BOARD OF CONTRACT AND SUPPLY
CITY OF PROVIDENCE, RHODE ISLAND

REQUEST FOR PROPOSALS

Item Description: Roger Williams Park Stormwater Treatment Train

Date to be opened: June 5, 2023

Issuing Department: **Department of Parks**

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: mbe-wbe@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:
    - Brian Byrnes - Deputy Superintendent of Parks
    - Email: bbyrnes@providenceri.gov

Pre-bid Conference

A non-mandatory pre-bid meeting will be held on site at the Roger Williams Park Casino on Monday, May 22, 2023 at 9:00 AM
1000 Elmwood Avenue, Providence, RI

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 Room 305, 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.

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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
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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 **$**_____ must be deposited with the City Clerk as a guarantee that the Contract will be signed and delivered by the bidder.

   b) ☐ A bid bond in the amount of _____ 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.

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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

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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

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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) MBE/WBE Outreach Director	Printed Name of City of Providence MBE/WBE Outreach Director	Date Signed

BOARD OF CONTRACT AND SUPPLY
CITY OF PROVIDENCE, RHODE ISLAND

SUPPLEMENTAL BID FORM

To whom it may concern:

1. The undersigned, having familiarized (himself) (themselves) (itself) with the **Roger Williams Park Stormwater Treatment Train** bid affecting the cost of work, and with the Contract Documents (which includes the Invitation for Bids, Instructions to Bidders, Form of Bid Bond, Form of Agreements, form of Non-Collusive Affidavit, Addenda (if any), Drawings, Technical Specification, Form of Surety Bond(s); as prepared by the Providence Parks Department, and on file in the office of the City Clerk 3rd Floor, City Hall, Providence, RI 02903, hereby proposes to furnish all supervision, technical personnel, labor, materials, machinery, tools, equipment and services including utility and transportation services, and to perform such other required work for the **Roger Williams Park Stormwater Treatment Train** and such other required and incidental work, complete, all in accordance with the above listed documents and for the unit prices for work in-place for the following items and quantities.

2. In submitting this Bid, the bidder understands that the right is reserved by The Providence Parks Department to reject any and all Bids, If written notice of acceptance of this Bid is mailed, telegraphed or delivered to the undersigned within (90) days after the opening thereof, or at any time thereafter before this Bid is withdrawn, the undersigned agrees to execute and deliver an Agreement in the prescribed form and furnish the required bond within (10) days after the Agreement is presented to him/her for signature.

Herewith in accordance with the instructions to Bidders.

3. Attached hereto is an affidavit in proof that the undersigned has not colluded with any person in respect to this Bid or any bids for the Contractor for which this Bid is submitted. Also attached is a Statement of Bidder's Qualifications.

4. Application unit prices are contained in the Agreement (established as the result of either a Unit Price Bid or a Supplemental Schedule of Unit Prices), the City of Providence may order the Contractor to proceed with desired changes in the work, the value of such changes to be determined by the measured quantities involved and the application unit prices specified in the Contract.

5. The City of Providence reserves the right to determine the lowest responsible Bidder based on past experience with the City and/or recommendations by City and/or state agencies with an interest in this procurement. The City reserves the right to award the project to the appropriate bidder in the best interest of the City of Providence.

CERTIFICATION OF NON-SEGREGATED FACILITIES

The Bidder certifies that he/she does not maintain or provide for his/her employees any segregated facilities at any of his establishments, and that he/she does not permit his/her employees to perform their services at any location, under his/her control, where segregation facilities are maintained. The Bidder agrees that a breach of this certification will be a violation of the Equal Opportunity Clause in any contract resulting from acceptance of this Bid. As used in this certification, term "segregation facilities" means any waiting rooms, work rooms, rest rooms and wash rooms, restaurants and other eating areas, time clocks, locker rooms and other storage or dressing areas, parking lots, drinking fountains, recreation or entertainment areas, transportation and housing facilities provided for employee which are segregated by explicit directive or are in fact segregated on basis of race, color, religion, or national origin, because of habit, local custom, or otherwise. The Bidder agrees that (except where he/she has obtained identical certification from proposed subcontractors for specific time periods) he/she will obtain identical certification from proposed subcontractor prior to the award of subcontracts exceeding $10,000.00 which are not exempt from provisions of the Equal Opportunity Clause, and that he /she will retain such certifications in his/her files.

NOTE: The penalty for making false statements in offers is prescribed in 18 U.S.C. & 1001.

DATE _____, 20___

Name of Bidder and Official Address: **Name of Authorized Representative (Contact):**

_____ _____

BOARD OF CONTRACT AND SUPPLY
CITY OF PROVIDENCE, RHODE ISLAND

_____ **By** _____
(Signature)
_____ **Title** _____

E-Mail: _____ **Phone:** _____

Bidder shall indicate, in space provided,
the earliest possible Project Start-up Date:_____, 20 _____

ADDENDA: The undersigned acknowledges receipt of the following Addenda, if any, and has included the provisions thereof in this Bid (If Any):

Addendum No.	**Date**	**Addendum No.**	**Date**
_____	_____, 20 ____	_____	_____, 20 ____
_____	_____, 20 ____	_____	_____, 20 ____

Sub-Contractors (If Any):

Name: _____ **Scope of Work:** _____**MBE / WBE**

Name: _____ **Scope of Work:** _____**MBE / WBE**

Name: _____ **Scope of Work:** _____**MBE / WBE**

Roger Williams Park Stormwater Treatment Train

Project Description:

The work generally consists of construction of a stormwater improvements project at an outfall to Roosevelt Pond within Roger Williams Park in Providence, RI. Work includes implementation of erosion and sedimentation controls; selective demolition and preparation of the site; grading; installation of a stormwater treatment train consisting of a diversion manhole, proprietary stormwater treatment structure, stormwater filter system, stormwater drainage pipes, and other appurtenances associated with a complete and operating system; landscape restoration; restoration of masonry walls and concrete sidewalks; and appurtenant work.

BASE BID: The Base Bid scope of work for this project shall include, but not be limited to the following:

- **Remove and Dispose (R&D)** existing trees, landscaping, lawn areas, and cement concrete sidewalk where indicated.
- **Furnish and Install (F&I)** tree protection, erosion and sedimentation controls, temporary facilities and controls, temporary construction fencing, landscape restoration, cement concrete sidewalk restoration, and loam and seed.
- **Furnish and Install (F&I)** proprietary stormwater treatment system, stormwater treatment filter system, monitoring ports and associated tanks, piping, valves, access covers and structures.
- **Remove and Reconstruct (R&R)** sections of existing masonry wall around edge of pond where indicated.

In addition to stating the Total Base Bid, the bidder shall state Unit Prices for related work listed under each bid item which represents the work items included in the Total Base Bid. The Unit Prices are quoted for computing adjustments to the Base Bid prior to Contract award, as well as during the course of construction, based upon extra work ordered by the City or for work countermanded, reduced or omitted by the City in order to stay within the Project budget.

Base Bid Items and Unit prices are to be Completed prices to be added or deducted on the basis of quantities of work involved, for each item in place in the unit indicated.

All Work Included in this Project Shall be Completed for the lump sum of:

_____**Dollars**

($_____), TOTAL BASE BID

ALLOWANCE: $15,000.00

BASE BID W/ ALLOWANCE: $_____

ADD ALTERNATES:

1. **Add Alt #1 Stormwater Treatment Filter System**

_____ **LS** **$**_____

price in writing

2. **Add Alt #2 F&I Flow Monitoring Equipment**

_____ **LS** **$**_____

price in writing

3. **Add Alt #3 Furnish Complete Set of Replacement Membrane Cartridges**

_____ **LS** **$**_____

price in writing

UNIT PRICES – BASE BID:

1. **Mobilization & Demobilization – Lump Sum**

_____ **LS** **$**_____

price in writing

2. **R&D (2) Trees – Lump Sum**

_____ **LS** **$**_____

price in writing

3. **Perform Test Pit – EA**

_____ **EA** **$**_____

price in writing

4. **F&I Erosion and Sedimentation Controls – Lump Sum**

_____ **LS** **$**_____

price in writing

5. **F&I Doghouse Diversion Manhole – Lump Sum**

_____ **LS** **$**_____

price in writing

6. **F&I Proprietary Membrane Treatment System – Lump Sum**

_____ **LS** **$**_____

price in writing

7. F&I Polypropylene Monitoring Port – Per Each

_____ **EA** **$**_____

price in writing

8. F&I Precast Concrete Manhole – Each

_____ **EA** **$**_____

price in writing

9. F&I 12" HDPE Pipe – Per Linear Foot

_____ **LF** **$**_____

price in writing

10. F&I 12" C900 PVC Pipe – Per Linear Foot

_____ **LF** **$**_____

price in writing

11. F&I 6" C900 PVC Pipe – Per Linear Foot

_____ **LF** **$**_____

price in writing

12. F&I 6" Gate Valve – Per Each

_____ **EA** **$**_____

price in writing

13. F&I 12" Inline Check Valve – Per Each

_____ **EA** **$**_____

price in writing

14. F&I Pipe Fittings – Lump Sum

_____ **LS** **$**_____

price in writing

15. F&I 1" Tap to Existing Water – Lump Sum

_____ **LS** **$**_____

price in writing

16. F&I Curb Stop with Box – Lump Sum

_____ **LS** **$**_____

price in writing

17. F&I 1" Water Service Piping – Per Linear Foot

_____ **LF** **$**_____

price in writing

18. F&I Ground Hydrant – Per Each

_____ **EA** **$**_____

price in writing

19. F&I Cement Concrete Sidewalk – Per Square Yard

_____ **SY** **$**_____

price in writing

20. F&I 4" Poured Concrete Equipment Pad – Lump Sum

_____**LS** **$**_____

price in writing

21. F&I Loam and Seed – Per Square Yard

_____**SY** **$**_____

price in writing

22. R&R Masonry Wall At Pond – Per Linear Foot

_____ **LF** **$**_____

price in writing

Please note that the list above is not intended to include all items required to complete the base bid scope of work but can and shall be used to adjust the contract prior to or after award – in the best interest of the City of Providence.

BIDDER: _____

BID DOCUMENTS:

The complete set of Bid Documents consists of the Bid Form, Technical Specifications, Minority Participation Forms, and the following Drawings:

DRAWINGS:

- COVER
- C1.1 NOTES & LEGEND
- C1.2 EXISTING CONDITIONS
- C2.0 DEMOLTION, EROSION & SEDIMENT CONTROL PLAN
- C3.0 GENERAL PLAN
- C4.0 GRADING, DRAINAGE & UTILITY PLAN
- C5.1 CIVIL DETAILS 1
- C5.2 CIVIL DETAILS 2
- C5.3 CIVIL DETAILS 3
- C5.4 CIVIL DETAILS 4
- C5.5 DOGHOUSE DIVERSION MANHOLE STRUCTURAL NOTES AND TYPICAL DETAILS
- C5.6 DOGHOUSE DIVERSION MANHOLE PLANS AND SECTIONS – 1
- C5.7 DOGHOUSE DIVERSION MANHOLE PLANS AND SECTIONS – 2
- C5.8 DOGHOUSE DIVERSION MANHOLE PLANS AND SECTIONS – 3
- C6.0 PEDESTRIAN DETOUR PLAN

PREVAILING WAGE DECISION

Davis-Bacon Act Prevailing Wages for Heavy Construction Published March 17, 2023

COPY OF THE CONTRACT

TBD

TECHNICAL SPECIFICATION:

- 01010 General Description of the Work
- 01015 Contractor's Use of the Premises
- 01019 Contract Considerations
- 01150 Measurement and Payment
- 01300 Submittals
- 01400 Quality Control
- 01500 Temporary Controls
- 01600 Material and Equipment
- 01700 Contract Closeout

- 02060 Demolition
- 02100 Site Preparation
- 02140 Dewatering
- 02160 Excavation Support
- 02200 Earthwork

- 02211 Rock Removal
- 02273 Erosion Control
- 02530 Restoration of Curb, Sidewalks, and Vegetated Areas
- 02630 Storm Drainage Utilities
- 02631 Proprietary Stormwater Treatment Systems
- 02643 Water Services
- 02900 Landscaping

- 03100 Concrete Formwork
- 03110 Precast Concrete
- 03200 Concrete Reinforcement
- 03300 Cast-in-Place Concrete

- 11100 Aluminum Stop Logs

Appendix A RIDEM Freshwater Wetlands Request for Insignificant Alteration Application

ADDITIONAL INFORMATION REQUIRED WITH BID:

- Qualifications to Perform Work – See Form Below for Information Required
- Minority Participation Forms – 10% MBE / 10 % WBE Goal on this Project
- Addenda (If Any) - Must Be Acknowledged on Bid Form
- Product Information for Items Submitted as 'Or Equal' to Specified Materials

PROVISIONS OF THIS PROJECT:

- Upon the Issuance of the Award from the Board of Contract – the City shall issue a Contract to be executed by the City and the vendor incorporating the bid specifications. All Provisions of the Specifications are binding.
- Any Permits Required by the City of Providence and/or State of Rhode Island Shall be Obtained by the Vendor – Permit Fees by the City of Providence Shall be Waived – the State ADA Fee Must be Paid
- The Davis Bacon Act Applies (HUD Projects) – Prevailing Wages Must Be Paid for On Site Hours – On-Site Interviews will be Conducted During the Project – Employees Shall be Advised of the Prevailing Wage Rates Prior to Mobilization on Site
- Certified payrolls Must be Submitted With Pay Requests Including Monthly Utilizations Form
- Performance and Payment Bonds (If Required) Must be Submitted within 10 Days of Award or Bid Bond Will be Forfeited
- An Insurance Certificate Shall be Submitted to the City Within 10 Days of Award
- A Copy of the Vendors Contractor's License Must be Submitted within 10 Days of Award
- All On-Site Personnel Shall be Licensed (If Required) and Shall have Proof of All Licenses Required by the State of Rhode Island to Perform the Work Required
- Pay Requests Must be Submitted on Approved AIA Billing Documents (City will Provide if Needed)
- All Subcontractors Shall be Listed on the Bid Form – All Insurance & Payroll Requirements Apply
    - General Contractor Shall be the Insurance Certificate Holder and the City Shall be Named as 'Additionally Insured' with Respect to Liability Insurance
- A Submittal Log Must be Submitted within 10 Days of Award

CLOSE OUT DOCUMENTS:

- Prior to Final Payment the Vendor Shall Provide the Following:
  - Copies of Permits Signed off and Approved (If Any)
  - Operating Manuals and Warranties Shall Be Transferred and/or Delivered
  - Full and Completed As-Built Drawings Shall be Submitted for Approval
  - Training Shall be Provided to City Personnel (If Required)
  - Certification by Manufactures Representative (If Required)

QUALIFICATIONS:

Qualifications will be evaluated on the basis of similar project experience for:

a. Completion of at least 3 similar projects within the past five years.
b. Size and dollar value of similar completed projects.
c. Contractor's performance with similar projects. (references will be checked)
d. Relevant experience of individuals assigned to the project.

Questions regarding this bid package shall be submitted via e-mail to Liza Perez at operez@providenceri.gov and **(Mr. Brian F. Byrnes, Deputy Superintendent of Parks, bbyrnes@providenceri.gov)**, no later than five (5) working days before the bid opening date.

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.
- IRS W-9 Form.
- Proof of Insurance in the amounts requested under contract.

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.

PREVAILING WAGE:

This project qualifies for prevailing wages per the Prevailing Wages Statute or the Davis Bacon Act (HUD). Certified payrolls will need to be submitted to the owner for all hours worked on site for this project.

The Wage Decision for this project shall be as recorded on the Bid Date and is available on the RI Department of Labor website.

Federal Labor Standards

U.S. Department of Housing & Urban Development

Applicability

The Project of Program to which the Construction work covered by this contract pertains is being assisted by the United States of America and the following Federal Labor Standards Provisions are included in this Contract pursuant to the provisions applicable to such Federal assistance.

A.1. (i) Minimum Wages. All laborers and mechanics employed or working up on the site of the work (or under the United States Housing Act of 1937 or under the Housing Act of 1949 in the construction of development of the project) will be paid unconditionally and not less often than once a week, and without subsequent deduction or rebate on any account (except such payroll deductions as are permitted by regulations issued by the Secretary of Labor under the Copeland Act (29 CFR Part 3), the full amount of wages and bona fide fringe benefits (or cash equivalents thereof) due at time of payment computed at rates not less than those contained in the wage determination of the Secretary of labor which is attached hereto and made a part hereof, regardless of any contractual relationship which may be alleged to exist between the contractor and such laborers and mechanics. Contributions made or costs reasonably anticipated for bona fide fringe benefits under Section 1(b)(2) of the Davis-Bacon Act on behalf of laborers of mechanics are considered wages paid to such laborers or mechanics, subject to the provisions of 29 CFR 5.5(a)(1)(iv); also, regular contributions made or costs incurred for more than weekly period (but not less often than quarterly) under plans, funds, or programs, which cover the particular weekly period, are deemed to be constructively made or incurred during such weekly period. Such laborers and mechanics shall be paid the appropriate wage rate and fringe benefits on the wage determination for the classification or work actually performed, without regard to skill, excepts as provided in 29 CFR Part 5.5 (a)(4). Laborers or mechanics performing work in more than one classification may be compensated at the rate specified for each classification for the time actually worked therein: Provided, that the employer's payroll records accurately set forth the time spent in each classification in which work is performed. The wage determination (including any additional classification and wage rates conformed under 29 CFT part 5.5(a)(1)(ii) and the Davis-Bacon poster (WH-1321) shall be posted at all times by the contractor and its subcontractors at the site of the work in a prominent and accessible place where it can be easily seen by the workers.

(ii) (a) Any class of laborers or mechanics which is not listed in the wage determination and which is to be employed under the contact shall be classified in conformance with the wage determination. HUD shall approve an additional classification and wage rate and fringe benefits therefore only when the following criteria have been met:

(1) The work to be performed by the classification requested is not performed by a classification in the wage determination; and

(2) The classification is utilized in the area by the construction industry; and

(3) The proposed wage rate, including any bona fide fringe benefits, bears a relationship to the wage rates contained in the wage determination.

(b) If the contractor and the laborers and mechanics to be employed in the classification (if known), or their representatives, and HUD or its designee on the classification and wage rate (including the amount designated for fringe benefits where appropriate), a report of the action taken shall be sent by HUD or its designee to the Administrator of the Wage and Hour Division, Employment Standards Administration, U.S. Department of labor, Washington, D.C. 20210. The Administrator, or an authorized representative, will approve, modify, or disapprove every additional classification action within 30 days of

receipt and so advise HUD or its designee or will notify HUD or its designee within the 30-day period that additional time is necessary. (Approved by the Office of Management and Budget under OMB control number 1215-0140.)

(c) In the event the contractor, the laborers or mechanics to be employed in the classification or their representatives, and HUD or its designee do not agree on the proposed classification and wage rate (including the amount designated for fringe benefits, where appropriate), HUD or its designee shall refer the questions, including the views of all interested parties and the recommendation of HUD or its designee to the Administrator for determination. The Administrator, or an authorized representative, will issue a determination within 30 days of receipt and so advise HUD or its designee or will notify HUD or its designee within the 30-day period that additional time is necessary. (Approved by the Office of Management and Budget under OMB Control Number 1215-0140.)

(d) The wage rate (including fringe benefits where appropriate) determined pursuant to subparagraphs (1)(b) or (c) of this paragraph, shall be paid to all workers performing work in the classification under this contract from the first day on which work is performed in the classification.

(iii) Whenever the minimum wage rate prescribed in the contract for a class of laborers or mechanics includes a fringe benefit which is not expressed as an hourly rate, the contractor shall either pay the benefit as stated in the wage determination or shall pay another bona fide fringe benefit or an hourly cash equivalent thereof.

(iv) If the contractor does not make payments to a trustee or other third person, the contractor may consider as part of the wages of any laborer or mechanic the amount of any costs reasonably anticipated in providing bona fide fringe benefits under a plan or program, Provided, That the Secretary of Labor has found, upon the written request of the contractor, that the applicable standards of the Davis-Bacon Act have been met. The Secretary of Labor may require the contractor to set aside in a separate account assets for the meeting of obligations under the plan or program. (Approved by the Office of Management and Budget under OMB Control Number 1215-0140.)

2. Withholding. HUD or its designee shall upon its own action or upon written request of an authorized representative of the Department of Labor withhold or cause to be withhold from the contractor under this contract or any other Federal contract with the same prime contractor, or any other Federally-assisted contract subject to Davis-Bacon prevailing wage requirements, which is held by the same prime contractor so much that the accrued payments or advances as may be considered necessary to pay laborers and mechanics, including apprentices, trainees and helpers, employed by the contractor or any subcontractor the full amount of wages required by the contract. In the event of failure to pay any laborer or mechanic, including any apprentice, trainee or helper, employed or working on the site of the work (or under the United States Housing Act of 1937 or under the Housing Act of 1949 in the construction or development of the project), all or part of the wages required by the contract. HUD or its designee may, after written notice to the contractor, sponsor, applicant, or owner, take such action as may be necessary to cause the suspension of any further payment, advance, or guarantee of funds until such violations have ceased. HUD or its designee may, after written notice to the contractor, disburse such amounts withheld for and on account of the contractor or subcontractor to the respective employees to whom they are due. The comptroller General shall make such disbursements in the case of direct Davis-Bacon Act contracts.

3. (i) Payrolls and basic records. Payrolls and basic record relating thereto shall be maintained by the contractor during the course of the work preserved for a period of three years thereafter for all laborers and mechanics working at the site of the work (or under the United States Housing Act of 1937, or under the Housing Act of 1949, in the construction or development of the project). Such records shall contain the name, address, and social security number of each such worker, his or her correct classification, hourly rates of wages paid (including rates of contributions or costs anticipated for bona fide fringe benefits or cash equivalents thereof of the types described in Section 1(b)(2)(B) of the Davis-Bacon Act), daily and weekly number of hours worked, deductions made and actual wages paid. Whenever the Secretary of labor has found under 29 CFR 5.5 (a)(1)(iv) that the wages of any laborer or mechanic include the amount of any costs reasonable anticipated in providing benefits under a plan or program described in Section 1(b)(2)(B) or the Davis-Bacon Act, the contractor shall maintain records which show that the commitment to provide such benefits ins enforceable, that the plan or program is financially responsible, and that the plan or program has been communicated in writing to the laborers or mechanics affected, and records which show the costs anticipated or the actual cost incurred in providing such benefits. Contractors employing apprentices or trainees under approved programs shall maintain written evidence of the registration of apprenticeship and certification of trainee programs, the registration of the apprentices and trainees, and the ratios and wage rates prescribed in the applicable programs. (Approved by the Office of Management and Budget under OMB Control Numbers 1215-0140 and 1215-0017.)

(ii) (a) The contractor shall submit weekly for each in which any contract work is performed a copy of all payrolls to HUD or its designee if the agency is a party to the contract, but if the agency is not such a party, the contractor will submit the payrolls to the applicant, sponsor or owner, as the case may be, for transmission to HUD or its designee. The payrolls submitted shall set out accurately and completely all of the information required to be maintained under 29 CFR Part 5.5(a)(3)(i). This information may be submitted in any form desired. Optional Form WH-34 is available for this purpose and may be purchases from the Superintendent of Documents (Federal Stock Number 029-005-00014-1), Government Printing Office, Washington, Dc 20402. The prime contractor is responsible for the submission of copies of payrolls by all subcontractors. (Approved by the Office of Management and Budget under OMB Control Number 1215-0149.)

(b) Each payroll submitted shall be accompanied by a "Statement of Compliance," signed by the contractor or his or her agent who pays or supervises the payment of the persons employed under the contract and shall certify the following:

(1) That the payroll for the payroll period contains the information required to be maintained under 20 CFR Part 5.5 (a)(3)(i) and that such information is correct and complete;

(2) That each laborer or mechanic (including each helper, apprentice, and trainee) employed on the contract during the payroll period has been paid the full weekly wages earned, without rebate, either directly or indirectly, and that no deductions have been made either directly or indirectly from the full wages earned, other than permissible deductions as set forth in 29 CFR Part 3;

(3) That each laborer or mechanic has been paid not less that the applicable wage rates and fringe benefits or cash equivalents for the classification of work performed, as specified in the applicable wage determination incorporated into the contract.

(c) The weekly submission of a property executed certification set forth on the reverse side of Optional Form WH-347 shall satisfy the requirement for submission of the "Statement of Compliance" required by paragraph AA.3. (ii)(b) of this section.

(d) The falsification of any of the above certifications may subject the contractor or subcontractor to civil or criminal prosecution under Section 1001 of Title 18 and Section 231 of Title 31 of the United States Code. (iii) The contractor of subcontractor shall make the records required under paragraph A.3. (i) of this section available for inspection, copying, or transcription by authorized representatives of HUD or its designee or the Department of Labor, and shall permit such representatives to interview employees during working hours on the job. If the contractor or subcontractor fails to submit the required records or to make them available, HUD or its designee may, after written notice to the contractor, sponsor, applicant, or owner, take such action as may be necessary to cause the suspension of any further payment, advance, or guarantee of funds. Furthermore, failure to submit the required records upon request or to make such records available may be grounds for debarment action pursuant to 29 CFR Part 5.12.

4. (i) Apprentices and Trainees. Apprentices. Apprentices will be permitted to work at less than the predetermined rate for the work they performed when they are employed pursuant to and individually registered in a bona fide apprenticeship program registered with the U.S. Department of Labor, Employment and Training Administration, Bureau of Apprenticeship and Training, or with a State Apprenticeship Agency recognized by the Bureau, or if a person is employed in his or her first 90 days of probationary employment as an apprentice in such an apprentice program, who is not individually registered in the program, but who has been certified by the Bureau of Apprenticeship and Training or a State Apprenticeship Agency (where appropriate) to be eligible for probationary employment as an apprentice. The allowable ratio of apprentices to journeymen on the job site in any craft classification shall not be greater than the ratio permitted to the contractor as to the entire work force under the registered program. Any worker listed on a payroll at an apprentice wage rate, who is not registered or otherwise employed as stated above, shall be paid not less than the applicable wage rate on the wage determination for the classification of work actually performed. In addition, any apprentice performing work on the job site in excess of the ratio permitted under the registered program shall be paid not less than the applicable wage rate on the age determination for the work actually performed. Where a contractor is performing construction on a project in a locality other than that in which its program is registered, the ratios and wage rates (expressed in percentages of the journeyman's hourly rate) specified in the contractor's or subcontractor's registered program shall be observed. Every apprentice must be paid at not less than the rate specified in the registered program for the apprentice's level of progress, expressed as a percentage of the journeymen hourly rate specified in the applicable wage determination. Apprentices shall be paid fringe benefits in accordance with the provisions of the apprenticeship program. If the apprenticeship program does not specify fringe benefits, apprentices must be paid the full amount of fringe benefits listed on the wage determination for the

applicable classification. If the Administrator determines that a different practice prevails for the applicable apprentice classification, fringes shall be paid in accordance with that determination. In the even the Bureau of Apprenticeship and Training, or a State Apprenticeship Agency recognized by the Bureau, withdraws approval of an apprenticeship program, the contractor will no longer be permitted to utilize apprentices at less than the applicable predetermined rate for the work performed until an acceptable program is approved.

(ii) Trainees. Except as provided in 29 CFR 5.16, trainees will not be permitted to work at less that the predetermined rate for the work performed unless they are employed pursuant to and individually registered in a program which has received prior approval, evidenced by formal certification by the U.S. Department of Labor, Employment and Training Administration. The ratio of trainees to journeymen on the job site shall not be greater than permitted under the plan approved by the Employment and Training Administration. Every trainee must be paid not less than the rate specified in the approved program for the trainee's level of progress, expressed as a percentage of the journeyman hourly rate specified in the applicable wage determination. Trainees shall be paid fringe benefits in accordance with the provisions of the trainee program. If the trainee program does not mention fringe benefits, trainees shall be paid the full amount of fringe benefits listed on the wage determination unless the Administrator of the Wage and Hour Division determines that there is an apprenticeship program associated with the corresponding journeyman wage rate on the wage determination which provides for less than full fringe benefits for apprentices. Any employee listed on the payroll at a trainee rate who is not registered and participating in a training plan approved by the Employment and Training Administration shall be paid not less than the applicable wage rate on the wage determination for the work actually performed. In addition, any trainee performing work on the job site in excess of the ratio permitted under the registered program shall be paid not less than the applicable wage rate on the wage determination for the work actually performed. In the event the Employment and Training Administration withdraws approval of a training program, the contractor will no longer be permitted to utilize trainees at less than the applicable predetermined rate for the work performed until an acceptable program is approved.

(iii) Equal employment opportunity. The utilization of apprentices, trainees and journeymen under this part shall be in conformity with the equal employment opportunity requirement of Executive Order 11246, s amended, and 29 CFR Part 30.

5. Compliance with Copeland Act requirements. The contractor shall comply with the requirements of 29 CFR Part 3, which are incorporated by reference in this contract.
6. Subcontracts. The contractor or subcontractor will insert in any subcontract the clauses contained in 29 CFR 5.5(a)(1) through (10) and such other clauses as HUD or its designee may by appropriate instructions require, and also a clause requiring the subcontractors to include these clauses in any lower tier subcontracts. The prime contractor shall be responsible for the compliance by any subcontractor or lower tier subcontractor with all contract clauses in 29 CFR Part 5.5
7. Contracts termination; debarment. A breach of the contract clauses in 29 CFR 5.5 may be grounds for termination of the contract, and for debarment as a contractor as provided in 29 CFR 5.12
8. Compliance with Davis-Bacon and Related Act Requirements. All ruling and interpretations of the Davis-Bacon and Related Act contained in 29 CFR Parts 1, 3, and 5 are herein incorporated by reference in this contract.
9. Disputes concerning labor standards. Disputes arising out of the labor standards provisions of this contract shall not be subject to the general disputes clause of this contract. Such disputes shall be resolved in accordance with the procedures of the Department of Labor set forth in 29 CFR Parts 5, 6, and 7. Disputes within the meaning of this clause include disputes between the contractor (or any of its subcontractors) and HUD or its designee, the U.S. Department of Labor, or the employees or their representatives.
10. (i) Certification of Eligibility. By entering in to this contract, the contractor certifies that neither it (nor he or she) nor any person or firm who has an interest in the contractor's firm is a person or firm ineligible to be awarded Government contracts by virtue of Section 3(a) of the Davis-Bacon Act or 29 CFR 5.12(a)(1) or to be awarded HUD contracts or participate in HUD programs pursuant to 24 CFR part 24.

    (ii) No part of this contract shall be subcontracted to any person or firm ineligible for award of a Government contract by virtue of Section 3(a) of the Davis-Bacon Act of 29 CFR 5.12(a)(1) or to be awarded HUD contracts or participate in HUD programs pursuant to 24 CFR Part 24.

    (iii) The penalty to making false statements is prescribed in the U.S. Criminal Code, 18 U.S.C. 1001. Additionally, U.S. Criminal Code, Section 1010, Title 18, U.S.C., "Federal Housing Administration transaction", provides in part: "Whoever,

for the purpose of …influencing in any way the action of such Administration…makes, utter of publishes any statement, knowing the same to be false…shall be fined not more than $5,000 or imprisoned not more than two years, or both."

11. Complaints, Proceedings, or Testimony by Employees. No laborer or mechanic to whom the wage, salary, or other labor standards provisions of this Contract are applicable shall be discharged or in any other manner discriminated against by the Contractor or any subcontractor because such employee has filed any complaint or instituted or caused to be instituted any proceeding or has testified or is about to testify in any proceeding under or relating to the labor standards applicable under this Contract to his employer.

B. Contract Work Hours and Safety Standards Act. As used in this paragraph, the terms "laborers" and "mechanics" include watchmen and guards.

(1) Overtime requirements. No contractor or subcontractor contracting for any part of the contract work which may require or involve the employment of laborers or mechanics shall require or permit any such laborer or mechanic in any workweek in which he or she is employed on such work to work I excess of forty hours I such workweek unless such laborer or mechanic receives compensation at a rate not less than one and one-half times the basic rate of pay for all hours worked in excess of forty hours in such workweek.

(2) Violation; liability for unpaid wages; liquidated damages. In the event of any violation of the clause set forth in subparagraph (1) or this paragraph, the contractor and any subcontractor responsible therefore shall be liable for the unpaid wages. In addition, such contractor and subcontractor shall be liable to the United States (in case of work done under contract for the District of Columbia or a territory, to such District or to such territory), for liquidated damages. Such liquidated damages shall be computed with respect to each individual laborer or mechanic, including watchmen and guards, employed in violation of the clause set forth in subparagraph (1) of this paragraph, in the sum of $25 for each calendar day on which such individual was required or permitted to work in excess of forty hours without payment of the overtime wages required by the clause set forth in subparagraph (1) of this paragraph.

(3) Withholding for unpaid wages for liquidated damages. HUD or its designees shall upon its own action or upon written request of an authorized representative of the Department of Labor withhold of cause to be withheld form any moneys payable on account of work performed by the contractor or subcontractor under any such contract or nay other Federal contract with the same prime contract, or any other Federally-assisted contract subject to the Contract Work Hours and Safety Standards Act, which is held by the same prime contractor such sums as may be determined to be necessary to satisfy any liabilities of such contractor or subcontractor for unpaid wages and liquidates damages as provided in the clause set forth in subparagraph (2) of this paragraph.

(4) Subcontracts. The contractor or subcontractor shall insert in any subcontracts the clauses set forth in subparagraph (1) through (4) of this paragraph and also a clause requiring the subcontractors to include these clauses in any lower tier subcontracts. The prime contractor shall be responsible for compliance by any subcontractor or lower tier subcontractor with the clauses set forth in subparagraphs (1) through (4) of this paragraph.

C. Health and Safety

(1) No laborer or mechanic shall be required to work in surrounding or under working conditions which are unsanitary, hazardous, or dangerous to his health and safety as determined under construction safety and health standards promulgated by the Secretary of Labor by regulation.

(2) The Contractor shall comply with all regulations issued by the Secretary of Labor pursuant to Title 29 Part 1926 (formerly Part 1518) and failure to comply may result in imposition of sanctions pursuant to the Contract Work Hours and Safety Standards Act (Public Law 91-54, 83 Stat. 96).

(3) The Contractor shall include the provisions of this Article in every subcontract so that such provisions will be binding on each subcontractor. The Contractor shall take such action with respect to any subcontract as the Secretary of Housing and Urban Development or the Secretary of Labor shall direct as a means of enforcing such provisions.

"General Decision Number: RI20230001 03/17/2023

Superseded General Decision Number: RI20220001

State: Rhode Island

Construction Types: Building, Heavy (Heavy and Marine) and Highway

Counties: Rhode Island Statewide.

BUILDING CONSTRUCTION PROJECTS (does not include residential construction consisting of single family homes and apartments up to and including 4 stories) HEAVY, HIGHWAY AND MARINE CONSTRUCTION PROJECTS

Note: Contracts subject to the Davis-Bacon Act are generally required to pay at least the applicable minimum wage rate required under Executive Order 14026 or Executive Order 13658. Please note that these Executive Orders apply to covered contracts entered into by the federal government that are subject to the Davis-Bacon Act itself, but do not apply to contracts subject only to the Davis-Bacon Related Acts, including those set forth at 29 CFR 5.1(a)(2)-(60).

If the contract is entered into on or after January 30, 2022, or the contract is renewed or extended (e.g., an option is exercised) on or after January 30, 2022:	. Executive Order 14026 generally applies to the contract. . The contractor must pay all covered workers at least $16.20 per hour (or the applicable wage rate listed on this wage determination, if it is higher) for all hours spent performing on the contract in 2023.
If the contract was awarded on or between January 1, 2015 and January 29, 2022, and the contract is not renewed or extended on or after January 30, 2022:	. Executive Order 13658 generally applies to the contract. . The contractor must pay all covered workers at least $12.15 per hour (or the applicable wage rate listed on this wage determination, if it is higher) for all hours spent performing on

	that contract in 2023.

The applicable Executive Order minimum wage rate will be adjusted annually. If this contract is covered by one of the Executive Orders and a classification considered necessary for performance of work on the contract does not appear on this wage determination, the contractor must still submit a conformance request.

Additional information on contractor requirements and worker protections under the Executive Orders is available at http://www.dol.gov/whd/govcontracts.

Modification Number	Publication Date
0	01/06/2023
1	01/13/2023
2	02/03/2023
3	03/17/2023

ASBE0006-006 06/01/2022

	Rates	Fringes
HAZARDOUS MATERIAL HANDLER (Includes preparation, wetting, stripping, removal scrapping, vacuuming, bagging & disposing of all insulation materials, whether they contain asbestos or not, from mechanical systems)	$ 38.30	25.55

ASBE0006-008 09/01/2021

	Rates	Fringes
Asbestos Worker/Insulator Includes application of all insulating materials, protective coverings, coatings & finishes to all types of mechanical systems.	$ 45.00	32.89

BOIL0029-001 01/01/2021

	Rates	Fringes
BOILERMAKER	$ 45.87	29.02

BRRI0003-001 06/01/2022

	Rates	Fringes
Bricklayer, Stonemason, Pointer, Caulker & Cleaner	$ 46.86	29.14

BRRI0003-002 09/01/2022

	Rates	Fringes
Marble Setter, Terrazzo Worker & Tile Setter	$ 46.54	30.34

BRRI0003-003 09/01/2022

	Rates	Fringes
Marble, Tile & Terrazzo Finisher	$ 38.78	29.61

CARP0330-001 01/01/2023

	Rates	Fringes
CARPENTER (Includes Soft Floor Layer)	$ 41.53	29.35
Diver Tender	$ 42.53	29.35
DIVER	$ 53.88	29.35
Piledriver	$ 41.53	29.35
WELDER	$ 42.53	29.35

FOOTNOTES:

When not diving or tending the diver, the diver and diver tender shall receive the piledriver rate. Diver tenders shall receive $1.00 per hour above the pile driver rate when tending the diver.

Work on free-standing stacks, concrete silos & public utility electrical power houses, which are over 35 ft. in height when constructed: $.50 per hour additional.

Work on exterior concrete shear wall gang forms, 45 ft. or more above ground elevation or on setback: $.50 per hour additional.

The designated piledriver, known as the ""monkey"": $1.00 per hour additional.

CARP1121-002 01/02/2023

	Rates	Fringes
MILLWRIGHT	$ 41.54	30.73

ELEC0099-002 12/05/2022

	Rates	Fringes
ELECTRICIAN	$ 45.86	53.26%
Teledata System Installer	$ 34.40	12.10%+15.31

FOOTNOTES:

Work of a hazardous nature, or where the work height is 30 ft. or more from the floor, except when working OSHA-approved lifts: 20% per hour additional.

Work in tunnels below ground level in combined sewer outfall: 20% per hour additional.

ELEV0039-001 01/01/2023

	Rates	Fringes
ELEVATOR MECHANIC	$ 59.36	37.335+a+b

FOOTNOTES:

a. PAID HOLIDAYS: New Years Day; Memorial Day; Independence Day; Labor Day; Veterans' Day; Thanksgiving Day; the Friday after Thanksgiving Day; and Christmas Day.

b. Employer contributes 8% basic hourly rate for 5 years or more of service of 6% basic hourly rate for 6 months to 5 years of service as vacation pay credit.

ENGI0057-001 06/01/2022

	Rates	Fringes
Operating Engineer: (power plants, sewer treatment plants, pumping stations, tunnels, caissons, piers,		

docks, bridges, wind
turbines, subterranean &
other marine and heavy
construction work)

GROUP 1	$ 43.55	29.25+a
GROUP 2	$ 41.55	29.25+a
GROUP 3	$ 37.17	29.25+a
GROUP 4	$ 34.32	29.25+a
GROUP 5	$ 40.60	29.25+a
GROUP 6	$ 31.40	29.25+a
GROUP 7	$ 25.40	29.25+a
GROUP 8	$ 37.25	29.25+a
GROUP 9	$ 41.17	29.25+a

a. BOOM LENGTHS, INCLUDING JIBS:

150 feet and over + $ 2.00
180 feet and over + $ 3.00
210 feet and over + $ 4.00
240 feet and over + $ 5.00
270 feet and over + $ 7.00
300 feet and over + $ 8.00
350 feet and over + $ 9.00
400 feet and over + $10.00

a. PAID HOLIDAYS:
New Year's Day, President's Day, Memorial Day, July Fourth, Victory Day, Labor Day, Columbus Day, Veterans Day, Thanksgiving Day, Christmas Day. a: Any employee who works 3 days in the week in which a holiday falls shall be paid for the holiday.

a. FOOTNOTES:
Hazmat work: $2.00 per hour additional.
Tunnel/Shaft work: $5.00 per hour additional.

POWER EQUIPMENT OPERATORS CLASSIFICATIONS

GROUP 1: Cranes, lighters, boom trucks and derricks

GROUP 2: Digging machine, Ross Carrier, locomotive, hoist, elevator, bidwell-type machine, shot & water blasting machine, paver, spreader, graders, front end loader (3 yds. and over), vibratory hammer & vacuum truck, roadheaders, forklifts, economobile type equipment, tunnel boring machines, concrete pump and on site concrete plants.

GROUP 3: Oilers on cranes.

GROUP 4: Oiler on crawler backhoe.

GROUP 5: Bulldozer, bobcats, skid steer loader, tractor, scraper, combination loader backhoe, roller, front end loader (less than 3 yds.), street and mobile-powered sweeper (3-yd. capacity), 8-ft. sweeper minimum 65 HP).

GROUP 6: Well-point installation crew.

GROUP 7: Utility Engineers and Signal Persons

GROUP 8: Heater, concrete mixer, stone crusher, welding machine, generator and light plant, gas and electric driven pump and air compressor.

GROUP 9: Boat & tug operator.

ENGI0057-002 05/01/2022

	Rates	Fringes
Power Equipment Operator (highway construction projects; water and sewerline projects which are incidental to highway construction projects; and bridge projects that do not span water)		
GROUP 1	$ 36.70	29.25+a
GROUP 2	$ 31.40	29.25+a
GROUP 3	$ 25.40	29.25+a
GROUP 4	$ 31.98	29.25+a
GROUP 5	$ 35.68	29.25+a
GROUP 6	$ 35.30	29.25+a
GROUP 7	$ 30.95	29.25+a
GROUP 8	$ 32.33	29.25+a
GROUP 9	$ 34.28	29.25+a

a. FOOTNOTE: a. Any employee who works three days in the week in which a holiday falls shall be paid for the holiday.

a. PAID HOLIDAYS: New Year's Day, President's Day, Memorial Day, July Fourth, Victory Day, Labor Day, Columbus Day, Veterans Day, Thanksgiving Day & Christmas Day.

POWER EQUIPMENT OPERATOR CLASSIFICATIONS

GROUP 1: Digging machine, crane, piledriver, lighter, locomotive, derrick, hoist, boom truck, John Henry's,

directional drilling machine, cold planer, reclaimer, paver, spreader, grader, front end loader (3 yds. and over), vacuum truck, test boring machine operator, veemere saw, water blaster, hydro-demolition robot, forklift, economobile, Ross Carrier, concrete pump operator and boats

GROUP 2: Well point installation crew

GROUP 3: Utlity engineers and signal persons

GROUP 4: Oiler on cranes

GROUP 5: Combination loader backhoe, front end loader (less than 3 yds.), forklift, bulldozers & scrapers and boats

GROUP 6: Roller,skid steer loaders, street sweeper

GROUP 7: Gas and electric drive heater, concrete mixer, light plant, welding machine, pump & compressor

GROUP 8: Stone crusher

GROUP 9: Mechanic & welder

ENGI0057-003 06/01/2022

BUILDING CONSTRUCTION

	Rates	Fringes
Power Equipment Operator		
GROUP 1	$ 42.82	29.25+a
GROUP 2	$ 40.82	29.25+a
GROUP 3	$ 40.60	29.25+a
GROUP 4	$ 36.60	29.25+a
GROUP 5	$ 33.75	29.25+a
GROUP 6	$ 39.90	29.25+a
GROUP 7	$ 39.47	29.25+a
GROUP 8	$ 36.79	29.25+a

a.BOOM LENTHS, INCLUDING JIBS:

150 ft. and over: + $ 2.00
180 ft. and over: + $ 3.00
210 ft. and over: + $ 4.00
240 ft. and over: + $ 5.00
270 ft. and over: + $ 7.00
300 ft. and over: + $ 8.00
350 ft. and over: + $ 9.00

400 ft. and over: + $10.00

a. PAID HOLIDAYS: New Year's Day, President's Day, Memorial Day, July Fourth, Victory Day, Labor Day, Columbus Day, Veterans Day, Thanksgiving Day & Christmas Day. a: Any employee who works 3 days in the week in which a holiday falls shall be paid for the holiday.

a. FOOTNOTE: Hazmat work: $2.00 per hour additional.
Tunnel/Shaft work: $5.00 per hour additional.

POWER EQUIPMENT OPERATORS CLASSIFICATIONS

GROUP 1: Cranes, lighters, boom trucks and derricks.

GROUP 2: Digging machine, Ross carrier, locomotive, hoist, elevator, bidwell-type machine, shot & water blasting machine, paver, spreader, front end loader (3 yds. and over), vibratory hammer and vacuum truck

GROUP 3: Telehandler equipment, forklift, concrete pump & on-site concrete plant

GROUP 4: Fireman & oiler on cranes

GROUP 5: Oiler on crawler backhoe

GROUP 6: Bulldozer,skid steer loaders,bobcats, tractor, grader, scraper,combination loader backhoe, roller, front end loader (less than 3 yds.), street and mobile powered sweeper (3 yds. capacity), 8-ft. sweeper (minimum 65 hp)

GROUP 7: Well point installation crew

GROUP 8: Heater, concrete mixer, stone crusher, welding machine, generator for light plant, gas and electric driven pump & air compressor

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IRON0037-001 09/16/2022

	Rates	Fringes
IRONWORKER	$ 39.01	31.58

LABO0271-001 05/30/2021

BUILDING CONSTRUCTION

	Rates	Fringes
LABORER		
GROUP 1	$ 33.55	26.15
GROUP 2	$ 33.80	26.15
GROUP 3	$ 34.30	26.15
GROUP 4	$ 34.55	26.15
GROUP 5	$ 35.55	26.15

LABORERS CLASSIFICATIONS

GROUP 1: Laborer, Carpenter Tender, Mason Tender, Cement Finisher Tender, Scaffold Erector, Wrecking Laborer, Asbestos Removal [Non-Mechanical Systems]

GROUP 2: Asphalt Raker, Adzemen, Pipe Trench Bracer, Demolition Burner, Chain Saw Operator, Fence & Guard Rail Erector, Setter of Metal Forms for Roadways, Mortar Mixer, Pipelayer, Riprap & Dry Stonewall Builder, Highway Stone Spreader, Pneumatic Tool Operator, Wagon Drill Operator, Tree Trimmer, Barco-Type Jumping Tamper, Mechanical Grinder Operator

GROUP 3: Pre-Cast Floor & Roof Plank Erectors

GROUP 4: Air Track Operator, Hydraulic & Similar Self-Powered Drill, Block Paver, Rammer, Curb Setter, Powderman & Blaster

GROUP 5: Toxic Waste Remover

LABO0271-002 05/30/2021

HEAVY AND HIGHWAY CONSTRUCTION

	Rates	Fringes
LABORER		
COMPRESSED AIR		
Group 1	$ 53.45	24.15
Group 2	$ 50.98	24.15
Group 3	$ 40.50	24.15
FREE AIR		
Group 1	$ 44.05	24.15
Group 2	$ 43.05	24.15
Group 3	$ 40.50	24.15
LABORER		
Group 1	$ 33.55	24.15
Group 2	$ 33.80	24.15
Group 3	$ 34.55	24.15

Group 4	$ 27.05	24.15
Group 5	$ 35.55	24.15
OPEN AIR CAISSON, UNDERPINNING WORK AND BORING CREW		
Bottom Man	$ 39.55	24.15
Top Man & Laborer	$ 38.60	24.15
TEST BORING		
Driller	$ 40.00	24.15
Laborer	$ 38.60	24.15

LABORER CLASSIFICATIONS

GROUP 1: Laborer; Carpenter tender; Cement finisher tender; Wrecking laborer; Asbestos removers [non-mechanical systems]; Plant laborer; Driller in quarries

GROUP 2: Adzeperson; Asphalt raker; Barcotype jumping tamper; Chain saw operators; Concrete and power buggy operator; Concrete saw operator; Demolition burner; Fence and guard rail erector; Highway stone spreader; Laser beam operator; Mechanical grinder operator; Mason tender; Mortar mixer; Pneumatic tool operator; Riprap and dry stonewall builder; Scaffold erector; Setter of metal forms for roadways; Wagon drill operator; Wood chipper operator; Pipelayer; Pipe trench bracer

GROUP 3: Air track drill operator; Hydraulic and similar powered drills; Brick paver; Block paver; Rammer and curb setter; Powderperson and blaster

GROUP 4: Flagger & signaler

GROUP 5: Toxic waste remover

LABORER - COMPRESSED AIR CLASSIFICATIONS

GROUP 1: Mucking machine operator, tunnel laborer, brake person, track person, miner, grout person, lock tender, gauge tender, miner: motor person & all others in compressed air

GROUP 2: Change house attendant, powder watchperson, top person on iron

GROUP 3: Hazardous waste work within the ""HOT"" zone

LABORER - FREE AIR CLASSIFICATIONS

GROUP 1: Grout person - pumps, brake person, track person, form mover & stripper (wood & steel), shaft laborer, laborer topside, outside motorperson, miner, conveyor operator, miner welder, heading motorperson, erecting operator, mucking machine operator, nozzle person, rodperson, safety miner, shaft & tunnel, steel & rodperson, mole nipper, concrete worker, form erector (wood, steel and all accessories), cement finisher (this type of work only), top signal person, bottom person (when heading is 50' from shaft), burner, shield operator and TBM operator

GROUP 2: Change house attendant, powder watchperson

GROUP 3: Hazardous waste work within the ""HOT"" zone

PAIN0011-005 06/01/2022

	Rates	Fringes
PAINTER		
Brush and Roller	$ 37.22	23.40
Epoxy, Tanks, Towers, Swing Stage & Structural Steel	$ 39.22	23.40
Spray, Sand & Water Blasting	$ 40.22	23.40
Taper	$ 37.97	23.40
Wall Coverer	$ 37.72	23.40

PAIN0011-006 06/01/2022

	Rates	Fringes
GLAZIER	$ 40.78	23.40

FOOTNOTES:

SWING STAGE: $1.00 per hour additional.

PAID HOLIDAYS: Labor Day & Christmas Day.

PAIN0011-011 06/01/2022

	Rates	Fringes
Painter (Bridge Work)	$ 55.00	23.75

PAIN0035-008 06/01/2011

	Rates	Fringes
Sign Painter	$ 24.79	13.72

PLAS0040-001 06/03/2019

BUILDING CONSTRUCTION

	Rates	Fringes
CEMENT MASON/CONCRETE FINISHER	$ 36.00	27.15

FOOTNOTE: Cement Mason: Work on free swinging scaffolds under 3 planks width and which is 20 or more feet above ground and any offset structure: $.30 per hour additional.

PLAS0040-002 07/01/2019

HEAVY AND HIGHWAY CONSTRUCTION

	Rates	Fringes
CEMENT MASON/CONCRETE FINISHER	$ 32.85	22.20

PLAS0040-003 07/01/2019

	Rates	Fringes
PLASTERER	$ 37.55	27.50

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* PLUM0051-002 02/27/2023

	Rates	Fringes
Plumbers and Pipefitters	$ 48.89	31.75

ROOF0033-004 12/01/2022

	Rates	Fringes
ROOFER	$ 42.23	29.67

SFRI0669-001 01/01/2023

	Rates	Fringes
SPRINKLER FITTER	$ 47.55	29.94

SHEE0017-002 12/01/2020

	Rates	Fringes
Sheet Metal Worker	$ 38.58	36.73

TEAM0251-001 05/01/2022

HEAVY AND HIGHWAY CONSTRUCTION

	Rates	Fringes
TRUCK DRIVER		
GROUP 1	$ 28.46	32.10+A+B+C
GROUP 2	$ 28.61	$ 32.10+A+B+C
GROUP 3	$ 28.66	$ 32.10+A+B+C
GROUP 4	$ 28.71	$ 32.10+A+B+C
GROUP 5	$ 28.81	$ 32.10+A+B+C
GROUP 6	$ 29.21	$ 32.10+A+B+C
GROUP 7	$ 29.41	$ 32.10+A+B+C
GROUP 8	$ 28.91	$ 32.10+A+B+C
GROUP 9	$ 29.16	$ 32.10+A+B+C
GROUP 10	$ 28.96	$ 32.10+A+B+C

FOOTNOTES:

A. Paid Holidays: New Year's Day, Memorial Day, Independence Day, Labor Day, Thanksgiving Day and Christmas Day, plus Presidents' Day, Columbus Day, Veteran's Day & V-J Day, providing the employee has worked at least one day in the calendar week in which the holiday falls.

B. Employee who has been on the payroll for 1 year or more but less than 5 years and has worked 150 Days during the last year of employment shall receive 1 week's paid vacation; 5 to 10 years - 2 weeks' paid vacation; 10 or more years - 3 week's paid vacation.

C. Employees on the seniority list shall be paid a one hundred dollar ($100.00) bonus for every four hundred (400) hours worked, up to a maximum of five hundred dollars ($500.00)

All drivers working on a defined hazard material job site shall be paid a premium of $2.00 per hour over applicable rate.

TRUCK DRIVER CLASSIFICATIONS

GROUP 1: Pick-up trucks, station wagons, & panel trucks

GROUP 2: Two-axle on low beds

GROUP 3: Two-axle dump truck

GROUP 4: Three-axle dump truck

GROUP 5: Four- and five-axle equipment

GROUP 6: Low-bed or boom trailer.

GROUP 7: Trailers when used on a double hook up (pulling 2 trailers)

GROUP 8: Special earth-moving equipment, under 35 tons

GROUP 9: Special earth-moving equipment, 35 tons or over

GROUP 10: Tractor trailer

WELDERS - Receive rate prescribed for craft performing operation to which welding is incidental.

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Note: Executive Order (EO) 13706, Establishing Paid Sick Leave for Federal Contractors applies to all contracts subject to the Davis-Bacon Act for which the contract is awarded (and any solicitation was issued) on or after January 1, 2017. If this contract is covered by the EO, the contractor must provide employees with 1 hour of paid sick leave for every 30 hours they work, up to 56 hours of paid sick leave each year. Employees must be permitted to use paid sick leave for their own illness, injury or other health-related needs, including preventive care; to assist a family member (or person who is like family to the employee) who is ill, injured, or has other health-related needs, including preventive care; or for reasons resulting from, or to assist a family member (or person who is like family to the employee) who is a victim of, domestic violence, sexual assault, or stalking. Additional information on contractor requirements and worker protections under the EO is available at https://www.dol.gov/agencies/whd/government-contracts.

Unlisted classifications needed for work not included within the scope of the classifications listed may be added after award only as provided in the labor standards contract clauses (29CFR 5.5 (a) (1) (ii)).

The body of each wage determination lists the classification and wage rates that have been found to be prevailing for the cited type(s) of construction in the area covered by the wage determination. The classifications are listed in alphabetical order of ""identifiers"" that indicate whether the particular rate is a union rate (current union negotiated rate for local), a survey rate (weighted average rate) or a union average rate (weighted union average rate).

Union Rate Identifiers

A four letter classification abbreviation identifier enclosed in dotted lines beginning with characters other than ""SU"" or ""UAVG"" denotes that the union classification and rate were prevailing for that classification in the survey. Example: PLUM0198-005 07/01/2014. PLUM is an abbreviation identifier of the union which prevailed in the survey for this classification, which in this example would be Plumbers. 0198 indicates the local union number or district council number where applicable, i.e., Plumbers Local 0198. The next number, 005 in the example, is an internal number used in processing the wage determination. 07/01/2014 is the effective date of the most current negotiated rate, which in this example is July 1, 2014.

Union prevailing wage rates are updated to reflect all rate changes in the collective bargaining agreement (CBA) governing this classification and rate.

Survey Rate Identifiers

Classifications listed under the ""SU"" identifier indicate that no one rate prevailed for this classification in the survey and the published rate is derived by computing a weighted average rate based on all the rates reported in the survey for that classification. As this weighted average rate includes all rates reported in the survey, it may include both union and non-union rates. Example: SULA2012-007 5/13/2014. SU indicates the rates are survey rates based on a weighted average calculation of rates and are not majority rates. LA indicates the State of Louisiana. 2012 is the year of survey on which these classifications and rates are based. The next number, 007 in the example, is an internal number used in producing the wage determination. 5/13/2014 indicates the survey completion date for the classifications and rates under that identifier.

Survey wage rates are not updated and remain in effect until a new survey is conducted.

Union Average Rate Identifiers

Classification(s) listed under the UAVG identifier indicate that no single majority rate prevailed for those classifications; however, 100% of the data reported for the classifications was union data. EXAMPLE: UAVG-OH-0010 08/29/2014. UAVG indicates that the rate is a weighted union average rate. OH indicates the state. The next number, 0010 in the example, is an internal number used in producing the wage determination. 08/29/2014 indicates the survey completion date for the classifications and rates under that identifier.

A UAVG rate will be updated once a year, usually in January of each year, to reflect a weighted average of the current negotiated/CBA rate of the union locals from which the rate is based.

WAGE DETERMINATION APPEALS PROCESS

1.) Has there been an initial decision in the matter? This can be:

* an existing published wage determination
* a survey underlying a wage determination
* a Wage and Hour Division letter setting forth a position on a wage determination matter
* a conformance (additional classification and rate) ruling

On survey related matters, initial contact, including requests for summaries of surveys, should be with the Wage and Hour National Office because National Office has responsibility for the Davis-Bacon survey program. If the response from this initial contact is not satisfactory, then the process described in 2.) and 3.) should be followed.

With regard to any other matter not yet ripe for the formal process described here, initial contact should be with the Branch of Construction Wage Determinations. Write to:

Branch of Construction Wage Determinations
Wage and Hour Division
U.S. Department of Labor

200 Constitution Avenue, N.W.
Washington, DC 20210

2.) If the answer to the question in 1.) is yes, then an interested party (those affected by the action) can request review and reconsideration from the Wage and Hour Administrator (See 29 CFR Part 1.8 and 29 CFR Part 7). Write to:

Wage and Hour Administrator
U.S. Department of Labor
200 Constitution Avenue, N.W.
Washington, DC 20210

The request should be accompanied by a full statement of the interested party's position and by any information (wage payment data, project description, area practice material, etc.) that the requestor considers relevant to the issue.

3.) If the decision of the Administrator is not favorable, an interested party may appeal directly to the Administrative Review Board (formerly the Wage Appeals Board). Write to:

Administrative Review Board
U.S. Department of Labor
200 Constitution Avenue, N.W.
Washington, DC 20210

4.) All decisions by the Administrative Review Board are final.

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END OF GENERAL DECISIO"

PROVIDENCE PARKS DEPARTMENT
ROGER WILLIAMS PARK STORMWATER TREATMENT TRAIN

TECHNICAL SPECIFICATIONS
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SECTION 01010 GENERAL DESCRIPTION OF THE WORK

PART 1 GENERAL

1.1 DESCRIPTION

A. The Contractor shall furnish and install stormwater improvements for the Providence Parks Department in the vicinity of Roosevelt Lake within Roger Williams Park in Providence, RI as described in the Contract Documents and depicted on the Contract Drawings.

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.

C. All work shall comply with a Rhode Island Department of Environmental Management (RIDEM) Freshwater Wetlands permit issued for this project. Contractor shall post all required signs and comply with all applicable conditions and stipulations of the permit.

1.2 LIMITS OF WORK/COORDINATION

A. The Contractor shall access the site from abutting rights-of-way as required to facilitate construction and as depicted on the Drawings. Areas for construction staging, storage, and construction shall be within the Limits of Disturbance identified on the Drawings, unless otherwise coordinated with and authorized by Owner.

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 within ten (10) days after date established in Notice to Proceed for Engineer review but no less than ten (10) days prior to the commencement of any work.

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. 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

SECTION 01015 CONTRACTOR'S USE OF THE PREMISES

PART 1 GENERAL

1.1 DESCRIPTION

A. Extent of Work: This Section applies to situations in which the Contractor or his 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 him, 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 his 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 his 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 5 p.m., Monday through Friday, excluding holidays.

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 make application for work outside regular working hours five (5) calendar days prior to such work. 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 his 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 equal 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

SECTION 01019 CONTRACT CONSIDERATIONS

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 AIA Document G702 – Application of Payment.

B. Provide AIA Document G703 – Continuation Sheet with each Application for Payment. Provide itemized listing of Work Items; Scheduled Values; Work Completed; Stored Material; Total Completed and Stored to Date; 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 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 Owner and 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.

1.5 SUBSTANTIAL COMPLETION

A. The date set for Substantial Completion of this Contract is **November 15, 2023**.

B. Contractor shall submit request for Substantial Completion using AIA Document G704 – Certificate of Substantial Completion.

PART 2 PRODUCTS

NOT USED

PART 3 EXECUTION

NOT USED

END OF SECTION

SECTION 01150 MEASUREMENT AND PAYMENT

PART 1 GENERAL

1.1 EXTENT OF WORK

A. Measurement. The quantities to be measured under the various Bid Items in the Request for Proposals (RFP) 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 Bid Items in the RFP 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 in the Bid and no separate payment will be made thereof.

B. Earth Excavation. Payment for earth excavation to the depths indicated on the Drawings or authorized by Owner 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 Owner, is included in the prices for the various Items in the Bid and no separate payment will be made thereof.

C. Rock Excavation. Payment for the excavation, removal, and disposal of boulders and cobbles up to 1 cubic yard in size is considered earth excavation is included in the prices for the various Items in the Bid. Separate payment will be made for excavation, removal, and disposal of bedrock or boulders larger than 1 cubic yard in diameter, subject to measurement by Contractor and verification by Owner in accordance with project specifications.

D. Filling, Backfilling, Embankment, and Disposal of Surplus Materials. Payment for filling; backfilling for all structures; underground pipelines and utilities, including appurtenances; construction of embankments; and disposal of surplus material is included in the prices for the various Items in the Bid 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, including design of support systems by a Professional Engineer as required by the project specifications, is included in the prices for the Items in the Bid 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 Bid and no separate payment will be made thereof.

G. Preparation of Site. Payment for preparation of site is included in the Lump Sum Price provided for Item 1 in the Bid 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 Bid but is necessary for the complete construction of the project set forth by the contract.

H. Environmental Protection. Payment for work under this Section is included in the prices for the various Bid Items in the RFP and no separate payment will be made thereof.

I. Pavement and Sidewalk Removal. Payment for bituminous concrete pavement or cement concrete sidewalk excavation and disposal is included in the prices for the various Bid Items in the Bid and no separate payment will be made thereof.

J. No separate payments will be made for cleaning up. Such clean-up shall be considered incidental to the item to which it applies and shall be included in the price for that item.

K. 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.

L. 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 RFP.

M. All disturbed areas outside the limits of disturbance shall be restored at the Contractor’s expense to the satisfaction of the Owner.

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 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 Owner in writing.

PART 2 PRODUCTS

2.01 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 in the Bid. 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.
2. 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; installing temporary utilities; furnishing and installing temporary fencing; furnishing and installing temporary signage; and furnishing, installing, and maintaining all other temporary facilities necessary for work on the project. Demobilization shall include, but is not limited to, moving out of personnel and equipment, removal and disposal of tracking pads and temporary signage, cleaning entire site, furnishing all required operation and maintenance documentation, and removing debris and rubbish.
3. The Lump Sum price provided for Bid Item No. 1 - Mobilization and Demobilization shall not exceed 10% of the total amount of this bid.
4. There shall be no separate payment associated with furnishing, installing, maintaining, and removing a temporary field office for use by the Contractor.

B. Payment

1. Payment for this item shall be made as a percentage of the Lump Sum price listed in the Bid. The price so-stated constitutes full and complete compensation for all labor, materials, and equipment and for all other incidentals required to finish the work, complete and accepted by Owner.

2.02 R&D TREES (BID ITEM NO. 2)

A. Measurement

1. The work of this section shall be measured as specified at the Lump Sum price provided in the Bid for the complete removal and offsite disposal of trees, where

indicated on the Drawings. Complete removal shall include grubbing roots and stumps. Removal of trees not indicated for removal on the Drawings is prohibited.

B. Payment

1. Payment for this item shall be made at the Lump Sum price listed in the Bid. The price so-stated constitutes full and complete compensation for all labor, materials, and equipment and for all other incidentals required to finish the work, complete and accepted by Owner.

2.03 PERFORM TEST PIT (BID ITEM NO. 3)

A. Measurement

1. The work of this section shall be measured as specified for Each test pit, up to a maximum depth of 10 feet and maximum volume of 12 cubic yards, where indicated on the Drawings or otherwise requested by Owner, performed by Contractor. Work shall include all necessary equipment, materials, workmen, and all incidental work to completely excavate each test pit and restore the area once complete.

B. Payment

1. Payment for this item shall be made at the per Each price listed in the Bid.

2.04 F&I EROSION AND SEDIMENTATION CONTROLS (BID ITEM NO. 4)

A. Measurement

1. The Work of this section shall be measured as specified at the Lump Sum price for installation, maintenance, inspection, removal, and disposal of erosion and sedimentation controls where shown on the Contract Drawings and as required by Owner. 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 and vegetation protection where shown on the Contract Drawings and as required by Owner.

B. Payment

1. Payment for this item shall be made as a percentage of the Lump Sum price listed in the Bid. The price so-stated constitutes full and complete compensation for all labor, materials, and equipment and for all other incidentals required to finish the work, complete and accepted by Owner.

2.05 F&I DOGHOUSE DIVERSION MANHOLE (BID ITEM NO. 5)

A. Measurement

1. The work of this item includes all labor, materials, and equipment to furnish and install all required: excavation; excavation support; dewatering; demolition of existing pipe; bedding; formwork; steel reinforcing; concrete work; backfill; compaction; maintenance of existing flow; and all associated appurtenant work, as indicated on the Drawings and as specified, and including all incidental Items required to furnish a complete structure meeting the functional intent described by the Drawings.
2. Contractor shall sequence the work to maintain or divert stormwater flow to Roosevelt Pond at all times. Temporary diversion of flow is incidental to the work of this item and no separate payment will be made thereof.
3. The work of this item includes furnishing and installing H-20 rated aluminum access hatch in top slab of structure, as manufactured by Bilco or approved equal.
4. The work of this item includes furnishing and installing aluminum stop logs and guide frame as detailed on the Drawings. A stop log lifter compatible with the aluminum stop log system shall also be furnished to Owner.

B. Payment

1. Payment for this item shall be made as a percentage of the Lump Sum price listed in the Bid. The price so-stated constitutes full and complete compensation for all labor, materials, and equipment and for all other incidentals required to finish the work, complete and accepted by Owner.

2.06 F&I PROPRIETARY MEMBRANE TREATMENT SYSTEM (BID ITEM NO. 6)

A. Measurement

1. The work of this item includes all labor, materials, and equipment to furnish and install a proprietary membrane treatment system in accordance with the Drawings and these specifications. This shall include, but not be limited to, all required: excavation; excavation support; dewatering; bedding; backfill; compaction; precast concrete tank; trench and manhole covers to grade; membrane cartridges; and all associated appurtenant work as indicated on the Drawings and as specified including all incidental Items required to furnish a complete structure meeting the functional intent described by the Drawings.
2. The proprietary membrane treatment system shall be furnished as a complete operational unit and shall meet the minimum performance requirements stipulated on the Drawings. The system shall be Jellyfish® by Contech Engineered Solutions, LLC, or approved equal.
3. Dewatering and support of excavation to properly prepare subgrade and install structure is incidental to the work of this section, and no separate payment will be made thereof.

B. Payment

1. Payment for this item shall be made as a percentage of the Lump Sum price listed in the Bid. The price so-stated constitutes full and complete compensation for all labor, materials, and equipment and for all other incidentals required to finish the work, complete and accepted by Owner.

2.07 F&I POLYPROPYLENE MONITORING PORT (BID ITEM NO. 7)

A. Measurement

1. The work of this section shall be measured as specified for Each polypropylene monitoring port completely installed in the locations shown on the Drawings and in accordance with project details. This shall include, but not be limited to, all required: excavation; excavation support; dewatering; furnishing and installing proper bedding; backfill; compaction; polypropylene structure; and all associated appurtenant work as indicated on the Drawings.

2. Furnishing and installing ductile iron manhole frame and cover to grade is included in this item.

B. Payment

1. Payment for this item shall be made at the per Each price listed in the Bid. The price so-stated constitutes full and complete compensation for all labor, materials, and equipment and for all other incidentals required to finish the work, complete and accepted by Owner.

2.08 F&I PRECAST CONCRETE MANHOLE (BID ITEM NO. 8)

A. Measurement

1. The work of this section shall be measured as specified for Each precast concrete manhole completely installed in the locations shown on the Drawings and in accordance with project details. This shall include, but not be limited to, furnishing and installing all required: precast manhole sections; excavation; excavation support; dewatering; bedding; backfill; compaction; and all associated appurtenant work as indicated on the Drawings.

2. Furnishing and installing ductile iron manhole frame and cover to grade is included in this item.

B. Payment

1. Payment for this item shall be made at the per Each price listed in the Bid. The price so-stated constitutes full and complete compensation for all labor, materials, and equipment and for all other incidentals required to finish the work, complete and

accepted by Owner.

2.09 F&I 12-INCH HDPE PIPE (BID ITEM NO. 9)

A. Measurement

1. The work of this section will be measured by the number of linear feet of 12" HDPE pipe actually installed in accordance with the Drawings and/or as directed by Owner.
2. The work of this section shall include, but not be limited to, all required: furnishing pipe; excavation; excavation support; dewatering; bedding; backfill; compaction; and all associated appurtenant work as indicated on the Drawings.
3. Structures shall be subtracted from the linear footage quantity; linear footage shall be measured along the centerline of the trench from beginning invert of the pipe to ending invert of the pipe.

B. Payment

1. The accepted quantity of the work in this section will be paid for at the contract unit price per linear feet as listed in the Bid. The price so-stated constitutes full and complete compensation for all labor, materials, and equipment and for all other incidentals required to finish the work, complete and accepted by Owner.

2.10 F&I 12-INCH C-900 PVC PIPE (BID ITEM NO. 10)

B. Measurement

1. The work of this section will be measured by the number of linear feet of 12" C-900 PVC pipe actually installed in accordance with the Drawings and/or as directed by Owner.
2. The work of this section shall include, but not be limited to, all required: furnishing pipe; excavation; excavation support; dewatering; bedding; backfill; compaction; and all associated appurtenant work as indicated on the Drawings.
3. Structures shall be subtracted from the linear footage quantity; linear footage shall be measured along the centerline of the trench from beginning invert of the pipe to ending invert of the pipe.

B. Payment

1. The accepted quantity of the work in this section will be paid for at the contract unit price per linear feet as listed in the Bid. The price so-stated constitutes full and complete compensation for all labor, materials, and equipment and for all other incidentals required to finish the work, complete and accepted by Owner.

2.11 F&I 6-INCH C-900 PIPE (BID ITEM NO. 11)

A. Measurement

1. The work of this section will be measured by the number of linear feet of 6" C-900 PVC pipe actually installed in accordance with the Drawings and/or as directed by Owner.
2. The work of this section shall include, but not be limited to, all required: furnishing pipe; excavation; excavation support; dewatering; bedding; backfill; compaction; and all associated appurtenant work as indicated on the Drawings.
3. Structures shall be subtracted from the linear footage quantity; linear footage shall be measured along the centerline of the trench from beginning invert of the pipe to ending invert of the pipe.

B. Payment

1. The accepted quantity of the work in this section will be paid for at the contract unit price per linear feet as listed in the Bid. The price so-stated constitutes full and complete compensation for all labor, materials, and equipment and for all other incidentals required to finish the work, complete and accepted by Owner.

2.12 F&I 6-INCH GATE VALVE (BID ITEM NO. 12)

A. Measurement

1. The work of this section shall be measured as specified for Each 6-inch valve completely installed in the locations shown on the Drawings and in accordance with project details. The unit price shall constitute full compensation for furnishing and installing valves and valve boxes complete, including all work incidental thereto and not specifically included for payment under other items.

B. Payment

1. Payment for this item shall be made at the per Each price listed in the Bid. The price so-stated constitutes full and complete compensation for all labor, materials, and equipment and for all other incidentals required to finish the work, complete and accepted by Owner.

2.13 F&I 12-INCH INLINE CHECK VALVE (BID ITEM NO. 13)

A. Measurement

1. The work of this section shall be measured as specified for Each 12-inch inline check valve completely installed in the locations shown on the Drawings and in accordance with project details.
2. Inline check valve shall be CheckMate UltraFlex by Tideflex, or approved equal.

B. Payment

1. Payment for this item shall be made at the per Each price listed in the Bid. The price so-stated constitutes full and complete compensation for all labor, materials, and equipment and for all other incidentals required to finish the work, complete and accepted by Owner.

2.14 F&I PIPE FITTINGS (BID ITEM NO. 14)

A. Measurement

1. The work of this section shall be measured as specified at the Lump Sum Price provided in the Bid Form to furnish and install pipe fittings outside of tanks and structures, where indicated on the Drawings. Fittings include 12”x6” reducer, 12”x12” tee, and 12”x6” tee.
2. The work of this section shall include, but not be limited to: furnishing materials; excavation; excavation support; dewatering; bedding; backfill; compaction; and all associated appurtenant work as indicated on the Drawings.

B. Payment

1. Payment for this item shall be made at the Lump Sum price listed in the Bid. The price so-stated constitutes full and complete compensation for all labor, materials, and equipment and for all other incidentals required to finish the work, complete and accepted by Owner.

2.15 F&I 1” TAP TO EXISTING WATER (BID ITEM NO. 15)

A. Measurement

1. The Work of this section shall be measured as specified at the Lump Sum price and shall constitute full compensation for tapping the water main, furnishing and installing service saddle, and furnishing and installing corporation stop in accordance with project details. The work of this section shall also include, but not be limited to, all required: excavation; excavation support; dewatering; bedding; backfill; compaction; and all associated appurtenant work as indicated on the Drawings.

B. Payment

1. Payment for this item shall be made at the Lump Sum price listed in the Bid. The price so-stated constitutes full and complete compensation for all labor, materials, and equipment and for all other incidentals required to finish the work, complete and accepted by Owner.

2.16 F&I CURB STOP WITH BOX (BID ITEM NO. 16)

A. Measurement

1. The Work of this section shall be measured as specified at the Lump Sum price and shall constitute full compensation for furnishing and installing new curb stop with box to grade. The work of this section shall also include, but not be limited to, all required: excavation; excavation support; dewatering; bedding; backfill; compaction; and all associated appurtenant work as indicated on the Drawings.

B. Payment

1. Payment for this item shall be made at the Lump Sum price listed in the Bid. The price so-stated constitutes full and complete compensation for all labor, materials, and equipment and for all other incidentals required to finish the work, complete and accepted by Owner.

2.17 F&I 1" WATER SERVICE PIPING (BID ITEM NO. 17)

A. Measurement

1. The work of this section will be measured by the number of linear feet of 1-inch polyethylene water service pipe actually installed in accordance with the Drawings and/or as directed by Owner.
2. The work of this section shall also include, but not be limited to, all required: excavation; excavation support; dewatering; bedding; backfill; compaction; and all associated appurtenant work as indicated on the Drawings.
3. Pressure testing of water service shall be included in this item.

B. Payment

1. The accepted quantity of the work in this section will be paid for at the contract unit price per linear feet as listed in the Bid. The price so-stated constitutes full and complete compensation for all labor, materials, and equipment and for all other incidentals required to finish the work, complete and accepted by Owner.

2.18 F&I GROUND HYDRANT (BID ITEM NO. 18)

A. Measurement

1. The work of this section shall be measured as specified for Each non-freeze ground hydrant assembly completely installed as indicated on the Drawings.
2. Ground hydrant shall be Zurn Z1360-VB or approved equal.
3. The work of this section shall include, but not be limited to, all required: excavation; excavation support; dewatering; bedding; backfill; compaction; and all associated appurtenant work as indicated on the Drawings.

B. Payment

1. The accepted quantity of the work in this section will be paid for at the contract unit price per Each as listed in the Bid. The price so-stated constitutes full and complete compensation for all labor, materials, and equipment and for all other incidentals required to finish the work, complete and accepted by Owner.

2.19 F&I CEMENT CONCRETE SIDEWALK (BID ITEM NO. 19)

A. Measurement

1. The Work of this section shall be measured as specified at the Unit Price provided in the Bid for each square yard of concrete sidewalk installed including rebar, welded wire fabric, and other incidentals necessary for the restoration of sidewalks in accordance with the Drawings and specifications. The work shall include restoration of sidewalks disturbed to a minimum depth to match the existing sidewalk or as called for in the contract documents (whichever is greater) and furnishing and installing gravel borrow sub-base to match a depth called for in contract documents.
2. Sawcutting of existing sidewalk is incidental to this work and is included in this item.
3. Sidewalk areas that are disturbed outside of the pay limits defined in the contract documents shall be restored by Contractor but not measured for payment unless work beyond the defined limits was previously authorized by Owner.

B. Payment

1. The accepted quantity of the work in this section will be paid for at the contract unit price per square yard as listed in the Bid. The price so-stated constitutes full and complete compensation for all labor, materials, and equipment and for all other incidentals required to finish the work, complete and accepted by Owner.

2.20 F&I 4” POURED CONCRETE EQUIPMENT PAD (BID ITEM NO. 20)

A. Measurement

1. The Work of this section shall be measured as specified at the Lump Sum price and shall constitute full compensation for furnishing and installing a new concrete equipment pad to the specified thickness and dimensions, as indicated on the Drawings.
2. The Work includes installing all rebar, welded wire fabric, gravel sub-base, and other incidentals necessary in accordance with the Drawings and Specifications.

B. Payment

1. The accepted quantity of the work in this section will be paid for at the Lump Sum price listed in the Bid. The price so-stated constitutes full and complete compensation for all labor, materials, and equipment and for all other incidentals required to finish the work, complete and accepted by Owner.

2.21 F&I LOAM AND SEED (BID ITEM NO. 21)

A. Measurement

1. The Work of this section shall be measured as specified at the Unit Price provided in the Bid for each square yard of existing lawn areas restored with minimum 4 inches of loam and seed meeting project specifications. Only areas that receive a minimum of 4 inches of loam will be measured for payment.
2. Areas that are disturbed outside of the pay limits defined in the contract documents shall be restored by Contractor but not measured for payment.
3. Costs associated with maintenance of loamed and seeded areas restored as part of this contract are included in this item.

B. Payment

1. The accepted quantity of the work in this section will be paid for at the contract unit price per square yard as listed in the Bid. The price so-stated constitutes full and complete compensation for all labor, materials, and equipment and for all other incidentals required to finish the work, complete and accepted by Owner.

2.22 R&R MASONRY WALL AT POND (BID ITEM NO. 22)

A. Measurement

1. The Work of this section shall be measured as specified at the Unit Price provided in the Bid for each linear foot of masonry wall removed, reset, and reconstructed to the lines and grades shown on the Drawings.
2. Only sections of the wall reconstructed within the limits shown on the Drawings will be eligible for payment.

B. Payment

1. The accepted quantity of the work in this section will be paid for at the contract unit price per linear foot of masonry wall removed, reset, and reconstructed as listed in the Bid. The price so-stated constitutes full and complete compensation for all labor, materials, and equipment and for all other incidentals required to finish the work, complete and accepted by Owner including new field stone and cement mortar in areas where the wall is to be raised to a new elevation.

2.23 ADD-ALTERNATE: STORMWATER TREATMENT FILTER SYSTEM (ADD-ALTERNATE ITEM NO. 1)

A. Measurement

1. The work of this item includes all labor, materials, and equipment to furnish and install a media filter treatment system in accordance with the Drawings and these specifications. This shall include, but not be limited to, all required: excavation; excavation support; dewatering; bedding; backfill; compaction; precast concrete tank;

H-20 rated aluminum access hatch and manhole covers to grade; interior piping; geogrid; double washed peastone filter layer; treatment media; and all associated appurtenant work as indicated on the Drawings and as specified including all incidental Items required to furnish a complete system meeting the functional intent described by the Drawings.

2. The treatment media shall be washed Biochar with gradation from ¼" to 1" in particle size. It shall be free of any deleterious material and shall be suitable for use in a stormwater quality treatment system. Biochar material shall be produced locally and furnished in bulk, such as by New England Biochar or approved equal vendor meeting project specifications.

B. Payment

1. Payment for this item shall be made as a percentage of the Lump Sum price listed in the Bid, if added to the Contract by Owner. The price so-stated constitutes full and complete compensation for all labor, materials, and equipment and for all other incidentals required to finish the work, complete and accepted by Owner.

2.24 ADD-ALTERNATE: F&I FLOW MONITORING EQUIPMENT (ADD-ALTERNATE ITEM NO. 2)

A. Measurement

1. The Work of this section shall be measured as specified at the Lump Sum Price provided in the Bid to furnish and install a battery-powered non-contact, intrinsically safe velocity sensor flow meter within the precast concrete manhole, as specified on the Drawings. Velocity sensor flow meter shall be LaserFlow by Teledyne ISCO or approved equal. Installation shall be in accordance with manufacturer's recommendations.

B. Payment

1. Payment for this item shall be made at the Lump Sum Price listed in the Bid, if added to the Contract by Owner.

2.25 ADD-ALTERNATE: FURNISH REPLACEMENT MEMBRANE CARTRIDGES (ADD-ALTERNATE ITEM NO. 3)

A. Measurement

1. The Work of this section shall be measured as specified at the Lump Sum Price provided in the Bid for one complete set of replacement membrane filter cartridge furnished to the Owner for future use. Membrane filter cartridges shall meet the same specifications as those installed under this Contract.

B. Payment

1. Payment for this item shall be made at the Lump Sum Price listed in the Bid if added

to the Contract by 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 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

SECTION 01300 SUBMITTALS

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 with Engineer-accepted form.

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. Submit initial progress schedule in duplicate within ten (10) days after date established in Notice to Proceed for Engineer review.

B. Revise and resubmit in a timely manner, as required.

C. Submit revised schedules with each Application for Payment, identifying changes since previous version.

D. Submit a horizontal bar chart with separate line for each major section of work or operation identifying first workday of each week.

E. 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.

F. Indicate estimated percentage of completion for each item of work at each submission.

G. 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. 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.

B. For products specified only by reference standards, give manufacturer, trade name, model or catalog designation and reference standards.

1.5 SHOP DRAWINGS

A. Submit the number of opaque reproductions, which Contractor requires, plus copies which will be retained by Architect/Engineer.

1.6 PRODUCT DATA

A. Submit the number of copies which the Contractor requires plus copies which will be retained by the Engineer.

B. 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 Owner’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 01400 QUALITY CONTROL

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, within thirty (30) days of observation.

PART 2 PRODUCTS

NOT USED

PART 3 EXECUTION

NOT USED

END OF SECTION

SECTION 01500 TEMPORARY CONTROLS

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 structures from damage and to minimize hazards to the general public (i.e., curiosity 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 dewatering of excavations, temporary diversion of water courses, and protection from flooding as necessary to permit the construction of work in the dry. This includes temporarily diverting flow into the diversion manhole from the pond and existing 48-inch outfall pipe to permit work in the dry.

1.4 EROSION AND SEDIMENT CONTROL

A. Erosion controls, such as compost filter sock and turbidity curtain, shall be placed as

shown on the plans or as directed by the Owner or the Engineer. Erosion controls shall be secured as detailed on the Drawings. Erosion controls shall be maintained or replaced as they are disturbed, 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. Calcium chlorine is not permitted for dust control on this project.

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 5:00 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 AND PEDESTRIAN CONTROL

A. Traffic and pedestrian control shall be provided in accordance with the Rhode Island Department of Transportation Manual on Uniform Traffic Control Devices and as depicted on the Contract Drawings. Refer to sheet C-6.0 Pedestrian Detour Plan for additional requirements.

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

SECTION 01600 MATERIAL AND EQUIPMENT

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 ensure 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 ensure 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. Requests for substitution shall be made as part of the Shop Drawing submittal process described in Section 01300 – Submittals. When substitutions are requested, Contractor shall submit shop drawings to Engineer for review to avoid undue delay in acquiring equipment and materials.

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. Submit copies or request for substitution for consideration. Limit each request to one proposed substitution.
2. Submit shop drawings, product data, and certified test results attesting to the proposed product equivalence.
3. The Engineer will notify Contractor, in writing, of decision to accept or reject request.

PART 2 PRODUCTS

NOT USED

PART 3 EXECUTION

NOT USED

END OF SECTION

SECTION 01700 CONTRACT CLOSEOUT

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. Submit written 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 equal or better 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, signs, 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-built drawings for all appurtenant work in AutoCAD Release 2018 or later, in hard copy and electronic format, 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 duplicate copies.

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

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 material called for removal or otherwise encountered during progress of the work where it conflicts with proposed construction. This includes, but is not limited to, section of existing reinforced concrete pipe proposed for removal, trees where called out on the Drawings, existing sections of masonry wall where called for reconstruction, and concrete walkway.

B. Coordinate with the Providence Parks Department for the removal and legal disposal of all demolished materials from the project site as shown on the Contract Drawings and as specified herein.

1.02 RELATED SECTIONS

A. Section 02100 – Site Preparation
B. Section 02200 – Earthwork

1.03 EXISTING CONDITIONS

A. Existing conditions are depicted on Sheet C1.2 – Existing Conditions. Owner and Engineer do not warrant or guarantee that all subsurface conditions are depicted accurately or completely.

1.04 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.

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.

1.05 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)

1.06 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 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.02 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".

B. Existing Conditions Plan compiled from the following sources:
1. Plan entitled "Topographic Survey Data Accumulation Plan" prepared by Martinez Couch & Associates LLC, dated 12-29-22.
2. Wetland flags identifying wetland resource areas placed by Pare Corporation on January 11, 2023 and located by Pare Corporation using a Trimble R12 GPS.
3. Existing subsurface utilities in project area located from ground penetrating radar (GPR) survey performed by GPRS, Inc. Locations are approximate.

1.03 SUMMARY

A. The work of this Section includes the following:
1. Provisions for protection of all existing utilities from damage.
2. Removal and disposal of concrete walks at the locations specified on the drawings.
3. Removal and disposal of sections of masonry wall for new outfall and where called for wall reconstruction.
4. Cleaning and maintenance of the site and stormwater treatment system components.
5. Transport and disposal of unsuitable material, if encountered during excavation operations as specified in the Contract Documents.
6. The removal and stockpiling of all suitable material encountered during excavation operations.
7. The removal and offsite disposal of trees and stumps called for removal.
8. Protection of existing chain link fence alongside the project site.
9. Protection of existing vegetation to remain by erecting snow fence, as shown on the Drawings.
10. Temporary removal and subsequent replacement of signage and sampling equipment at locations specified on the Drawings.

B. Related Sections include the following:
1. Section 02200 Earthwork

1.04 DEFINITIONS

A. Cleaning as described in Subsection 212.01.2a of the State Standards.

B. Maintenance as described in Subsection 212.01.2b of the State Standards.

C. Tree Protection Zone: Area surrounding individual trees or groups of trees to be protected during construction and defined by the drip line of individual trees or the perimeter drip line of groups of trees, unless otherwise indicated.

1.05 MATERIAL OWNERSHIP

A. Unless noted otherwise, cleared materials shall become Contractor's property and shall be removed from Project site.

B. The Owner reserves the right to claim ownership over any materials removed from the site, including earthwork. The materials claimed by the Owner shall be stockpiled on the site as directed.

1.06 SUBMITTALS

A. The Contractor shall submit disposal site certification and haul routes for all disposals.

B. The Contractor shall submit to the Owner and Engineer a schedule of removal and disposal.

1.07 PROJECT CONDITIONS

A. Existing Utilities: Do not interrupt utilities serving facilities occupied by Owner or others unless permitted in writing by Owner and then only after arranging to provide temporary utility services according to requirements indicated:
   1. Notify Owner and Engineer not less than two weeks in advance of proposed utility interruptions in writing. Renotify in writing 72 hours in advance of proposed utility interruptions.
   2. Do not proceed with utility interruptions without Owner’s written permission.
   3. Underground utilities are approximate, compiled from GPR survey information and visible aboveground features. Prior to commencing excavation, the Contractor shall contact “Dig Safe” at 1-888-Dig Safe to verify locations of existing underground utilities in areas of proposed excavation.

B. The Contractor is responsible to schedule the work and determine any required temporary utility lines and connections required to keep the existing facilities in operation. The cost to furnish and install temporary utility lines and connections shall be included in the Contactor’s base bid.

C. Demolish and completely remove from site existing underground utilities indicated to be removed. Coordinate with the utility companies to shut off services if lines are active.

D. Contractor shall coordinate with Owner to verify that suspected electric duct bank in project area is inactive. Remove and dispose duct bank within project area once it is confirmed to be inactive.

E. Contractor shall not operate existing water gate valves. Only Owner’s designated personnel are authorized to operate valves and hydrants.

F. All abandoned underground utilities shall be designated on as-built drawings by the Contractor of record and provided to the Owner and Engineer in AutoCAD electronic format prior to completion of the project. All as-built drawings, (underground and above ground) shall be

dimensioned from permanent benchmarks such as existing buildings and include depths at various points throughout the extent of the work, and invert elevations at all structures.

G. Do not commence site operations until temporary erosion and sedimentation control measures are in place.

H. Removal of all asbestos piping or structures, if found, shall be in accordance with Subsection 201.03.8 of the State Standard Specifications.

PART 2 PRODUCTS

2.01 GENERAL

A. The Contractor shall provide all materials and equipment in suitable and adequate quantity as required to accomplish the work shown and specified.

PART 3 EXECUTION

3.01 PREPARATION

A. Protect and maintain benchmarks and survey control points from disturbance during construction. The Contractor shall employ a Professional Land Surveyor registered in the State of Rhode Island to perform a benchmark and field verification survey prior to commencing work. The Contractor is responsible to provide horizontal and vertical layout of all proposed work.

B. Locate and clearly flag trees and vegetation to remain. Review trees with Owner and Engineer prior to removal.

C. Protect existing site improvements to remain from damage during construction.

D. Restore damaged improvements to their original condition, as acceptable to Owner.

3.02 REMOVE AND DISPOSE CONCRETE WALKS

A. Perform in accordance with Subsections 201.03.7, and 201.03.10 of the State Standard Specifications.

3.03 REMOVE AND DISPOSE CONCRETE WALKS IN SENSITIVE TREE AREAS

A. This work shall include removing concrete sidewalks from areas where sensitive tree roots are located below the sidewalk. Contractor shall coordinate with Owner and Owner's designated representative to identify areas of sensitive tree areas. All work shall be performed under direct on-site supervision of the Owner and Engineer.

B. Removal of concrete shall be accomplished by using hand tools and light power equipment. Pavement breakers and large backhoes shall not be used for this operation in sensitive tree areas.

C. Remove sidewalk material taking special care not to damage underlying tree roots. The root system may be located directly below the sidewalk in some areas. The Engineer must be present during the sidewalk removal. The existing gravel sub-base will be left in place.

D. Remove and dispose all debris immediately from the job site. No stockpiling of removed material will be allowed around the root zone of any tree.

E. Tree roots that are exposed during this work will not be allowed to remain uncovered for more than one (1) hour. Loam borrow will be placed over the tree roots until the stone dust and/or sidewalk is installed. The roots shall be kept moist, and not allowed to dry out. Water shall be provided by the Contractor until the actual surface is placed within the sidewalk area. Heavy equipment shall not be permitted to traverse the remaining root system.

3.04 REMOVE AND DISPOSE MASONRY WALL

A. The Contractor shall sawcut and selectively removal a portion of the masonry wall, as shown on the Drawings. Remove and dispose concrete and stone wall remnants in accordance with local and State requirements.

3.5 DISPOSAL

A. Disposal: Remove surplus soil material, obstructions, demolished materials, and waste materials including trash and debris, and legally dispose of them offsite.

B. Any potentially contaminated soil material encountered, as specified by the State of Rhode Island Department of Environmental Management rules and regulations, shall be legally disposed of offsite. Refer to Section 02200 - Earthwork.

C. Separate recyclable materials produced during site clearing from other non-recyclable materials. Store or stockpile without intermixing with other materials and transport them to recycling facilities.

3.6 REMOVE AND DISPOSE UNSUITABLE ON-SITE MATERIALS

A. Remove and dispose of off-site, on-site earthen materials, loam, and stone materials deemed unacceptable for reuse. Refer to Section 02200 – Earthwork.

3.7 REMOVE AND STOCKPILE ON-SITE MATERIALS

A. Remove and stockpile on-site earthen materials from excavation for later reuse.

B. Materials shall be segregated by material type so as to not be mixed or require further segregation.

C. The suitability of the existing material for later reuse shall be determined by the Engineer or Owner. No material shall be disposed of offsite without the approval of the Engineer or Owner. Suitable soil material shall be used for backfilling, filling, or regrading operations or any other use as determined by the Engineer or Owner. All suitable soil material that is temporarily stockpiled on-site shall be protected from adverse weather conditions until the time of installation.

3.8 CLEANING AND MAINTENANCE OF STORM DRAIN SYSTEM

A. The Contractor shall remove sediment and debris from existing drainage systems prior to commencing work.

B. Contractor shall be responsible to clean sediment and debris from existing and recently installed drainage system components during construction.

C. Prior to project completion the complete drainage system shall be cleaned of all debris and sediment.

3.9 CLEARING AND GRUBBING

A. Remove obstructions, trees, shrubs, and other vegetation to permit installation of new construction.

1. Only remove trees, shrubs, and other vegetation indicated for removal and disposal.
2. Grind down stumps and remove roots, obstructions, and debris.
3. Use only hand methods for grubbing within protection zones.
4. Chip removed tree branches and dispose of offsite.

B. Fill depressions caused by clearing and grubbing operations with satisfactory soil material unless further excavation or earthwork is indicated.

END OF SECTION

PART 1 GENERAL

1.01 SUMMARY

A. Section Includes:

1. Requirements for designing, furnishing, installing, maintaining, operating and removing 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 allow for work in the dry in excavations; 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. Minimum qualifications for the design, installation, and operation of dewatering systems are specified herein. Owner may waive any of these minimum qualifications at their sole discretion.

2. Submit the following:

a. Dewatering systems to be designed under the direct supervision of a Professional Engineer registered in the State of Rhode Island.
b. Complete the Certificate of Design at the end of this section.
c. Provide documentation demonstrating ability and experience of personnel installing and operating the system noting experience with the type of project conditions under this contract.
d. Identify supervisory personnel and their qualifications including past experience successfully operating dewatering systems similar to those anticipated for 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. A test hole was conducted at the site on April 7, 2023. The location of the test hole is shown on the drawings. Groundwater seepage was identified approximately 24 inches below grade. The test hole was advanced to 10 feet below grade without encountering refusal.

2. Groundwater surface is subject to fluctuations during periods of heavy precipitation.

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, pipelines, 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 1.04 of this section, made to accommodate field conditions.

3.03 MONITORING

A. Observe and record the elevation of the groundwater during the duration 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, when required, shall be made at no additional expense to the Owner.

C. Maintain the water level a minimum of two (2) feet below subgrade or at lower elevation to eliminate hydrostatic pressure on structures.

D. Prevent disturbance of foundation soils and loss of ground as water is removed.

E. Notify the Engineer of disturbance to the foundation soils caused by an interruption or inadequacy of the dewatering system.

F. Maintain auxiliary equipment on site 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 operation 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 install and completely construct all sheeting, bracing supports, trench boxes, and appurtenances required for temporary and permanent trench and excavation support necessary to perform 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 of Rhode Island, 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 design of Contractor's Engineer, 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. A test hole was performed at the project site on April 7, 2023, in the location shown on the Drawings. 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

2.01 MATERIALS

A. Timber Sheeting and Bracing:

1. Timber sheeting and bracing may be of any species of wood which will satisfactorily withstand all driving and construction stresses and the loads to which the members will be subjected. Sheeting shall not be less than 3 inches nominal thickness and shall be provided with continuous interlocks. All timber sheeting and bracing shall be free from wormholes, windshakes, loose knots, decayed or unsound portions or other defects which might impair its strength or tightness.

B. Steel Sheeting:

1. The shapes, sizes, and lengths of steel sheeting to be utilized are optional with the Contractor, providing they are satisfactory to withstand all driving and construction stresses and provided with continuous interlocks.

C. Bracing, Hardware, and Fastenings:

1. Bracing and other supports whether of steel or of timber, shall be of the strength and dimensions necessary to satisfactorily withstand the loads to which they will be subjected. All bracing and other supports shall be free from any defects which might impair this strength. The Contractor shall provide all hardware and fastenings in connections with satisfactory installation of all sheeting and bracing.

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 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)

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; excavation and trenching for installation of underground structures and utilities; protection of new work; rough grading; compaction, backfills, fills and subgrades; and excavation and backfilling of all other appurtenant work as required or as directed.

B. Excavating rock less than 1 cubic yard in volume is incidental to the work of this section and no separate payment will be made thereof.

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 02140 – Dewatering
Section 02160 – Excavation Support
Section 02211 – Rock Removal
Section 02630 – Storm Drainage Utilities
Section 02643 – Water Service Lines
Section 02900 – Landscaping

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. A test hole was conducted at the site on April 7, 2023 in the location depicted on the Drawings. The test hole was advanced to approximately 10 feet below grade and refusal was not encountered. Groundwater seepage was identified approximately two feet below grade. Additional subsurface conditions observed in the test hole are provided on the Drawings.

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. Contact Owner to locate private utilities on the site seventy-two (72) hours before commencing with any excavation.
3. 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.
4. Active utility lines damaged in the course of construction operations shall be repaired or replaced at no additional cost to the Owner.

1.08 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. Refer to Section 01300 – Submittals.

PART 2 PRODUCTS

2.01 MATERIALS

A. Common borrow, also referred to as borrow, common fill 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.

D. 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. Sand gravel fill shall be material free of rock or gravel larger than 1 – 1/2 inches in any dimension, debris, broken pavement, waste, frozen materials, vegetation, and other deleterious matter. Sand gravel fill shall conform to the gradation requirements:

U.S. Standard Sieve Size	Percent Passing by Weight
1 – 1/2"	70 – 100
3/4"	50 – 85
No. 4	30 – 55
No. 50	8 – 25
No. 100	0 – 8

G. Coarse sand bedding shall conform to the sand gravel fill gradations specified above, except 100% weight must pass the 1 – 1/2 inch sieve.

H. Gravel borrow subbase also referred to bank-run gravel 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

I. 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.

J. 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.

K. 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

L. Nonwoven Geotextile shall consist of non-woven geotextile/fabrics (Class 2): Provide nonwoven and needle punched pervious sheets of polyester, polyethylene, nylon, or polypropylene filaments formed into a uniform pattern conforming to AASHTO M288 Class 2 Non-Woven for Infiltration.

1. The geotextile shall have minimum properties as stated in the following table, when measured in accordance with the following referenced standards:

Mechanical Properties	Test Method	Unit	Min. Average Roll Value
Grab Tensile Strength	ASTM D 4632	lbs	160
Grab Tensile Elongation	ASTM D 4632	%	50
Trapezoid Tear Strength	ASTM D 4533	lbs	60
Mullen Burst Strength	ASTM D 3786	psi	305
Puncture Strength	ASTM D 4833	lbs	95
Apparent Opening Size (AOS)	ASTM D 4751	U.S. Sieve	70
Permittivity	ASTM D 4491	sec^{-1}	1.4
Flow Rate	ASTM D 4491	gal/min/ft	110
UV Resistance (at 500 hours)	ASTM D 4355	% strength retained	70

M. Geogrid

1. Geogrid for use within media filtration tank shall be manufactured from a punched polypropylene sheet, which is then oriented in three substantially equilateral directions

so that the resulting ribs shall have a high degree of molecular orientation, which continues at least in part through the mass of the integral node.

2. The geogrid shall have the following properties:
    a. Rib pitch: 1.3 inch (diagonal); 1.3 inch (longitudinal)
    b. Rib Shape: Rectangular
    c. Rib Pitch: Triangular
    d. Junction efficiency (%): 93
    e. Isotropic Stuffness Ratio: 0.6
    f. Radial stiffness at low strain (lb/ft @ 0.5% strain):13,708
3. The geogrid shall be Tensar Triax 130 or approved equal.

N. Biochar shall be a black charcoal material produced from plant matter, free of peat, unprocessed vegetable or organic matter, roots, sods, weeds, cobbles, stones, clay lumps and other debris. Biochar shall be produced through the process of pyrolysis, using biomass which shall yield the greatest percentage of phosphorus removed when in contact with stormwater. Biochar shall meet the gradation specified on the Drawings to promote infiltration. The Contractor shall submit sieve analysis as well as a sample for testing and shall be approved by the Engineer prior to placement.

O. Peastone shall meet the following gradation:

U.S. Standard Sieve Size	Percent Passing by Weight
1/2"	80-100
3/8"	60-75
No. 4	10-30
No. 8	0-10
No. 200	0 – 1

Soundness shall conform to the applicable requirements of Subsection M.01.11 of the State Standards

P. Common borrow is suitable for general filling to establish proposed grades except in areas where other materials are specified (i.e., gravel subbase beneath sidewalks). Common borrow shall be free of frozen materials, vegetation, roots, peat, muck or other unsuitable matter.

Q. Material needed for subgrades, pipe bedding, structural fill, and other specified uses shall be provided from off-site sources and shall meet the above gradation requirements.

R. 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.

2.02 MASONRY WALL

A. All stones shall be provided by the same quarry. Stone shall be standard grade, sound and uniform in quality, texture, and strength, and free of flaws, reeds, rifts, laminations, cracks, seams, starts, or other defects which may impair its strength, durability, or appearance. All exposed surfaces shall be free of chips, stains, spots, spalls, discoloration, and any other defects which would affect its appearance.

B. Contractor shall review stone with Owner prior to purchasing and commencing with reconstruction of the wall.

C. Mortar Materials: Mortar shall be composed of one part Portland cement and two parts sand, by volume with sufficient water to form workable, stiff mixture. Setting mortar bed shall conform to ASTM C 270 S except that latex polymer additive shall be mixed with the cementitious materials and aggregate in lieu of water.

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. No material shall be disposed offsite without Owner approval.

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 0.1 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. Refer to Section 02160, Excavation Support.

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. Rock excavation shall include the excavation, removal and disposal of all boulders, 1 cubic yard or more in volume. 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.

B. No blasting will be permitted. Excavate for and remove rock by mechanical means.

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.

F. Refer to Section 02211 – Rock Removal.

3.05 DEWATERING

A. Refer to Section 02140 – Dewatering.

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 and walkways shall be compacted to not less than 95 percent of the ASTM maximum dry density.

B. Subgrade of utility pipes and structures shall be compacted to not less than 95 percent of ASTM maximum dry density.

C. Backfill material shall be placed in lifts no greater than 6 inches and compacted to 95 percent of maximum dry density under slabs and footings.

D. All disturbed in-situ material shall be compacted to 95 percent of maximum density under slabs and footings. Maximum dry density of backfill and subgrade materials shall be determined by AASHTO T-180 Method A or D.

E. Compaction of other areas not subject to vehicle loading and not otherwise specified above shall be to 90 percent of the ASTM maximum dry density.

F. Density of soil in place shall be determined by AASHTO T-191 or by a nuclear moisture density gauge approved by Engineer. The method for oversize particles in soil compaction test results shall conform to AASHTO T-244-671.

G. 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 and backfill material proposed to be used by the Contractor for earthwork operations, and to perform field density tests.

H. 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.

I. 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.

J. 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.

K. 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.

L. 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.

M. 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 EXCAVATION OF UNSUITABLE MATERIALS

D. The Contractor shall notify the Owner and Engineer when excavations uncover potential unsuitable materials.

E. Excavation and disposal of Unsuitable Soils within the project limits shall be made in accordance with Section 01150, Measurement and Payment.

F. No excavation and disposal of Unsuitable Soils shall be performed beyond project limits unless directed by Owner in writing.

3.10 UNAUTHORIZED EXCAVATION

G. Fill unauthorized excavation under structures or footings by extending bottom elevation of concrete foundation or footing to excavation bottom, without altering top elevation. Lean concrete fill, with 28-day compressive strength of 2500 psi (17.2 MPa), may be used when approved by Engineer.

H. Concrete required to fill unauthorized excavation shall be furnished and installed at the expense of the Contractor.

3.11 STORAGE OF SOIL MATERIALS

A. Stockpile borrow soil materials and excavated satisfactory soil materials without intermixing. Place, grade, and shape stockpiles to drain surface water. Cover to prevent windblown dust.

1. Stockpile soil materials away from edge of excavations in locations approved by the Owner. Do not store within drip line of remaining trees.

3.12 MASONRY WALL RECONSTRUCTION

A. Stones shall be cleaned with fiber brushes and rinsed with water prior to setting. Be sure not to damage or stain the stone during the cleaning process.

B. Provide anchors, supports, fasteners, and other attachments shown, specified, or necessary to secure stonework in place in accordance with the best practices in the trade.

C. Dress joints (bed and vertical) straight and at 90-degree angle to face unless otherwise shown.

D. Joint width shall range in size from ¼ inch to ¾ inch with an average of 3/8 inch. Rake out joints to 1.5 inches deep to provide depth for the mortar pointing. All fieldstone face shall be cleaned after raking.

E. No petroleum-based fillers or sealant shall come into contact with the stonework.

F. Remove and replace stones that are broken, chipped, stained, or damaged. Remove and replace stone that does not match adjoining stonework as requested by the Owner's Representative. Provide new matching units and install as specified and point-up joints to

eliminate evidence of replacement.

G. All stone shall be cleaned thoroughly to remove stains, excess mortar, dirt and other discolorations or blemishes.

H. The Contractor shall obtain, from the installer, advice on the proper procedures required to protect the stonework from deterioration, discoloration, or damage during construction, and until acceptance of work. Contractor shall implement whatever procedures necessary to protect completed stonework from damage.

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 greater than 1 cubic yard.

B. Mechanical trench rock removal. Rock removal through means of blasting is not permitted on the Site.

1.02 RELATED WORK

A. Section 01300 – Submittals

B. Section 01400 – Quality Control Requirements

C. 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 12 inches beneath utility pipes and conduits and width as specified on contract drawings. Rock removal performed beyond these limits will not be measured for payment.

B. Unit prices for rock excavation include replacement with approved materials.

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 cubic yard for bulk footing, trench, or pit excavation that cannot be removed by rock excavating equipment equivalent to the following in size and performance ratings, without systematic drilling, ram hammering or ripping:

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 on the contract drawings and to not less than twleve (12) inches below the underside of pipes or 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 at least to 12 inches below invert elevation of pipe and at least 24 inches wider than pipe diameter. Contractor shall over excavate as necessary to prepare the trench for sheeting and/or shoring to make the trench OSHA complient. The Contractor shall include in their various bid prices all costs associated with necessary over excavation beyond trench pay limits due to Contractor's trench width requirements as established by their selected means and methods. Trench pay limits shall be as stipulated on the contract drawings and will be strictly enforced with respect to the calculation of quantities of rock eligible for payment. In no event shall over excavation be measured and paid for unless authorized by Owner or Engineer. Payment limits are further identified in Section 01150 – Measurement and Payment.

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 - Earthwork.

G. Contractor shall be required to provide adequate manpower and equipment to remove all rock provided for in the bid form in a timely manner. Failure to remove the quanity of rock as outlined in the bid form within the allowed contract time, shall not be considered as a reason for an extension in the contract time or contract price.

3.04 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

1.01 WORK INCLUDED

A. The work included for erosion control shall include but not necessarily be limited to:

1. Furnishing and installing compost filter tubes, turbidity barriers in water, 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.

1.02 RELATED SECTIONS

Section 02200 – Earthwork

1.03 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.

1.04 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.

B. Work shall conform to the Rhode Island Soil Erosion and Sediment Control Handbook and any conditions and stipulations in the freshwater wetlands permit issued by RIDEM for this project.

1.05 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

2.01 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.

2.02 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.

2.03 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.

2.04 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.

2.05 STABILIZED CONSTRUCTION ENTRANCE

A. The area of the construction entrance shall be cleared of all vegetation, roots, stumps, or other objectionable material. The area shall then be excavated to subgrade and graded. Filter fabric shall be placed on the prepared subgrade prior to the placement of the stone pad. The stone shall be placed according to the specified dimensions.

2.06 TREE PROTECTION DEVICE

A This work consists of applying wood framing around the trunk or trunks of the tree from the ground level to the height of 6 feet as indicated on the Plans or as directed by the Engineer, all in accordance with these Specifications.

2.07 TEMPORARY TURBIDITY BARRIER

A. Turbidity barrier shall consist of a flexible impermeable barrier which is supported by flotation devices and is tied off to a fixed structure on the shore. The barrier shall be anchored to the bottom of the pond no less than 36 inches from the limits of disturbance (LOD) to allow for changes in water level.

B. Turbidity barrier shall be suitable for moving water conditions so that storm flow entering the pond through the existing 48-inch outfall does not damage or displace it. Barrier shall be Type II Turbidity Curtain by Neptune Flotation, Abasco, or approved equal.

PART 3 - EXECUTION

3.01 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.

3.02 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.

3.03 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.

3.04 COMPOST FILTER TUBES

A. Compost filter tubes shall be installed and filled in accordance with project details and manufacturer's recommendations.

3.05 TURBIDITY CURTAIN

A. Turbidity curtain shall be positioned to meet the limits of disturbance on land.

3.06 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.

3.07 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 be disposed of at an appropriate facility of the Contractor's discretion. All loading, hauling, stockpiling, and disposal shall be performed by the Contractor at no additional expense to the Owner.

3.08 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. Refer to the Details sheets contained within the design drawings.

END OF SECTION

SECTION 02530 RESTORATION OF CURB, SIDEWALKS, AND VEGETATED AREAS

PART 1 – GENERAL

1.01 SUMMARY

A. Section Includes

1. Requirements for removal and replacement of concrete sidewalks.
2. Requirements for restoration of vegetated areas, plantings, and tree beds.
3. Requirements for construction of sidewalks in sensitive tree areas.
4. Restoration to include those areas designated by the Contract Drawings and those affected or damaged by the construction operations, outside the limits of Work.

B. Related Sections

1. Section 02200 – Earthwork
2. Section 02900 – Landscaping
3. Section 03100 – Concrete Formwork
4. Section 03200 – Concrete Reinforcement
5. Section 03300 – Cast-in-Place Concrete

1.02 REFERENCES

A. This specification makes reference to the requirements of additional specifications as listed. The Contractor shall obtain and familiarize himself with all requirements referenced by this specification prior to preparation and installation of any pavements.

1. 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"..

1.03 SUBMITTALS

A. The Contractor shall submit the following items,

1. Sieve analysis for aggregates and loams.
2. Mix designs for batched materials.
3. Certifications for landscape material.
4. Samples when requested by the Engineer.

1.04 COORDINATION WITH CITY FORESTER

A. The Contractor shall notify Owner and Engineer in advance of all work that may impact existing trees or tree roots. This includes any required tree trimming or root pruning or excavation of sidewalks or structures encumbered by tree roots, in order to perform the Work as detailed by the Contract Drawings. Contractor is made aware that tree trimming and root pruning along the project may require advanced coordination with the City and/or RIDOT.

1. Contractor shall minimize disturbance to trees during the performance of its work to the greatest extent possible.
2. The Contractor shall identify specific areas subject to possible tree trimming and root pruning for review. This shall be done at the start of the project so that consultation with City and RIDOT, if required, can be coordinated in advance to avoid delay.
3. Contractor is made aware that upon review, some locations identified by Contractor may be identified, and require handling, as a "Sensitive Tree Area".

PART 2 – PRODUCTS

2.01 MATERIALS

A. Gravel Borrow

1. In accordance with State of Rhode Island Standard Specification, Subsection M.01.02, meeting the gradation requirements of Table 1, Column 1, with 100% passing the 3-inch Square Mesh Sieves. Refer to Section 02200, Earthwork.

B. Cement Concrete

1. In accordance with the requirements of Section M.02 of the Standard Specifications.

C. Loam, Seed, Lime, Fertilizer, Mulch, and Water

1. In accordance with Section M.18 of the Standard Specifications. Refer to Section 02900, Landscaping.

2.02 SOURCE QUALITY CONTROL

A. The plants used by the Contractor for preparation of bituminous paving materials and cement concrete shall be acceptable to the Owner and Engineer who shall have the right to inspect the plant and the making of the material.

PART 3 – EXECUTION

3.01 INSTALLATION/RESTORATION

A. Excavation shall be in accordance with Section 02200, Earthwork unless noted otherwise by the referenced specifications below.

B. Sidewalks

1. Installation of new or replacing existing sidewalks, driveways, and wheelchair ramps at the locations shown on the Drawings or as directed by the Engineer shall be in accordance with Section 905 of the Standard Specifications.
2. Sidewalk panel dimensions for new and replacement to meet existing sidewalk layout to establish a walkway of uniform appearance.

3. Forms shall be used to establish straight lines to establish required width and to meet adjacent sidewalks. Forms shall be in accordance with Section 03100, Concrete Formwork.
4. Wire mesh shall be provided in accordance with project details and Section 03200, Concrete Reinforcement.
5. Expansion and control joints shall be provided in accordance with project details.

C. Vegetated Areas, Plantings, and Tree Beds

1. Restore all disturbed areas in accordance with Section 02900, Landscaping and the following Sections of the Standard Specifications:

    a. Loam in accordance with L.01;
    b. Seeding in accordance with L.02; and
    c. Plantings and Tree Beds in accordance with L.08.

D. Restoration Limits

1. Where the trench location is in a sidewalk, the entire width of the sidewalk shall be replaced with new material. Side forms shall be set so as to obtain and preserve a straight edge along both sides of the walk.
2. Sidewalks shall be cut at existing joints unless directed otherwise by the Engineer.
3. Where trench is in a driveway, the driveway shall be repaved across its entire width with even edges.

E. Restoration Outside Limits of Work

1. Sidewalks, driveways, parking lots and curbing that are damaged by the Contractor's operations shall be restored to a condition at least equal to that in which they are found immediately prior to the start of operations. Materials and methods used for such restoration shall be in conformance with the requirements of the Standard Specification.
2. There shall be no cost to the Owner for work required or performed outside the designated Limits of Disturbance (LOD) of the project.

END OF SECTION

PART 1 GENERAL

1.01 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.02 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".

B. AASHTO: America Association of State Highway and Transportation Officials

C. ASTM: American Society for Testing and Materials

D. AWWA: American Water Works Association

E. NSF: National Sanitation Foundation

1.03 RELATED WORK SPECIFIED ELSEWHERE

A. Section 02200 - Earthwork
Section 02631 – Proprietary Stormwater Treatment Systems

1.04 SUMMARY

A. This Section includes gravity-flow, non-pressure storm drainage, with the following components:
1. HDPE and PVC Pipe
2. Precast concrete drain manhole
3. ADS Drain Basins
4. Precast concrete treatment tanks
5. Gate Valves
6. Cast-in-place diversion doghouse manhole
7. Pipe Appurtenances

1.05 DEFINITIONS

A. PVC: Polyvinyl chloride plastic.

B. HDPE: High Density Polyethylene.

C. RCP: Reinforced Concrete Pipe

D. PE: Polyethylene

1.06 SUBMITTALS

A. The Contractor shall submit for approval, manufacturer's printed recommendations for the storage, protection, handling, installation and testing of stormwater piping, fittings and appurtenances, which shall be strictly adhered to by the Contractor.

B. Shop Drawings:
   1. Precast Concrete Manholes: Include plans, elevations, sections, details, and frames and covers.
   2. Cast In Place Diversion Doghouse Manhole: Include design calculations, and concrete design-mix report for cast-in-place manholes.
   3. Precast Concrete Treatment Tanks: The shop drawings submitted by the Manufacturer shall show the setting plans, exact dimensions of the structure, openings required, all inserts and other items which are to be embedded in the units, including:
      a. Attachments, type, size, and location of all reinforcing steel;
      b. Connection and anchoring methods;
      c. All other construction requirements necessary for the proper fitting of the contract work and for receiving the work of other trades;
      d. Details for joints between all precast concrete units and sections, to provide lateral load transfer and a watertight structure;
      e. A detailed listing of all material and installation techniques to be employed to assure watertight joints;
      f. Concrete compression test results for 28-day strength shall be submitted by the Manufacturer to the Contractors for forwarding to the Engineer.
   4. Gate Valves: Include plans, elevations, sections, and details.
   5. Pipe of all materials.
      a. Geotextiles: Include specifications on materials, dimensions, and physical characteristics.

C. Conformance Certificate: Each shipment of castings and concrete manholes and catch basins shall be accompanied with the manufacturer's notarized certification and cylinder testing results those materials meet specified requirements.

D. Record Drawings: All installed underground utilities shall be designated on as-built drawings by the Contractor and provided to the Owner and Engineer in AutoCad electronic format prior to contract closeout. All as-built drawings, (underground and above ground) shall be dimensioned from permanent benchmarks and include depths at various points throughout the extent of the work, including invert elevations at all structures. Refer to Section 01300 – Submittals.

1.07 DELIVERY, STORAGE, AND HANDLING

A. Protect pipe, pipe fittings, and seals from dirt and damage.

B. Handle manholes according to manufacturer's written rigging instructions.

C. Use only nylon-protected slings to handle pipe. The use of hooks or bare cables will not be permitted.

D. Avoid damage to castings from impact, abrasion, or corrosion during handling and storage.

E. Do not store HDPE and PVC piping and fittings in sunlight for extended periods of time. Store pipe in accordance with manufacturer's recommendations.

F. Ship rubber gaskets in cartons and store in a clean area away from grease, oil, ozone producing electric motors, heat and the direct rays of the sun.

G. 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.

H. In case of damage, immediately make all repairs and replacements necessary to the approval of the Engineer at the Contractor's expense.

I. Pipe, pipe fittings, and other associated appurtenances damaged during delivery, handling, or storage shall be replaced at no additional cost to the Owner.

1.08 PROJECT CONDITIONS

A. The Contractor shall provide means of stormwater management during construction to control runoff and protect downstream areas from damage resulting from stormwater runoff, including maintaining stormwater flow into Roosevelt Pond.

B. The Contractor is responsible for any damage resulting from stormwater runoff during construction, including damage from flooding.

1.09 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 the 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. Precast concrete treatment tanks:

1. All precast concrete units shall be stored, handled, protected, and installed by the Manufacturer and/or Contractor in accordance with the printed recommendations of the manufacturer and in a manner to prevent overstressing, marring, or damaging of all precast structures.

2. The work shall be performed by workers experienced in this type of work.

3. Installation by the Contractor shall be true to the lines and grades indicated on the Drawings.

4. In addition to all other requirements specified, all precast concrete shall be adequately designed and fabricated by the Manufacturer to:

a. Safely withstand all handling stresses without damage.

b. Adequately and safely support all loads imposed by the work of other trades which might affect construction.
c. Adequately and safely support all loads expected during the lifetime of the structure including but not limited to maintenance equipment.

PART 2 PRODUCTS

2.01 HIGH-DENSITY POLYETHYLENE (HDPE) PIPE AND FITTINGS

A. High-Density Polyethylene (HDPE) pipe and fittings shall be ADS N-12 IB ST Smooth Interior Pipe, ADS N-12 IB ST High Capacity Large Diameter Pipe or approved equivalent. Joints shall be soil-tight and include a rubber gasket on the spigot end of the pipe. When installed into the bell end, the joint shall be sealed.

B. Pipe shall conform to AASHTO M294 (Type 'S') for the specified diameters and strength classes.

C. Pipe shall be rated to withstand H-20 Loading Criteria with 18" of cover.

2.02 PVC PIPE AND FITTINGS

A. PVC pipe shall be DR 18 and shall conform to AWWA C900, latest revision, and shall have push-on type joints, except at fittings which shall be mechanical joints.

B. PVC pipe shall be manufactured from quality PVC resin, compounded to provide physical and mechanical properties that equal or exceed cell class 12454 as defined in ASTM D1784.

C. Gaskets shall meet ASTM F477 and joints shall be in compliance with ASTM D3139.

D. PVC pipe shall be Cast Iron Overall Diameter and shall be designed for connection with ductile iron pipe sizes.

E. PVC pipe shall be rated for use at a pressure class of 235 psi.

2.03 POLYPROPYLENE MONITORING PORT

A. Polypropylene Basin bodies shall be made from an impact modified copolymer polypropylene meeting the material requirements of ASTM F2764. The joint tightness shall conform to ASTM D3212 for joints for drain and sewer plastic pipe using flexible elastomeric seals. The flexible elastomeric seals used for the polyethylene cone and pipe connections to the structure shall conform to ASTM F477.

B. The reducing plate, covers, grates and frames furnished for all Polypropylene Basins shall be ductile iron. Ductile iron castings used shall conform to ASTM A536 grade 70-50-05 for ductile iron and shall be painted black.

2.04 PRECAST CONCRETE MANHOLE MATERIALS

A. Cement shall be Portland cement conforming to ASTM 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, and a minimum unit weight of not less than one hundred forty-eight (148) pounds.

C. Water: shall be clear and free of injurious and deleterious substances.

D. Concrete: shall have a minimum strength of 5000 psi at twenty-eight (28) days and a strength of 3000 psi at the time of form release.

E. During the process of manufacturing of the units not less than two (2) test cylinders shall be tested at time release of the form and two (2) at age twenty-eight (28) days.

F. All compression test cylinders shall be made, cured and stored in accordance with ASTM C31. Cylinders shall be tested in accordance with ASTM C39.

G. All concrete shall be air entrained as specified per RIDOT Standard Specifications.

H. Admixtures shall only be used after prior approval of the Engineer.

I. All reinforcing bars shall conform to the requirements of ASTM designation: A615, Grade 60.

J. Welded wire fabric shall conform to the requirements of ASTM designation: A185.

2.05 PRECAST CONCRETE MANHOLES

A. Precast Concrete Manhole sections shall be equal to that shown on the drawings and shall conform to ASTM Specifications C-478 and C-76 Class IV Wall “B”. The horizontal joints between sections shall be sealed using a flexible butyl resin sealant and shall conform to ASTM C-990. In addition, the horizontal joints on the inside and outside of the manhole and catch basin shall be sealed with a “Quick Plug” as manufactured by Parson or approved equal.

B. Brick shall conform to ASTM Specification C-32, except that the table therein is amended to provide that the required minimum compressive strength in pounds per square inch shall be for any individual brick 3,000 or 5,000 for the average of five bricks selected at random. The maximum absorption of water by five-hour boiling test shall not exceed 16% for any individual brick or 12% for the average of any five bricks selected at random.

C. Unless otherwise noted on the Drawings, manholes less than fifteen (15) feet deep shall have an interior diameter of 48 inches. Manholes fifteen (15) feet and deeper shall have an interior diameter of 60 inches unless otherwise noted. Manholes with an interior diameter of 72 inches shall be utilized where indicated on the Drawings. All catch basins shall have an interior diameter of 48 inches unless specified otherwise.

D. Openings for pipe insertions shall be round and shall be precast or cored only. The diameter of the opening shall be adequate to install a rubber boot seal. The cored or precast opening shall maintain a minimum undisturbed distance of 6” from manhole section joints. Flexible rubber boot shall be neoprene with stainless steel clamps and bands.

E. Weirs for diversion manholes may be constructed with concrete block joined with mortar or cast into the structure. Contractor shall form each weir as depicted on the plans. Provide a watertight seal with no gaps between weir wall and structure wall. Weirs shall be connected to structure wall using epoxy coated steel rebar reinforcement.

2.06 MANHOLE FRAMES AND COVERS

A. Manhole Frames and Covers shall be cast iron and conform 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. 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.

C. Mortar shall consist of one part cement and two parts clean sand. No lime shall be used.

D. Covers shall have a non-slip surface and shall have the word “DRAIN”, inscribed.

E. 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 grade of frame and cover. One half inch of cement mortar plaster cast shall be applied to exterior of red clay bricks.

2.06 ALUMINUM ACCESS HATCH

A. Furnish and install where indicated on plans vault access door Type JD-AL-H20, size 30” W x 48” L. Length denotes hinge sides. The floor access door shall be double leaf and pre-assembled from the manufacturer.

B. Performance characteristics:
   1. Operation of the covers shall be smooth and easy with controlled operation throughout the entire arc of opening and closing.
   2. Operation of the covers shall not be affected by temperature.
   3. Entire door, including all hardware components, shall be highly corrosion resistant.

C. Covers: Shall be 1/4” aluminum diamond pattern tread plate reinforced for H-20 wheel loading.

D. Frame: Channel frame shall be extruded aluminum with bend down anchor tabs around the perimeter.

E. Hinges: Shall be specifically designed for horizontal installation and shall be through bolted to covers with tamperproof Type 316 stainless steel lock bolts and shall be through bolted to the frame with Type 316 stainless steel bolts and locknuts.

F. Latch: Type 316 stainless steel slam lock with fixed interior handle and removal exterior turn/lift handle.

G. Drain Coupling: Provide a 1-1/2” drain coupling located in the right front corner of the channel frame.

H. Lifting mechanisms: Manufacturer shall provide the required number and size of compression spring operators enclosed in telescopic tubes to provide, smooth, easy, and controlled cover operation throughout the entire arc of opening and to act as a check in retarding downward motion of the covers when closing. The upper tube shall be the outer tube to prevent accumulation of

moisture, grit, and debris inside the lower tube assembly. The lower tube shall interlock with a flanged support shoe fastened to a formed 1/4" gusset support plate.

I. A removable exterior turn/lift handle with a spring loaded ball detent shall be provided to open the cover and the latch release shall be protected by a flush, gasketed, removable screw plug.

J. Hardware:

1. Hinges: Heavy forged Type 316 stainless steel hinges, each having a minimum 1/4" diameter Type 316 stainless steel pin, shall be provided and shall pivot so the covers do not protrude into the channel frame.
2. Covers shall be equipped with a hold open arm which automatically locks each cover in the open position.
3. Covers shall be fitted with the required number and size of compression spring operators. Springs and spring tubes shall be Type 316 stainless steel.
4. A Type 316 stainless steel snap lock with fixed handle shall be mounted on the underside of one cover.
5. Hardware: Shall be Type 316 stainless steel throughout.

K. Finishes: Factory finish shall be mill finish aluminum with bituminous coating applied to the exterior of the frame.

L. Manufacturer shall be The BILCO Company, P.O. Box 1203, New Haven, CT 06505, 1-800-366-6530, Fax: 1-203-535-1582, Web: www.bilco.com, or approved equal.

2.07 GEOTEXTILES

A. Refer to Section 02200 - Earthwork for requirements regarding geotextile filter fabrics and geotextile drainage net materials.

2.08 FLEXIBLE PIPE COUPLINGS

A. Flexible Couplings: Elastomeric sleeve with stainless-steel shear ring and corrosion-resistant-metal tension band and tightening mechanism on each end as manufactured by Fernco Inc. or approved equivalent.

2.09 PRECAST CONCRETE TREATMENT TANKS

A. Cement shall be Portland cement conforming to the requirements of ACI 350, Chapter 3, Section 3.1.2 - Sulfate Resistant Cement.

A. Aggregate shall conform to the requirements of ACI 350, Chapter 3, Section 3.4.1 - Aggregates for Watertight, Chemical Resistant Concrete.

B. Water shall be clean and free of injurious and deleterious substances.

C. Concrete shall have a minimum strength of 5,000 psi at 28 days and strength of 3,000 psi at time of form release unless otherwise specified.
1. During the process of manufacturing of all precast structures, 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 5-9 percent air entrainment.

D. Admixtures shall only be used after prior approval of the Engineer.

E. All reinforcing bars shall conform to the requirements of AASHTO M 31, Grade 60. All reinforcing bars shall be galvanized in accordance with ASTM A 767.

F. Welded wire fabric shall conform to the requirements of ASTM A185. Welded wire fabric shall be galvanized, plain, fabricated from galvanized-steel wire into flat sheets.

G. All joint sealants shall be butyl rubber, per ASTM C-990 and AASHTO M-198.

H. All joint fillers shall be performed non-expansive, non-extruding type and appropriate for the intended use.

I. All concrete shall be coated with approved waterproofing at the place of manufacture.

J. All anchors and lifting hooks engineered in concrete shall be hot dip galvanized.

2.10 IDENTIFICATION

K. Underground-type line markers for non-metallic pipelines: manufacturer's standard permanent detection tape, bright-colored, continuous printed polyethylene tape with a metallic core for each detection of non-metallic underground installations, intended for direct-burial service; not less than 6" wide x 4 mils thick. Provide green detection tape with black printing reading "Caution Drain Line Buried Below" as manufactured by Seton or approved equivalent.

2.11 INLINE CHECK VALVE

A. Check valve is to be all rubber and the flow operated check type with slip-in cuff connection. The entire valve shall be ply reinforced throughout the body, saddle and bill, which is cured and vulcanized into a one-piece unibody construction. A separate valve body or pipe used as the housing is not acceptable. The valve shall be manufactured with no metal, mechanical hinges or fasteners, which would be used to secure any component of the valve to a valve housing. The port area of the saddle shall contour into a circumferential sealing area (the “bill”) that is concentric with the pipe which shall allow passage of flow in one direction while preventing reverse flow. The entire valve shall fit within the pipe inside diameter. The saddle area of the valve must be flat, not conical, and integral with the rubber body above centerline in order to not produce any areas or voids that can collect or trap debris. The valve must be easily installed in pipes with poor end condition without the need to modify or utilize the headwall or structure to seal and anchor the valve. Once installed, the valve shall not protrude beyond the face of the structure or end of the pipe.

B. The valve shall incorporate multiple concave grooves molded integrally into the flat saddle wall thickness extending longitudinally a minimum of 80% of the length of the saddle to reduce opening resistance and reduce headloss.

C. The valve shall incorporate a custom shaped notch in the end of the bill to reduce cracking pressure. The notch shall be at the invert/bottom of the bill and symmetrical about the valve centerline. The longitudinal length of the notch shall be no greater than half the length of the bill.

D. The outside diameter of the upstream and downstream sections of the valve must be circumferentially in contact with the inside diameter of the pipe.

E. Slip-in style valves shall be furnished with a set of stainless steel expansion clamps. The clamps, which will secure the valve in place, shall be installed in the upstream or downstream cuff of the valve, depending on installation orientation, and shall expand outwards by means of a turnbuckle. Each band shall be pre-drilled allowing for the valve to be pinned and secured into position in accordance with the manufacturer's installation instructions.

F. Manufacturer must have flow test data from an accredited hydraulics laboratory to confirm pressure drop and hydraulic data.

G. Company name, plant location, valve size patent number, and serial number shall be bonded to the check valve.

H. Inline Check Valve shall be CheckMate Ultraflex Valve manufactured by Tideflex Technologies, or approved equal.

2.12 PVC BUTTEFLY VALVE

A. PVC Butterfly valve shall be ASAHI/AMERICA Type 57, gear operated with 2" square nut on the stem, or approved equivalent.

B. Provide stem extensions as required and telescoping cast iron valve box.

PART 3 EXECUTION

3.01 EARTHWORK

A. Excavating, trenching, and backfilling are specified in Section 02200 - Earthwork.

3.02 PIPING INSTALLATION

A. Use only nylon-protected slings to handle pipe. The use of hooks or bare cables will not be permitted.

B. HDPE Piping: No machinery shall directly contact the HDPE pipe to push the pipe into place. Installation stub to be used when pushing into place either by hand or via machinery. A board to shield the installation stub shall be used in all instances. pipe damaged while being pushed into place or while being laid in the trench shall be removed from the site and replaced at the expense of the Contractor.

C. Pipe shall be inspected before any backfill is placed. Any pipe determined by the Engineer to be out of alignment, unduly settled, or damaged shall be taken up and re-laid or replaced at no additional cost to Owner.

D. General Locations and Arrangements: Drawing plans and details indicate location and arrangement of underground storm drainage piping. Install piping as indicated, following piping manufacturer's written instructions.

E. Install piping beginning at low point, true to grades and alignment indicated with unbroken continuity of invert. Place bell ends of piping facing upstream. Install gaskets, seals, sleeves, and

couplings according to manufacturer's written instructions for use of lubricants, cements, and other installation requirements.

F. If an underground conflict is identified during pipe installation, the Contractor shall stop work, contact the Engineer, and await direction.

G. Install piping to the lines and grades specified on the Drawings.

H. Install HDPE piping according to ASTM D 2321 and manufacturer's recommendations.

3.03 MANHOLE INSTALLATION

A. Excavation and backfilling requirements for installation of precast concrete manholes shall be in accordance with the requirements as specified in Section 02200, Earthwork.

B. Manhole sections shall be set so as to be vertical and in true alignment.

C. Where required for future connections, openings shall be cast in the manholes at the proper location and shall be sealed with watertight brick bulkheads or plugs.

D. The inverts of manholes shall be constructed of brick and mortar and formed to the details shown on the Drawings. Inverts shall have a smooth flow line and an even curve in accordance with the Drawings.

E. Joints: Pipe joints into manholes shall be constructed in accordance with the details shown on the Drawings. Complete details of the boot manufacture and installation shall be submitted for approval. All areas around pipes passing through walls of manholes shall be completely filled with waterproof cement mortar to tightly fill any space through which water can pass. All manhole joints between sections shall be sealed with 1" diameter Butyl rubber sealant with hydraulic cement and coated with bitumastic sealant on the exterior.

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" 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. Damp-proofing: All exterior surfaces of manholes shall receive at least one coat of asphalt damp-proofing.

3.04 POLYPROPYLENE BASIN INSTALLATION

A. The maximum burial depth of the Polypropylene Basin is 15' with the use of Class I compacted material as defined in ASTM D234.

B. Excavate Polypropylene Basin location to the depth required and provide a stone base. Stone base shall be a minimum of 6 inches. Set Polypropylene Basin in place and level.

C. Connect storm pipe into Polypropylene Basin. Re-check Polypropylene Basin depth, level and position. The backfill material shall be crushed stone meeting the requirements of Class I material

as defined in ASTM D2321. Bedding and backfill shall be well placed and compacted uniformly in accordance with ASTM D2321.

D. The frame and grate/cover must be fully supported by a reinforced concrete collar. The concrete collar must extend no less than 18" from the edge of the frame in all directions. The collar must bear on the surrounding stone and soil backfill and not on the structure.

3.05 PRECAST CONCRETE TREATMENT TANK INSTALLATION

A. Preparation:

1. All precast structures shall be installed true to line and grade, and in the proper sequence as outlined on the approved shop drawings.
2. To avoid damage and stress concentration, lifting devices shall be designed by the Manufacturer for 100 percent impact loading and shall be sufficiently ductile to insure obvious deformation before failure.

B. Installation:

1. All precast structures shall be set on clean and properly prepared bearing surfaces, free from any conditions that would interfere with the proper setting of each structure.
2. All anchoring and fastening devices shall be provided by the Manufacturer for the proper and satisfactory installation of each structure.
3. Anchoring and fastening devices to be embedded in other work shall be built-in as the work progresses.
4. No defects that might adversely affect the serviceability of each structure shall be used in the work. Any precast structure found defective shall be removed from the site and shall be replaced by the Manufacturer with a new and sound structure at no additional expense to the Owner.

C. Installation Tolerances:

1. 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.

D. Patching:

1. Where patching is permitted by the Owner and Engineer, 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.
2. Patching of imperfections at the plant shall require the Owner's approval before the unit is shipped from the manufacturer's plant.

E. Curing:

1. All precast concrete structures 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.

3.06 ALUMINUM ACCESS HATCH

A. Install products in strict accordance with manufacturer's instructions and approved submittals. Locate units level, plumb, and in proper alignment with adjacent work.
   1. Test units for proper function and adjust until proper operation is achieved.
   2. Repair finishes damaged during installation.
   3. Restore finishes so no evidence remains of corrective work.

3.07 INLINE CHECK VALVE INSTALLATION

A. Valve shall be installed in accordance with manufacturer’s written Installation and Operation Manual and approved submittals.

3.08 IDENTIFICATION

A. Materials and their installation are specified in Section 02200 - Earthwork. Arrange for installation of green warning tape directly over piping and at outside edge of underground structures.

3.09 FIELD QUALITY CONTROL

A. Inspect interior of piping to determine whether line displacement or other damage has occurred. Inspect after approximately 24 inches of backfill is in place, and again at completion of Project.

1. Defects requiring correction include the following:
   i. Alignment: Less than full diameter of inside of pipe is visible between structures.
   ii. Deflection: Flexible piping with deflection that prevents passage of ball or cylinder of size not less than 92.5 percent of piping diameter.
   iii. Crushed, broken, cracked, or otherwise damaged piping.
   iv. Infiltration: Water leakage into piping.
   v. Exfiltration: Water leakage from or around piping.
2. The Contractor shall, at his own expense, replace defective piping using new materials, and repeat inspections until defects are within allowances specified.
3. The Contractor shall repair any defects or corrections required by the Engineer.

3.10 CLEANING

A. The Contractor shall clean interior of piping and structures of dirt, debris, and superfluous materials prior to commencing work, during construction and prior to acceptance of stormwater drainage system.

B. The Contractor shall also clean downstream portions of the stormwater conveyance system which recovered silt deposits from the construction activity.

END OF SECTION

PART 1 - GENERAL

1.01 WORK INCLUDED

A. The Contractor shall furnish and install the Proprietary Stormwater Treatment Systems, complete and operable as shown and as specified herein, in accordance with the requirements of the plans and contract documents. The Proprietary Stormwater Treatment system removes pollutants from stormwater runoff through the unit operations of sedimentation, floatation, and membrane filtration.

B. The proprietary stormwater treatment system used shall be The Jellyfish Filter, manufactured by Contech Engineered Solutions, or approved equal.

C. The proprietary stormwater treatment system shall include a spare set of membrane filter cartridges in addition to the quantity installed in the complete in-place system.

1.02 REFERENCES

A. American Society for Testing and Materials (ASTM) Reference Specifications:

1. ASTM C891: Standard Specification for Installation of Underground Precast Concrete Utility Structures
2. ASTM C478: Standard Specification for Precast Reinforced Concrete Manhole Sections
3. ASTM C858: Standard Specification of Underground Precast Concrete Utility Structures
4. ASTM C857: Standard Practice for Minimum Structural Design Loading for Underground Precast Concrete Utility Structures
5. ASTM C990: Standard Specification for Joints for Concrete Manholes Using Preformed Flexible Joint Sealants
6. ASTM D4101: Standard Specification for Copolymer steps construction
7. ASTM D4097: Standard Specification for Contact-Molded Glass-Fiber-Reinforced Thermoset Resin Corrosion-Resistant

1.03 RELATED WORK SPECIFIED ELSEWHERE

A. Section 02200 – Earthwork
B. Section 02630 – Storm Drainage Utilities
C. Section 03110 – Precast Concrete

1.04 QUALIFICATIONS

A. Manufacturer: Company specializing in manufacturing Products specified in this section with minimum five years of experience.

1.05 PERFORMANCE

A. The proprietary stormwater treatment system shall function to remove pollutants by the

following unit treatment processes; sedimentation, floatation, and membrane filtration.

B. The system shall remove oil, debris, trash, coarse and fine particulates, particulate-bound pollutants, metals and nutrients from stormwater during runoff events.

C. The system shall be designed for a flow rate of 2.94 cubic feet per second and shall utilize an external bypass to divert excessive flows.

D. The system shall treat 100% of the required water quality treatment flow based on a maximum design flux rate (surface loading rate) across the membrane filter cartridges not to exceed 0.21 gpm/ft^2 (gallon per minute per square foot).

E. At a minimum, the system shall have been field tested and verified with a minimum 25 qualifying storm events and field monitoring conducted according to the TARP Tier II or TAPE field test protocol, and have received NJCAT verification.

F. The system shall have demonstrated a minimum median TSS removal efficiency of 85% and a minimum median SSC removal efficiency of 95%.

G. The system shall have demonstrated the ability to capture fine particles as indicated by a minimum median removal efficiency of 75% for the particle fraction less than 25 microns, an effluent D_{50} of 15 microns or lower for all monitored storm events, and an effluent turbidity of 15 NTUs or lower

H. The system shall have demonstrated a minimum median Total Phosphorus removal of 55%, and a minimum median Total Nitrogen removal of 50%

I. The system shall have demonstrated a minimum median Total Zinc removal of 50%, and a minimum median Total Copper removal of 75%.

PART 2 - PRODUCTS

2.01 MATERIALS

A. PRECAST CONCRETE STRUCTURE

The device shall be an all-concrete structure (including risers), constructed from precast concrete riser and slab components or monolithic precast structure(s). Precast concrete vault shall be provided according to ASTM C857. Structure shall be installed to conform to ASTM C891 and to any required state highway, municipal or local specifications; whichever is more stringent. All precast concrete components shall be manufactured to a minimum live load of HS-20 truck loading or greater based on local regulatory specifications, unless otherwise modified or specified by the design engineer. Refer to Section 03110 – Precast Concrete.

B. GASKETS

Gaskets and/or sealants shall be used to seal between concrete joints. Joints shall be sealed with preformed joint sealing compound conforming to ASTM C990.

C. INTERNAL COMPONENTS

1. CARTRIDGE DECK

The deck insert shall be bolted and sealed inside the precast concrete chamber. The insert shall serve as: (a) a horizontal divider between the lower treatment zone and the upper treated effluent zone; (b) a deck for attachment of filter cartridges such that the membrane filter elements of each cartridge extend into the lower treatment zone; (c) a platform for maintenance workers to service the filter cartridges; (c) a conduit for conveyance of treated water to the effluent pipe.

In rectangular configurations, the aluminum cartridge deck shall be ¼" thick, 5052-H32 Aluminum with all welds to be 100% continuous waterproof weld using 5356 filler.

2. MEMBRANE FILITER CARTRIDGES

a. Filter cartridges shall be comprised of reusable cylindrical membrane filter elements connected to a perforated head plate. The number of membrane filter elements per cartridge shall be a minimum of eleven 2.75-inch or greater diameter elements. The length of each filter element shall be a minimum 15 inches. Each cartridge shall be fitted into the cartridge deck by insertion into a cartridge receptacle that is permanently mounted into the cartridge deck. Each cartridge shall be secured by a cartridge lid that is threaded onto the receptacle, or similar mechanism to secure the cartridge into the deck. The maximum treatment flow rate of a filter cartridge shall be controlled by an orifice in the cartridge lid, or on the individual cartridge itself, and based on a design flux rate (surface loading rate) determined by the maximum treatment flow rate per unit of filtration membrane surface area. The maximum design flux rate shall be 0.21 gpm/ft^2 .

Each membrane filter cartridge shall allow for manual installation and removal. Each filter cartridge shall contain no less than 7 ft^2 of surface area per inch of length and have filtration membrane surface area and dry installation weight as follows (if length of filter cartridge is between those listed below, the surface area and weight shall be proportionate to the next length shorter and next length longer as shown below):

Filter Cartridge Length (in)	Minimum Filtration Membrane Surface Area (ft^2)	Maximum Filter Cartridge Dry Weight (lbs)
15	106	10.0
27	190	14.5
40	282	19.5
54	381	25.0

b. As part of the project, an additional set of membrane filter cartridges shall be provided for future use (if selected by Owner as provided for in the Bid).

3. BACKWASHING MECHANISM

a. The filter device shall have a weir extending above the cartridge deck, or other mechanism, that encloses the high flow rate filter cartridges when placed in their respective cartridge receptacles within the cartridge deck. The weir, or other mechanism, shall collect a pool of filtered water during inflow events that backwashes the high flow rate cartridges when the inflow event subsides. All filter cartridges and membranes shall be reusable and allow for the use of filtration membrane rinsing procedures to restore flow capacity and sediment capacity; extending cartridge service life.

4. MAINTENANCE ACCESS

a. The filter device shall contain an opening(s) that provides maintenance access for removal of accumulated floatable pollutants and sediment, removal of and replacement of filter cartridges, cleaning of the sump, and rinsing of the deck. Access shall have a minimum clear height over all of the filter cartridges (length of cartridge + 6 inches), or be accessible by a hatch or other mechanism that provides vertical clear space over all of the filter cartridges such that the cartridges can be lifted straight vertically out of the receptacles and deck for the entire length of the cartridge.

5. BAFFLE

a. The filter device shall provide a baffle that extends from the underside of the cartridge deck to a minimum length equal to the length of the membrane filter elements. The baffle shall serve to protect the membrane filter elements from contamination by floatables and coarse sediment. The baffle shall be flexible and continuous in cylindrical configurations and shall be a straight concrete or aluminum wall in rectangular configurations.

6. SUMP

a. The device shall include a minimum 24 inches of sump below the bottom of the cartridges for sediment accumulation, unless otherwise specified.

7. STEPS

a. Steps shall be constructed according to ASTM D4101 of copolymer polypropylene, and be driven into preformed or pre-drilled holes after the concrete has cured, installed to conform to applicable sections of state, provincial and municipal building codes, highway, municipal or local specifications for the construction of such devices.

8. MANUFACTURERS

    a. Contech Engineered Solutions LLC.
    b. Approved equivalent.

9. BEND STRUCTURE

    a. The device shall be able to be used as a bend structure with minimum angles between inlet and outlet pipes of 90-degrees or less in the stormwater conveyance system.

10. FRAME AND COVER

    a. Frame and covers must be manufactured from cast-iron or other composite material tested to withstand H-20 or greater design loads. Frames and covers must be approved by the stormwater treatment system manufacturer.

11. TRENCH COVERS

    a. Trench covers shall meet designated loading requirements or at a minimum for incidental vehicular traffic.

PART 3 - EXECUTION

3.01 GENERAL

A. HANDLING AND STORAGE

1. Prevent damage to materials during storage and handling by following all recommendations provided by the manufacturer.

B. PRECAST CONCRETE STRUCTURE

1. The installation of the precast concrete device should conform to ASTM C891 and to any state highway, municipal or local specification for the installation of underground precast concrete structures, whichever is more stringent. Selected sections of a general specification that are applicable are summarized below. Refer to Section 03110 – Precast Concrete.

3.02 INSTALLATION OF PRECAST CONCRETE STRUCTURE

A. The precast concrete device is installed in sections in the following sequence:

- aggregate base
- base slab
- treatment chamber and cartridge deck riser section(s)

- bypass section
- connect inlet and outlet pipes
- concrete riser section(s) and/or transition slab (if required)
- maintenance riser section(s) (if required)
- frame and access cover

B. The precast base should be placed level at the specified grade on minimum 6 inches of crushed stone. Subsequent sections, complete with joint seals, should be installed in accordance with the manufacturer's recommendations.

C. Adjustment of the stormwater treatment filter can be performed by lifting the upper sections free of the excavated area, re-leveling the base, and re-installing the sections. Damaged sections and gaskets should be repaired or replaced as necessary to restore original condition and seals. Once the stormwater treatment filter has been constructed, any/all lift holes must be plugged with mortar or non-shrink grout. Any filters damaged during deliver handling, storage, or installation shall be replaced at no additional cost to the Owner

D. Inlet and outlet pipes should be securely set into the device using approved pipe seals (flexible boot connections, where applicable), and such that any pipe intrusion into the device does not impact the device functionality.

3.03 INSTALLATION OF TREATMENT SYSTEM

A. Filter cartridges shall be installed in the cartridge deck in accordance with the manufacturer's guidelines and recommendations. Contractor to contact the manufacturer to schedule cartridge delivery and review procedures/requirements to be completed to the device prior to installation of the cartridges and activation of the system.

B. Manufacturer shall coordinate delivery of filter cartridges and other internal components with Contractor. Filter cartridges shall be installed after site is stabilized and/or unit is isolated from construction influent and ready to accept cartridges. Unit is ready to accept cartridges after it has been cleaned out and any standing water, debris, and other materials have been removed. Contractor shall take appropriate action to protect the filter cartridge receptacles and filter cartridges from damage during construction, and in accordance with the manufacturer's recommendations and guidance. For systems with cartridges installed prior to full site stabilization, the contractor shall plug inlet and outlet pipes to prevent stormwater and other influent from entering the device. Plugs are to be removed once the site is stabilized and unit is ready to receive stormwater runoff.

C. Durability of membranes are subject to good handling practices during inspection and maintenance (removal, rinsing, and reinsertion) events, and site-specific conditions that may have heavier or lighter loading onto the cartridges, and pollutant variability that may impact the membrane structural integrity. Membrane maintenance and replacement shall be in accordance with the manufacturer's recommendations.

D. Inspection; which includes trash and floatables collection, sediment depth determination, and visible determination of backwash pool depth; shall be easily conducted from grade (outside the structure).

E. The filter device shall have a minimum 12 inches of sediment storage depth, and a minimum of 12 inches between the top of the sediment storage and bottom of the filter cartridge tentacles, unless otherwise specified by the design engineer. Variances may have an impact on the total performance and/or longevity between cartridge maintenance/replacement of the device.

F. Sediment removal from the filter treatment device shall be able to be conducted using a standard maintenance truck and vacuum apparatus, and a minimum one point of entry to the sump that is unobstructed by filter cartridges.

G. Maintenance access shall have a minimum clear height over all of the filter cartridges (length of cartridge + 6 inches), or be accessible by a hatch or other mechanism that provides vertical clear space over all of the filter cartridges such that the cartridges can be lifted straight vertically out of the receptacles and deck for the entire length of the cartridge.

H. After construction and installation, the device shall be inspected and cleaned as necessary based on the manufacturer's recommended inspection and maintenance guidelines and the local regulatory agency/body.

I. The manufacturer shall provide an Operation and Maintenance Manual to Owner and Engineer.

END OF SECTION

PART 1 GENERAL

1.01 DESCRIPTION

A. Work under this section includes furnishing, installing, testing, and disinfecting of all new water service, or water service branch connections, of the size and location shown on the Drawings and/or as may be required by the Owner.

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. The work of this Section shall conform to application standards of the American Water Works Association, latest revisions.

1.02 RELATED WORK SPECIFIED ELSEWHERE

A. Section 02100 – Site Preparation
B. Section 02200 – Earthwork
C. Section 02273 – Erosion Control

1.03 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" or "Standard Specifications".

B. American Society for Testing and Materials D3035 – Standard Specification for Polyethylene (PE) Plastic Pipe Based on Controlled Outside Diameter

C. American Water Works Association:

a. C800 – Underground Service Line Valves and Fittings

b. C901 – Polyethylene (PE) Pressure Pipe and Tubing, ¾ Inch Through 3 Inch, for Water Service.

1.04 QUALITY ASSURANCE

A. Shop Drawings: Contractor shall submit shop drawings and submittals for all material to be used for this item of work in accordance with Section 01300 - Submittals.

1.05 MANUFACTURER'S INFORMATION

A. Contractor shall furnish, at no additional expense to the Owner, detailed parts information, as well as operating, maintenance and installation procedures, as recommended by the manufacturer, for all units used for this specification. This information shall be submitted in duplicate to the Engineer, bound and indexed for each type of unit as herein specified.

PART 2 PRODUCTS

2.01 GENERAL

A. All materials required to be incorporated into the work shall be new, unused, and purchased specifically for this contract.
B. All materials shall be certified lead free. Contractor shall furnish certification to Engineer.

2.02 WATER SERVICE PIPING (TUBING)

A. PE Tubing

1. PE tubing shall be supplied in conformance with ASTM D3035, latest revision. Water service tubing shall be 1 inch in size unless otherwise specified.

2.03 FITTINGS

A. Fittings shall be PE 3408 and, where applicable, shall meet the requirements of AWWA C800. Molded fittings shall be manufactured in accordance with either ASTM D2683 (socket fused) or ASTM D3261 (butt fused) and shall be so marked.

2.04 CORPORATION STOPS AND FITTINGS

A. Corporation Stops:

1. The inlet thread shall be AWWA taper "cc" threads and conform to AWWA 800. The outlet thread shall conform to CTS and accessories required for a compression type connection. Design to withstand a minimum of 200-psi pressure.

2. Corporation stops shall be Mueller Style No. H-15008, or Ford Style No. FB1000, for ¾ inch and 1-inch sizes; and Mueller style H-15013 for 1-1/2 inch and 2-inch sizes, or approved equal. For the purposes of system standardization, no substitution will be allowed.

B. Fittings – Brass:

1. Compression Fitting: Materials shall meet standard AWWA C-800 for brass fittings. Fittings shall be designed to withstand a minimum of 200-psi pressure and shall be as manufactured by Mueller or Ford. For the purposes of system standardization, no substitution will be allowed. The fittings shall be either of the following:
   a. Mueller H 15403
   b. Ford A 44-34

2.05 CURB STOPS

A. Curb stop to meet the following requirements:

1. Valve to open left.
2. T-head which aligns with the port that provides a quick identification of valve position.
3. Valves shall be of bronze, meeting AWWA C-800.

4. Design of valve shall be for a minimum hydrostatic test pressure of 200-psi.
5. Curb stop shall be non-draining type.
6. Curb stops shall be Mueller Style No. H1504-2, or Ford Style No. B44-333, for ¾-inch and 1-inch sizes, or approved equal.

2.06 CURB BOXES

A. Curb boxes shall be 2½-inch "Erie" type. The construction shall provide adjustment for varying grade levels and provide allowance for settlement or frost heave. Extension range shall be 40” to 60”. The boxes shall completely cover the curb stop. "Water" shall be clearly cast on the cover and have a brass pentagonal bolt.

B. The box and cover shall be coated inside and out with a tar base enamel.

C. Provide a standard valve box cover in lieu of a curb box cover if placed in a paved area.

D. Curb box shall be Bingham & Taylor E-100/E-125 or approved equal.

2.07 GROUND HYDRANT

A. Shall be encased, non-freeze, flush with grade ground hydrant complete with galvanized steel casing, all bronze interior parts, bronze seat and replaceable seat washer, non-turning operating rod with free-floating compression closure valve with 1” connection. Plain bronze box and hinged scoriated cover with operating key lock and "WATER" cast on cover. Hydrant shall be equipped with a tapped ¼” drain port in valve housing.

B. Ground hydrant shall have minimum 4’-6” depth of bury.

C. Ground hydrant shall contain adapter vacuum breaker.

D. Hydrant must be opened one turn minimum to seal drain port during use.

E. Ground hydrant shall be Zurn Z1360-VB or approved equal.

PART 3 EXECUTION

3.01 GENERAL

1. All service pipe, valves, 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 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 shall be provided by the Contractor for the proper and satisfactory execution of the work.

4. All materials found to be defective during the progress of the work will be rejected by the Owner 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.

5. The Contractor shall be responsible for the safe storage and proper handling of all materials.

3.02 INSTALLATION OF WATER SERVICE LINES

A. Water service lines shall be installed in accordance with the Contract Documents. Contractor shall use conventional, open-trench cut method for construction.

B. All work shall be left open and remain unburied until inspected by Engineer. Contractor shall coordinate with Engineer to schedule inspection of completed work.

C. One continuous length of new PE tubing shall be installed for the service. The Contractor shall use the manufacturer's recommended installation procedures while performing the work. Care shall be taken to ensure a watertight connection.

D. Service pipe, 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. Service pipe, valves, and fittings shall be laid to the required lines and grades 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. Service pipe, valves, and fittings that have been disturbed after installation shall be taken up and reinstalled.

G. Care shall be exercised in the placing and laying of PE service tubing to be sure that the pipe (tubing) does not have kinks or sharp bends and to assure against it being in contact with sharp stones or ledge which would cause damage to the pipe. At least 12-inches of clean compacted sand shall be placed adjacent to, below and above the water service tubing and no stone shall be placed over the pipe until the depth of backfill above the latter is in excess of one foot.

H. All new water services shall have a minimum cover of four and one-half feet, as measured from finished grade; throughout the installation from the water main to the curb stop. New water services shall also have a maximum cover of eight feet measured from finished grade; throughout the installation from the water main to the curb stop. In the event that this minimum or maximum cover cannot be attained, the Contractor shall propose an alternative alignment for approval by the Engineer and Owner. In no event shall the Contractor install any service not meeting the above requirements without prior approval by the Owner and Engineer.

I. The interior of all pipe, valves, and fittings shall be thoroughly cleaned of foreign matter before being lowered into trench for installation. Open ends of pipes, valves, and fittings shall be securely closed so no foreign matter will enter.

J. Corporation stop shall be directly tapped into water main. New service tubing shall run directly from the corporation stop to the curb stop and yard hydrant. Corporation stop shall be installed as near horizontal as possible. Stops shall be tightened only sufficiently to give water tightness and care must be constantly exercised to not overtighten stops.

3.03 SETTING VALVES AND VALVE BOXES

A. Valves shall be set in the pipelines as directed. Blocking or use of supports of a permanent nature shall be placed under each valve to ensure against settlement. Concrete Anchoring for each valve shall be provided.

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 placed and the box cover set to the finished grade.

3.04 GROUND HYDRANT

A. Install ground hydrant with 1 cubic yard of crushed stone around drain opening.

B. Set ground hydrant with box flush with grade.

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.

B. This section includes furnishing and importing topsoil, scarification of subsoil to prepare for loaming, spreading and fine grading topsoil, seeding, and maintenance of seeded areas within the project guarantee period.

1.02 RELATED WORK SPECIFIED ELSEWHERE

A. Section 02200 – Earthwork
B. Section 02273 – Erosion Control

1.03 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" or "Standard Specifications".

B. American Society for Testing and Materials (ASTM) D5268 – Standard Specification for Topsoil Used for Landscaping and Construction Purposes.

1.04 QUALITY ASSURANCE

A. Submittals:

1. 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.

2. Submit grass seed mix, topsoil, and soil amendments for Engineer review in accordance with Section 01300 - Submittals.

1.05 PRODUCT HANDLING

A. Delivery and Storage:

1. Deliver all items to the site in their original containers with all labels intact and legible.

2. Immediately remove all materials which do not comply with specified requirements.

3. Use all means necessary to protect seed from moisture and other contaminants which may adversely effect proper germination.

4. Use all means necessary to protect fertilizers, amendments, and other materials from

moisture and other contaminants which may adversely effect their efficacy.

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. Topsoil shall be imported material meeting the following criteria:

a. Meeting ASTM D5268

b. pH in the range of 5.5 to 7

c. Minimum 4% organic material content

d. Free of stones 1 inch or larger in any dimension or other extraneous materials harmful to plant 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: Quality seed, free of noxious seed such as Russian or Canadian Thistle, European Bindweed, Johnson Grass or Leafy Spurge. Indicate supplier, lot number, net weight, percent weed seed content, and guaranteed percent purity and germination as follows:

Seed Type	Proportion by Weight	Percent Purity
Creeping Red Fescue	30	85
Kentucky Bluegrass	30	90
Perennial Ryegrass	40	90

Refer to RIDOT Standard Specifications for Road and Bridge Construction Section M18.10.4 Residential Seed Mix.

PART 3 EXECUTION

3.01 GRASS SEEDING

A. Apply seed between April 1 and May 31 or between August 15 and October 15, unless otherwise allowed by Engineer. Re-seed all newly filled or disturbed areas.

B. Topsoil - place and spread to a compacted thickness of not less than 4 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, and in a manner that will prevent washing and eroding.
2. Minimize or eliminate travel over areas that have received topsoil. Remove topsoil that has become compacted due to excessive construction activity.

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 seed 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

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. Rhode Island 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. 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. 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 Engineer 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 for the water storage reservoir and pre-cast concrete altitude valve vault; 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 precast 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. Rhode Island 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 GENERAL PROVISIONS

A. All of the Contract Documents, including General and Supplementary Conditions apply to the Work of this Section.

1.02 SCOPE

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.

1.03 REFERENCES

A. General: Where the language in any of the documents referred to herein be 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 (except as modified in this Specification Section for anchor rod placement).
2. ACI 211.2: Standard Practice for Selecting Proportions for Structural Lightweight Concrete
3. ACI 213: Guide for Structural Lightweight Aggregate Concrete
4. ACI 301: Specifications for Structural Concrete
5. ACI 302: Guide for Concrete Floor and Slab Construction
6. ACI 304R: Guide for Measuring, Mixing, Transporting and Placing Concrete.
7. ACI 305R: Hot Weather Concreting
8. ACI 306: Cold Weather Concreting
9. ACI 308: Standard Practice for Curing Concrete
10. ACI 309R: Guide for Consolidation of Concrete
11. 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 StrengthTest-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. C127 Standard test method for Density, Relative Density (Specific Gravity) and Absorption of Coarse Aggregate
6. C136 Sieve Analysis of Fine and Coarse Aggregate
7. C138 Unit Weight, Yield, and Air Content of Concrete
8. C143 Test for Slump of Portland Cement Concrete
9. C150 Specification for Portland Cement
10. C171 Sheet Materials for Curing Concrete
11. C172 Sampling Fresh Concrete

12. C173 Standard test Method for Air Content of Freshly Mixed Concrete by the Volumetric Method
13. C595 Standard Specifications for Portland Blast Furnace Slag Cement
14. C231 Test for Air Content of Freshly Mixed Concrete by the Pressure Method
15. C260 Specification for Air-Entraining Admixtures for Concrete
16. C309 Specification for Liquid Membrane Forming Compounds for Curing Concrete
17. C340 Standard Specifications for Portland-Pozzolan Cement
18. C494 Specification for Chemical Admixtures for Concrete
19. C618 Standard Specifications for Coal Fly Ash and Raw or Calcined Natural Pozzolan for Use in Concrete
20. C827 "Test Method for Change in Height at Early Ages of Cylindrical Specimens from Cementitious Mixtures
21. C845 Standard Specifications for Expansive Hydraulic Cement
22. C989 Specification for Ground Iron Blast-Furnace Slag for Use in Concrete and Mortars
23. C1017 Standard Specifications for Chemical Admixtures for Use in Producing flowing Concrete
24. C1064 Test Method for Temperature of Freshly Mixed Portland-Cement Concrete
25. C1107: Specification for Packaged Dry, hydraulic Cement Grout (Non-Shrink)
26. C1157 Standard Performance Specifications for Silica Fume in Cementitious Mixtures
27. C1240 Standard Specification for Silica Fume for Use in Hydraulic-Cement Concrete
28. D1751: Specification for Preformed Expansion Joint Fillers for Concrete Paving and Structural Construction (Nonextruding and Resilient Bituminous Types).
29. E154 Test Methods for Water Vapor Retarders Used in Contact with Earth Under Concrete Slabs, on Walls, or as Ground Cover

D. Federal Specifications (Fed. Spec.):

1. TT-S-00230: Sealing Compound: Elastomeric Type, Single Component (for Caulking, Sealing, and Glazing in Buildings and Other Structures)

1.03 DESIGN REQUIREMENTS

A. Codes: Building concrete shall be in conformance with the requirements of ACI 318, and the Rhode Island State Building Code.

B. Coordinate use of curing compounds with the floor coatings, sealers, and hardeners.

C. Air-entrain all exterior exposed concrete.

1.04 SUBMITTALS

A. Product Data: Submit design mix including color additives as applicable. Submit manufacturer's product data with application and installation instructions for proprietary materials and items, including reinforcement and forming accessories, synthetic fibers, admixtures, color additives, patching compounds, waterstops, joint systems, curing compound, and others as requested by the Engineer.

B. Shop Drawings: Submittals included in the Section shall be in accordance with the requirements specified. 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. 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 State of Rhode Island.

C. Samples: Submit samples of materials as specified, including names, sources and descriptions.

D. Laboratory Test Reports: Submit laboratory test reports for concrete, concrete materials, and mix design tests.

E. 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.

F. 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.

G. 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.

1.05 QUALITY ASSURANCE

A. Provide in accordance with the requirements as specified.

B. 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.

C. 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.

D. 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.

1.06 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

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.

D. Schedule delivery of colored concrete to provide consistent mix times from batching until discharge.

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. Fly Ash and Ground Granulated Blast-Furnace Slag: Fly Ash shall conform with ASTM C 618, Type F or C. Ground Granulated Blast-Furnace Slag shall conform with ASTM C 989, Grade 100 or 120. Products used shall be of the same type, brand, and

source throughout the Project. Limit percentage, by weight, of cementitious materials other than portland cement in concrete as follows:

1. Fly Ash: 25 percent.
2. Ground Granulated Blast-Furnace Slag: 50 percent.
3. Combined Fly Ash and Ground Granulated Blast-Furnace Slag: 50 percent portland cement minimum, with fly ash not exceeding 25 percent.

C. Normal Weight Aggregates: ASTM C 33, and as herein specified. Use ¾" maximum size for all concrete. Provide aggregates from a single source for exposed concrete.

D. Water: Clean, potable and free from foreign materials such as oils, acids, alkalis, and organic materials in amounts harmful to concrete and embedded steel. Provide water which meets ACI/ASTM requirements for concrete mix water.

E. Air-Entraining Admixture: ASTM C 260, certified by manufacturer to be compatible with other required admixtures.

1. Products: Subject to compliance with requirements, products which may be incorporated in the Work include the following
   a. "Air-Mix"; Euclid Chemical Co.
   b. "Sika AeA-14"; Sika Corp.
   c. "MasterAir VR 10 or MasterAir AE 90"; Master Builders
   d. "Darex AEA" or "Daravair"; W.R. Grace
   e. Or equal.

F. 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 with Hycol"; W. R. Grace.
2. "Eucon WR-75"; Euclid Chemical Co.
3. "Master Pozzolith" Master Builders
4. "Sikament 686"; Sika Chemical Corp.
5. Or equal.

G. 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. "ADVA CAST 585"; W. R. Grace.
   b. "Super P"; Anti-Hydro.
   c. "Sikament 686"; Sika Chemical Corp.
   d. "Master Rheobuild 1000"; Master Builders.
   e. Or equal.

H. 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. “MasterSet FP 20”; Master Builders, Inc.
   c. “PolarSet”; Grace Construction Products.
   d. Or equal.

I. 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. “MasterPozzolith-80”; Master Builders.
   b. “Eucon Retarder 75”; Euclid Chemical Co.
   c. “Daratard 17”; W. R. Grace.
   d. “Plastiment”; Sika Chemical Co.
   e. Or equal.

J. Prohibited Admixtures: Calcium chloride thyocyanates or admixtures containing more than 0.1% chloride ions are not permitted.

2.02 RELATED MATERIALS

A. Reglets: Where resilient or elastomeric sheet flashing or bituminous membranes are terminated in reglets, provide reglets of not less than 26 gauge galvanized sheet steel. Fill reglet or cover face opening to prevent intrusion of concrete or debris.

B. Absorptive Cover: Burlap cloth made from jute or kenaf, weighing approximately 9 oz. Per sq. yd., complying with AASHTO M 182, Class 2.

C. Moisture-Retaining Cover: One of the following, complying with ASTM C 171.

1. Waterproof paper.
2. Polyethylene film.
3. Polyethylene-coated burlap.

D. Joint Sealants shall be provided in color to match color of concrete.

E. 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. “MasterKure”; Master Builders.
   b. “A-H 3 Way Sealer WB”; Anti-Hydro Waterproofing Co.
   c. “Kurez DR VOX”; Euclid Chemical Co.
   d. “Clear Seal”: A.C. Horn, Inc.
   e. “Sealco 309”; Gifford-Hill/American Admixtures.
   f. “Cure & Seal LV 25% J20UV”; Dayton Superior.

F. 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 230"; Silpro Masonry Systems.
   c. "Ultraplan"; Mapei.

G. Bonding Compound: Polyvinyl acetate or acrylic base.

1. Products: Subject to compliance with requirements, products which may be incorporated in the Work include, but are not limited to, the following:
   a. Acrylic or Styrene Butadiene:
      1) "J-40 Bonding Agent"; Dayton Superior Corp.
      2) "Everbond"; L & M Construction Chemicals.
      3) "Hornweld"; A. C. Horn, Inc.
      4) "Daraweld C"; W. R. Grace.

H. 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.

I. Vapor barrier shall be Stego Wrap Vapor Barrier (15 mil) or equivalent, in accordance with ASTM E 1745. Use caution to avoid perforations in the vapor barrier material. Install barrier in accordance with ASTM E 1643 and ASTM F 710 guidelines.

2.03 PROPORTIONING AND DESIGN OF MIXES

A. Prepare design mixes for each 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 5000 – 3/4" normal weight concrete: Typical, unless noted otherwise.

   The concrete quality, mixing and placing shall conform to ACI-318, Chapter 5.

Design mixes to provide normal weight concrete with the following properties, as indicated:

Minimum Design Compressive Strength	Minimum Strength fc 7 days	Laboratory Testing Age 28 day	Minimum** Cement Content/cu.yd.	Maximum* W/C Ratio
5,000 (3/4") psi	3,000 psi	5,000 psi	565	.45

*Maximum: Decrease if possible
**Minimum: Increase as necessary to meet all other stated requirements.

D. 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.

E. 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 except interior slabs, unless otherwise indicated. Add air-entraining admixture at manufacturer's prescribed rate to result in concrete at point of placement having total air content as follows:
   a. ¾" aggregate normal weight concrete: 6.0% with a tolerance of ±1%

F. 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" inch nor more than 4 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 4" slump concrete.
3. Ramps, slabs and sloping surfaces: Not more than 3 inches.
4. Reinforced foundation systems: Not less than 1-1/2" inch nor more than 4 inches.

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.

B. High Early Strength Concrete: Follow manufacture's product specific installation guidelines. Cement shall be added to a pre-measured amount of water that does not exceed the manufacturer's maximum recommended water content. Material can be extended up to 60% using pea gravel.

PART 3 EXECUTION

3.01 INSTALLATION

A. Batch, mix and deliver Portland cement concrete in conformance with ASTM C 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. Do not add retarder admixture to any concrete.
2. Conform to ACI 306R and as specified for cold weather concreting. Do not add accelerator admixture to any concrete.

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. Embedded items, including column anchor rods and concrete reinforcement, shall be set prior to the placement of concrete. Embedded items shall not be "wet-set" without prior written approval from the Engineer of Record.

B. Install anchor rods, accurately located, to elevation required and complying with the following tolerances (acceptable deviation from rod locations shown on the Drawings):

1. 3/4" and 7/8" diameter rods: +/- 1/4"
2. 1", 1-1/4", and 1-1/2" diameter rods: +/- 3/8"
3. 1-3/4", 2", and 2-1/2" diameter rods: +/- 1/2"

C. Clean embedded items of oil, ice, dirt and all other foreign items.

D. 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 03 11 00, 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. Do not add water to concrete during delivery, at the Project site, or during placement, unless approved by the Engineer of Record. Amount of water to be added at the project site shall be indicated on the mix design and batch tickets submitted by the contractor. Water shall be added prior to on-site testing of the concrete mix.
3. Before placing concrete, and if agreed upon by the Engineer of Record, water may be added at the Project site, subject to the limitations of ACI 301.

a. Do not add water to concrete after adding high-range water-reducing admixtures.

4. Retempering of concrete by adding water or any other material shall not be permitted.
5. 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.
    e. Subgrade shall be slightly moist when the concrete is placed for floor slabs, to prevent excessive loss of water from the concrete mix.

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.
3. Construction joints in floors shall be located within the middle third spans of slabs, beams, and girders.

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 and floors, tamp to force coarse aggregate away from surface, bull float, and steel trowel. Floor areas designated to receive a floor coating shall receive a finish as recommended by the coating manufacturer. Steel trowel finish shall be provided for surfaces that will receive flooring and all exposed floor areas.

C. Overall conformance to design grade shall be within ¾" of design elevation.

D. 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. Do not over-trowel or start troweling late.
    c. 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. 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.
    a. Use a fiber bristle broom.
    b. Frequently clean broom to avoid deep brooming.
4. Finishing Formed Surface:
    a. Rough-Formed Finish: Provide a rough-formed finish on formed concrete surfaces not exposed to view in the finished Work or Concealed by other construction. This is the concrete surface having texture imparted by form-facing material used, with tie holes and defective areas repaired and patched, and fins and other projections exceeding ¼ inch in height rubbed down or chipped off.
    b. Smooth-Formed Finish: Provide a smooth-formed finish on formed concrete surfaces exposed to view or to be covered with a coating material applied directly to concrete, or a covering material applied directly to concrete, such as waterproofing, dampprooofing, veneer plaster, painting, or another similar system. This is an as-cast concrete surface obtained with selected form-facing material, arranged in an orderly and symmetrical manner with a minimum of seams. Repair and patch defective areas with fins and other projects, completely removed and smoothed.

c. Smooth-Rubbed Finish: Provide smooth-rubbed finish on scheduled concrete surfaces that have received smooth-formed finish treatment not later than one (1) day after form removal.
   1) Moisten concrete surfaces and rub with carborundum brick or another abrasive until producing a uniform color and texture. Do not apply cement grout other than that created by the rubbing process.

d. Grout-Cleaned Finish: Provide grout-cleaned finish on scheduled concrete surfaces that have received smooth-formed finish treatment.
   1) Combine one part Portland Cement to one and one-half parts fine sand by volume, and a 50:50 mixture of acrylic or styrene butadiene-based bonding admixture and water to form the consistency of thick paint. Blend standard Portland Cement and white Portland Cement in amounts determined by trial patches so that final color of dry grout will match adjacent surfaces.
   2) Thoroughly wet concrete surfaces, apply grout to coat surfaces, and fill small holes. Remove excess grout by scraping and rubbing with clean burlap. Keep damp by fog spray for at least thirty-six (36) hours after rubbing.

e. Related Unformed Surfaces: At tops of walls, horizontal offsets, and similar uniformed surfaces adjacent to formed surfaces, strike-off smooth and finish with a texture matching adjacent formed surfaces. Continue final surface treatment of formed surfaces uniformly across adjacent uniformed surfaces unless otherwise indicated.

E. Monolithic Slab Finishes:

1. Scratch Finish: Apply scratch finish to monolithic slab surfaces to receive concrete floor topping or mortar setting beds for tile, portland cement terrazzo, and other bonded applied cementitious finish flooring material, and where indicated.
   a. After placing slabs, finish surface to tolerances of F(F) 15 (floor flatness) and F(L) 13 (floor levelness) measured according to ASTM E 1155. Slope surfaces uniformly to drains where required. After leveling, roughen surface before final set with stiff brushes, brooms, or rakes.
2. Float Finish: Apply float finish to monolithic slab surfaces to receive trowel finish and other finishes as specified; slab surfaces to be covered with membrane or elastic waterproofing, membrane or elastic roofing, or sand-bed terrazzo; and where indicated.
   a. After screeding, consolidating, and leveling concrete slabs, do not work surface until ready for floating. Begin floating, using gloat blades or float shoes only, when surface water has disappeared, or when concrete has stiffened sufficiently to permit operation of power-driven floats or by hand-floating if area is small or inaccessible to power units. Finish surfaces to tolerances of F(F) 18 (floor flatness) and F(L) 15 (floor levelness) measured according to ASTM E 1155. Cut down high spots and fill low spots. Uniformly slope surfaces to drains. Immediately after leveling, refloat surface to a uniform, smooth, granular texture.
3. Trowel Finish: Apply a trowel finish to monolithic slab surfaces exposed to view and slab surfaces to be covered with resilient flooring, carpet, ceramic or thinset quarry tile, paint, or another thin film-finish coating system.
   a. After floating, begin first trowel-finish operation using a power-driven trowel. Begin final toweling when surface produces a ringing sound as

trowel is moved over surface. Consolidate concrete surface by final hand-toweling operation, free of trowel marks, uniform in texture and appearance, and finish surfaces to tolerances of F(F) 25 (floor flatness) and F(L) 20 (Floor levelness) measured according to ASTM E 1155. Grind smooth any surface defects that would telegraph through applied floor covering system.

4. Trowel and Fine Broom Finish: Where ceramic or quarry tile is to be installed with thin-set mortar, apply a trowel finish as specified, then immediately flow by slightly scarifying the surface with a fine broom.
5. Non-slip Broom Finish: Apply a non-slip broom finish to exterior concrete platforms, steps, and ramps, and elsewhere as indicated.
    a. Immediately after float finishing, slightly roughen concrete surface by brooming with fiber-bristle broom perpendicular to main traffic route. Coordinate required final finish with Architect before application.
6. Non-slip Aggregate Finish: Apply non-slip aggregate finish to concrete stair treads, platforms, ramps, sloped walks.
    a. After completing float finishing and before starting trowel finish, uniformly spread 25 lbs. Of dampened non-slip aggregate per 100 sq. ft. of surface. Tamp aggregate flush with surface using a steel trowel, but do not force below surface. After broadcasting and tamping, apply trowel finishing as specified.
    b. After curing, lightly work surface with a steel wire brush or an abrasive stone, and water to expose non-slip aggregate.

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. If high-early strength concrete has been used, the final curing shall continue for a total of 3 days beyond the initial curing period.
    2. 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 brush coat 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 labs, 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. A statement of special inspections will be established by the Registered design professional in responsible charge who will prepare a schedule of tests to be carried out by an independent testing agency. All costs for inspection and testing shall be borne by the Owner. Materials and workmanship shall be subjected to inspection and testing in mill, shop, and/or filed by the Registered design professional in responsible charge and/or Testing Agency. Such inspection and testing shall not relieve the Contractor of his responsibility to provide his own inspection, testing, and quality control as necessary to furnish materials and workmanship in accordance with requirements of Contract Documents.

B. The General Contractor shall notify the Registered design professional in responsible charge and the Testing Agency prior to start of any phase of concrete work so as to afford them reasonable opportunity to inspect the work. Such notification shall be made at least 24 hours in advance.

C. 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.
3. 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.
4. 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.
    a. 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.
    b. 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.
    c. 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.

d. Strength level of concrete will be considered satisfactory if both of the following requirements are met:
   1) Every arithmetic average of any three consecutive strength tests equals or exceeds the specified 28-day compressive strength (f'c).
   2) No individual strength test results falls below the specified 28-day compressive strength (f'c) by more than 500 psi when f'c is 5000 psi or less; or by more than 0.1 x f'c when f'c is greater than 5000 psi.

D. 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.

E. 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.

F. 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

PART 1 GENERAL

1.01 SCOPE OF WORK

A. Contractor shall furnish all labor, materials, equipment and incidentals required to design, fabricate, install, and ready for operation aluminum stop logs, guide frame, and stop log lifter for doghouse diversion manhole, as shown on the Drawings and as specified herein.

1.02 SUBMITTALS

A. Provide the following information to confirm compliance with this specification, and in accordance with Section 01300 – Submittals:
   1. Complete description of all materials including material thickness of all structural components of the stop log, guide frame, and stop log lifter.
   2. Installation drawings showing all details of construction, details required for installation, dimensions and anchor bolt location.
   3. Maximum bending stress and deflection of the stop logs under the maximum design head.
   4. The location of the company headquarters and the location of the principle manufacturing facility. Provide the name of the company that manufactures the equipment if the supplier utilizes an outside source.

1.03 MANUFACTURER

A. Stop logs, guide frames, and stop log lifters to be furnished by a manufacturer with a minimum of 10 years of experience in successful design and manufacturing of low-leakage stop logs of similar design to that specified herein.

PART 2 PRODUCTS

2.01 GENERAL

A. Stop log assemblies shall be as specified herein and have the characteristics and dimensions shown on the Contract Drawings.
B. Leakage shall not exceed 0.05 gpm/ft of wetted seal perimeter.
C. All extrusions shall have a minimum thickness of 5/16 inches.
D. Maximum bending stress shall not exceed 7600psi at the maximum head.
E. The stop logs shall have resilient lip-type seals that are attached along the sides and across the bottom of each log with type 316 stainless steel fasteners. Seals will not be permitted to be attached to the guides due to potential floating debris.
F. Stop logs shall be designed to function properly when stacked in any order.
G. Stop logs shall be designed to drop into place under their own weight without any downward pressure necessary. Stacking stop plates are not acceptable in lieu of stop logs.
H. All structural components of the stop logs shall be fabricated of aluminum and shall have adequate strength to prevent distortion during normal handling, during installation, and while in service.
I. All structural components of the guide frames shall be fabricated of aluminum and shall have adequate strength to prevent distortion during normal handling, during installation and while in service.

J. All welds shall be performed by welders with AWS certification.

K. An engraved aluminum tag shall be welded to each log. Tag information shall include location and size of log.

L. Non-extruded logs will not be accepted.

M. Fiberglass logs will not be accepted.

N. Finish: Mill finish on aluminum and stainless steel. All aluminum in contact with concrete shall be field coated with a heavy coat of bitumastic paint. Welds on aluminum shall be cleaned to provide a uniform finish. Welds on stainless steel shall be sandblasted to remove weld burn and scale.

O. Materials:

Components	Materials
Frame Guides and Invert	316 Stainless Steel
Stop Logs	6061-T6 Aluminum
Lip Seal	Urethane, EPDM or Neoprene ASTM D-2000
Anchor Studs, Fasteners and Nuts	Stainless Steel, Type 316, ASTM A276

2.02 FRAME GUIDES

A. The frame guides or grooves and invert member shall be constructed of type 316 stainless steel and shall be designed to be embedded into the wall as specified on the Drawings, or as recommended by the manufacturer.

1. Frame design shall allow for embedded mounting within wall with stainless steel shear pins. Mounting style shall be as shown on the Drawings, or as recommended by the manufacturer.
2. An invert member shall be provided across the bottom of the guides. The invert member shall be designed for minimal flow interference along the bottom of the channel, as recommended by the manufacturer.
3. Frame mounted seals are not acceptable.

2.03 ALUMINUM STOP LOGS

A. The stop logs shall be constructed of extruded aluminum shapes with a minimum thickness of 5/16-inch.

1. Each stop log shall be 6 inches tall.
2. Each stop log shall be sized for a 48-inch clear opening.
3. Maximum bending stress shall not exceed 7600 psi at the maximum operating head.
4. Adequate drainage shall be provided for each stop log.
5. Two slots shall be provided in the top of each stop log for removal and installation via the stop log lifter.
6. Each stop log shall be outfitted with an identification tag indicating the manufacturer, width of the opening and maximum head rating at a minimum. Additional tags shall be included on each stop log that indicate “dry side” and “wet side”. Tags shall be welded to each log.

2.04 SEALS

A. Each stop log shall be outfitted with a continuous resilient lip seal along the bottom and both sides to restrict leakage in accordance with the requirements listed in this specification.

1. The continuous lip seal shall be constructed of urethane or rubber and shall be mechanically retained to the stop log.

2. The lip seal shall be activated by a combination of the weight of the stop log and the differential water pressure, which pushes the seal against the inside of the groove assembly.
3. Stop logs that utilize rubber "J" seals or "P" seals are not acceptable.

2.05 LIFTER

A. One stop log lifter shall be provided for the specified guide frame width.
   1. The lifter shall be constructed of aluminum and shall be outfitted with UHMW guide bars and stainless steel fasteners.
   2. The lifter shall be provided with lifting hooks designed to engage the slots in the top of the stop logs. A lanyard release will be incorporated into the design.
   3. The lifter shall be capable of installing and removing all stop logs of the same width whether they are installed or at the operating floor level.

2.06 ANCHOR BOLTS/SHEAR PINS

A. Anchor bolts/shear pins shall be provided by the stop log manufacturer for embedding the guide frames and storage racks (if applicable).
   1. Quantity and location shall be determined by the stop log manufacturer.
   2. Anchor bolts/shear pins shall have a minimum diameter of 1/2-inch.

PART 3 EXECUTION

3.01 STORAGE, HANDLING, AND DELIVERY

A. The Contractor shall take delivery of the frames and stop logs directly from the manufacturer. Upon receiving the frames and stop logs, the Contractor is responsible for protecting all materials from damage. Damage present on the slide gate frames and stop logs or components upon delivery from the manufacturer shall immediately be documented with each the Owner, Engineer, and Manufacturer upon receipt. Damage to the frames and stop logs after the Contractor has taken delivery of the frames and stop logs shall be repaired at the Contractor's sole expense in accordance with Manufacturer repair recommendations and procedures.

B. The frames and stop logs and components shall be stored in such a way to prevent any damage and weathering to the structure and components of the frames and stop logs. The frames and stop logs shall be stored at a secured location to prevent theft and/or vandalism.

C. The frames and stop logs should be picked from approved pick points in accordance with the manufacturer recommendations. Equipment used to move the frames and stop logs shall be adequately sized and capable of lifting the stated loads without damaging the frames and stop logs.

D. The frames and stop logs shall only be delivered to the site when the Contractor is ready for installation and shall be stored in a secure location.

3.02 INSTALLATION

A. Installation of the stop logs, guide frame, and appurtenances shall be done in a workmanlike manner. It shall be the responsibility of the Contractor to handle, store, and install the equipment specified in this Section in strict accordance with the manufacturer's recommendations.

B. The Contractor shall review the installation drawings and installation instruction prior to installing the guide frames.
C. The guide frames shall be installed in a true vertical plane, square and plumb.
D. The Contractor shall fill the void in between the guide frames and the wall with non-shrink grout as shown on the installation drawing and in accordance with the manufacturer's recommendations.

3.03 FIELD TESTING

A. After installation, all stop logs shall be field tested in the presence of the Engineer and Owner to ensure that all items of equipment are in full compliance with this Section. The stop logs shall be inserted into the guide frames to confirm that they operate in accordance with the specification. Each stop log assembly shall be water tested by the Contractor along with a representative of the manufacturer, at the discretion of the Engineer and Owner, to confirm that leakage does not exceed the specified allowable leakage.

END OF SECTION

Appendix A

RIDEM Freshwater Wetlands Request
for Insignificant Alteration Application

PARE PROJECT NO. 22220.00

RHODE ISLAND DEPARTMENT OF ENVIRONMENTAL MANAGEMENT

APPLICATION FOR A FRESHWATER WETLANDS PERMIT SUPPLEMENTAL DOCUMENTATION

ROGER WILLIAMS PARK STORMWATER TREATMENT TRAIN
1000 ELMWOOD AVENUE
PROVIDENCE, RHODE ISLAND

Applicant:

City of Providence
25 Dorrance Street
Providence, RI 02903

Prepared by:

Pare Corporation
8 Blackstone Valley Place
Lincoln, Rhode Island

APRIL 2023

PARE CORPORATION

TABLE OF CONTENTS

SECTION NO.

SECTION 1

Filing Fee Calculation

RIDEM FRESHWATER WETLANDS FEE DETERMINATION (§ 3.8.9)

Fee determination according to § 3.8.9(C)(2):

Fee for water quality improvement projects:

Application for Freshwater Wetlands Fee = **$100.00**

SECTION 2

Figures

RIGIS

SITE LOCATION MAP

SCALE:1"=2,000'

N
W E
S

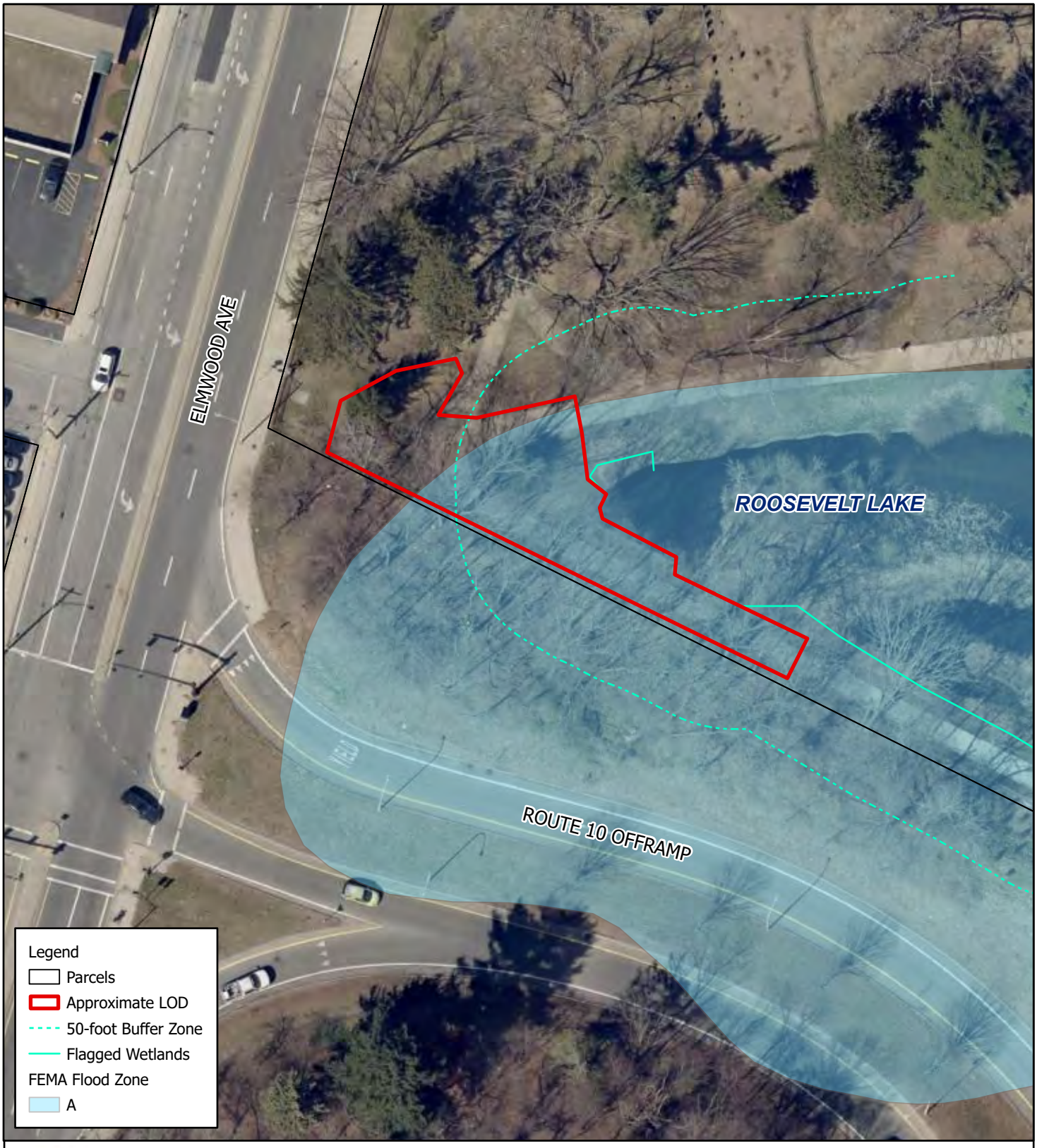
8 BLACKSTONE VALLEY PLACE
LINCOLN, RI 02865
(401) 334-4100

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

PARE PROJECT No. 22220.00 MARCH 2023

FIGURE 1

ROGER WILLIAMS PARK
STORMWATER TREATEMENT TRAIN
PROVIDENCE, RI



ANNOTATED AERIAL PHOTOGRAPH

SCALE:1"=50'

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

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

PARE PROJECT No. 22220.00

March 2023

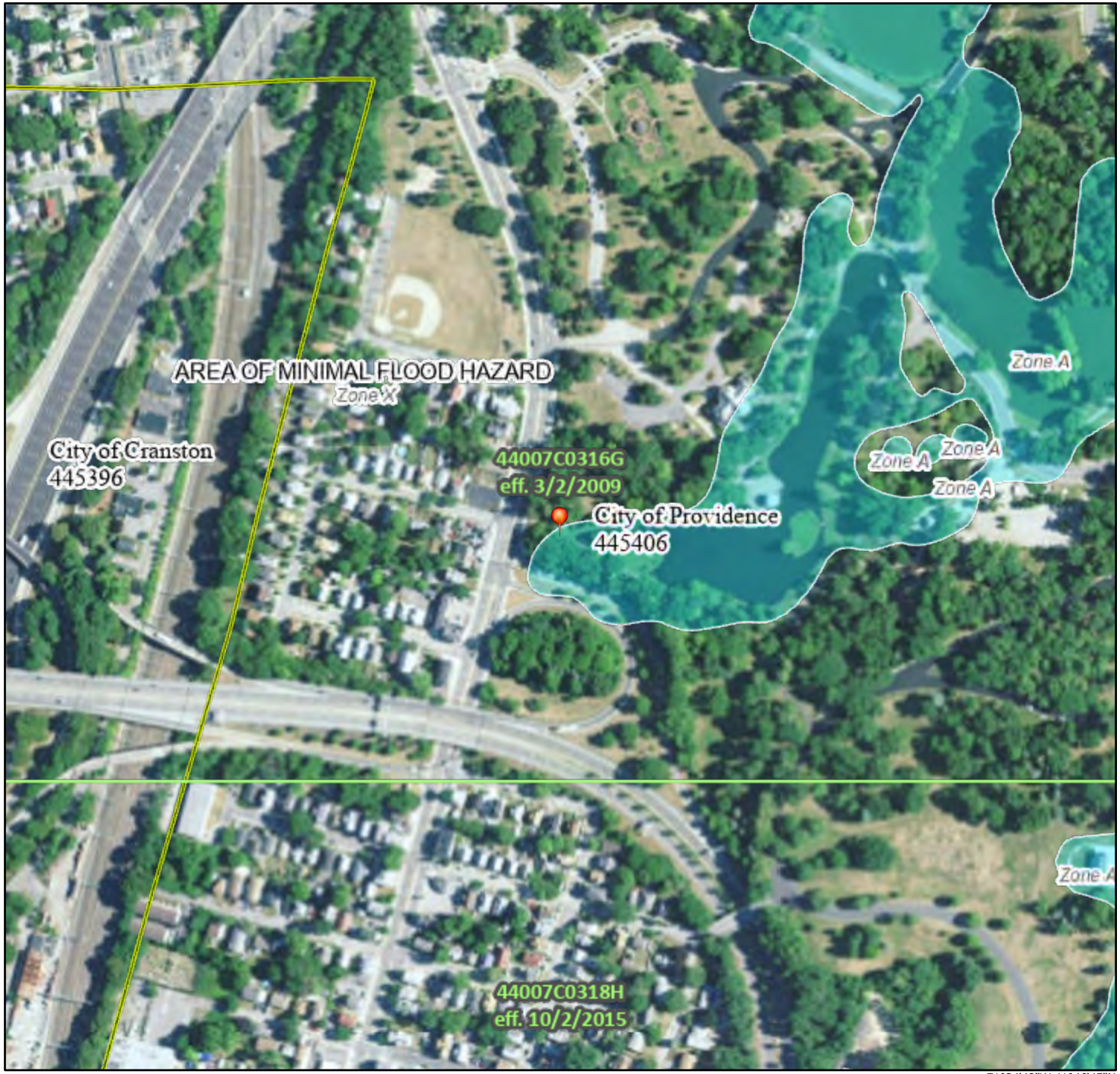
FIGURE 2

Roger Williams Park
Stormwater Treatment Train
Providence, RI

National Flood Hazard Layer FIRMette

FEMA

71°25'26"W 41°47'12"N



71°24'48"W 41°46'45"N

Feet 1:6,000

0 250 500 1,000 1,500 2,000

Basemap: USGS National Map: Orthoimagery: Data refreshed October, 2020

Legend

SEE FIS REPORT FOR DETAILED LEGEND AND INDEX MAP FOR FIRM PANEL LAYOUT

SPECIAL FLOOD HAZARD AREAS
- Without Base Flood Elevation (BFE) *Zone A, V, A99*
- With BFE or Depth *Zone AE, AO, AH, VE, AR*
- Regulatory Floodway

OTHER AREAS OF FLOOD HAZARD
- 0.2% Annual Chance Flood Hazard, Areas of 1% annual chance flood with average depth less than one foot or with drainage areas of less than one square mile *Zone X*
- Future Conditions 1% Annual Chance Flood Hazard *Zone X*
- Area with Reduced Flood Risk due to Levee. See Notes. *Zone X*
- Area with Flood Risk due to Levee *Zone D*

OTHER AREAS
- NO SCREEN Area of Minimal Flood Hazard *Zone X*
- Effective LOMRs
- Area of Undetermined Flood Hazard *Zone D*

GENERAL STRUCTURES
- Channel, Culvert, or Storm Sewer
- Levee, Dike, or Floodwall

OTHER FEATURES
- 20.2 Cross Sections with 1% Annual Chance
- 17.5 Water Surface Elevation
- Coastal Transect
- Base Flood Elevation Line (BFE)
- Limit of Study
- Jurisdiction Boundary
- Coastal Transect Baseline
- Profile Baseline
- Hydrographic Feature

MAP PANELS
- Digital Data Available
- No Digital Data Available
- Unmapped

N

The pin displayed on the map is an approximate point selected by the user and does not represent an authoritative property location.

This map complies with FEMA's standards for the use of digital flood maps if it is not void as described below. The basemap shown complies with FEMA's basemap accuracy standards

The flood hazard information is derived directly from the authoritative NFHL web services provided by FEMA. This map was exported on 3/22/2023 at 1:39 PM and does not reflect changes or amendments subsequent to this date and time. The NFHL and effective information may change or become superseded by new data over time.

This map image is void if the one or more of the following map elements do not appear: basemap imagery, flood zone labels, legend, scale bar, map creation date, community identifiers, FIRM panel number, and FIRM effective date. Map images for unmapped and unmodernized areas cannot be used for regulatory purposes.

SECTION 3

Narrative Project Description

I. INTRODUCTION

This supplemental documentation has been prepared on behalf of the City of Providence (the City) and the Providence Parks Department (Owner), to support an Application for a Freshwater Wetland Permit (Application) for proposed water quality improvements at Roger Williams Park in Providence, Rhode Island. The Application is submitted pursuant to the Rules and Regulations Governing the Administration and Enforcement of the Freshwater Wetlands Act (the "Regulations").

Roger Williams Park is an approximately 212-acre public park located on Providence Assessors Map 90, Lot 157 in the South Elmwood neighborhood. The park is a prominent attraction in the State of Rhode Island and sees over 1.5 million visitors annually. A network of manmade open-water ponds occupy approximately 114 acres in the park, and are referred to as the Roger Williams Park Ponds (Waterbody ID: RI0006017L-05). In recent years significant water quality issues have been identified in the Roger Williams Park Ponds including cyanobacteria blooms. The City has partnered with numerous organizations over the years to address this concern including the Rhode Island Department of Environmental Management (RIDEM). This proposed project, identified as the Roger Williams Park Stormwater Treatment Train, is the latest effort aimed at improving water quality in the Roger Williams Park Ponds to comply with the requirements of a Consent Agreement between the City and RIDEM.

The intent of the project is to treat stormwater entering the Roger Williams Park Ponds from offsite via a 48-inch outfall that discharges into Roosevelt Lake. Roosevelt Lake is the most upstream of the Roger Williams Park Ponds, and the project site is located along its shoreline. Treatment of stormwater from the project site itself is not proposed. Rather, this project is a retrofit, with treatment components being installed to treat the stormwater that flows into the pond from offsite. Portions of the project site are located within the 100-foot Jurisdictional Area and 50-foot Buffer Zone associated with Roosevelt Lake as well as vegetated wetlands. Work within Jurisdictional Areas and Buffer Zone is primarily confined to maintained lawn and pedestrian walkways. Disturbance to vegetated Buffer has been minimized to two American Holly *(Ilex opaca)* trees and significant effort has gone into avoiding direct impacts to freshwater wetlands. Existing conditions

will be substantially restored following construction and the change in impervious area is negligible, limited to a small concrete maintenance pad and tank covers flush with finished grade.

The following narrative will describe the existing site conditions, demonstrate the need for the proposed project, discuss the proposed work sequence, and demonstrate compliance with the Freshwater Wetland and Buffer Zone Standards and Variance Criteria established in the Regulations. Existing site conditions and the proposed project are depicted on the attached project plans entitled "*Roger Williams Park Stormwater Treatment Train"*, prepared by Pare and dated April 2023 (the Plans).

II. EXISTING SITE CONDITIONS

a. General

The project site is located at the western end of Roosevelt Lake with a limit of disturbance (LOD) that encompasses approximately 6,420 square feet (sf) (referred to herein as, "the site"). The site is located approximately 120 feet east of Elmwood Avenue (Route 1) and immediately northeast of the R.I. Route 10 offramp to Elmwood Avenue. Rhode Island Department of Transportation property is immediately south of the site (e.g., the Route 10 offramps), which is a steep forested embankment. Commercial and dense residential housing is located to the west, across Elmwood Avenue. Roger Williams Park grounds border the site to the north and east.

Land cover on the site consists of concrete pedestrian walkways and maintained lawn areas or vegetated wetlands along the shoreline of Roosevelt Lake. The lake is manmade with masonry walls forming its shoreline in the project area. Woody vegetation within the LOD is limited to two planted trees.

b. Wetlands

Site wetlands were delineated and classified by Pare in accordance with the Rhode Island Fresh Water Wetlands Act and Regulations. Delineation was completed on January 11, 2023.

The site is located within the Urban River Protection Region according to the Freshwater Buffer Regions Map. Wetlands on or adjacent to the site include a pond (Roosevelt Lake) and two shrub swamps. No "rare" wetland types were identified on site in accordance with the definition provided in §3.4 of the Regulations. According to the FEMA Flood Insurance Rate Map for the area (Map Number 44007C0316G, effective date March 2, 2009), a portion of the project site is located within Zone A: area of 1% chance of annual flooding with no base flood elevation. The remaining site is within Zone X: Area of Minimal Flood Hazard. Wetlands and their associated buffer zones are described briefly below and in greater detail in the Wetland Delineation Report included as Section 4 of this application.

i. Roosevelt Lake

Roosevelt Lake is defined as a Pond under §3.4 of the RIDEM Regulations and, according to the table in §3.23(I)(1), has an associated **50-foot Buffer Zone**. As a Pond, Roosevelt Lake has an associated 100-foot Jurisdictional Area. The pond is manmade and its edges in the vicinity of the site are defined by a stone masonry retaining wall. Vegetated Buffer in the vicinity of the site is limited to two planted American Holly *(Ilex opaca)* trees and other landscaped areas. A majority of the Buffer Zone consists of maintained grass and concrete walkway. This area is well maintained by the Roger Williams Park grounds crew and is utilized by the public for passive recreation. According to §3.7.1(C)(1), a 20-foot Primary Structure Setback and 5-foot Accessory Structure Setback are offset from the Buffer edge. Setbacks are presumed to be offset from the Pond edge in areas where there is no Buffer contiguous to the Pond.

ii. Shrub Swamp

Two shrub swamps are located on the project site and are defined by flag series A and B. According to Rule 3.23(I)(3)(d) all swamps, except for evergreen forested swamps, receive a 25-foot Buffer Zone. Under Rule 3.23(F)(2) each wetland has a 25-foot buffer zone extension because another wetland type (Roosevelt Lake) exists within 50-feet of the wetland edge. Therefore, the A and B series shrub swamps have associated **50-foot Buffer Zones**. The A-series swamp is located east of the project site and is a manmade wetland that was constructed in 2019. The B-series swamp is located northeast of the site and is also manmade consisting of hydrophytic shrub plantings along Roosevelt Lake. The shrub swamp is separated from Roosevelt Lake by the stone masonry retaining wall. Vegetated Buffer in the vicinity of the site includes landscaped shrub plantings along an earthen slope that leads down from the pedestrian walkway. According to §3.7.1(C)(1), a 20-foot Primary Structure Setback and 5-foot Accessory Structure Setback are offset from the Buffer edge. Setbacks are presumed to be offset from the Pond edge in areas where there is no Buffer contiguous to the shrub swamps.

c. Drainage

The intent of this project is to improve water quality in the Roger Williams Park Ponds by treating stormwater that enters the ponds via the 48-inch outfall to Roosevelt Lake. While there are other point sources to Roosevelt Lake and the Roger Williams Park Ponds, the 48-inch outfall is the most significant and the only point source in the project area. The site itself receives overland flow from a relatively small catchment area, confined to the vegetated slope on RIDOT-owned land to the south and the park's western property line along Elmwood Avenue.

The 48-inch outfall pipe originates as a 36-inch pipe at a weir box on Mashapaug Brook, downgradient of Mashapaug Pond. Mashapaug Pond is located in Providence, approximately 4,300 feet west of the site. It is impaired for phosphorus, among other pollutants. Water from Mashapaug Pond drains out of the pond via the Mashapaug Brook and into the weir box where outflow is split between Roosevelt Lake and the Pawtuxet River. Flow from the brook is primarily carried out by the 36-inch pipe that flows to Roosevelt Lake. In larger storm events where the 36-in pipe does not provide enough capacity, stormwater from the brook stages up within the weir box, overtops a linear concrete weir and flows into the lower chamber where it discharges into the Pawtuxet River. Therefore, there is a maximum flow rate that can enter the pond due to the weir box constriction.

Based on information reviewed by Pare, a peak flow of approximately 2 cubic feet per second (cfs) discharges from the weir box toward Roosevelt Lake during a 1-inch, 1-hour design storm. This represents the water quality volume storm and was used to establish minimum treatment capacity for the primary component in the proposed treatment system. The water quality volume storm event was selected as a design criterion because it represents the "first flush" that produces runoff with a large pollutant loading. Based on a review of available record plans along the alignment of the 48-inch outfall, there are additional connections from City streets that contribute additional flow, though this has not been quantified. However, discharge from the weir box at Mashapaug Brook is assumed to be the major source of flow in this pipeline.

d. Utilities

The main utilities within the project area consist of the Park's private utility lines. Pare employed GPRS, Inc. to conduct a Ground Penetrating Radar (GPR) survey to locate existing utilities within the project area and their respective depths of burial. GPRS was able to locate the alignment of a water main, electric conduit, and stormwater drain lines within the vicinity of the project area. This information was verified with the existing conditions survey and depths to the utilities were noted for design purposes.

e. Rare and Endangered Species

According to RIGIS data layer NatHeritage21 (2021) viewed on March 23, 2023, the site is located adjacent to a Natural Heritage Area but is not with the boundary of this area. According to the U.S. Fish and Wildlife Service Information for Planning and Consultation (IPaC) tool viewed on March 23, 2023; two species listed under the Federal Endangered Species Act were identified as "potentially affected by activities" at the site. These include one Threatened species: Northern Long-eared Bat *(Myotis septentrionalis)* and one Candidate species: Monarch Butterfly *(Danaus plexippus)*. No critical habitats were identified at the site by the IPaC tool.

III. PROPOSED PROJECT

The proposed project consists of the construction of a new stormwater treatment train at the location of the existing 48-inch outfall pipe to Roosevelt Lake. The treatment train consists of below grade structures with access covers and hatches to grade for future inspection and maintenance. Once the project is complete, the site will be restored substantially to its existing condition by loaming and seeding disturbed lawn areas, rebuilding parts of the masonry wall surrounding the pond, and replacing cement concrete walkway. A new cement concrete pad with water source will be added for future maintenance activities.

The stormwater treatment train consists of a primary, proprietary membrane filtration system followed by a media bed filter for additional treatment. A diversion manhole is proposed in line with the 48-inch outfall pipe to direct stormwater flow to the offline treatment system. Monitoring ports are provided at critical locations for inspection, sampling, and flow measuring, and a new outfall to the pond is proposed on the downgradient end of the treatment train. The major components of the stormwater treatment train are described in more detail below.

Diversion Manhole

Stormwater enters the pond from offsite via the 48-inch outlet, which has an invert elevation of 26.1[1]. The outfall is typically submerged due to the normal pool level in the lake, which is controlled by a dam with a spillway crest at approximate elevation 27.7. This elevation is approximate based on a comparison of the water level at the pipe and spillway crest during multiple site visits. The water level in the lake is a critical control variable for system layout. To prevent the lake from backing up into the proposed treatment system, the discharge from the treatment train must be set at or above the typical water surface elevation. There is also a head differential required through the treatment train.

Water will be diverted from the 48-inch outfall to the treatment train using a diversion manhole constructed on top of the 48-inch outfall pipe. This structure is currently proposed as an 8-foot by 6-foot rectangular, cast-in-place concrete doghouse style manhole. Stop logs will be installed

[1] All elevations are referenced to NAVD 88.

within this structure across the 48-inch pipe to control flow. During storm events, the increased water that flows into this structure will be impounded behind the stop logs to reach the elevation of the treatment train. The stop logs will not extend to the bottom of the structure so that baseflow in the pipe can continue to flow into the lake during typical, dry weather conditions. It will be open at the top of the structure to allow very large storms, which exceed the capacity of the treatment train, to overtop it and flow to the lake.

Diversion to the treatment train will be through a 12-inch outlet set at an invert elevation of 29.0 (approximately 12 inches above the normal water surface elevation in the lake). The top of the stop logs will be set at elevation 29.5, which is 18 inches below the inside ceiling height of the manhole. When modeled like an 8-foot-wide rectangular weir, flow capacity over the stop logs is approximately 49 cfs.

Primary Membrane Treatment - Contech Jellyfish Filter or Approved Equal

The first step in the treatment train will be a proprietary membrane treatment system, such as the Jellyfish Filter by Contech Engineered Solutions, Inc, or approved equal.

This type of system is a stormwater quality treatment technology featuring high flow pretreatment and membrane filtration in a compact stand-alone system. Jellyfish is advertised to remove floatables, trash, oil, debris, total suspended solids, fine silt-sized particles, and particulate-bound pollutants including phosphorus, nitrogen, metals and hydrocarbons. They are approved by the RIDEM and have been installed in several applications throughout the State.

Stormwater enters the system through an inlet pipe in the side of a precast concrete tank where a small compartment allows for settling and floatables removal behind a maintenance access wall. From here, flow passes under the baffled maintenance wall into the treatment compartment. Peak flows can overtop the inlet compartment to the outlet, bypassing treatment. Stormwater flows upward through treatment cartridges surrounded by a separation skirt, where oil, trash and debris can be isolated outside the filtration zone. The treatment cartridges have a high surface area effective at removing particulate bound pollutants, possibly achieving close to 60% phosphorous removal with proper use and maintenance, based on literature from the manufacturer. Treated water flows upward through openings in the top of each treatment cartridge and to the tank outlet. Once

the storm ends, treated water passively backwashes the treatment cartridges by falling back down to the lower level of the tank. A minimum drop of six inches through the tank is required to meet the minimum performance requirements stipulated by Contech.

This system will be within an 8-foot square precast concrete tank with a total depth of about 11 feet to utilize the maximum depth cartridge available. The treatment capacity of the unit is 2.94 cfs, based on information from the manufacturer. This exceeds the minimum design flow of 2 cfs described earlier. Ultimately, system design was selected to maximum treatment capacity to handle larger storms and flow from other sources into the 48-inch outfall while considering project constraints, including cost. Based on the vertical dimensional requirements of the system, 24-inch wide trench covers will be set into the top slab of the structure in lieu of the traditional frame and cover castings, and the top of the structure will be set at finished grade. This is required for future maintenance activities which will require that treatment cartridges be lifted out of the structure for routine cleaning. The tank will be installed an estimated 6 feet below the groundwater table so anti-flotation concrete collars will need to be added to the structure to prevent buoyancy.

Secondary Filter Media Treatment - Biochar

One of the project goals identified by the Owner and their project partners is to use a second treatment step that achieves additional phosphorus removal while providing flexibility to change the treatment media that is used. This would allow the project team to perform long-term research on the performance of various treatment media over time. Biochar has been selected as the initial treatment media for this application.

Biochar is a charcoal-like substance that is made by burning organic material from biomass. The two most common processes for producing biochar are pyrolysis and gasification. During pyrolysis, the organic material is heated to 250-800^{o}C in a limited oxygen environment. Gasification involves temperatures greater than 700^{o}C in the presence of oxygen. Both methods produce a black, highly porous, lightweight, fine-grained material. One central component to the biochar is its large surface area. In addition, approximately 70 percent of its composition is carbon. The remaining percentage consists of nitrogen, hydrogen, and oxygen among other elements. Biochar's chemical composition varies depending on the feedstocks used to make it and methods used to heat it.

When used in agriculture, the biochar material is used as a soil amendment that can help with water retention. While biochar has been used in stormwater treatment applications, the same properties that aid in water retention limit the available treatment rate when used as a filtration media. Initial research suggests a treatment capacity of the biochar between 8 to 15 gallons per minute per square foot of surface area, but it is unclear how performance diminishes in saturated conditions and what effect filter bed depth plays in treatment capacity. Other research suggests the hydraulic conductivity of a fine-grained washed biochar is approximately 0.2 inches per second. Due to the limited data currently available, it makes for a great media for use in this application because of the project team's interest in measuring and monitoring its performance in a real-world application.

Based on discussions Pare has had with a supplier that services New England, a coarse-grained mix with particle size from ¼ inch to 1-inch is most suitable for this project. The biochar will be installed in a 3-foot layer of media within a precast concrete tank. The media will sit on a bed of peastone to prevent it from discharging with treated effluent through the tank's primary outlet. A geosynthetic drainage net will be placed on top of the media to prevent inflow from scouring it and to prevent the media from floating. The tank will be accessible by an aluminum access hatch and the biochar material can be removed using a vac-truck for either maintenance or for replacement with a different type of treatment media. The tank has also been designed so that the top slab can be lifted and removed with a large excavator to facilitate future modifications and treatment media changeout.

Site Restoration

Generally, the site will be restored to original conditions. An insignificant amount of filling is required to install and cover the tanks and piping, but existing grades will be restored wherever possible and overland drainage patterns will remain unchanged. The existing masonry rock wall be raised in some areas to provide suitable cover at tanks and over piping. No filling, grading, or other disturbance is proposed within the shrub swamp and no work is proposed within the pond itself. Reconstruction of the masonry wall surrounding the pond will be entirely above the typical water surface at an elevation of approximately 27.9.

All unpaved surfaces will be restored with loam and seed. Vegetated areas will have maximum slope of 4H:1V. Disturbed walkways will be restored with new concrete sidewalk to the existing

dimensions. A cast-in-place concrete pad will be provided next to the treatment train system to store equipment for inspection, operation, and maintenance. A potable water supply is also provided for maintenance activities.

a. Demolition and Erosion and Sediment Control

Standard erosion and sediment controls will be implemented at the site prior to the commencement of earth disturbing activities in accordance with the Rhode Island Soil Erosion and Sediment Control Handbook. A crushed stone construction access way will be provided just east to the project area within the general limits of the existing concrete pedestrian walkway. Compost filter socks will be installed along the limit of disturbance (LOD) to contain the construction site and minimize sediment migration. A designated stockpile area is proposed and situated the furthest away from the lake as feasible. Tree protection fencing will be installed to protect trees within the LOD that are to remain. Finally, a turbidity barrier will be installed within the pond in the vicinity of the project area during construction. Erosion and sedimentation controls proposed on the project are depicted on the enclosed Project Plan set. Erosion controls, including compost filter sock and the turbidity barrier, will be removed once construction is complete.

Demolition is limited to the removal of existing cement concrete sidewalk, removal of two planted trees within the project site, and cutting and removing part of the masonry wall at the pond for the installation of a new outfall downstream of the treatment train. All demolition debris will be removed and legally disposed of offsite. Demolition activities will only take place within the LOD shown on the plans.

b. Grading

Minor grading will take place throughout the site to accommodate the stormwater treatment train and associated access structures. Grading is limited to the area from the main stormwater treatment train structures down to the edge of the lake, where portions of the existing masonry rock wall will be rebuilt and raised slightly. No changes in drainage patterns are proposed and runoff from the project area will still reach the pond by overland flow. All disturbed areas will be restored with loam and seed or concrete walkway to match existing land uses and ground cover.

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IV. WETLAND IMPACTS

The proposed water quality improvements have been designed to avoid direct wetland impacts and minimize disturbance within Jurisdictional Areas and Buffer Zones to the extent practicable. While the entire site is within the 50-foot Buffer Zone from Roosevelt Lake, the site has been minimized to the smallest possible footprint to meet the project goals. The LOD for the project is approximately 6,420 square feet and none of the project area extends to shrub wetlands that exist outside of the pond. A discrete portion of the stone masonry retaining wall will be re-built but should not adversely impact the wetland functions and values of Roosevelt Lake. Work proposed within the Buffer Zone will be mitigated by restoring existing conditions at the end of construction.

a. 50-foot Buffer Zone

Approximately 4,607 square feet of 50-foot Buffer Zone will be impacted by the proposed work. A majority of the project area, including the entirety of proposed treatment system tanks and components, is within the Buffer Zone of Roosevelt Lake. Work could not avoid Buffer Zone as proximity to the existing drainage infrastructure is critical to the project intent. Additionally, the southern property boundary of the site is approximately 20 feet from the edge of the pond and constrains the proposed work to this area.

Buffer Zone within the project limits includes portions of the Roger Williams Park trail network and consists primarily of concrete walkway and maintained lawn. This area is well maintained and provides for passive public recreation opportunities. Two American Holly trees are located side by side within the Buffer Zone, which is the extent of vegetated Buffer that will be impacted by the proposed project. The project site does not extend into nearby shrub wetlands. Once work is complete, the impacted areas will be restored to their existing condition with loam and seed or concrete walkway. With the exception of the American Holly trees noted above, clearing of naturally vegetated areas has been avoided.

b. Roosevelt Lake

An approximately 12-foot section of the stone masonry retaining wall at the western end of Roosevelt Lake will be impacted during construction. A small part of the wall will be cut and removed to install the new 12-inch outlet from the proposed treatment train. Additionally, a section of wall will be raised to provide cover over the pipe and to match proposed grades. Approximately 13 linear feet of wall will be rebuilt. Reconstruction of the wall and installation of the new outfall will be performed on land above the water surface elevation and will not require work or construction access within Roosevelt Lake. An approximately 35-foot-long temporary turbidity barrier will be installed across Roosevelt Lake east of the work area to minimize turbidity and sedimentation impacts during installation of the new outlet and wall removal/reconstruction.

V. FRESHWATER WETLAND AND BUFFER PROTECTION STANDARDS (§ 3.7.1)

a. General Freshwater Wetlands Protection Standard

The project avoids direct alterations to freshwater wetlands and naturally vegetated Buffer. Shrub swamps and Roosevelt Lake will be protected throughout construction. Installation of the new 12-inch stormwater outlet will be performed from land and will not result in direct impacts to Roosevelt Lake. The nearby shrub swamp will be protected with a snow fence installed around the perimeter of the wetland and Buffer. Erosion controls will be placed along the perimeter of the work area to minimize construction phase impacts to the adjacent freshwater wetlands.

b. Freshwater Wetlands Buffer Standard

There is no naturally vegetated Buffer within the project site as it consists entirely of landscaped areas that are primarily maintained lawn. The existing buffer along the northern edge of the B-series shrub swamp is outside the LOD and will be protected with snow fencing during construction.

Creation of new Buffer (§3.7.1(B)(4)) within the site limits is not feasible as the proposed treatment train structures must be accessible for regular maintenance and cannot be planted over. Additionally, the area functions as a public park utilized for passive recreation. Maintaining public access and views of Roosevelt Lake is a primary purpose of the Roger Williams Park walking paths. Planting a dense vegetated buffer in this area would restrict this access and make it difficult to maintain the proposed treatment train structures. Given the nature of the project and significant water quality benefits to the Roger Williams Park Ponds that will result from it, a variance is requested for the creation of a new buffer.

c. Setback Standards

No primary structures are proposed as part of this project. The proposed water quality treatment units are considered accessory structures and have been located over 5 feet from Roosevelt Lake, shrub swamps, and vegetated Buffer contiguous to the B-series shrub swamp. Dimensions showing the distance of the unit from nearby freshwater wetlands have been added to the Project Plans demonstrating compliance with this standard. The diversion manhole must be installed directly on the 48-inch pipeline without compromising current recreational uses of the concrete walkway in this area.

d. Rare or Endangered Species Standard

No rare freshwater wetland types are located on or adjacent to the site and there will be no direct impacts to freshwater wetlands. The site is located outside of Natural Heritage Areas and due to the location of work in existing developed and well-maintained portions of Roger Williams Park, impacts to rare or endangered species is not anticipated.

e. Flood Protection Standard

FEMA mapping indicates that the project site is within Zone A of Roosevelt Lake. However, the map does not appear to accurately account for the grades in and around the project site. The mapped Zone A includes areas known to be at a higher elevation, to the south of the project site, but excludes lower lying areas within the park to the west and north. No flood elevation is indicated on the FEMA mapping and it is difficult to determine the actual flood elevation due to these noted discrepancies. Nevertheless, a minor amount of grading with minimal filling is proposed to adequately bury structures and piping necessary for the project. The area of regrading is under 1,000 square feet. The impact of this work on flood protection is believed to be insignificant and it is not believed that this project will result in a change in flooding conditions offsite.

f. Surface Water and Groundwater Diversion Standard

Surface and groundwater diversion may be performed on a temporary basis to facilitate construction, but no permanent diversion of surface water or groundwater is proposed by this project. Grading revisions are proposed but existing runoff drainage patterns and flow directions will be maintained. Surface water drainage from the project site is via overland flow to the pond.

g. Stormwater Management Standard

This project is a retrofit to provide treatment to stormwater that enters the Roger Williams Park Ponds from offsite via the 48-inch outfall into Roosevelt Lake. No changes in land use or ground cover are proposed so no additional stormwater management systems are planned or proposed.

The project site is approximately 6,420 square feet. Because it is under one acre and is not part of a larger common plan of development within the park, it is exempt from needing coverage under the Rhode Island Pollutant Discharge Elimination System (RIPDES) Construction General Permit (CGP).

h. Erosion and Sedimentation Control Standard

Erosion and sedimentation controls will be implemented throughout the site in accordance with the Rhode Island Soil Erosion and Sediment Control Handbook. Sediment will be contained by perimeter compost filter socks around stockpiles and the project LOD. A crushed stone tracking pad will be installed and maintained at the construction entrance. A turbidity curtain will be installed within the pond east of the project area as a secondary containment, in the event fugitive sediment escapes erosion control barriers on land. The enclosed Project Plans show erosion and sedimentation control details and their proposed locations at the site.

i. Water Quality Standard

Best Management Practices (BMPs) for managing stormwater from the project site are not planned because there are no changes to land use proposed and existing conditions will be substantially

restored following construction. The project site and surrounding area will continue to be used for passive recreation upon construction completion. The intent of the project is to provide treatment to stormwater entering the park ponds from offsite, so the result will be significant water quality improvements to the Roger Williams Park Ponds.

VI. REVIEW CRITERIA (§ 3.7.2)

The project meets the Review Criteria established in §3.7.2 as follows:

1. Significant reduction in the overall wildlife production or diversity of a freshwater wetland or buffer.

No reduction in wildlife production or diversity will result from this project. The intent of the project is to improve water quality in the Roger Williams Park Ponds, which will help improve habitat for fish, waterfowl, and terrestrial wildlife that utilize the ponds for habitat.

2. Significant reduction in the ability of a freshwater wetland or buffer to satisfy the needs of a particular wildlife species.

No work is proposed within freshwater wetlands and the Buffer Zone will be restored upon the completion of construction. As such, no reduction in the ability of freshwater wetlands or buffers to satisfy the needs of wildlife species in anticipated.

3. Significant displacement or extirpation of any wildlife species from a freshwater wetland or surrounding areas due to the alteration of the freshwater wetland or buffer.

Wildlife will not be displaced by the completed project and long-term impacts to wildlife are not anticipated. Temporary impacts during construction will be minimal, if any, because construction duration is estimated to be approximately four months.

4. Any reduction in the ability of the freshwater wetland or buffer to ensure the long-term viability of any rare animal or rare plant species.

No rare animal or plant species are known to exist or inhabit the project site. Nevertheless, the project will not result in any changes to the long-term viability or uses of the project area and will result in an improvement in the ability of Roosevelt Lake to provide habitat.

5. Any degradation in the natural characteristic(s) of any rare freshwater wetland type.

No rare wetland types are located in the vicinity of the project site.

6. Significant reduction in the suitability of any freshwater wetland or buffer for use by any resident, migratory, seasonal, transient, facultative, or obligate wildlife species, in either the short or long term as a travel corridor; feeding site; resting site; nesting site; escape cover; seasonal breeding or spawning area;

No impacts, either long-term or in the short-term during construction, to wildlife use is anticipated to result from this project. The project avoids naturally vegetated Buffer and freshwater wetlands and is contained to developed and maintained areas. The area is used for passive recreation as part of the park's network of trails. Existing conditions and land uses will be restored at the completion of construction.

7. Any more than a minimal intrusion of, or increase in, less valuable, invasive or exotic plant or animal species in a freshwater wetland or buffer.

No new plantings are proposed for this project. Two existing trees, American Hollys which have been planted at the site, will be removed and disposed to provide space for proposed system components. Mature trees that surround the project area will remain undisturbed.

8. **Significant reduction in the wildlife habitat functions and values of any freshwater wetland or buffer which could disrupt the management program for any game or non-game wildlife species carried out by State or Federal fish, game, or wildlife agencies.**

The proposed activities will not disrupt any State or Federal agency management programs.

9. Significant reduction in overall current or potential ability of a freshwater wetland or buffer to provide active or passive recreational activities to the public.

The project site is currently used for passive recreation as part of the network of walking paths and trails within Roger Williams Park. The project will not detract from these uses and walking paths disturbed by this project will be restored. Furthermore, the intent of the project is to improve water quality in the park's ponds, which will further enhance recreational uses.

10. Significant disruption of any on-going scientific studies or observations performed by or in cooperation with Federal, State, or municipal agencies or educational institutions.

This project will not disrupt or interfere with any ongoing studies or observations by any agency or institution. On the contrary, the Providence Stormwater Innovation Center and University of Rhode Island are project partners and are committed to performing long-term monitoring of the completed system.

11. Elimination of, or severe limitation to traditional human access to, along the bank of, up or down, or through any rivers, streams, ponds, or other freshwater wetlands or buffers;

Pedestrian access to wetlands will not be hindered by the project. No pathways will be removed, and existing concrete walkways disturbed by the project will be restored at the completion of construction.

12. Any reduction in water quality functions and values or negative impacts to natural water quality characteristics, either in the short or long term, by modifying or changing: water elevations, temperature regimes, volumes, velocity of flow regimes of water; increasing turbidity; decreasing oxygen; causing any form of pollution; or modifying the amount of flow of nutrients so as to negatively impact freshwater wetland functions and values.

The intent of the project is to improve water quality in the Roger Williams Park Ponds by the construction and installation of a new stormwater treatment train at the existing 48-inch outfall to Roosevelt Lake.

13. Any placement of any matter or material beneath surface water elevations or erection of any barriers within any ponds or flowing bodies of water which could cause any hazards to safety.

No permanent facilities are proposed within Roosevelt Pond as part of this project. A turbidity curtain will be installed temporarily during construction to act as a secondary containment device in the event sediment escapes compost filter sock used on land. It will be removed once construction is complete, and the project area has been restored and stabilized. The turbidity curtain will not result in any hazards to safety. Also, existing masonry wall along the edge of the pond will be reconstructed and raised in some sections, but no work is planned beneath the water surface elevation of the pond. Approximately 13 linear feet of wall will be rebuilt.

14. Significant loss of important open space or significant modification of any uncommon geologic or archaeological features;

No loss of open space will result from this project. No uncommon geologic or archaeological features are known to exist at the project site.

15. Significant modification to the natural characteristics of any freshwater wetlands or buffer area of unusually high visual quality;

The proposed work area avoids freshwater wetlands and naturally vegetated buffer areas.

16. Any decrease in the flood storage capacity of any floodplain or area subject to flooding which could impair its ability to protect life or property from flooding or flood flows;

FEMA mapping indicates that the project site is within a Zone A of Roosevelt Lake. However, the map does not appear to accurately account for the grades in and around the project site. The mapped Zone A includes areas known to be at a higher elevation, to the south of the project site, but excludes lower lying areas within the park to the west and north. Nevertheless, a minor amount of grading with minimal filling is proposed to adequately bury structures and piping necessary for the project.

The area of regrading is under 1,000 square feet. The impact of this work on flood protection is believed to be insignificant and it is not believed that this project will result in any change in flooding offsite.

17. Significant reduction of the rate at which flood water is stored by any floodplain or any area subject to flooding during any flood event;

See response to item 16 above.

18. Restriction or significant modification of the path or velocities of flood flows for the one (1) year, ten (10) year, or one hundred (100) year frequency, twenty-four (24) hour, Type III storm events so as to cause harm to life, property, or other functions and values provided by freshwater wetlands, buffers or floodplain;

See response to item 16 above. The site is not in a velocity zone and although a minimal amount of filling is proposed, no changes in flow paths or flow directions are proposed.

19. Placement of any structure or obstruction within a floodway so as to cause harm to life, property, or other functions and values provided by freshwater wetlands or their associated buffers;

No aboveground structures are planned at the project site so an increased risk or harm to life or property is not anticipated from this project. The project will not change the functions or values or freshwater wetlands or Buffer.

20. Any increase in run-off rates over pre-project levels or any increase in peak flood elevations within freshwater wetlands, buffers, floodplains, areas subject to flooding or areas subject to storm flowage for the one (1) year, ten (10) year, or one hundred (100) year frequency, twenty-four (24) hour, Type III storm events which could impair their ability to protect life or property from flooding or flood flows;

The project is a stormwater retrofit intended to treat stormwater that enters the Roger Williams Park Ponds by constructing and installing a new treatment train at the location of an existing 48-inch outfall to Roosevelt Lake. The site will remain substantially unchanged between existing and proposed conditions and current land uses will be restored to their existing condition. While a minor amount of filling is proposed, it has been limited to an area of approximately 3,000 square feet. The total fill volume is about 75 cubic yards, approximately 50 cubic yards of which is in the concrete sidewalk area. This fill is necessary to adequately install and cover structures and piping associated with the treatment system.

The project proposes impounding stormwater flow in the existing 48-inch outfall to Roosevelt Pond with stop logs, to divert up to 3 cfs of flow to the new stormwater treatment train. Hydraulic calculations were performed to verify that the capacity overtopping the stop logs (approximately 65 cfs) meets the capacity in the 48-inch pipe in its partially submerged condition.

Due to the stormwater retrofit nature of the project, the project's relatively small footprint, and plans to substantially restore the site to its existing condition, pre- and post- condition stormwater flows have not been calculated from the project site and are anticipated to be predominately unchanged.

21. Any increase in run-off volumes and discharge rates which could, in any way, exacerbate flooding conditions in flood-prone areas;

Due to the stormwater retrofit nature of the project, the project's relatively small footprint, and plans to substantially restore the site to its existing condition, pre- and post- condition stormwater flows have not been calculated from the project site and are anticipated to be predominately unchanged. The diversion manhole has been designed to allow peak flows to overtop the stop log diversion at the capacity of the existing, partially submerged 48-inch outfall.

22. Significant changes in the quantities and flow rates of surface or groundwater to or from isolated freshwater wetlands (e.g., those freshwater wetlands without inflow or outflow channels);

Volumes and flow rates of surface or groundwater to isolated freshwater wetlands on the site will not be altered by project activities. Minimal grading and filling is necessary for the project but changes in flow patterns and pathways are not anticipated.

23. Placement of any structural stormwater best management practices within freshwater wetlands, or proposal to utilize freshwater wetlands as a stormwater best management practice;

No stormwater BMPs, outside of the stormwater treatment train itself, are planned for the site. The stormwater treatment train is designed to treat stormwater that discharges to Roosevelt Lake from offsite and not stormwater runoff into the lake from the site itself.

24. Any more than a short-term decrease in surface water or groundwater elevations within any freshwater wetlands;

Surface and groundwater diversion may be performed on a temporary basis to facilitate construction, but no permanent diversion of surface water or groundwater is proposed by this project. Grading revisions are proposed but existing runoff drainage patterns and flow directions will be maintained. Surface water drainage from the project site is via overland flow to the pond.

25. Non-compliance with the Rhode Island Department of Environmental Management Water Quality Regulations, Subchapter 05 Part 1 of this Chapter; or

The project complies with the RIDEM Water Quality Regulations.

26. Any detrimental modification of the ability of a freshwater wetland or buffer to retain or remove nutrients or act as natural pollution filter.

No impact to freshwater wetland or Buffer Zone, or their ability to remove nutrients and provide natural filtration, is anticipated as a result of this project.

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VII. VARIANCE REQUEST (§ 3.7.3)

The proposed project meets the Freshwater Wetlands and Buffer Protection Standards with the exception of the Freshwater Wetlands Buffer Standard (§3.7.1(B)) as detailed in Section V above. The applicant requests a variance from this standard to complete the project as proposed. As the City of Providence is a municipality, the project applies to Variance Criteria for Public and Governmental Bodies identified in §3.7.3(B) of the Regulations.

Impacts to freshwater wetlands and Buffer Zone have been avoided and minimized to the extent practicable and disturbed Buffer Zone will be substantially restored to its existing condition. The Buffer Zone is already used for passive recreation as part of the park's network of walking trails, and those long-standing uses will remain unchanged. The Review Criteria in §3.7.2 are addressed in Section VI above. Due to the goals of the project and site constraints, work within Buffer Zone is unavoidable and work within the Buffer Zone has been minimized to the greatest extent possible.

The project meets the applicable Variance Criteria for Public and Governmental Bodies established at §3.7.3(B) as follows:

3.7.3(B)(1)(a) Avoidance

1) **Whether the primary proposed activity is water-dependent or whether it requires access to freshwater wetlands, buffers, floodplains, areas subject to flooding or areas subject to storm flowage as a central element of its primary purpose.**

   The project is water-dependent as the intent is to provide water quality improvements in the Roger Williams Park Ponds by installing and constructing a new stormwater treatment train at an existing 48-inch outfall to Roosevelt Lake.

2) **Whether any areas within the same property or other properties owned or controlled by the applicant could be used to achieve the project purpose without altering the natural character of any freshwater wetlands, buffers, floodplains, areas subject to flooding or areas subject to storm flowage.**

The project is proposed in its current scale and configuration to capture and treat stormwater that enters Roosevelt Lake from the existing 48-inch outfall. The park's southern property line is approximately 20 feet from the edge of the pond, so there are no upland areas on City property that are feasible for this project.

3) **Whether any other properties reasonably available to, but not currently owned or controlled by, the applicant could be used to achieve the project purpose while avoiding freshwater wetlands, buffers, floodplains, areas subject to flooding or areas subject to storm flowage alterations. A property is reasonably available if, in whole or in part, it can be acquired without excessive cost, taking individual circumstances into account, or, in the case of property owned or controlled by the same family, entity, group of affiliated entities, or local, State or Federal government, may be obtained without excessive hardship.**

   Property immediately to the south of the project area is owned by RIDOT. While an easement from RIDOT to relocate the treatment system onto their property may have been feasible, it would introduce other project challenges and costs such as significant tree clearing, work on a steep slope, and relocation of an existing water main where it would have been in conflict with new drainage pipe. We believe these constraints would present technical and financial hardships for the success of the project.

4) **Whether alternative designs, layouts or technologies could be used to avoid freshwater wetlands, buffers, floodplains, areas subject to flooding or areas subject to storm flowage or impacts on functions and values on the subject property or whether the project purpose could be achieved on other property that is reasonably available and would avoid freshwater wetlands, buffers, floodplains, areas subject to flooding or areas subject to storm flowage.**

   The proposed design entirely avoids freshwater wetlands. No alternative designs, layouts, or technologies have been identified that would avoid impacts to Buffer Zones.

5) **Whether the applicant has made any attempts (and if so what they were) to avoid alterations to freshwater wetlands, buffers, floodplains, areas subject to flooding or areas subject to storm flowage by overcoming or removing constraints imposed by zoning, infrastructure, parcel size or the like;**

No impacts to freshwater wetlands are planned. Earlier project layouts proposed grading within a portion of the shrub swamp wetland to the north of the site, but the project has been revised to avoid disturbing this area.

6) **Whether the feasible alternatives that would not alter the natural character of any freshwater wetlands, buffers, floodplains, areas subject to flooding or areas subject to storm flowage on the subject property or on property that is reasonably available, if incorporated into the proposed project would adversely affect public health, safety, or the environment.**

No feasible alternatives have been identified that would entirely avoid work within the Buffer Zone. The proposed project will not result in adverse impacts to public health, safety, or the environment. On the contrary, the intent is to improve water quality in the Roger Williams Park Ponds which benefits public health, safety, and the environment.

3.7.3(B)(1)(a) Minimization

1) **Whether the proposed project is necessary at the proposed scale or whether the scale of the alteration could be reduced and still achieve the project purpose.**

The project scale is necessary to achieve the City's goals for the project.

2) **Whether the proposed project is necessary at the proposed location or whether another location within the site could achieve the project purpose while resulting in less impacts to the freshwater wetlands, buffers, floodplains, areas subject to flooding or areas subject to storm flowage.**

As described above, the work is necessary at the proposed location due to the site-specific nature of the work. No practical alternative site is available to fulfill the project goals.

3) **Whether there are feasible alternative designs, layouts, densities or technologies, that would result in less impacts to the freshwater wetlands, buffers, floodplains, areas subject to flooding or areas subject to storm flowage while still achieving the project purpose; and**

No alternative designs, layouts, densities, or technologies that would result in less impact have been identified. No freshwater wetland impacts are planned and the project site will be substantially restored once construction is complete.

4) **Whether reduction in the scale or relocation of the proposed project to minimize impact to the freshwater wetlands, buffers, floodplains, areas subject to flooding or areas subject to storm flowage would result in adverse consequences to public health, safety, or the environment.**

Reduction in the project scale or relocation of the project would not have direct adverse consequences to public health, safety, and the environment except that these changes could affect the project's ability to meet the water quality goals envisioned for the project.

3.7.2(B)(1)(c) Project Site Conditions

Existing site conditions, constraints, and the overall goals and objectives of the project prevent the applicable Freshwater Wetland and Buffer Protection Standards from being fully met. These site constraints are explained throughout this project narrative and are evident on the Plans. As detailed in previous sections, significant effort has been made to minimize disturbance to Buffer Zones and no work is planned or proposed within freshwater wetlands.

3.7.2(B)(1)(d) Public Purpose & Benefits

The project serves a necessary public purpose, aimed at significantly improving water quality within the Roger Williams Park Ponds to help comply with the requirements of a Consent Agreement between the City and RIDEM.

SECTION 4

Wetland Delineation Documentation

WETLAND FIELD REPORT

PROJECT TITLE: Roger Williams Park
REPORT DATE: 3/22/2023
LOCATION: Providence, Rhode Island
WEATHER: Sunny; 34° F
PARE JOB NO.: 22220.00
PERFORMED BY: Seaver Anderson

DISCUSSIONS AND COMMENTS

Wetlands in the vicinity of the westernmost end of Roosevelt Lake in Roger Williams Park, were defined and delineated in accordance with Section 3.21 of the Rhode Island Department of Environmental Management (RIDEM) Rules and Regulations Governing the Administration and Enforcement of the Rhode Island Freshwater Wetlands Act (referred to herein as the RIDEM Regulations). Inspection and delineation of the site wetlands were completed on January 11, 2023.

In this report the "site" refers to the area west of Roosevelt Lake approximately 120 feet east of Elmwood Avenue (Route 1) and 150 northeast of the R.I. Route 10 offramp to Elmwood Avenue. Roosevelt Lake and two shrub swamps are located east of the site. According to RIGIS data, the site is not located within any Natural Heritage Areas. According to the 2022 State of Rhode Island Impaired Waters Report the Roger Williams Park Ponds (WBID RI0006017L-05), which Roosevelt Lake is a part of, are impaired for excess algal growth, total phosphorus, dissolved oxygen, fecal coliform, and non-native aquatic plants.

Pink field flags were placed at appropriate intervals along the edges of Roosevelt Lake and bordering wetlands in the vicinity of the proposed work area. Roosevelt Lake is a manmade feature and a majority of its edges are defined by stone retaining walls. Therefore, field flags were only placed along pond edges not defined by a retaining wall. Primary parameters evaluated in wetland delineation included vegetation, hydric soil features, and other visual indicators of hydrology. Observed wetland vegetation, hydrologic indicators and soils are described in the following sections and within the attached Wetland Edge Delineation Data Forms. The project site is located in the Urban Region according to the Freshwater Wetlands Buffer Regions Map included under Rule 3.24. Wetland resource areas on the property include the following, as defined under §3.4 of the RIDEM Regulations: Roosevelt Lake (**Pond**) with an associated **50-foot Buffer Zone** and two (2) **Shrub Swamps** with associated **50-foot Buffer Zones.** All three (3) wetland resource areas receive a **100-foot Jurisdictional Area**.

WETLAND DESCRIPTIONS

Roosevelt Lake

Roosevelt Lake is an approximately 4.4-acre manmade waterbody and is part of the Roger Williams Park Pond complex. Roosevelt Lake is defined as a Pond under §3.4 of the RIDEM Regulations and, according to the table in §3.23(I)(1), has an associated **50-foot Buffer Zone**. The edges of the Pond in the vicinity of the site were delineated to establish the limits of the buffer zone, setbacks, and jurisdictional area in the vicinity of the site. A majority of the pond bank in the this area is defined by masonry retaining wall and therefore, the surveyed edge of wall was used to determine edges of the pond where present.

Flags P-1 to P-3 define an approximately 20-foot section of earthen bank northeast of the site. Banks in this area are defined by a break in slope from a concrete pedestrian walkway. Landscape plantings are present along this section of bank as well as areas upgradient of the retaining wall north of the site.

The Pond receives flow from Mashapaug Pond (±0.75 miles to the northwest of the site) via a 48-inch reinforced concrete pipe. The pipe discharges to Roosevelt Pond at the western end of the pond within the site limits. Typical vegetation observed along the Bank of the Pond include, but are not limited to, the following species:

Common Name	Scientific Name	Indicator Status
Sweet Pepperbush	*Clethra alnifolia*	FAC
Willow	*Salix sp.*	Assume FAC or wetter
Winterberry	*Ilex verticillata*	FACW
Silky Dogwood	*Cornus amomum*	FACW
Swamp Rose	*Rosa palustris*	OBL
Common Boneset	*Eupatorium perfoliatum*	FACW
Cattail	*Typha latifolia*	OBL
Soft Rush	*Juncus effusus*	FACW
Sensitive fern	*Onoclea sensibilis*	FACW

Vegetated Wetlands

Two (2) shrub swamps exist in the vicinity of the project site. These include Wetland A (7,167± sf) bordering the southern bank of the pond and Wetland B (165± sf) bordering the northwest bank of the pond. According to Rule 3.23(I)(3)(d) all swamps, except for evergreen forested swamps, receive a 25-foot Buffer Zone. Under Rule 3.23(F)(2) each wetland has a 25-foot buffer zone extension because another wetland type (Roosevelt Lake) exists within 50-feet of the wetland edge. Therefore, the A and B series shrub swamps have associated **50-foot Buffer Zones**. Each of the delineated wetlands are described below.

Wetland A

Flag series A-1 to A-8 defines the southwestern edge of a manmade **Shrub Swamp** bordering the southern edge of Roosevelt Lake in the vicinity of the site. The flag series begins east of the site at the end of a stone masonry wall and extends northwest along the toe of slope associated with the concrete walkway that surrounds the pond area. The shrub swamp is a manmade wetland that was constructed in 2019. The swamp extends into Roosevelt Lake and is vegetated with a diverse array of saplings, shrubs and emergent vegetation. Prevalent species include Willow, Sweet Pepperbush, and Broadleaf Cattail. The wetland appears to have seasonally flooded hydrology as indicated by water-stained leaves and pockets of standing water observed within the wetland. Hydrology appears to be driven primarily by Roosevelt Lake. Vegetation within the wetland included, but was not limited to, the following species:

Common Name	Scientific Name	Indicator Status
Sweet Pepperbush	*Clethra alnifolia*	FAC
Willow	*Salix sp.*	Assume FAC

Winterberry	*Ilex verticillata*	FACW
Silky Dogwood	*Cornus amomum*	FACW
Common Boneset	*Eupatorium perfoliatum*	FACW
Broadleaf Cattail	*Typha latifolia*	OBL
Soft Rush	*Juncus effusus*	FACW
Tussock sedge	*Carex stricta*	OBL
Sensitive fern	*Onoclea sensibilis*	FACW

Wetland B

Flag series B-1 to B-5 defines the northern edge of a pocket **Shrub Swamp** wetland that borders Roosevelt Lake. The wetland area exists above the masonry retaining wall that surrounds the lake and is also a manmade feature, the result of hydrophytic shrub plantings in a saturated area. Due to its low elevation along Roosevelt Lake this area appears to remain saturated during the growing season. The upper edge of the wetland aligns with the foot slope of an earthen embankment that leads downgradient from the adjacent pedestrian walkway. The delineation starts at the retaining wall where shrub vegetation begins and continues north and east around an area that, based upon soil characteristics, remains saturated during the growing season. The retaining wall separates the shrub swamp from Roosevelt Pond. The wetland is dominated by Swamp Rose with Silky Dogwood present as well. In a follow up conversation with the City of Providence Parks and Recreation department, it was found that this area was also planted by the Roger Williams Park grounds crew. Vegetation within the wetland included, but was not limited to, the following species:

Common Name	Scientific Name	Indicator Status
Silky Dogwood	*Cornus amomum*	FACW
Swamp Rose	*Rosa palustris*	OBL

Floodplain and Floodway

According to FEMA Flood Insurance Rate Map for the area (Map Number 44007C0095G, effective date March 3, 2009), the site is mapped as Flood Zone X (0.2% annual chance flood hazard, areas of 1% annual chance flood with average depths of less than one foot or with drainage areas of less than one square mile) and Zone A (1% annual chance of flooding, with no base flood elevation).

SWA/GDL

Wetland Edge Delineation Data Form (UPLAND)

Applicant: City of Providence
Wetland No. 1
Project Name: Roger Williams Stormwater Treatment Train
Flag No. Sequence: A-1 to A-8
City/Town: Providence
Delineation Date: 1/11/2023

Vegetation: List the three dominant species in each vegetative strata along with their NWI status:

Tree	Indicator Status	Herbs	Indicator Status
Quercus rubra	FACU	Maintained Grass	Assume FACU
Ulmus rubra	FAC		
Catalpa sp.	Assume FACU		

Saplings/Shrubs	Indicator Status	Woody Vines	Indicator Status
Rosa Multiflora	FACU	Toxicodendron radicans	FAC
Clethra alnifolia	FAC	Celastrus orbiculatus	FACU

List other vegetative species noted which may have affected determination of the wetland edge: Other, unidentifiable landscape plantings are located in the vicinity of the A-Series wetland, likely non-native.

Soil: SCS Soil Survey Mapping Unit: MmB - Merrimac fine sandy loam, 3-8% slopes
On Hydric Soils List? ☐ YES ☐ NO
Soil Profile (Note wetland flag no. nearest soil test pit): A-6

Horizon	Depth	Matrix Color	Mottling Description	Depth to Saturation	Depth to Free Water
Ap	0-6"	10YR 2/2	-	-	-
Bw	6-18+"	10YR 3/2	-	-	-

Other indicators exhibiting an absence of wetland hydrology (e.g. absence of water marks, lack of redoximorphic features, lack of oxidized rhizospheres, etc.):
Landscape position: sideslope
Altered/atypical situation? (describe): Concrete walkway up-gradient of upland transect.

Comments:

Wetland Edge Delineation Data Form (WETLAND)

Applicant: City of Providence
Wetland No. 1
Project Name: Roger Williams Stormwater Treatment Train
Flag No. Sequence: A-1 to A-8
City/Town: Providence
Delineation Date: 1/11/2023

Vegetation: List the three dominant species in each vegetative strata along with their NWI status:

Tree	Indicator Status	Herbs	Indicator Status
Salix sp.	Assume FAC or FACW	Dichanthelium clandestinum	FACW
Populus deltoides	FAC	Juncus effusus	OBL
		Carex sp.	Assume FACW

Saplings/Shrubs	Indicator Status	Woody Vines	Indicator Status
Clethra alnifolia	FAC	N/A	
Ilex verticillata	FACW		
Rosa multiflora	FACU		

List other vegetative species noted which may have affected determination of the wetland edge: Eupatorium perfoliatum, Typha latifolia, Carex lurida

Soil: SCS Soil Survey Mapping Unit: MmB - Merrimac fine sandy loam, 3-8% slopes
On Hydric Soils List? ☐ YES ☐ NO
Soil Profile (Note wetland flag no. nearest soil test pit): A-6

Horizon	Depth	Matrix Color	Mottling Description	Depth to Saturation	Depth to Free Water
Ap	0-8"	10YR 3/1	5YR 3/4	0"	-
Bg	8-16+"	10YR 4/2	5YR 3/4	-	10"

Other indicators exhibiting an absence of wetland hydrology (e.g. water marks, drainage patterns, root rhizospheres, etc.; see § 3.21.1 (D) of the Rules): Water-stained leaves
Landscape position: Toeslope
Altered/atypical situation? (describe): manmade wetland

Comments:

Wetland Edge Delineation Data Form (UPLAND)

Applicant: City of Providence
Project Name: Roger Williams Stormwater Treatment Train
City/Town: Providence
Wetland No. 1
Flag No. Sequence: A-1 to A-8
Delineation Date: 1/11/2023

Vegetation: List the three dominant species in each vegetative strata along with their NWI status:

Tree	Indicator Status	Herbs	Indicator Status
Quercus rubra	FACU	Maintained Grass	Assume FACU
Ulmus rubra	FAC		
Catalpa sp.	Assume FACU		

Saplings/Shrubs	Indicator Status	Woody Vines	Indicator Status
Rosa Multiflora	FACU	Toxicodendron radicans	FAC
Clethra alnifolia	FAC	Celastrus orbiculatus	FACU

List other vegetative species noted which may have affected determination of the wetland edge: Other, unidentifiable landscape plantings are located in the vicinity of the A-Series wetland, likely non-native.

Soil: SCS Soil Survey Mapping Unit: MmB - Merrimac fine sandy loam, 3-8% slopes
On Hydric Soils List? ☐ YES ☐ NO
Soil Profile (Note wetland flag no. nearest soil test pit): A-6

Horizon	Depth	Matrix Color	Mottling Description	Depth to Saturation	Depth to Free Water
Ap	0-6"	10YR 2/2	-	-	-
Bw	6-18+"	10YR 3/2	-	-	-

Other indicators exhibiting an absence of wetland hydrology (e.g. absence of water marks, lack of redoximorphic features, lack of oxidized rhizospheres, etc.):
Landscape position: sideslope
Altered/atypical situation? (describe): Concrete walkway up-gradient of upland transect.

Comments:

Wetland Edge Delineation Data Form (WETLAND)

Applicant: City of Providence
Project Name: Roger Williams Stormwater Treatment Train
City/Town: Providence
Wetland No. 1
Flag No. Sequence: A-1 to A-8
Delineation Date: 1/11/2023

Vegetation: List the three dominant species in each vegetative strata along with their NWI status:

Tree	Indicator Status	Herbs	Indicator Status
Salix sp.	Assume FAC or FACW	Dichanthelium clandestinum	FACW
Populus deltoides	FAC	Juncus effusus	OBL
		Carex sp.	Assume FACW

Saplings/Shrubs	Indicator Status	Woody Vines	Indicator Status
Clethra alnifolia	FAC	N/A	
Ilex verticillata	FACW		
Rosa multiflora	FACU		

List other vegetative species noted which may have affected determination of the wetland edge: Eupatorium perfoliatum, Typha latifolia, Carex lurida

Soil: SCS Soil Survey Mapping Unit: MmB - Merrimac fine sandy loam, 3-8% slopes
On Hydric Soils List? ☐ YES ☐ NO
Soil Profile (Note wetland flag no. nearest soil test pit): A-6

Horizon	Depth	Matrix Color	Mottling Description	Depth to Saturation	Depth to Free Water
Ap	0-8"	10YR 3/1	5YR 3/4	0"	-
Bg	8-16+"	10YR 4/2	5YR 3/4	-	10"

Other indicators exhibiting an absence of wetland hydrology (e.g. water marks, drainage patterns, root rhizospheres, etc.; see § 3.21.1 (D) of the Rules): Water-stained leaves
Landscape position: Toeslope
Altered/atypical situation? (describe): manmade wetland

Comments:

SECTION 5

Existing Conditions Photographs

Photo No. 1: View of the shrub swamp and western end of Roosevelt Lake where work is proposed. Facing southeast toward flag B-3 and the water quality sampling equipment.

Photo No. 2: View of the 50-foot Buffer Zone west of Roosevelt Lake where work is proposed. Facing northwest from the pedestrian walkway.

Photo No. 3: View of the shrub swamp, pedestrian walkway, and Roosevelt Lake facing west from near wetland flag A-6.

Photo No. 4: View of the 48-inch pipe outlet that discharges flow from Mashapaug Pond to Roosevelt Lake.

SECTION 6

Project Plans
(Bound Separately)

Roger Williams Park
Stormwater Treatment Train

AP 090, Lot 157

1000 Elmwood Avenue
Providence, Rhode Island

CIVIL ENGINEER:

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

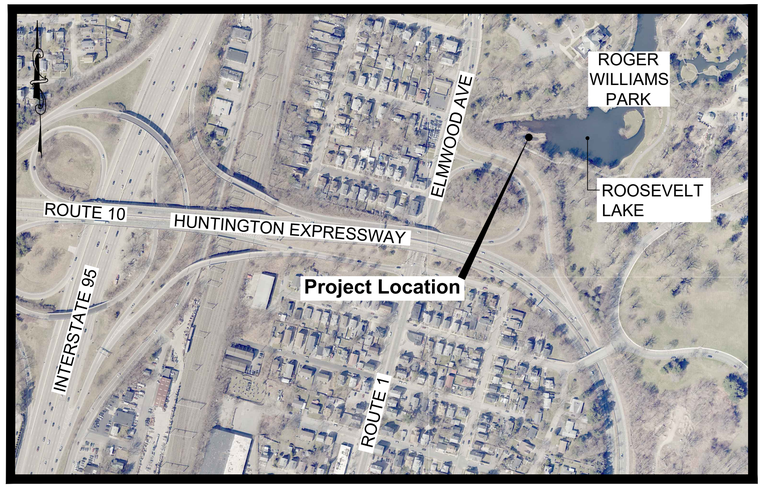
14 BOBALA ROAD, SUITE 2B
HOLYOKE, MA 01040
413.507.3448

PREPARED FOR:

PROVIDENCE PARKS DEPARTMENT
1000 ELMWOOD AVENUE
PROVIDENCE, RI 02905

Providence Stormwater Innovation Center

PROVIDENCE STORMWATER
INNOVATION CENTER
1000 ELMWOOD AVENUE
PROVIDENCE, RI 02905



Scale : N.T.S.

HONORABLE BRETT P. SMILEY, MAYOR
WENDY NILSSON, SUPERINTENDENT OF PARKS

BID DOCUMENTS
APRIL 2023

INDEX OF DRAWINGS

REFERENCE

1. PROJECT LOCATION: ROGER WILLIAMS PARK 1000 ELMWOOD AVENUE, PROVIDENCE, RI 02905
   ASSESSOR'S MAP 090, LOT 157.
2. EXISTING CONDITIONS MAPPING TAKEN FROM PLAN ENTITLED "TOPOGRAPHIC SURVEY DATA ACCUMULATION PLAN" PREPARED BY MARTINEZ COUCH & ASSOCIATES LLC, DATED 12-29-22.
3. WETLAND FLAGS IDENTIFYING WETLAND RESOURCE AREAS WERE PLACED BY PARE CORPORATION ON JANUARY 11, 2023 AND LOCATED BY PARE CORPORATION USING A TRIMBLE R12 GPS DEVICE.
4. EXISTING SUBSURFACE UTILITIES IN PROJECT AREA LOCATED FROM GROUND PENETRATING RADAR (GPR) SURVEY PERFORMED BY GPRS, INC. IN DECEMBER 2022. LOCATIONS ARE APPROXIMATE.
5. EXISTING CONDITIONS SHOWN ARE ACCURATE TO THE DEGREE IMPLIED BY THE METHODS USED.

GENERAL NOTES

1. PER AVAILABLE RIDEM MAPPING, THE PROJECT SITE IS LOCATED ADJACENT TO A NATURAL HERITAGE AREA.
2. THE PROJECT SITE IS LOCATED WITHIN ZONE A, ACCORDING TO FEMA FLOOD MAP 44007C0316G EFF 3/2/2009.
3. THE STATE OF RHODE ISLAND STANDARD SPECIFICATIONS FOR ROAD AND BRIDGE CONSTRUCTION, AMENDED MARCH 2018 WITH ALL REVISIONS AND ADDENDA, THE RHODE ISLAND STANDARD DETAILS, AND THE PROVIDENCE PARKS STANDARD DETAILS ARE MADE A PART HEREOF AS FULLY AND COMPLETELY AS IF ATTACHED HERETO. ALL WORK SHALL MEET OR EXCEED THE RHODE ISLAND STANDARD SPECIFICATIONS FOR ROAD AND BRIDGE CONSTRUCTION, WITH LATEST REVISIONS. REFERENCES TO MEASUREMENT AND PAYMENT ARE OMITTED. THE LATEST REVISION OF THE STANDARD SPECIFICATIONS MAY BE OBTAINED AT THE RHODE ISLAND DEPARTMENT OF TRANSPORTATION.
4. THE CONTRACTOR SHALL MAKE ALL NECESSARY CONSTRUCTION NOTIFICATIONS AND APPLY FOR AND OBTAIN ALL NECESSARY CONSTRUCTION PERMITS, PAY ALL FEES AND POST ALL BONDS ASSOCIATED WITH THE SAME, AND COORDINATE WITH THE ENGINEER AND OWNER'S REPRESENTATIVE AS REQUIRED.
5. THE CONTRACTOR SHALL BE SOLELY RESPONSIBLE FOR JOB SITE SAFETY. THE CONTRACTOR SHALL PROVIDE TEMPORARY FENCING AND/OR BARRIERS AROUND ALL OPEN EXCAVATED AREAS IN ACCORDANCE WITH OSHA FEDERAL, STATE, AND LOCAL REQUIREMENTS. TEMPORARY CONSTRUCTION FENCE LOCATION SHALL BE DETERMINED BY CONTRACTOR AND APPROVED BY THE OWNER AND ENGINEER.
6. THE CONTRACTOR SHALL BE RESPONSIBLE FOR VERIFYING THAT THE PROPOSED IMPROVEMENTS SHOWN ON THE PLANS DO NOT CONFLICT WITH ANY KNOWN EXISTING OR OTHER PROPOSED IMPROVEMENTS. IF ANY CONFLICTS ARE DISCOVERED, THE CONTRACTOR SHALL NOTIFY THE OWNER AND THE ENGINEER PRIOR TO INSTALLATION OF ANY PORTION OF THE SITE WORK WHICH WOULD BE AFFECTED. NO FIELD ADJUSTMENTS IN THE LOCATION OF SITE ELEMENTS SHALL BE MADE WITHOUT THE ENGINEER'S APPROVAL.
7. IF ANY DEVIATION OR ALTERATION OF THE WORK PROPOSED ON THESE DRAWINGS IS REQUIRED, THE CONTRACTOR SHALL IMMEDIATELY CONTACT AND COORDINATE ANY DEVIATIONS WITH THE ENGINEER AND OWNER. ALL CHANGE ORDERS NEED TO BE PRE-APPROVED BY OWNER IN WRITING.
8. ANY AREA OUTSIDE OF THE LIMIT OF WORK THAT IS DISTURBED SHALL BE RESTORED TO ITS ORIGINAL CONDITION AT NO ADDITIONAL COST TO THE OWNER.
9. ALL SITE WORK SHALL MEET OR EXCEED THE SITE WORK SPECIFICATIONS PREPARED FOR THIS PROJECT.
10. ALL TEMPORARY SIGNS SHALL BE REFLECTORIZED TYPE III SHEETING AND CONFORM WITH THE MANUAL OF UNIFORM TRAFFIC CONTROL DEVICES (MUTCD), LATEST REVISION.
11. ALL UTILITIES (LOCATION AND ELEVATION) DEPICTED SHALL BE CONSIDERED APPROXIMATE ONLY. BEFORE COMMENCING SITE WORK IN ANY AREA, CONTACT "DIG SAFE" AT 1-888-DIG-SAFE (1-888-344-7233) OR 811 TO ACCURATELY LOCATE UNDERGROUND UTILITIES. ANY DAMAGE TO EXISTING UTILITIES OR STRUCTURES AND THE COST TO REPAIR THE DAMAGES TO INITIAL CONDITIONS, AS DEPICTED ON THE PLANS, SHALL BE THE CONTRACTOR'S RESPONSIBILITY.
12. NO EXCAVATION SHALL BE DONE UNTIL UTILITY COMPANIES ARE PROPERLY NOTIFIED IN ADVANCE. NOTE THAT NOT ALL EXISTING UNDERGROUND UTILITIES MIGHT BE SHOWN. IT IS THE CONTRACTOR'S RESPONSIBILITY TO CONTACT ALL RESPECTIVE UTILITY COMPANIES TO VERIFY AND LOCATE EXISTING UTILITIES.
13. ALL LINES ARE PERPENDICULAR OR PARALLEL TO THE LINES FROM WHICH THEY ARE MEASURED UNLESS OTHERWISE INDICATED.
14. PRIOR TO COMMENCING WORK, THE CONTRACTOR SHALL PERFORM BENCHMARK FIELD LEVEL VERIFICATION AND COORDINATE LAYOUT CHECK. THE CONTRACTOR SHALL CONTACT ENGINEER IF ANY DISCREPANCIES ARE FOUND.
15. CONTRACTOR SHALL PROVIDE LOAM AND SEED ON ALL DISTURBED AREAS UNLESS NOTED OTHERWISE.
16. **PRIOR TO COMMENCING WORK**, THE CONTRACTOR SHALL EMPLOY A PROFESSIONAL LAND SURVEYOR REGISTERED IN THE STATE OF RHODE ISLAND TO ESTABLISH CONTROL ON THE SITE AND TO PERFORM FIELD MEASUREMENTS AS REQUIRED TO LAYOUT THE PROPOSED FACILITIES AND SITE IMPROVEMENTS.
17. COORDINATE ALL SIGN PLACEMENT AND SIZE WITH OWNER PRIOR TO INSTALLATION.
18. OWNER, ENGINEER AND OWNER'S DESIGNATED PROJECT TEAM MEMBERS SHALL BE NOTIFIED OF MOBILIZATION AND DEMOBILIZATION AT LEAST 48 HOURS IN ADVANCE.
19. LIMIT OF WORK MUST BE CLEARED FOR 'LOCAL LINES' BY THE PARKS DEPARTMENT PRIOR TO MOBILIZATION.

DEMOLITION NOTES

1. THE CONTRACTOR SHALL COORDINATE ALL DEMOLITION OF STRUCTURES, PAVEMENT AND CONCRETE MATERIALS, AND UTILITIES WITH ALL APPROPRIATE PROPOSED SITE PLANS AND DETAILS.
2. ALL NOTED UTILITIES TO BE REMOVED AND DISPOSED OF, RELOCATED, OR CAPPED REPRESENT ALL KNOWN SITE CONDITIONS TO BE DEMOLISHED. THE CONTRACTOR SHALL COORDINATE ALL UNFORESEEN CONDITIONS WITH THE ENGINEER, OWNER, AND/OR RESPECTIVE UTILITY COMPANIES PRIOR TO PROCEEDING WITH WORK.
3. EXISTING UTILITIES, INCLUDING STORMWATER OUTFALLS ARE TO REMAIN ACTIVE THROUGHOUT CONSTRUCTION. THERE SHALL BE NO INTERRUPTION OF UTILITY SERVICES DURING THE CONSTRUCTION OPERATION WITHOUT APPROVAL FROM THE OWNER. CONTRACTOR SHALL SUBMIT A SEQUENCE OF WORK THAT DETAILS HOW STORMWATER FLOW TO POND WILL REMAIN ACTIVE DURING DIVERSION MANHOLE CONSTRUCTION.
4. PRIOR TO ANY UTILITY AND/OR DRAINAGE SYSTEM DEMOLITION, PROVISIONS FOR MAINTAINING THE UTILITY SHALL BE APPROVED BY THE OWNER OR ENGINEER BEFORE ANY RELATED WORK MAY COMMENCE.
5. ALL TEMPORARILY CUT UTILITIES SHALL BE PROTECTED FROM SEDIMENTATION UNTIL IT IS CONNECTED IN ITS POST-CONSTRUCTION POSITION.

GRADING AND UTILITY NOTES

1. ALL WORK PERFORMED AND ALL MATERIALS FURNISHED SHALL CONFORM WITH THE LINES AND GRADES ON THE PLANS AND SITE WORK SPECIFICATIONS.
2. AT ALL LOCATIONS WHERE EXISTING CURBING OR PAVEMENT ABUT NEW CONSTRUCTION, THE EDGE OF THE EXISTING CURB OR PAVEMENT SHALL BE SAWCUT TO A CLEAN, SMOOTH EDGE. BLEND NEW PAVEMENT AND CURBS SMOOTHLY INTO EXISTING BY MATCHING LINES, GRADES AND JOINTS.
3. ALL UTILITY COVERS, GRATES, ETC. SHALL BE ADJUSTED TO BE FLUSH WITH THE SURROUNDING SURFACE OR PAVEMENT FINISH GRADE. RIM ELEVATIONS OF STRUCTURES AND MANHOLES ARE APPROXIMATE. FINAL ELEVATIONS ARE TO BE SET FLUSH AND CONSISTENT WITH THE GRADING PLANS UNLESS OTHERWISE INDICATED.
4. THE CONTRACTOR SHALL MAKE ALL ARRANGEMENTS FOR THE ALTERATION OF PRIVATE UTILITIES BY THE UTILITY COMPANIES, AS REQUIRED. CONTRACTOR SHALL HAVE OWNER IDENTIFY ALL PRIVATE UTILITY LINES PRIOR TO EARTHWORK.
5. WHERE AN EXISTING UTILITY IS FOUND TO CONFLICT WITH THE PROPOSED WORK, THE LOCATION, ELEVATION AND SIZE OF THE UTILITY SHALL BE ACCURATELY DETERMINED WITHOUT DELAY BY THE CONTRACTOR AND THE INFORMATION SHALL BE PROVIDED ON A SKETCH TO SCALE OF THE EXISTING UTILITY WITH TIES TO KNOWN POINTS, ALONG WITH PHOTOS, TO THE ENGINEER FOR RESOLUTION.
6. THE CONTRACTOR SHALL PROTECT ALL UNDERGROUND DRAINAGE, AND OTHER UTILITY FACILITIES FROM EXCESSIVE VEHICULAR LOADS DURING CONSTRUCTION. ANY DAMAGE TO THESE FACILITIES RESULTING FROM CONSTRUCTION LOADS SHALL BE RESTORED TO ORIGINAL CONDITION AT NO ADDITIONAL COST TO THE OWNER.
7. CONTRACTOR IS RESPONSIBLE FOR DESIGN AND IMPLEMENTATION OF SUPPORT OF EXCAVATION AND DEWATERING SYSTEMS REQUIRED FOR THEIR WORK.
8. DURING CONSTRUCTION OPERATIONS, THE CONTRACTOR SHALL PROTECT EXISTING UTILITIES BY PROVIDING TEMPORARY SUPPORTS OR SHEETING AS REQUIRED AT NO ADDITIONAL COST TO THE OWNER.
9. EXCAVATION REQUIRED WITHIN THE PROXIMITY OF EXISTING UTILITY LINES SHALL BE DONE BY HAND. CONTRACTOR SHALL REPAIR ANY DAMAGE TO EXISTING UTILITY LINES OR STRUCTURES INCURRED DURING CONSTRUCTION OPERATIONS AT NO ADDITIONAL COST TO THE OWNER.
10. PITCH EVENLY BETWEEN SPOT GRADES. ALL PAVED AREAS MUST PITCH TO DRAIN AT A MIN. OF 1/8" PER FOOT UNLESS SPECIFIED OTHERWISE.
11. ALL DRAIN PIPES SHALL BE SMOOTH INTERIOR CORRUGATED HIGH DENSITY POLYETHYLENE UNLESS NOTED OTHERWISE.
12. ALL SLOPES PROVIDED ARE FT/FT. MAXIMUM SLOPE FOR LANDSCAPED SLOPES SHALL BE LESS THAN OR EQUAL TO 4H:1V.

EROSION AND SEDIMENTATION CONTROL NOTES

1. ALL EROSION CONTROLS SHALL BE IN ACCORDANCE WITH THE RHODE ISLAND SOIL EROSION AND SEDIMENT CONTROL HANDBOOK, LATEST REVISION.
2. THE CONTRACTOR SHALL BECOME FAMILIAR WITH THE CONDITIONS ISSUED FOR THE PROJECT BY RIDEM AND BE RESPONSIBLE FOR CONFORMANCE WITH ALL PERMIT REQUIREMENTS AND CONSTRUCTION DOCUMENTS.
3. THE CONTRACTOR SHALL BE RESPONSIBLE FOR ESTABLISHING OR INSTALLING ALL TEMPORARY SEDIMENT AND EROSION CONTROLS AS SHOWN ON THESE PLANS AND SHALL MAINTAIN ALL EROSION CONTROL MEASURES AS NECESSARY DURING THE ENTIRE CONSTRUCTION PERIOD.
4. ANTI-TRACKING PADS (R.I. STD. DETAIL 9.9.0) SHALL BE PROVIDED AT ALL POINTS OF VEHICULAR INGRESS AND EGRESS ON THE CONSTRUCTION SITE AND SHALL BE MAINTAINED TO LIMIT TRACKING OR FLOWING OF SEDIMENT ONTO PUBLIC ROADS.
5. EROSION CONTROL BARRIERS SHALL BE INSTALLED AS SHOWN ON THESE PLANS PRIOR TO COMMENCEMENT OF CONSTRUCTION OPERATIONS.
6. SOIL EROSION AND SEDIMENTATION CONTROL MEASURES SHALL BE INSPECTED AND MAINTAINED ON A WEEKLY BASIS AND AFTER EACH STORM EVENT OF 0.25 INCH OR GREATER DURING CONSTRUCTION TO ENSURE THAT CHANNELS, DITCHES AND PIPES ARE CLEAR OF DEBRIS AND THAT THE EROSION CONTROL BARRIERS ARE INTACT. IDENTIFIED DEFICIENCIES SHALL BE CORRECTED IMMEDIATELY.
7. DUST SHALL BE CONTROLLED BY WATERING OR OTHER APPROVED METHODS AS NECESSARY, OR AS DIRECTED BY THE OWNER OR ENGINEER.
8. THE CONTRACTOR SHALL CLEAN AND MAINTAIN EROSION CONTROL BARRIER WHEN SEDIMENT ACCUMULATES TO ONE HALF THE HEIGHT OF THE BARRIER. MATERIAL COLLECTED FROM THE SEDIMENTATION BARRIERS SHALL BE REMOVED AS NECESSARY AND DISPOSED IN AN UPLAND AREA.
9. THE CONTRACTOR SHALL SCHEDULE HIS WORK TO ALLOW THE FINISHED SUBGRADE ELEVATIONS TO DRAIN PROPERLY WITHOUT PONDING. PROVIDE TEMPORARY POSITIVE DRAINAGE, AS REQUIRED, TO STABILIZED DISCHARGE POINTS.
10. INSTALLATION OF THE EROSION CONTROL BARRIERS AS ILLUSTRATED IS INTENDED TO REPRESENT THE MINIMUM SEDIMENTATION CONTROL FACILITIES NECESSARY TO MEET ANTICIPATED SITE CONDITIONS. ADDITIONAL EROSION CONTROL MEASURES SHALL BE IMPLEMENTED AS CONDITIONS WARRANT OR AS DIRECTED BY THE OWNER OR ENGINEER.
11. REQUIRED SEDIMENTATION CONTROL FACILITIES MUST BE PROPERLY ESTABLISHED, CLEARLY VISIBLE AND IN OPERATION PRIOR TO INITIATING ANY LAND CLEARING ACTIVITY AND/OR OTHER CONSTRUCTION RELATED WORK. SUCH FACILITIES SHALL REPRESENT THE LIMIT OF WORK. WORKERS SHALL BE INFORMED THAT NO CONSTRUCTION ACTIVITY IS TO OCCUR BEYOND THE LIMIT OF WORK AT ANY TIME THROUGHOUT THE CONSTRUCTION PERIOD.
12. THE CONTRACTOR SHALL MAINTAIN A SUFFICIENT RESERVE OF VARIOUS EROSION CONTROL MATERIALS ONSITE AT ALL TIMES FOR EMERGENCY PURPOSES OR ROUTINE MAINTENANCE.
13. EXISTING AND NEWLY INSTALLED CATCH BASINS AND STORM DRAIN INLETS SHALL BE PROTECTED WITH APPROPRIATE TEMPORARY INLET PROTECTION IN ACCORDANCE WITH THE RHODE ISLAND SOIL EROSION AND SEDIMENT CONTROL HANDBOOK.
14. DEWATERING WASTE WATERS PUMPED FROM EXCAVATIONS SHALL BE CONVEYED BY HOSE TO AN UPLAND AREA AND DISCHARGED INTO STRAW BALE CORRALS OR SEDIMENTATION BAGS.
15. THE CONTRACTOR SHALL NOT REMOVE ANY TEMPORARY SEDIMENT CONTROL BARRIERS UNTIL THE CONTRIBUTING DRAINAGE AREA HAS BEEN PERMANENTLY STABILIZED.
16. CONSTRUCTION SITE WASTE MATERIALS SHALL BE PROPERLY CONTAINED ONSITE AND DISPOSED OFF SITE AT A LOCATION IN ACCORDANCE WITH THE LOCAL AND STATE REGULATIONS.
17. RIP-RAP OR OTHER ENERGY DISSIPATERS SHALL BE USED WHERE NECESSARY TO PREVENT SCOUR.
18. ALL DISTURBED AREAS SHALL BE STABILIZED WITHIN 14 DAYS UPON COMPLETION OF WORK IN THAT AREA.
19. ALL DRAINAGE STRUCTURES SHALL BE CLEARED OF ACCUMULATED SEDIMENT PRIOR TO ACCEPTANCE OF FINAL PROJECT.
20. NEWLY VEGETATED AREAS SHALL BE MAINTAINED REGULARLY TO ENSURE STABLE VEGETATED SURFACES.
21. EROSION AND SEDIMENTATION CONTROLS SHALL BE UTILIZED AS SHOWN ON THE PLANS. POTENTIAL EROSION AND SEDIMENTATION PROBLEMS ASSOCIATED WITH THE CONSTRUCTION OF THE PROJECT SHALL BE AVOIDED THROUGH THE PROJECT SCHEDULING AND THE USE OF APPROPRIATE STANDARD CONTROLS (RHODE ISLAND SOIL EROSION AND SEDIMENTATION CONTROL HANDBOOK) AS ILLUSTRATED ON THE PROJECT PLANS.
22. WHERE EROSION CONTROLS ARE NEEDED ON IMPERVIOUS SURFACES, THE CONTRACTOR SHALL PROVIDE SAND BAG EROSION CONTROL BARRIER.
23. WATER IN ROGER WILLIAMS PARK PONDS AND SPECIFICALLY, ROOSEVELT POND, SHALL BE PROTECTED FROM SEDIMENT MIGRATION FROM CONSTRUCTION OPERATIONS, AT ALL TIMES.

STORMWATER MANAGEMENT SYSTEM INSPECTION AND MAINTENANCE NOTES

DURING CONSTRUCTION (CONTRACTOR'S RESPONSIBILITY)

1. THE CONTRACTOR SHALL REMOVE SEDIMENT AND DEBRIS FROM ALL STRUCTURES AND PIPELINES IN THE PROJECT AREA ON A ROUTINE BASIS, IMMEDIATELY FOLLOWING SITE STABILIZATION, AND PRIOR TO PROJECT COMPLETION AND ACCEPTANCE.
2. NEW DRAINAGE STRUCTURES SHALL BE CLEANED AND FLUSHED BY THE CONTRACTOR AT THE COMPLETION OF CONSTRUCTION, AND THE CONTRACTOR SHALL BE RESPONSIBLE FOR INSPECTION AND MAINTENANCE OF THE DRAINAGE SYSTEM UNTIL ACCEPTANCE OF THE SYSTEM BY THE OWNER AND ENGINEER. FOLLOWING ACCEPTANCE OF THE SYSTEM, THE OWNER OR THEIR DESIGNATED REPRESENTATIVE SHALL BE RESPONSIBLE FOR THE LONG-TERM INSPECTION AND MAINTENANCE OF THE DRAINAGE SYSTEM IN ACCORDANCE WITH THE PROJECT SPECIFIC OPERATION AND MAINTENANCE MANUAL.
3. ANY ACCUMULATION OF PONDING WATER IN AREAS WITHIN THE LIMITS OF DISTURBANCE, OTHER THAN DESIGNATED AREAS, SHALL BE REMOVED ACCORDINGLY AND PREVENTED IN THE FUTURE.
4. WATERBODIES IN ROGER WILLIAMS PARK, INCLUDING ROOSEVELT LAKE, SHALL BE PROTECTED AT ALL TIMES FROM SEDIMENT MIGRATION RESULTING FROM CONSTRUCTION ACTIVITIES.

RHODE ISLAND ABBREVIATIONS

GENERAL

RIDEM	RHODE ISLAND DEPARTMENT OF ENVIRONMENTAL MANAGEMENT
RIDOT	RHODE ISLAND DEPARTMENT OF TRANSPORTATION
RIHP	RHODE ISLAND HIGHWAY PLAT
RIPDES	RHODE ISLAND POLLUTION DISCHARGE ELIMINATION SYSTEM
R.I. STD.	RHODE ISLAND STANDARD

PARE

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

Roger Williams Park Stormwater Treatment Train

1000 Elmwood Avenue Providence, Rhode Island

NOTES & LEGEND

BRANDON M. BLANCHARD
No. 8965
4.10.25
REGISTERED PROFESSIONAL ENGINEER (CIVIL)

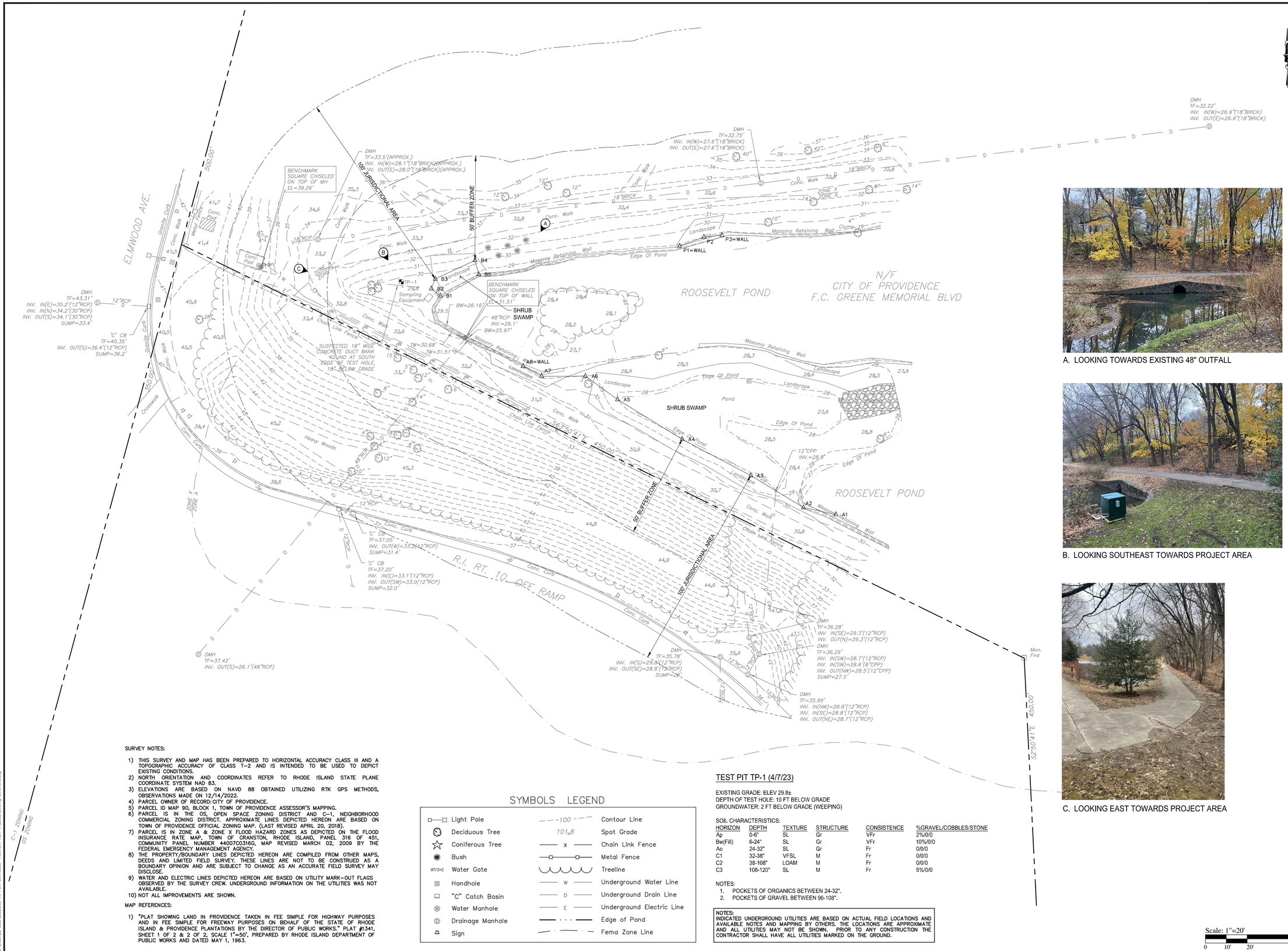
REVISIONS:

PROJECT NO.:	22220.00
DATE:	APRIL 2023
SCALE:	NOT TO SCALE
DESIGNED BY:	CRL
CHECKED BY:	BB
DRAWN BY:	AWB \ AKL
APPROVED BY:	BB

DRAWING NO.: C1.1

SHEET NO. 2 OF 15

Z:\JOBS\22_Jobs\22220.00 RW Pavs Stormwater Treatment Train-RI\DWG\Notes & Legend.dwg



SURVEY NOTES:

1) THIS SURVEY AND MAP HAS BEEN PREPARED TO HORIZONTAL ACCURACY CLASS III AND A TOPOGRAPHIC ACCURACY OF CLASS T-2 AND IS INTENDED TO BE USED TO DEPICT EXISTING CONDITIONS.
2) NORTH ORIENTATION AND COORDINATES REFER TO RHODE ISLAND STATE PLANE COORDINATE SYSTEM NAD 83.
3) ELEVATIONS ARE BASED ON NAVD 88 OBTAINED UTILIZING RTK GPS METHODS, OBSERVATIONS MADE ON 12/14/2022.
4) PARCEL OWNER OF RECORD: CITY OF PROVIDENCE.
5) PARCEL ID MAP 90, BLOCK 1, TOWN OF PROVIDENCE ASSESSOR'S MAPPING.
6) PARCEL IS IN THE OS, OPEN SPACE ZONING DISTRICT AND C-1, NEIGHBORHOOD COMMERCIAL ZONING DISTRICT. APPROXIMATE LINES DEPICTED HEREON ARE BASED ON TOWN OF PROVIDENCE OFFICIAL ZONING MAP. (LAST REVISED APRIL 20, 2018).
7) PARCEL IS IN ZONE A & ZONE X FLOOD HAZARD ZONES AS DEPICTED ON THE FLOOD INSURANCE RATE MAP, TOWN OF CRANSTON, RHODE ISLAND, PANEL 316 OF 451, COMMUNITY PANEL NUMBER 440070C0316G, MAP REVISED MARCH 02, 2009 BY THE FEDERAL EMERGENCY MANAGEMENT AGENCY.
8) THE PROPERTY/BOUNDARY LINES DEPICTED HEREON ARE COMPILED FROM OTHER MAPS, DEEDS AND LIMITED FIELD SURVEY. THESE LINES ARE NOT TO BE CONSTRUED AS A BOUNDARY OPINION AND ARE SUBJECT TO CHANGE AS AN ACCURATE FIELD SURVEY MAY DISCLOSE.
9) WATER AND ELECTRIC LINES DEPICTED HEREON ARE BASED ON UTILITY MARK-OUT FLAGS OBSERVED BY THE SURVEY CREW. UNDERGROUND INFORMATION ON THE UTILITIES WAS NOT AVAILABLE.
10) NOT ALL IMPROVEMENTS ARE SHOWN.

MAP REFERENCES:

1) "PLAT SHOWNG LAND IN PROVIDENCE TAKEN IN FEE SIMPLE FOR HIGHWAY PURPOSES AND IN FEE SIMPLE FOR FREEWAY PURPOSES ON BEHALF OF THE STATE OF RHODE ISLAND & PROVIDENCE PLANTATIONS BY THE DIRECTOR OF PUBLIC WORKS." PLAT #1341, SHEET 1 OF 2 & 2 OF 2, SCALE 1"=50', PREPARED BY RHODE ISLAND DEPARTMENT OF PUBLIC WORKS AND DATED MAY 1, 1963.

SYMBOLS LEGEND

Light Pole		100	Contour Line
Deciduous Tree		101x8	Spot Grade
Coniferous Tree		x	Chain Link Fence
Bush			Metal Fence
Water Gate	WV		Treeline
Handhole		W	Underground Water Line
"C" Catch Basin		D	Underground Drain Line
Water Manhole	W	E	Underground Electric Line
Drainage Manhole	D		Edge of Pond
Sign			Fema Zone Line

TEST PIT TP-1 (4/7/23)

EXISTING GRADE: ELEV 29.8±
DEPTH OF TEST HOLE: 10 FT BELOW GRADE
GROUNDWATER: 2 FT BELOW GRADE (WEEPING)

SOIL CHARACTERISTICS:

HORIZON	DEPTH	TEXTURE	STRUCTURE	CONSISTENCE	%GRAVEL/COBBLES/STONE
Ap	0-6"	SL	Gr	VFr	2%/0/0
Bw(Fill)	6-24"	SL	Gr	VFr	10%/0/0
Ao	24-32"	SL	Gr	Fr	0/0/0
C1	32-38"	VFSL	M	Fr	0/0/0
C2	38-108"	LOAM	M	Fr	0/0/0
C3	108-120"	SL	M	Fr	5%/0/0

NOTES:
1. POCKETS OF ORGANICS BETWEEN 24-32".
2. POCKETS OF GRAVEL BETWEEN 96-108".

NOTES:
INDICATED UNDERGROUND UTILITIES ARE BASED ON ACTUAL FIELD LOCATIONS AND AVAILABLE NOTES AND MAPPING BY OTHERS. THE LOCATIONS ARE APPROXIMATE AND ALL UTILITIES MAY NOT BE SHOWN. PRIOR TO ANY CONSTRUCTION THE CONTRACTOR SHALL HAVE ALL UTILITIES MARKED ON THE GROUND.

A. LOOKING TOWARDS EXISTING 48" OUTFALL

B. LOOKING SOUTHEAST TOWARDS PROJECT AREA

C. LOOKING EAST TOWARDS PROJECT AREA

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

PARE

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

Roger Williams Park Stormwater Treatment Train

1000 Elmwood Avenue Providence, Rhode Island

EXISTING CONDITIONS

BRANDON M. BLANCHARD
No. 8985
4.10.23
REGISTERED PROFESSIONAL ENGINEER (CIVIL)

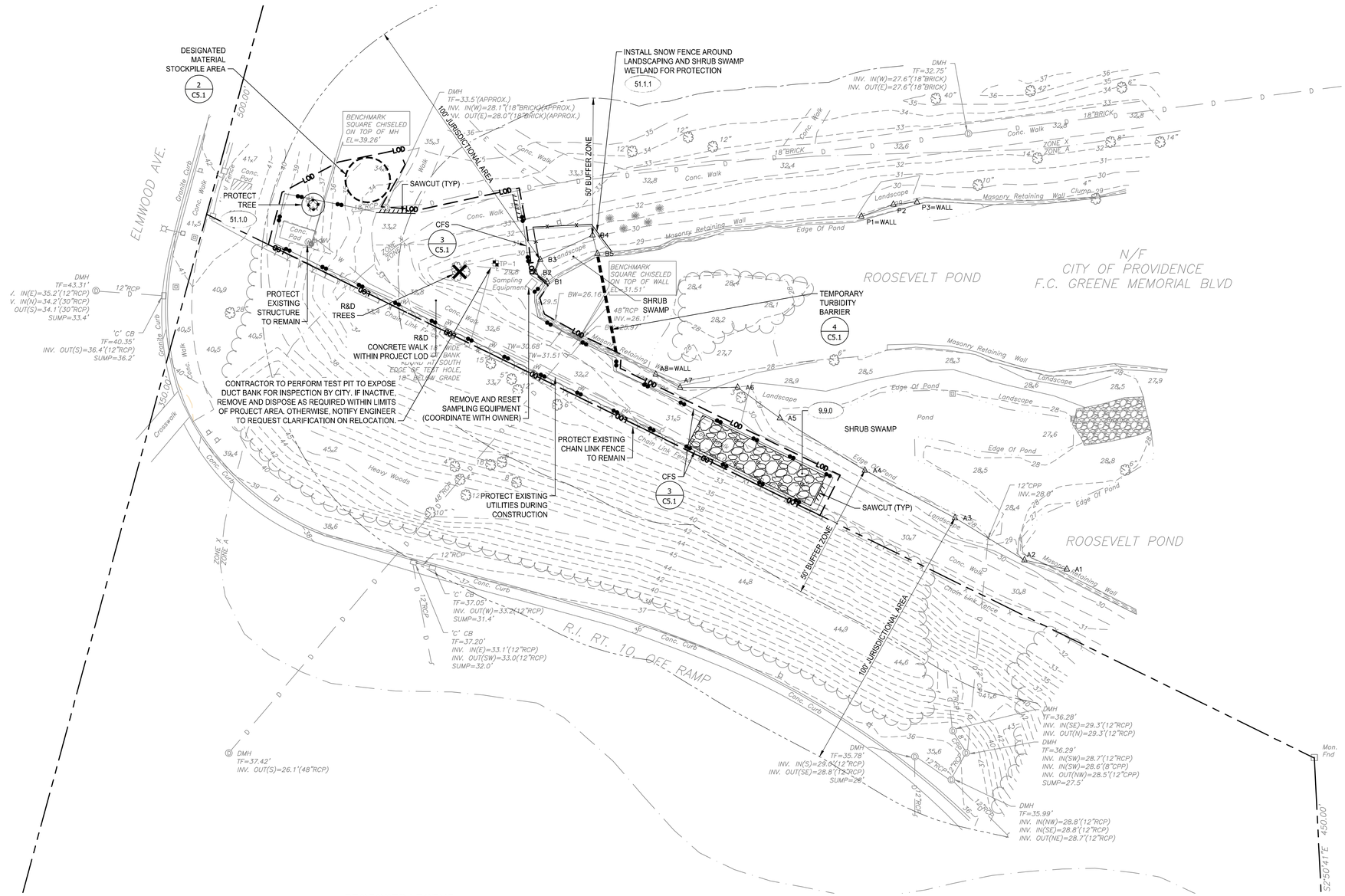
REVISIONS:

PROJECT NO.:	22220.00
DATE:	APRIL 2023
SCALE:	1" = 20'
DESIGNED BY:	CRL
CHECKED BY:	BB
DRAWN BY:	AWB \ AKL
APPROVED BY:	BB

DRAWING NO.: C1.2

SHEET NO. 3 OF 15

Z:\JOBS\22_Jobs\22220.00 RW Park Stormwater Treatment Train-RI\DWGS\Existing Conditions.dwg



EXISTING LEGEND

- Light Pole
- Deciduous Tree
- Coniferous Tree
- Bush
- Water Gate
- Handhole
- "C" Catch Basin
- Water Manhole
- Drainage Manhole
- Sign
- Contour Line
- Spot Grade
- Chain Link Fence
- Metal Fence
- Treeline
- Underground Water Line
- Underground Drain Line
- Underground Electric Line
- Edge of Pond
- Fema Zone Line

PROPOSED LEGEND

- CONTOUR
- SPOT ELEVATION
- DRAINAGE LINE
- LIMIT OF DISTURBANCE
- CHAIN LINK FENCE
- FENCE
- CURBING
- EDGE OF PAVEMENT
- SAWCUT LINE
- SIGN
- COMPOST FILTER SOCK
- TEST PIT
- REMOVE & DISPOSE TREE. DISPOSE OF TREE AND STUMP OFF-SITE.
- PROTECT EXISTING TREE TO REMAIN.

PARE

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

Roger Williams Park Stormwater Treatment Train

1000 Elmwood Avenue Providence, Rhode Island

DEMOLITION, EROSION & SEDIMENT CONTROL PLAN

BRANDON M. BLANCHARD
No. 8965
4.10.23
REGISTERED PROFESSIONAL ENGINEER (CIVIL)

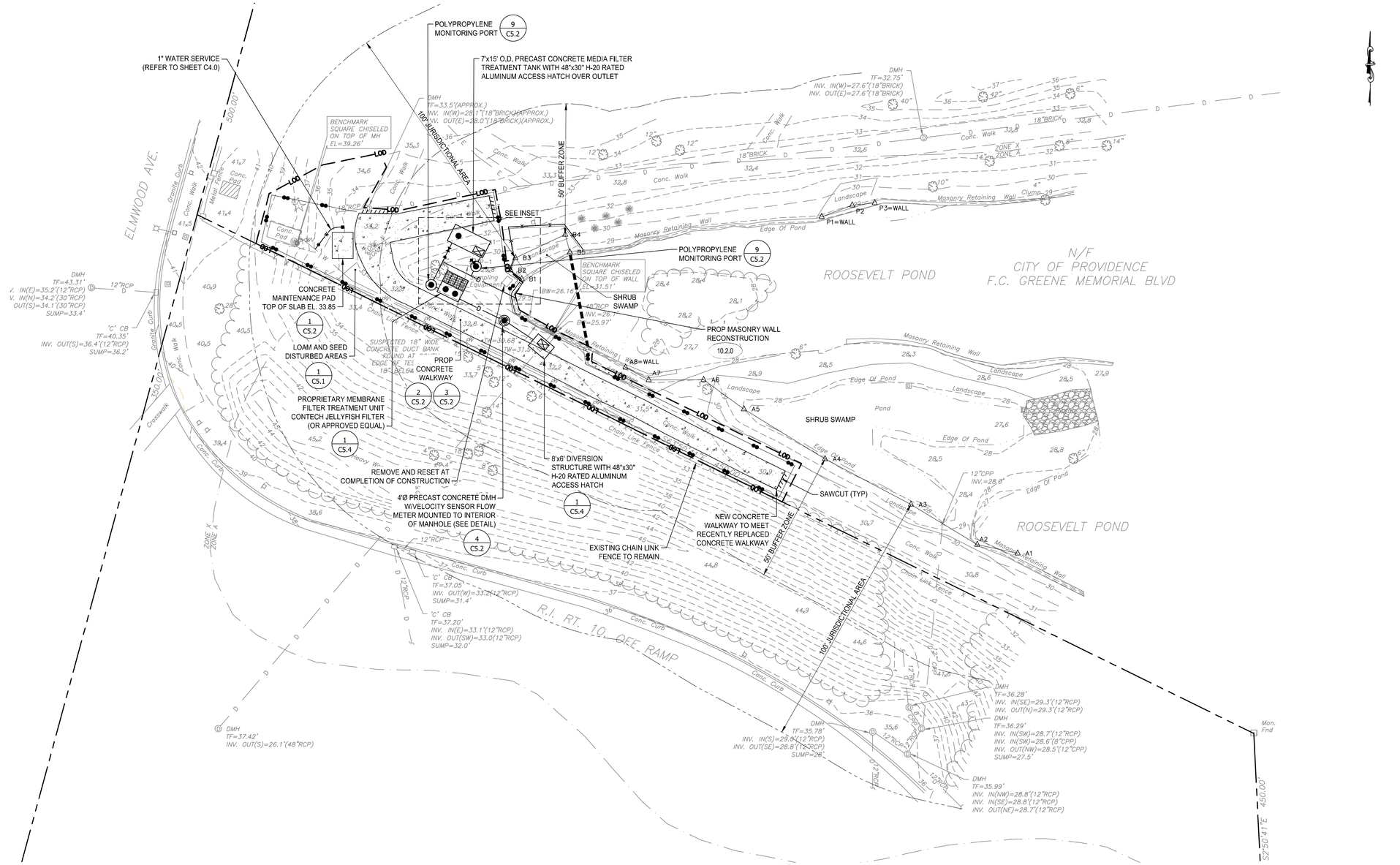
REVISIONS:

PROJECT NO.:	22220.00
DATE:	APRIL 2023
SCALE:	1" = 20'
DESIGNED BY:	CRL
CHECKED BY:	BB
DRAWN BY:	AWB \ AKL
APPROVED BY:	BB

DRAWING NO.: C2.0

SHEET NO. 4 OF 15

Z:\JOBS\22 Jobs\22220.00 RW Park Stormwater Treatment Train-(R)\LDM\03 Demolition Erosion & Sediment Control Plans.dwg

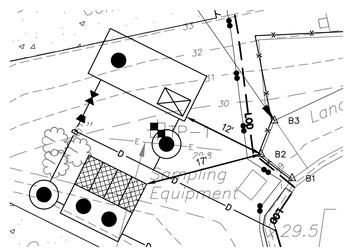


EXISTING LEGEND

- Light Pole
- Deciduous Tree
- Coniferous Tree
- Bush
- Water Gate
- Handhole
- "C" Catch Basin
- Water Manhole
- Drainage Manhole
- Sign
- 100 — Contour Line
- 101x8 — Spot Grade
- x — Chain Link Fence
- Metal Fence
- Treeline
- W — Underground Water Line
- D — Underground Drain Line
- E — Underground Electric Line
- Edge of Pond
- Fema Zone Line

PROPOSED LEGEND

- CONTOUR — 262
- SPOT ELEVATION — x 261.5
- DRAINAGE LINE — D D D
- LIMIT OF DISTURBANCE — LOD
- CHAIN LINK FENCE
- FENCE — x x x x x x x
- CURBING
- EDGE OF PAVEMENT
- SAWCUT LINE
- SIGN
- COMPOST FILTER SOCK
- TEST PIT — TP-1



INSET

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

PARE

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

Roger Williams Park Stormwater Treatment Train

1000 Elmwood Avenue Providence, Rhode Island

GENERAL PLAN

BRANDON M. BLANCHARD No. 8985 4.10.23 REGISTERED PROFESSIONAL ENGINEER (CIVIL)

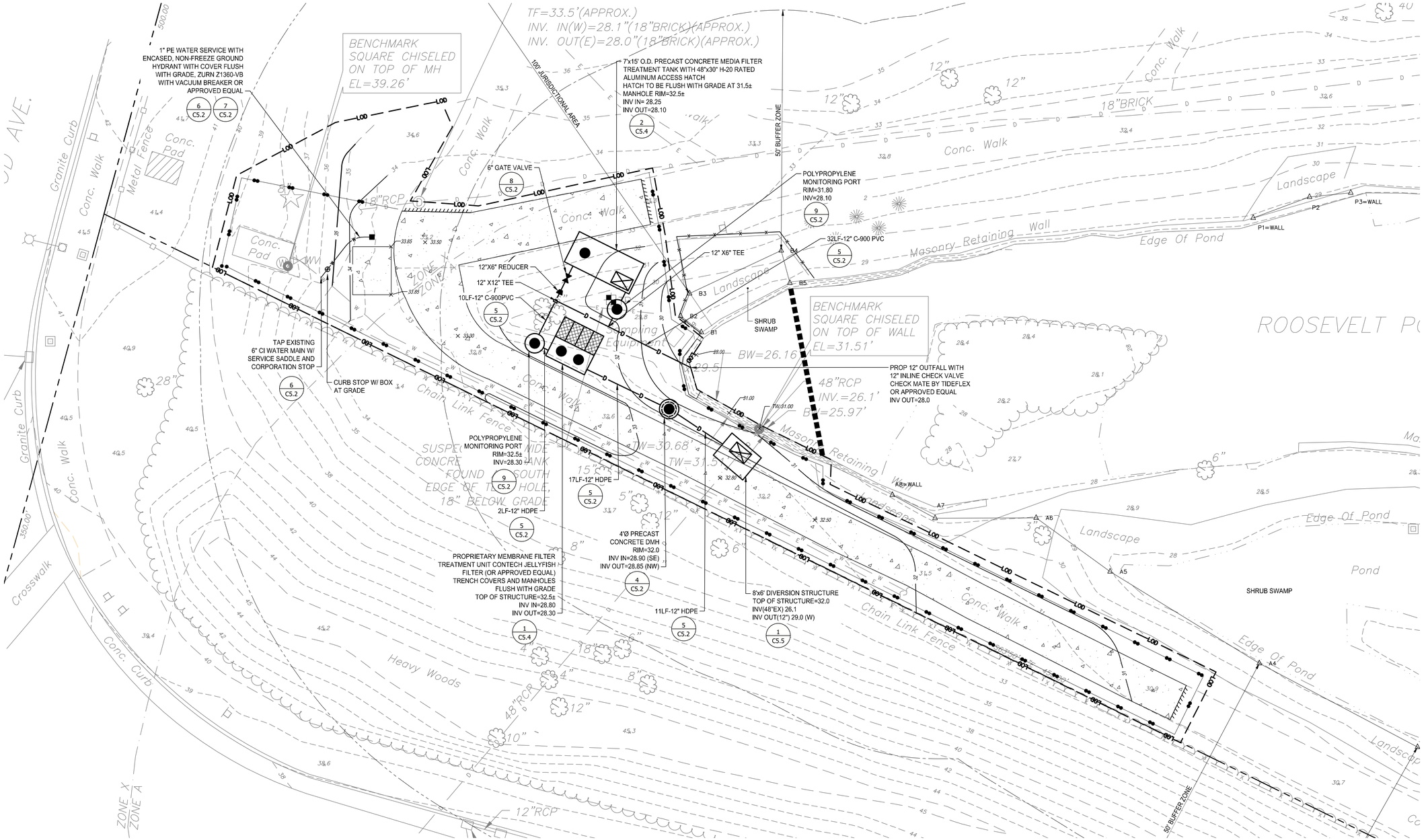
REVISIONS:

PROJECT NO.:	22220.00
DATE:	APRIL 2023
SCALE:	1" = 20'
DESIGNED BY:	CRL
CHECKED BY:	BB
DRAWN BY:	AWB \ AKL
APPROVED BY:	BB

DRAWING NO.: C3.0

SHEET NO. 5 OF 15

Z:\JOBS\22_Jobs\22220.00 RW Park Stormwater Treatment Train-RI\DWGS\General Plan.dwg



EXISTING LEGEND

- Light Pole
- Deciduous Tree
- Coniferous Tree
- Bush
- Water Gate
- Handhole
- "C" Catch Basin
- Water Manhole
- Drainage Manhole
- Sign
- Contour Line
- Spot Grade
- Chain Link Fence
- Metal Fence
- Treeline
- Underground Water Line
- Underground Drain Line
- Underground Electric Line
- Edge of Pond
- Fema Zone Line

PROPOSED LEGEND

- CONTOUR
- SPOT ELEVATION
- DRAINAGE LINE
- LIMIT OF DISTURBANCE
- CHAIN LINK FENCE
- FENCE
- CURBING
- EDGE OF PAVEMENT
- SAWCUT LINE
- SIGN
- COMPOST FILTER SOCK
- TEST PIT
- CURB STOP
- GROUND HYDRANT
- GATE VALVE
- REDUCER
- POLYPROPYLENE MONITORING PORT
- PRECAST CONCRETE MANHOLE
- HATCH

Scale: 1"=10'

0 5' 10' 20'

Z:\JOBS\22_Jobs\22220.00 RW Park Stormwater Treatment Train-RI\DWGS\Grading Drainage & Utility Plan.dwg

PARE

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

Roger Williams Park Stormwater Treatment Train

1000 Elmwood Avenue Providence, Rhode Island

GRADING, DRAINAGE & UTILITY PLAN

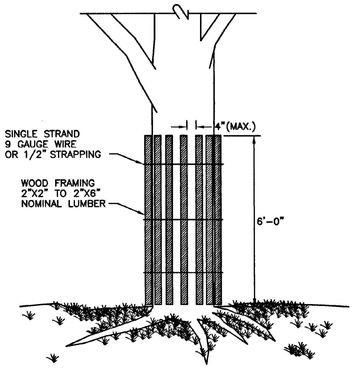
BRANDON M. BLANCHARD No. 8985 4.10.23 REGISTERED PROFESSIONAL ENGINEER (CIVIL)

REVISIONS:

PROJECT NO.:	22220.00
DATE:	APRIL 2023
SCALE:	1" = 10'
DESIGNED BY:	CRL
CHECKED BY:	BB
DRAWN BY:	AWB \ AKL
APPROVED BY:	BB

DRAWING NO.: C4.0

SHEET NO. 6 OF 15



NOTE:
SHALL BE IN ACCORDANCE WITH SECTION L.11 OF THE STANDARD SPECIFICATIONS.

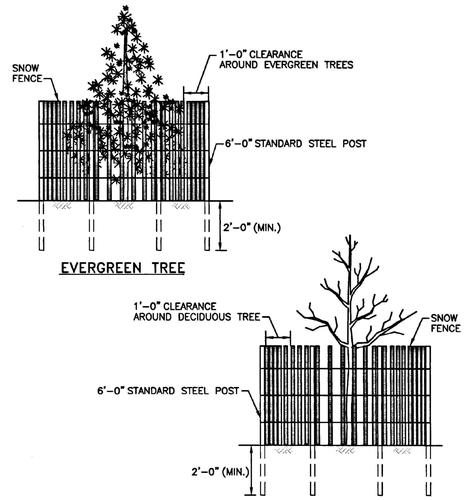
RHODE ISLAND DEPARTMENT OF TRANSPORTATION

REVISIONS NO.	BY	DATE

TREE PROTECTION DEVICE

Jeffrey A. Cyganik, CHIEF ENGINEER TRANSPORTATION — Edmund F. Parker, Jr., CHIEF DESIGN ENGINEER TRANSPORTATION — JUNE 15, 1998 ISSUE DATE

R.I. STANDARD 51.1.0



NOTE:
SHALL BE IN ACCORDANCE WITH SECTION L.11 OF THE R.I. STANDARD SPECIFICATIONS.

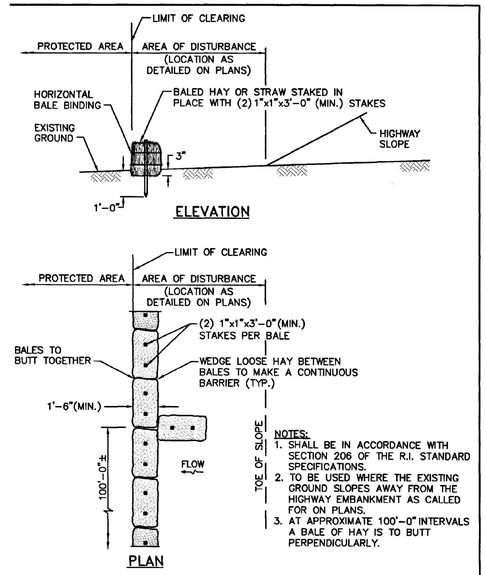
RHODE ISLAND DEPARTMENT OF TRANSPORTATION

REVISIONS NO.	BY	DATE

DRIP LINE TREE PROTECTION DEVICE FOR EXISTING TREES

Jeffrey A. Cyganik, CHIEF ENGINEER TRANSPORTATION — Edmund F. Parker, Jr., CHIEF DESIGN ENGINEER TRANSPORTATION — JUNE 15, 1998 ISSUE DATE

R.I. STANDARD 51.1.1



NOTES:
1. SHALL BE IN ACCORDANCE WITH SECTION 206 OF THE R.I. STANDARD SPECIFICATIONS.
2. TO BE USED WHERE THE EXISTING GROUND SLOPES AWAY FROM THE HIGHWAY EMBANKMENT AS CALLED FOR ON PLANS.
3. AT APPROXIMATE 100'-0" INTERVALS A BALE OF HAY IS TO BUTT PERPENDICULARLY.

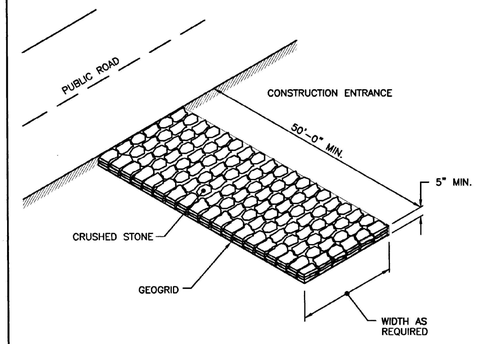
RHODE ISLAND DEPARTMENT OF TRANSPORTATION

REVISIONS NO.	BY	DATE

BALED HAY EROSION CHECK

Jeffrey A. Cyganik, CHIEF ENGINEER TRANSPORTATION — Edmund F. Parker, Jr., CHIEF DESIGN ENGINEER TRANSPORTATION — JUNE 15, 1998 ISSUE DATE

R.I. STANDARD 9.1.0



NOTE:
SHALL BE IN ACCORDANCE WITH SECTION 211 OF THE R.I. STANDARD SPECIFICATIONS.

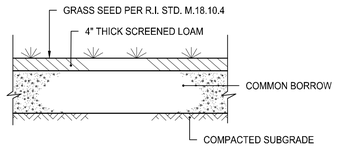
RHODE ISLAND DEPARTMENT OF TRANSPORTATION

REVISIONS NO.	BY	DATE

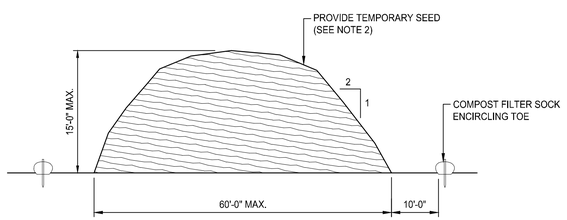
CONSTRUCTION ACCESS

Jeffrey A. Cyganik, CHIEF ENGINEER TRANSPORTATION — Edmund F. Parker, Jr., CHIEF DESIGN ENGINEER TRANSPORTATION — JUNE 15, 1998 ISSUE DATE

R.I. STANDARD 9.9.0



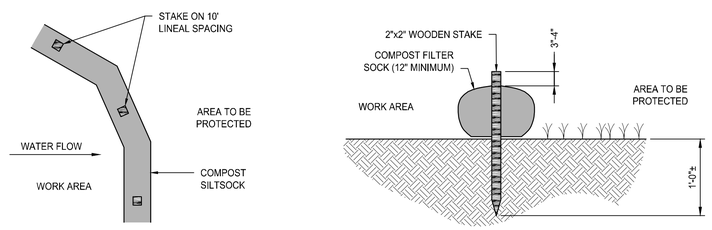
1 LOAM & SEED DETAIL
NOT TO SCALE



NOTES:

1. STOCKPILE AREA SHALL NOT EXCEED SPECIFIED DIMENSIONS WITHOUT APPROVAL FROM ENGINEER.
2. STOCKPILED ERODIBLE MATERIAL THAT WILL NOT BE USED FOR GREATER THAN 14 DAYS SHALL BE STABILIZED WITH TEMPORARY SEED IMMEDIATELY FOLLOWING PLACEMENT. USE RIDOT STD. M.18.10.5 SEED MIX.

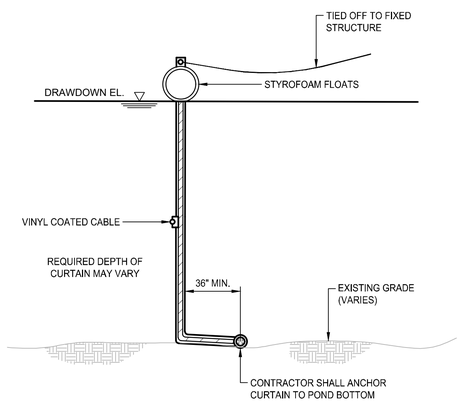
2 ERODIBLE MATERIAL STOCKPILE
NOT TO SCALE



NOTES:

1. COMPOST/ SOIL/ ROCK/ SEED FILL TO MEET APPLICATION REQUIREMENTS.
2. COMPOST MATERIAL TO BE REMOVED OR DISPERSED ON SITE AS DETERMINED BY ENGINEER.
3. IF SOCK NETTING MUST BE JOINED, FIT BEGINNING OF NEW SOCK OVER END OF OLD SOCK, OVERLAPPING BY 2 FEET AND STACK OVERLAP. IF SOCK NETTING IS NOT JOINED, OVERLAP OLD SOCK WITH NEW ONE BY MINIMUM OF 2 FEET.

3 COMPOST FILTER SOCK DETAIL
NOT TO SCALE



4 TYPICAL TURBIDITY BARRIER
NOT TO SCALE

PARE

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

Roger Williams Park Stormwater Treatment Train

1000 Elmwood Avenue Providence, Rhode Island

CIVIL DETAILS 1

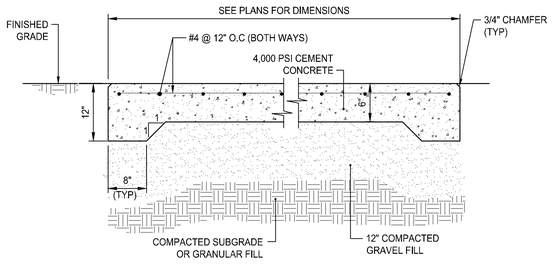
BRANDON M. BLANCHARD
No. 8965
4.10.23
REGISTERED PROFESSIONAL ENGINEER (CIVIL)

REVISIONS:

PROJECT NO.:	22220.00
DATE:	APRIL 2023
SCALE:	NOT TO SCALE
DESIGNED BY:	CRL
CHECKED BY:	BB
DRAWN BY:	AWB \ AKL
APPROVED BY:	BB

DRAWING NO.: C5.1

SHEET NO. 7 OF 15

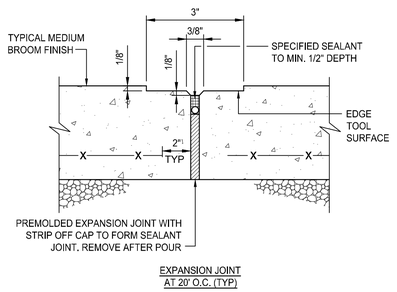


NOTES:

1. REINFORCING TO BE #4 GRADE 60 BARS AND SHALL CONFORM TO ASTM STANDARD A-615 OF THE LATEST DATA. REINFORCING RODS TO BE LOCATED IN THE CENTER OF THE SLAB, WITH A MINIMUM OF 2" CLEARANCE FROM FACE OF CONCRETE.

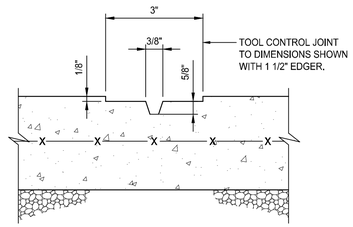
1 CEMENT CONCRETE PAD

NOT TO SCALE



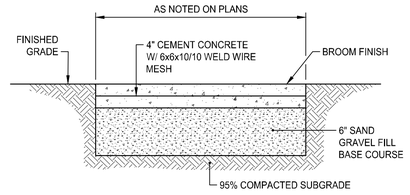
NOTES:

1. EXPANSION JOINTS (E.J.) 20 FEET O.C. UNLESS OTHERWISE NOTED.
2. CONTROL JOINTS (C.J.) 5 FEET O.C. UNLESS OTHERWISE NOTED.
3. WHERE EXISTING AND NEW CONCRETE SIDEWALKS MEET, SAWCUT EXISTING WALK AND INSTALL EXPANSION JOINT AND DOWELS AS SHOWN. DRILL EXISTING CONCRETE WALK EDGE TO RECEIVE STEEL DOWELS AT EXPANSION JOINT.
4. REFER TO SITE PLANS FOR LOCATIONS.



2 EXPANSION AND CONTROL JOINTS FOR SIDEWALK PAVING

NOT TO SCALE

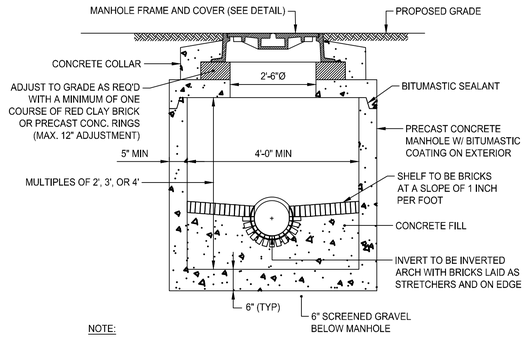


NOTES:

1. CONCRETE SIDEWALK SHALL BE CONSTRUCTED IN ACCORDANCE WITH SECTION 905 OF THE RI STANDARD SPECIFICATIONS.
2. WIRE MESH SHALL BE IN ACCORDANCE WITH SECTION M.05.02 OF THE RI STANDARD SPECIFICATIONS.

3 TYPICAL CEMENT CONCRETE SIDEWALK

NOT TO SCALE

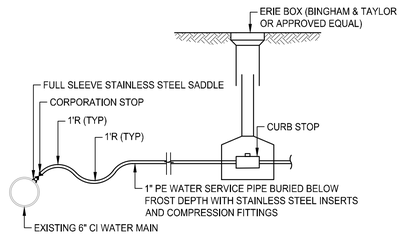


NOTE:

INSTALL BATTERY POWERED VELOCITY SENSOR FLOW METER MOUNTED TO MANHOLE WALLS ABOVE FLOW CHANNEL. INSTALL IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS. FLOW METER TO BE ISCO LASERFLOW OR APPROVED EQUAL.

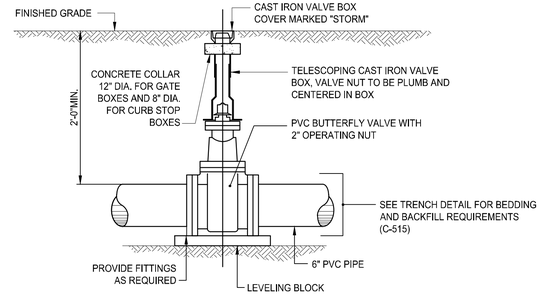
4 SHALLOW MANHOLE DETAIL

NOT TO SCALE



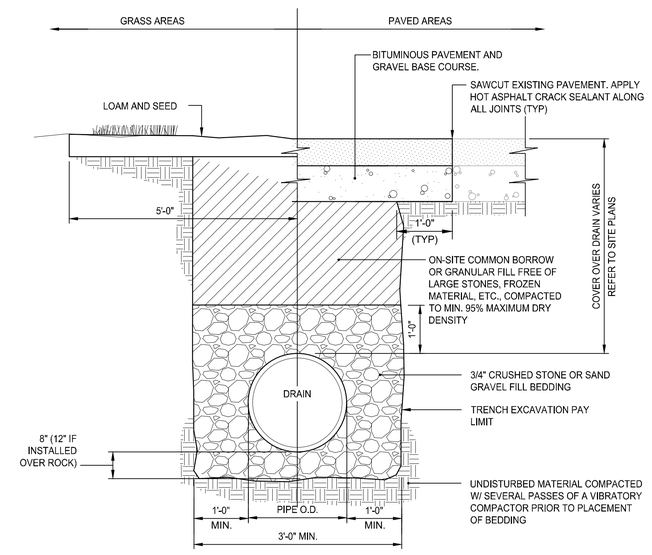
6 WATER SERVICE

NOT TO SCALE



8 STORMWATER VALVE DETAIL

NOT TO SCALE

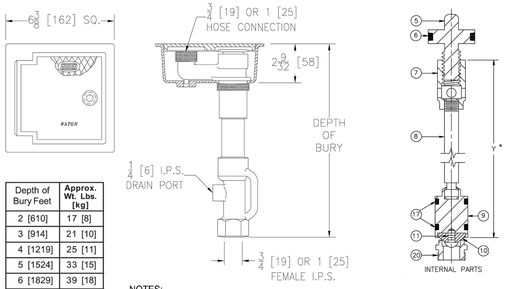


NOTES:

1. WHERE THE DISTANCE BETWEEN THE SAWCUT AND EDGE OF PAVEMENT IS 3' OR LESS, THE CONTRACTOR SHALL REPLACE THE PAVEMENT FROM THE TRENCH EDGE TO THE EXISTING EDGE OF PAVEMENT.
2. 3/4" DIA. CRUSHED STONE SHALL BE USED AS BEDDING WHERE TRENCH IS BELOW THE GROUND WATER TABLE.

5 DRAIN TRENCH DETAIL

NOT TO SCALE



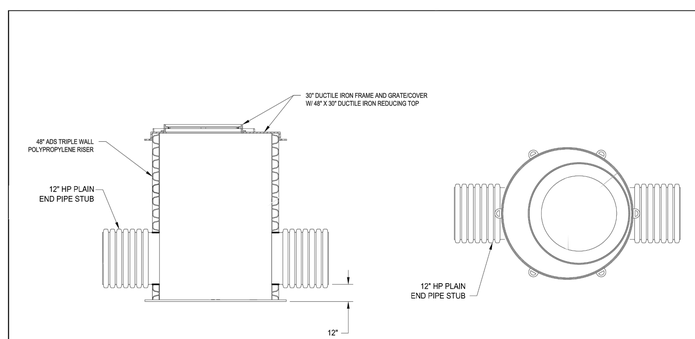
Depth of Bury Feet	Approx. Wt. Lbs. [kg]
2 [610]	17 [8]
3 [914]	21 [10]
4 [1219]	25 [11]
5 [1524]	33 [15]
6 [1829]	39 [18]
7 [2134]	43 [20]
8 [2438]	47 [21]
9 [2743]	52 [24]
10 [3048]	56 [25]

NOTES:

1. GROUND HYDRANT SHALL BE ZURN Z1360-VB WITH VACUUM BREAKER OR APPROVED EQUAL.
2. CASING AND DRAIN PORT SHALL BE ENCASED IN 18" DIA. 3/4" CRUSHED STONE.

7 GROUND HYDRANT DETAIL

NOT TO SCALE



NOTE:

BASIN SHALL BE MANUFACTURED BY ADS, INC. OR APPROVED EQUAL.

NOTES:
1 - FOR BURIAL DEPTHS GREATER THAN 10' BUT NO MORE THAN 15', REFERENCE DRAWING STD-403A
2 - AVOID CONSTRUCTION LOADING ON DOME AND STRUCTURE PRIOR TO CONCRETE COLLAR INSTALLATION
3 - WEIR LOCATION, ORIENTATION AND FABRICATION TO BE DETERMINED BASED ON STUB LOCATION
4 - MAX 8FT WEIR HEIGHT. WEIR MAY REQUIRE ADDED SUPPORT WHEN EXCEEDING 2FT.
5 - 48" POLYPROPYLENE BASINS WITH WEIRS REQUIRE REVIEW BY ADS ENGINEERING

STANDARD DETAIL 48" POLYPROPYLENE BASIN WITH WEIR PLATE	ADS 4640 TRUEMAN BLVD HILLIARD, OH 43026	DRAWN BY: NBH	
		DATE: 02/02/21	
		CHK'D BY:	
DRAWING NUMBER 7009-110-019 A		SCALE: NTS.	
		SHEET: 1 OF 1	

9 POLYPROPYLENE MONITORING PORT

NOT TO SCALE

PARE

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

Roger Williams Park Stormwater Treatment Train

1000 Elmwood Avenue Providence, Rhode Island

CIVIL DETAILS 2

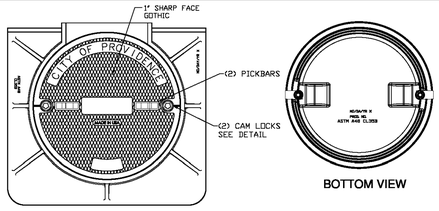
BRANDON M. BLANCHARD
No. 8965
4.10.23
REGISTERED PROFESSIONAL ENGINEER (CIVIL)

REVISIONS:

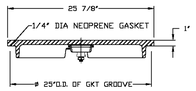
PROJECT NO.:	22220.00
DATE:	APRIL 2023
SCALE:	NOT TO SCALE
DESIGNED BY:	CRL
CHECKED BY:	BB
DRAWN BY:	AWB \ AKL
APPROVED BY:	BB

DRAWING NO.: C5.2

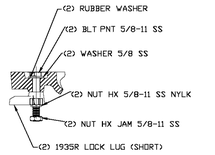
SHEET NO. 8 OF 15



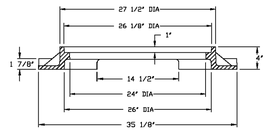
BOTTOM VIEW



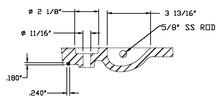
SECTION VIEW



LOCK LUG ASSEMBLY



SECTION



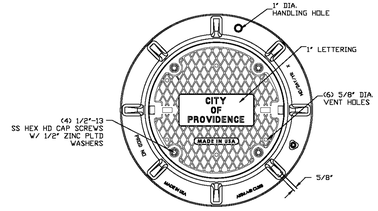
PICKBAR & LOCKLUG HOLE DETAIL

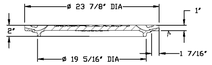
NOTES:

1. MATERIALS SHALL CONFORM TO SECTION M.04 OF THE RHODE ISLAND STANDARD SPECIFICATIONS.
2. ALL MATERIALS SHALL BE GRAY IRON AND SHALL BE ASTM A48 CERTIFIED.
3. SHALL BE EJ PRODUCT 1040081A02 OR APPROVED EQUAL.

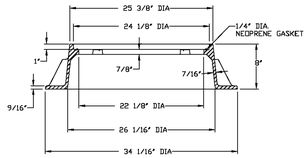
SIDEWALK MANHOLE FRAME AND COVER — 6.1.1.P PROVIDENCE STANDARD

ISSUE DATE: 1/6/17





COVER SECTION



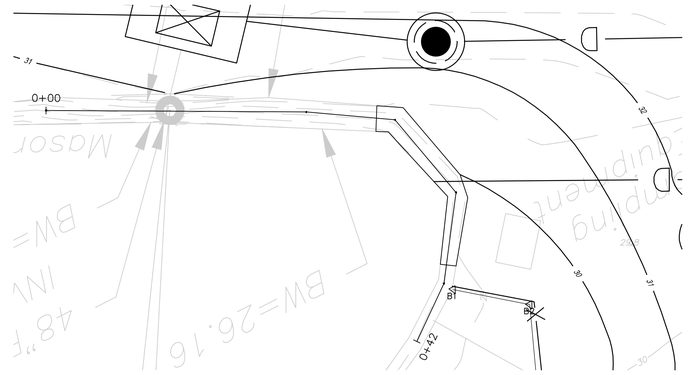
FRAME SECTION

NOTES:

1. MATERIALS SHALL CONFORM TO SECTION M.04 OF THE RHODE ISLAND STANDARD SPECIFICATIONS.
2. THE MATERIALS SHALL BE GRAY IRON AND SHALL BE ASTM A48 CERTIFIED.
3. SHALL BE EJ PRODUCT 240834B01 OR APPROVED EQUAL.

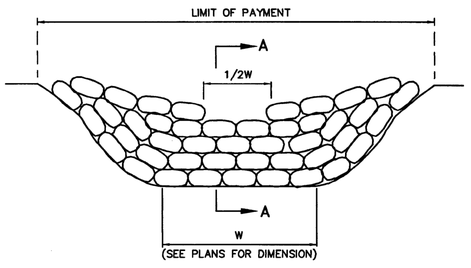
HEAVY DUTY MANHOLE FRAME AND COVER-24 INCH — 6.2.1 P PROVIDENCE STANDARD

ISSUE DATE: 1/6/17

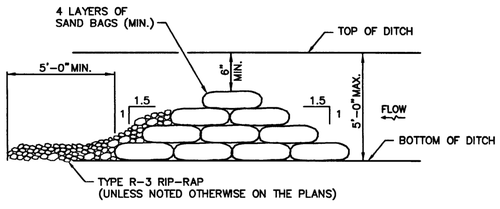


WALL CROSS SECTION

SCALE: 1"=5' HORIZ
1"=2.5' VERT



ELEVATION



SECTION A-A

NOTE:
SHALL BE IN ACCORDANCE WITH SECTION 207 OF THE R.I. STANDARD SPECIFICATIONS.

RHODE ISLAND DEPARTMENT OF TRANSPORTATION

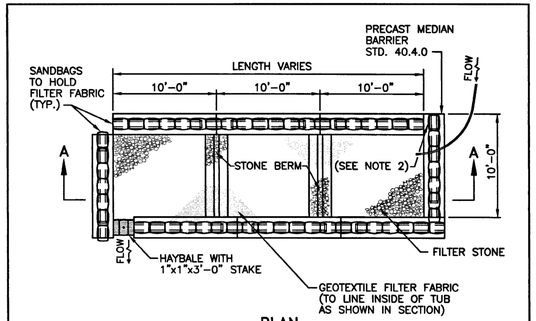
REVISIONS: NO. | BY | DATE

SAND BAG EROSION CHECK

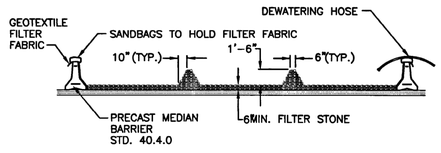
JUNE 15, 1998 ISSUE DATE

CHIEF ENGINEER TRANSPORTATION — CHIEF DESIGN ENGINEER TRANSPORTATION

R.I. STANDARD 9.6.0



PLAN



SECTION

NOTS:
1. SHALL BE IN ACCORDANCE WITH SECTION 208 OF THE R.I. STANDARD SPECIFICATIONS.
2. PROVIDE ADDITIONAL SAND BAGS AS REQUIRED TO FILL SPACE BETWEEN ADJACENT BARRIERS.

RHODE ISLAND DEPARTMENT OF TRANSPORTATION

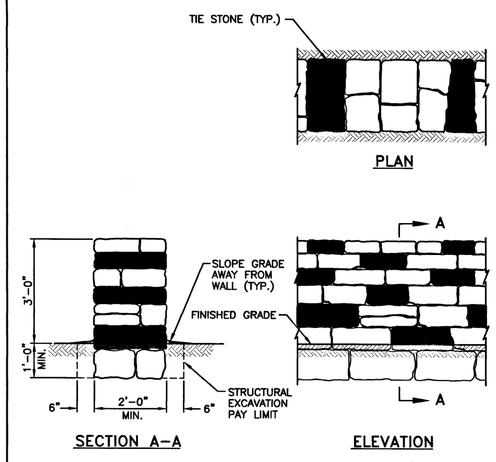
REVISIONS: NO. | BY | DATE

DEWATERING BASIN

JUNE 15, 1998 ISSUE DATE

CHIEF ENGINEER TRANSPORTATION — CHIEF DESIGN ENGINEER TRANSPORTATION

R.I. STANDARD 9.7.0



SECTION A-A — ELEVATION

NOTES:
1. SHALL BE IN ACCORDANCE WITH SECTION 912 OF THE R.I. STANDARD SPECIFICATIONS.
2. TIE STONES SHALL BE PLACED A MAXIMUM OF 4'-0" O.C.

RHODE ISLAND DEPARTMENT OF TRANSPORTATION

REVISIONS: NO. | BY | DATE

RUBBLE MASONRY WALL

JUNE 15, 1998 ISSUE DATE

CHIEF ENGINEER TRANSPORTATION — CHIEF DESIGN ENGINEER TRANSPORTATION

R.I. STANDARD 10.2.0

PARE

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

Roger Williams Park Stormwater Treatment Train

1000 Elmwood Avenue Providence, Rhode Island

CIVIL DETAILS 3

BRANDON M. BLANCHARD No. 8985 REGISTERED PROFESSIONAL ENGINEER (CIVIL) 4.10.23

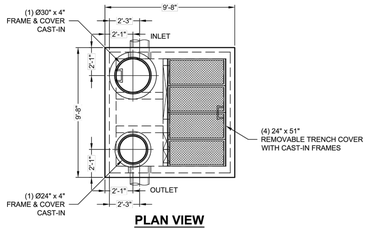
REVISIONS:

PROJECT NO.:	22220.00
DATE:	APRIL 2023
SCALE:	NOT TO SCALE
DESIGNED BY:	CRL
CHECKED BY:	BB
DRAWN BY:	AWB \ AKL
APPROVED BY:	BB

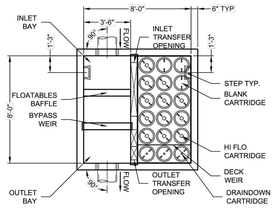
DRAWING NO.: C5.3

SHEET NO. 9 OF 15

Z:\JOBS\22_Jobs\22220.00 RW Park Stormwater Treatment Train-RI\DWGS\Details.dwg

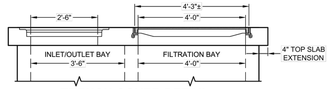


PLAN VIEW

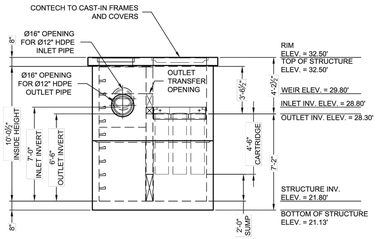


PLAN VIEW
(TOP SLAB NOT SHOWN FOR CLARITY)

TRENCH COVERS SHIPPED SEPARATELY. TOP SLAB IS NOT TO BE LIFTED WITH COVERS INSTALLED.



TRENCH COVER DETAIL



ELEVATION VIEW

MATERIAL LIST - PROVIDED BY CONTECH

COUNT	DESCRIPTION	INSTALLED BY
15	54" HI-FLO CARTRIDGE (70 mm ORIFICE)	CONTECH
3	54" DRAINDOWN CARTRIDGE (35 mm ORIFICE)	CONTECH
0	CARTRIDGE BLANK (NO ORIFICE)	CONTECH
1	JELLYFISH VAULT 18-CARTRIDGE DECK, STANDARD	CONTECH
1	JOINT SEALANT (BY PRECASTER)	CONTRACTOR
1	Ø30" X 4" FRAME & COVER, EJ #41600483	CONTECH
1	Ø24" X 4" FRAME & COVER, EJ #41600389	CONTECH
4	24" X 51" TRENCH COVER, EJ #47514031	CONTECH
4 PCS.	2.5" X 48" TRENCH FRAME, EJ #47300311	CONTECH
10	STEPS	CONTECH
1	STEP, LANE P-14850 (FOR LADDER ATTACHMENT)	CONTECH
1	REMOVABLE, LANE 4-STEP POLY LADDER	CONTECH

MAX CAPACITIES

WATER QUALITY FLOW RATE	2.94 CFS
PEAK FLOW RATE	29.47 CFS
RETURN PERIOD OF PEAK FLOW	100 YRS

GENERAL NOTES:
1. CONTECH TO PROVIDE ALL MATERIALS UNLESS NOTED OTHERWISE.
2. FOR FABRICATION DRAWINGS WITH DETAILED STRUCTURE DIMENSIONS AND WEIGHT, PLEASE CONTACT YOUR CONTECH ENGINEERED SOLUTIONS REPRESENTATIVE. WWW.ContechES.COM
3. JELLYFISH WATER QUALITY STRUCTURE SHALL BE IN ACCORDANCE WITH ALL DESIGN DATA AND INFORMATION CONTAINED IN THIS DRAWING. CONTRACTOR TO CONFIRM STRUCTURE MEETS REQUIREMENTS OF PROJECT.
4. STRUCTURE SHALL MEET AASHTO HS-20, ASSUMING EARTH COVER OF 0' - 0', AND GROUNDWATER ELEVATION AT, OR BELOW, THE OUTLET PIPE INVERT ELEVATION. ENGINEER OF RECORD TO CONFIRM ACTUAL GROUNDWATER ELEVATION. CASTINGS SHALL MEET AASHTO M306 LOAD RATING AND BE CAST WITH THE CONTECH LOGO.
5. STRUCTURE SHALL BE PRECAST CONCRETE CONFORMING TO ASTM C-478 AND AASHTO LOAD FACTOR DESIGN METHOD.

INSTALLATION NOTES
A. ANY SUB-BASE, BACKFILL DEPTH, AND/OR ANTI-FLOTATION PROVISIONS ARE SITE-SPECIFIC DESIGN CONSIDERATIONS AND SHALL BE SPECIFIED BY ENGINEER OF RECORD.
B. CONTRACTOR TO PROVIDE EQUIPMENT WITH SUFFICIENT LIFTING AND REACH CAPACITY TO LIFT AND SET THE STRUCTURE.
C. CONTRACTOR WILL INSTALL AND LEVEL THE STRUCTURE, SEALING THE JOINTS, LINE ENTRY AND EXIT POINTS (NON-SHRINK GROUT WITH APPROVED WATERSTOP OR FLEXIBLE BOOT)
D. WHEN ACTIVATED PRIOR TO SITE STABILIZATION, CONTRACTOR TO PROTECT CARTRIDGES FROM CONSTRUCTION-RELATED EROSION RUNOFF.
E. CARTRIDGE INSTALLATION, BY CONTECH, SHALL OCCUR ACCORDING TO THE PROVISIONS IN THE ACTIVATION CHECKLIST AND THE QUOTED SCOPE OF WORK. CONTACT CONTECH TO COORDINATE CARTRIDGE INSTALLATION WITH SITE STABILIZATION AT (800) 338-1122.

STRUCTURE WEIGHT
APPROXIMATE HEAVIEST PICK OF (3) PIECES = 20,500 LBS.

CONTECH **PROPOSAL** DRAWING

ARRO
5756 / 452612
LAYOUT 7
CLASS 600

MARK	DATE	REVISION DESCRIPTION	BY

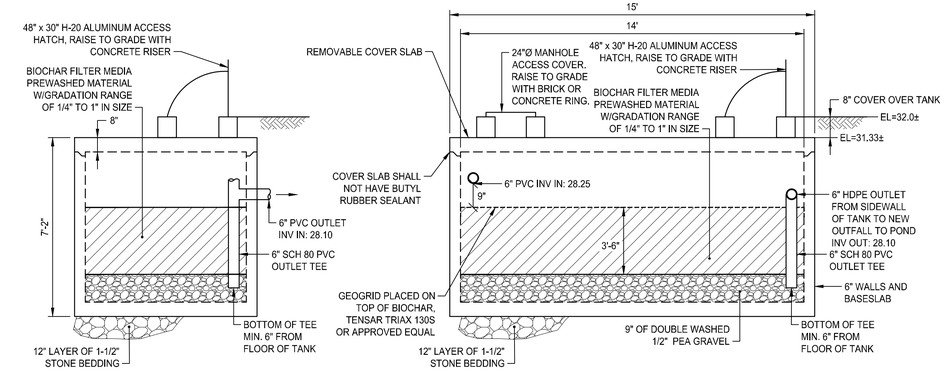
8' X 8' JELLYFISH - 736084-010
ROGER WILLIAMS PARK
PROVIDENCE, RI
SITE DESIGNATION:

CONTECH ENGINEERED SOLUTIONS LLC
Jellyfish Filter

DATE: 03/09/2023

DESIGNED: DJW	DRAWN: DJW
CHECKED: DJW	APPROVED: DJW
PROJECT No. 736084	SEQUENCE No. 010
SHEET: 1 OF 2	

1 "JELLYFISH" TREATMENT FILTER UNIT (OR APPROVED EQUAL)
NOT TO SCALE

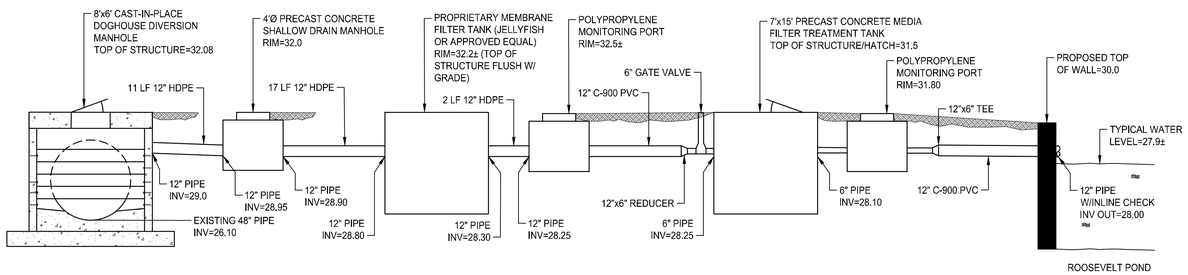


END VIEW SIDE VIEW

NOTES:

1. STRUCTURE SHALL BE CAST TO ALLOW FOR TOP COVER TO BE REMOVED AS SHOWN ON THE DETAIL. BUTYL SEALANT SHALL NOT BE USED ON THIS JOINT.
2. ALL OTHER JOINTS SHALL BE SEALED WITH BUTYL RUBBER SEALANT.
3. CONCRETE SHALL BE 5000 PSI @ 28 DAYS.
4. REINFORCING SHALL BE ASTM A-615 GRADE 60.
5. TANK AND ACCESS HATCH SHALL BE RATED FOR H-20 LOADING.

2 MEDIA FILTER TREATMENT SYSTEM DETAIL
NOT TO SCALE



2 TREATMENT TRAIN SYSTEM PROFILE
NOT TO SCALE

PARE

CITY OF PROVIDENCE

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

Roger Williams Park Stormwater Treatment Train

1000 Elmwood Avenue Providence, Rhode Island

CIVIL DETAILS 4

BRANDON M. BLANCHARD
No. 8965
4.10.23
REGISTERED PROFESSIONAL ENGINEER (CIVIL)

REVISIONS:

PROJECT NO.:	22220.00
DATE:	APRIL 2023
SCALE:	NOT TO SCALE
DESIGNED BY:	CRL
CHECKED BY:	BB
DRAWN BY:	AWB \ AKL
APPROVED BY:	BB

DRAWING NO.: C5.4

SHEET NO. 10 OF 15

Z:_JOBS\22_Jobs\22220.00 RW Park Stormwater Treatment Train-RI\CIVIL\Details.dwg

A. GENERAL STRUCTURAL REQUIREMENTS

1. ALL METHODS OF CONSTRUCTION, DETAILS, NOTES, ETC., INDICATED ON THE DRAWINGS ARE TO BE CONSIDERED TYPICAL FOR ALL SIMILAR CONDITIONS.
2. CONSTRUCTION SHALL BE MADE FROM APPROVED SHOP DRAWINGS ONLY.
3. ELEVATIONS SHOWN ARE BASED OFF CIVIL DRAWINGS. REFER TO THESE DRAWINGS FOR FINAL ELEVATIONS.
4. DIMENSIONS AND ELEVATIONS OF EXISTING FEATURES HAVE BEEN OBTAINED FROM EXISTING DRAWINGS OR FIELD SURVEYS. CONTRACTOR TO VERIFY ALL DIMENSIONS AND ELEVATIONS THAT ARE REQUIRED FOR FABRICATION AND INSTALLATION OF STRUCTURES WITH FIELD MEASUREMENTS.
5. REFER TO CIVIL DRAWINGS AND SPECIFICATIONS FOR LOCATIONS AND DIMENSIONS OF OTHER PROJECT REQUIREMENTS NOT INDICATED ON STRUCTURAL DRAWINGS.
6. ANY DISCREPANCIES ON THESE PLANS WITH REGARD TO DIMENSIONS OR CONDITIONS SHALL BE BROUGHT TO THE ATTENTION OF THE ENGINEER BEFORE PROCEEDING WITH THE AFFECTED PORTION OF WORK.
7. ALL APPLICABLE FEDERAL, STATE, AND MUNICIPAL REGULATIONS SHALL BE FOLLOWED, INCLUDING THE FEDERAL DEPARTMENT OF LABOR OCCUPATIONAL SAFETY AND HEALTH ACT AND THE RHODE ISLAND STATE BUILDING CODE.
8. THE LATEST EDITION OF THE FOLLOWING LISTED CODES SHALL APPLY. IN CASE OF CONFLICT, THE MORE RIGID REQUIREMENTS AND CODES SHALL GOVERN.
   A. RHODE ISLAND STATE BUILDING CODE (STATE CODE): INTERNATIONAL BUILDING CODE, 2021 EDITION AND ITS APPLICABLE REFERENCED STANDARDS.
   B. AMERICAN INSTITUTE OF STEEL CONSTRUCTION SPECIFICATIONS AND ITS CODE OF STANDARD PRACTICE (AISC).
   C. AMERICAN CONCRETE INSTITUTE BUILDING CODE REQUIREMENTS FOR REINFORCED CONCRETE, ACI 318.
   D. AMERICAN CONCRETE INSTITUTE BUILDING CODE REQUIREMENTS FOR CONCRETE MASONRY STRUCTURES, ACI 530 AND ACI 530.1.
6. THE DESIGN LOADS ARE RESISTED BY THE COMPLETED STRUCTURE ACTING AS A UNIT. THE CONTRACTOR SHALL DESIGN AND PROVIDE ANY AND ALL TEMPORARY BRACING, SHORING, OR ADDITIONAL REINFORCEMENT NECESSARY TO RESIST LOADS IMPOSED ON ANY PORTION OF THE STRUCTURE THROUGHOUT ALL STAGES OF CONSTRUCTION. THE SHORING SHALL BE DESIGNED TO RESIST ALL DEAD LOADS AND ANY APPLICABLE CONSTRUCTION LOADS.
7. ALL SHORING DESIGNS AND PLANS SHALL BE STAMPED BY A RHODE ISLAND REGISTERED PROFESSIONAL ENGINEER.
8. NOTES AND TYPICAL DETAILS APPLY TO ALL STRUCTURAL WORK UNLESS OTHERWISE NOTED. FOR CONDITIONS NOT SPECIFICALLY SHOWN PROVIDE DETAILS OF SIMILAR NATURE. VERIFY APPLICABILITY BY SUBMITTING SHOP DRAWINGS FOR REVIEW.
9. PLANS SHALL NOT BE SCALED FOR DIMENSIONS.

B. FOUNDATIONS

1. NEW FOUNDATIONS HAVE BEEN DESIGNED BASED UPON A PRESUMPTIVE NET ALLOWABLE BEARING PRESSURE OF 1.5 KSF.
2. NO FOOTING OR SLAB SHALL BE PLACED ON FROZEN SOIL OR IN WATER.
3. UNSUITABLE BEARING MATERIALS, SUCH AS "FILL", "SUBSOIL", "BURIED ORGANIC SOILS", AND "TOPSOIL" MAY BE PRESENT BELOW PROPOSED FOOTINGS. EXISTING UNSUITABLE MATERIAL WITHIN THE FOUNDATION FOOTPRINT SHALL BE OVER EXCAVATED AND REPLACED WITH COMPACTED SAND-GRAVEL FILL.
4. ALL SURFACE WATER SHALL BE DIVERTED AWAY FROM EXCAVATION BY THE CONTRACTOR. CONTRACTOR SHALL MAINTAIN CONTINUOUS CONTROL OF SURFACE AND SUBSURFACE WATER DURING CONSTRUCTION SO THAT WORK IS DONE UNDER DRY CONDITIONS.
5. SHORING AND BRACING FOR THE LATERAL SUPPORT OF EXCAVATION SHALL REMAIN IN PLACE UNTIL ALL PERMANENT STRUCTURAL SYSTEMS ARE COMPLETE.
6. PERCENT COMPACTION IS DEFINED AS THE RATIO OF THE FIELD DRY DENSITY, DETERMINED BY ASTM D-6938, TO THE MAXIMUM DRY DENSITY, DETERMINED BY ASTM D-1557 (MODIFIED PROCTOR).
7. COMPACT BACKFILL UNDER ALL FOUNDATION TO A MINIMUM OF 95 PERCENT OF MAXIMUM DRY DENSITY AS DETERMINED BY ASTM D-1557, UNLESS OTHERWISE INDICATED OR SPECIFIED. FREQUENCY OF COMPACTION TESTING SHALL BE INDICATED BY THE GEOTECHNICAL ENGINEER AND PROJECT SPECIFICATIONS.
8. DO NOT BACKFILL AGAINST CONCRETE WALLS UNTIL CONCRETE HAS REACHED THE 28-DAY SPECIFIED DESIGN STRENGTH.
9. BACKFILL SHALL BE PLACED AND COMPACTED SIMULTANEOUSLY ON BOTH SIDES OF CONCRETE WALLS WHEREVER POSSIBLE.
10. ANY BOULDER, LEDGE, OR ANY OTHER OBSTRUCTION LOCATED WITHIN THE CONSTRUCTION AREA SHALL BE REMOVED TO A DEPTH OF AT LEAST 12" (MIN.) BELOW FOUNDATION. VOIDS SHALL BE BACKFILLED WITH COMPACTED SAND-GRAVEL FILL APPROVED BY THE GEOTECHNICAL ENGINEER.
11. PROOF-COMPACTION AND SUBGRADE PREPARATION SHALL BE PERFORMED IN ACCORDANCE WITH THE PROJECT SPECIFICATIONS AND VERIFIED BY THE GEOTECHNICAL ENGINEER.
12. FOUNDATION SHALL REST ONLY ON 6" (MIN.) OF CRUSHED STONE (WELL GRADED, 3/8" TO 3/4"). IF A LAYER GREATER THAN 6" IS USED, IT SHALL BE WRAPPED IN NON-WOVEN GEOTEXTILE FABRIC.

C. CAST-IN-PLACE CONCRETE

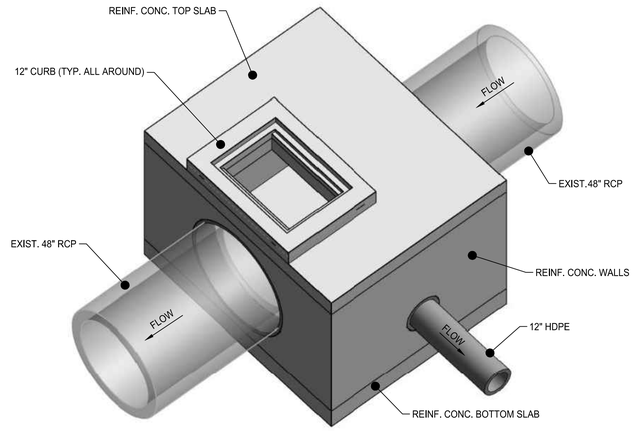
1. CONCRETE WORK SHALL CONFORM TO THE LATEST EDITIONS OF THE "BUILDING CODE REQUIREMENTS FOR REINFORCED CONCRETE" (ACI 318) AND STATE CODE.
2. CONCRETE SHALL BE PROPORTIONED, MIXED, AND PLACED UNDER THE SUPERVISION OF THE APPROVED TESTING AGENCY.
3. UNLESS NOTED OTHERWISE, CONCRETE SHALL BE NORMAL WEIGHT, WITH TYPE II CEMENT, AND SHALL HAVE A MINIMUM COMPRESSIVE STRENGTH AT 28 DAYS AS FOLLOWS:
   A. 5,000 PSI 3/4" AGGREGATE-TYPICAL, U.N.O.
4. ALL CONCRETE, UNLESS NOTED OTHERWISE, SHALL BE AIR-ENTRAINED WITH AN AIR CONTENT OF 6%± 1%.
5. CALCIUM CHLORIDE SHALL NOT BE USED.
6. ALL CONSTRUCTION JOINT LOCATIONS MUST BE SHOWN ON SHOP DRAWINGS AND APPROVED BY THE ENGINEER. CONSTRUCTION JOINTS NOT SHOWN ON THE DRAWINGS SHALL BE LOCATED SO AS TO LEAST IMPAIR THE STRENGTH OF THE STRUCTURE AND SHOULD GENERALLY BE LOCATED AT MIDSPAN OR AT POINTS OF MINIMUM SHEAR.
7. ALL TYPES OF SLABS AND WALLS SHALL BE PLACED WITHOUT HORIZONTAL CONSTRUCTION JOINTS UNLESS SPECIFICALLY SHOWN ON THE DRAWINGS OR APPROVED IN WRITING BY THE ENGINEER. ALL CONSTRUCTION JOINTS SHALL BE FORMED WITH A STANDARD KEY OR WITH A ROUGHENED SURFACE, UNLESS SHOWN OTHERWISE.
8. ALL SHORING SHALL REMAIN IN PLACE UNTIL CONCRETE HAS ATTAINED ITS SPECIFIED 28-DAY MINIMUM COMPRESSIVE STRENGTH.
9. PROVIDE A SMOOTH RUBBED SURFACE, FREE FROM BURRS, TIE HOLES, HONEYCOMBING, ETC. ON EXPOSED CONCRETE SURFACES.
10. ALL EXPOSED EDGES SHALL BE CHAMFERED 1" UNLESS NOTED OTHERWISE.
11. WHEN CONCRETE IS PLACED AGAINST PREVIOUSLY HARDENED CONCRETE, THE INTERFACE SHALL BE CLEAN, FREE OF LAITANCE, AND INTENTIONALLY ROUGHENED TO FULL AMPLITUDE OF APPROXIMATELY 1/4 INCH.
12. AT ALL CONSTRUCTION JOINTS NOT DESIGNATED TO BE CONTROL JOINTS, NEW CONCRETE SHALL BE EPOXY BONDED TO HARDENED CONCRETE WITH SIKADUR 32 H1-MOD LPL MANUFACTURED BY SIKA CORP. OR ENGINEER APPROVED EQUAL. APPLY PER MANUFACTURER'S RECOMMENDED ABOVE.
13. ELASTOMERIC JOINT SEALANT SHALL BE "SIKAFLEX 1CSL" BY SIKA CORP. OR ENGINEER APPROVED EQUAL.
14. ALL CONCRETE SHALL BE PLACED IN THE DRY.
15. PROVIDE PVC WATERSTOPS AT ALL KEYED/CONSTRUCTION JOINTS.

D. REINFORCING STEEL

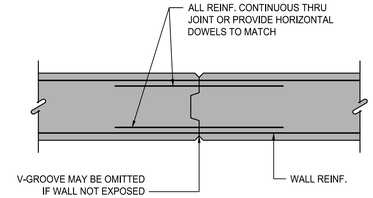
1. REINFORCING BARS SHALL BE DETAILED IN ACCORDANCE WITH ACI 315 MANUAL OF STANDARD PRACTICE FOR DETAILING REINFORCED CONCRETE STRUCTURES AND THE STATE CODE.
2. COMPLETE SHOP DRAWINGS AND SCHEDULES OF ALL REINFORCING STEEL SHALL BE PREPARED BY THE CONTRACTOR AND SUBMITTED TO THE ENGINEER FOR APPROVAL PRIOR TO COMMENCEMENT OF THAT PORTION OF THE WORK. ALL ACCESSORIES MUST BE SHOWN ON THE SHOP DRAWINGS.
3. REINFORCING BARS SHALL CONFORM TO ASTM A615 OR A706 (WELDABLE) GRADE 60.
4. REINFORCING STEEL SHALL BE EPOXY COATED. ALL SUPPORTS SUCH AS CHAIRS, BOLSTERS, SPACERS, BLOCKS AND HANGERS SHALL BE OF NON-CORROSIVE MATERIAL. PROVIDE MINIMUM #5 SUPPORT BAR.
5. UNLESS NOTED ON THE DRAWINGS, THE MINIMUM CONCRETE PROTECTION (CLEAR COVER) FOR CAST-IN-PLACE CONCRETE COVER SHALL BE AS FOLLOWS:
   A. CONCRETE PLACED AGAINST EARTH_____3"
   B. FORMED CONCRETE EXPOSED TO EARTH OR WATER_____2"
6. ALL MECHANICAL SLEEVE CONNECTIONS SHALL CONFORM TO ACI 318 REQUIREMENTS AND DEVELOP IN TENSION AND COMPRESSION AT LEAST 125% OF THE YIELD STRENGTH OF THE BAR.
7. ALL REINFORCEMENT SHALL BE CONTINUOUS THROUGH CONSTRUCTION JOINTS.
8. UNLESS NOTED OTHERWISE, BARS SHALL BE CONTINUOUS AND SHALL RUN CONTINUOUSLY AROUND CORNERS AND LAPPED AT NECESSARY SPLICES OR HOOKED AT DISCONTINUOUS ENDS. SPLICES SHALL GENERALLY OCCUR AT MID-SPAN FOR TOP AND MIDDLE BARS, AT SUPPORT FOR BOTTOM BARS AND SHALL BE STAGGERED WHEREVER POSSIBLE.
9. MINIMUM REINFORCEMENT DEVELOPMENT LENGTH AND LAP SPLICE LENGTHS SHALL BE IN ACCORDANCE WITH ACI 318 FOR CLASS B LAPS UNLESS OTHERWISE NOTED ON THE DRAWINGS.
10. PROVIDE ADDITIONAL #5 BAR REINFORCEMENT ALONG EACH SIDE OF OPENINGS (AND EACH FACE), UNLESS NOTED OTHERWISE. BARS SHALL EXTEND AT LEAST 1'-0" BEYOND THE OPENING PERIMETER.

ABBREVIATIONS

ADD'L	ADDITIONAL
ALT	ALTERNATE
A.B.	ANCHOR BOLT
ARCH	ARCHITECT
B	BOTTOM
BEW	BOTTOM EACH WAY
BM	BEAM
BOF	BOTTOM OF FOOTING
BRG	BEARING
BS	BOTH SIDES
C	CAMBER
CFMF	COLD FORMED METAL FRAMING
CIP	CAST-IN-PLACE
CLR.	CLEAR
COL	COLUMN
COMP.	CONCRETE
CMU	CONCRETE MASONRY UNIT
CJ	CONTROL JOINT
CONST. JT	CONSTRUCTION JOINT
CONST.	CONTINUOUS
DIA or Ø	DIAMETER
DWL'S	DOWELS
DWG	DRAWING
EA.	EACH
EF	EACH FACE
EW	EACH WAY
EL	ELEVATION
E.J.	EXPANSION JOINT
EQ.	EQUAL
F.F.	FAR FACE
FFE	FINISH FLOOR ELEVATION
FND	FOUNDATION
FTG	FOOTING
GA.	GAUGE
GALV.	GALVANIZED
G.C.	GENERAL CONTRACTOR
HORIZ.	HORIZONTAL
HSS	HOLLOW STRUCTURAL SHAPE
IF	INSIDE FACE
LONG.	LONGITUDINAL
LLV	LONG LEG VERTICAL
L.W.	LONG WAY
L.W.	LIGHT WEIGHT CONCRETE
MAX.	MAXIMUM
MECH	MECHANICAL
M.M.	MISCELLANEOUS METAL
MIN.	MINIMUM
MTL.	METAL
NF	NEAR FACE
N-S	NON SHRINK
NTS	NOT TO SCALE
O.C.	ON CENTER
PL.	PLATE
OPNG.	OPENING
R & D	REMOVE AND DISPOSE
REINF.	REINFORCING
SC	SHEAR CONNECTOR
SLV	SHORT LEG VERTICAL
SOG	SLAB ON GRADE
S.S.	STAINLESS STEEL
STIFF	STIFFENER
STL	STEEL
SJ	SAWN JOINT
T	TOP
TCX	TOP CHORD EXTENSION
THK	THICK
TOC	TOP OF CONCRETE
TOF	TOP OF FOOTING
TOW	TOP OF WALL
TRANS.	TRANSVERSE
TSL	TOP OF SLAB
TST	TOP OF STEEL
TYP.	TYPICAL
U.N.O.	UNLESS NOTED OTHERWISE
VERT.	VERTICAL
V.I.F.	VERIFY IN FIELD
WWF	WELDED WIRE FABRIC
W/	WITH
W.P.	WORKING POINT

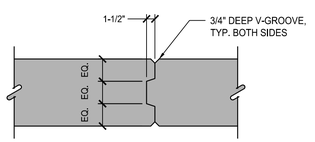


1 DOGHOUSE DIVERSION MANHOLE ISOMETRIC
NOT TO SCALE

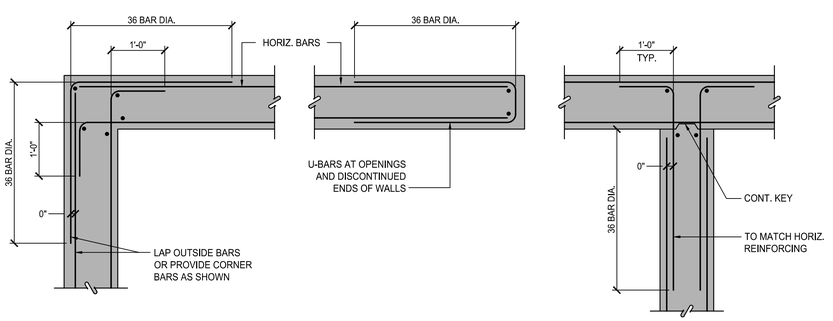


NOTE:
PROVIDE CONSTRUCTION JTS @ 60' O.C. (MAX.)
ALTERNATE PLACING OF PANELS, ALLOWING 36 HOURS FROM THE END OF ONE POUR TO THE BEGINNING OF ADJACENT POURS.

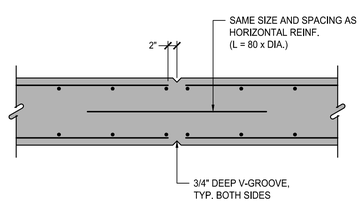
2 TYPICAL CONCRETE WALL CONSTRUCTION JOINT DETAIL
NOT TO SCALE



3 TYPICAL KEY DETAIL
NOT TO SCALE



4 TYPICAL PLAN OF HORIZONTAL REINFORCING OF CONCRETE AND FOUNDATION WALLS
NOT TO SCALE



NOTES:
1. SPACE AT 20'-0" CENTER TO CENTER MAX.
2. CONSTRUCTION JOINT MAY BE SUBSTITUTED FOR A CONTROL JOINT.

5 TYPICAL CONCRETE WALL CONTROL JOINT DETAIL
NOT TO SCALE

PARE

RHODE ISLAND DEPARTMENT OF ENVIRONMENTAL MANAGEMENT

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

Roger Williams Park Stormwater Treatment Train

1000 Elmwood Avenue Providence, Rhode Island

DOGHOUSE DIVERSION MANHOLE

STRUCTURAL NOTES AND TYPICAL DETAILS

MICHAEL J. RONGIONE
No. 7437
REGISTERED PROFESSIONAL ENGINEER (STRUCTURAL)

REVISIONS:

PROJECT NO.:	22220.00
DATE:	APRIL 2023
SCALE:	NOT TO SCALE
DESIGNED BY:	MJR
CHECKED BY:	MJR
DRAWN BY:	JDB
APPROVED BY:	MJR

DRAWING NO.: C5.5

SHEET NO. 11 OF 15

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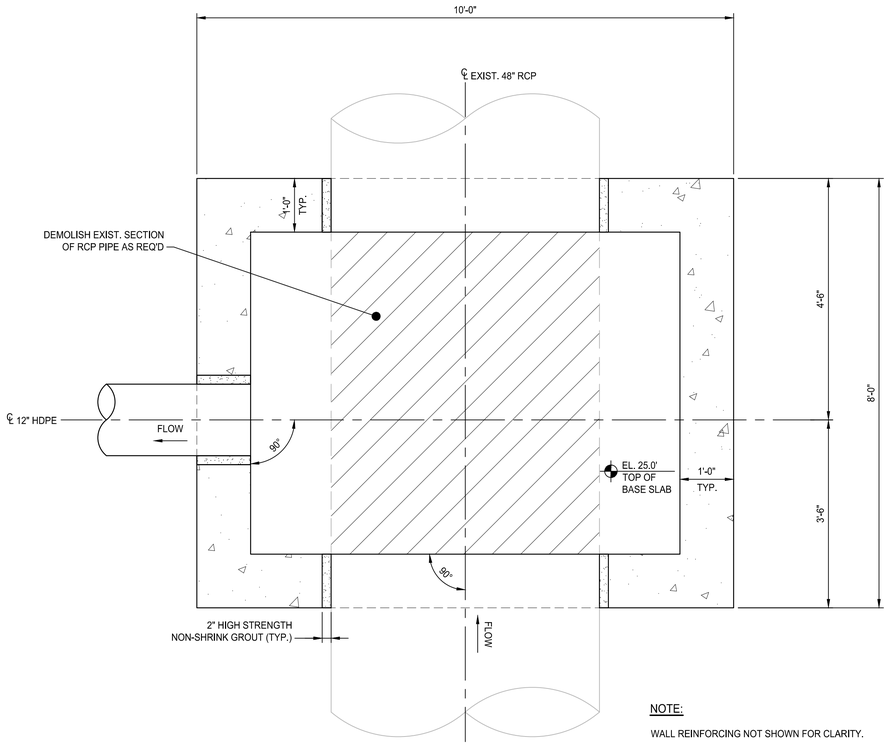
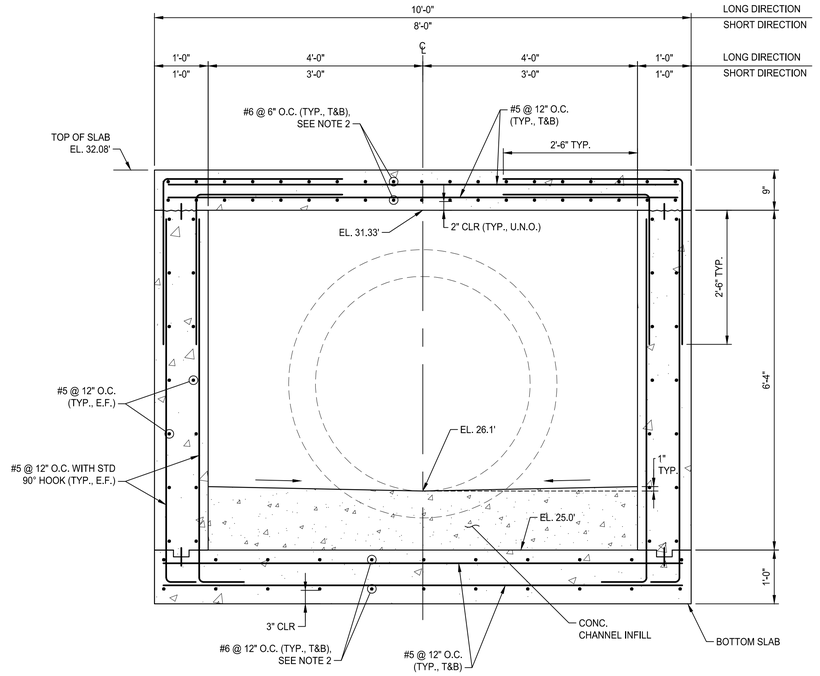


NOTE:

WALL REINFORCING NOT SHOWN FOR CLARITY.

1 DOGHOUSE DIVERSION MANHOLE PLAN

3/4"=1'-0"



NOTES:

1. STOP LOGS AND CONC. STOP LOG PIERS NOT SHOWN FOR CLARITY. SEE CONCRETE STOP LOG PIER SECTION.
2. OUTER MOST REINF. BARS MATS TO SPAN SHORT DIRECTION BETWEEN WALLS.

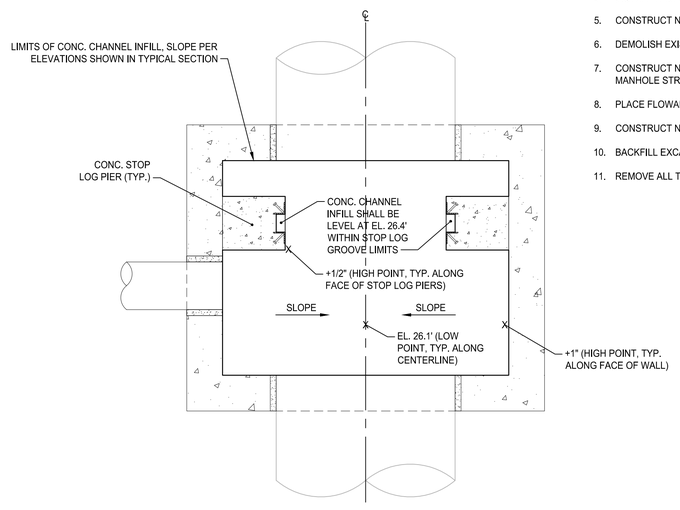
2 TYPICAL SECTION

3/4"=1'-0"

CONSTRUCTION SEQUENCE:

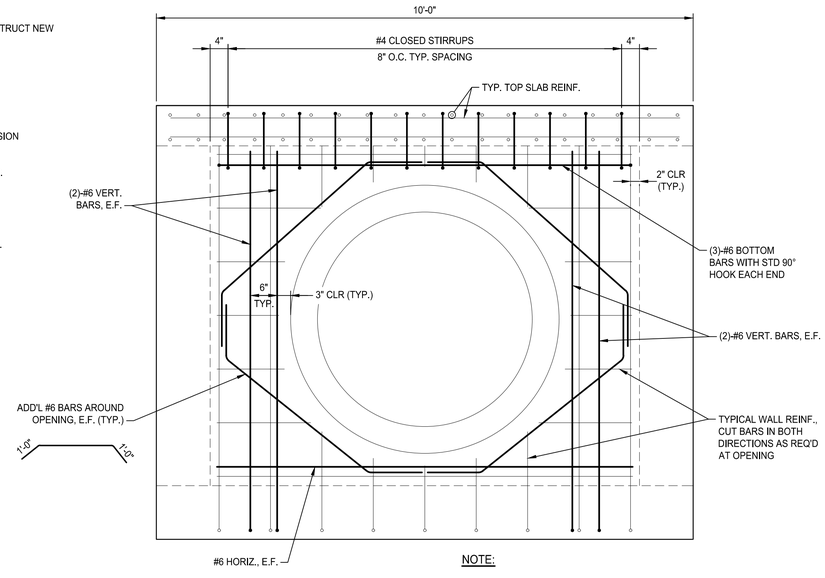
IT IS ANTICIPATED THAT THE FOLLOWING GENERAL CONSTRUCTION SEQUENCE MAY BE FOLLOWED; (PLEASE NOTE THAT SOME ACTIVITIES MAY OCCUR CONCURRENTLY AND CONTRACTOR MAY ADJUST THE ORDER OF WORK TO FACILITATE CONTRACTOR'S MEANS AND METHODS.)

1. INSTALL EXCAVATION SUPPORT AROUND LIMITS OF CONSTRUCTION.
2. EXCAVATE SOIL TO APPROXIMATE LINES AND GRADES SHOWN. INSTALL SHEETING AS REQUIRED WHEN EXCAVATING ADJACENT O EXISTING STRUCTURES.
3. TEMPORARILY SHORE EXISTING RCP PIPE AS REQUIRED TO EXCAVATE AND CONSTRUCT NEW BOTTOM SLAB.
4. INSTALL TEMPORARY DEWATERING SYSTEM AS REQUIRED.
5. CONSTRUCT NEW BOTTOM SLAB AS SPECIFIED ON PLANS.
6. DEMOLISH EXISTING RCP PIPE AS SPECIFIED ON PLANS.
7. CONSTRUCT NEW WALLS AND CONCRETE STOP LOG PIERS OF DOGHOUSE DIVERSION MANHOLE STRUCTURE AS SPECIFIED ON PLANS.
8. PLACE FLOWABLE CONCRETE CHANNEL INFILL MATERIAL AS SPECIFIED ON PLANS.
9. CONSTRUCT NEW TOP SLAB AND ACCESS CURB AS SPECIFIED ON PLANS.
10. BACKFILL EXCAVATION TO PROPOSED FINISHED GRADES.
11. REMOVE ALL TEMPORARY SHORING AND RESTORE SITE TO PREVIOUS CONDITION.



3 CONCRETE CHANNEL INFILL LIMITS

1/2"=1'-0"



NOTE:

BOTTOM SLAB REINFORCING NOT SHOWN FOR CLARITY.

4 TYPICAL BEAM/WALL ELEVATION

3/4"=1'-0"

PARE

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

Roger Williams Park Stormwater Treatment Train

1000 Elmwood Avenue Providence, Rhode Island

DOGHOUSE DIVERSION MANHOLE

PLANS AND SECTIONS - 1

MICHAEL J. RONGIONE
No. 7437
REGISTERED PROFESSIONAL ENGINEER (STRUCTURAL)

REVISIONS:

PROJECT NO.:	22220.00
DATE:	APRIL 2023
SCALE:	AS SHOWN
DESIGNED BY:	MJR
CHECKED BY:	MJR
DRAWN BY:	JDB
APPROVED BY:	MJR

DRAWING NO.: C5.6

SHEET NO. 12 OF 15

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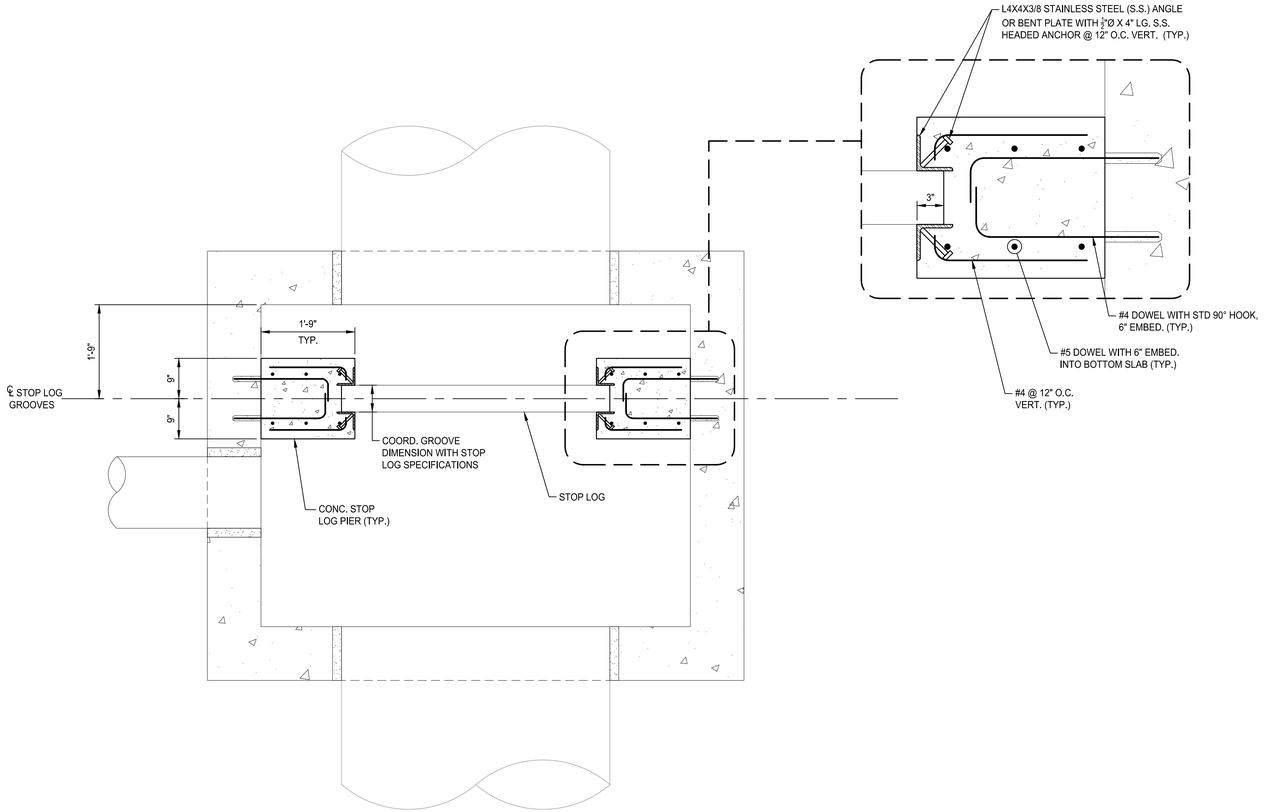
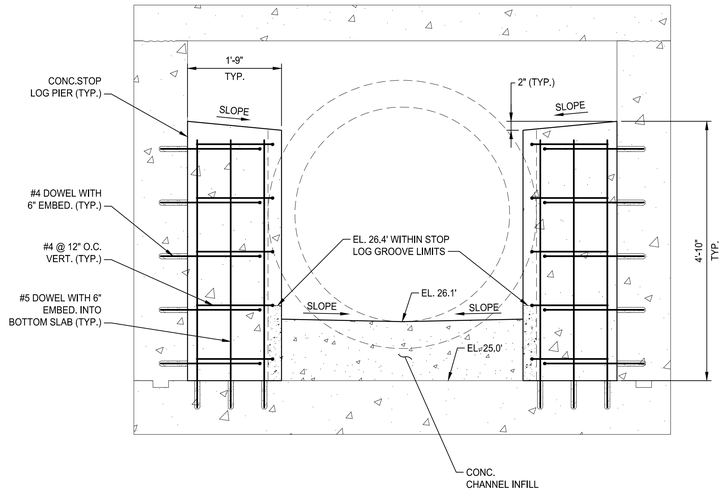


1 CONCRETE STOP LOG PIER PLAN
3/4"=1'-0"



NOTE:

STOP LOGS NOT SHOWN FOR CLARITY.

2 CONCRETE STOP LOG PIER SECTION
3/4"=1'-0"

PARE

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

Roger Williams Park Stormwater Treatment Train

1000 Elmwood Avenue Providence, Rhode Island
DOGHOUSE DIVERSION MANHOLE
PLANS AND SECTIONS - 2

MICHAEL J. RONGIONE
No. 7437
REGISTERED PROFESSIONAL ENGINEER (STRUCTURAL)

REVISIONS:

PROJECT NO.:	22220.00
DATE:	APRIL 2023
SCALE:	AS SHOWN
DESIGNED BY:	MJR
CHECKED BY:	MJR
DRAWN BY:	JDB
APPROVED BY:	MJR

DRAWING NO.: C5.7
SHEET NO. 13 OF 15

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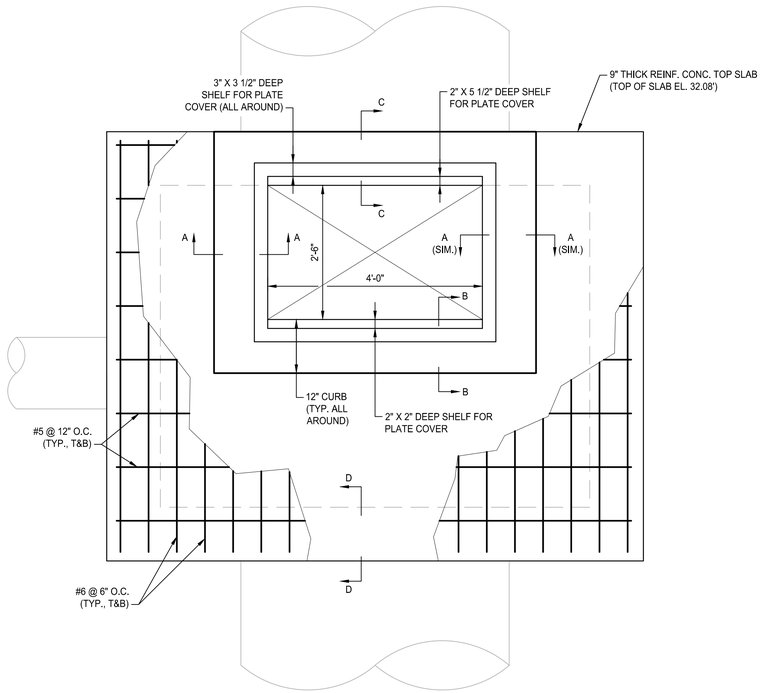
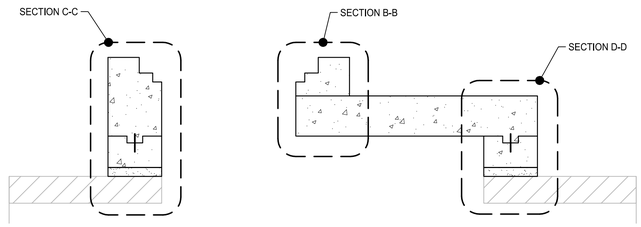


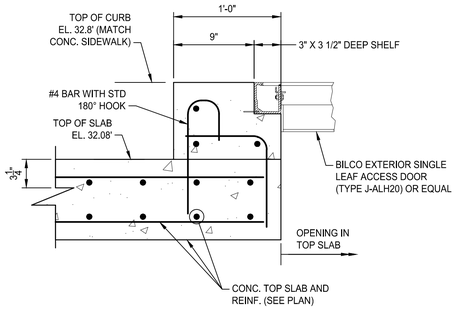
1 TOP SLAB AND ACCESS CURB PLAN

3/4"=1'-0"

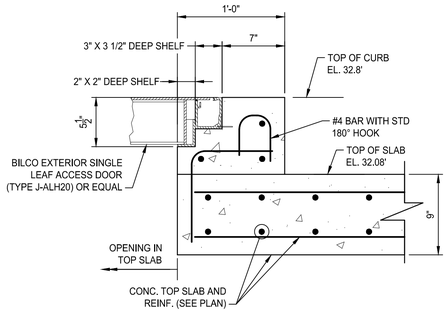


2 SECTION THROUGH TOP SLAB AT OPENING

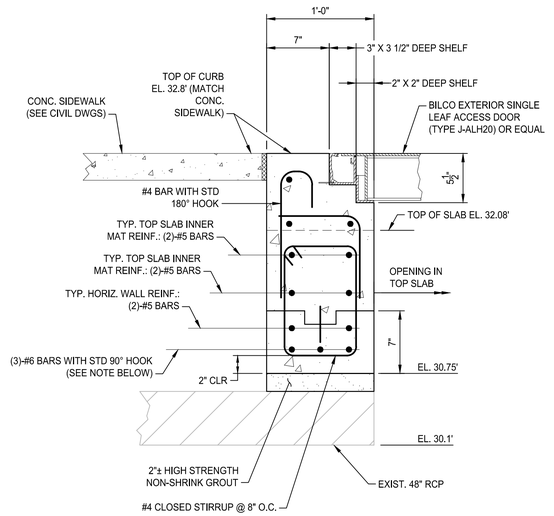
3/4"=1'-0"



SECTION A-A



SECTION B-B

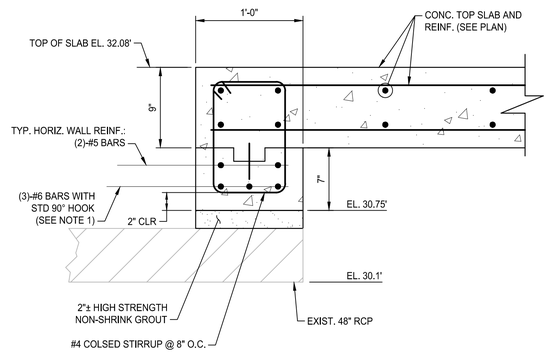


SECTION C-C

NOTE:

BAR LENGTH WITH STD 90° HOOK EACH END ("L")

- AT EXIST. 48" RCP: L = 7'-8"
- AT 12" HDPE: L = 5'-8"



SECTION D-D

3 TOP SLAB AND ACCESS CURB SECTIONS

1 1/2"=1'-0"

PARE

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

Roger Williams Park Stormwater Treatment Train

1000 Elmwood Avenue Providence, Rhode Island

DOGHOUSE DIVERSION MANHOLE

PLANS AND SECTIONS - 3

MICHAEL J. RONGIONE
No. 7437
REGISTERED PROFESSIONAL ENGINEER (STRUCTURAL)

REVISIONS:

PROJECT NO.:	22220.00
DATE:	APRIL 2023
SCALE:	AS SHOWN
DESIGNED BY:	MJR
CHECKED BY:	MJR
DRAWN BY:	JDB
APPROVED BY:	MJR

DRAWING NO.: C5.8

SHEET NO. 14 OF 15

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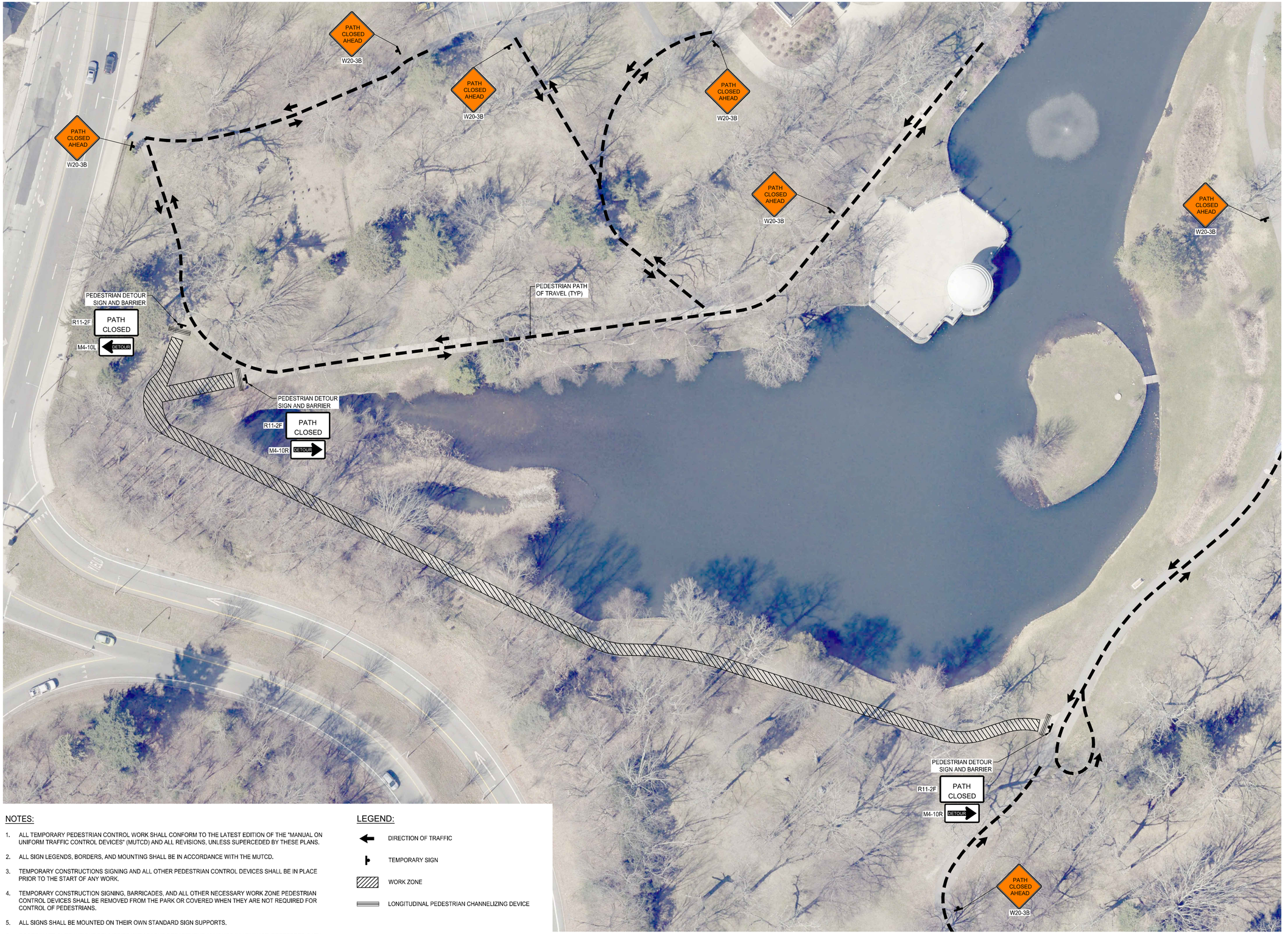

NOTES:

1. ALL TEMPORARY PEDESTRIAN CONTROL WORK SHALL CONFORM TO THE LATEST EDITION OF THE "MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES" (MUTCD) AND ALL REVISIONS, UNLESS SUPERCEDED BY THESE PLANS.
2. ALL SIGN LEGENDS, BORDERS, AND MOUNTING SHALL BE IN ACCORDANCE WITH THE MUTCD.
3. TEMPORARY CONSTRUCTIONS SIGNING AND ALL OTHER PEDESTRIAN CONTROL DEVICES SHALL BE IN PLACE PRIOR TO THE START OF ANY WORK.
4. TEMPORARY CONSTRUCTION SIGNING, BARRICADES, AND ALL OTHER NECESSARY WORK ZONE PEDESTRIAN CONTROL DEVICES SHALL BE REMOVED FROM THE PARK OR COVERED WHEN THEY ARE NOT REQUIRED FOR CONTROL OF PEDESTRIANS.
5. ALL SIGNS SHALL BE MOUNTED ON THEIR OWN STANDARD SIGN SUPPORTS.
6. COORDINATE OVER WEIGHT DELIVERIES WITH PARKS DEPARTMENT 48 HOURS IN ADVANCE. PREFERRED PATH IS FROM PARK AVENUE ENTRANCE, TRAVELING AGAINST NORMAL ONE-WAY FLOW OF TRAFFIC TO AVOID TRAVELING OVER BRIDGES WITHIN THE PARK.

LEGEND:

- DIRECTION OF TRAFFIC
- TEMPORARY SIGN
- WORK ZONE
- LONGITUDINAL PEDESTRIAN CHANNELIZING DEVICE

Scale: 1"=30'
0 15' 30' 60'

PARE

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

Roger Williams Park
Stormwater Treatment Train
1000 Elmwood Avenue Providence, Rhode Island
PEDESTRIAN DETOUR PLAN

BRANDON M. BLANCHARD
No. 8985
4.10.23
REGISTERED PROFESSIONAL ENGINEER (CIVIL)

REVISIONS:

PROJECT NO.:	22220.00
DATE:	APRIL 2023
SCALE:	1" = 20'
DESIGNED BY:	CRL
CHECKED BY:	BB
DRAWN BY:	AWB \ AKL
APPROVED BY:	BB

DRAWING NO.: C6.0
SHEET NO. 15 OF 15

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