

**CITY OF WARWICK, RHODE ISLAND
WARWICK SEWER AUTHORITY
BAYSIDE SEWER SYSTEM PRESSURE SEWER
CONTRACT 86B
ADDENDUM NO. 4**

January 15, 2020

The following information is provided as part of the Contract Documents as Addendum No. 4.

COMMENTS AND CLARIFICATIONS

Comment 1: Item No. 41 states there are 937 pits for saw cutting. Are we correct to assume that there are 937 pits (8' x 8' squares) to dig for the trenchless portion of the job?

Response 1: The quantity has been reduced. Pavement saw-cutting for operation/receiving pits is not required for the installation of service connections within open cut mainline sewer excavations. The schedule of prices has been revised.

Comment 2: Item No. 6 says that "backfill to replace unsuitable materials will be paid for separately". What item do you use to get paid for replacing unsuitable materials as it appears No. 6 only accounts for removing them.

Response 2: Backfill to replace unsuitable material will be paid under Item No. 10 – Additional Gravel Borrow.

Comment 3: Can you further explain Item No. 7 and when we would use this item? Is this item just for the chance that we would come across archeological findings incidentally and the downtime we experience? Would the awarded bidder actually be excavating to assist the archeologist?

Response 3: Reference is made to Section 05812, 1.2, D. and E.

D. Contractor shall notify the Archeologist, Engineer, and Owner of any additional excavations which may be required outside of the predetermined pits and trenches to facilitate work. The Engineer and Owner shall review and determine if the excavations are required and necessary to facilitate work. If determined necessary to complete work, the cost for archaeological investigations shall be borne by the Owner. If the excavations are determined to be for the general benefit and convenience of the Contractor, the cost shall be borne the Contractor. Contractor shall provide a minimum 21day notice to the Owner for additional excavations outside of the predetermined pits and trenches.

E. Prior to work on Mayor Lane, archaeological investigations shall be scheduled and completed.

Work to assist in excavation needed for archaeological excavations shall be as stated above, and for unanticipated discoveries. The Contractor would be paid for excavation work. The method of payment for this item has been changed to a day rate.

Comment 4: What are the average archeological investigation costs per day? On page 05812-2, it mentions if we determine we need to excavate outside of the limits, and the archeologist/engineer determine it was not necessary (and we come across archeological findings in that area) then we own the cost.

Response 4: The Contractor will only assume costs for archeological work if relocation of operation/receiving pits are for the sole benefit of the Contractor, and deemed unnecessary by the Warwick Sewer Authority. Investigation costs are approximately \$1,200 per day.

Comment 5: What is the maximum length of pipe allowed to test at a time?

Response 5: There is no defined length for testing. However, methods for testing shall be in accordance with standard industry practices, (ASTM F2164-13). Contractor shall submit proposed method or methods for testing pipe in accordance with the requirements for shop drawing submittals.

Comment 6: Would we have to set up a dewater system for every street? i.e. well points?

Response 6: Dewatering methods shall be in accordance with Section 03750.

Comment 7: Will an Aquatic Specialist be required to be on site during all directional drilling operations? What constitutes an Aquatic Specialist?

Response 7: The requirement for an aquatic specialist has been removed.

Comment 8: Section 01800 Archaeological Provisions Part 2 Execution Para. 2.2 Preparation; all contractor personnel will receive basic training in cultural resource site recognition. Who provides this training? Is the training provided at no charge to the contractor? Do you know how long the training takes?

Response 8: Training will be provided by the Warwick Sewer Authority at no cost to the Contractor. Training will be 8 hours.

Comment 9: Addendum No. 2 Section 01800 Archaeological Provisions Part 2 Execution Para. 2.5 Mobilization; should an unanticipated discovery be made contractor shall include 10 such remobilizations for unanticipated discoveries. Will the contractor be paid for the time while determination is made whether the area is a cultural resource site and if it is to secure the site?

Response 9: Contractor shall remobilize to an alternative location. There will be no additional payment during the determination time. Contractor will be compensated under Item No. 7 Earth Excavations – Archeological Investigations if services for excavation are required.

Comment 10: Section 05812 Horizontal Directional Drilling Part3 – Execution Para. 3.2 Preconstruction & Postconstruction Surveys. This is the only section that the Preconstruction & Postconstruction Surveys is mentioned. Are the surveys only required in the horizontal directional drilling areas or are the required on the entire project?

Response 10: Surveys are required for all work. Additional information has been provided with this addendum.

Comment 11: Section 01510 Utility Relocations – Not included in specifications.

Response 11: This section is deleted.

Comment 12: Section 05813 Geotechnical Instrumentation & Monitoring – Not included in the specifications.

Response 12: This section has been added to the Contract and is enclosed within this addendum.

Comment 13: Dwg. 63, Typical Excavation Pits detail. Calls off and shows 8 feet of sand underneath Typical Excavation Pit.

Response 13: The detail has been revised to 8-inches of sand.

Comment 14: Are extend bases require on the manholes?

Response 14: Extended bases are not required on manholes provided the design is adequate to prevent buoyancy. Contractor shall provide shop drawings in accordance with Contract requirements.

Comment 15: If successful installation of sewer pipe through the horizontal directional drilling method proves to be impossible due to poor subsurface conditions, how will the Contractor be compensated for costs incurred? Will there be an inspector that is well-versed in HDD work on site when HDD is scheduled for the purpose of verifying a drillable condition?

Response 15: Contractor will be paid for sewer pipe installed. The construction management team has expertise in HDD drilling.

Comment 16: Is it anticipated that every service connection is going to be installed? How many responses/connections have been confirmed so far?

Response 16: All services connections will be installed. At a minimum, the service would be installed to the property line, should the property owner refuse access. Refusal of the service does not relieve the owner of the sewer assessment. The WSA received approximately a 50% response in the initial request for service location. Secondary requests will be made prior to construction.

Comment 17: Also, is there a schedule that shows the lengths of the connections?

Response 17: There is no schedule of the connection lengths.

Comment 18: Bid Item No. 59 Overhead Utility House Service (Disconnect & Reconnect): Can this item be changed to an allowance.

Response 18: This Item has been changed to an allowance.

Comment 19: Are there restrictions on usage of electrofusion couplings in lieu of butt fusion? If so, will special consideration be made if spatial constraints are encountered?

Response 19: Butt fusion shall be utilized for all directional drilling. Electrofusion couplings will be permitted within constrained or confined areas.

Comment 20: On the Details Page 3, in the notes it states that the minimum bury depth for water pipe is 5'. Is it also 5' for installing the pipe for sewer force main?

Response 20: The minimum depth for installing sewer force main is 5 feet. However, force main placement must meet the requirements for "PLACEMENT OF SEWERS" provided on Sheet 57 of 75.

CONTRACT SPECIFICATIONS

1. Delete Section 00300 Bid Forms and replace with the enclosed Section 00300. Changes were made to Items No. 7, 11, 33 - 39, 59, and 71 - 76.
2. Delete Section 00010 Table of Contents and replace with the enclosed Section 00010.
3. Add enclosed Section 05813 Geotechnical Instrumentation and Monitoring.
4. Section 05812 Horizontal Directional Drilling, Part 1, 1.3 Description of Work, No. 8. - Delete, "Water course monitoring and testing by Qualified Aquatic Specialist."

5. Section 01025 Measurement and Payment, **Delete**

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

Measurement: Earth excavation for archeological investigations 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. 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 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, 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.

Replace with the following.

<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.

6. Section 01025 Measurement and Payment, **Delete**

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

Measurement: overhead utility service requiring temporary disconnect to facilitate trenchless technologies and subsequent reactivation will be measured by the number of such disconnects performed in accordance with the Plans and/or as directed by the Owner.

Payment: The accepted quantities of overhead utility house services, disconnect and reactivate, 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 and full coordination with National Grid and other communication providers to temporarily disconnect and reactivate service to facilitate the install of sewer pipe.

Replace with the following.

<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.

CONTRACT PLANS

1. Plan Sheet No. 63, Details – 6, Delete and Replace with the attached Plan.

Attachments (29 Pages)

SECTION 00010

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WARWICK SEWER AUTHORITY
CONTRACT NO. 86B
 BAYSIDE SEWER SYSTEM
 PRESSURE SEWERS

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APPENDICIES

Appendix A Geotechnical Report & Boring Logs
 Appendix B R.I. Coastal Resources Management Council Permit
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 Appendix D Archaeological Report
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END OF SECTION

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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

No. _____ Dated: _____

No. _____ Dated: _____

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.

(Add additional pages as required)

00300- 2

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

00300- 3

SCHEDULE OF PRICES

Addendum No. 4

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	12	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. _____	_____

SCHEDULE OF PRICES

Item No.	Approx. Quantity	Unit Measure	Items w/Unit Bid Prices Written in Words	Unit Bid \$ Price	Amount \$ Bid
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. _____		
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	24	EA.	Pressure Sewer Manhole - Open Cut Excavation - Junction / Intersection Cleanout		
			At _____ Per EA. _____		

SCHEDULE OF PRICES

Addendum No. 4

Item No.	Approx. Quantity	Unit Measure	Items w/Unit Bid Prices Written in Words	Unit Bid \$ Price	Amount \$ Bid
26	16	EA.	Pressure Sewer Manhole - Open Cut Excavation - Bend Cleanout		
			At _____	Per EA. _____	_____
27	13	EA.	Pressure Sewer Manhole - Open Cut Excavation - Straight Cleanout		
			At _____	Per EA. _____	_____
28	39	EA.	Trenchless - Type A - End Cleanout		
			At _____	Per EA. _____	_____
29	1	EA.	Trenchless - Type B - In Line Cleanout		
			At _____	Per EA. _____	_____
30	4	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 _____	_____

SCHEDULE OF PRICES

Addendum No. 4

Item No.	Approx. Quantity	Unit Measure	Items w/Unit Bid Prices Written in Words	Unit Bid \$ Price	Amount \$ Bid
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. _____	_____
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. _____	_____

SCHEDULE OF PRICES

Addendum No. 4

Item No.	Approx. Quantity	Unit Measure	Items w/Unit Bid Prices Written in Words	Unit Bid \$ Price	Amount \$ Bid
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. _____	_____
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 Two hundred thousand dollars	\$200,000	\$200,000
			At _____	Per EA. _____	_____
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. _____	_____

SCHEDULE OF PRICES

Addendum No. 4

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

TOTAL OF BID (ITEMS 1 THROUGH 76):

\$ _____

(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: _____

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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

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- 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 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 deflections and 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- and post-construction surveys of homes and structures noted on the Plans. 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, surveying or monitoring, protecting, maintaining, and removing monuments and crack gauges for the purposes of deflection monitoring.
 3. Supplying, installing, monitoring, protecting, and maintaining seismographs for the purposes of monitoring vibrations.
 4. Incidental work necessary to ensure the accuracy and precision of the data, including establishing controls and baseline data, as needed.
 5. Establishment of an on-site horizontal and vertical datum that is located relative to the established datum used for previous work on the Site.
- B. 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.
- C. 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.
- D. The Contractor shall adjust his equipment and/or procedures as necessary, to prevent damage to adjacent homes, structures and features, and maintain vibrations and deflections to within the threshold limit values (TLV) specified herein.
- E. Threshold Limit Values:
1. Deflections
 - i. Surveyed at homes and structures shall not exceed 1/8 inch, in the x, y, or z axis.

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- ii. Measured along Support of Excavation system walls shall not exceed 1-inch at the top of sheeting.
 - iii. Measured at cracks shall not exceed 1/16 inch.
2. Vibrations – TLV will be based on the following information:
- a. Performance criteria for direct aesthetic or structural damage to adjacent residential homes.
3. The following are published criteria for potential to damage from construction-related vibrations to prevent/minimize impacts to a home.

Category: Residential, Poor Construction

Source: Chae

Particle velocity (IN/SEC): 1.0

Category:	Residential,	Very	Poor	Construction
-----------	--------------	------	------	--------------

Source:				Chae
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Particle velocity (IN/SEC): 0.5

Category:		Historic		Homes
-----------	--	----------	--	-------

Source:				Swiss
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Particle velocity (INC/SEC): 0.12

References:

Chae, Y.S., "Design of Excavation Blasts to Prevent Damage," Civil Engineering, ASCE, Vol. 48, No. 4, Apr. 1978, pp. 77-79.

Swiss Association of Standardization, "Effects of Vibration on Construction, "Seefeldstrasse9, CH 8008, Zurich, Switzerland.

- 4. 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.
- 5. 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 and monuments shall be installed and removed so as not to damage existing homes and structures.
- B. The instruments and monuments shall be installed, and readily observed, monitored or surveyed 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. Permanent Benchmark: Permanent benchmark is used as control for determining the elevation and location of all instruments, existing survey benchmarks and control points are indicated on the Contract Drawings.
- B. Surface Settlement Markers: Vertical masonry-concrete type marker placed on structures. Surface settlement markers are monitored by optical survey methods to determine vertical displacements during construction.
- C. Crack monitoring pins: Instruments used to monitor the width of existing cracks and cracks that may develop in adjacent homes during construction.
- D. Instrument Monitoring: The reading of the installed instruments at specified time intervals and subsequently performing calculations including change of data since initial and previous readings; plotting instrument readings; and submitting the readings, calculations and plots to the Engineer.
- E. Survey Control: A system of precise field measurements of the types and kinds specified, utilizing suitable methods and equipment and utilizing qualified personnel, for determination or elevations, coordinates and distances for the prosecution of the Work.

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.
 - b. Employ a Rhode Island licensed Professional Land Surveyor that is thoroughly experienced in instrument monitoring of the types specified, to supervise and direct instrument monitoring technicians and to be responsible for instrument monitoring.
 - 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.

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3. Survey Control
 - a. Employ qualified staff with previous experience in performing control surveying of the type specified.
 - b. Employ a Rhode Island licensed Professional Land Surveyor that is thoroughly experienced in survey control of the type specified, to supervise and direct survey-control staff and to be responsible for survey control.

- B. Tolerances
 1. Establish the coordinates of permanent benchmark and survey-control monuments to 0.012-inches.
 2. Establish the coordinates of survey-control baseline traverse points to 0.012-inches.
 3. Establish the initial elevation of surface settlement markets to 0.012-inches.
 4. Establish the initial coordinates of all other instruments to 0.012-inches.
 5. Record readings of crack monitoring pins to 0.01-inches.

- C. Instrument Locations:
 1. Install and maintain survey reference points on walls, on surrounding grade, and on adjacent improvements. Engage a Surveyor, licensed in the State of Rhode Island, to take initial readings and subsequent readings at regular intervals to monitor for vertical and horizontal movement. Intervals shall not exceed one time per week during the progress of excavation.

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. Qualifications of the surveyor including resumes of personnel to staff or manage the work.
 2. Product and equipment data.
 - a. Crack gauges and survey monuments.
 - b. Survey equipment make and model, including manufacturer's recommended practices for setup and operation, and corresponding precision and bias in the x, y, and z directions.
 - c. 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 gage locations, and background/ambient vibration data, as discussed herein. These reports shall be submitted to WSA within seven (7) business days following completion.

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- C. Records. Survey and 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 of survey and 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 Support of Excavation system.
- E. Describe the proposed location of each instrument type specified and the rationale for that location; the QA/QC procedure the Contractor will follow; the frequency of data collection and interpretation for each instrument, as defined in this Section; an example set of tabulated data and plots; and the equipment manufacturer's literature including descriptions and details of all instrumentation proposed for use, including sensors, readouts, software, wiring, curb boxes, grout, epoxy and protective covers.
- F. 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 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.
- G. Vibration Monitoring Plan: Describe in detail, the Contractor's plan to monitor vibration levels at adjacent homes during the pipeline excavation and installation. At a minimum, the vibration monitoring plan is required to include three (3) vibration monitors placed at the closer structures to the horizontal directional drilling (HDD) operations, unless directed otherwise
- H. Prior to mobilizing to the Site, submit pre-construction building condition survey in accordance with the Contract Documents Section 05812.
- I. During execution of the Work, submit the following documents:
1. Instrument-Monitoring Data that includes, but is not limited to:
 - a. Copies of a minimum of two (2) sets of vertical and horizontal readings taken a minimum of one (1) week apart and prior to commencement of Work to establish baseline elevations and spatial locations of existing structures and utilities (surface arid, sub-surface, as applicable);
 - b. 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;
 - c. Reduced notes within 24 hours after observations have been made;
 - d. Construction activities, including excavation depths, within the vicinity of the monitoring instrument;

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- e. Immediate report of vertical movements detected; and,
 - f. Graphical plots of movement with respect to time of all movement data within 24 hours after observations have been made. Construction activities affecting instrument movement shall be included on the submissions.
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, 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. Location and elevation of significant soil strata boundaries encountered during excavation and brief soil descriptions.
 - d. Construction loading and /or dewatering in the vicinity of instrumentation.
 - e. Duration and cause of interruptions or delays to excavation progress
 - f. Temperature, rain-gauge readings and notation of heavy rainfall.
3. Survey Notes: One hard copy and an electronic (pdf) copy of original field notes of survey-control surveying.
- a. Working Drawings: Within seven (7) days of completion of installation of each instrument, submit to the Engineer a plan indicating the as-built location of the instrument as specified, and its corresponding installation record sheet with initial readings presented as specified herein.

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 and survey 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

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these specifications. All equipment shall be set up, operated and data downloaded and recorded by experienced and qualified personnel.

- C. Survey equipment and methods shall achieve a precision of 1/8 inch or better in the x, y, and z axis.
- D. Crack gauges shall achieve a precision of 1/32 inch or better.
- E. Seismographs shall have a PPV minimum and maximum range of 0.05 and 10.0 inches per second.
- F. Surface Settlement Markers:
 - 1. Vertical masonry-concrete surface type: Three piece expansion anchors, outer lead- alloy sleeve, inner lead-alloy wedge nut and stainless steel cap head bolt.

PART 3 - EXECUTION

3.01 PRE-CONSTRUCTION SURVEY(S)

- A. A pre-construction survey, construction-monitoring program, and subsequent post-construction survey are required to document baseline and post-construction conditions of adjacent structures and utilities.
- B. 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 Contract Documents.
- C. 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 gages, settlement markers, survey monuments, and seismographs. All locations shall be field verified before installation. Install the instruments and gages as close as practicable to the locations deemed to provide the required information, based upon actual locations in the field.
- B. Paint instrument identification number on an adjacent surface. Use stencils cut for purpose. Do not free-hand letter or spray-paint identification numbers. Where adjacent surfaces do not exist, erect or drive into the ground a substantial wooden marker and paint identification number on marker.
- C. Protect from damage, and maintain instruments installed by the Contractor, and existing instruments installed by others throughout the duration of the Work. Repair or replace damaged or inoperative instruments, including instruments and equipment installed and/or supplied by other Contractors.

- D. After the instruments have been installed or, if damaged, repaired and reinstalled, prepare drawings and a report summarizing the installation of each instrument. 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 including elevations, station, offset, 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 through the completion of Site restoration.
- 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. Reproducible fixed benchmarks and monuments will be installed at key utility structures, foundations, slabs and pavements, and within 35 feet of the planned excavation limits. Monuments shall be surveyed by a State of Rhode Island licensed land surveyor. Crack gauges will be installed at identified cracks and/or notable aesthetic and structural cracks in foundations, slabs, and walls. If existing benchmarks, and/or survey monuments, are in such condition and in the proper location as to provide the required data, they may be used for this Work.
- B. Initially, the gauges and monuments will be noted / surveyed daily until two consecutive days of no change are recorded. Subsequently, the Contractor shall regularly check the crack gauges and survey monuments for signs of deflection, and/or changes in crack width, and no less frequently than twice per week.
- C. Increase frequency of recording crack gage measurements to three (3) times per day (beginning, middle and end of work day) and surveying monuments to once per day when:
 - 1. The excavation is advancing through or encounters obstructions.
 - 2. The applicable TLV for deflections is exceeded.
 - 3. Deemed necessary upon WSA, Engineer, or Contractor discretion.

3.06 VIBRATION MONITORING

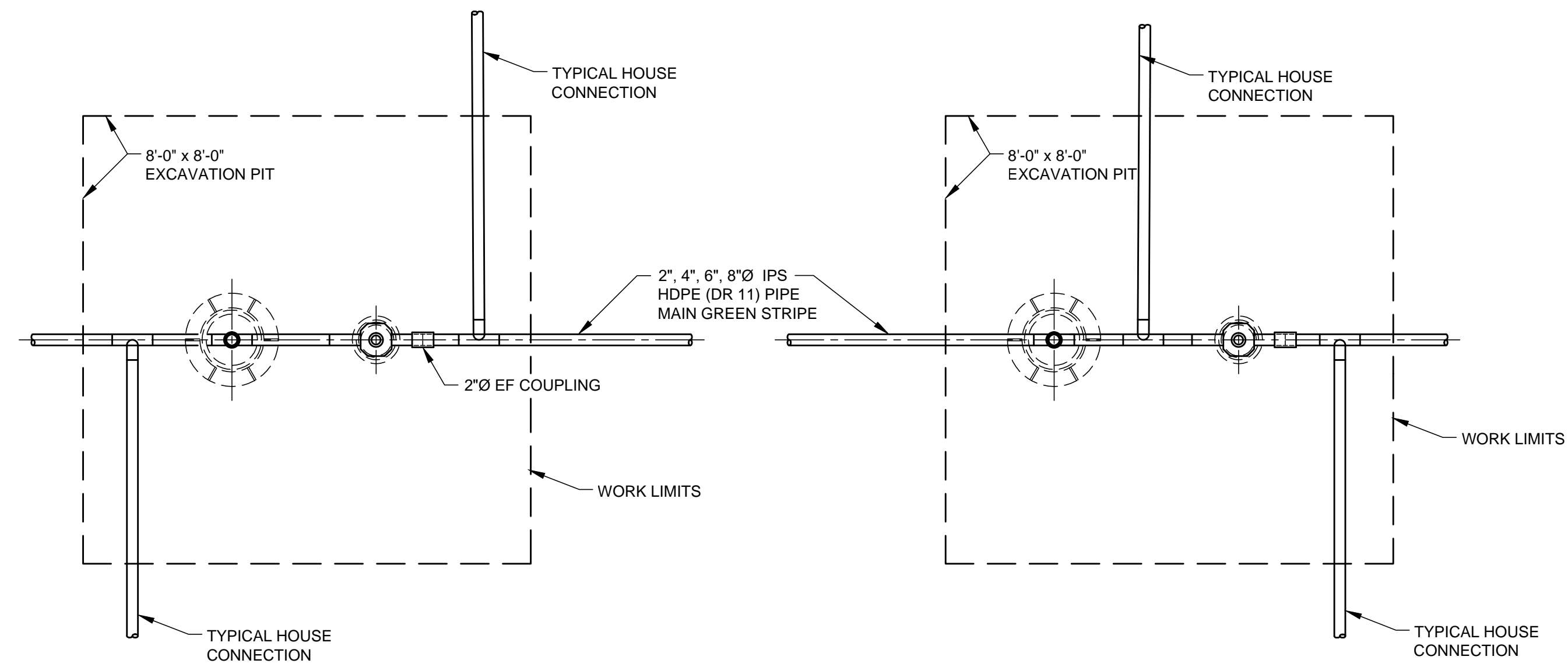
- A. Vibration monitoring will be conducted continuously by the Contractor at agreed location(s) using a seismograph. Monitor vibrations continuously with a PPV trigger level set at 0.05 inches per second during ground disturbance (mobilizing heavy equipment, excavation support system installation, excavation, 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 or deflections 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

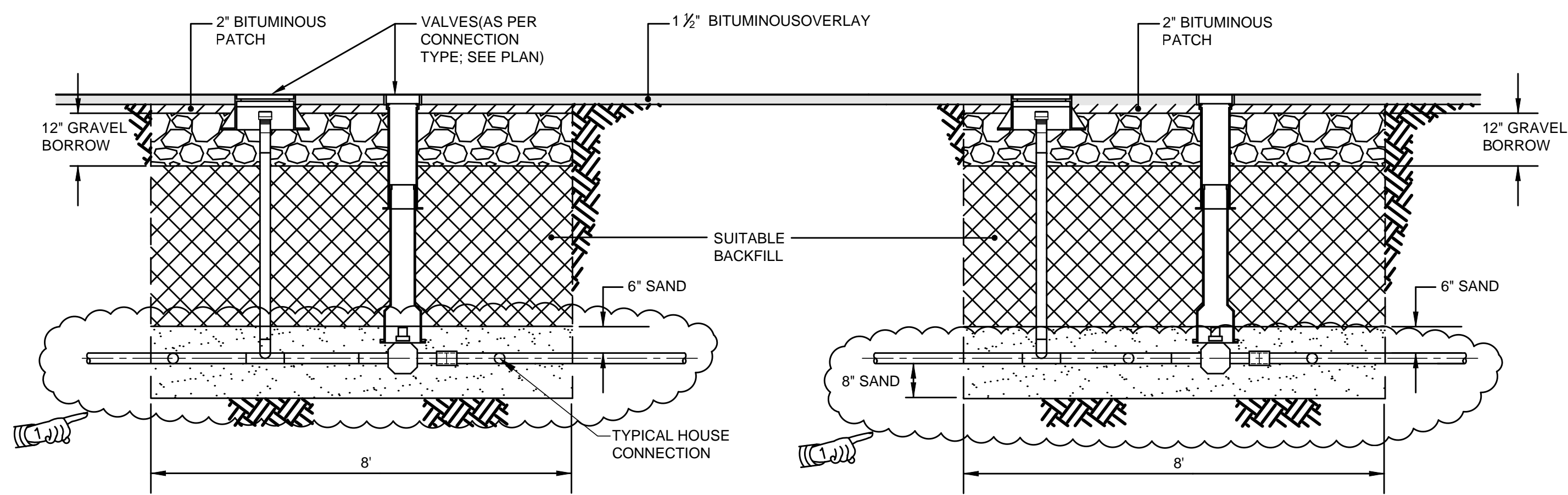
- A. Upon completion of work, all monuments and crack gauges shall be removed. Any damage caused by the installation or removal of the gauges and monuments shall be repaired at no additional cost to WSA.
- B. Restore disturbed or damaged surfaces to conditions existing prior to installation of instruments.
- C. Remove painted instrument identification numbers from building and other surfaces. Remove markers and protective barriers.

END OF SECTION

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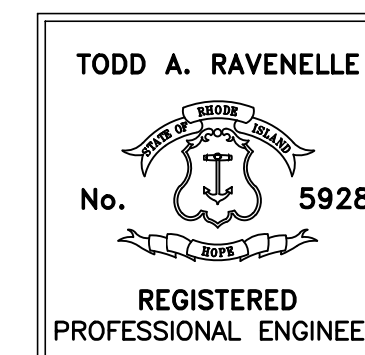
PLAN



SECTION

TYPICAL EXCAVATION PITS

NOT TO SCALE



1	ADDENDUM 4	1-15-2020	TR	DRAWN LBD	CITY OF WARWICK, RHODE ISLAND WARWICK SEWER AUTHORITY SYSTEM OF SEWERS CONTRACT NO. 86B
				CHECKED TAR	
				APPROVED	
				DATE NOV 2019	DETAILS - 6 EXCAVATION PITS
				SCALE AS SHOWN	
REV. NO.	DESCRIPTION	DATE	INT.		Gordon R. Archibald, Inc. Civil and Environmental Engineers Pawtucket, Rhode Island
APPROVED				SHT. NO. 63 OF 75	
WARWICK SEWER AUTHORITY				FILE NO. 998	