

**BROOKE COUNTY PUBLIC SERVICE DISTRICT
BROOKE COUNTY, WEST VIRGINIA**

PROPOSED DROVER'S INN AREA SANITARY SEWER EXTENSION PROJECT

ADDENDUM #1

JUNE 23, 2022

THRASHER PROJECT #020-10158

TO WHOM IT MAY CONCERN:

A Pre-Bid Conference was held on Tuesday, June 14, 2022, on the above-referenced project, a copy of the sign in sheet is included in this Addendum. The following are clarifications and responses to questions posed by contractors for the above referenced project.

A. GENERAL

AMERICAN IRON AND STEEL REQUIREMENTS

American Iron and Steel Requirements have been added to the Bid Opening Requirements as BOR-7. The Index has been revised to include American Iron and Steel Requirement (AISR). The AISR Contract Requirement Section has been included in Addendum #1. The contractor must sign the AISR sheet and include it with their BOR section. The contractor must use the revised BOR-1 requirements that are included as part of this addendum.

2. DAVIS BACON WAGE RATES

Please use the Davis Bacon Wage Rates that were included in the original Contract Documents. Federal Davis Bacon Wage Rates apply.

B. TECHNICAL SPECIFICATIONS

1. Section 432700.01 Variable Frequency Drives was added as part of this addendum.

C. DRAWINGS

1. Sheets #2, #6, #8 and D4 have been included in this addendum showing the revisions of the valve vault and wet well diameters, meter drop pole for electrical service, and detail of the pressure in-line cleanouts.

D. QUESTIONS AND RESPONSES

QUESTION

1. On plan sheet No. 6 the diameter of the wet well and valve vault show 5'-00" and sheet No. 7 show these diameters to be 4'-00". Which diameter is correct?

RESPONSE

The correct diameter for the wet well and valve vault is 4'-00". See revised sheet No. 6.

QUESTION

2. The drawings indicate that the power company is installing a power pole that we are to tie our electrical supply into. Typically, the power company only provides power to the meter. Is it your intention to have us install a meter pole that they can connect to?

RESPONSE

Yes. The contractor shall set the meter drop pole as shown in the typical underground electric service detail included in this addendum on revised sheet 8. Sheet 2 has also been revised to reflect this.

QUESTION

3. Are the flushing connections on the mains or laterals?

RESPONSE

Two flushing connections or pressure in-line cleanouts are located on the force main. One (1) 2" shown on sheet 2 and one (1) 3" shown on sheet 3.

QUESTION

4. Will we be allowed to directional drill 4" PE as discussed at the pre-bid meeting instead of boring the 8" steel casing as called for in the documents?

RESPONSE

Yes, the HDPE casing must have a minimum inside diameter of 4" larger than the outside diameter of the 2" force main. Contractor shall use 6" HDPE DR13.5 IPS at a minimum. Any casing used that is a larger inside diameter shall have casing spacers.

QUESTION

5. Can a detail for the pressure clean-outs be provided?

RESPONSE

A detail for Pressure In-Line Cleanouts has been included in with this addendum on revised sheet D4.

QUESTION

6. Will another pump station supplier be acceptable for bid item #25?

RESPONSE

Yes, however, all specifications provided by TEPCO must be followed at a minimum in the contractor's alternate pump station submittal. Engineer reserves the right to reject alternate if not equal or better.

QUESTION

7. What is the voltage and electrical phase available at the duplex station?

RESPONSE

230 Volt, single phase power is available at the meter drop pole to be set by the contractor. As part of the contractor's unit bid price for item #25, two (2) Variable Frequency Drives (VFD's) shall be included to convert this power supply to 230 Volt 3 phase power for the pump motors.

E. CLARIFICATIONS

1. The contractor will be required to provide and use an electrical generator capable of providing power for startup operations of the E/One grinder pumps to ensure pump stations are functioning properly. Contractor shall provide water to fill E/One pump stations to verify the operation of each pump station.

If you have any questions or comments, please feel free to contact me at your earliest convenience. As a reminder, bids will be received until 10:00 a.m. on Tuesday, June 28, 2022, at Brooke County Public Service District, 711 Charles Street, WV 26070. Good luck to everyone and thank you for your interest in the project.

Sincerely,

THE THRASHER GROUP, INC.


DANIEL E. FERRELL, P.E.

Project Manager

Enclosures: Pre-Bid Meeting Sign-In Sheet
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Bid Opening Requirements
American Iron and Steel Requirements (AISR)
432700.01 – Variable Frequency Drives
Plan Sheet #2, #6, #8, D4



**BROOKE COUNTY PUBLIC SERVICE DISTRICT
BROOKE COUNTY, WEST VIRGINIA
DROVER'S INN AREA SANITARY SEWER EXTENSION**

PRE-BID CONFERENCE

Tuesday, June 14, 2022

Thrasher Project #020-10158

Name	Representing	Phone #	Email Address
Melissa Lewis	BCPSD	304-737-4077	mlewis-bcpsd@comcast.net
Emily Thomas	BCPSD	304-737-4077	ethomas.bcpsd@gmail.com
Randy Watson	THE THRASHER GROUP	304-626-0703	RWATSON@THETHRASHERGROUP.COM
Terry Bonaventura	BCPSD	304-491-5233	Bonaventura@gmail.com
Rich Smathers	OUV Excavating	740-258-3921	RSMATHERS@OUV6CONSTRUCTION.COM
Kelly Hendershat	OUV Excavating	740-312-0275	KHendershat@OUVExcavating.com
Thomas Gianni	James White Const.	304-748-8181	tgianni@jameswhiteconstruction.com
Mark Stolle	Foster	304.206.7808	mark@foster-supply.com
Will Allison	Alex E Paris Cont	724-947-2235	willisond@alexeparis.com

**BROOKE COUNTY PUBLIC SERVICE DISTRICT
BROOKE COUNTY, WEST VIRGINIA
FOR THE
DOVER'S INN AREA SANITARY SEWER EXTENSION**

- I N D E X -

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**PROPOSED
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FOR THE
BROOKE COUNTY PUBLIC SERVICE DISTRICT
BROOKE COUNTY, WEST VIRGINIA
THRASHER PROJECT #020-10158**

A two envelope system will be used. Envelope No. 1 will be opened first and the Bid Opening Requirement items checked for compliance, as outlined on this page. If such documents are found to be in order, sealed Envelope No. 2 "Bid Proposal", which shall also be placed inside of Envelope #1, will then be opened and will be publicly read aloud. If the documents required to be contained in Envelope No. 1 are not in order, Envelope No. 2 "Bid Proposal" will not be opened and the Bid will be considered non-responsive and will be returned to the Bidder. At that time, the Owner will declare the Bidder non-responsive. The lowest responsive, responsible Bidder shall be the Bidder who has completed all of the requirements of the "Bid Opening Requirements" and has the lowest total bid.

BID OPENING REQUIREMENT CHECKLIST

Item	Completed Satisfactory (Check if completed)
1. Bid submitted on time	_____
2. Bid Bond (Sample BOR-2 & 3)	_____
3. Certification of receipt of all addenda to Plans and Specifications. (BOR-4)	_____
4. West Virginia Code §21-1D-5 Drug Free Workplace Conformance Affidavit (BOR-5 & 6)	_____
5. American Iron and Steel Requirement (BOR-7)	_____
6. WV Infrastructure & Jobs Development Council WV Jobs Act (BOR – 8 & 9)	_____
7. Any additional special requirements (by owner, engineer, or other funding sources)	
1. Copy of WV Contractor License	_____

BID BOND (PENAL SUM FORM)

Bidder Name: [Full formal name of Bidder] Address <i>(principal place of business)</i> : [Address of Bidder's principal place of business]	Surety Name: [Full formal name of Surety] Address <i>(principal place of business)</i> : [Address of Surety's principal place of business]
Owner Name: Brooke County Public Service District Address <i>(principal place of business)</i> : 711 Charles Street P.O. Box 150 Wellsburg, WV 26070	Bid Project <i>(name and location)</i> : Drover's Inn Area Sanitary Sewer Extension Brooke County, WV Bid Due Date: [Enter date bid is due]
Bond Penal Sum: [Amount] Date of Bond: [Date]	
Surety and Bidder, intending to be legally bound hereby, subject to the terms set forth in this Bid Bond, do each cause this Bid Bond to be duly executed by an authorized officer, agent, or representative.	
Bidder	Surety
_____ <i>(Full formal name of Bidder)</i>	_____ <i>(Full formal name of Surety) (corporate seal)</i>
By: _____ <i>(Signature)</i>	By: _____ <i>(Signature) (Attach Power of Attorney)</i>
Name: _____ <i>(Printed or typed)</i>	Name: _____ <i>(Printed or typed)</i>
Title: _____	Title: _____
Attest: _____ <i>(Signature)</i>	Attest: _____ <i>(Signature)</i>
Name: _____ <i>(Printed or typed)</i>	Name: _____ <i>(Printed or typed)</i>
Title: _____	Title: _____
Notes: (1) Note: Addresses are to be used for giving any required notice. (2) Provide execution by any additional parties, such as joint venturers, if necessary.	

1. Bidder and Surety, jointly and severally, bind themselves, their heirs, executors, administrators, successors, and assigns to pay to Owner upon default of Bidder the penal sum set forth on the face of this Bond. Payment of the penal sum is the extent of Bidder's and Surety's liability. Recovery of such penal sum under the terms of this Bond will be Owner's sole and exclusive remedy upon default of Bidder.
2. Default of Bidder occurs upon the failure of Bidder to deliver within the time required by the Bidding Documents (or any extension thereof agreed to in writing by Owner) the executed Agreement required by the Bidding Documents and any performance and payment bonds required by the Bidding Documents.
3. This obligation will be null and void if:
 - 3.1. Owner accepts Bidder's Bid and Bidder delivers within the time required by the Bidding Documents (or any extension thereof agreed to in writing by Owner) the executed Agreement required by the Bidding Documents and any performance and payment bonds required by the Bidding Documents, or
 - 3.2. All Bids are rejected by Owner, or
 - 3.3. Owner fails to issue a Notice of Award to Bidder within the time specified in the Bidding Documents (or any extension thereof agreed to in writing by Bidder and, if applicable, consented to by Surety when required by Paragraph 5 hereof).
4. Payment under this Bond will be due and payable upon default of Bidder and within 30 calendar days after receipt by Bidder and Surety of written notice of default from Owner, which notice will be given with reasonable promptness, identifying this Bond and the Project and including a statement of the amount due.
5. Surety waives notice of any and all defenses based on or arising out of any time extension to issue Notice of Award agreed to in writing by Owner and Bidder, provided that the total time for issuing Notice of Award including extensions does not in the aggregate exceed 120 days from the Bid due date without Surety's written consent.
6. No suit or action will be commenced under this Bond prior to 30 calendar days after the notice of default required in Paragraph 4 above is received by Bidder and Surety, and in no case later than one year after the Bid due date.
7. Any suit or action under this Bond will be commenced only in a court of competent jurisdiction located in the state in which the Project is located.
8. Notices required hereunder must be in writing and sent to Bidder and Surety at their respective addresses shown on the face of this Bond. Such notices may be sent by personal delivery, commercial courier, or by United States Postal Service registered or certified mail, return receipt requested, postage pre-paid, and will be deemed to be effective upon receipt by the party concerned.
9. Surety shall cause to be attached to this Bond a current and effective Power of Attorney evidencing the authority of the officer, agent, or representative who executed this Bond on behalf of Surety to execute, seal, and deliver such Bond and bind the Surety thereby.
10. This Bond is intended to conform to all applicable statutory requirements. Any applicable requirement of any applicable statute that has been omitted from this Bond will be deemed to be included herein as if set forth at length. If any provision of this Bond conflicts with any applicable statute, then the provision of said statute governs and the remainder of this Bond that is not in conflict therewith continues in full force and effect.
11. The term "Bid" as used herein includes a Bid, offer, or proposal as applicable.

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Certification of Receipt of Addenda

In submitting this Bid, Bidder represents, as more fully set forth in the Agreement, that:

- (a) Bidder has examined copies of all the Contract Documents and the following addenda:

Date

Number

Signature

Date

Name and Title of Signer
(Please Type)

To Be Submitted in Envelope No. 1
Item No. 3 on Checklist

WEST VIRGINIA CODE 21-1D-5 PROVIDES THAT ANY SOLICITATION FOR A PUBLIC IMPROVEMENT CONSTRUCTION CONTRACT REQUIRES EACH VENDOR THAT SUBMITS A BID FOR THE WORK TO SUBMIT AT THE SAME TIME AN AFFIDAVIT OF COMPLIANCE WITH THE BID. THE ENCLOSED DRUG-FREE WORKPLACE AFFIDAVIT MUST BE SIGNED AND SUBMITTED IN THE FIRST ENVELOPE AS EVIDENCE OF THE VENDOR'S COMPLIANCE WITH THE PROVISIONS OF ARTICLE ID, CHAPTER 21 OF THE WEST VIRGINIA CODE. FAILURE TO SUBMIT THE SIGNED DRUG-FREE WORKPLACE AFFIDAVIT IN THE FIRST ENVELOPE SHALL RESULT IN DISQUALIFICATION OF SUCH BID.



State of West Virginia
DRUG FREE WORKPLACE CONFORMANCE AFFIDAVIT
West Virginia Code §21-1D-5

STATE OF WEST VIRGINIA,

COUNTY OF _____, TO-WIT:

I, _____, after being first duly sworn, depose and state as follows:

1. I am an employee of _____; and,
(Company Name)
2. I do hereby attest that _____
(Company Name)

maintains a written plan for a drug-free workplace policy and that such plan and policy are in compliance with **West Virginia Code §21-1D**.

The above statements are sworn to under the penalty of perjury.

Printed Name: _____

Signature: _____

Title: _____

Company Name: _____

Date: _____

Taken, subscribed and sworn to before me this _____ day of _____, _____.

By Commission expires _____

(Seal)

(Notary Public)

CONTRACTOR’S
AMERICAN IRON AND STEEL
CERTIFICATION

As the contractor for the Proposed Buffalo Creek Crossing project, I certify that I have read, understand and will comply with the “American Iron and Steel (AIS)” requirements of section 436 of P.L. 113-76, Consolidated Appropriations Act, 2014 (Act) that requires Clean Water State Revolving Loan Fund (CWSRF) and Drinking Water State Revolving Loan Fund (DWSRF) assistance recipients to use iron and steel products that are produced in the United States for projects for the construction, alteration, maintenance, or repair of a public water system or treatment works.

Name (Printed)

Company

Name (Signature)

Date

Certification of Bidder Regarding Compliance with the
WV Jobs Act (SB 103) WV Code 21-1C-1

WV JOBS ACT REQUIREMENTS

- (a) Contractors shall hire at least 75% of employees for the project from the local labor market.
- Two employees from outside local labor markets are permissible for each employer
 - Employees shall have resided in the local labor market
- (b) Any employer unable to employ the minimum number of employees from the local labor market shall provide the nearest office of the Workforce West Virginia the following:
- (1) the number of qualified employees needed; and
 - (2) a job description of positions to be filled
- (c) If, within 3 business days following the placing of the job order with Workforce West Virginia, Workforce West Virginia is unable to refer any qualified applicants to the employer or refers less qualified job applicants than the number requested, then Workforce West Virginia shall issue a waiver to the employer stating the unavailability of applicants and permit the employer to fill any positions by the waiver from outside the local labor market.
-

CONTRACTOR REQUIREMENTS

The contractor hereby agrees to the following:

- (a) Contractor will comply with the WV Jobs Act and will file, or cause to be filed, with Workforce West Virginia copies of waiver certificates and certified payrolls as required by the Act, or other comparable documents that include the number of employees, the county and state where the employees reside and their occupation
- (b) the contractor will follow the procedure established by Workforce West Virginia for efficient collection of the data;
- (c) the contractor will provide with each pay requisition a certification that the contract is in compliance with the WV Jobs Act

Name & Title of Signer (Please type)	
Signature:	Date:

“Local Labor Market”

For the purposes of S.B. 103, "West Virginia Labor Market" includes all counties in West Virginia and the following out-of-state counties:

Kentucky

Bath, Boyd, Breathitt, Carter, Elliott, Fleming, Floyd, Greenup, Johnson, Knott, Lawrence, Letcher, Lewis, Magoffin, Martin, Menifee, Morgan, Perry, Pike, Rowan, and Wolfe

Maryland

Allegany, Anne Arundell, Baltimore, Carroll, Charles, Frederick, Garrett, Howard, Montgomery, Prince George's, Washington

Ohio

Adams, Athens, Belmont, Carroll, Columbiana, Coshocton, Fairfield, Gallia, Guernsey, Harrison, Hocking, Jackson, Jefferson, Lawrence, Mahoning, Meigs, Monroe, Morgan, Muskingum, Noble, Perry, Pickaway, Pike, Portage, Ross, Scioto, Stark, Summit, Trumbull, Tuscarawas, Vinton, Washington

Pennsylvania

Adams, Allegheny, Armstrong, Beaver, Bedford, Blair, Butler, Cambria, Cumberland, Fayette, Franklin, Fulton, Greene, Huntingdon, Indiana, Juniata, Lawrence, Mercer, Perry, Somerset, Venango, Washington, Westmoreland, York

North Carolina

Alleghany, Ashe, Surry

Tennessee

Johnson, Sullivan

Virginia

Albermarle, Alleghany, Amherst, Augusta, Bath, Bedford, Bland, Botetourt, Buchanan, Carroll, Clarke, Craig, Culpeper, Dickenson, Fairfax, Fauquier, Floyd, Franklin, Frederick, Giles, Grayson, Greene, Henry, Highland, Lee, Loudoun, Madison, Montgomery, Nelson, Orange, Page, Patrick, Prince William, Pulaski, Rappahannock, Roanoke, Rockbridge, Rockingham, Russell, Scott, Shenandoah, Smyth, Stafford, Tazewell, Warren, Washington, Wise, and Wythe.

Washington, D.C.

All

American Iron and Steel Requirement P.L. 113-76, Section 436

P.L. 113-76, Consolidated Appropriations Act, 2014 (Act), includes an “American Iron and Steel (AIS)” requirement in section 436 that requires Clean Water State Revolving Loan Fund (CWSRF) and Drinking Water State Revolving Loan Fund (DWSRF) assistance recipients to use iron and steel products that are produced in the United States for projects for the construction, alteration, maintenance, or repair of a public water system or treatment works.

The Act states:

Sec. 436. (a)(1) None of the funds made available by a State water pollution control revolving fund as authorized by title VI of the Federal Water Pollution Control Act (33 U.S.C. 1381 et seq.) or made available by a drinking water treatment revolving loan fund as authorized by section 1452 of the Safe Drinking Water Act (42 U.S.C. 300j–12) shall be used for a project for the construction, alteration, maintenance, or repair of a public water system or treatment works unless all of the iron and steel products used in the project are produced in the United States.

(2) In this section, the term “iron and steel products” means the following products made primarily of iron or steel: lined or unlined pipes and fittings, manhole covers and other municipal castings, hydrants, tanks, flanges, pipe clamps and restraints, valves, structural steel, reinforced precast concrete, and construction materials.

(b) Subsection (a) shall not apply in any case or category of cases in which the Administrator of the Environmental Protection Agency (in this section referred to as the “Administrator”) finds that—

(1) applying subsection (a) would be inconsistent with the public interest;

(2) iron and steel products are not produced in the United States in sufficient and reasonably available quantities and of a satisfactory quality; or

(3) inclusion of iron and steel products produced in the United States will increase the cost of the overall project by more than 25 percent.

(c) If the Administrator receives a request for a waiver under this section, the Administrator shall make available to the public on an informal basis a copy of the request and information available to the Administrator concerning the request, and shall allow for informal public input on the request for at least 15 days prior to making a finding based on the request. The Administrator shall make the request and accompanying information available by electronic means, including on the official public Internet Web site of the Environmental Protection Agency.

(d) This section shall be applied in a manner consistent with United States obligations under international agreements.

(e) The Administrator may retain up to 0.25 percent of the funds appropriated in this Act for the Clean and Drinking Water State Revolving Funds for carrying out the provisions described in subsection (a)(1) for management and oversight of the requirements of this section.

(f) This section does not apply with respect to a project if a State agency approves the engineering plans and specifications for the project, in that agency's capacity to approve such plans and specifications prior to a project requesting bids, prior to the date of the enactment of this Act.

The following guidance excerpt has been provided from EPA:

(Complete guidance may be downloaded from: <https://www.epa.gov/cwsrf/state-revolving-fund-american-iron-and-steel-ais-requirement>)

Covered Iron and Steel Products

11) What is an iron or steel product?

For purposes of the CWSRF and DWSRF projects that must comply with the AIS requirement, an iron or steel product is one of the following made primarily of iron or steel that is permanently incorporated into the public water system or treatment works:

- Lined or unlined pipes or fittings;
- Manhole Covers;
- Municipal Castings (defined in more detail below);
- Hydrants;
- Tanks;
- Flanges;
- Pipe clamps and restraints;
- Valves;
- Structural steel (defined in more detail below);
- Reinforced precast concrete; and
- Construction materials (defined in more detail below).

12) What does the term 'primarily iron or steel' mean?

'Primarily iron or steel' places constraints on the list of products above. For one of the listed products to be considered subject to the AIS requirements, it must be made of greater than 50% iron or steel, measured by cost. The cost should be based on the material costs.

13) Can you provide an example of how to perform a cost determination?

For example, the iron portion of a fire hydrant would likely be the bonnet, body and shoe, and the cost then would include the pouring and casting to create those components. The other material costs would include non-iron and steel internal workings of the fire hydrant (i.e., stem,

coupling, valve, seals, etc.). However, the assembly of the internal workings into the hydrant body would not be included in this cost calculation. If one of the listed products is not made primarily of iron or steel, United States (US) provenance is not required. An exception to this definition is reinforced precast concrete, which is addressed in a later question.

14) If a product is composed of more than 50% iron or steel, but is not listed in the above list of items, must the item be produced in the US? Alternatively, must the iron or steel in such a product be produced in the US?

The answer to both question is no. Only items on the above list must be produced in the US. Additionally, the iron or steel in a non-listed item can be sourced from outside the US.

15) What is the definition of steel?

Steel means an alloy that includes at least 50 percent iron, between .02 and 2 percent carbon, and may include other elements. Metallic elements such as chromium, nickel, molybdenum, manganese, and silicon may be added during the melting of steel for the purpose of enhancing properties such as corrosion resistance, hardness, or strength. The definition of steel covers carbon steel, alloy steel, stainless steel, tool steel and other specialty steels.

16) What does 'produced in the United States' mean?

Production in the United States of the iron or steel products used in the project requires that all manufacturing processes, including application of coatings, must take place in the United States, with the exception of metallurgical processes involving refinement of steel additives. All manufacturing processes includes processes such as melting, refining, forming, rolling, drawing, finishing, fabricating and coating. Further, if a domestic iron and steel product is taken out of the US for any part of the manufacturing process, it becomes foreign source material. However, raw materials such as iron ore, limestone and iron and steel scrap are not covered by the AIS requirement, and the material(s), if any, being applied as a coating are similarly not covered. Non-iron or steel components of an iron and steel product may come from non-US sources. For example, for products such as valves and hydrants, the individual non-iron and steel components do not have to be of domestic origin.

17) Are the raw materials used in the production of iron or steel required to come from USsources?

No. Raw materials, such as iron ore, limestone, scrap iron, and scrap steel, can come from non-US sources.

18) If an above listed item is primarily made of iron or steel, but is only at the construction site temporarily, must such an item be produced in the US?

No. Only the above listed products made primarily of iron or steel, permanently incorporated into the project must be produced in the US. For example trench boxes, scaffolding or equipment, which are removed from the project site upon completion of the project, are not required to be made of U.S. Iron or Steel.

19) What is the definition of 'municipal castings'?

Municipal castings are cast iron or steel infrastructure products that are melted and cast. They typically provide access, protection, or housing for components incorporated into utility owned drinking water, storm water, wastewater, and surface infrastructure. They are typically made of grey or ductile iron, or steel. Examples of municipal castings are:

- Access Hatches;
- Ballast Screen;
- Benches (Iron or Steel);
- Bollards;
- Cast Bases;
- Cast Iron Hinged Hatches, Square and Rectangular;
- Cast Iron Riser Rings;
- Catch Basin Inlet;
- Cleanout/Monument Boxes;
- Construction Covers and Frames;
- Curb and Corner Guards;
- Curb Openings;
- Detectable Warning Plates;
- Downspout Shoes (Boot, Inlet);
- Drainage Grates, Frames and Curb Inlets;
- Inlets;
- Junction Boxes;
- Lampposts;
- Manhole Covers, Rings and Frames, Risers;
- Meter Boxes;
- Service Boxes;
- Steel Hinged Hatches, Square and Rectangular;
- Steel Riser Rings;
- Trash receptacles;
- Tree Grates;
- Tree Guards;
- Trench Grates; and
- Valve Boxes, Covers and Risers.

20) What is 'structural steel'?

Structural steel is rolled flanged shapes, having at least one dimension of their cross-section three inches or greater, which are used in the construction of bridges, buildings, ships, railroad rolling stock, and for numerous other constructional purposes. Such shapes are designated as wide-flange shapes, standard I-beams, channels, angles, tees and zeeks. Other shapes include H-piles, sheet piling, tie plates, cross ties, and those for other special purposes.

21) What is a 'construction material' for purposes of the AIS requirement?

Construction materials are those articles, materials, or supplies made primarily of iron and steel, that are permanently incorporated into the project, not including mechanical and/or electrical components, equipment and systems. Some of these products may overlap with what is also considered "structural steel". This includes, but is not limited to, the following products: wire rod, bar, angles, concrete reinforcing bar, wire, wire cloth, wire rope and cables, tubing, framing, joists, trusses, fasteners

(i.e., nuts and bolts), welding rods, decking, grating, railings, stairs, access ramps, fire escapes, ladders, wall panels, dome structures, roofing, ductwork, surface drains, cable hanging systems, manhole steps, fencing and fence tubing, guardrails, doors, and stationary screens.

22) What is not considered a 'construction material' for purposes of the AIS requirement?

Mechanical and electrical components, equipment and systems are not considered construction materials. Mechanical equipment is typically that which has motorized parts and/or is powered by a motor. Electrical equipment is typically any machine powered by electricity and includes components that are part of the electrical distribution system. The following examples (including their appurtenances necessary for their intended use and operation) are NOT considered construction materials: pumps, motors, gear reducers, drives (including variable frequency drives (VFDs)), electric/pneumatic/manual accessories used to operate valves (such as electric valve actuators), mixers, gates, motorized screens (such as traveling screens), blowers/aeration equipment, compressors, meters, sensors, controls and switches, supervisory control and data acquisition (SCADA), membrane bioreactor systems, membrane filtration systems, filters, clarifiers and clarifier mechanisms, rakes, grinders, disinfection systems, presses (including belt presses), conveyors, cranes, HVAC (excluding ductwork), water heaters, heat exchangers, generators, cabinetry and housings (such as electrical boxes/enclosures), lighting fixtures, electrical conduit, emergency life systems, metal office furniture, shelving, laboratory equipment, analytical instrumentation, and dewatering equipment.

23) If the iron or steel is produced in the US, may other steps in the manufacturing process take place outside of the US, such as assembly?

No. Production in the US of the iron or steel used in a listed product requires that all manufacturing processes must take place in the United States, except metallurgical processes involving refinement of steel additives.

24) What processes must occur in the US to be compliant with the AIS requirement for reinforced precast concrete?

While reinforced precast concrete may not be at least 50% iron or steel, in this particular case, the reinforcing bar and wire must be produced in the US and meet the same standards as for any other iron or steel product. Additionally, the casting of the concrete product must take place in the US. The cement and other raw materials used in concrete production are not required to be of domestic origin.

If the reinforced concrete is cast at the construction site, the reinforcing bar and wire are considered to be a construction material and must be produced in the US.

Certification and Compliance

The attached “Contractor’s American Iron and Steel Certification” must be executed and included in Envelope 1 of the bid package. Failure to complete the certification will result in Envelope 2 remaining sealed and the bid being returned. The contractor will supply to the loan recipient manufacturers’ certifications for each iron and steel item documenting/asserting that all manufacturing processes occurred in the United States. Such certifications will be submitted with shop drawings, and must include the following key items:

1. Specific project reference.
2. Specific list of products.
3. Location of manufacturing (city and state).
4. EPA’s AIS Requirement reference.
5. Signature of company representative.
6. **If a product has multiple manufacturers**, AIS Step Certifications are required that list which step(s) were completed by each manufacturer, in addition to the items listed above.

For additional information on the EPA’s AIS Requirements and examples of manufacturers’ AIS certifications, please see the following links:

- EPA’s AIS website
<https://www.epa.gov/cwsrf/state-revolving-fund-american-iron-and-steel-ais-requirement>
- EPA’s webinar “AIS Requirements for State Revolving Funds – AIS Certification Letters”
https://www.epa.gov/sites/production/files/2020-08/documents/lunch_and_learn_certification_letters_july_2020.pdf

Waiver Process

The statute permits EPA to issue waivers for a case or category of cases where EPA finds (1) that applying these requirements would be inconsistent with the public interest; (2) iron and steel products are not produced in the US in sufficient and reasonably available quantities and of a satisfactory quality; or (3) inclusion of iron and steel products produced in the US will increase the cost of the overall project by more than 25 percent.

In order to implement the AIS requirements, EPA has developed an approach to allow for effective and efficient implementation of the waiver process to allow projects to proceed in a timely manner. The framework is described in the guidance document found at:

<https://www.epa.gov/cwsrf/american-iron-and-steel-requirement-waiver-process>

Approved and denied waivers may be reviewed at: <https://www.epa.gov/cwsrf/american-iron-and-steel-requirement-approved-project-waivers> and <https://www.epa.gov/cwsrf/american-iron-and-steel-requirement-withdrawn-or-denied-waivers>

De Minimis Materials Waiver

The EPA has granted a nationwide waiver of the AIS requirements of the Consolidated Appropriations Act under the authority of Section 436(b)(1) (public interest waiver) for de minimis incidental components of eligible infrastructure projects. For many of these incidental components, the country of manufacture and the availability of alternatives is not always readily or reasonably identifiable prior to procurement in the normal course of business; for other incidental components, the country of manufacture may be known but the miscellaneous character in conjunction with the low cost, individually and (in total) as typically procured in bulk, mark them as properly incidental. Examples of incidental components could include small washers, screws, fasteners (i.e., nuts and bolts), miscellaneous wire, corner bead, ancillary tube, etc. Examples of items that are clearly not incidental include significant process fittings (i.e., tees, elbows, flanges, and brackets), distribution system fittings and valves, force main valves, pipes for sewer collection and/or water distribution, treatment and storage tanks, large structural support structures, etc.

Funds used for such de minimis incidental components cumulatively may comprise no more than a total of 5 percent of the total cost of the total materials used in and incorporated into a project; the cost of an individual item may not exceed 1 percent of the total cost of the total materials used in and incorporated into a project. Contractors who wish to use this waiver should determine the costs of all items installed or supplied for the project. The contractor must retain relevant documentation (i.e., invoices) for each of these items in their project files, and must summarize the items in monthly draw requests to the owner: the total cost of all materials, the total cost of "incidental" materials, and the calculations by which they determined the percentage of incidental products installed or supplied for the project. None of the products specifically listed as "Covered Iron and Steel Products" are incidental. None of the products identified in detail in the technical specifications are considered incidental.

Construction Contract Language

All contracts must have a clause requiring compliance with the AIS requirements of the Act. The following is an example of what could be included in all contracts in projects that use SRF funds. No claim regarding the legality of this clause with regard to federal, state or local laws is made.

The Contractor acknowledges to and for the benefit of _____ ("Owner") that it understands the goods and services under this Agreement are being funded with monies made available by the Clean Water State Revolving Fund that have statutory requirements commonly known as "American Iron and Steel;" that requires all of the iron and steel products used in the project to be produced in the United States ("American Iron and Steel Requirement") including iron and steel products provided by the Contractor pursuant to this Agreement. The Contractor hereby represents and warrants to and for the benefit of the Owner that (a) the Contractor has reviewed and understands the American Iron and Steel Requirement, (b) all of the iron and steel products used in the project will be and/or have been produced in the United States in a manner that complies with the American Iron and Steel Requirement, unless a waiver of the requirement is approved, and (c) the Contractor will provide any further verified information, certification or assurance of compliance with this paragraph, or information necessary to support a waiver of the American Iron and Steel Requirement, as may be requested by the Owner or the State. Notwithstanding any other provision of this Agreement, any failure to comply with this paragraph by the Contractor shall permit the Owner to recover as damages against the Contractor any loss, expense, or cost (including without limitation attorney's fees) incurred by the Owner resulting from any such failure (including without limitation any impairment or loss of funding, whether in whole or in part, from the State or any damages owed to the State by the Owner). While the Contractor has no direct contractual privity with the State, as a lender to the Owner for the funding of its project, the Owner and the Contractor agree that the State is a third-party beneficiary and neither this paragraph (nor any other provision of this Agreement necessary to give this paragraph force or effect) shall be amended or waived without the prior written consent of the State.

CONTRACTOR'S
AMERICAN IRON AND STEEL
CERTIFICATION

As the contractor for the _____
project, I certify that I have read, understand and will comply with the “American Iron and Steel
(AIS)” requirements of section 436 of P.L. 113-76, Consolidated Appropriations Act, 2014 (Act)
that requires Clean Water State Revolving Loan Fund (CWSRF) and Drinking Water State
Revolving Loan Fund (DWSRF) assistance recipients to use iron and steel products that are
produced in the United States for projects for the construction, alteration, maintenance, or repair
of a public water system or treatment works.

Name (Printed)

Company

Name (Signature)

Date

De Minimis Log

The following information is provided as a sample De Minimis log for AIS compliance. The TWDB makes no claims regarding the legality of the De Minimis log with respect to AIS compliance.

Figure 1 - Information contained in the log example: Owner Name, Project Name, TWDB SRF Number, Contractor Name, Total Project Cost, Total Material Cost followed by data entered for each of the following categories: Item Number, Iron or Steel Product, Unit Cost, Quantity, Total Cost, Percent of Total Material Cost Less Than One Percent, Cumulative Cost, Percent of Total Material Cost Less Than Five Percent.

American Iron and Steel de minimis log								
	Owner Name:	City		Total Project Cost:	\$130,000.00			
	Project Name:	CID 01 - Project		Total Material Cost:	\$100,000.00			
	TWDB SRF No.:	####						
	Contractor Name:	Contractor						
Item No.	Iron or Steel Product	Unit Cost	Quantity	Total Cost	% Mat Cost ($< 1\%$)	Cum Cost	% Mat Cost ($< 5\%$)	
1	Steel Door	\$400.00	1	\$ 400.00	0.40%	\$ 400.00	0.40%	
2	Bolts	\$100.00	1	\$ 100.00	0.10%	\$ 500.00	0.50%	
3	Welding rods	\$30.00	1	\$ 30.00	0.03%	\$ 530.00	0.53%	
4								
5								
6								
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10								
11								
12								
13								

SECTION 432700.01 - VARIABLE FREQUENCY DRIVE

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions, Division 01, and all related Specification Sections apply, to this Section.

1.2 REFERENCES

The products covered in this section shall be designed, manufactured, and tested in accordance with the latest applicable standards as follows:

CSA 22.2 N14-95	Industrial control equipment
EN 50178	Low Voltage Directive
EN 60204-1	Safety of machinery-electrical equipment of machines. Part 1 - Specification for general requirement.
EN 60950	Safety of information technology equipment including electrical business equipment.
EN 61010-1	Safety requirement for electrical equipment for measurement, control, and laboratory use. Part 1 – general requirement.
EN 61800-3	Electro Magnetic Compliance
UL 508	Industrial control equipment.
UL 508C	Power conversion equipment.
IEC 664	Insulation coordination for equipment within low-voltage systems.
IEC 60068-2-6	Environmental testing – Part 2 – Test Fc: vibration (sinusoidal).
IEC 60068-2-27	Environmental testing. Part 2: Tests. Test Ea and guidance: Shock
IEC 801-4	Electrical Fast Transient (Supplementary Wave).
NEMA ICS6	Industrial control and systems enclosures.
NEMA 250	Enclosures for electrical equipment.

1.3 QUALITY ASSURANCE

- A. The manufacturer of the VFD shall be a certified ISO 9001 and ISO 14000 facility.
- B. The VFD, including its internal electronic thermal overload protection circuit, shall be UL and cUL Listed in accordance to UL 508C - Power Conversion Equipment.
- C. UL / cUL labels shall be attached on the outside of each VFD as verification.
- D. The VFD shall be designed in accordance with NEMA, IEC, EN, UL and CSA standards.
- E. The VFD manufacturer shall have 20 years of experience, minimum, in the design, construction and application of variable frequency drives.

- F. The VFD manufacturer shall have an existing service organization.
- G. The manufacturer of the VFD shall have the ability to design and manufacture insulated gate bipolar transistors (IGBT) to be incorporated into the construction of the VFD.
- H. The manufacturer of the VFD shall have the ability to evaluate any component failure at their own analysis lab. The services available shall include x-ray magnification of components, complete electrical testing, and the ability to analyze failures within the components.

1.4 GENERAL DESCRIPTION

- A. The VFD shall convert the input AC mains power to an adjustable frequency and adjustable voltage as defined in the following sections.
- B. The input power section shall utilize a full wave 6-pulse bridge design incorporating diode rectifiers. The diode rectifiers shall convert AC line power of fixed voltage and frequency to fixed DC voltage. This power section shall be insensitive to phase sequence of the AC line voltage.
- C. The DC bus shall have external connections for external braking and allow for customer common DC Bus for multiple drive regeneration.
- D. The output power section shall change fixed DC voltage to adjustable frequency AC voltage. This section shall utilize insulated gate bipolar transistors (IGBT's).

1.5 DELIVERY, STORAGE, AND HANDLING

A. Delivery

- 1. Ship all units assembled as much as practical.
- 2. Label all units with all labeling intact and legible with item name, model number, size, and manufacturer's name.

B. Storage

- 1. Store all units, accessories, and components in the manufacturer's original package, under cover and protected from damage.

C. Handling

- 1. Handle all units and components in accordance with the manufacturer's instructions.
- 2. Use lifting rings and canvas harnesses for lifting to prevent scratching or abrading finished surfaces.
- 3. Store in a clean, dry space. Maintain factory wrapping or provide an additional heavy canvas or heavy plastic cover, to protect units from dirt, water, construction debris, and traffic.

4. Handle carefully, in accordance with manufacturer's written instructions, to avoid damage to components, enclosure, and finish.

1.6 CONSTRUCTION

- A. The VFD shall be rated UL Type 1 and shall be UL Listed as a plenum rated VFD.
- B. The VFD shall employ built-in RS-485 communication via an RJ45 connection or terminal block.
- C. The VFD shall employ built-in Modbus-RTU communication via a terminal block connection.
- D. The VFD shall employ a standard control panel with built-in parameter copy functionality.
- E. The VFD shall utilize one (1) connector slots for internally mounting plug-in options.
- F. The VFD shall employ a removable control terminal block.
- G. The VFD shall employ sink/source selectable control logic.
- H. The VFD shall employ modular cooling fans – no tools required to exchange (up to 75Hp).
- I. The VFD shall include a standard DC link reactor for ratings 100Hp and above.

1.7 APPLICATION DATA

- A. The VFD shall be sized to operate a {Variable Torque, Variable Torque Low Noise, Constant Torque} load.
- B. The speed range shall be from a minimum speed of 0.5 Hertz to a maximum speed of 400Hertz.

1.8 ENVIRONMENTAL RATINGS

- A. The VFD shall be designed to operate in the following Ambient Temperature range: Non-freezing.
 - a. Variable Torque and Constant Torque loads: -10C to +50C (14 to 122F).
- B. The storage temperature shall be -20C to +65C (-4 to 149F), non-condensing. Applicable for short periods, such as during transit.
- C. The maximum relative humidity shall be 90% at 50C (122F), non-condensing.
- D. The VFD shall be rated to operate at altitudes less than or equal to 1000m (3280ft). For altitudes above 1000m (3280ft):

- a. Sizes up to 75Hp: Reduce the rated output current (Amperes) by 3% for every 500m (1640ft), up to 2500m (8200ft) maximum (91% of rated).
 - b. Sizes 100Hp and larger: Reduce the rated output current (Amperes) by 2% for every 500m (1640ft), up to 3000m (9842ft) maximum (92% of rated).
 - c. Consult factory for higher altitudes.
- E. The VFD shall be designed according to IEC 60068-2-6 to resist vibration.

PART 2 – PRODUCTS

2.1 VFD RATINGS

- A. The VFD shall be designed for operation with the following input voltages.
- a. FR-F720, 1Hp to 75Hp: 170-242Vac 50HZ, 170-264Vac 60Hz, 200-240Vac (+10%/-15%).
 - b. FR-F740, 1Hp to 800Hp: 323-528Vac 50/60Hz, 380-480Vac (+10%/-15%).
- B. The speed range shall be from a minimum of 0.5 Hz to a maximum of 400Hz, adjustable by increments of 0.01Hz. Operation above 60Hz shall require programming changes to avoid over speeding the application.
- C. The input voltage frequency range shall be 47.5 to 63 Hz.
- D. The displacement power factor shall not be less than 0.93 with optional DC line reactor at 100% load factor. (DC reactor included as standard for VFD's 100HP and above.)
- E. The efficiency of the VFD at 100% speed and load shall not be less than 95%.
- F. The VFD shall conform to the European Union ElectroMagnetic Compatibility directive, CE labeled. The VFD shall meet product standard EN61800-3 for Second (2nd) Environmental.
- G. Frequency precision shall not be less than:
- a. Using analog input: Within +/- 0.2% of maximum output frequency. (25C +/- 10C)
 - b. Using digital input: Within +/- 0.01% of set output frequency.
- H. The Over-current capacity shall be:
- a. Variable torque (LD): 120% for 1 min or 150% for 3sec, at 50C (continuous).
 - b. Variable torque (SLD): 110% for 1 min or 120% for 3sec, at 40C (continuous).
- I. The VFD shall minimize the audible motor noise through the use of an adjustable carrier frequency.

- J. The Speed Control Range shall be:
 - a. 20:1 while running between 3 and 60 Hz.

2.2 PROTECTION

- A. The VFD shall be UL 508C Listed for use on distribution systems with 65kArms available fault current, based upon the UL short-circuit test.
- B. Upon power-up and before operational control is allowed to begin, the VFD shall check for valid operation of memory, pre-charge circuit, fan operation, and option board communication.
- C. The VFD shall be protected against short circuits between the output phases & ground and the logic & analog outputs.
- D. Once operational, monitoring shall continually take place and an abnormality will result in an alarm.
- E. The following Circuit protection shall be allowed:
 - a. The VFD shall be rated for use with the appropriate UL class fuse.
 - b. Alternately, circuit breakers may be used, provided that they are listed or certified by an accredited electrical testing laboratory such as Underwriters Laboratories.
- F. For a fault condition other than an internal fault, an auto restart function shall provide up to 10 programmable restart attempts. The programmable time delay before each restart shall range from 0 to 10 seconds.
- G. The deceleration ramp of the VFD shall be programmable for normal and fault conditions. Stop modes shall include: dc injection braking, controlled deceleration to stop and coast to stop.
- H. Upon loss of the analog speed reference signal:
 - a. The VFD shall follow the programmed deceleration ramp to a controlled stop.
 - b. Hold the VFD speed based upon the last good value and trigger a warning alarm.
- I. The VFD shall have solid state I²t protection that is evaluated in accordance with UL 508C. The minimum adjustment range shall be from 0 to 150% of the current output of the VFD.
- J. The VFD shall include Metal Oxide Varistors (MOVs) wired to the incoming AC terminals.
- K. STOP key on the keypad shall be functional at all time, drive mode insensitive.
- L. The VFD shall be insensitive to input power phase sequence.

- M. The VFD shall include 3 skip frequency ranges that can each be programmed with a selectable bandwidth of the user's choice. The skip frequencies shall allow independent programming for back-to-back or overlap.
- N. The output frequency shall be parameter setting enabled to fold back when the motor is overloaded.
- O. The VFD shall monitor the main circuit capacitors, control circuit capacitor, in-rush suppression circuit, and cooling fan and shall provide a pre-alarm so that maintenance can be scheduled.
- P. The VFD shall include an output timer function so that peripheral equipment maintenance can be scheduled.
- Q. The VFD shall include parameter selectable input and output phase loss protection.
- R. The VFD basic insulation level shall be tested based upon ANSI/IEEE C62.41-1999.

2.3 ADJUSTMENTS AND CONFIGURATIONS

- A. The VFD shall be factory pre-set to operate most common applications.
- B. Choice of four (4) types of acceleration and deceleration patterns shall be available: linear, S-curve shaped – two types, and backlash compensated.
- C. The acceleration and deceleration ramps shall be individually adjustable from 0.00 to 3600 seconds.
- D. The volts per hertz ratios shall be user selectable.
- E. The VFD shall store the last eight (8) alarm faults and data at time of fault. The data shall include output frequency, output current, output voltage and VFD operation time at fault occurrence.
- F. The VFD shall have user programmable DC injection braking to stop the motor's rotation. DC injection braking voltage is adjustable between 0 to 30% and up to 10 seconds of continuous operation.
- G. Cooling fan control shall be selectable: Operates continuously during run operation, and dependent upon temperature at stop.
- H. The VFD shall have adjustable accel/decel ramp profiles.
- I. The VFD shall have the ability to start into a reverse rotating motor (anti-windmill) and achieve the set speed.
- J. The VFD shall have two (2) different selectable settings for accel/decel times, torque boost, base frequency, stall prevention frequency and current, and output frequency detection functions.

- K. The VFD shall have coast to stop functionality by parameter setting.
- L. The VFD shall automatically compute the motor's slip compensation.
- M. The VFD shall be able to limit motor rotation to only one direction.
- N. The VFD shall have two (2) output current detection functions which are able to trigger individual alarms.
 - a. Zero current detection level.
 - b. High output current detection.
- O. The VFD shall include two (2) parameters for user entry. (Unit or machine number, install date).

2.4 OPERATIONAL FEATURES

- A. The VFD shall allow the motor to be switched in sequence to line power when operating at the base frequency.
- B. The VFD shall be able to start into a rotating motor (any speed or direction) and accelerate (decelerate) to set speed without tripping or component loss.
- C. There shall be a regenerative avoidance function to minimize the effect of opposite rotation of another fan within the same duct.
- D. The VFD shall allow for automatic optimization of the VFD output, during accel/decel and constant speed, characteristic based upon the application and load.
- E. The VFD shall incorporate PID control for process controls such as flow rate, air volume, or pressure.
 - a. The VFD shall include programmable PID shutoff for energy savings in low speed region. (PID sleep)
 - b. The VFD shall include the capability to monitor values of PID setpoint, process value, and deviation.
 - c. The VFD shall include PID forward/reverse operation switchover by external signal.
- F. The VFD shall allow for controlled deceleration to stop following an input power loss.
- G. The VFD shall included automatic pump sequencing, which will allow the VFD to sequence up to 4 pumps across the line without additional controllers or software.
- H. The VFD shall contain three (3) skip frequency ranges that can be programmed within a selectable range of 0-400Hz with a minimum bandwidth of 0.01Hz. Each skip range shall be independently programmable.
- I. The VFD shall be able to perform bi-direction rotation following a -10 to +10Vdc input.

- J. The VFD shall be able to run for at set hold time at the start frequency to smooth motor start.
- K. Communication options include:
 - a. RS-485 (standard).
 - b. Modbus RTU.
 - c. LonWorks™
 - d. CC-Link
 - e. Profibus DP
 - f. DeviceNet™
 - g. Metasys-N2
- L. The VFD output signals shall be able to be utilized in lieu of a remote output terminal of a programmable logic controller when the VFD is being controlled via RS 485 or network.

2.5 OPERATOR INTERFACE

- A. Six (6) key Control Panel, with setting dial, shall be mounted on each drive and shall be removable & interchangeable regardless of the Hp rating. The customer control shall include the following functionality.
 - a. Furnished with each VFD as standard.
 - b. Batch parameter read, copy and verification functionality.
 - c. Four (4) digit numerical display.
 - d. Standard RS-485 communication through a RJ 45 port.
 - e. Allows direct access for parameter changes.
 - f. Includes an electronic parameter write disable feature.
 - g. Stores/displays last four (4) alarm faults and data at time of fault. The data shall include output frequency, output current, output voltage and VFD operation time at fault occurrence.
 - h. Forward, Reverse and Stop keys command normal starting and stopping as programmed when the VFD is in keypad control mode.
 - i. Display of I/O and output terminal ON/OFF states.
 - j. STOP key is functional at all time, drive mode insensitive.
 - k. Can be mounted at a distance of 20 meters from the VFD.
- B. Twenty-four (24) key parameter unit shall be available as an optional accessory and shall be removable & interchangeable regardless of the Hp rating. The customer control shall include the following functionality.
 - a. Batch parameter read, copy and verification functionality.
 - b. Standard RS-485 communication through a RJ 45 port.
 - c. Alpha numeric LCD display.
 - 4 Lines x 16 characters.
 - Adjustable LCD contrast.
 - d. Includes a parameter write disable feature.

- e. Stores last eight (8) alarm faults and operation data (frequency, voltage, current, and VFD run time) at time of fault occurrence.
- f. Forward, Reverse and Stop keys command normal starting and stopping as programmed when the VFD is in keypad control mode.
- g. STOP key is functional at all time, drive mode insensitive.
- h. Can be mounted at a distance of 20 meters from the VFD.
- i. Eight (8) languages available selectable among English, Japanese, German, French, Spanish, Italian, Swedish and Finnish.
- j. Allows direct access for parameter changes individually, by function set and by user selected groups. Parameters can be listed by definition, factory default setting, or user changed values.
- k. Calibration of frequency meter or bias/gain settings.
- l. Arrow keys shall provide the ability to scroll through menus and screen, select or activate functions or change the value of a selected parameter.
- m. HELP functionality shall include the following:
 - 1. Monitoring of data: Running frequency, motor current, output voltage, set frequency, running speed (RPM), DC bus voltage, over-current load %, peak output current, peak dc bus voltage, input & output power used (kW), input and output signal state (ON or OFF).
 - 2. Stores/displays last eight (8) alarm faults and data at time of fault. The data shall include output frequency, output current, output voltage and VFD operation time at fault occurrence.
 - 3. Troubleshooting hints shall reference alarm definitions in plain English and point to applicable parameter settings.
 - 4. Display of installed options and software version shall be available.

C. Computer interface via RS-485 option

- a. An optional VFD Software program shall be available which supports serial communication between a PC and network of 1 to 32 variable frequency drives (VFD's) through the Parameter Unit ports.

Capabilities include:

- Edit drive parameters, transfer settings to and from the drive, and save them to disk
- Monitoring of I/O, analog outputs, and VFD status using a variety of available displays
- Diagnostics
- Help screens that include detailed parameter descriptions
- Access to parameters grouped by function (for example, all parameters related to accel / decel, braking, or options).

2.6 CONTROL

- A. The control power for the digital inputs and outputs shall be 24Vdc, selectable to sink or source. Optional 120Vac control power for the digital inputs and outputs shall be available.
- B. All logic connections shall be furnished on a removable terminal strip.

- C. External devices shall be able to be connected to the terminal strip for starting/stopping the VFD, speed control and indicating operation status.
- D. Speed command input shall be by means of:
 - a. Keypad.
 - b. Analog input.
 - c. Serial communications.
 - d. Floating point input shall accept a three-wire input
 - e. There shall be three (3) parameter assignable analog inputs.
 - f. The selection consists of the following configurations: 0-5Vdc, 0-10Vdc, 4-20mA dc, -5 to +5 Vdc, and -10 to +10 Vdc.
 - g. Two (2) terminals shall be selectable for either voltage or current reference input.
 - h. Combinations of the above speed references can be selected and be switched via remote terminal.
- F. There shall be twelve (12) logic inputs that are parameter assignable.
 - a. The selection consists of PTC, 15 preset speeds (up to four inputs), second functions, jog, current input selection, auto restart, external thermal relay, PID control, Advanced PID control to allow motor sequencing, PU to external switch-over.
 - b. Optional 3-digit BCD or 12-bit binary input terminals (3) shall be available as relay contact or open collector signals.
- G. Output signals shall consist of:
 - a. Five (5) open collector outputs shall be available, which are parameter assignable and are optically isolated.
 - 1) Can be selected for positive or negative logic.
 - 2) The selection of assignments shall consist of: Running, Up to speed, Power failure/Under-voltage, Overload, Output frequency detection (first & second), Electronic over-current pre-alarm, PU mode, Inverter ready, Zero current detection, PID upper limit, PID lower limit, PID reverse rotation output, Commercial power supply switch over (MC1-MC3), Fan fault, Fin (heatsink) overheat pre-alarm, Power savings, Minor and Major fault outputs as standard selections.
 - 3) The VFD's output terminals shall allow control through network commands.
 - 4) Optional relay output contact signals (3) shall be available and selectable.
 - 5) Optional digital outputs (5) shall be available and selectable through open collector terminals.
 - b. Pulse or Analog output signal shall be selectable in the form of either:
 - 1) Analog output signal, 4-20mA dc.
 - 2) Analog output signal, 0-10Vdc
 - c. Two (2) Form (C) relay outputs with selectable Normally Open or Normally Closed alarm outputs shall be available.
 - 1) Alarm terminals shall be individually parameter assignable.

2.7 BRAKING

- A. The VFD shall provide terminals for adding an external braking unit to allow for dissipation of excessive electrical energy from the motor.
- B. The following shall be available:
 - a. DC dynamic braking – Including adjustable operation frequency, time and voltage.
 - b. External line regeneration.
 - c. Can be used for common bus systems for multiple drive regeneration.

2.8 DRIVE OPTIONS

- A. Provide the following options/modifications to the VFD. All special features shall be factory mounted and wired within the VFD enclosure unless otherwise specified.
 - a. Input Line Reactors.
 - b. Fast acting input fusing.

2.9 DRIVE OPERATION

- A. With the H-O-A switch in the "HAND" position, the drive shall be controlled by the manual speed potentiometer on the drive door.
- B. With the H-O-A switch in "AUTOMATIC", the drive shall start from the automatic pump controller and its speed shall be controlled by a 4-20mA signal from this controller.
- C. With the H-O-A switch in the "OFF" position, the run circuit will be open and the VFD will not operate.

PART 3 – EXECUTION

A. INSTALLATION

- 1. Install VFDs according to manufacturer recommendations and as shown in the Drawings.

B. START-UP

- 1. Start-up shall be provided for each VFD by a factory authorized service professional. A start-up form shall be filled out for each drive with a copy provided to the owner, and a copy kept on file at the manufacturer.

C. PRODUCT SUPPORT

- 1. Factory trained service personnel that are trained on the VFD products offered shall be locally available at both the specifying and installation locations.

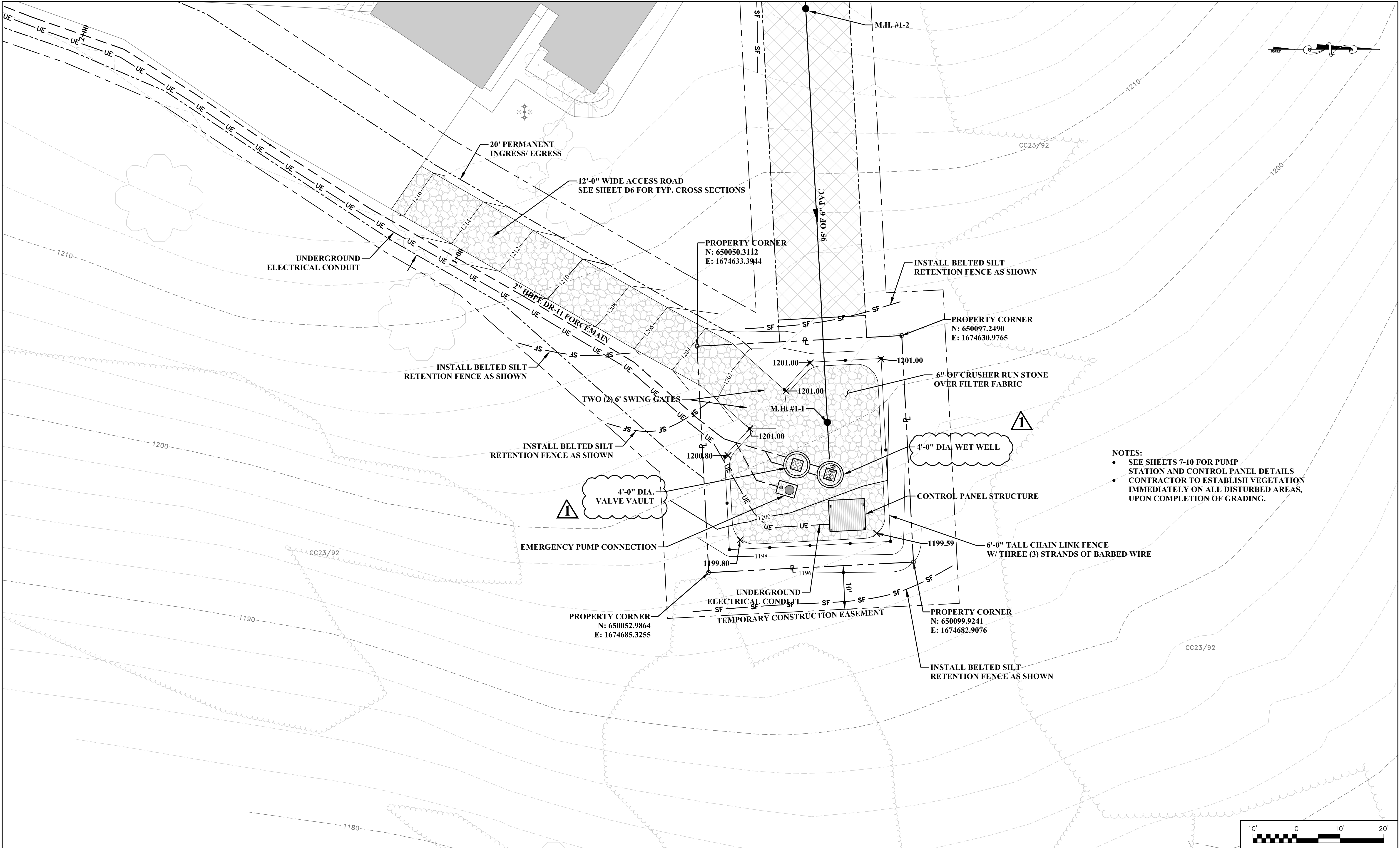
2. A toll free 24/365 technical support line connected to factory support personnel located in the US shall be available. Technical support offered only through the local sales office is not acceptable.
3. Training shall include installation, programming and operation of the VFD, and serial communication. Factory authorized start up and owner training to be provided locally upon request.

D. WARRANTY

1. The VFD Product Warranty shall be 24 months from the date of manufacture. A 36 month warranty shall be available with authorized factory start up and drive registration. The warranty shall include all parts, labor, travel time and expenses. A toll free 24/365 technical support line shall be available.
2. Extended Warranty shall be available for purchase for up to 72 months from date of manufacture.

END OF SECTION 432700.01

LAYOUT TAB: 1
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- NOTES:
- SEE SHEETS 7-10 FOR PUMP STATION AND CONTROL PANEL DETAILS
 - CONTRACTOR TO ESTABLISH VEGETATION IMMEDIATELY ON ALL DISTURBED AREAS, UPON COMPLETION OF GRADING.



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APPROVED: D. FERRELL	DATE: 4/2022
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SURVEY BY:	
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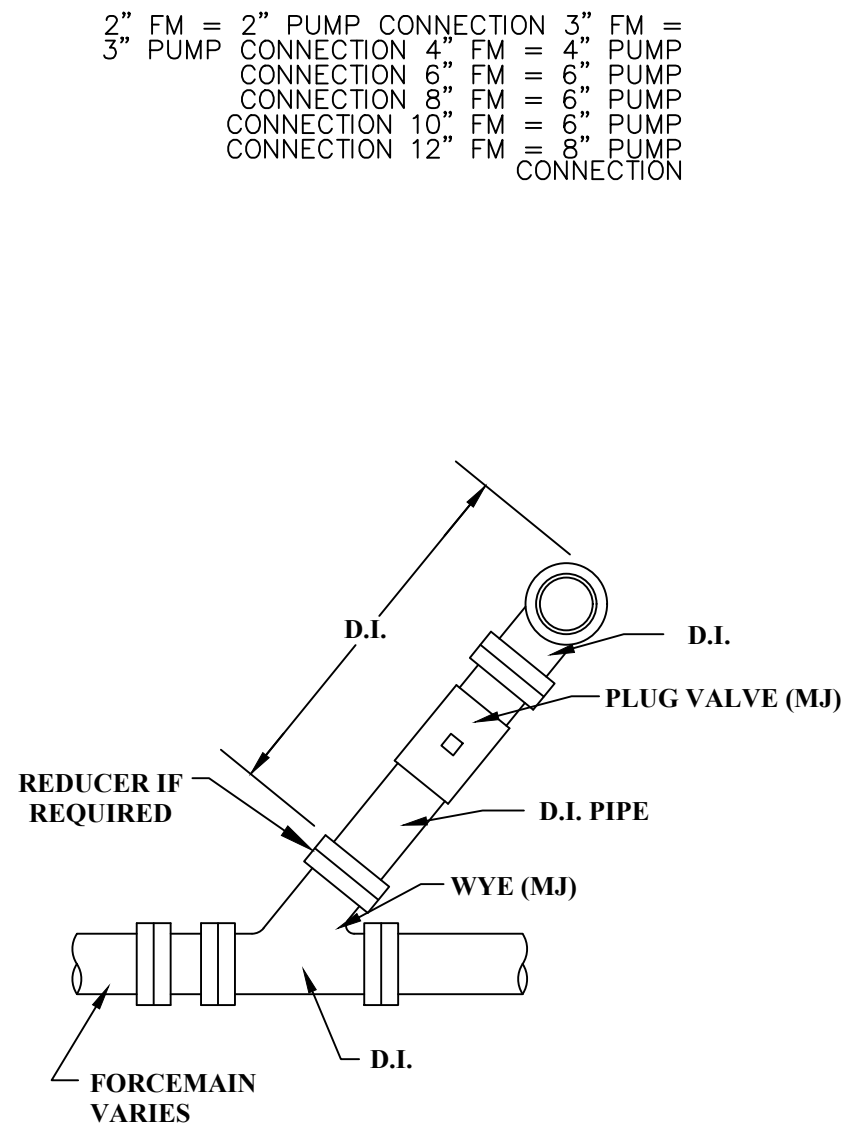
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PHASE No.
CONTRACT No.
PROJECT No.
020-10158

BROOKE COUNTY PUBLIC SERVICE DISTRICT
DROVER'S INN AREA
SANITARY SEWER EXTENSION PROJECT
BROOKE COUNTY, WEST VIRGINIA
PUMP STATION #1 SITE PLAN

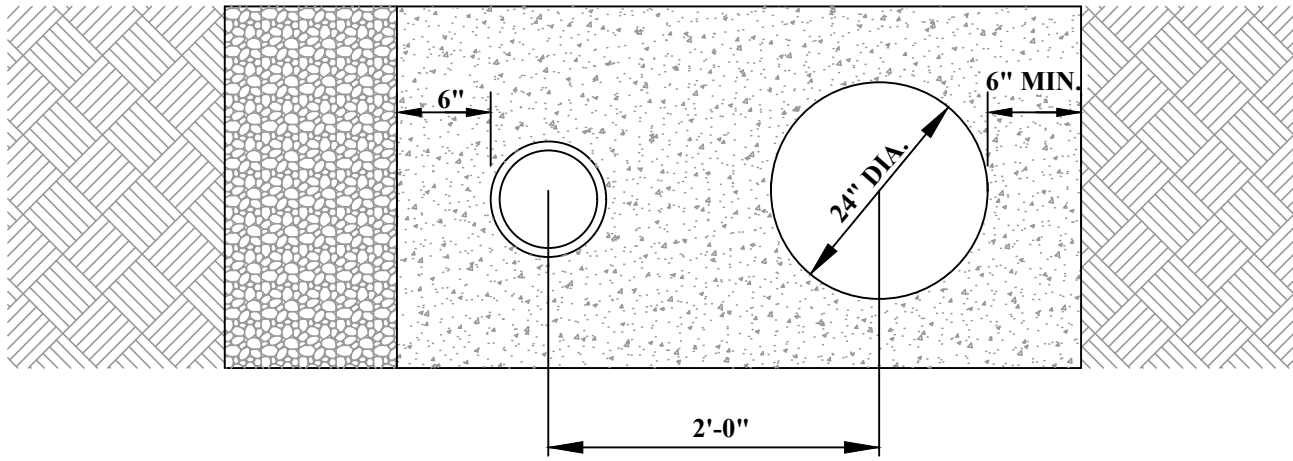
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LAYOUT TAB: 8
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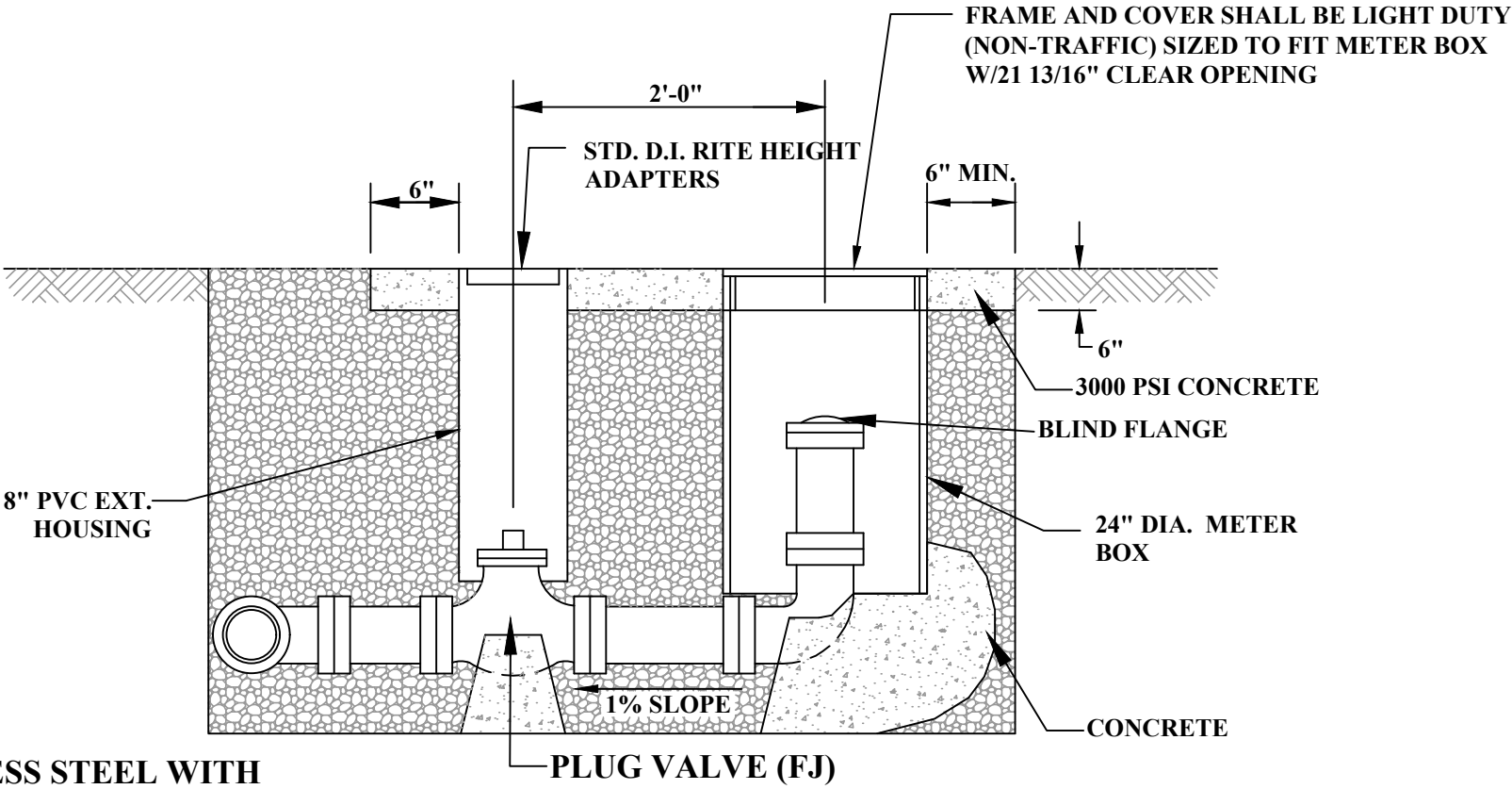
NOTE: ALL PIPING STAINLESS STEEL WITH
DUCTILE IRON FITTINGS.(SIZE VARIES)

EMERGENCY PUMP CONNECTION

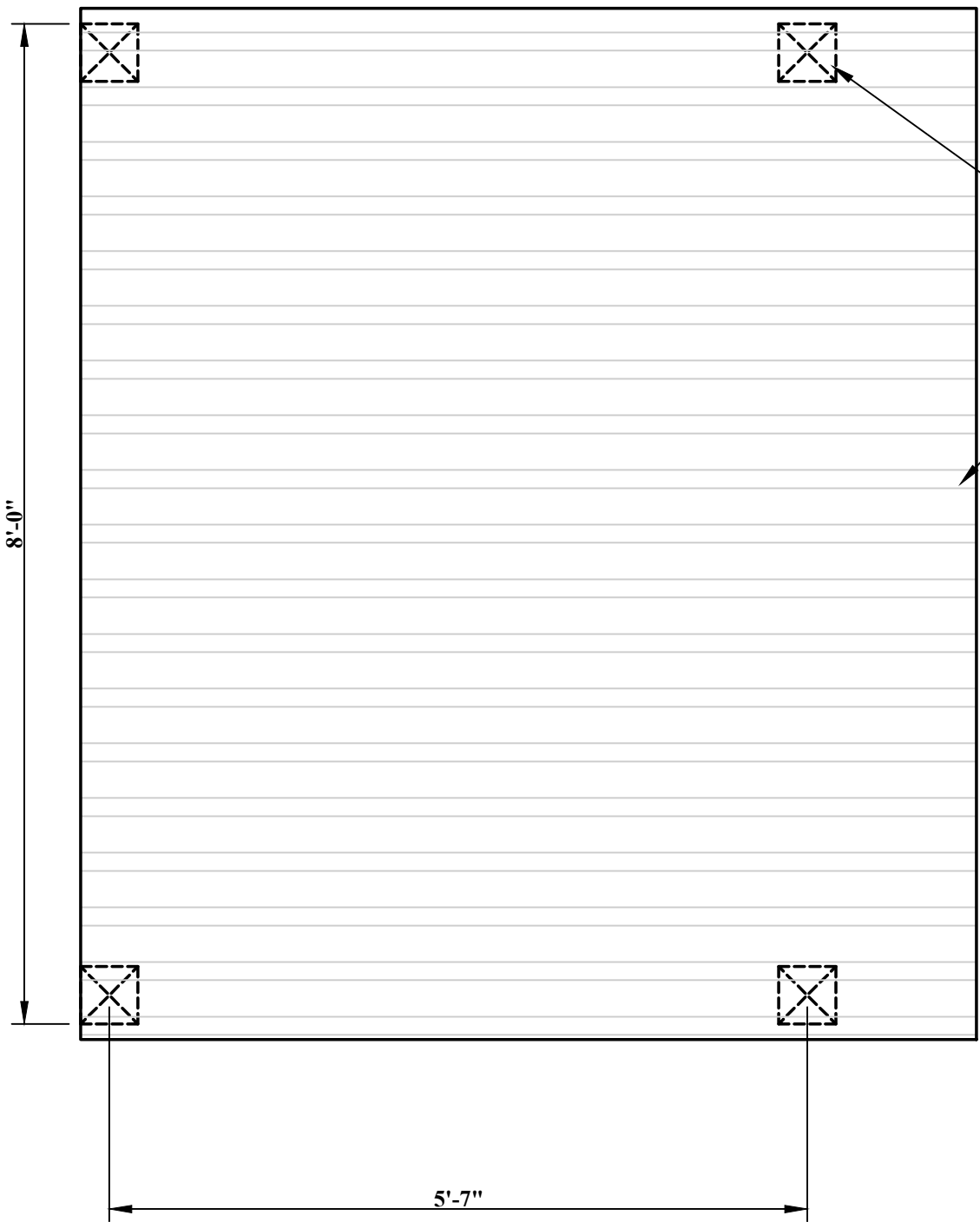
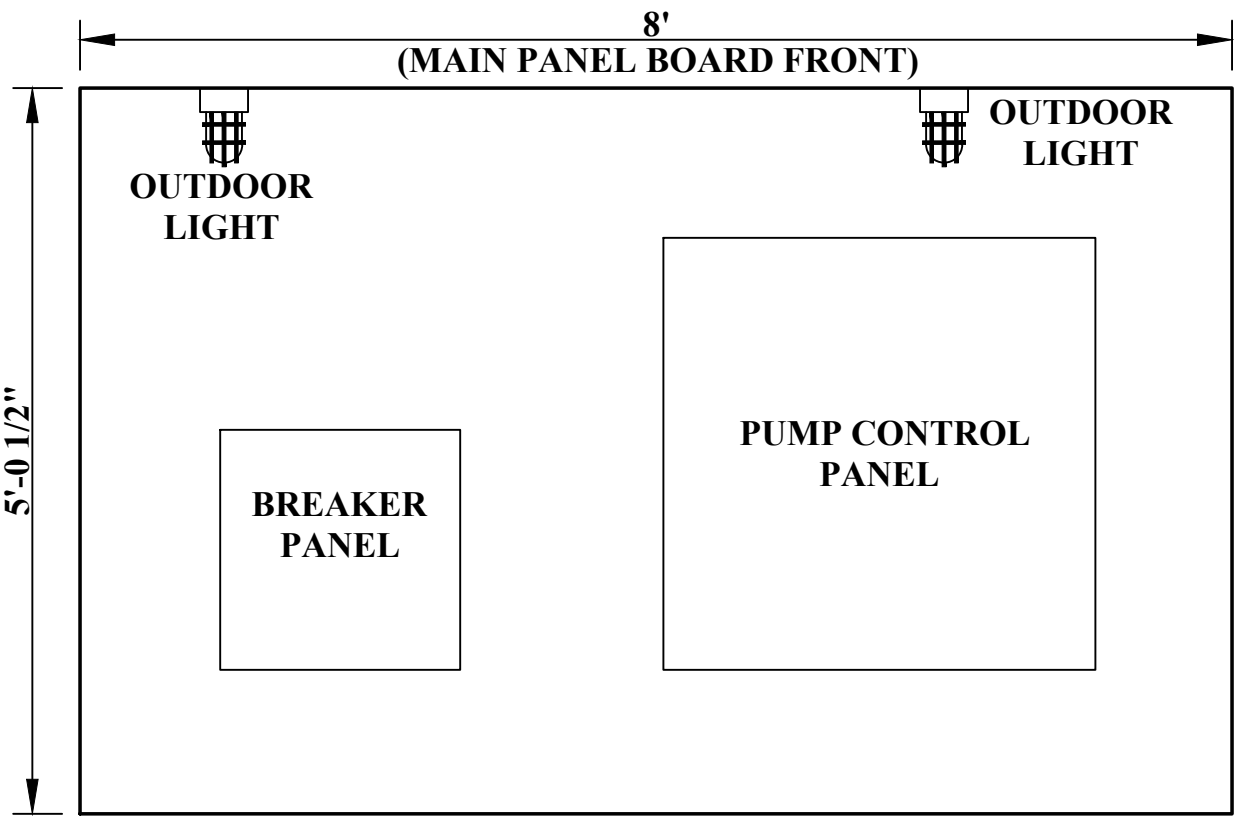


EMERGENCY PUMP CONNECTION

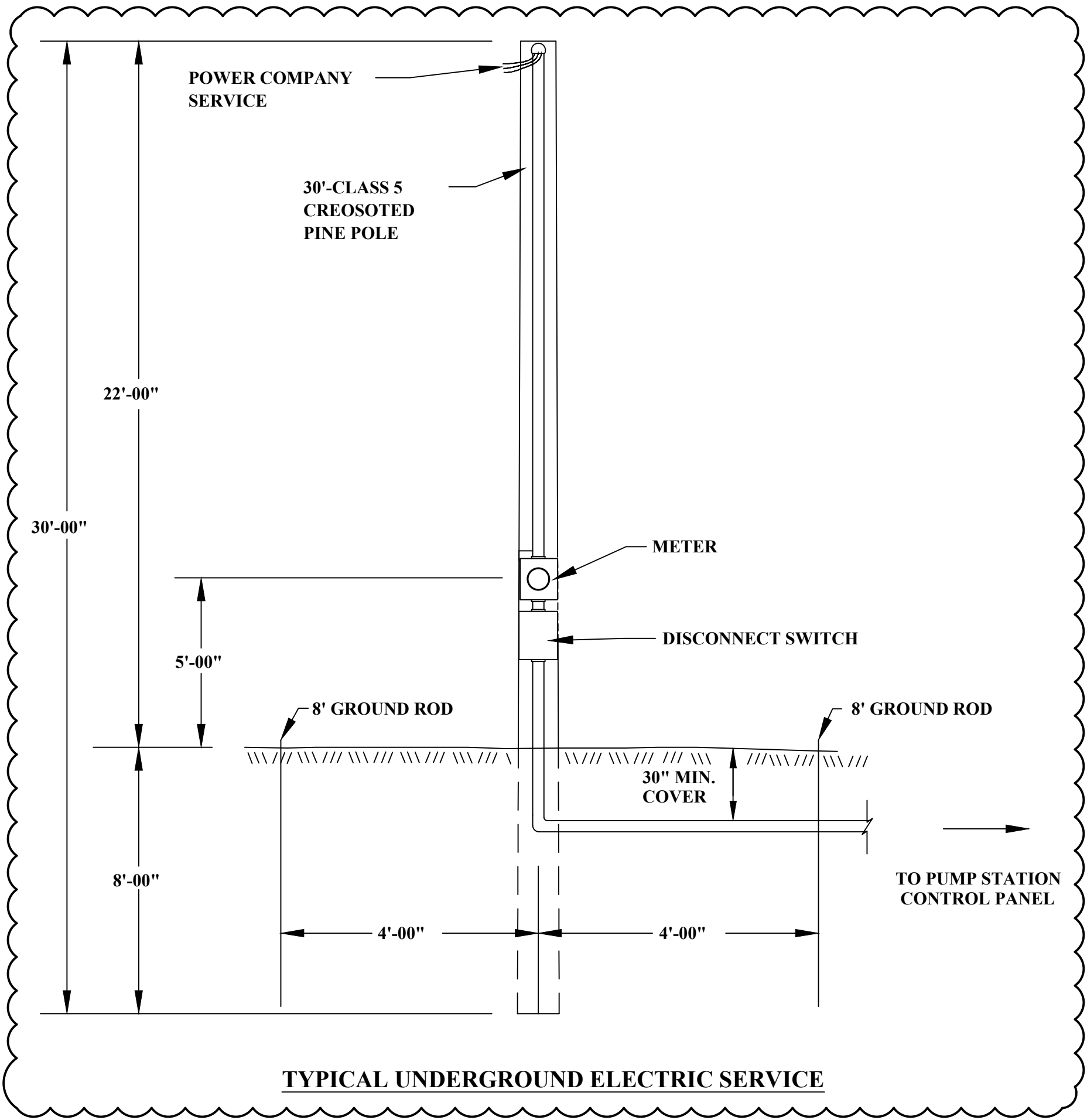
PLAN VIEW



SECTION VIEW



8' LONG CONTROL PANEL
BOARD STRUCTURE TOP VIEW
NOT TO SCALE



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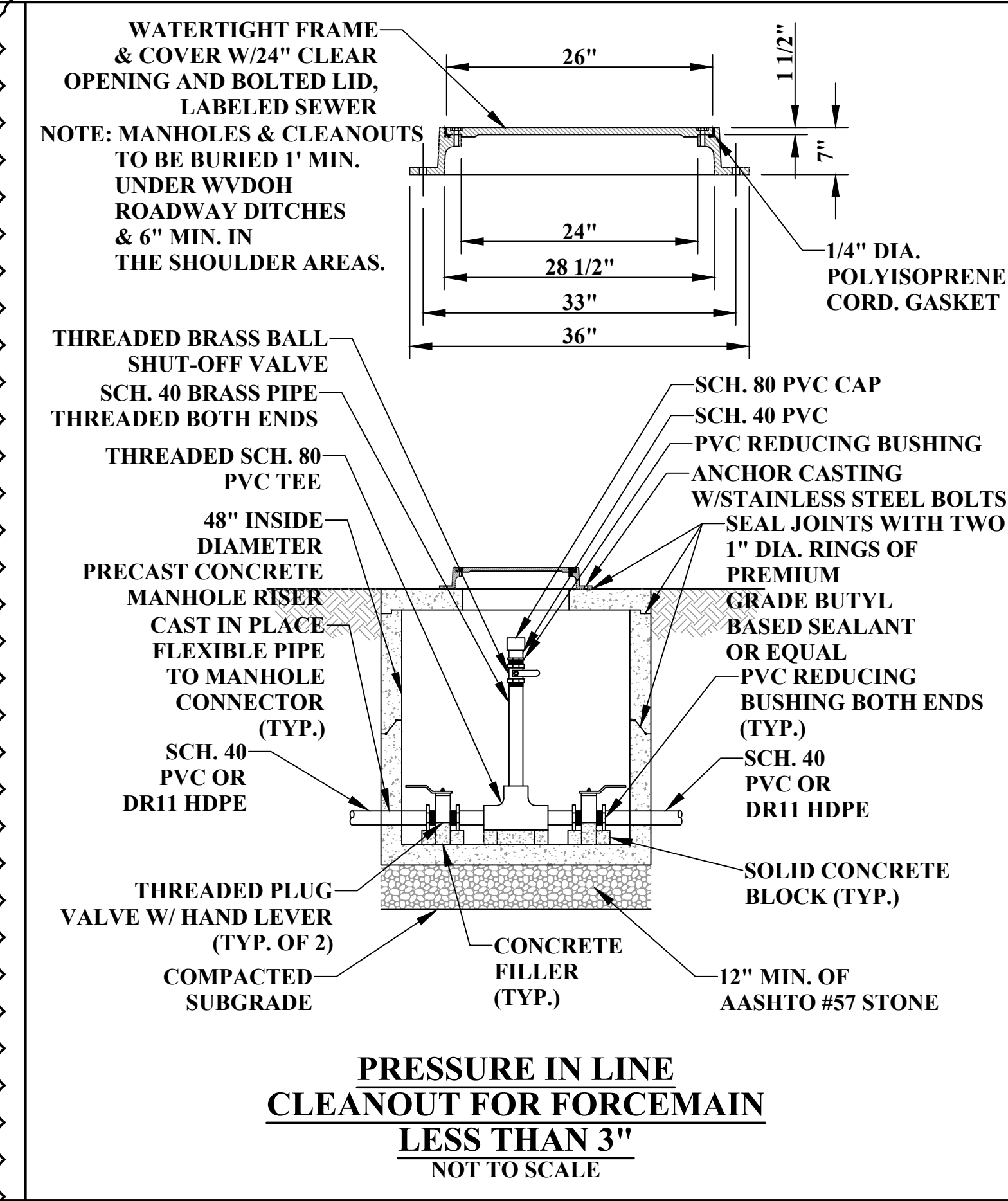
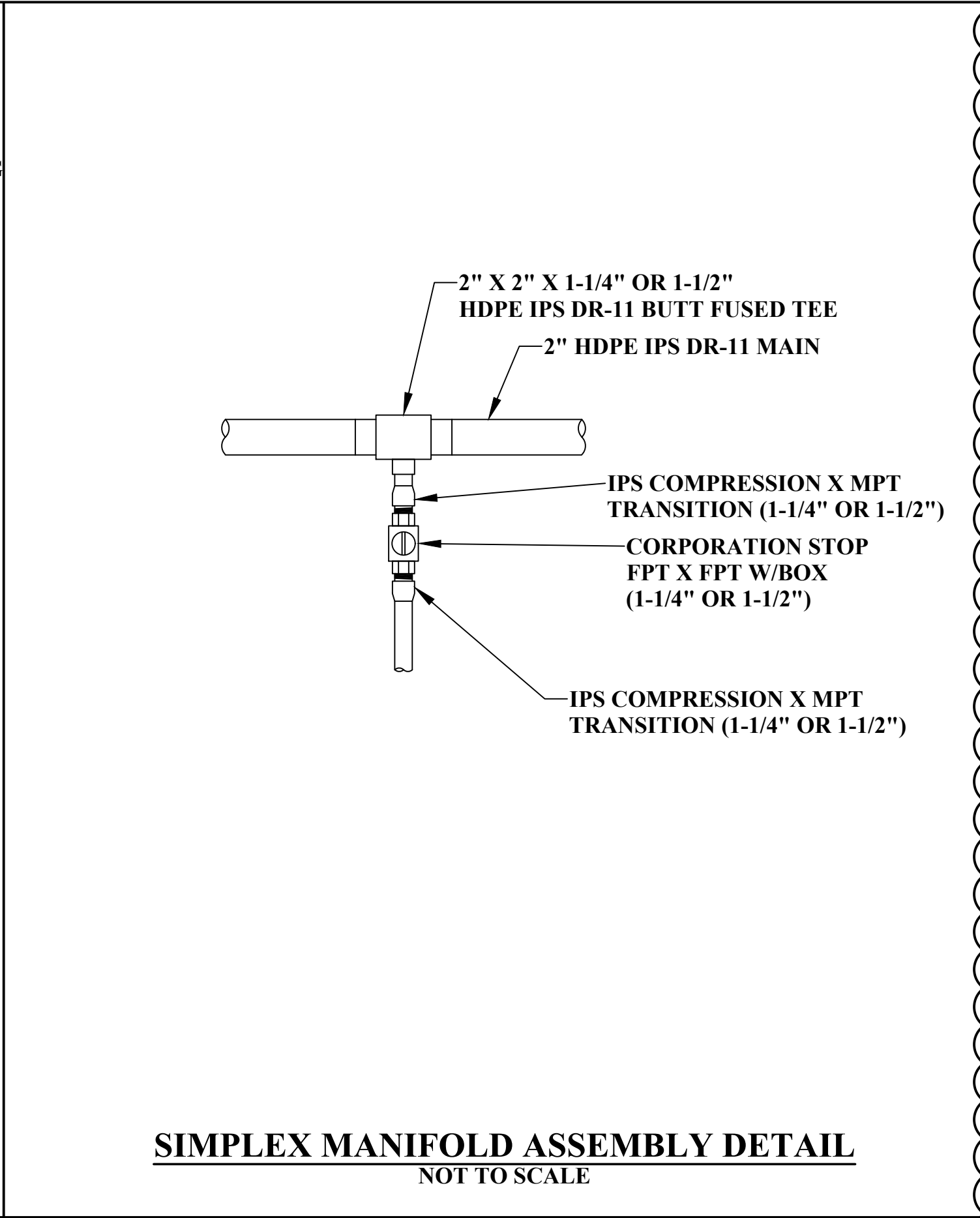
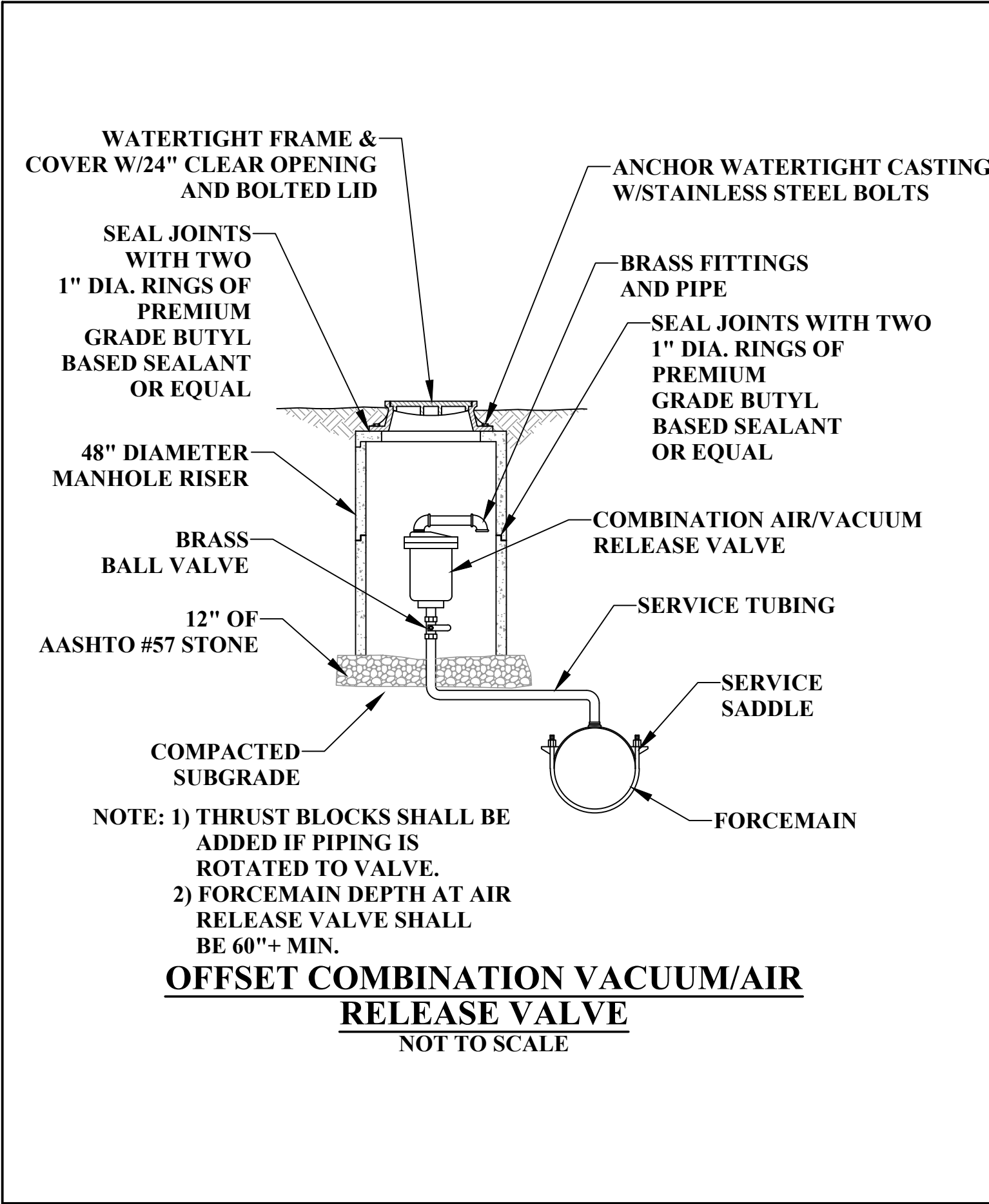


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BROOKE COUNTY PUBLIC SERVICE DISTRICT
DROVER'S INN AREA
SANITARY SEWER EXTENSION PROJECT
BROOKE COUNTY, WEST VIRGINIA
PUMP STATION DETAILS SHEET

SHEET No.
8

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BROOKE COUNTY PUBLIC SERVICE DISTRICT
DROVER'S INN AREA
SANITARY SEWER EXTENSION PROJECT
BROOKE COUNTY, WEST VIRGINIA
TYPICAL SEWER DETAILS

SHEET No.
D4