

**CITY OF WARWICK, RHODE ISLAND  
WARWICK SEWER AUTHORITY  
BAYSIDE SEWER SYSTEM PRESSURE SEWER  
CONTRACT 86B  
ADDENDUM NO. 5**

**January 24, 2020**

**The following information is provided as part of the Contract Documents as Addendum No. 5.**

**CLARIFICATIONS**

1. Any permits required with the City of Warwick for the Warwick Department of Public Works or the Warwick Water Department shall be paid by the Warwick Sewer Authority.
2. Sewer service connections to dwellings shall be terminated at the locations indicated on the plan or as directed by the WSA at a depth of 6 +/- feet. Contractor shall stake the termination point for location by the WSA. All work to install the service connection shall be performed within the roadway. Work on private property will not be permitted without permission of the Warwick Sewer Authority.

**CONTRACT SPECIFICATIONS**

1. Delete Section 00300 Bid Forms and replace with the enclosed Section 00300. Prior addenda changes were incorporated into the specification, and additional changes were made to the quantities.
2. Delete Section 01025 Measurement and Payment and replace with the enclosed Section 01025. Prior addendum changes have been incorporated into the specification, and additional items and quantity changes have been made to items 70, 70A, 70B, and 77.
3. Delete Section 05813 Geotechnical Instrumentation and Monitoring and replace with the enclosed Section 05813. Prior addendum changes have been incorporated into the specification, and additional changes were made.

Attachments (40 Pages)

SECTION 00300

BID FORMS

TO: WARWICK SEWER AUTHORITY  
125 Arthur W. Devine Boulevard Warwick, RI 02886  
BID FOR: Contract No. 86B – Bayside Sewer System, Pressure Sewers

The undersigned BIDDER, having read and examined the Specifications and associated Contract Documents for the above-designated Work, does hereby propose to perform the Work and provide the services set forth in this Bid. All prices stated herein are firm and shall not be subject to escalation provided this Bid is accepted within one hundred twenty (120) days after the time set for receipt of Bids.

The BIDDER, in compliance with the Invitation for Bid for Contract No. 86B Bayside Sewer System in the City of Warwick, Rhode Island, having examined the Drawings and Specifications with related documents and the site of the proposed Work and being familiar with all of the conditions surrounding the construction of the proposed Project, including the availability of materials and labor, hereby proposes to furnish all labor, materials, supplies, supervision and anything else required or necessary in order to construct the Project in accordance with the Contract Documents within 730 calendar days from the "Notice to Proceed" and in accordance with the prices stated in the Schedule of Bid Items.

This Bid is accordingly submitted in the sum of

\_\_\_\_\_ Dollars  
*(Written in Words)*  
(\$ \_\_\_\_\_)  
*(Numerical)*

for the Contract No. 86B Bayside Sewer System. These prices cover all costs of performing the Work required under the Contract Documents of which this Bid is a part.

BIDDER hereby agrees to commence work under this Contract on a date to be specified in a written "Notice to Proceed" by the Warwick Sewer Authority, and to fully complete the project within **730** calendar days of said notice, or as otherwise mutually agreed upon by the Warwick Sewer Authority and BIDDER. BIDDER further agrees to pay as liquidated damages, the sum of \$2,500.00 for each consecutive calendar Day thereafter until the Project is completed.

Upon receipt of written notice of the acceptance of this Bid, BIDDER shall execute the formal Contract attached within ten (10) calendar Days, and deliver surety Bonds and insurance certificates as required in the General Conditions. In the event the Contract and Bond are not executed within the time set forth above, the Bid Security attached in the sum of (10% of the Bid Price)

\_\_\_\_\_ Dollars  
(Written in Words)  
(\$ \_\_\_\_\_)  
(Numerical)

shall become the property of the Warwick Sewer Authority as liquidated damages for the delay and additional expense to the Warwick Sewer Authority caused thereby.

BIDDER acknowledges receipt of the following addenda:

- Addendum No. 1      December 23, 2020**
- Addendum No. 2      January 8, 2020**
- Addendum No. 3      January 14, 2020**
- Addendum No. 4      January 15, 2020**
- Addendum No. 5      January 24, 2020**

The undersigned hereby declares that the following list states any and all variations from and exceptions to the requirements of the Contract Documents and that, otherwise, it is the intent of this bid that the Work will be performed in strict accordance with the Contract Documents. If the BIDDER takes no exceptions, he/she shall write "None" in the space provided.

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(Add additional pages as required)

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The Owner reserves the right to reject any BID which includes variations from and exceptions to the requirements of the Contract Documents.

A.1 SCHEDULE OF BID ITEMS

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## SCHEDULE OF PRICES

Item No.	Approx. Quantity	Unit Measure	Items w/Unit Bid Prices Written in Words	Unit Bid \$ Price	Amount \$ Bid
The Bidder agrees to perform all the construction work described in the CONTRACT DOCUMENTS, for the following unit and lump sum prices. BIDS shall include applicable fees.					
1	1	L.S.	Site Preparation and Mobilization		
			At _____	Per L.S. _____	_____
2	200	C.Y.	Rock Excavation (Open Cut Excavation)		
			At _____	Per C.Y. _____	_____
3	300	C.Y.	Rock Excavation (Trenchless - Open Cut Excavation)		
			At _____	Per C.Y. _____	_____
4	200	L.F.	Rock Excavation (Trenchless - Drilling - All Diameters)		
			At _____	Per L.F. _____	_____
5	1,043	C.Y.	Earth Excavation (Test Pits - Utilities)		
			At _____	Per C.Y. _____	_____
6	500	C.Y.	Earth Excavation - Unsuitable Materials		
			At _____	Per C.Y. _____	_____
7	20	Days	Earth Excavation - Archeological Investigations		
			At _____	Per Day. _____	_____
8	250	C.Y.	Additional Selected Material		
			At _____	Per C.Y. _____	_____
9	15	TON	Calcium Chloride		
			At _____	Per TON _____	_____
10	750	C.Y.	Additional Gravel Borrow		
			At _____	Per C.Y. _____	_____
11	100	L.F.	1 1/4" Pipe Open Cut Excavation - Service		
			At _____	Per L.F. _____	_____
12	10,482	L.F.	2" Pipe - Open Cut Excavation - Lateral		
			At _____	Per L.F. _____	_____
13	9,809	L.F.	3" Pipe - Open Cut Excavation - Lateral		
			At _____	Per L.F. _____	_____

**SCHEDULE OF PRICES**

<b>Item No.</b>	<b>Approx. Quantity</b>	<b>Unit Measure</b>	<b>Items w/Unit Bid Prices Written in Words</b>	<b>Unit Bid \$ Price</b>	<b>Amount \$ Bid</b>
14	2,465	L.F.	4" Pipe - Open Cut Excavation - Lateral		
			At _____ Per L.F. _____		
15	1,115	L.F.	6" Pipe - Open Cut Excavation - Lateral		
			At _____ Per L.F. _____		
16	67,186	L.F.	1 1/4" Trenchless - Service		
			At _____ Per L.F. _____		
17	13,076	L.F.	2" Trenchless - Lateral		
			At _____ Per L.F. _____		
18	12,735	L.F.	3" Trenchless - Lateral		
			At _____ Per L.F. _____		
19	100	L.F.	4" Trenchless - Lateral		
			At _____ Per L.F. _____		
20	2,427	L.F.	6" Trenchless - Lateral		
			At _____ Per L.F. _____		
21	1,425	L.F.	8" Trenchless - Lateral		
			At _____ Per L.F. _____		
22	45	L.F.	16" Ductile Iron Gravity Sewer		
			At _____ Per L.F. _____		
23	1	EA.	Sewer Manhole (Gravity)		
			At _____ Per EA. _____		
24	26	EA.	Pressure Sewer Manhole - Open Cut Excavation - Main End Manhole		
			At _____ Per EA. _____		
25	28	EA.	Pressure Sewer Manhole - Open Cut Excavation - Junction / Intersection Cleanout		
			At _____ Per EA. _____		
26	<b>20</b>	EA.	Pressure Sewer Manhole - Open Cut Excavation - Bend Cleanout		
			At _____ Per EA. _____		
27	<b>15</b>	EA.	Pressure Sewer Manhole - Open Cut Excavation - Straight Cleanout		
			At _____ Per EA. _____		

**SCHEDULE OF PRICES**

<b>Item No.</b>	<b>Approx. Quantity</b>	<b>Unit Measure</b>	<b>Items w/Unit Bid Prices Written in Words</b>	<b>Unit Bid \$ Price</b>	<b>Amount \$ Bid</b>
28	39	EA.	Trenchless - Type A - End Cleanout		
			At _____ Per EA. _____		
29	2	EA.	Trenchless - Type B - In Line Cleanout		
			At _____ Per EA. _____		
30	<b>30</b>	EA.	Trenchless - Type C - 3 Way / 4 Way Intersection Connection		
			At _____ Per EA. _____		
31	940	EA.	Trenchless - Type D - Service Connection		
			At _____ Per EA. _____		
32	10	EA.	Air Release Sewer Manhole (All Sizes)		
			At _____ Per EA. _____		
33	47,600	S.Y.	Remove Bituminous Surface by Cold Planing (Gutters)		
			At _____ Per S.Y. _____		
34	24,000	L.F.	2" Bituminous Pavement Patch Linear, HMA CL 9.5		
			At _____ Per L.F. _____		
35	6,700	S.Y.	2" Bituminous Pavement Square, HMA CL 9.5		
			At _____ Per S.Y. _____		
36	14,200	TON	1-1/2" Permanent Pavement Overlay, HMA CL 9.5		
			At _____ Per TON _____		
37	1,450	TON	2" Permanent Pavement Overlay (Tidewater Drive), HMA		
			At _____ Per TON _____		
38	6,000	TON	2-1/2" Driveways & Sidewalks HMA CL 9.5 Surface Course		
			At _____ Per TON _____		
39	2,700	L.F.	Bituminous Berm RI STD 7.5.1.		
			At _____ Per L.F. _____		
40	13,340	L.F.	Saw-cutting Bituminous Concrete Driveways		
			At _____ Per L.F. _____		
41	410	EA.	Saw-cutting Operation / Reception Pits		
			At _____ Per EA. _____		

**SCHEDULE OF PRICES**

<b>Item No.</b>	<b>Approx. Quantity</b>	<b>Unit Measure</b>	<b>Items w/Unit Bid Prices Written in Words</b>	<b>Unit Bid \$ Price</b>	<b>Amount \$ Bid</b>
42	100	C.Y.	Controlled Low Strength Concrete Material		
	At _____			Per C.Y. _____	_____
43	100	C.Y.	Miscellaneous Concrete		
	At _____			Per C.Y. _____	_____
44	2,702	L.F.	8" Compost Filter Sock		
	At _____			Per L.F. _____	_____
45	330	EA.	Silt Sack Protection		
	At _____			Per EA. _____	_____
46	500	S.Y.	4" Loam and Seed		
	At _____			Per S.Y. _____	_____
47	10	EA.	Precast Drainage Structures - All Depths		
	At _____			Per EA. _____	_____
48	500	L.F.	Remove and Dispose Drainage Pipe - All Sizes		
	At _____			Per L.F. _____	_____
49	10	EA.	Remove and Dispose Existing Drainage Structures - All Sizes		
	At _____			Per EA. _____	_____
50	400	L.F.	12" RCP Drainage Pipe		
	At _____			Per L.F. _____	_____
51	400	L.F.	12" D.I. Drainage Pipe		
	At _____			Per L.F. _____	_____
52	100	L.F.	18" RCP Drainage Pipe		
	At _____			Per L.F. _____	_____
53	100	L.F.	18" D.I. Drainage Pipe		
	At _____			Per L.F. _____	_____
54	200	L.F.	Remove and Reset Drainage Pipe - 12-inches or less - All Types		
	At _____			Per L.F. _____	_____
55	100	L.F.	Remove and Reset 18-inch Drainage Pipe - All Types		
	At _____			Per L.F. _____	_____



## SCHEDULE OF PRICES

Addendum No. 5

Item No.	Approx. Quantity	Unit Measure	Items w/Unit Bid Prices Written in Words	Unit Bid \$ Price	Amount \$ Bid
56	50	L.F.	Remove and Reset 24-inch Drainage Pipe - All Types		
At _____ Per L.F. _____					
57	28	EA.	Isolate and Reactivate Water Mains - Less Than 40 Feet		
At _____ Per EA. _____					
58	28	EA.	Isolate and Reactivate Water Mains - 40 to 80 Feet		
At _____ Per EA. _____					
59	1	Allowance	Overhead Utility House Services - Disconnect & Reactivate - All Types		
At <b>Two hundred thousand dollars</b> Per EA. <b>\$200,000</b> <b>\$200,000</b>					
60	500	L.F.	6" PVC Water Pipe (Sewer Conflicts)		
At _____ Per L.F. _____					
61	500	L.F.	8" PVC Water Pipe (Sewer Conflicts)		
At _____ Per L.F. _____					
62	40	EA.	Water Service Connections		
At _____ Per EA. _____					
63	8	EA.	6" Water Gate Valve		
At _____ Per EA. _____					
64	8	EA.	8" Water Gate Valve		
At _____ Per EA. _____					
65	1	EA.	Tapping Sleeve and Valve - All Sizes		
At _____ Per EA. _____					
66	2	EA.	Fire Hydrants		
At _____ Per EA. _____					
67	1	L.S.	Construction Road Signs		
At _____ Per L.S. _____					
68	1	L.S.	Traffic Barrels w/Type A or Type C Light		
At _____ Per L.S. _____					
69	1	L.S.	Traffic Barricades		
At _____ Per L.S. _____					

**SCHEDULE OF PRICES**

<b>Item No.</b>	<b>Approx. Quantity</b>	<b>Unit Measure</b>	<b>Items w/Unit Bid Prices Written in Words</b>	<b>Unit Bid \$ Price</b>	<b>Amount \$ Bid</b>
70	1	L.S.	Vibration Monitoring		
	At _____			Per L.S. _____	_____
70A	1	L.S.	Pre-Construction Survey		
	At _____			Per L.S. _____	_____
70B	1	L.S.	Post-Construction Survey		
	At _____			Per L.S. _____	_____
71	1	Allowance	Miscellaneous Utility Work (Allowance)		
	At	<b>Two hundred thousand dollars</b>		<b>\$200,000</b>	<b>\$200,000</b>
72	1	Allowance	Asbestos Containing Materials (Allowance)		
	At	<b>One hundred thousand dollars</b>		<b>\$100,000</b>	<b>\$100,000</b>
73	1	Allowance	Gas Main Relocation (Allowance)		
	At	<b>One hundred thousand dollars</b>		<b>\$100,000</b>	<b>\$100,000</b>
74	1	Allowance	Soil Compaction Testing (Allowance)		
	At	<b>Twenty thousand dollars</b>		<b>\$20,000</b>	<b>\$20,000</b>
75	1	Allowance	Tree Trimming (Allowance)		
	At	<b>Twenty Five thousand dollars</b>		<b>\$25,000</b>	<b>\$25,000</b>
76	1	Allowance	Police Protection Paid by Warwick Sewer Authority		
				<b>\$0</b>	<b>\$0</b>
77	900	Each	Utility Location by Vacuum Excavator		
	At _____			Per Each _____	_____

TOTAL OF BID (ITEMS 1 THROUGH 77): \$ \_\_\_\_\_

(Figures)

TOTAL BID WRITTEN IN WORDS:

Dollars

The BIDDER agrees to perform the Work described in the Specifications and shown on the Drawings for the following lump sum or unit prices. All prices must be given in numerical figures and must be typewritten or printed legibly.

Due to the length and nature of this request, only the Total Bid Price will be read aloud at the Bid Opening. The prices for the individual items will not be read aloud, but following the Bid Opening, a Bid Abstract will be prepared, and it will be made available to all interested parties upon request.

TOTAL BASE BID PRICE (In Figures):

\$ \_\_\_\_\_

Note: In case of error in the extension of prices, the unit price will govern.

The BIDDER warrants that it has available or under its control, labor, equipment, materials, and resources of the character and in the amount required to complete the proposed Work within the specified time.

A.2 ALTERNATES

The Warwick Sewer Authority reserves the right to include one or more alternates identified herein to/from the scope of the project; provided, however, that said alternates shall only be selected by the Warwick Sewer Authority in the order in which they are listed. Bidders are required to submit a bid price for each and every alternate. Failure to submit a bid price for each and every alternate will result in the entire proposal being deemed to be nonresponsive to the solicitation.

Alternates are listed in numerical sequence in order of Warwick Sewer Authority's priority. In determining the lowest responsive bid the awarding authority shall consider alternates in descending numerical sequence such that no individual alternate shall be considered until every alternate preceding it on the list has been added to the base bid price.

Bidder understands that the Warwick Sewer Authority reserves the right to reject any and all bids, and to waive any irregularities in the bidding and accept the bid, with or without alternates, as deemed to be in the best interest of the Warwick Sewer Authority.

A.3 EXTRA WORK

Payment for extra work, if any performed, shall be in accordance with Section 00700 – General Conditions of the Contract Documents, and shall be computed in one of the following methods:

- A. A lump sum agreed upon by the Contractor, the Warwick Sewer Authority, and the Engineer.
- B. The unit price proposed by the Contractor.

C. Actual costs as defined by Section 00700 – General Conditions.

A.4 ENGINEER'S ESTIMATE OF QUANTITIES

Quantities are provided for informational purposes only for use by the BIDDERS in developing a total Bid price. BIDDERS are advised to develop their own material takeoff quantities from the Contract Documents.

A.5 DECLARATION AND SIGNATURES

The undersigned hereby declares that, in regard to all conditions affecting the Work to be done and the labor and materials required, this Bid is based on its investigations and findings, and the WARWICK SEWER AUTHORITY, their officers, agents and employees of the WARWICK SEWER AUTHORITY shall not in any manner be held responsible for the accuracy of, or be bound by, any estimates, borings, indications of borings, soils, rock, water, or underground conditions relative to the proposed Work indicated in this or in the other Contract Documents; that no warranty or representation has been made by the WARWICK SEWER AUTHORITY, its officers, agents and employees as to subsurface soil or rock conditions, groundwater conditions, or other underground and similar conditions.

A.6 BIDDER CONTRACTOR QUALIFICATIONS

The Bidder shall meet the minimum qualification requirements provided below.

A.6.1 Required Bidder Qualification Statement

The Bidder shall state below what works of a similar character to that of the proposed contract it has performed, and provide such references as will enable the Owner to judge its experience, skill, and business standing.

All questions must be answered and the data given must be clear and comprehensive. This statement must be notarized. If necessary, add separate sheets.

1. Name of Bidder.
  
2. Permanent Main Office address.
  
3. When organized?
  
4. Where incorporated?

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5. Is bidder registered with the Secretary of the State to do business in Rhode Island?
  6. For how many years has your firm engaged in the contracting business under its present name? Also state names and dates of previous firm names, if any.
  7. Contracts on hand. (Schedule these, showing gross amount of each contract and the approximate anticipated dates of completion.)
  8. General character of work performed by your company.
  9. Have you ever failed to complete any work awarded you in the scheduled contract time, including approved time extensions?  (Yes)  (No).  
  
If so, where and why?
  10. Have you ever defaulted on a contract?  (Yes)  (No).  
  
If so, where and why?
  11. Have you ever had liquidated damages assessed on a contract?  (Yes)  (No).  
  
If so, where and why?
  12. List the more important contracts recently executed by your company, stating approximate cost for each, and the month and year completed.
  13. List your major equipment available for this contract.
  14. List your key personnel such as Project Superintendent and foreman available for this contract.
  15. With what banks do you conduct business?
- Do you grant the Engineer permission to contact this (these) institutions?  (Yes)  (No)

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NOTE: Bidders may be required to furnish their latest financial statement as part of the award process.

Projects of Similar Size and Complexity Demonstrating BIDDER possess Minimum BIDDER Qualifications

Project 1

Project Name: \_\_\_\_\_

Project Location: \_\_\_\_\_

Year Completed: \_\_\_\_\_

Construction Cost: \_\_\_\_\_

Owner and Contact Information: \_\_\_\_\_

Engineer and Contact Information: \_\_\_\_\_

Reference Contact Information: \_\_\_\_\_

Scope of Work: \_\_\_\_\_

\_\_\_\_\_  
\_\_\_\_\_

Projects of Similar Size and Complexity Demonstrating BIDDER possess Minimum BIDDER Qualifications

Project 2

Project Name: \_\_\_\_\_

Project Location: \_\_\_\_\_

Year Completed: \_\_\_\_\_

Construction Cost: \_\_\_\_\_

Owner and Contact Information: \_\_\_\_\_

Engineer and Contact Information: \_\_\_\_\_

Reference Contact Information: \_\_\_\_\_

Scope of Work: \_\_\_\_\_

**A.6.2 DIRECTIONAL DRILLING CONTRACTOR**

The BIDDER or BIDDER's subcontractor shall either be chosen from the prequalified subcontractor list below or be qualified by meeting the minimum qualification requirements provided below.

**Prequalified Subcontractor List**

1. Directional Technologies, Inc. 77 N. Plains Industrial Road Wallingford, CT 06492 1-877-788-4479
2. S.J. Louis Construction 1351 Broadway St. W., PO Box 459 Rockville, MN 56369 (320) 253-9291

**DIRECTIONAL DRILLING QUALIFICATIONS**

**I. Submission Requirements**

In order to conduct a reasonable and efficient evaluation of the contractor, the WSA requires that firms prepare qualification statements which are clear and concise, and which follow the format outlined below.

1. **Cover Letter.** The respondent shall include a cover letter, signed by an individual authorized to submit information for the contractor. In the cover letter, the contractor must:
  - a. Certify that the information contained in the submittal is true and accurate.
  - b. Certify that the personnel for the horizontal directional drilling operations listed in their submittal will be directly involved with the project for its duration.
  - c. Disclose if the contractor or any member of its team is currently debarred from doing business with any governmental agency or is a party to any pending or current litigation which would adversely affect performance on the project.
  - d. Disclose if the firm or any member of the firm has filed for protection of US Bankruptcy court in the last 7 years. If yes, then describe the circumstances and evidence of the firm's ability to complete the project.

2. **Firm Background.** The HDD Contractor must be an established business with the experience, equipment and qualified personnel in the area of trenchless technology/horizontal directional drilling. Provide a general description of the firm, services provided, office locations, number and type of personnel involved in the providing the services offered, years in business. The firm must have a **minimum of 10 years providing horizontal directional drilling services.**
  
3. **Equipment, Condition, Size and Capacity.** The HDD Contractor must demonstrate they possess the necessary directional drilling and ancillary equipment of adequate size, capacity and condition to execute the project with consideration of existing /subsurface conditions. The Contractor shall provide a listing of the following:
  - a. Make, model, serial number, year manufactured, rated torque and thrust/pull capacity of HDD equipment owned or proposed to be acquired / rented by the Contractor.
  - b. Make, model, serial number, year manufactured, rated torque and thrust/pull capacity of HDD equipment of choice for use on this project.
  - c. Type, manufacturer, model and accuracy of tool detection/location/guidance systems.
  - d. Means for recording and information to be recorded detailing drilling history for as-built drawings and documentation.
  
4. **Personnel.** The HDD Contractor shall provide information on the capabilities and experience of the management, project staff, and field personnel anticipated to be assigned to the project (i.e. Project Manager, Site Superintendent, Crew Foreman, Directional Drilling Equipment Operators and other relevant staff). The Superintendent, Crew Foreman and directional drilling equipment operator(s) shall have **at least 3 years of experience using directional drilling equipment/installation techniques on at least 5 projects similar in size, scope and setting to the project described above.** Provide a resume for each showing their name, title, including a detailed description of their role and job responsibilities, education, construction experience, years with the firm and a list of all the projects completed that they have had direct/indirect experience on similar projects of size and scope.
  
5. **Project Experience.** The HDD contractor must include a record of experience on 5 projects of similar size, scope and setting completed in the last 10 years. For each project, provide information on:
  - a. The project name and client
  - b. Description of the project
  - c. Scope of services provided
  - d. Pipe diameters, pipe material and lengths
  - e. HDD technology used
  - f. Problems encountered and how they were resolved
  - g. Any claims and how they were resolved.
  - h. The original and final contract sum
  - i. Start and completion dates
  - j. The owners name, address, telephone number and contact for project
  
6. **References.** Provide reference information for the following:
  - a. Project References
    - Provide the following reference information for each project listed under the project experience section.
    - Project Name
    - Name, address, telephone, and email of Owner



- Name, address, telephone, and email of Owner's representative or Engineer
  - Name of Contact person, title, telephone and email for each
7. **Financial Stability.** The contractor must submit proof of their financial stability. This will include an audited financial statement for the most recent completed year, information demonstrating available bonding and a letter from the firm's banking institution indicating their line of credit available to cover project cash flow. The surety/bonding company must be licensed to do business in the State of Rhode Island. Any and all financial information requested and/or submitted shall be maintained as confidential upon request.
8. **Safety Record.** Provide a 3-year history of the Contractor's worker's compensation experience modifier rating and documentation from their insurance carrier supporting the rating history provided.
9. **Insurance.** The Contractor should demonstrate that they maintain adequate insurance coverage and provide evidence of such coverages.

BIDDER certifies that materials and means and methods used to construct above projects are similar in nature to the Work of this Contract.

Respectfully submitted,

\_\_\_\_\_ Date \_\_\_\_\_  
Name of Company\*

By \_\_\_\_\_  
(Signature) (Printed or Typed)

Title \_\_\_\_\_

Business Address \_\_\_\_\_

SEAL

(Seal if Bid is by a Corporation)

\*Note: Insert BIDDER'S name. If a corporation, give the state of incorporation, using the phrase "A corporation organized under the laws of \_\_\_\_\_, composed of officers as follows:

Further, be advised that \_\_\_\_\_, who serves as \_\_\_\_\_ of this company, is duly authorized to enter into any resulting contract with the OWNER.

\_\_\_\_\_  
President

\_\_\_\_\_  
Vice President

\_\_\_\_\_  
Secretary

\_\_\_\_\_  
Treasurer

END OF SECTION

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## SECTION 01025

## MEASUREMENT AND PAYMENT

## PART 1 – GENERAL

## 1.1 MEASUREMENT AND PAYMENT

- A. All Work performed as described in these Contract Documents will be paid for under one or more of the items listed in the Schedule of Bid Items. All other activities required in connection with performance of the Work, including all Work required under Division 1 – General Requirements, whether described in the Contract Documents or mandated by applicable codes, permits and laws, will not be separately paid for unless specifically provided for in the form of general bid, but will be considered incidental to performance of the overall Project and deemed to be included in the various bid items listed in the Schedule of Bid Items.
- B. Each unit or lump sum price stated in the Schedule of Bid Items shall constitute full compensation as herein specified for each item of Work completed in accordance with the Drawings and Specifications.
- C. Contractor shall make its own estimate of the quantities necessary to complete the Work.
- D. The payment items listed herein and in the Schedule of Bid Items are intended to provide full payment for the Work shown on the Drawings and specified herein. Any Work called for or inferred in the documents but not listed as a payment item shall be considered incidental to the overall Project.
- E. It is the intent of these Specifications to provide all labor, equipment, materials, supplies, temporary facilities, incidentals, and appurtenances to satisfactorily complete the Work of this Contract.
- F. Partial payment for lump sum items will be made based upon the percentage of Work complete in accordance with the schedule of values as estimated by Contractor and verified and approved by Engineer under each individual item to date. Partial payment for unit price items will be made based upon the Contractor's estimated quantity completed to date, and verified by Engineer, for items listed in the schedule of values.
- G. Contractor shall coordinate all quantity surveys with the Engineer, so that Engineer may conduct its own quantity survey for verification purposes. Discrepancies in the quantities estimated by Contractor and Engineer shall be resolved prior to modifying the site surface.
- H. Allowances have been included on the Bid Price Form for work that cannot be sufficiently quantified and must be completed by a specific third party, the services of which are arranged and provided by the Contractor. Measurement for these services will be the invoice amounts paid by the Contractor for work authorized and directed by the Engineer. No Contractor markup will be

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applied to these costs. Payment will constitute full compensation for work and costs associated with reimbursable payments to third parties.

## 1.2 METHOD OF MEASUREMENT AND BASIS OF PAYMENT

- A. The methods of measurement and basis of payment for the Payment Items listed above are specified in the following section.

<u>BID ITEM</u>	<u>DESCRIPTION</u>	<u>PAY UNIT</u>
1	Site Preparation and Mobilization	Lump Sum

Measurement: The work of this section shall be measured on a lump sum basis. The work consists of the performance of actions that are required to clear and prepare the site for subsequent construction operations and those efforts necessary for the movement of Contractor's personnel and equipment to the project site and for the establishment of all the Contractor's field offices, buildings, and facilities required for the performance of the Contract, and other incidentals not paid elsewhere in the contract.

Payment: Site Preparation and Mobilization will be paid for at the contract lump sum price listed in the Proposal. The price so-stated constitutes full and complete compensation for all labor, materials and equipment and other incidentals required to establish site preparation, Contractor's facilities at the site and at the conclusion of the contract, for complete removal thereof.

<u>BID ITEM</u>	<u>DESCRIPTION</u>	<u>PAY UNIT</u>
2	Rock Excavation (Open Cut Excavation)	Cubic Yard (CY)

Measurement: Rock excavation for open cut trench installation will be measured on a volume basis as computed from the area in its original position. The volume will be determined by differencing the area to be excavated from its original position before excavation is begun to the design subgrade after excavation is completed. Rock excavation for open cut excavations will consist of the removal of intact bedrock and boulders or detached bedrock fragments which have a minimum volume of 1 cubic yard.

Payment: The accepted quantity of Rock excavation for open cut trench removal will be paid for at the contract unit price per cubic yard as listed in the Proposal. The payable quantity will be the number of cubic yards of ledge rock or boulders drilled and mechanically split, or split by hand, as measured before excavation, that would have been removed if the excavation had been made everywhere to a depth of 6 inches below the underside of the pipe or masonry and to a width of 27 inches greater than the outside dimensions of said pipe or masonry on each side. The price so-stated constitutes full and complete compensation for all labor, materials and equipment, including excavation within the prescribe limits of the work, formation of embankments, grading, compaction, disposal of surplus materials, preparation of subgrade, and all other incidentals required to finish the work complete and accepted by the Engineer.

<u>BID ITEM</u>	<u>DESCRIPTION</u>	<u>PAY UNIT</u>
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3	Rock Excavation (Trenchless - Open Cut Excavation)	Cubic Yard (CY)
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Measurement: Rock excavation to facilitate trenchless technologies will be measured on a volume basis as computed from the area in its original position. **Trenchless technology rock excavation will include excavations for operation and reception pits, and for rock removal required to retrieve or facilitate directional drilling runs using open cut excavation.** Rock excavation for trenchless open cut excavations will consist of the removal of intact bedrock and boulders or detached bedrock fragments which have a minimum volume of 1 cubic yard.

Payment: The accepted quantity of Rock Excavation for trenchless open cut removal will be paid for at the contract unit price per cubic yard as listed in the Proposal. The payable quantity will be the number of cubic yards of ledge rock or boulders drilled and mechanically split, or split by hand, as measured before excavation, that would have been removed if the excavation had been made everywhere. The price so-stated constitutes full and complete compensation for all labor, materials and equipment, including excavation within the prescribed limits of the work, formation of embankments, grading, removal of bituminous pavement, compaction, disposal of surplus materials, preparation of subgrade, and all other incidentals required to finish the work complete and accepted by the Engineer.

<u>BID ITEM</u>	<u>DESCRIPTION</u>	<u>PAY UNIT</u>
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4	Rock Excavation (Trenchless – Drilling – All Diameters)	Linear Foot (LF)
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Measurement: Rock excavation to facilitate directional drilling through boulders or ledge rock encountered during operations will be measured in linear feet of continuous run.

Payment: The accepted quantity for rock drilling via trenchless technologies will be paid for at the contract unit price per linear foot for all pipe size diameters as listed in the Proposal. **The linear foot price shall be the additional premium cost to facilitate directional drill through boulders or ledge rock.** The price so-stated constitutes full and complete compensation for all labor, materials and equipment, including all other incidentals required to finish the work complete and accepted by the Engineer.

<u>BID ITEM</u>	<u>DESCRIPTION</u>	<u>PAY UNIT</u>
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5	Earth Excavation (Test Pits - Utilities)	Cubic Yard (CY)
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Measurement: Earth excavation performed to locate existing utilities or to determine subsurface soil conditions will be measured on a volume basis as computed from the area in its original position. The volume will be determined by differencing the area to be excavated from its original position before excavation is begun to the design subgrade after excavation is completed.

Payment: The accepted quantity of Earth Excavation for test pits for utility exploration will be paid for at the contract unit price per cubic yard as listed in the Proposal. The payable quantity will be the number of cubic yards of material excavated. The price so-stated constitutes full and complete compensation for all labor, materials and equipment, including excavation within the prescribe limits of the work, backfill of material, grading, compaction, disposal of surplus materials, preparation of subgrade, and all other incidentals required to finish the work complete and accepted by the Engineer.

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<u>BID ITEM</u>	<u>DESCRIPTION</u>	<u>PAY UNIT</u>
6	Earth Excavation (Unsuitable Materials)	Cubic Yard (CY)

Measurement: Earth excavation performed to remove unsuitable soils which due to their consolidation properties, degree of saturation, gradation, organic content or other deleterious characteristics will not provide a stable subgrade or foundation or cannot be placed and compacted as backfill will be measured on a volume basis as computed from the area in its original position. The volume will be determined by differencing the area to be excavated from its original position before excavation is begun to the design subgrade after excavation is completed.

Payment: The accepted quantity of Earth Excavation to remove unsuitable soil will be paid for at the contract unit price per cubic yard as listed in the Proposal. The payable quantity will be the number of cubic yards of material excavated. The price so-stated constitutes full and complete compensation for all labor, materials and equipment, including excavation within the prescribe limits of the work, dewatering, disposal of materials, preparation of subgrade, and all other incidentals required to finish the work complete and accepted by the Engineer. Backfill to replace unsuitable materials will be paid for separately.

<u>BID ITEM</u>	<u>DESCRIPTION</u>	<u>PAY UNIT</u>
7	Earth Excavation (Archeological Investigations)	Day

Measurement: Earth excavation for archeological investigations will be measured on a day rate for work performed. The work will include providing a backhoe with a flat blade bucket, dump truck, backhoe operator, dump truck, driver, and laborer. Earth excavations for archeological investigation will be performed as required to facilitate the placement of additional operation or reception pits, to support additional excavation within areas not previously approved by archeological investigations.

Payment: The accepted quantity of Earth Excavation for archeological investigations will be paid for at the contract unit price per day as listed in the Proposal. The payable quantity will be the number of days work is performed. The price so-stated constitutes full and complete compensation for all labor, materials and equipment, saw-cutting bituminous pavement, including excavation within the prescribe limits of the work, disposal of bituminous pavement and materials, preparation of subgrade, and all other incidentals required to finish the work complete and accepted by the Engineer.

<u>BID ITEM</u>	<u>DESCRIPTION</u>	<u>PAY UNIT</u>
8	Additional Select Material	Cubic Yard (CY)

Measurement: Additional select material will be measured by the number of cubic yards actually placed. Additional select material shall be placed as directed by the Engineer as needed to facilitate construction operations. The material will be commercial grade crushed stone or filter stone in accordance the Rhode Island Department of Transportation Standard Specifications for Road and Bridge Construction. All stone shall be suitably graded from the smallest to the largest particles; it shall be clean, hard, durable and free from dust, loam, clay or organic matter.

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Payment: The accepted quantity of additional select material will be paid for at the contract unit price per cubic yard as listed in the Proposal. The price so-stated constitutes full and complete compensation for all labor, materials and equipment, and all other incidentals, including trimming and fine grading required to finish the work, and complete and accepted by the Owner. Selected material required to fill unauthorized excavations will not be paid for separately, but will be provided at the Contractor's expense.

<u>BID ITEM</u>	<u>DESCRIPTION</u>	<u>PAY UNIT</u>
9	Calcium Chloride Dust Control	Tons (TON)

Measurement: Calcium Chloride for Dust Control will be measured by the number of tons actually applied as directed by the Owner and as needed to conform to the soil erosion and sediment control plan. The material shall conform to the latest ASTM Specifications. The Owner may allow the weights as printed on the shipping contained to constitute the official measure, otherwise the contractor shall provide scales to weight the material at no additional cost to the Owner.

Payment: The accepted quantity of calcium chloride for dust control will be paid for at the contract unit price per ton as listed in the Proposal. The price so-stated constitutes full and complete compensation for all labor, materials, and equipment, and all other incidentals, required to finish the work, complete and accepted by the Owner.

<u>BID ITEM</u>	<u>DESCRIPTION</u>	<u>PAY UNIT</u>
10	Additional Gravel Borrow	Cubic Yard (CY)

Measurement: Additional gravel borrow material will be measured by the number of cubic yards actually placed. Additional gravel borrow material shall be placed as directed by the Engineer as needed to facilitate construction operations.

Payment: The accepted quantity of additional select material will be paid for at the contract unit price per cubic yard as listed in the Proposal. The price so-stated constitutes full and complete compensation for all labor, materials and equipment, and all other incidentals, including trimming and fine grading required to finish the work, and complete and accepted by the Owner. Gravel borrow used as a subbase course for temporary and permanent pavement patch and for pipe bedding will not be paid for separately, but is included for payment under the appropriate pipe and pavement items.

<u>BID ITEM</u>	<u>DESCRIPTION</u>	<u>PAY UNIT</u>
11, 12, 13, 14, 15	Pressure Sewer Pipe (All Sizes) Laterals – Open Cut Excavation	Linear Foot (LF)

Measurement: Pressure sewer pipe installed by open cut excavations of the various types and sizes indicated on the Plans will be measured in linear feet of continuous runs of such sewers actually installed in accordance with the Plans and/or as directed by the Owner. Deductions will not be made for the pipe length, inside diameter, of manholes.

Payment: The accepted quantity for pressure sewer pipe, laterals and services, installed by open cut excavation will be paid for at the contract unit price per linear foot for the various pipe sizes as listed in the Proposal. The price so-stated constitutes full and complete compensation for all labor, materials and equipment to install the pipe complete and in place. The work will include furnishing all pipes, plugs, excavation, dewatering, compaction, saw-cut of bituminous and concrete pavements, furnishing and placing a bedding materials, geo-textile filter fabric; laying, setting and jointing all pipes and fittings, making all connections to existing pipes and manholes, for rebuilding inverts of existing manholes as may be required, including adapters for all leakage testing, for backfilling and compacting backfill material, for disposal of all excess excavated materials, for replacing or rebuilding driveways, walks, sidewalks, curbs, walls, and any other impacted structures, including shrubs, fences, sprinkler systems, existing grassed areas and other surface material; for furnishing, placing, and removing all temporary timber sheeting and bracing, trench boxes and or steel plates; for providing temporary bracing at existing utility poles, for removing and resetting existing mailboxes; for removing abandoned water and gas main pipe, and all other incidentals.

<u>BID ITEM</u>	<u>DESCRIPTION</u>	<u>PAY UNIT</u>
16, 17, 18, 19, 20 & 21	Pressure Sewer Pipe (All Sizes) Laterals and Services – Trenchless	Linear Foot (LF)

Measurement: Pressure sewer pipe installed by trenchless technologies, horizontal directional drilling, of the various types and sizes indicated on the Plans will be measured in linear feet of continuous runs of such sewers actually installed in accordance with the Plans and/or as directed by the Owner.

Payment: The accepted quantity for pressure sewer pipe, laterals and services, installed by directional drilling will be paid for at the contract unit price per linear foot for the various pipe sizes as listed in the Proposal. The price so-stated constitutes full and complete compensation for all labor, materials and equipment to install the pipe complete and in place. The work will include furnishing all pipes, plugs, installing and jointing all pipes and fittings, making all connections to existing pipes and manholes, disposal of all excess excavated materials, for replacing or rebuilding driveways, walks, sidewalks, curbs, walls, and any other impacted structures, including shrubs, fences, sprinkler systems, existing grassed areas and other surface material; for providing temporary bracing at existing utility poles, and all other incidentals.

<u>BID ITEM</u>	<u>DESCRIPTION</u>	<u>PAY UNIT</u>
22	16-Inch Ductile Iron Gravity Sewer Pipe Laterals - Open Cut Excavation	Linear Foot (LF)

Measurement: Gravity sewer pipe installed by open cut excavation as indicated on the Plans will be measured in linear feet of continuous runs of such sewers actually installed in accordance with the Plans and/or as directed by the Owner. Deductions will not be made for the pipe length, inside diameter, of manholes.

Payment: The accepted quantity for gravity sewer pipe installed by open cut excavation will be paid for at the contract unit price per linear foot for the various pipe sizes as listed in the Proposal. The price so-stated constitutes full and complete compensation for all labor, materials and equipment to install the pipe complete and in place. The work will include furnishing all pipes, plugs,



excavation, dewatering, compaction, saw-cut of bituminous and concrete pavements, furnishing and placing a bedding materials, geo-textile filter fabric; laying, setting and jointing all pipes and fittings, making all connections to existing pipes and manholes, for rebuilding inverts of existing manholes as may be required, including adapters for all leakage testing, for backfilling and compacting backfill material, for disposal of all excess excavated materials, for replacing or rebuilding driveways, walks, sidewalks, curbs, walls, and any other impacted structures, including shrubs, fences, sprinkler systems, existing grassed areas and other surface material; for furnishing, placing, and removing all temporary timber sheeting and bracing, trench boxes and or steel plates; for providing temporary bracing at existing utility poles, for removing and resetting existing mailboxes; for removing abandoned water and gas main pipe, and all other incidentals.

<u>BID ITEM</u>	<u>DESCRIPTION</u>	<u>PAY UNIT</u>
23, 24, 25, 26 & 27	Sewer Manholes (Open Cut Excavation) (Gravity and Pressure Sewer)	Each (EA)

Measurement: Sewer Manholes installed by open cut excavation of the various types and sizes all indicated on the Plans will be measured by the number of such structures actually installed in accordance with the Plans and/or as directed by the Owner.

Payment: The accepted quantities of sewer manholes installed by open cut excavation will be paid for at the contract unit price per each such structure as listed in the Proposal. The price so-stated constitutes full and complete compensation for all labor, materials and equipment to install the manholes complete and in place. The work will include furnishing all excavation, dewatering, earth supports systems, compaction, saw-cut of bituminous and concrete pavements, furnishing and placing bedding materials, geo-textile filter fabric; making all connections to existing pipes, constructing brick inverts, manholes frames and covers (all types), valves, fittings, adapters, leakage tests, temporary bracing at existing utility poles, removing abandoned water and gas main pipe, joint sealant, non-shrink grout, concrete, manhole steps, rubber boots, waterproofing, and all other incidentals. No extra payment will be made for the various type of manhole frames and covers.

<u>BID ITEM</u>	<u>DESCRIPTION</u>	<u>PAY UNIT</u>
28, 29, 30 & 31	Valve, Cleanout, & Junctions Connections (Trenchless Technologies, Types A, B, C, & D)	Each (EA)

Measurement: The various types of valve, cleanout and junction connection types installed by open cut excavation within the designated operation and reception pits all indicated on the Plans will be measured by the number of each such configurations actually installed in accordance with the Plans and/or as directed by the Owner.

Payment: The accepted quantities of each type of valve, cleanout and junction connection installed by open cut excavation within the designated operation and reception pits will be paid for at the contract unit price per each such type as listed in the Proposal. The price so-stated constitutes full and complete compensation for all labor, materials and equipment to install the manholes complete and in place. The work will include furnishing all excavation, dewatering, earth supports systems, compaction, saw-cut of bituminous and concrete pavements, furnishing and placing bedding materials, making all connections to existing pipes, concrete, frames and covers, curb boxes, covers, risers, valves, fittings, caps, adapters, temporary bracing at existing utility poles, joint sealant, and all other incidentals.

<u>BID ITEM</u>	<u>DESCRIPTION</u>	<u>PAY UNIT</u>
32	Air Release Manhole and Valve (Open Cut Excavation)	Each (EA)

Measurement: Air Release Manholes and Valves installed by open cut excavation with a trench or designated operation or reception pits of the various types and sizes all indicated on the Plans will be measured by the number of such structures actually installed in accordance with the Plans and/or as directed by the Owner.

Payment: The accepted quantities of air release manholes and valves installed by open cut excavation will be paid for at the contract unit price per each such structure as listed in the Proposal. The price so-stated constitutes full and complete compensation for all labor, materials and equipment to install the manholes complete and in place. The work will include furnishing all excavation, dewatering, earth supports systems, compaction, saw-cut of bituminous and concrete pavements, furnishing and placing bedding materials, geo-textile filter fabric; making all connections to existing pipes, constructing brick inverts, manholes frames and covers (all types), air release valves, fittings, adapters, leakage tests, temporary bracing at existing utility poles, removing abandoned water and gas main pipe, joint sealant, non-shrink grout, concrete, manhole steps, rubber boots, waterproofing, and all other incidentals. No extra payment will be made for the various type of manhole frames and covers.

<u>BID ITEM</u>	<u>DESCRIPTION</u>	<u>PAY UNIT</u>
33	Remove Bituminous Pavement Surface Gutters by Cold Planing / Milling	Square Yard (SY)

Measurement: Removing bituminous pavement within the roadway gutters by cold planning will be measured by the number of square yards of said pavement actually removed in accordance with the Plans and/or as directed by the Owner.

Payment: The accepted quantities of removing bituminous pavement surface from roadway gutters by cold planning will be paid for at the contract unit price per square yard as listed in the Proposal. The price so-stated constitutes full and complete compensation for all labor, materials, and equipment, removal and disposal of millings, sweep pavement immediately following operations, all other incidentals required to finish the work complete and accepted by the Owner.

<u>BID ITEM</u>	<u>DESCRIPTION</u>	<u>PAY UNIT</u>
34	2-Inch Depth Bituminous Pavement Patch Linear HMA CL 9.5 - Open Cut Excavation Trenches	Linear Foot (LF)

Measurement: Bituminous pavement patch for sewer pipe installed by open cut trench excavations as indicated on the Plans will be measured in linear feet of continuous runs of such 2-inch depth installed in accordance with the Plans and/or as directed by the Owner.

Payment: The accepted quantities of bituminous pavement patch will be paid for at the contract unit price per linear foot as listed in the Proposal. The price so-stated constitutes full and complete compensation for all labor, materials, and equipment and includes sawcut and tack coating the pavement edge, 12-inches of compacted gravel borrow base, 2-inch of bituminous pavement (HMA CL 9.5), temporary stripping, all other incidentals required to finish the work complete and accepted by the Owner.

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<u>BID ITEM</u>	<u>DESCRIPTION</u>	<u>PAY UNIT</u>
35	2-Inch Depth Bituminous Pavement Patch HMA CL 9.5 – Operating and Reception Pits	Square Yard (SY)

Measurement: Bituminous pavement patch open cut operation and reception pits for trenchless technologies as indicated on the Plans will be measured in square yard of such 2-inch depth installed in accordance with the Plans and/or as directed by the Owner.

Payment: The accepted quantities of bituminous pavement patch will be paid for at the contract unit price per square yard as listed in the Proposal. The price so-stated constitutes full and complete compensation for all labor, materials, and equipment and includes sawcut and tack coating the pavement edge, 12-inches of compacted gravel borrow base, 2-inch of bituminous pavement (HMA CL 9.5), temporary stripping, all other incidentals required to finish the work complete and accepted by the Owner.

<u>BID ITEM</u>	<u>DESCRIPTION</u>	<u>PAY UNIT</u>
36, 37 & 38	Bituminous Pavement Surface Course HMA CL 9.5 1-1/2" Permanent Pavement Overlay 2" Permanent Pavement Overlay - Tidewater Drive 2-1/2" Driveways and Sidewalks Surface Course	Ton (TON)

Measurement: Bituminous pavement for permanent surface course overlay will be measured by the number of tons based on certified delivery slips actually placed in accordance with the Plans and/or as directed by the Owner.

Payment: The accepted quantities of bituminous pavement for permanent surface course will be paid for at the contract unit price per ton as listed in the Proposal. The price so-stated constitutes full and complete compensation for all labor, materials, and equipment including sweeping and cleaning, tack coat, removal and disposal of broken or loose pavement, saw-cutting of street pavements, saw-cutting side streets, cut and match areas existing roadways, filling of potholes or depressions, adjusting of all utility frames, covers, and roadway boxes, temporary bituminous wedges, hauling, spreading, shaping, rolling and compaction of bituminous concrete material for leveling courses and new pavement, pavement markings; and for furnishing all labor, materials, and equipment and for all other incidental required to finish the work complete and accepted by the Owner.

<u>BID ITEM</u>	<u>DESCRIPTION</u>	<u>PAY UNIT</u>
39	Bituminous Berm Rhode Island Standard No. 7.5.1	Linear Foot (LF)

Measurement: Bituminous berm will be measured in linear feet of continuous runs installed in accordance with the Plans and/or as directed by the Owner.

Payment: The accepted quantities of bituminous berm will be paid for at the contract unit price per linear foot as listed in the Proposal. The price so-stated constitutes full and complete compensation for all labor, materials, and equipment including forming, shaping, rolling and compaction of

bituminous berm and for all other incidentals required to finish the work complete and accepted by the Owner.

<u>BID ITEM</u>	<u>DESCRIPTION</u>	<u>PAY UNIT</u>
40	Saw-cutting Bituminous Driveways	Linear Foot (LF)

Measurement: Saw-cutting operation and bituminous driveways will be measured in linear feet of continuous runs completed in accordance with the Plans and/or as directed by the Owner.

Payment: The accepted quantities of saw-cutting bituminous driveways will be paid for at the contract unit price per linear foot as listed in the Proposal. 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 the Owner.

<u>BID ITEM</u>	<u>DESCRIPTION</u>	<u>PAY UNIT</u>
41	Saw-cutting Operation / Reception Pits	Each (EA)

Measurement: Saw-cutting bituminous at operation and reception pits will be measured per each operation/reception pit sawcut completed in accordance with the Plans and/or as directed by the Owner.

Payment: The accepted quantities of saw-cutting operation / reception pits will be paid for at the contract unit price per each as listed in the Proposal. The price so-stated constitutes full and complete compensation for saw-cutting all four sides of each pit and for all labor, materials, and equipment and for all other incidentals required to finish the work complete and accepted by the Owner.

<u>BID ITEM</u>	<u>DESCRIPTION</u>	<u>PAY UNIT</u>
42	Controlled Low Strength Material	Cubic Yard (CY)

Measurement: Controlled low strength material, flowable fill, will be measured by the number of cubic yards actually placed. Controlled low strength material shall be placed as directed by the Engineer as needed to facilitate construction operations.

Payment: The accepted quantity of controlled low strength material will be paid for at the contract unit price per cubic yard as listed in the Proposal. The price so-stated constitutes full and complete compensation for all labor, materials and equipment, and all other incidentals required to finish the work complete and accepted by the Owner.

<u>BID ITEM</u>	<u>DESCRIPTION</u>	<u>PAY UNIT</u>
43	Miscellaneous Concrete	Cubic Yard (CY)

Measurement: Concrete will be measured by the number of cubic yards actually placed. Concrete shall be placed as directed by the Engineer as needed to facilitate construction operations.

Payment: The accepted quantity of concrete will be paid for at the contract unit price per cubic yard as listed in the Proposal. The price so-stated constitutes full and complete compensation for all labor, materials and equipment, and all other incidentals complete and accepted by the Owner.

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<u>BID ITEM</u>	<u>DESCRIPTION</u>	<u>PAY UNIT</u>
44	8" Compost Filter Sock	Linear Foot (LF)

Measurement: Compost Filter Sock will be measured in linear feet of continuous runs completed in accordance with the Plans and/or as directed by the Owner.

Payment: The accepted quantities of compost filter sock will be paid for at the contract unit price per linear foot as listed in the Proposal. The price so-stated constitutes full and complete compensation for all labor, materials, and equipment including continuous maintenance throughout construction and removal upon completion of work, and for all other incidentals required to finish the work complete and accepted by the Owner.

<u>BID ITEM</u>	<u>DESCRIPTION</u>	<u>PAY UNIT</u>
45	Silt Sack Inlet Protection	Each (EA)

Measurement: Silt Sack Inlet Protection will be measured per each unit installed in accordance with the Plans and/or as directed by the Owner.

Payment: The accepted quantities of silt sacks will be paid for at the contract unit price per each as listed in the Proposal. The price so-stated constitutes full and complete compensation for all labor, materials, and equipment including continuous maintenance throughout construction, cleaning and removal upon completion of work, and for all other incidentals required to finish the work complete and accepted by the Owner.

<u>BID ITEM</u>	<u>DESCRIPTION</u>	<u>PAY UNIT</u>
46	4-Inch Loam and Seed	Square Yard (SY)

Measurement: 4-Inch Loam and seed will be measured in square yards installed in accordance with the Plans and/or as directed by the Owner.

Payment: The accepted quantities of loam and seed will be paid for at the contract unit price per square yard as listed in the Proposal. The price so-stated constitutes full and complete compensation for all labor, materials, and equipment including placing of loam, seed, and fertilizer, for watering all newly seeded and all other incidentals required to finish the work complete and accepted by the Owner. Payment for loam and seed for areas disturbed by the Contractor, outside of normal work limits during construction of this project will be paid by the Contractor.

<u>BID ITEM</u>	<u>DESCRIPTION</u>	<u>PAY UNIT</u>
47	Precast Drainage Structure	Each (EA)

Measurement: Precast Drainage Structures of the various types and sizes all indicated on the Plans will be measured by the number of such structures actually installed in accordance with the Plans and/or as directed by the Owner.

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Payment: The accepted quantities of drainage manholes installed by will be paid for at the contract unit price per each such structure as listed in the Proposal. The price so-stated constitutes full and complete compensation for all labor, materials and equipment to install the structures complete and in place. The work will include furnishing all excavation, dewatering, earth supports systems, compaction, saw-cut of bituminous and concrete pavements, furnishing and placing bedding materials, geo-textile filter fabric; making all connections to existing pipes, constructing brick inverts, manholes frames and covers (all types), temporary bracing at existing utility poles, removing abandoned water and gas main pipe, joint sealant, non-shrink grout, concrete, manhole steps, waterproofing, and all other incidentals.

<u>BID ITEM</u>	<u>DESCRIPTION</u>	<u>PAY UNIT</u>
48	Remove and Dispose Drainage Pipe – All Sizes	Linear Foot (LF)

Measurement: Removal of drainage pipe will be measured in linear feet of continuous runs completed in accordance with the Plans and/or as directed by the Owner.

Payment: The accepted quantity removal and dispose drainage pipe will be paid for at the contract unit price per linear foot as listed in the Proposal. The price so-stated constitutes full and complete compensation for all labor, materials, and equipment including legal disposal of all pipe and excess materials and for all other incidentals required to finish the work complete and accepted by the Owner.

<u>BID ITEM</u>	<u>DESCRIPTION</u>	<u>PAY UNIT</u>
49	Remove and Dispose Existing Drainage Structures – All Sizes	Each (EA)

Measurement: Remove and dispose existing drainage structures of the various types and sizes will be measured by the number of such structures actually removed and disposed in accordance with the Plans and/or as directed by the Owner.

Payment: The accepted quantities of remove and dispose drainage structures will be paid for at the contract unit price per each such structure as listed in the Proposal. The price so-stated constitutes full and complete compensation for all labor, materials and equipment to install the structures complete and in place. The work will include all excavation, dewatering, earth supports systems, compaction, saw-cut of bituminous and concrete pavements, and all other incidentals.

<u>BID ITEM</u>	<u>DESCRIPTION</u>	<u>PAY UNIT</u>
50, 51, 52 & 53	Storm Drainage Pipe 12" Reinforced Concrete Pipe 12" Ductile Iron Pipe 18" Reinforced Drainage Pipe 18" Ductile Iron Pipe	Linear Foot (LF)

Measurement: Drainage pipe will be measured in linear feet of continuous runs of such pipe actually installed in accordance with the Plans and/or as directed by the Owner.

Payment: The accepted quantity for drainage pipe will be paid for at the contract unit price per linear foot for the various pipe type and sizes as listed in the Proposal. The price so-stated constitutes full and complete compensation for all labor, materials and equipment to install the pipe

complete and in place. The work will include furnishing all pipes, plugs, excavation, dewatering, compaction, saw-cut of bituminous and concrete pavements, furnishing and placing of bedding materials; laying, setting and jointing all pipes and fittings, making all connections to existing pipes and manholes, for rebuilding inverts of existing manholes as may be required, for backfilling and compacting backfill material, for disposal of all excess excavated materials, and all other incidentals.

<u>BID ITEM</u>	<u>DESCRIPTION</u>	<u>PAY UNIT</u>
54, 55 & 56	Remove and Reset Storm Drainage Pipe (All Types) 12" Pipe or Less, 18" and 24"	Linear Foot (LF)

Measurement: Remove and reset storm drainage pipe will be measured in linear feet of continuous runs of such pipe actually removed and reset in accordance with the Plans and/or as directed by the Owner.

Payment: The accepted quantity for remove and reset storm drainage pipe (all types) will be paid for at the contract unit price per linear foot for the various pipe types and sizes as listed in the Proposal. The price so-stated constitutes full and complete compensation for all labor, materials and equipment to remove and reset pipe complete and in place. The work will include furnishing all pipes, plugs, excavation, dewatering, compaction, saw-cut of bituminous and concrete pavements, furnishing and placing of bedding materials; laying, setting and jointing all pipes and fittings, making all connections to existing pipes and manholes, for backfilling and compacting backfill material, for disposal of all excess excavated materials, and all other incidentals.

<u>BID ITEM</u>	<u>DESCRIPTION</u>	<u>PAY UNIT</u>
57 & 58	Isolate, Remove, Replace & Reactivate Water Mains Less than 40 Feet of Water Pipe (6" and 8" Ductile Iron and PVC) 40 to 80 Feet of Water Pipe (6" and 8" Ductile Iron and PVC)	Each (EA)

Measurement: Isolate, remove, replace and reactivate water mains of the various types and sizes will be measured by the number of such operations made to facilitate sewer pipe installation in accordance with the Plans and/or as directed by the Owner.

Payment: The accepted quantities of remove, replace, and reactivate water mains will be paid for at the contract unit price per each such structure as listed in the Proposal. The price so-stated constitutes full and complete compensation for all labor, materials and equipment include furnishing all pipes, fittings, restraints, earth support, dewatering, excavation, backfill, compaction, saw-cut of bituminous pavements, bedding materials; laying, setting and jointing all pipes and fittings, disinfection, re-activation of the water system and all other incidentals.

<u>BID ITEM</u>	<u>DESCRIPTION</u>	<u>PAY UNIT</u>
59	Overhead Utility House Services (Disconnect & Re-activate)	Allowance

This allowance is for the temporary disconnect and reactivation of overhead utilities to facilitate trenchless technologies. The Contractor shall include in the Contract Sum this allowance stated as listed in the Proposal. The items covered by allowances shall be supplied for such amounts and by such

persons or entities as the Owner may direct, but the Contractor shall not be required to employ persons or entities to whom the Contractor has reasonable objection. Unless otherwise provided in the Contract Documents, allowances shall cover the cost to the Contractor’s materials and equipment delivered at the site and all required taxes, less applicable trade discounts. Contractor’s costs for unloading and handling at the site, labor, installation costs, overhead, profit and other expenses contemplated for stated allowance amounts shall be included in the Contract Sum but not in the allowances. The Contractor shall submit invoice from National Grid or other overhead service providers for payment without surcharge or markup.

<u>BID ITEM</u>	<u>DESCRIPTION</u>	<u>PAY UNIT</u>
60 & 61	6” PVC Water Pipe (Sewer Conflicts) 8” PVC Water Pipe (Sewer Conflicts)	Linear Foot (LF)

Measurement: Water main installed will be measured in linear feet of continuous runs of such pipe actually installed in accordance with the Plans and/or as directed by the Owner.

Payment: The accepted quantity for water pipe installed will be paid for at the contract unit price per linear foot for the various pipe sizes as listed in the Proposal. The price so-stated constitutes full and complete compensation for all labor, materials and equipment to install the pipe complete and in place. The work will include furnishing all pipes, fitting, restraints, excavation, backfill, dewatering, compaction, earth support systems, saw-cut of bituminous pavements, bedding materials; laying, setting and jointing all pipes and fittings, making all connections to existing pipes, leakage testing, for backfilling and compacting backfill material, for disposal of all excess excavated materials, for replacing or rebuilding driveways, walks, sidewalks, curbs, walls, and any other impacted structures, including shrubs, fences, sprinkler systems, existing grassed areas and other surface material; for furnishing, placing, and removing all temporary timber sheeting and bracing, trench boxes and or steel plates; for providing temporary bracing at existing utility poles, for removing and resetting existing mailboxes; for removing abandoned water and gas main pipe, and all other incidentals.

<u>BID ITEM</u>	<u>DESCRIPTION</u>	<u>PAY UNIT</u>
62	Water Service Connections (House Services)	Each (EA)

Measurement: Water service connections will be measured by the number of service connections installed from the water main to the property line in accordance with the Plans and/or as directed by the Owner.

Payment: The accepted quantities of water service connections will be paid for at the contract unit price per each service installed as listed in the Proposal. The price so-stated constitutes full and complete compensation for all labor, materials and equipment include furnishing all pipes, fittings, tapping new mains, saddles, corporation stops, curb stops, cast iron curb boxes and extension rods, removal and disposal of existing curb stops and boxes; reconnecting the new service pipe to the existing service; providing miscellaneous fittings and unions; and other materials required for installing the services complete, earth support systems, dewatering, excavation, backfill, compaction, saw-cut of bituminous pavements, bedding materials; laying, setting and jointing all pipes and fittings, disinfection, re-activation of the water service and all other incidentals.



<u>BID ITEM</u>	<u>DESCRIPTION</u>	<u>PAY UNIT</u>
63 & 64	6" and 8" Water - Gate Valves	Each (EA)

Measurement: Gate Valves will be measured by the number of gate valve of various sizes installed on the water main in accordance with the Plans and/or as directed by the Owner.

Payment: The accepted quantities of gate valves will be paid for at the contract unit price per each installed as listed in the Proposal. The price so-stated constitutes full and complete compensation for all labor, materials and equipment include furnishing all valves, fittings, cast iron curb boxes and extension rods, restraints, removal and disposal of existing valves and other materials, earth support systems, dewatering, excavation, backfill, compaction, saw-cut of bituminous pavements, bedding materials; laying, setting and jointing all connections and fittings, disinfection, re-activation of the water service and all other incidentals.

<u>BID ITEM</u>	<u>DESCRIPTION</u>	<u>PAY UNIT</u>
65	Tapping Sleeve and Valve – All Sizes	Each (EA)

Measurement: Tapping Sleeves and Valves will be measured by the number of various types and sizes installed on the water main in accordance with the Plans and/or as directed by the Owner.

Payment: The accepted quantities of tapping sleeves and valves will be paid for at the contract unit price per each installed as listed in the Proposal. The price so-stated constitutes full and complete compensation for all labor, materials and equipment include furnishing all valves, fittings, cast iron curb boxes and extension rods, restraints, removal and disposal of existing valves and other materials, earth support systems, dewatering, excavation, backfill, compaction, saw-cut of bituminous pavements, bedding materials; laying, setting and jointing all connections and fittings, disinfection, re-activation of the water service and all other incidentals.

<u>BID ITEM</u>	<u>DESCRIPTION</u>	<u>PAY UNIT</u>
66	Fire Hydrants	Each (EA)

Measurement: Hydrants will be measured by the number installed on the water main in accordance with the Plans and/or as directed by the Owner.

Payment: The accepted quantities of hydrants will be paid for at the contract unit price per each installed as listed in the Proposal. The price so-stated constitutes full and complete compensation for all labor, materials and equipment include furnishing all valves, fittings, cast iron curb boxes and extension rods, restraints, removal and disposal of existing valves, hydrants, and other materials, concrete, earth support systems, dewatering, excavation, backfill, compaction, saw-cut of bituminous pavements, bedding materials; laying, setting and jointing all connections and fittings, disinfection, re-activation of the water service and all other incidentals.

<u>BID ITEM</u>	<u>DESCRIPTION</u>	<u>PAY UNIT</u>
67, 68 & 69	Traffic Control Devices Construction Road Signs Traffic Barrels w/Type A or Type C Light Traffic Barricades	Lump Sum (LS)

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Measurement: The work of this section shall be measured on a lump sum basis. The payable quantity will be for devices in place including but not limited to construction road signs, traffic barrels w/ type A or type C lights, and traffic barricades.

Payment: Traffic control devices including construction road signs, traffic barrels w/Type A or Type C lights, and traffic barricades will be paid for at the contract lump sum price listed in the Proposal. The price so-stated constitutes full and complete compensation for all labor, materials and equipment including daily maintenance, moving, and resetting of all traffic control equipment and devices and all other incidentals.

<u>BID ITEM</u>	<u>DESCRIPTION</u>	<u>PAY UNIT</u>
70	Vibration Monitoring	Lump Sum (LS)

Measurement: The work of this section shall be measured on a lump sum basis. The payable quantity will be for providing vibration monitoring throughout construction of the project as defined by the Contract Documents.

Payment: Vibration monitoring will be paid for at the contract lump sum price listed in the Proposal. The price so-stated constitutes full and complete compensation for all labor, materials, equipment, and reports and all other incidentals.

<u>BID ITEM</u>	<u>DESCRIPTION</u>	<u>PAY UNIT</u>
70A	Pre-Construction Survey	Lump Sum (LS)

Measurement: The work of this section shall be measured on a lump sum basis. The payable quantity will be for providing pre-construction surveys throughout the project area prior to performing work as defined by the Contract Documents.

Payment: Pre-construction surveys will be paid for at the contract lump sum price listed in the Proposal. The price so-stated constitutes full and complete compensation for all labor, materials, equipment, and reports and all other incidentals.

<u>BID ITEM</u>	<u>DESCRIPTION</u>	<u>PAY UNIT</u>
70B	Post-Construction Survey	Lump Sum (LS)

Measurement: The work of this section shall be measured on a lump sum basis. The payable quantity will be for providing post-construction surveys throughout the project area upon completion of work as defined by the Contract Documents.

Payment: Post-construction surveys will be paid for at the contract lump sum price listed in the Proposal. The price so-stated constitutes full and complete compensation for all labor, materials, equipment, and reports and all other incidentals.

<u>BID ITEM</u>	<u>DESCRIPTION</u>	<u>PAY UNIT</u>
71 & 72	Miscellaneous Utility Work Asbestos Containing Materials	Allowances

The Contractor shall include in the Contract Sum all allowances stated as listed in the Proposal. The items covered by allowances shall be supplied for such amounts and by such persons or entities

as the Owner may direct, but the Contractor shall not be required to employ persons or entities to whom the Contractor has reasonable objection. Unless otherwise provided in the Contract Documents, allowances shall cover the cost to the Contractor’s materials and equipment, delivery, unloading and handling, labor, installation costs, overhead, profit and other expenses.

<u>BID ITEM</u>	<u>DESCRIPTION</u>	<u>PAY UNIT</u>
73, 74 & 75	Gas Main Relocation Soil Compaction Testing Tree Trimming	Allowances

The Contractor shall include in the Contract Sum all allowances stated as listed in the Proposal. The items covered by allowances shall be supplied for such amounts and by such persons or entities as the Owner may direct, but the Contractor shall not be required to employ persons or entities to whom the Contractor has reasonable objection. Unless otherwise provided in the Contract Documents, allowances shall cover the cost to the Contractor’s materials and equipment delivered at the site and all required taxes, less applicable trade discounts. Contractor’s costs for unloading and handling at the site, labor, installation costs, overhead, profit and other expenses contemplated for stated allowance amounts shall be included in the Contract Sum but not in the allowances.

<u>BID ITEM</u>	<u>DESCRIPTION</u>	<u>PAY UNIT</u>
76	Police Protection	Lump Sum

Measurement: None.

Payment: Payment for police protection will be paid directly by the Warwick Sewer Authority. The Contractor will be responsible for coordinating police protection with the Police Department and the Owner. The Warwick Police Department will invoice the WSA directly without charge to the Contractor. The Owner’s representative will review and approve all related police invoices.

<u>BID ITEM</u>	<u>DESCRIPTION</u>	<u>PAY UNIT</u>
77	Utility location Investigation – (Vacuum Excavator)	Each (EA)

Measurement: Earth excavation performed to locate existing utilities by vacuum excavator will be measured per each pit. Utility locations shall be performed by a vacuum excavator. Investigations shall be performed to locate gas and water services and mains, and to locate drainage utilities to maximum depths of 8 feet. Excavation pits shall be performed to ensure directional drilling does not conflict with existing utilities.

Payment: The accepted quantity of utility pits for utility exploration will be paid for at the contract unit price per each as listed in the Proposal. The payable quantity will be the number of excavation pits performed. The price so-stated constitutes full and complete compensation for all labor, materials and equipment, including excavation within a maximum 30” x 30” pit, sawcut of pavement, excavation, backfill of material, grading, compaction, disposal of surplus materials, preparation of subgrade, placement of 3-inches of bituminous cold patch, and all other incidentals required to finish the work complete and accepted by the Engineer. Any archaeological oversight of the excavation will be performed by the WSA.

## SECTION 05813

## GEOTECHNICAL INSTRUMENTATION AND MONITORING

## PART 1 - GENERAL

## 1.01 SCOPE

- A. The Work specified in this section consists of furnishing, all engineering, labor, materials, equipment, surveys, and services necessary for the instrumentation and monitoring of vibrations during the period of time encompassing Work at the project Site (e.g. horizontal directional drilling, blasting, sheeting installation, ram hoe of rock, drilling through rock, etc.). The Contractor shall implement precautionary and remedial measures, as necessary, based on the instrumentation and monitoring data. The Work described herein includes:
1. Accessing, photo- and video-documenting, noting, and summarizing existing conditions for the purposes of completing pre-construction surveys of homes and structures noted on the Plans and if necessary post construction survey where damage has been noted by residences. May include but not limited to cracks in homes, and retaining walls, misalignment of fences, walkways and/or driveway cracks and settlement.
  2. Supplying, installing, monitoring, protecting, maintaining, and removing crack gauges for the purposes of deflection monitoring.
  3. Supplying, installing, monitoring, protecting, and maintaining seismographs for the purposes of monitoring vibrations caused by lateral installations onto private property. Does not include vibration monitoring during pipeline installation in streets
- B. In the event the WSA is unable to obtain access agreements for individual buildings, survey the exterior of the building from a vantage point on the Site, but as close as reasonably possible to the building and/or structure. Note any access restrictions in the subsequent Building Condition Report.
- C. Employ a qualified vibration specialist to establish a safe vibration level for homes, supervise the Contractor's vibration-monitoring program, and monitor vibration levels at homes within the specified radius for each pipeline installation.
- D. This section specifies the requirements of monitoring of instrumentation prior to and during construction. Instrument monitoring provides early information on the interaction of the construction process and its effect on structures and equipment.
- E. The Contractor shall adjust his equipment and/or procedures as necessary, to prevent damage to adjacent homes, structures and features, and maintain vibrations within the threshold limit values (TLV) specified herein.
- F. Threshold Limit Values:
- a. Deflections - Measured at cracks shall not exceed 1/16 inch.
  - b. Vibrations – TLV will be based on the following information:

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1. Performance criteria for direct aesthetic or structural damage to adjacent residential homes.
  - c. The following is published criteria for potential to damage from construction-related vibrations to prevent/minimize impacts to a home.

Category: Residential, Very Poor Construction  
Source: Chae Y.S., "Design of Excavation Blasts to Prevent Damage," Civil Engineering, ASCE, Vol. 48, No. 4, Apr. 1978, pp. 77-79  
Particle velocity (IN/SEC): 0.5
  - d. On-going monitoring results. During construction, the vibration TLV may require adjustments, depending upon practical considerations regarding productivity and available means and methods during excavation and backfilling, and the results of deflection monitoring data. Any proposed modifications to these TLV must first be accepted by WSA and the Engineer.
  - e. Exceeding of the TLV shall be the basis for making adjustments to the Contractor's means and methods.

1.02 PROJECT CONDITIONS

- A. The instruments shall be installed and removed so as not to damage existing homes and structures.
- B. The instruments shall be installed, and readily observed, monitored in a manner so as to be functional without disruption or damage for any reasonably foreseeable weather condition during the course of this project Work

1.03 DEFINITIONS

- A. Crack monitoring pins: Instruments used to monitor the width of existing cracks and cracks that may develop in adjacent homes during construction.

1.04 QUALITY ASSURANCE

- A. Qualifications of Personnel
  1. Instrument Installation and Monitoring
    - a. Instrument installation and monitoring work must be performed under the direct supervision of a qualified instrumentation specialist. The instrumentation specialist must be a registered professional engineer within the State of Rhode Island having at least three (3) years of recent experience in the design, installation, and monitoring of instrumentation similar to the types specified. Persons not meeting the registered professional engineer requirement will be considered on the basis of extensive experience and technical knowledge as demonstrated by resumes, personal interviews, and if that person is supervised by a professional engineer. WSA reserves the right to reject any person deemed to be insufficiently qualified.
  2. Pre-Construction Survey
    - a. Professional Engineer licensed in the State of Rhode Island experienced in performing pre-construction surveys of homes, bridges and grounds that

identifies areas of concern, including potential personnel hazards (falling debris) and structural elements that may require support or repair.

B. Tolerances

1. Record readings of crack monitoring pins to 0.01-inches.

1.05 SUBMITTALS

- A. At least thirty (30) days prior to proceeding with the respective component of the Work, submit the following information for review and approval by WSA.
  1. Product and equipment data.
    - a. Crack gauges.
    - b. Seismograph make, model and year, including specifications, sensitivity, and manufacturer's recommended practices for installation, setup, and data downloading.
- B. Report of the pre-construction surveys, identifying sensitive receptors, structures of special interest, proposed crack gauge locations, and background/ambient vibration data, as discussed herein. These reports shall be submitted to WSA within seven (7) business days following completion.
- C. Records. Vibration monitoring data shall be retained by the Contractor and available for review by WSA at all times during construction. The Contractor shall submit all data on a weekly basis to WSA per the approved procedures. This submittal will include as-built locations vibration monitoring locations.
- D. Schedule and Detailed Procedures: Proposed schedule and procedures for installing and monitoring all instruments and performing the other work of this section. The duration of the readings is dependent on the Contractor's schedule, and at a minimum must continue through the complete placement of the backfill soils and the removal of the sending pit excavation support.
- E. Pre-Construction Building Survey Outline: Describe the process to document the condition of all homes within 50 feet of the excavation support and pipeline installation. At a minimum the survey is required to include documentation of the , roof and visible exterior wall that faces the pipeline installation as viewed from the grade level. It will detail (by engineering sketches, video tape, photographs, and/or notes) any existing structural, cosmetic damage. It will also document the condition of retaining walls, sidewalks and driveways.
- F. Vibration Monitoring Plan: Describe in detail, the Contractor's plan to monitor vibration levels at each home during the pipeline excavation and installation on private property. At a minimum, the vibration monitoring plan is required to include up to two (2) vibration monitors placed at the closer structures to the horizontal directional drilling (HDD) operations, unless directed otherwise
- G. Prior to mobilizing to the Site, submit pre-construction building condition survey in accordance with the Contract Documents Section 05812.

- H. During execution of the Work, submit the following documents:
1. Instrument-Monitoring Data that includes, but is not limited to:
    - a. One hard (paper) and an electronic (pdf) copy of original field notes and data submitted to the Owner's Representative no later than close of business on the day in which the observations were made.
    - b. Reduced notes within 24 hours after observations have been made; and
    - c. Construction activities, including excavation depths, within the vicinity of the monitoring instrument.
  2. Daily Logs: A daily log of major construction events and observations. Include in the daily log at least the following:
    - a. Detailed excavation and construction records, including time required for installation of excavation support, HDD pipeline installation, completion of excavation and removal of excavation support, if required.
    - b. Incidence of excessive ground loss through the excavation support wall, boulders, groundwater flow, instability or other unusual events.
    - c. Duration and cause of interruptions or delays to excavation progress

#### 1.06 ANCILLARY RESPONSIBILITIES

- A. Reading of Instruments: Reading of all instrumentation, recording of data, interpretation of data, and distribution of data will be performed by the Contractor.
- B. Coordinate pre-construction inspections and subsequent instrument readings on properties outside the Limits of Work with the Engineer.
- C. Protection of Instruments: Protect all instruments from damage related to the weather, construction activities, and vandalism. The cost of replacement of damaged instruments is the responsibility of the Contractor.

### PART 2 - PRODUCTS

#### 2.01 MATERIALS

- A. All materials, equipment, and accessories shall meet the performance requirements of these specifications and be consistent with the other documentation included in the Submittals paragraph of these Specifications.
- B. All seismograph equipment shall be properly calibrated per the manufacturer's recommended procedure, frequency and schedule. The equipment shall be of sufficient sensitivity and quality to routinely meet the precision requirements of these specifications. All equipment shall be set up, operated and data downloaded and recorded by experienced and qualified personnel.
- C. Crack gauges shall achieve a precision of 1/32 inch or better.
- D. Seismographs shall have a PPV minimum and maximum range of 0.05 and 10.0 inches per second.

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## PART 3 - EXECUTION

### 3.01 PRE-CONSTRUCTION SURVEY(S)

- A. A pre-construction survey, construction-monitoring program, are required to document baseline conditions. Conduct a preconstruction building condition survey on all homes within 50 feet of any vibration producing activity prior to starting any intrusive work in accordance with the Contraction Documents.
- B. Representative cracks, gaps, displacement, or otherwise distressed structures will be monitored with crack gauges, installed prior to any ground disturbance. Document notable cracks and/or deflections in the written pre-construction report. Use information obtained during the pre-construction inspection to identify monitoring areas and to locate crack gauges prior to construction.

### 3.02 PREPARATION

- A. Install crack gauges, , and seismographs. All locations shall be field verified before installation. Install the instruments and gauges as close as practicable to the locations deemed to provide the required information, based upon actual locations in the field.
- B. After the instruments have been installed or, if damaged, repaired and reinstalled, prepare drawings and a report summarizing the instrument installation at each home. Include the following information:
  - 1. Instrument identification number and type;
  - 2. Installation procedures and the date of installation; and
  - 3. The "as installed" configuration of each instrument and other dimensions of key elements of each installed instrument.
- C. Baseline readings for data collection shall be obtained from all instruments before commencement of construction activities.

### 3.03 DURATION AND FREQUENCY

- A. All instruments shall be installed before the start of construction or the beginning of ground disturbance. Monitoring and data collection shall continue though the completion of Site restoration at each individual home/structure.
- B. Frequency shall be increased in the event of exceeding the applicable TLV, drilling through obstructions, or at the discretion of WSA and/or the Engineer

### 3.04 THRESHOLD LIMIT VALUE

- A. Report any exceedance of the TLV to WSA and the Engineer immediately.
- B. Continue work in a manner that does not cause further exceedance of the TLV, until such time the means and methods are discussed, and a resolution is agreed upon among the Contractor, WSA and the Engineer.



3.05 DEFLECTION MONITORING

- A. Crack gauges will be installed at identified cracks and/or notable aesthetic and structural cracks in foundations, slabs, and walls.
- B. The Contractor shall regularly check the crack gauges for signs of deflection, and/or changes in crack width, and no less frequently than twice daily while the lateral installations are occurring within 200 feet of the individual structure..

3.06 VIBRATION MONITORING

- A. Vibration monitoring will be conducted continuously by the Contractor at agreed location(s) at individual homes/structures during the lateral installations on private property using a seismograph. Monitor vibrations continuously with a PPV trigger level set at 0.05 inches per second during ground disturbance (mobilizing heavy equipment, excavation support system installation, excavation, horizontal directional drilling, concrete placement, backfilling, grading, etc.). The trigger level may be increased, depending upon background vibration levels.
- B. The peak particle velocity shall be maintained below a level that will cause disturbance or aesthetic or structural damage to homes, including cracking of any part of the homes or structures and at no time exceed the TLV unless accepted by WSA and the Engineer.
- C. Monitoring requirements may be increased or decreased depending upon the recorded background vibration levels, particularly of completion of the work, and findings of the deflection monitoring.

3.06 REMOVAL

- A. Upon completion of construction activities within 200 feet of a home/structure, remove crack gauges Noting the total extent of movement of the cracks, if any. Any damage caused by the installation or removal of the gauges shall be repaired at no additional cost to WSA.
- B. Restore disturbed or damaged surfaces to conditions existing prior to installation of instruments.

3.07 POST-CONSTRUCTION MONITORING

- A. Complete post-construction home/building surveys after completion of all intrusive Work within 200 feet of locations where property owners have submitted a claim that damage has occurred to their building/structure due to the pipeline installation within private property.
- B. Submit the post-construction building survey report(s) seven (7) business days prior to demobilizing from the Site.
- C. Immediately notify the WSA and the Engineer of any condition observed during execution of the building condition survey that may be damaged as a result of the planned construction.

END OF SECTION

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