by PW and delivered to its laboratory for analysis of the effectiveness of the disinfection treatment.

D. Any main or section of pipe failing to meet laboratory standards for disinfection shall be retreated until the desired results are obtained.

E. Particular attention is directed to the requirement that a double check valve backflow prevention device installation shall be made in the water supply to main under treatment, to prevent possible backflow or back-siphonage of treated solution into the distribution system that is in service.

F. PW approval must be obtained before any main is placed into service.

Connections at cuttings shall be swabbed with 50 ppm solution of Chlorine at locations when other methods are not applicable.

The contractor shall make all necessary arrangements for securing the water for test purposes and shall bear the expense of these arrangements.

The installer shall furnish and install suitable temporary testing plugs, cap, pumps, pipe connections and other appurtenances, as necessary. Water samples shall be collected by a PW representative at points no further apart than 1,000 feet. Sample testing shall be done at the PW laboratory.

TABLE 4-2

THRUST* (IN POUNDS) AT FITTINGS WITH 150 PSI WATER PRESSURE

PIPE SIZE (in)	TEES & DEAD ENDS	90° BEND	45° BEND	22½° BEND	11¼° BEND
4	2,356	3,332	1,803	919	462
6	5,301	7,497	4,058	2,069	1,039
8	9,425	13,329	7,213	3,677	1,848
10	14,726	20,826	11,271	5,746	2,887
12	21,206	29,989	16,230	8,274	4,157
14	28,863	40,819	22,091	11,262	5,658
16	37,699	53,315	28,854	14,709	7,390
18	47,713	67,476	36,518	18,617	9,353
20	58,905	83,304	45,084	22,984	11,547
24	84,823	119,958	64,921	33,096	16,628
30	132,536	187,434	101,439	51,713	25,982
36	190,852	269,905	146,072	74,467	37,413
42	259,770	367,371	198,820	101,357	50,924
48	339,292	479,831	259,683	132,385	66,513
54	429,416	607,287	328,661	167,550	84,180
60	530,144	749,736	405,754	206,852	103,926
66	641,474	907,181	490,963	250,291	125,751
72	763,407	1,079,621	584,286	297,867	149,654

*Calculated by the Formula **T = (2PA SIN(Θ• 2)) x 1.25** (except for Tees & Dead Ends where T = PA x 1.25)

where....

T = Thrust, in pounds
P = Water Pressure, in pounds per square inch
A = Area of Pipe, in square inches
Θ = Bend Deflection Angle, in degrees
1.25 = Factor of Safety

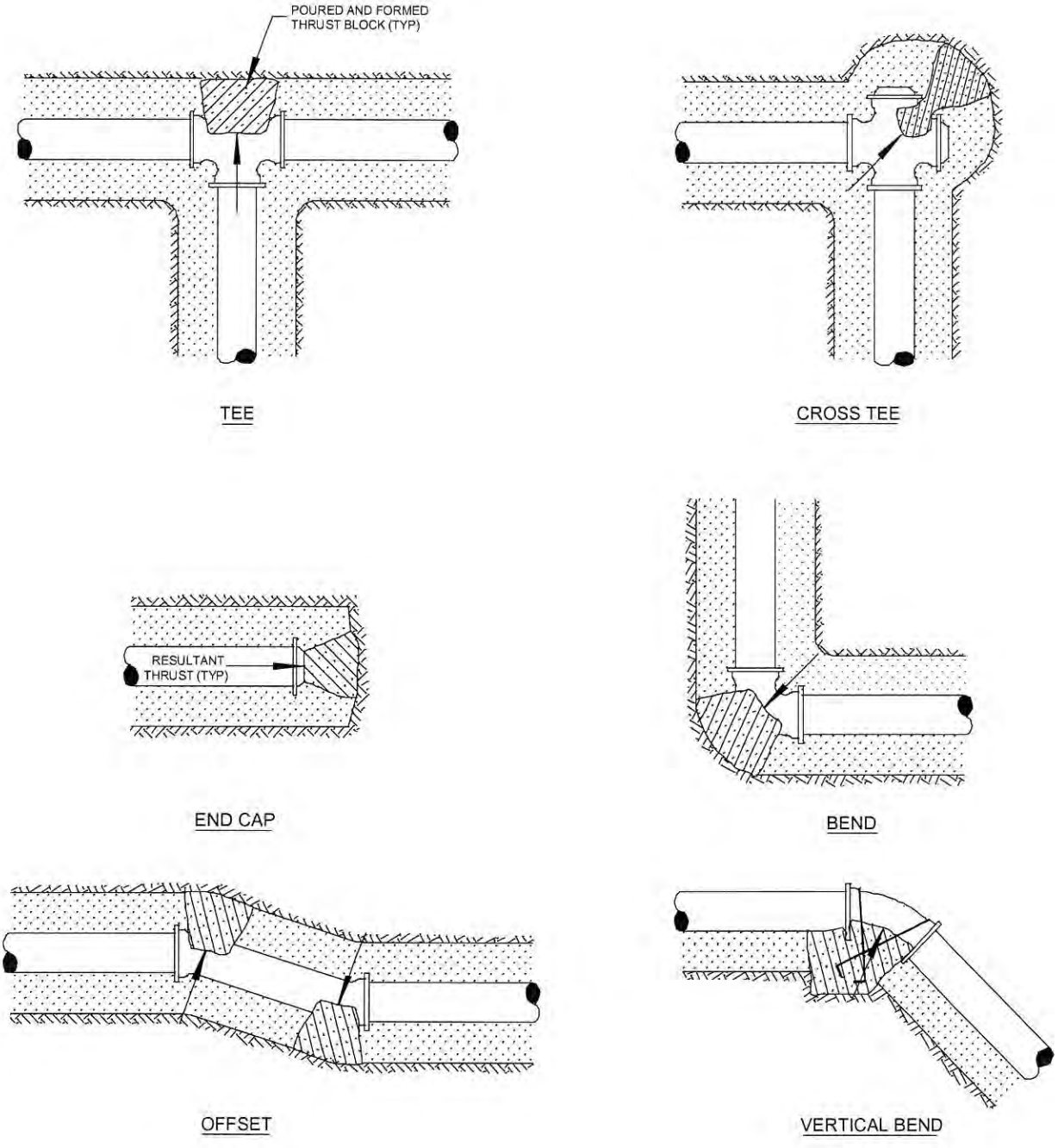
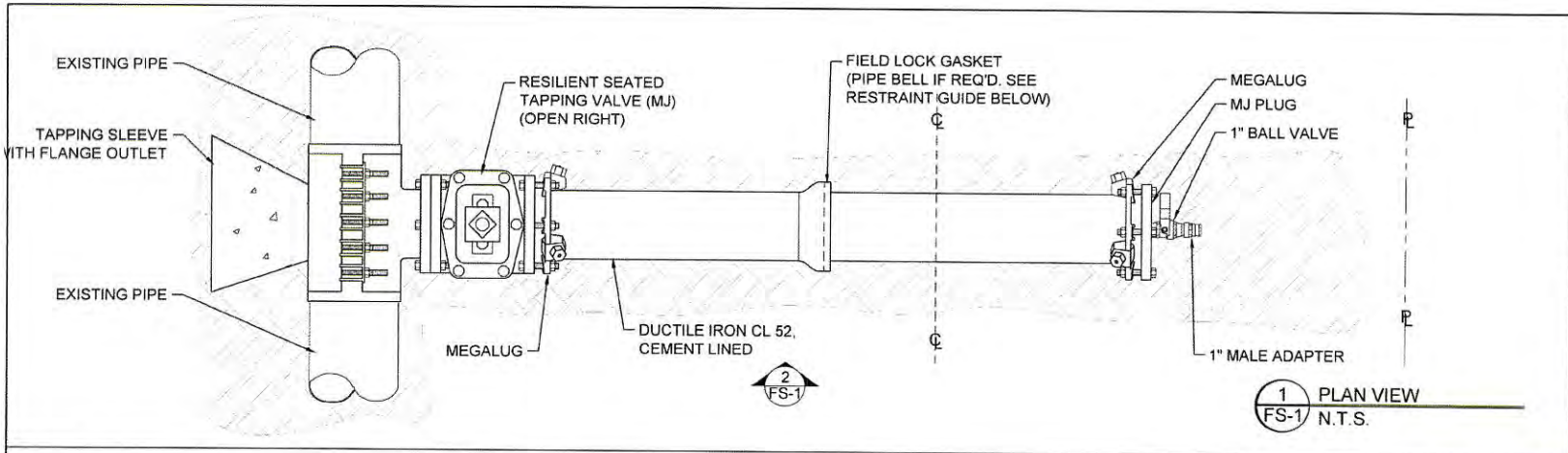
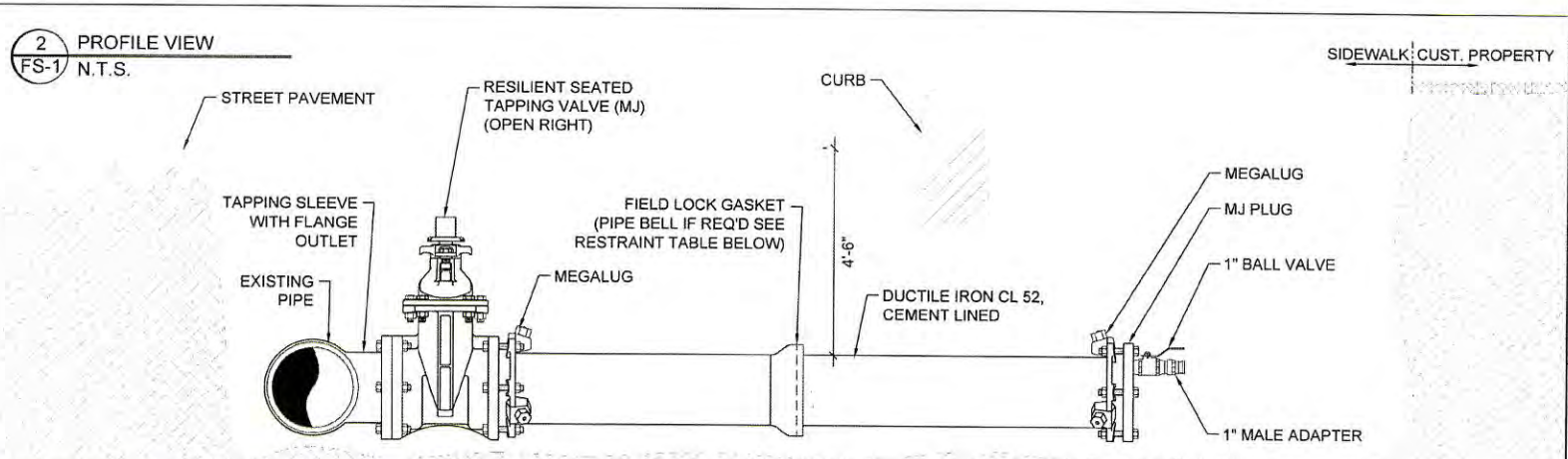


Fig. 4-2 - COMMON TYPES OF THRUST BLOCKING

APPENDIX A

INSTALLATION DETAILS





Providence Water

APPROVED PWSB MANUFACTURERS

DUCTILE IRON PIPE

- ATLANTIC STATES CAST IRON PIPE CO.
- GRIFFIN PIPE PRODUCTS CO.
- U.S. PIPE & FOUNDRY CO.

TAPPING SLEEVES & VALVES

- AMERICAN FLOW CONTROL
- CLOW VALVE CO.
- KENNEDY VALVE
- M&H VALVE CO.
- MUELLER CO.
- U.S. PIPE & FOUNDRY CO.
- AVK

JOINT RESTRAINTS (MECHANICAL

- EBBA IRON SALES, INC - MEGALUG

JOINT RESTRAINTS (GASKETED)

- U.S. PIPE & FOUNDRY CO. FIELD LOK 350 GASKET

PWSB TYPICAL DUCTILE IRON DOMESTIC & FIRE SERVICES 4"±

GENERAL NOTES:

1. OTHER EXISTING UTILITIES ARE NOT SHOWN. CONTRACTOR SHALL NOTIFY "DIG-SAFE" PRIOR TO COMMENCING WORK.
2. NEW WATER MAINS SHALL BE TESTED AND CHLORINATED IN ACCORDANCE WITH PROVIDENCE WATER STANDARDS AND AS DIRECTED BY PROVIDENCE WATER.
3. NEW WATER MAINS SHALL BE CEMENT-LINED DUCTILE IRON PIPE, CLASS 52, CONFORMING TO THE LATEST AWWA STANDARDS.
4. PIPE FITTINGS SHALL BE CEMENT-LINED DUCTILE IRON, CLASS 350, WITH MECHANICAL JOINT ENDS.
5. UNLESS OTHERWISE NOTED, EARTH COVER OVER PIPE SHALL NOT BE LESS THAN 4.5-FEET.
6. GATE VALVES SHALL BE RESILIENT SEAT TYPE WITH MECHANICAL JOINT ENDS AND SHALL OPEN "RIGHT" (CLOCKWISE).
7. METALLIZED, DETECTABLE, IDENTIFICATION TAPE SHALL BE 2-INCHES WIDE, BLUE IN COLOR, AND IMPRINTED WITH THE WORDS "CAUTION - WATER LINE BURIED BELOW", AND SHALL BE INSTALLED OVER ALL MAINS AND HYDRANT RUN-OUTS AT A DEPTH OF 12-INCHES BELOW FINISHED GRADE.
8. CURB STOPS SHALL BE INSTALLED 1 FT. TO 1-1/2 FT. BEHIND FACE OF CURB OR EDGE OF PAVEMENT. CURB STOPS ARE NOT TO BE INSTALLED IN EXISTING OR FUTURE DRIVEWAYS.
9. UNLESS OTHERWISE NOTED, BREAKAWAY TYPE HYDRANTS, WHERE REQUIRED, SHALL BE INSTALLED AT EXISTING LOCATIONS WITH OPERATING NUT POSITIONED 24-INCHES BEHIND FACE OF CURB OR EDGE OF PAVEMENT. THE BREAKAWAY FLANGE SHALL BE SET 2-INCHES TO 4-INCHES ABOVE FINISHED GRADE. HYDRANTS SHALL OPEN "RIGHT" (CLOCKWISE).
10. PORTLAND CEMENT CONCRETE THRUST BLOCKS AND/OR GRAVITY BLOCKS SHALL BE CONSTRUCTED IN PLACE AT CHANGES OF PIPE DIRECTION (TEES, BENDS, ETC) AND/OR DEAD ENDS IN ACCORDANCE WITH PROVIDENCE WATER STANDARDS. FURTHERMORE, MECHANICAL JOINT THRUST RESTRAINTS SHALL BE PLACED ON EACH SIDE OF IN-LINE FITTINGS OR PIPE JOINTS PRIOR TO END CAPS/PLUGS SO AS TO SUFFICIENTLY RESTRAIN AN ADEQUATE LENGTH OF PIPE AT 1-1/2 TIMES THE STATIC PRESSURE, BUT IN ANY EVENT, NOT LESS THAN 150 PSI.

RESTRAINTS		RESTRAINTS	
TAPPING SLEEVE	LENGTH	TAPPING SLEEVE	LENGTH
4"X4"	33'	12"X4"	33'
6"X4"	33'	12"X6"	47'
6"X6"	47'	12" X 8"	61'
8"X4"	33'	12"X10"	74'
8"X6"	47'	12"X12"	87'
8"X8"	61'	-	-
10"X4"	33'	-	-
10"X6"	47'	-	-
10"X8"	61'	-	-
10"X10"	74'	-	-

RESTRAINTS					
BENDS					
	90°	45°	22.5°	11.25°	
SIZE	RESTRAINT LENGTH				-
4"	13'	5'	3'	1'	-
6"	19'	8'	4'	2'	-
8"	24'	10'	5'	2'	-
10"	29'	12'	6'	3'	-
12"	34'	14'	7'	3'	-
					-
					-
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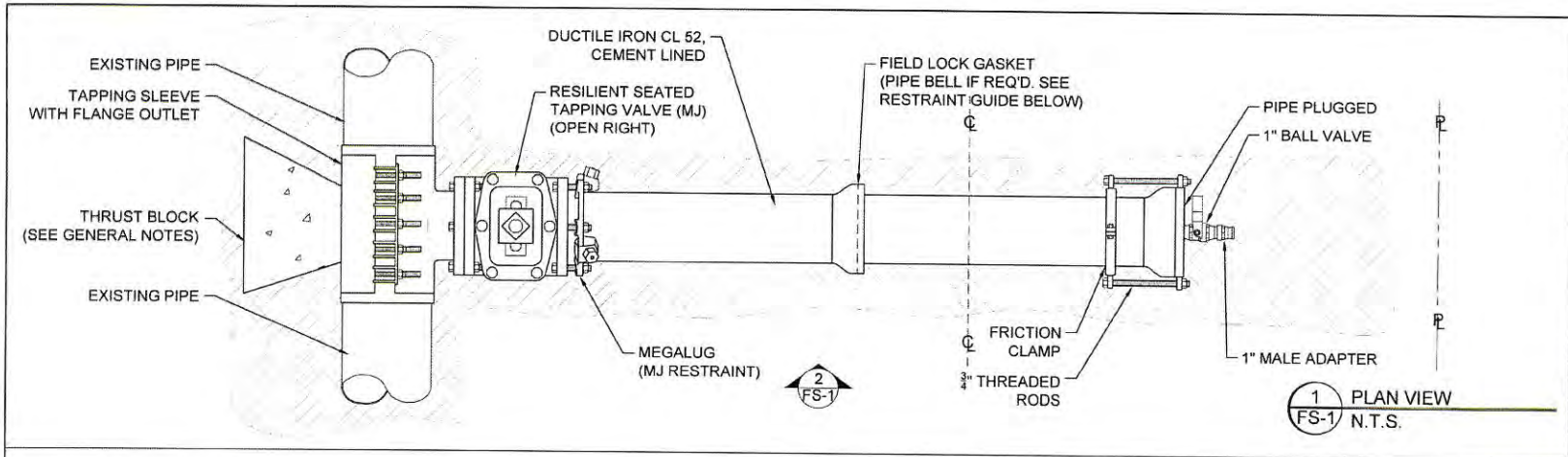
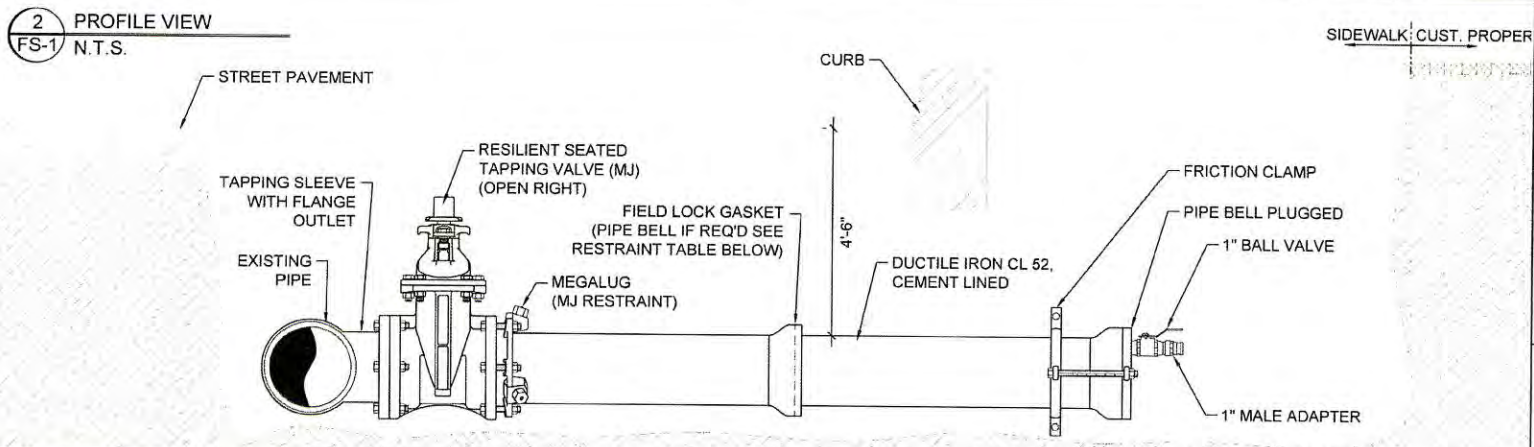
MDM — DRAWN BY
AMP — CHECKED BY
N.T.S. — SCALE
11-9-2011 — DATE

DIRECTOR OF ENGINEERING

FS-1





GENERAL NOTES:

1. OTHER EXISTING UTILITIES ARE NOT SHOWN. CONTRACTOR SHALL NOTIFY "DIG-SAFE" PRIOR TO COMMENCING WORK.
2. NEW WATER MAINS SHALL BE TESTED AND CHLORINATED IN ACCORDANCE WITH PROVIDENCE WATER STANDARDS AND AS DIRECTED BY PROVIDENCE WATER.
3. NEW WATER MAINS SHALL BE CEMENT-LINED DUCTILE IRON PIPE, CLASS 52, CONFORMING TO THE LATEST AWWA STANDARDS.
4. PIPE FITTINGS SHALL BE CEMENT-LINED DUCTILE IRON, CLASS 350, WITH MECHANICAL JOINT ENDS.
5. UNLESS OTHERWISE NOTED, EARTH COVER OVER PIPE SHALL NOT BE LESS THAN 4.5-FEET.
6. GATE VALVES SHALL BE RESILIENT SEAT TYPE WITH MECHANICAL JOINT ENDS AND SHALL OPEN "RIGHT" (CLOCKWISE).
7. METALLIZED, DETECTABLE, IDENTIFICATION TAPE SHALL BE 2-INCHES WIDE, BLUE IN COLOR, AND IMPRINTED WITH THE WORDS "CAUTION - WATER LINE BURIED BELOW", AND SHALL BE INSTALLED OVER ALL MAINS AND HYDRANT RUN-OUTS AT A DEPTH OF 12-INCHES BELOW FINISHED GRADE.
8. CURB STOPS SHALL BE INSTALLED 1 FT. TO 1-1/2 FT. BEHIND FACE OF CURB OR EDGE OF PAVEMENT. CURB STOPS ARE NOT TO BE INSTALLED IN EXISTING OR FUTURE DRIVEWAYS.
9. UNLESS OTHERWISE NOTED, BREAKAWAY TYPE HYDRANTS, WHERE REQUIRED, SHALL BE INSTALLED AT EXISTING LOCATIONS WITH OPERATING NUT POSITIONED 24-INCHES BEHIND FACE OF CURB OR EDGE OF PAVEMENT. THE BREAKAWAY FLANGE SHALL BE SET 2-INCHES TO 4-INCHES ABOVE FINISHED GRADE. HYDRANTS SHALL OPEN "RIGHT" (CLOCKWISE).
10. PORTLAND CEMENT CONCRETE THRUST BLOCKS AND/OR GRAVITY BLOCKS SHALL BE CONSTRUCTED IN PLACE AT CHANGES OF PIPE DIRECTION (TEES, BENDS, ETC) AND/OR DEAD ENDS IN ACCORDANCE WITH PROVIDENCE WATER STANDARDS. FURTHERMORE, MECHANICAL JOINT THRUST RESTRAINTS SHALL BE PLACED ON EACH SIDE OF IN-LINE FITTINGS OR PIPE JOINTS PRIOR TO END CAPS/PLUGS SO AS TO SUFFICIENTLY RESTRAIN AN ADEQUATE LENGTH OF PIPE AT 1-1/2 TIMES THE STATIC PRESSURE, BUT IN ANY EVENT, NOT LESS THAN 150 PSI.

RESTRAINTS		RESTRAINTS	
TAPPING SLEEVE	LENGTH	TAPPING SLEEVE	LENGTH
4"X4"	33'	12"X4"	33'
6"X4"	33'	12"X6"	47'
6"X6"	47'	12" X 8"	61'
8"X4"	33'	12"X10"	74'
8"X6"	47'	12"X12"	87'
8"X8"	61'	-	-
10"X4"	33'	-	-
10"X6"	47'	-	-
10"X8"	61'	-	-
10"X10"	74'	-	-

RESTRAINTS					
BENDS					
	90°	45°	22.5°	11.25°	-
SIZE	RESTRAINT LENGTH				-
4"	13'	5'	3'	1'	-
6"	19'	8'	4'	2'	-
8"	24'	10'	5'	2'	-
10"	29'	12'	6'	3'	-
12"	34'	14'	7'	3'	-
					-
					-
					-

Providence Water

APPROVED PWSB MANUFACTURERS

DUCTILE IRON PIPE

- ATLANTIC STATES CAST IRON PIPE CO.
- GRIFFIN PIPE PRODUCTS CO.
- U.S. PIPE & FOUNDRY CO.

TAPPING SLEEVES & VALVES

- AMERICAN FLOW CONTROL
- CLOW VALVE CO.
- KENNEDY VALVE
- M&H VALVE CO.
- MUELLER CO.
- U.S. PIPE & FOUNDRY CO.
- AVK

JOINT RESTRAINTS (MECHANICAL

- EBBA IRON SALES, INC - MEGALUG

JOINT RESTRAINTS (GASKETED)

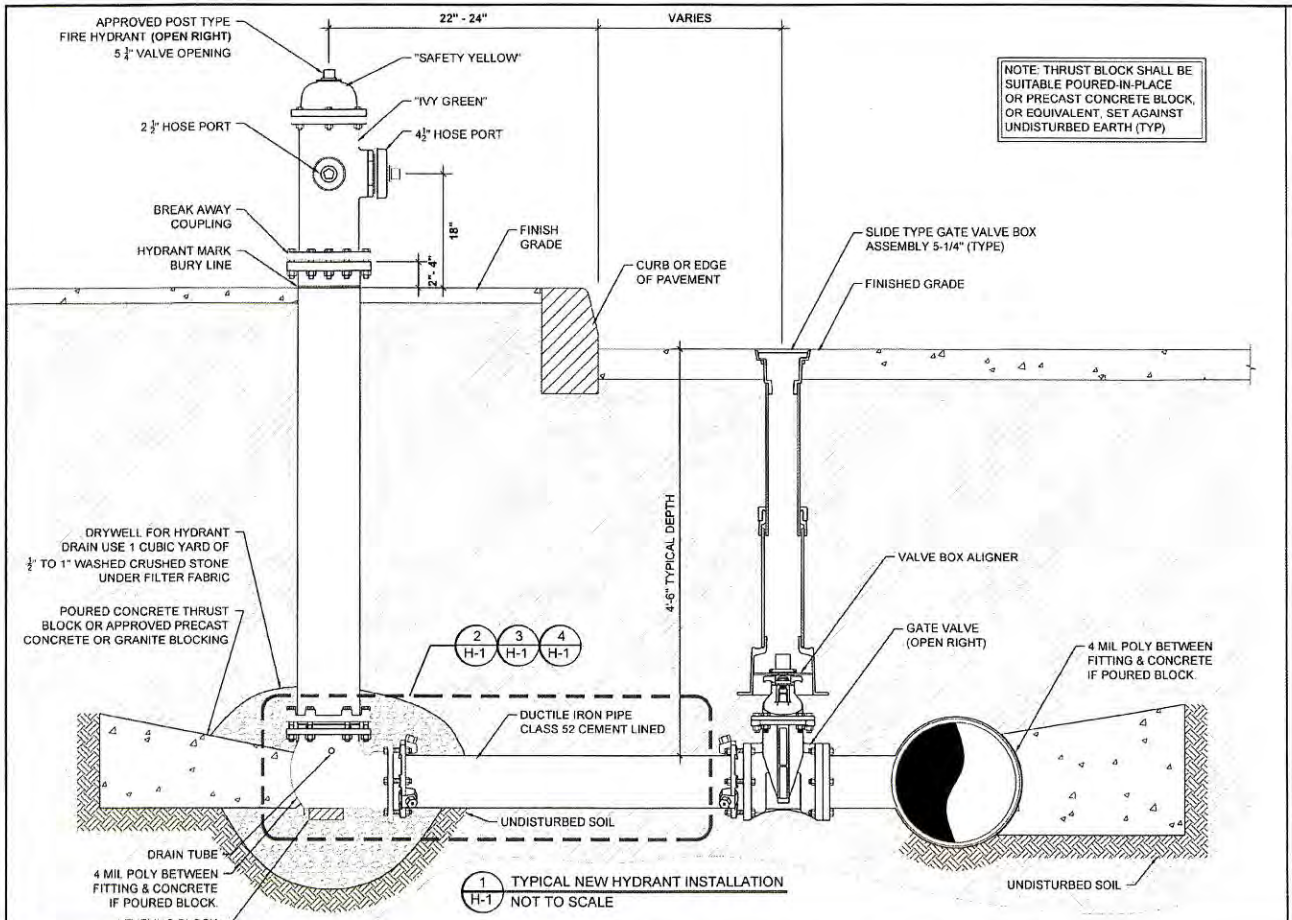
- U.S. PIPE & FOUNDRY CO. FIELD LOK 350 GASKET

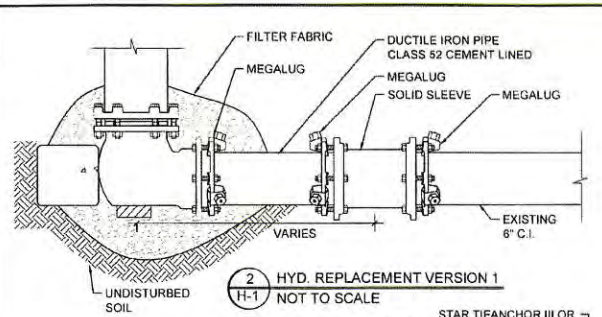
PWSB TYPICAL DUCTILE IRON DOMESTIC & FIRE SERVICES 4"±

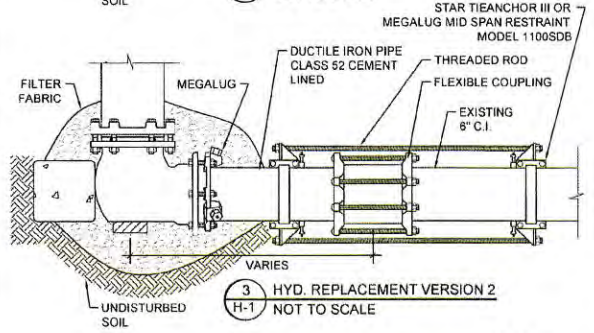
MDM	AMP
DRAWN BY	CHECKED BY
N.T.S.	11-9-2011
SCALE	DATE

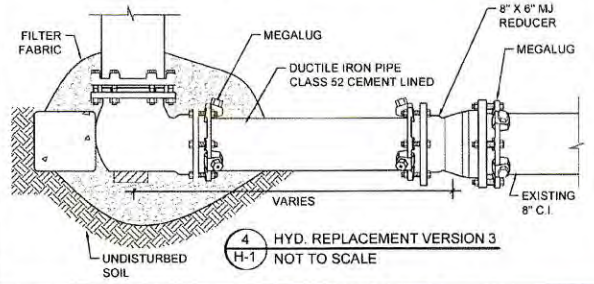
DIRECTOR OF ENGINEERING

FS-2









GENERAL NOTES

1. OTHER UTILITIES ARE NOT SHOWN. CONTRACTOR SHALL NOTIFY "DIG-SAFE" & PWSB PRIOR TO COMMENCING WORK.
2. NEW WATER PIPE SHALL BE TESTED AND CHLORINATED IN ACCORDANCE WITH PROVIDENCE WATER STANDARDS AND AS DIRECTED BY PROVIDENCE WATER.
3. NEW WATER PIPE SHALL BE CEMENT-LINED DUCTILE IRON PIPE, CLASS 52, CONFORMING TO THE LATEST AWWA STANDARDS.
4. PIPE FITTINGS SHALL BE CEMENT-LINED DUCTILE IRON, CLASS 350, WITH MECHANICAL JOINT ENDS.
5. UNLESS OTHERWISE NOTED, EARTH COVER OVER PIPE SHALL NOT BE LESS THAN 4'-6".
6. GATE VALVES SHALL BE RESILIENT SEAT TYPE WITH MECHANICAL JOINT ENDS AND SHALL OPEN "RIGHT" (CLOCKWISE).
7. METALLIZED, DETECTABLE, IDENTIFICATION TAPE SHALL BE 2-INCHES WIDE, BLUE IN COLOR, AND IMPRINTED WITH THE WORDS "CAUTION WATER LINE BURIED BELOW", AND SHALL BE INSTALLED OVER ALL MAINS AND HYDRANT RUN-OUTS AT A DEPTH OF 12 INCHES BELOW FINISHED GRADE.
8. UNLESS OTHERWISE NOTED, BREAKAWAY TYPE HYDRANTS, SHALL BE INSTALLED WITH OPERATING NUT POSITIONED 22-24 INCHES BEHIND FACE OF CURB OR EDGE OF PAVEMENT. THE BREAKAWAY FLANGE SHALL BE SET 2 INCHES TO 4-INCHES ABOVE FINISHED GRADE. HYDRANTS SHALL OPEN "RIGHT" (CLOCKWISE).
9. PROPERLY SIZED CONCRETE THRUST BLOCKS SHALL BE INSTALLED AT CHANGES OF PIPE DIRECTION (TEES, BENDS, ETC) AND/OR DEAD ENDS IN ACCORDANCE WITH PROVIDENCE WATER STANDARDS. FURTHERMORE, MECHANICAL JOINT THRUST RESTRAINTS SHALL BE PLACED ON EACH SIDE OF FITTINGS AND AT PIPE JOINTS TO SUFFICIENTLY RESTRAIN AN ADEQUATE LENGTH OF PIPE AWAY FROM FITTINGS AT 1-1/2 TIMES THE STATIC PRESSURE, OR NOT LESS THAT 150 PSI.

GENERAL NOTES

APPROVED HYDRANTS

- KENNEDY GUARDIAN HYDRANT - K81D
- AMERICAN DARLING HYDRANT - B84B BY AMERICAN FLOW CONTROL

HYDRANTS MUST BE "HYDRA-SHIELD CUSTODIAN" READY.

HYDRANT EXTENSION KITS AND TRAFFIC REPAIR KITS MUST BE AVAILABLE FROM THE MANUFACTURER BY THE ORIGINAL HYDRANT MANUFACTURER & CONSIDERED "ORIGINAL EQUIPMENT", SUBSTITUTES ARE NOT ALLOWED.

TYPICAL LOW SERVICE HYDRANT WOULD HAVE A DEPTH OF 5 FEET

TYPICAL HIGH SERVICE HYDRANT WOULD HAVE A DEPTH OF 5 FEET 6 INCHES

NOTE: FOR REPLACEMENT OF EXISTING HYDRANTS THE DEPTH SHOULD BE DETERMINED PRIOR TO INSTALLATION TO ASSURE THAT NEW HYDRANT IS OF PROPER DEPTH

Providence Water

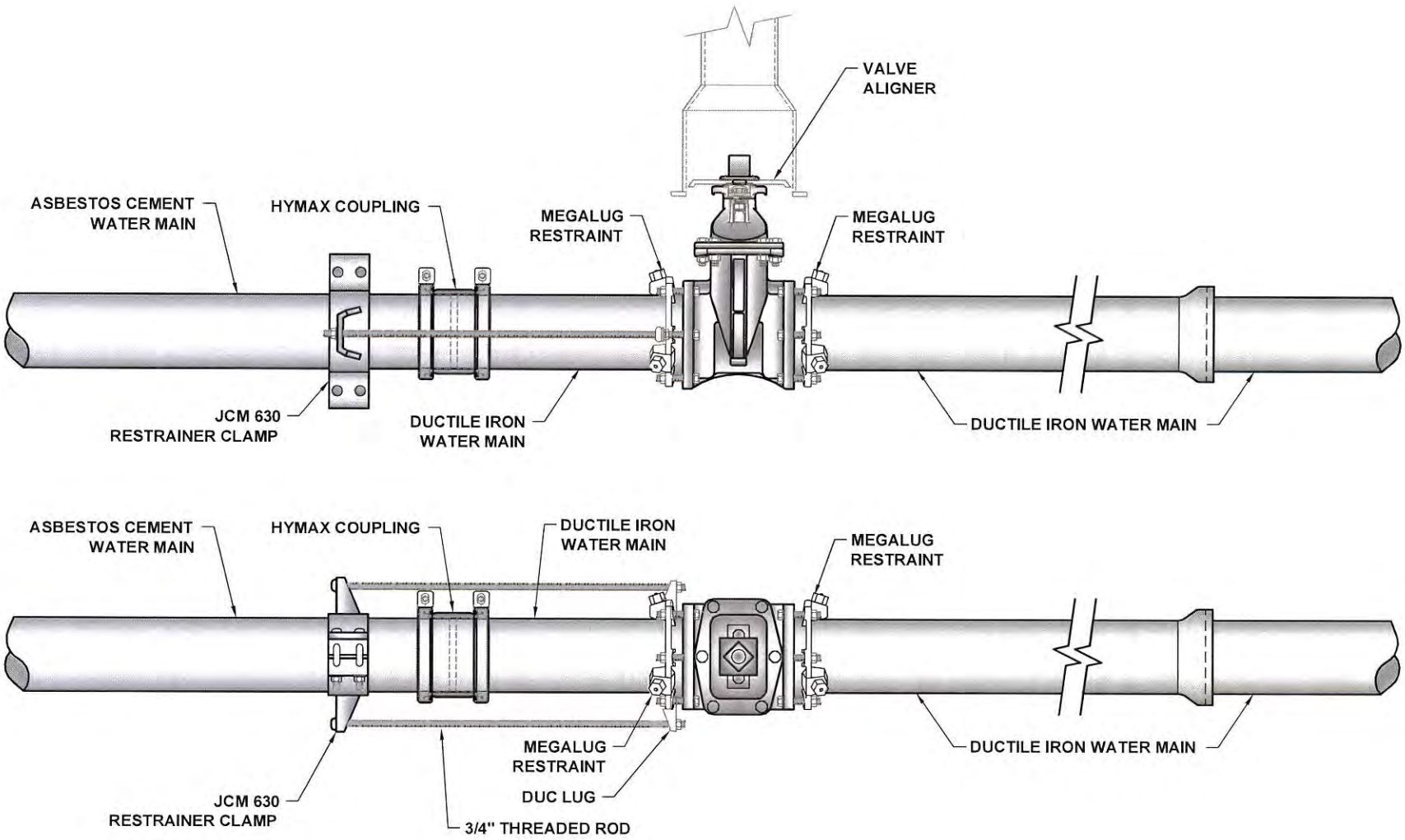
PWSB NEW HYDRANT INSTALLATION & REPLACEMENTS

MDM DRAWN BY	AMP, JA CHECKED BY
N.T.S. SCALE	5-31-2012 DATE

Paul J. Hadoury
DIRECTOR OF ENGINEERING

TYPICAL DETAILS

H-1
SHEET NUMBER
1 of 1



TYPICAL 4" TO 8" GATE VALVE INSTALLATION WITH HYMAX COUPLINGS

(ON EXISTING AC and DI PIPE)

NOT TO SCALE

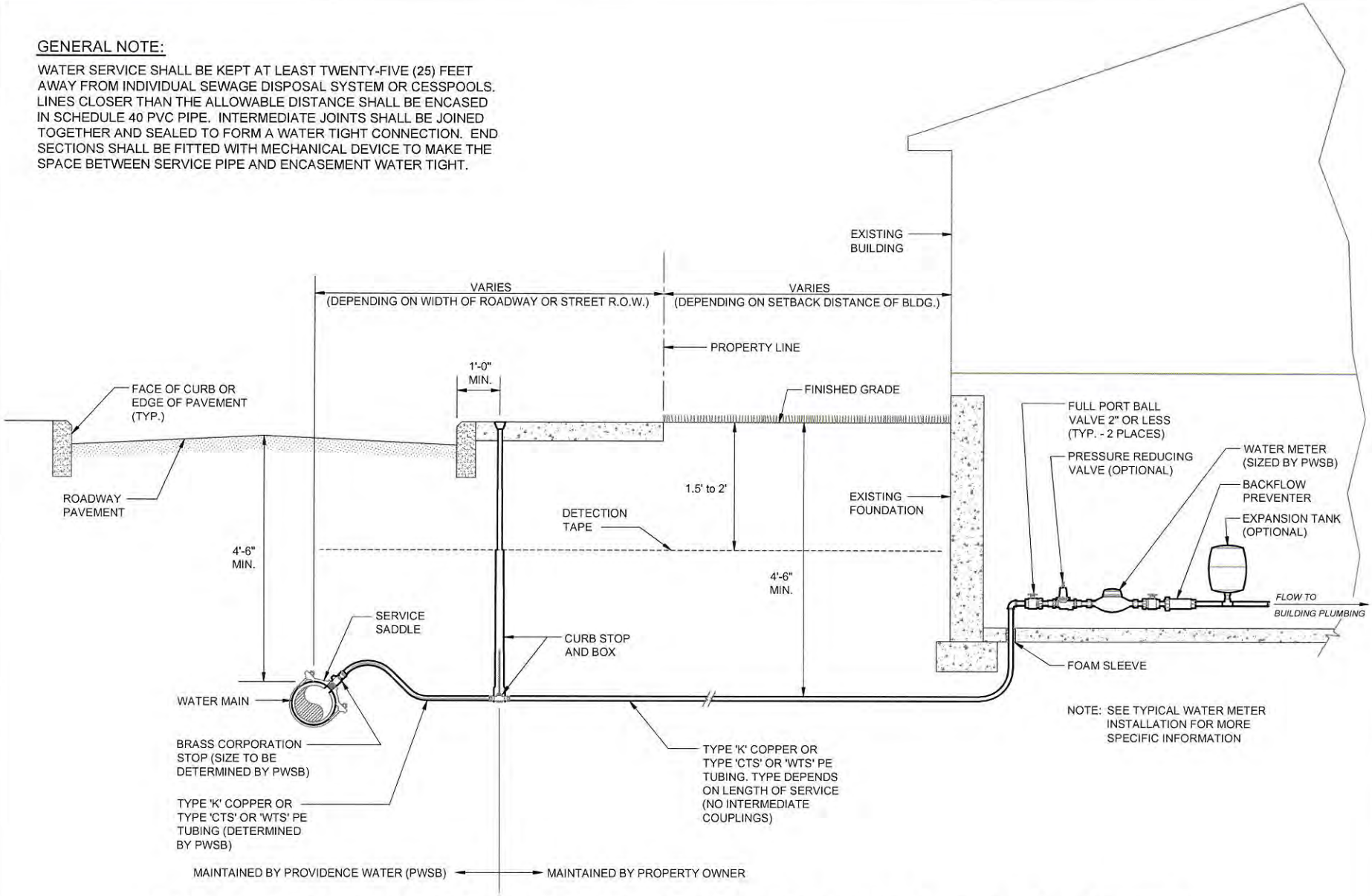
3-11-13

Senior Manager of Engineering Date

Providence Water

GENERAL NOTE:

WATER SERVICE SHALL BE KEPT AT LEAST TWENTY-FIVE (25) FEET AWAY FROM INDIVIDUAL SEWAGE DISPOSAL SYSTEM OR CESSPOOLS. LINES CLOSER THAN THE ALLOWABLE DISTANCE SHALL BE ENCASED IN SCHEDULE 40 PVC PIPE. INTERMEDIATE JOINTS SHALL BE JOINED TOGETHER AND SEALED TO FORM A WATER TIGHT CONNECTION. END SECTIONS SHALL BE FITTED WITH MECHANICAL DEVICE TO MAKE THE SPACE BETWEEN SERVICE PIPE AND ENCASEMENT WATER TIGHT.



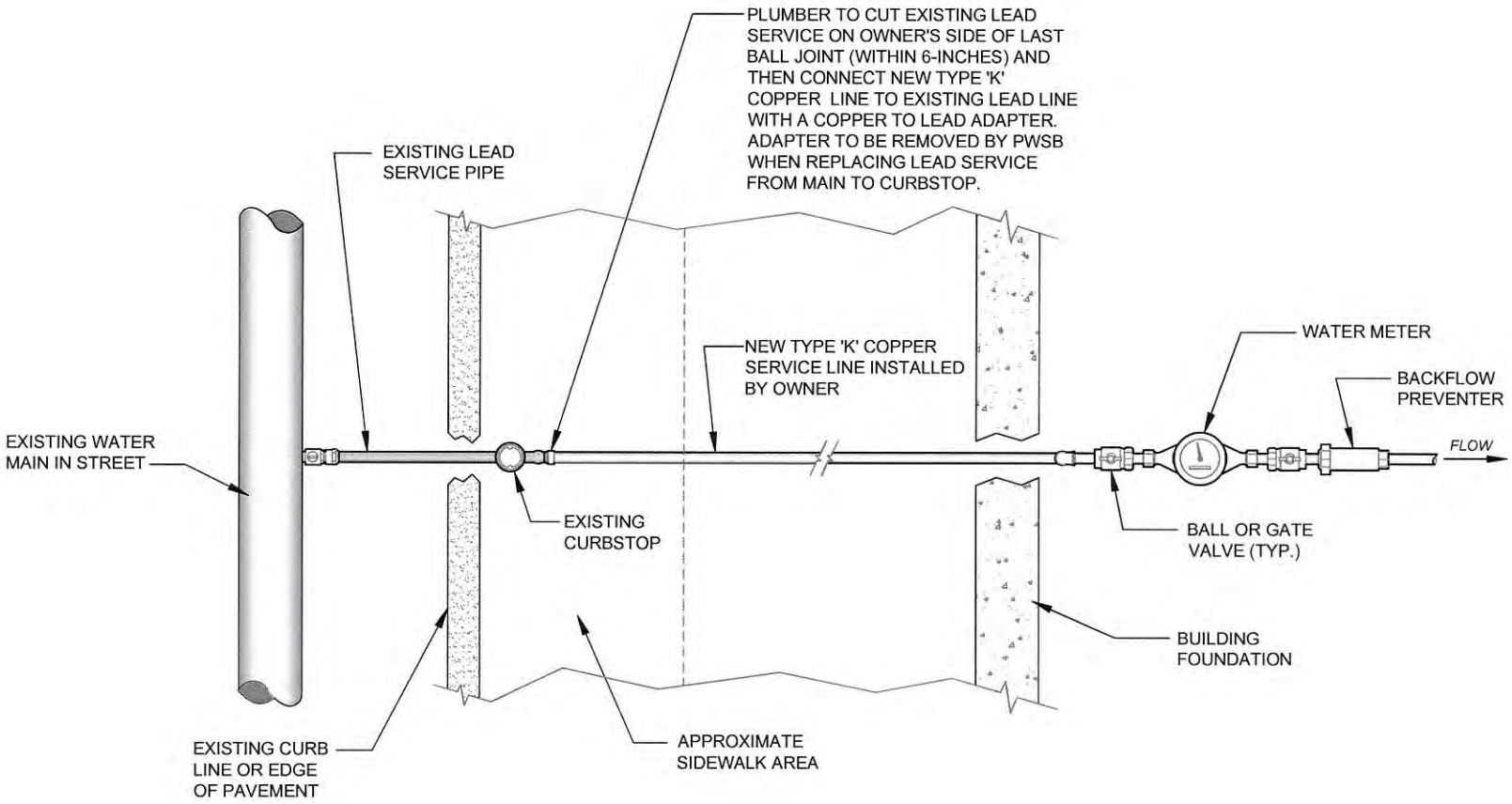
RESIDENTIAL WATER SERVICE CONNECTION SCHEMATIC - ELEVATION VIEW

NOT TO SCALE

9-28-12

Senior Manager of Engineering Date

Providence Water



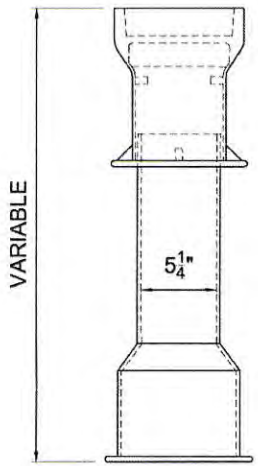
OWNER'S SIDE LEAD SERVICE REPLACEMENT SCHEMATIC - PLAN VIEW

NOT TO SCALE

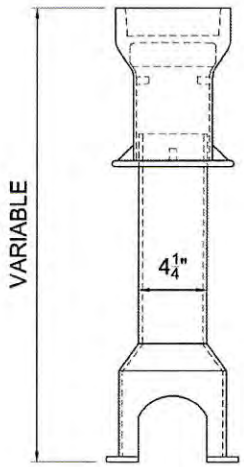
9-28-12

Senior Manager of Engineering Date

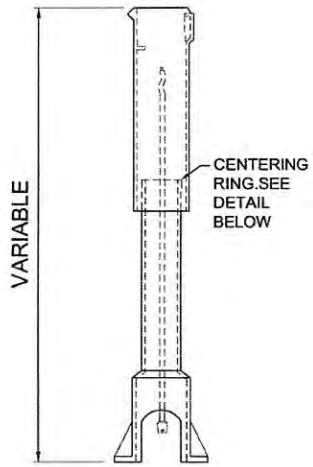
Providence Water



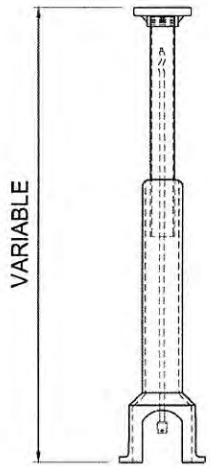
GATE VALVE BOX
BINGHAM & TAYLOR
FIG. NO. 4908
OR EQUIVLANT



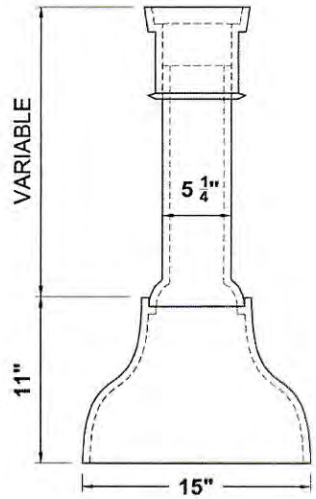
ROADWAY BOX
1-1/2" - 2" SERVICE
BINGHAM & TAYLOR
FIG. NO. 4903
OR EQUIVLANT



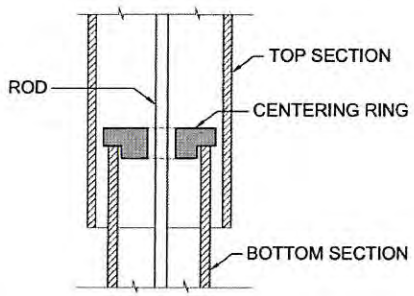
BUFFALO BOX
USED UNDER SPECIAL CICUMSTANCES
BINGHAM & TAYLOR
FIG. NO. 4901
OR EQUIVLANT



ERIE BOX
3/4" - 1" SERVICE
BINGHAM & TAYLOR
FIG. NO. E-100 / E-125
OR EQUIVLANT



3-PIECE VALVE BOX
WEDGE 2" BLOW OFF
BINGHAM & TAYLOR
FIG. NO. 4909-A
OR EQUIVLANT

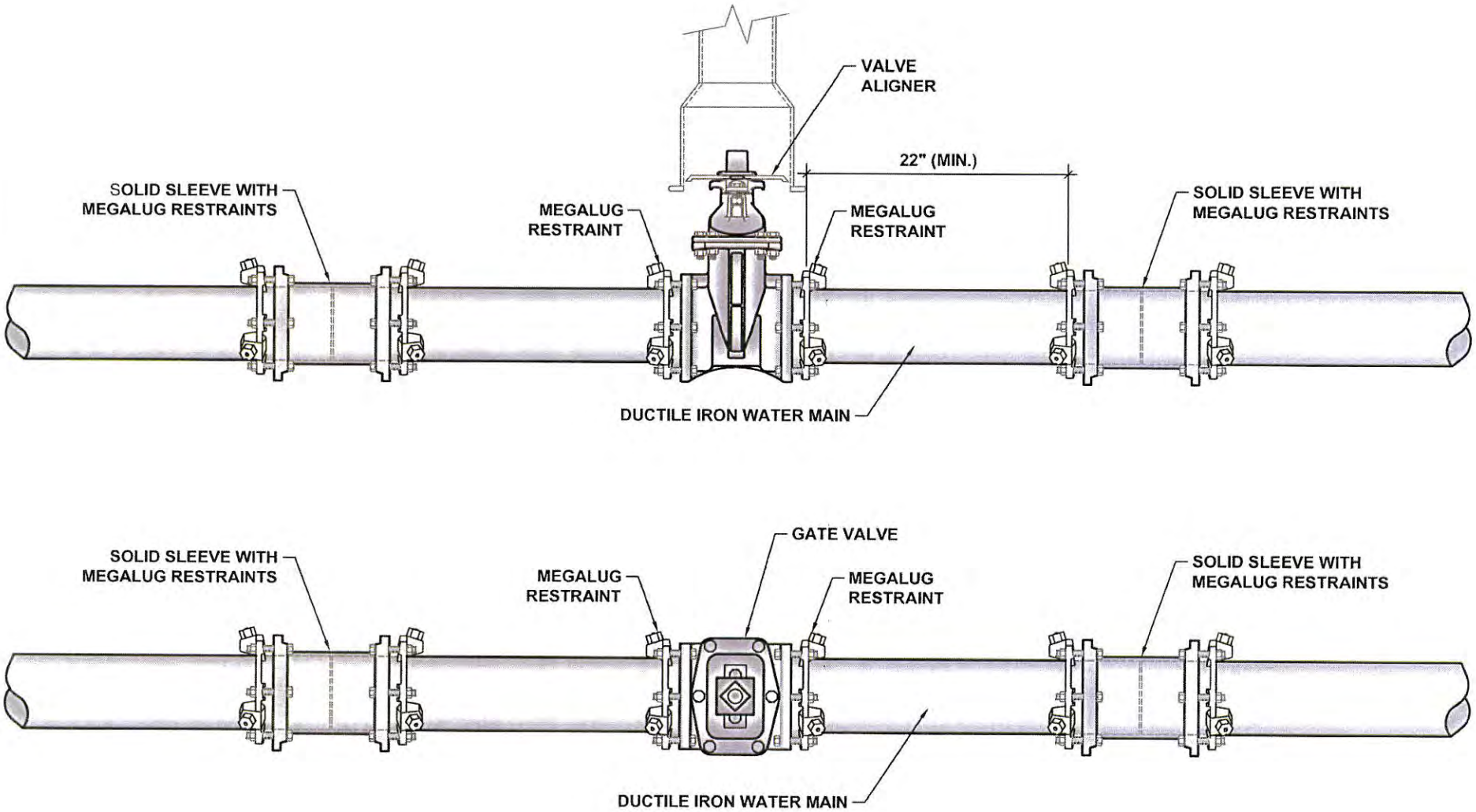


VALVE & CURBSTOP BOXES

NOT TO SCALE

R. [illegible] 2/5/13
Senior Manager of Engineering Date

Providence Water



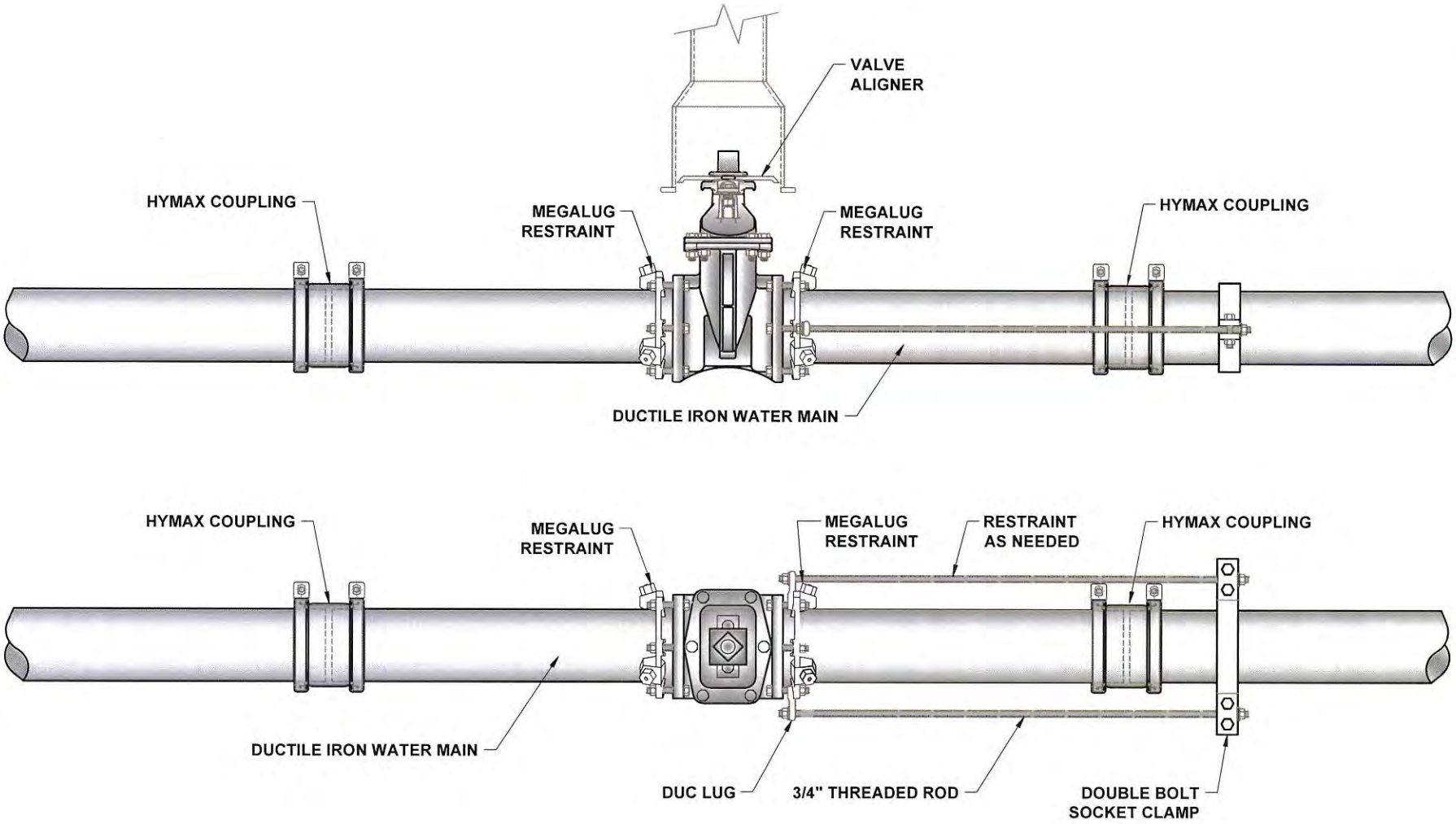
TYPICAL GATE VALVE W/ SOLID SLEEVES

NOT TO SCALE

P A R V 2/6/13

Senior Manager of Engineering Date

Providence Water



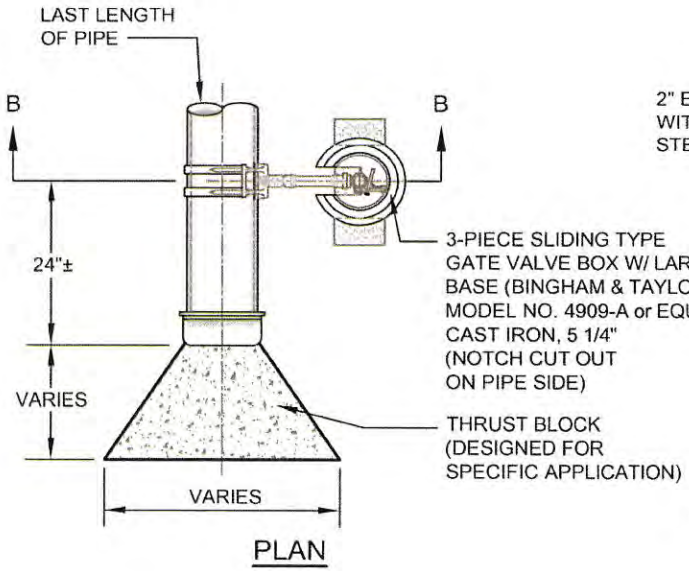
TYPICAL GATE VALVE W/ HYMAX COUPLINGS

NOT TO SCALE

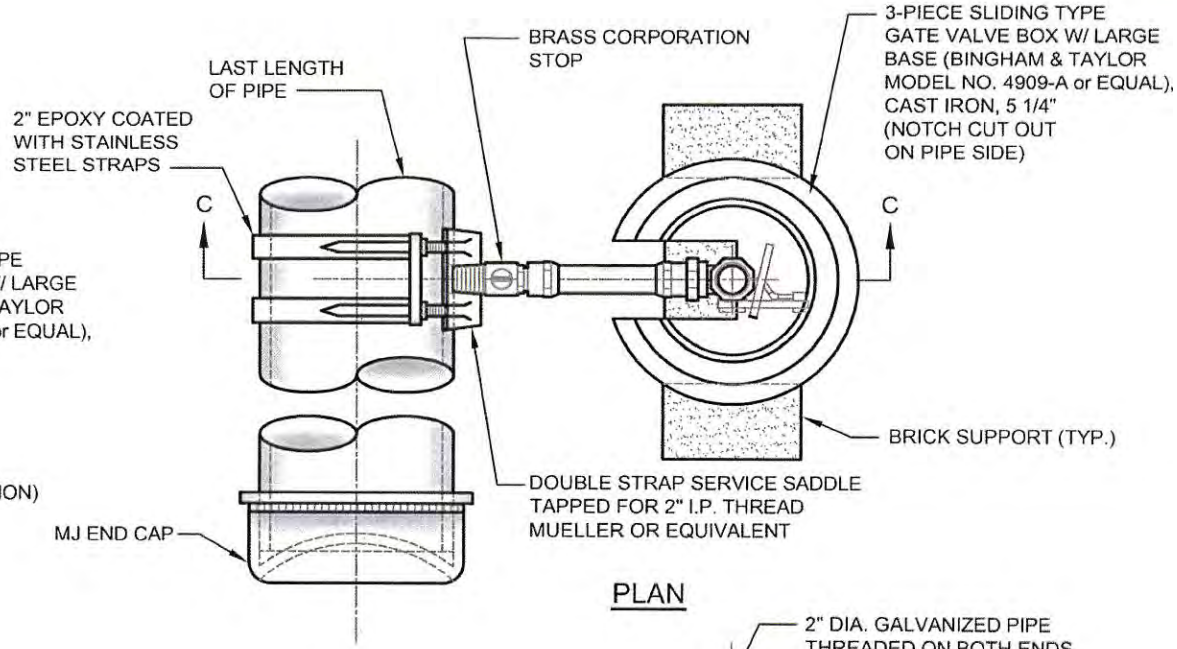
P A R V 2/6/13

Senior Manager of Engineering Date

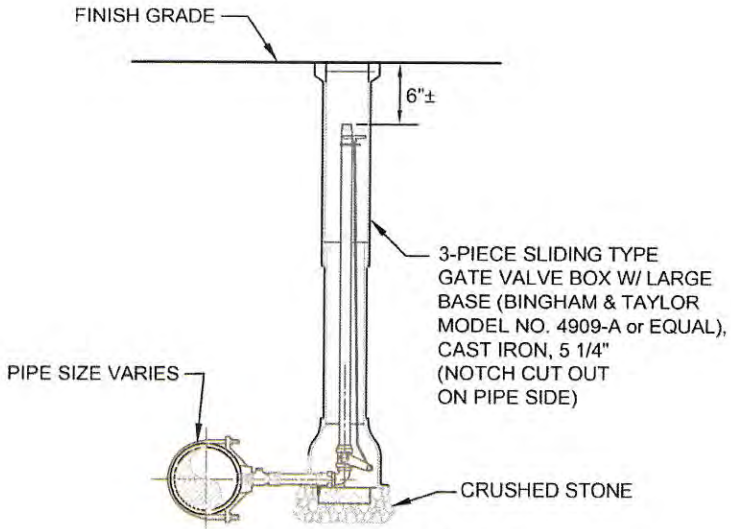
Providence Water



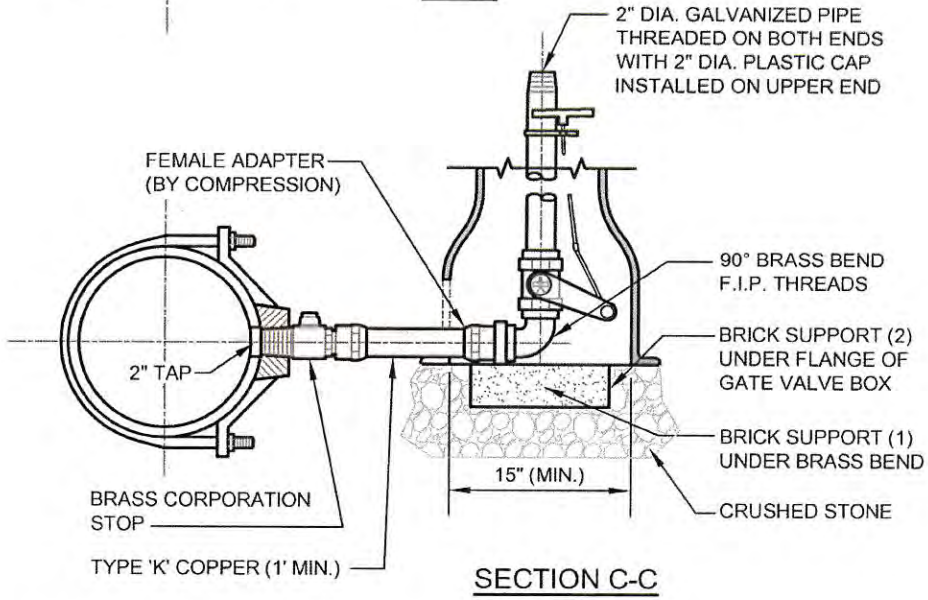
PLAN



PLAN



SECTION B-B

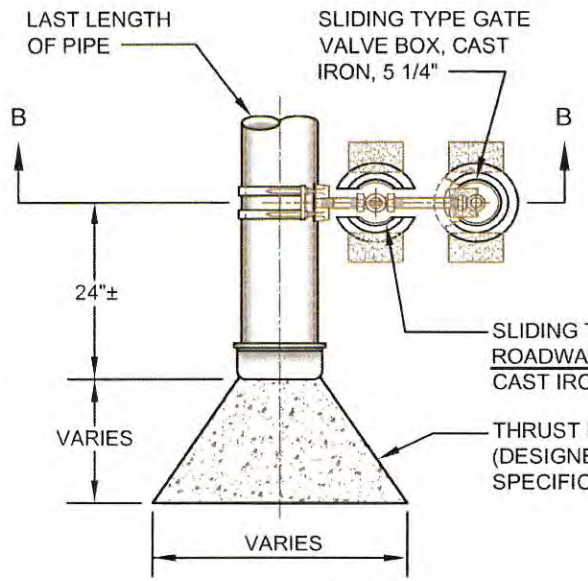


SECTION C-C

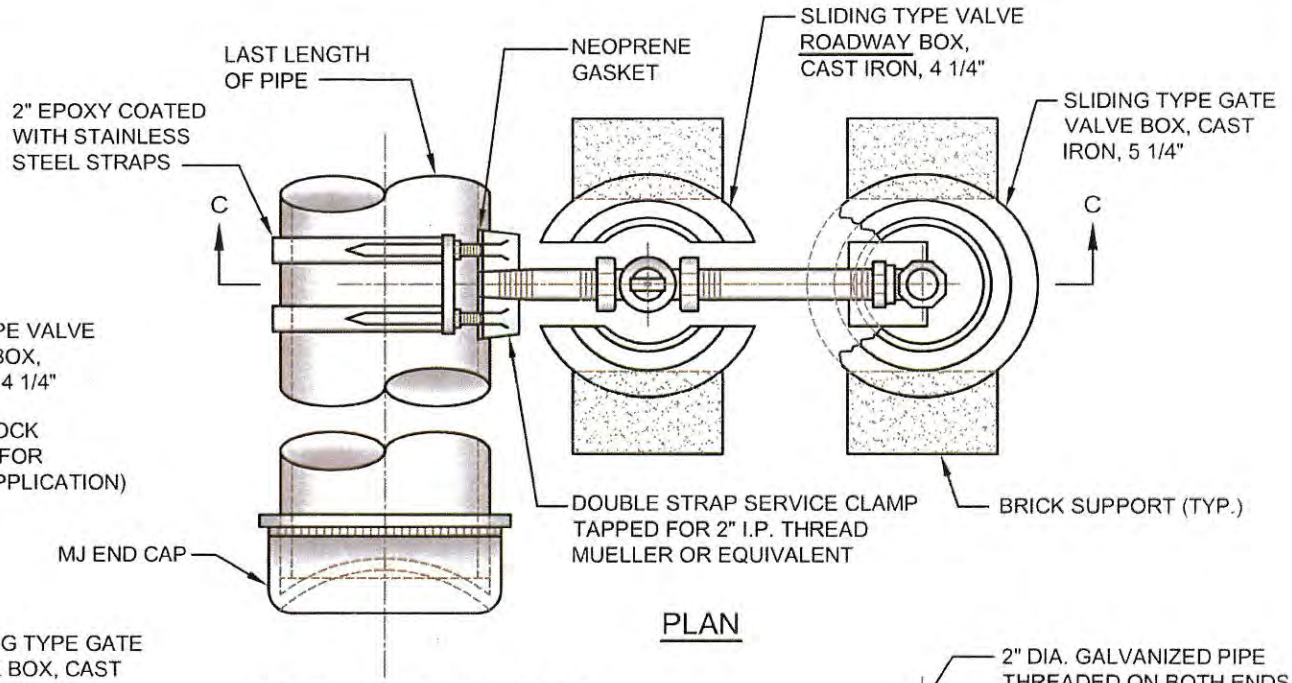
TYPICAL
NEW 2-INCH WEDGE BLOWOFF ASSEMBLY
(ON EXISTING MAIN)
NOT TO SCALE

Senior Manager of Engineering — Date 2/6/13

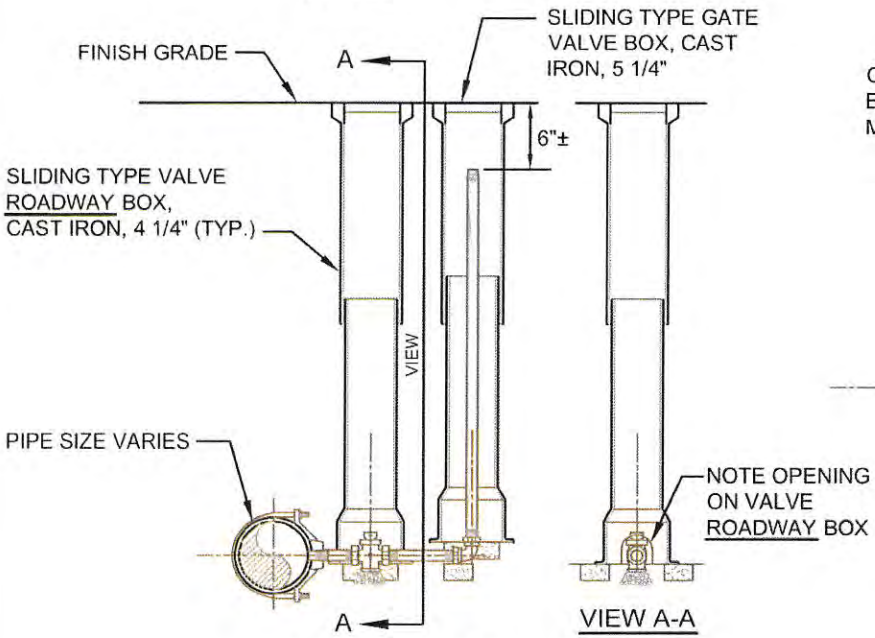
Providence Water



PLAN

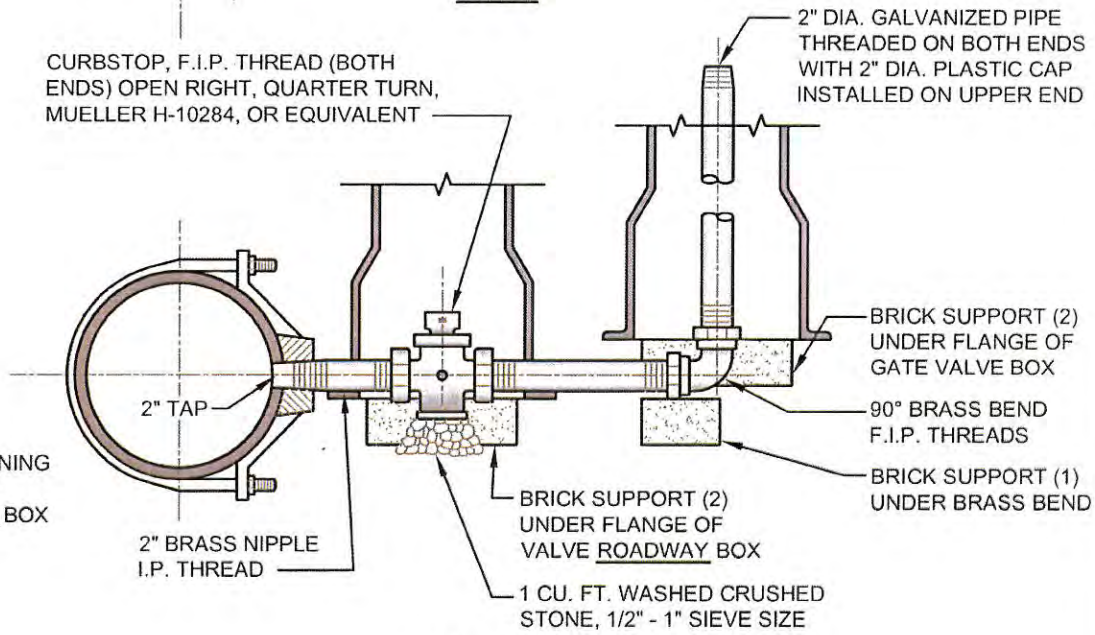


PLAN



SECTION B-B

VIEW A-A



SECTION C-C

P R 9-28-12

Senior Manager of Engineering Date

TYPICAL NEW 2-INCH BLOWOFF ASSEMBLY

NOT TO SCALE

Providence Water

Ductile Iron Pipe Restraint Guide

Bends

	11.25	22.5	45	90
Pipe Size	Restraint Length			
4"	1'	3'	5'	13'
6"	2'	4'	8'	19'
8"	2'	5'	10'	24'
10"	3'	6'	12'	29'
12"	3'	7'	14'	34'

End Caps

Pipe Size	Restraint L
4"	33'
6"	47'
8"	61'
10"	74'
12"	87'

Reducers

Pipe Size	Restraint L
6"X4"	24'
8"X4"	44'
8"X6"	26'
10"X4"	61'
10"X6"	46'
10"X8"	25'
12"X4"	76'
12"X6"	63'
12"X8"	46'

Tees

Pipe Size	Restraint L	Pipe Size	Restraint L
4"X4"	33'	**10"X8"**	61'
6"X4"	33'	**10"X10"**	74'
6"X6"	47'	**12"X4"**	33'
8"X4"	33'	**12"X4"**	33'
8"X6"	47'	**12"X6"**	47'
8"X8"	61'	**12"X8"**	61'
10"X4"	33'	**12"X10"**	74'
10"X6"	47'	**12"X12"**	87'

Notes:

Restraint length's are calculated in feet from face of fitting to closest bell or mechanical joint.

All calculations are based on the pipe bedded in a 4" minimum of loose soil backfill, lightly consolidated to top of pipe and then backfilled to a depth of 4.0'.

Also the piping will have a maximum pressure of 150psi.

APPENDIX B

LIST OF APPROVED MATERIALS / MANUFACTURERS
FOR USE IN THE
PROVIDENCE WATER DISTRIBUTION SYSTEM

(As of July 1, 2017)

DUCTILE IRON PIPE

Atlantic States Cast Iron Pipe Co.
American DI Pipe Co.
U.S. Pipe & Foundry Co.
Note: All DI pipe must be zinc coated

DUCTILE IRON FITTINGS

Tyler/Union Foundry Co. – US made only
US Pipe & Foundry Co. – US made only
Star Pipe Products – US made only

VALVES

American
Clow Valve Co.
Kennedy Valve
M&H Valve Co.
Mueller Co.
U.S. Pipe & Foundry Co.
AVK

BUTTERFLY VALVES (16" and larger)

Mueller Co.
Henry Pratt Co.

VALVE AND SERVICE BOXES

Tyler Union / Biby – US made only
Bingham & Taylor
Mueller Co.

PIPE COUPLINGS

ROMAC Industries, Inc.
Smith-Blair, Inc.
Baker
Total Piping Solutions, Inc. (Hymax)

SERVICE ADAPTER COUPLINGS, PLASTIC

The Harrington Corp (HARCO)

FIRE HYDRANTS

Kennedy Guardian Hydrant - K81D, by Kennedy Valve (Must be "Hydra-Shield - Custodian" ready for installation in Providence only)

Mueller Super Centurion - A423 (Must be "Hydra-Shield - Custodian" ready for installation in Providence only)

MECHANICAL JOINT RESTRAINT FOR DUCTILE IRON PIPE AND FITTINGS

EBAA Iron Sales, Inc. MEGALUG MJ Retainer Gland
  Series 1100 – MJ Gland
  Series 1100SDB – Mid Span Restraint
Tyler Union Series 1000 TUFGRIP MJ Retainer Gland – US made only
Sigma - One-Lok D-SLDE MJ Retainer Gland – US made only
Star National Products - "Star Tie-Anchor III Joint Restrainer"

JOINT RESTRAINT FOR DUCTILE IRON PIPE-GASKETED

U.S. Pipe & Foundry Co. - Field Lok 350 Gasket
McWane – Sure Stop 350 Gasket
American – Fast-Grip Gasket

SERVICE BRASS – Must Meet Lead Free Standard

A.Y. McDonald Manufacturing Co.
Cambridge Brass
Mueller Co.
Red Hed Manufacturing
The Ford Meter Box Co.

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APPENDIX B

CITY OF PROVIDENCE ORDINANCES

Appendix B – City of Providence Ordinances

Sec. 2-12. - Purchase of fuel-efficient vehicles.
When the city purchases motor vehicles for its municipal operations, each vehicle purchased must be the most fuel-efficient model available that will fulfill the intended municipal function; provided that the vehicle also meets other normal procurement criteria including price, reliability, and life-cycle costs. Hybrid or alternatively fueled vehicles shall be prominently labeled. Among the most fuel-efficient vehicles, a preference shall be given for vehicles with more than sixty-five (65) percent of their value from domestic production and for vehicles made in U.S. unionized factories.

Sec. 21-28.1 – Qualifications for parties doing business with the city.
(d)Any construction project subject to subsection (a) that is or is budgeted to be one hundred thousand dollars ($100,000.00) or more shall:

(1) Contain a provision requiring all contractors and subcontractors have or be affiliated with a state registered apprenticeship program as defined in 29 C.F.R. § 29 et seq.

(2) Require that not less than fifteen (15) percent of the total hours worked by the contractors' and subcontractors' employees on any one (1) project are completed by apprentices registered in state registered apprenticeship programs as defined.

(3) Subsequent to the city's award of the contract and prior to commencement of work, the prime contractor may petition the awarding agency to adjust the apprenticeship work hour requirements in subsection (2). The awarding agency may lower the fifteen (15) percent requirement only if it determines in writing that compliance is not feasible or that it would be unduly cost prohibitive to the project.

(4) Contain the following enforcement provisions:

a. All contractors and subcontractors shall submit written reports documenting compliance with their apprenticeship obligations prior to approval and issuance of any periodic and/or final payments being made by the contracting party.

b. Any contracting governmental subdivision or agency or its designee shall have the power to impose sanctions on any contractor or subcontractor found not to be in compliance with its obligations under this section. Such sanctions shall include, but not be limited to:

1. Termination of contract.
2. Debarment from future city projects.
3. Recovery of any benefits which accrued to the business during the period of violation.
4. Referral for civil sanctions and/or prosecution under the False Claims Act.

(5) Any and all bidders shall certify in writing, as a condition precedent for bidding on any City of Providence-sponsored project worth in excess of fifty thousand dollars ($50,000.00), that the bidder shall comply with the following. ("Bidder" shall include all construction managers, contractors, and subcontractors bidding on a construction, repair, or demolition contract).

a. All bidders shall adhere to air quality protocols outlined in the Green During Construction initiative. These refer specifically to:

1. The implementation of dust controls - especially silica control measures - during construction;
2.The substitution of all gasoline, propane, and diesel-powered construction equipment - either stationary and mobile - with equipment designed to reduce toxic emissions, either through engine modification, the use of alternative fuels, or the implementation of electric or hybrid power systems; and

3. The prohibition of idling motors on gasoline and diesel vehicles as published by the Rhode Island Committee on Occupational Safety and Health.

b. All bidders who are awarded or otherwise obtain contracts with the City of Providence shall comply with all obligations set forth in paragraph a. for the entire duration of the contract. Any bidder performing work pursuant to this initiative shall be obligated to immediately notify the City of Providence regarding any material changes relating to concurrence with this initiative. Failure to notify the city of any material change shall be considered a submission of false information and the city shall have the discretion to impose any and all sanctions authorized by this section.

c. Any bidder who negligently or willfully fails or refuses to comply with any of the obligations set forth in paragraph a., above, for any period of time, shall be subject to sanctions at the discretion of the City of Providence, which may or may not include one (1) or more of the following:

1. Cessation of work on the project until compliance is obtained;
2. Withholding of payment due under any contract or subcontract until compliance is obtained;
3. Permanent removal from any further work on the project;
4. Debarment from eligibility to contract with the City of Providence;
5. Declaration of any contract held by the bidder null and void.

d. Each bidder shall be responsible for, and shall ensure that any and all subcontractors to the bidder shall comply with all the requirements of the section, and each bidder shall certify the compliance of any and all subcontractors with the provisions of this section in the manner provided in paragraph b. above.