



**CITY MANAGER'S OFFICE**  
CITY OF NEWARK

220 South Main Street · Newark, Delaware 19711  
302.366.7000 · Fax 302.366.7035 · [www.newarkde.gov](http://www.newarkde.gov)

\_\_\_\_\_  
BIDDER

\_\_\_\_\_  
BID SECURITY

INVITATION TO BID (ITB) NO. 24-13

SOUTH COLLEGE INTERCONNECTION  
BOOSTER STATION REPLACEMENT

NOTICE

Do not disassemble. Return intact with  
properly completed forms or bid may be rejected.

CITY OF NEWARK  
Delaware

INVITATION TO BID NO. 24-13

SOUTH COLLEGE INTERCONNECTION  
BOOSTER STATION REPLACEMENT

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ATTACHMENTS

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CITY OF NEWARK  
Delaware

INVITATION TO BID NO. 24-13

SOUTH COLLEGE INTERCONNECTION  
BOOSTER STATION REPLACEMENT

NOTICE OF LETTING

Sealed bids in response to Invitation to Bid No. 24-13 South College Interconnection Booster Station Replacement will be received by the Purchasing Division (220 South Main Street; Newark, Delaware 19711) until 2:00 p.m., prevailing time on Tuesday, October 29, 2024, and will be publicly opened and read aloud in the Council Chamber shortly thereafter. Prevailing wage rates do not apply to this project.

Alternatively, bids may also be emailed in PDF form to the City Purchasing Division at [contracts@newark.de.us](mailto:contracts@newark.de.us) by the deadline noted above and will be opened after the closing date and time and will be publicly recorded in the Council Chamber shortly thereafter. Please note that only emails up to 25 MB in size can be accepted.

**There will be a non-mandatory pre-bid meeting on Monday October 7, 2024 at 10:00 a.m. at the City of Newark Municipal Services Building, inside Council Chambers, located at 220 South Main Street, Newark Delaware 19711.**

All questions/requests for information regarding this Invitation to Bid must be submitted via email to [contracts@newark.de.us](mailto:contracts@newark.de.us) by 5:00 p.m. on Friday, October 18, 2024 to allow staff sufficient time to develop answers to questions deemed appropriate. Please submit all questions/requests for information in bulk (e.g., in a Word document attachment to an email) to limit the total number of emails received.

The Invitation to Bid documents may be obtained from the City website at [www.newarkde.gov/bids](http://www.newarkde.gov/bids).

CITY OF NEWARK  
Delaware

INVITATION TO BID NO. 24-13

SOUTH COLLEGE INTERCONNECTION  
BOOSTER STATION REPLACEMENT

GENERAL PROVISIONS

**1. BIDS**

Each bid shall be submitted on the proposal form included herein. The proposal and all other required documents must be submitted in a sealed envelope clearly identified with the bidder's name and marked, "City of Newark – South College Interconnection Booster Station Replacement". **Bid Documents must be received in the Purchasing Office prior to 2:00 p.m. prevailing time, Tuesday October 29, 2024.** Each bid so submitted shall constitute an irrevocable offer for a period of thirty (30) calendar days following the bid opening date.

**There will be a non-mandatory pre-bid meeting on Monday October 7, 2024 at 10:00 a.m. at the City of Newark Municipal Services Building, inside Council Chambers, located at 220 South Main Street, Newark Delaware 19711.**

Alternatively, bids may also be emailed in PDF form to the City Purchasing Division at [contracts@newark.de.us](mailto:contracts@newark.de.us) by the deadline noted above and will be opened after the closing date and time and will be publicly recorded in the Council Chamber shortly thereafter. Please note that only emails up to 25 MB in size can be accepted—if file sizes are larger than 25 MB, attachments should be broken into multiple emails.

**2. DEFINITIONS**

- a. *Agreement*: The written instrument which is evidence of the agreement between Owner and Contractor covering the Work.
- b. *Contract Documents*: Those items so designated in the Agreement. Only printed or hard copies of the items listed in the Agreement are Contract Documents. Approved Shop Drawings, other Contractor submittals, and the reports and drawings of subsurface and physical conditions are not Contract Documents.
- c. *Contractor*: The individual or entity with whom the Owner has entered into the Agreement.
- d. *Engineer*: The Owner's consultant engineer. The Engineer for this project is JMT, Inc.
- e. *Owner*: The individual or entity with whom Contractor has entered into the

Agreement and for whom the Work is to be performed. The Owner for this project is the City of Newark.

- f. *Shop Drawings*: All drawings, diagrams, illustrations, schedules, and other data or information which are specifically prepared or assembled by or for Contractor and submitted by Contractor to illustrate some portion of the Work.
- g. *Site*: Lands or areas indicated in the Contract Documents as being furnished by Owner upon which the Work is to be performed, including rights-of-way and easements for access thereto, and such other lands furnished by Owner which are designated for the use of Contractor.
- h. *Subcontractor*: An individual or entity having a direct contract with Contractor or with any other Subcontractor for the performance of a part of the Work at the Site.
- i. *Work*: The entire construction or the various separately identifiable parts thereof required to be provided under the Contract Documents. Work includes and is the result of performing or providing all labor, services, and documentation necessary to produce such construction, and furnishing, installing, and incorporating all materials and equipment into such construction, as required by the Contract Documents.

### **3. BID SECURITY**

Each bid must be accompanied by a certified check, cashier's check, or bid bond in the amount of ten percent (10%) of the proposed bid price, payable to the City of Newark. Failure to provide the required bid security may be grounds for rejection of the bid. If a bid bond is submitted, the attached "Bond to Accompany Proposal" form must be completed and issued by a surety licensed to operate in the State of Delaware.

If the successful bidder fails or refuses to execute and deliver the contract within twenty (20) calendar days after receiving notice of the award of the contract, the successful bidder shall forfeit to the City for such failure or refusal the security deposited with the bid. Any certified check or cashier's check submitted as security shall be returned to all unsuccessful bidders thirty (30) calendar days after the bid opening date.

### **4. CONTRACT SURETY BOND**

The successful bidder shall provide the City with a Performance Bond and Payment Bond in the full amount of the contract guaranteeing faithful performance of the contract. Such bonds shall be provided to the City with the executed contract within twenty (20) calendar days after receiving notice of award of the contract. Upon receipt of the contract surety bond, the City will return any certified check or cashier's check submitted as bid security by the successful bidder.

If a warranty is included as part of this Invitation to Bid's scope of work, once the project is

substantially complete the surety bond shall be converted into a warranty bond for the term of the warranty. Once substantial completion of the project is reached and approved, City staff shall release any remaining retainage and issue a close out letter to the vendor stating the start date of the warranty period. A copy of the above noted warranty bond shall be provided to the City Purchasing Division no later than thirty (30) days from the receipt of the City's close out letter.

**5. TAXES**

The price(s) quoted shall not include federal or state taxes. If applicable, the successful bidder shall provide the City with three (3) copies of the required tax exemption forms to accompany the bidder's invoice.

**6. AWARDS**

The City Manager or designee will review each of the bids submitted and make a recommendation to the City Council on the disposition of the bids. The City Council reserves the right to accept or reject any or all bids or parts of bids as they may determine and to waive any irregularities or defects where the best interest of the City would be served.

**7. BID PRICE**

For material purchases, the prices shall include all transportation, delivery preparation, and installation charges for the equipment specified. The bid prices shall be F.O.C. Destination and shall not include federal or state taxes. If applicable, the successful bidder/vendor must furnish the City with the necessary tax exception forms in triplicate upon submission of his invoice.

Any prices quoted are those for which the material will be furnished F.O.B. Destination and include all charges that may be imposed during the period of the contract. Unless otherwise specified and agreed upon by both parties in writing, all material shall be designated F.O.B. Destination and have freight included in quotations.

**8. UNIT PRICES**

In the event of a conflict or error in extension from unit price to total amount, the unit prices shall prevail and shall be considered the correct bid figures. Bidders are cautioned to thoroughly review their bid figures for errors prior to submitting their proposal. The unit price shall include all transportation, delivery, installation and all charges for the goods and

services specified in this Invitation to Bid or otherwise by City staff.

9. **EQUALS**

Where a specific product is specified by catalog or model number, the acceptability of any other "or equal" product shall be subject to the sole judgment of the City of Newark.

10. **INQUIRIES/REQUESTS FOR INFORMATION & ADDENDA**

All inquiries/requests for information regarding this Invitation to Bid must be submitted via email to [contracts@newark.de.us](mailto:contracts@newark.de.us) by 5:00p.m. on Friday October 18, 2024. These inquiries will be passed along to relevant staff for their review. Please submit all questions/requests for information in bulk (e.g., in a Word document attachment to an email) to limit the total number of emails received. Any answers deemed necessary will be provided via addendum prior to the bid opening date.

Any changes to the Invitation to Bid documents shall be made by written addendum no later than four (4) calendar days prior to the bid opening date, which may be issued with extensions to the bid submittal date (if necessary) to allow adequate time for review and response. Bidders shall bear the entire responsibility for being sure they have received all such addenda. **The bidder is responsible for submitting a signed letter listing the addenda received for this Invitation to Bid.** All addenda will be posted on the City website at [www.newarkde.gov/bids](http://www.newarkde.gov/bids). After the bids have been received, no claim that the bidder did not have complete information will be considered. No verbal agreement or conversation with any officer, agent or employee of the City, either before or after the execution of this contract, shall affect or modify any of the terms or conditions outlined herein.

11. **TIME OF COMPLETION AND LIQUIDATED DAMAGES**

Contractor shall commence work on a date to be specified by the City in a written "Notice to Proceed" and to fully complete all work under this contract on or before the noted completion date. The contract duration is 180 calendar days from the notice to proceed. Liquidated damages of \$200.00 per day may be assessed to the Contractor by the City for each day the contract is extended beyond the completion date. Such damages shall be payable to the City immediately upon notice of a breach of contract completion timelines. Liquidated damages shall not be considered a penalty, but rather a reasonable estimate of the damages that would be suffered by the City in the event of a breach. The City and the contractor shall acknowledge that the actual damages resulting from a breach may be difficult to ascertain and that this provision represents a reasonable estimation of such damages. This provision shall not limit the City's right to pursue any other remedies available

under law or equity.

## **12. LIABILITY INSURANCE**

- a. The Contractor shall at all times maintain and keep in force such insurance as will protect him from claims under Worker's Compensation Acts, and also such insurance as will protect him and the owner from any such claims for damages for personal injuries, including death, which may arise from operations under this contract, whether such operations be by the Contractor or by any Subcontractor or anyone directly or indirectly employed by any of them.
- b. The Contractor shall be required to provide Workers' Compensation (WC)/Employer's Liability (EL) coverage with limits of insurance not less than:

\$1,000,000 Per Accident  
\$1,000,000 Per Illness, Employee  
\$1,000,000 Per Illness, Aggregate

The Contractor shall be required to provide Contractors Professional Liability coverage with limits of insurance not less than (requests for waivers of Contractors Professional Liability coverage will be considered by the City on a case-by-case basis):

\$1,000,000 Per Claim  
\$1,000,000 Per Aggregate

The Contractor shall be required to provide Umbrella/Excess Liability coverage with limits of insurance not less than:

\$3,000,000 Each Occurrence  
\$3,000,000 Aggregate

The Contractor shall be required to provide Commercial General Liability (CGL) coverage with limits of insurance not less than:

\$1,000,000 Each Occurrence Limit  
\$1,000,000 Personal & Advertising Injury Limit  
\$2,000,000 Annual Aggregate Limit  
\$2,000,000 Products-Completed Operations Limit  
\$1,000,000 Business Auto Liability Limit (Owned, Hired, & Non-Owned Autos)

The Contractor, The City of Newark (Owner) and all other parties required of the Contractor shall be included as insured on the CGL, using Additional Insured



Endorsements providing coverage as broad as the coverage provided for the named insured Subcontractor.

Subcontractors approved in association with the hiring of a Contractor shall be required to provide Commercial General Liability (CGL) coverage with limits of insurance in equal amount to those required of the Contractor.

- c. A copy of the Certificate of Insurance must accompany each bid. The Contractor shall ensure that all insurances required remain valid for the entire term of the contract, inclusive of any term extension(s) and retroactive if claim is made afterward. The Prime Contractor's attention should be directed to other sections of the contract documents in the event additional insurance is required based on the scope of work.

**13. APPROVAL**

The contractor shall receive approval in writing from the City before ordering any material for work to be done under this contract.

**14. STANDARDS AND WARRANTY OF TITLE**

No material, supplies, or equipment to be installed as part of the work shall be purchased subject to any chattel mortgage or under a conditional sale or other agreement by which any interest therein or in any part thereof is retained by the seller or supplier. The contractor shall warrant good title to all material, supplies, and equipment installed or incorporated in the work and upon completion of all work, shall deliver the same together by him to the City free from any claims, liens or charges. Neither the contractor nor any person, firm or corporation furnishing any material or labor covered by this contract shall have any right to a lien upon any improvement or appurtenance thereon. Nothing contained in this paragraph, however, shall defeat or impair the right of persons furnishing materials or labor to recover under any bond given by the contractor for their protection or any right under any law permitting such persons to look to funds due the contractor in the hands of the City. The provisions of this paragraph shall be inserted in all the subcontracts and material contracts and notice of its provisions shall be given to all persons furnishing materials for the work when no formal contract is entered into for such materials.

All equipment shall be unused in all component parts and will be the latest current production including all accessories. The specifications will be construed as the minimum required. When the manufacturer's standards exceed these, the standard units will be furnished. All material will be free of defects. Manufacturer's standard warranties shall apply.

**15. GUARANTEE**

The contractor hereby guarantees all work for a period of two years after the date of completion and final acceptance thereof by the City as follows:

- a. Against all faulty or imperfect materials and against all imperfect, careless, and/or unskilled workmanship.
- b. The contractor agrees to replace with proper workmanship and materials, and to re-execute, correct or repair without cost to the City, any work which may be found to be improper or imperfect and/or which fails to perform as specified.
- c. The guarantee obligations assumed by the contractor under these contract documents shall not be held or taken to be in any way impaired because of the specifications, indication or approval by or on behalf of the City of any articles, materials, means, combination of things used or to be used in the construction, performance and completion of the work or any part thereof.
- d. No use or acceptance by the City of the work or any part thereof, nor any failure to use the same nor any repairs, adjustments, replacements, or corrections made by the City due to the contractor's failure to comply with any of his obligations under the contract documents, shall impair in any way the guarantee obligations assumed by the contractor under these contract documents.

**16. EEO AND LICENSING**

The contractor shall be licensed to do business in the State of Delaware and shall be registered as a contractor in the City of Newark and possess all other required licenses. The contractor shall also be a fair and equal opportunity employer.

**17. PREFERENCE FOR DELAWARE LABOR**

According to State law, any person, company or corporation who violates the requirements of Title 29, Section 6962, of the Delaware Code regarding preference for Delaware Labor shall pay a penalty to the State Secretary of Finance equal to the amount of compensation paid to any person in violation of this Section. This regulation is waived if it is in conflict with Federal requirements.

**18. VENDOR REQUIREMENTS FOR FEDERALLY FUNDED PROJECTS**

This ITB is funded through a federal grant. As such, the awarded vendor and subcontractors must be registered at [www.sam.gov](http://www.sam.gov) before contract agreements are signed. The awarded vendor and subcontractors must also show proof of SAM registration and good standing through the SAM portal before contract agreements are signed. SAM (System for Award Management) is the primary supplier database for the U.S. Federal Government.

The City of Newark shall not conduct business with vendors that are debarred or otherwise flagged/blacklisted if the project is funded using federal money. If a vendor or subcontractors are determined to be debarred at any point during the term of a contract, this will be seen as grounds for termination of the contract, and potentially grounds for termination from other contracts held with the City, if any.

**19. NONCOLLUSION**

The bidder shall not, either directly or indirectly, enter into any agreement, participate in any collusion, or otherwise take any action in restraint of free competitive bidding in connection with this contract.

**20. EXCEPTIONS & OMISSIONS**

Any and all exceptions which are taken to the specifications and terms and conditions outlined herein shall be noted in the space provided on the proposal form. The listing of any exception may be grounds for rejection of a bid.

Further, the bidder recognizes that the City of Newark is not in the business of preparing specifications, and any omissions in this ITB/RFP must be strictly addressed by the firm with the submittal of its proposal.

**21. INCREASE AND/OR REDUCTION OF ESTIMATED QUANTITIES**

- a. The contractor's attention is directed to the fact that the quantities indicated in this contract are approximate and may be increased or decreased by the engineer. An increase or a reduction in these quantities will in no way alter the unit prices bid by or paid to the contractor.
- b. The City shall also have the right to delete any portion of this contract or to update specific quantities as needed. Regardless of any changes, deletions, or additions authorized by the City, all work done or purchases made under this contract shall be

based on the unit prices stipulated by the contractor in his proposal.

**22. PAYMENT**

No invoice will be processed for payment until the goods and/or services have been delivered and verification is made that the specifications under this contract have been met. Progress payments, when requested, will be evaluated and approved for payment based on work completed to date. If applicable, upon written request from the Contractor, payment for material stored on site may be made at 50% of the material's invoice price; full payment will be made after the material is installed. Payment for all services complete or goods received will be made within thirty (30) days of final acceptance by the City.

The City of Newark will not disperse payment to any vendor via paper check. As such, all bidders acknowledge that electronic fund transfer (EFT) payments are acceptable. The successful bidder will be required to submit EFT payment information to the City at the time of contract execution.

**23. BASIS OF PAYMENT**

Payment for these items shall be included in the unit prices for each item as described in the Proposal. All other items, methods, and materials necessary to complete the work as described above shall be incidental to the bid item the work is being completed under.

**24. RETAINAGE**

The City will retain 5% of the progress payments until such time as the project is complete and accepted by the City.

**25. RELEASE OF LIENS**

The Contractor is required to provide documentation stating that all liens filed against the Contractor have been paid before the final 5% retainage is released to the Contractor.

**26. ADVERTISEMENT**

It is further agreed that any bidder/contractor submitting bids will not use the name of the City in any advertisement without first obtaining the written consent of the City Manager or their designee. All such requests should be submitted in writing to [contracts@newark.de.us](mailto:contracts@newark.de.us).

**27. CONTRACTOR'S UNDERSTANDING**

It is understood and agreed that the contractor has, by careful examination, satisfied himself as to the nature and location of the work, the conformation of the ground; the character, quality and quantity of the material which will be required; the character of equipment needed preliminary to and during the prosecution of the work; the general and local conditions; all permit restrictions and conditions; and all other matters which can in any way affect the work under this contract. No verbal agreement or conversation with any officer, agent, or employee of the City of Newark, either before or after the execution of this contract, shall affect or modify any of the terms or obligations herein contained.

**28. INTENT OF SPECIFICATIONS**

It shall be the Contractor's responsibility to furnish the goods and services specifically indicated in the scope of work and specifications and such other as may be required to meet the intent of the specifications, drawings, or as may be necessary to provide the operation intended by the City.

**29. LIST OF SUBCONTRACTORS' CERTIFICATION**

- a. Each bidder shall execute and submit with his bid, on the form provided herein, a list of subcontractors, including complete names and addresses, whose services the bidder intends to use in performing all work under the contract. Bids submitted without such a list, or with a list not completely or properly executed, are subject to rejection.
- b. Each bidder is required to notify all subcontractors that they are obligated to comply with the provisions of Federal and State law as they pertain to this project, and that they must submit evidence of such compliance upon notice or request. The bidder shall certify his compliance with this requirement on the list of subcontractors.
- c. After the contract has been awarded, the successful bidder shall not substitute another subcontractor for any subcontractor whose name was set forth on the list of subcontractors which accompanied his bid, without the written consent of the City.

**30. INDEMNIFICATION**

The contractor shall solely be responsible and liable for the accuracy and completeness of all work performed and shall agree to indemnify, defend and hold harmless the City of Newark, its officers, agents and employees, from and against any and all claims, actions, suits

and proceedings arising out of, based upon or caused by negligent acts, omissions or errors of or the infringement of any copyright of patent, by the contractor, its officers, agents, employees or subcontractors, in the performance of the contracted agreement.

**31. TERMINATION OF AGREEMENT**

This agreement may be terminated by the City upon thirty (30) days written notice if the contractor fails to perform satisfactorily in accordance with the terms and conditions of the contract. In the event this agreement is terminated, the contractor shall be paid for services satisfactorily rendered up to the termination date.

**32. FAMILIARITY WITH PROPOSED WORK**

A complete understanding of the conditions as they exist is required by careful personal examination of the work at the site. Each contractor bidding must completely satisfy himself as to the exact nature and existing conditions of the work area. The contractor also shall carefully examine the plans, specifications, and the contract forms for the work contemplated. Failure to do so will not relieve the successful contractor of his obligation to carry out the provisions of the contract.

The contractor shall not, at any time after the execution of the contract, set up any claims whatsoever based upon insufficient data or incorrectly assumed conditions, nor shall claim any misunderstanding in regard to the nature, conditions or character of the work to be done under this contract, and shall assume all risks resulting from any change in the conditions which may occur during the progress of the work.

The Contractor is solely responsible to identify, obtain, and pay for all required permits, licenses, and approvals required by any and all State, local, or Federal authorities or governmental agencies to complete the Work.

**33. FINAL INSPECTION**

All delivered goods and services will be subject to inspection by the City of Newark, Delaware. If in any way an item fails to meet the terms of the contract, it may be rejected or liquidated damage charges made. The decision of the City will be final, and any rejected items or materials will have to be replaced at the expense of the vendor.

**34. OWNERSHIP OF MATERIAL**

All documents prepared and submitted pursuant to this RFP or ITB shall be property of the City upon submittal and will be subject to staff and public review and discussion in

association with our public bidding and formal proposal process. Any information or documents deemed proprietary shall be so marked at time of submittal and limited to detail where the disclosure of contents could be prejudicial to competing offerors during the process of negotiation, and any commercial or financial information of a privileged or confidential nature.

### **35. REGULATIONS AND EXCEPTIONS**

The application of lead paint as defined in Title 16, Chapter 30M of State Code and Chapter 7 of City Code as part of this contract is prohibited. The contractor will be subject to fines as outlined in State and City Code if it is determined that lead paint was applied in violation of State and City code.

Safety Data Sheet information for all paints applied to internal or external structures shall be provided to the City for review and approval prior to application. The contractor will be required to remove and remediate any lead paint to the satisfaction of the City, at no cost to the City. Prior to commencing removal and remediation efforts, the contractor shall provide a written remedial action plan which includes health safety protection requirements for both employees and the public for review and approval by the City and/or DNREC/DHSS. Any and all sample results that are generated as a result of improper application of lead paint shall be provided to the City within 5 working days of being received by the contractor. The contractor will also be required to replace all paint removed with non-lead paint to the satisfaction of the City, and at no cost to the City.

Failure to adequately remove, remediate, and replace lead paint applied in violation of State and City Code as outlined herein will be considered a breach of contract.

### **36. FORCE MAJEURE OCCURRENCE**

Upon the occurrence of a force majeure event, the City of Newark shall immediately notify the awarded vendor. In this instance, the City shall be excused from any further financial or contractual obligations for as long as such circumstances prevail. As used in this document, a "force majeure occurrence" means acts of God; acts of the public enemy; acts of the State and any other governmental entity in its sovereign or contractual capacity; fires; floods; epidemics or pandemics; quarantine restrictions; strikes or other labor disputes; freight embargoes; unusually severe weather; or other unusual event outside of the reasonable control of a party hereto that prevents a party to this Agreement from performing its contractual obligations.

### **37. SEVERABILITY**

If any provision of this contract (general, special, technical, or other) shall be held to be invalid or unenforceable for any reason, the remaining provisions shall continue to be valid and enforceable. If a court finds that any provision of this contract is invalid or unenforceable, but that by limiting such provision it would become valid and enforceable, then such provision shall be deemed to be written, construed, and enforced as so limited.

**38. BIDDER'S QUALIFICATIONS**

No contract will be awarded to any bidder who in the judgment of the City is not a responsible or fit bidder, or is not prepared with all the necessary experience, capital, organization, and equipment to conduct and complete the work for which the bidder proposes on the proposal form.

**39. SAFETY REQUIREMENTS**

The Contractor shall comply with the requirements and standards of the Occupational Safety and Health Act (OSHA) and all other state and local laws, ordinances, and codes governing all work associated with the executed contract.

**40. RESTORATION OF DISTURBED AREAS AND CLEAN UP**

Upon completion of the work, all related work, such as lawns, curbs, sidewalks, fences, shrubbery, and driveways that have been disturbed shall be restored to their original condition and in accordance with City of Newark Standards and Specifications. The area shall be cleared of all tools, equipment and refuse resulting from the project. The contractor shall, at the end of each day, leave the areas in which he has worked, free of debris and safely secure his material and equipment.

**41. DEBRIS COLLECTION AND DISPOSAL**

The Contractor is responsible for collection, removal, transport, and lawful disposal of construction debris and or materials.

**42. INSPECTION OF MATERIAL AND WORK**

- a. Workmanship shall be of good quality and all work and material shall be at all times subject to the inspection of the City of Newark or their duly authorized representatives. The Contractor shall provide reasonable and necessary facilities for such inspection. If required by the City of Newark, the contractor shall take down or uncover portions of the finished work.



- b. The Contractor agrees that in case any of the material or work, or both, shall be rejected as defective or unsuitable by the city, material and the work shall be done again immediately to the satisfaction and approval of the city at the cost and expense of the Contractor.
- c. Any omission or failure on the part of the City of Newark or inspectors to disapprove or reject any defective work or materials shall not be construed to be an acceptance of any defective work or material.
- d. In case the City should not consider the defect of sufficient importance to require the contractor to replace any imperfect work or materials, the City shall have the power to make an equitable deduction from the stipulated price.
- e. Neither the inspection nor supervision of the work, nor the presence or absence of an inspector shall relieve the contractor of any of his obligations under the contract or of making his work conform to the specifications.

**43. REFERENCES**

Bidders must provide three (3) business references consisting of current or previous (within the last five (5) calendar years) customers where similar services are/were provided.

**44. COUNTERPARTS AND ELECTRONIC SIGNATURE**

The Agreement with the awarded vendor may be executed in counterparts, each of which shall be deemed an original, but which together shall constitute one and the same document. Through submission of a proposal in response to this ITB, vendors understand and agree that they have the right to execute an Agreement through paper or through electronic signature technology, which is in compliance with state and federal law governing electronic signatures. Vendors submitting a proposal in response to this ITB additionally agree that, to the extent they sign electronically, their electronic signature is the legally binding equivalent to their handwritten signature and shall be considered an original signature on an original document, including when transmitted as a PDF file. No vendors submitting a proposal in response to this ITB shall claim that a party's electronic signature is not legally binding, or object to the admissibility of an Agreement with the City in any legal proceeding.

**45. ITEMS TO BE EXECUTED AND SUBMITTED WITH BID**

Bidders are notified that the proposal, insurance documentation, and bid security must be executed and completed in full and submitted with the bid at the time of bidding, or bid may be subject to rejection.

The bidder shall submit the following with the bid:

- A. Proposal
- B. Executed Bid Bond or Cashier's Check
- C. Acknowledgement of Addendum(a)
- D. [www.sam.gov](http://www.sam.gov) information
- E. Exceptions or qualifications to the ITB documents
- F. List of subcontractors
- G. References
- H. Non-collusion statement

**46. ITEMS TO BE SUBMITTED WITH SIGNED CONTRACT**

- A. Construction Schedule
- B. Performance/surety bond
- C. Insurance documentation showing required coverages and the City of Newark as the certificate holder

CITY OF NEWARK

Delaware

INVITATION TO BID NO. 24-13

SOUTH COLLEGE INTERCONNECTION  
BOOSTER STATION REPLACEMENT

SCOPE OF WORK

**1. SCOPE OF WORK**

The South College Interconnection Booster Station Replacement project includes, but is not limited to, the construction of the proposed prefabricated potable water booster station shown on the attached drawings.

**2. LOCATION**

The project is located to the east of South College Avenue and just south of the Amtrak Railroad lines adjacent to Newark Train Station and the Delaware Agricultural Farm.

**3. PERMITS, CERTIFICATIONS, LAWS AND ORDINANCES**

The Contractor shall perform the work in accordance with all local, state and federal laws and ordinances.

The Contractor is required to have or obtain a City Contractor's License and State of Delaware business license prior to starting the work. The Contractor is required to obtain any permits required for completion of the work. The fees for City of Newark permits, if applicable, will be waived.

**4. COORDINATION**

- A. Contractor shall coordinate construction operations with those of other contractors and entities to ensure efficient and orderly installation of each part of the Work. Contractor shall coordinate its operations with operations that depend on each other for proper installation, connection, and operation.
- B. Schedule construction operations in sequence required to obtain the best results where

installation of one part of the Work depends on installation of other components, before or after its own installation.

- C. Coordinate removal of different components to ensure maximum performance and accessibility for required maintenance, service, and repair.
- D. Coordinate with the City to detour pedestrian access to the project site.

## **5. SUBMITTALS**

The Contractor shall submit an **electronic copy** of each submittal for review and approval by the Owner. Provide submittals in accordance with specifications. For scheduling purposes, the Contractor shall allow for a ten (10) business day review time by the Owner. Comments and Approvals will be returned in a digital format. The Contractor shall provide, at minimum, all submittals identified in the specifications. Each shop drawing shall contain only one work item and shall be consecutively numbered before submission. Additional submittals may be requested at the discretion of the Owner.

## **6. RESTORATION**

The Contractor is responsible to restore all disturbed areas to original or better condition and remove all debris, residuals, trash, and excess materials from the sites.

## **7. SECURITY AND SITE ACCESS**

The Contractor is responsible for security of his equipment and materials related to the work. The Contractor is responsible to maintain the work site in a safe and orderly manner.

Contractor is required to maintain a secure perimeter around the work area. Pedestrian walkways shall be always open except where indicated on the project plans.

- A. Walkways and Entrances: Keep walkways and entrances outside of designated laydown and work area clear and accessible at all times. Do not use these areas for parking or storage of materials.
- B. Schedule deliveries to minimize disruption to walkways and entrances not within the limits of disturbance shown on the project plans.
- C. Schedule deliveries to minimize space and time requirements for storage of materials and equipment on-site.

Prior to mobilization, the Contractor shall take a pre-construction video or photographs of any such areas to be used for access, staging, or work during the project and submit to the Owner. Video or photographs shall be used to document any existing damage or deteriorated conditions.

It shall be the responsibility of the contractor to obtain permission from any neighboring property owner if said contractor finds it necessary to enter upon or use in any manner the property of any neighbor for the expedition of the contractor's work.

## **8. WORK RESTRICTIONS**

- A. Comply with limitations on use of public streets and with other requirements of authorities having jurisdiction.
- B. On-Site Work Hours: Limit work at the site to normal business working hours of 7:00 a.m. to 5:00 p.m., Monday through Friday, unless otherwise indicated or approved by City of Newark.
- C. Weekend Hours: Weekend hours must be approved by the City. Contractor must submit request to work on weekends at least 5 business days in advance of the projected work date.
- D. Existing Utility Interruptions: Do not interrupt utilities serving facilities occupied by Owner or others unless permitted under the following conditions and then only after providing temporary utility services according to requirements indicated:
  - 1. Notify Owner not less than five days in advance of proposed utility interruptions.
  - 2. Obtain Owner's written permission before proceeding with utility interruptions.
- E. Noise, Vibration, and Odors: Coordinate operations that may result in high levels of noise and vibration, odors, or other disruption with Owner.
  - 1. Notify Owner not less than two days in advance of proposed disruptive operations.
  - 2. Obtain Owner's written permission before proceeding with disruptive operations.
- F. Controlled Substances: Use of tobacco products and other controlled substances on Project sites is not permitted. See Office of Management and Budget – Drug Testing Requirements for further information regarding controlled substances.
- G. Contractor shall have contaminant spill response equipment readily available on-site during construction activity.

## **9. SITE CONSTRUCTION AND EXISTING UTILITIES**

- A. The Contractor is responsible to account for and consider existing site conditions and existing utilities. Prior to starting any work, the Contractor shall contact Miss Utility of Delmarva at 1-800-282-8555 for a utility mark out. The Contractor is responsible for locating and protecting existing utilities for the duration of the work.
- B. The failure to show on the contract drawings any existing utilities shall not relieve the

contractor of his responsibility in determining the locations of utilities.

- C. Any damage done to existing utility lines, services, poles and structures shall be repaired or replaced by the Contractor at his own expense. The Contractor shall notify all possible owners of utilities in the areas where work is to be done and the schedule and extent of such work.

#### **10. EXAMINATION OF SITE, DRAWINGS, ETC.**

Before submitting proposals, bidders shall inform themselves fully of the nature of the work by a personal examination of the site and the drawings and by such other means as they may prefer or consider necessary, as to matters, conditions and considerations bearing on or in any way affecting the preparation of their proposals and the contract. They shall not, at any time after submission of the proposal, dispute the accuracy of such drawings or the specifications and the general conditions nor assert that there is any misunderstanding in regard to the location, extent or nature of the work to be performed.

Existing drawings and information provided in these contract documents and appendices form a part of the Bid Specification to the extent referenced and provide detailed information about the project. The documentation is provided for informational purposes only and for the sole use of the Contractor. The City makes no claims as to the correctness or accuracy of the data provided therein. The Contractor shall review and determine for themselves the correctness and accuracy of the information before incorporating and relying on the prior work as part of their work product to the City.

#### **11. STARTING DATE, SEQUENCE OF CONSTRUCTION & COMPLETION DEADLINE**

The starting date of this contract will be as specified by the City in a written "Notice to Proceed." A preconstruction meeting shall be scheduled to finalize the sequence of construction. The final decision as to sequence of construction shall be that of the Owner.

#### **12. SUPERVISION OF WORK AND COORDINATION**

The Contractor shall supervise the work and shall secure full cooperation of all subcontractors, if any, to complete the work with a minimum interference from the operating personnel of the Owner.

#### **13. COORDINATION WITH THE OWNER**

The Contractor shall coordinate all activities with the Owner. The Contractor shall provide the City with reasonable time to respond to requests for information and for coordination.

#### **14. INSPECTION OF MATERIAL AND WORK**

- A. Workmanship shall be of good quality and all work and material shall be at all times subject to the inspection of the City of Newark or their duly authorized representatives. The contractor shall provide reasonable and necessary facilities for such inspection. If required by the City, the contractor shall take down or uncover portions of the finished work.
- B. The contractor agrees that in the event that any of the material or work, or both, shall be rejected as defective or unsuitable by the City, the material shall be replaced and the work shall be done again immediately to the satisfaction and approval of the City at the cost and expense of the Contractor.
- C. Any omission or failure on the part of the City of Newark or its inspectors to disapprove or reject any defective work or materials shall not be construed to be acceptance of any defective work or material.
- D. Contractor and City Inspector must agree on additional work required outside of the contract documents. A daily time and material log for all additional work shall be supplied by the contractor and signed by the City Inspector.

#### **15. PROTECTION TO PUBLIC AND PROPERTY**

- A. The contractor shall insure protective measures to the general public and to occupants of property along and adjacent to the work area.
- B. The contractor is responsible for any and all damage or injury of any kind which directly or indirectly may be done to any property or sustained by any persons during the execution of the work.
- C. If any direct or indirect damage or injury is done to public or private property by or on account of any act, omission, neglect or misconduct in the execution of the work, the contractor shall restore at his own expense such property to a condition similar or equal to that existing before such damage or injury was done by repairing, rebuilding or otherwise restoring as may be directed, or he shall make good such damage or injury in an acceptable manner.

#### **16. SAFETY PRECAUTIONS**

- A. The Contractor shall execute work under this contract with the utmost concern for the safety of the general public. All areas worked upon and subject to travel by the public shall be identified with the proper warning indicators and signs during the working period. Upon completion of the contract or when such areas are reopened to public travel, they shall be rendered in a safe condition using either temporary or permanent repair material as the case may be. No private driveway shall be blocked or closed without the property owner being notified and obtaining their agreement.
- B. Streets, roads, and driveways used by the contractor for access to and from the work site shall be protected from damage in excess of that caused by the normal traffic of vehicles used for or in connection with construction work. Any such damage done shall be repaired

immediately and left in good condition at the end of the construction period and shall be repaired at the contractor's expense.

**17. RIGHT-OF-WAY**

All operations shall be confined to the assigned work area. The City will provide no right-of-way over other properties. The contractor shall take every precaution to minimize the inconvenience to the owners or tenants of adjacent property. Public roads shall not be obstructed in such a way as to cut off traffic. The contractor shall, at his own expense, repair any damage or injury to either public or private property during the progress of the work.

**18. TRAFFIC CONTROL AND ROAD SIGNS**

- A. The contractor shall be responsible for traffic control for the duration of the project, as needed, and shall coordinate traffic control plans and obtain necessary permits from the Owner for work on city-owned roads. The contractor shall be responsible for removal and re-installation of all signs in the work area. Signs necessary for the safe movement of traffic shall be maintained in operation during construction. Any other signs shall be properly stored by the Contractor, who shall be responsible for them. All signage shall comply with the current Manual on Uniform Traffic Control Devices (MUTCD).
- B. The Contractor shall provide notice to the City seven (7) calendar days in advance of any planned road or entrance closure. All closures shall be at the discretion of the City.

**19. JOB SITE MAINTENANCE, RESTORATION AND CLEANUP**

The contractor is responsible to restore all disturbed areas to original or better condition and remove all debris, residuals, trash, and excess materials from the site. The contractor is required to keep the work area clean during construction and remove trash as it accumulates. Roads shall be kept clean and free of mud, debris, and dirt. At the direction of the City Inspector, the contractor is responsible for the cost of street sweeping and maintenance required for upkeep of clean road surfaces.

**20. DRAWINGS**

Project Drawings are included as Attachment 1.

**21. AVAILABLE BACKGROUND INFORMATION**

Maps, photographs, closed circuit television (CCTV) inspection videos, and other documents provided herein form a part of this Bid Specification to the extent referenced and provide



detailed information about the Project Location, and existing conditions of the site(s). The documentation is provided for informational purposes only and for the sole use of the Contractor. The City makes no claims as to the correctness or accuracy of the data provided therein. The Contractor shall review and determine for themselves the correctness and accuracy of the information before incorporating and relying on the prior work as part of their work product to the City.

CITY OF NEWARK

Delaware

INVITATION TO BID NO. 24-13

SOUTH COLLEGE INTERCONNECTION  
BOOSTER STATION REPLACEMENT

PROPOSAL

To: City of Newark Mayor and City Council

From: \_\_\_\_\_

We, the undersigned as a lawfully authorized agent for the bidder named herein has carefully examined the Bid Documents to be known as Invitation to Bid No. 24-13 and binds themselves on award to the City of Newark by the Mayor and City Council of Newark, Delaware to execute in accordance with such award, a contract of which this Proposal and said General Provision, Specifications, and any Addenda shall be a part, and to furnish the goods as specified F.O.B. destination (Newark, Delaware) in a manner that is in complete accordance with said General Provisions and Specifications at the following named unit price on or before the delivery period stated below:

**1. BID ITEMS**

Bidders must provide prices on the Proposal form including all adjustment bid items. The Owner reserves the right to delete from the Contract one or more items listed and the right to add or subtract from the quantity of each item. The total price to be paid will be adjusted in accordance with the Contractor's unit prices as required above. There will be no extra compensation or increase in unit prices in the Proposal if such additions and/or deletions are made to quantities. **The Contractor must submit their schedule of values for each lump sum bid item with their bid.**

**2. BASIS OF PAYMENT**

Payment for these items shall be included in the unit prices for each item as described in the Proposal. All other items, methods, and materials necessary to complete the work described in each pay item shall be incidental to the bid item the work is being completed under.

**2. METHOD OF MEASUREMENT AND INCIDENTALS DETERMINATION**

The measurement of payment shall be for the removal, disposal, and installation of the materials listed in the Proposal in accordance with the units indicated below. All work

required to complete the work outlined in the proposal shall be incidental to the unit cost provided for the item the work is being conducted under.

- A. **Bid Item 1 – Site Improvements:** The lump sum cost for the site improvements shown on the plans which include but are not limited to the proposed fence and concrete installation, and electric work. This bid item includes all costs for the scope of work items shown on the plans and any and all incidental costs required to complete the project per the contract documents.
- B. **Bid Item 2 – Prefabricated Booster Station:** The lump sum cost for the construction of the proposed prefabricated booster station as shown on the project plans including any coordination required with Allied Control Services, Inc. (ACS). This bid item includes all costs for the scope of work items shown on the plans and any and all incidental costs required to complete the project per the contract documents.
- C. **Bid Item 3 – System Integrator Allied Control Services, Inc (ACS):** The lump sum cost for system integrator services, as detailed in the contract specifications and project plans shall be furnished by the Contractor through the City’s approved vendor Allied Control Services, Inc.

| Bid Item          | Item Description              | Units | Quantity | Unit Price | Total |
|-------------------|-------------------------------|-------|----------|------------|-------|
| 1                 | Site Improvements             | LS    | 1        |            |       |
| 2                 | Prefabricated Booster Station | LS    | 1        |            |       |
| 3                 | Integration                   | LS    | 1        |            |       |
| <b>Total Bid:</b> |                               |       |          |            |       |

Project to be Completed by \_\_\_\_\_

DATE: \_\_\_\_\_ BIDDER: \_\_\_\_\_

By: \_\_\_\_\_

Legally authorized representative

PRINT NAME: \_\_\_\_\_

TITLE: \_\_\_\_\_

ADDRESS: \_\_\_\_\_

CITY, STATE, ZIP: \_\_\_\_\_

TELEPHONE: \_\_\_\_\_

CITY OF NEWARK  
Delaware

INVITATION TO BID NO. 24-13

SOUTH COLLEGE INTERCONNECTION  
BOOSTER STATION REPLACEMENT

PROPOSAL (CONT.)

We acknowledge that we **are/are not** (circle one) registered on [www.sam.gov](http://www.sam.gov). We also acknowledge that there are no exceptions noted against us as outlined on [www.sam.gov](http://www.sam.gov).

Our unique entity identifier (UEI), as outlined on [www.sam.gov](http://www.sam.gov) is (write N/A if none): \_\_\_\_\_

We acknowledge receipt of addendum(a) numbers: \_\_\_\_\_

Exceptions: \_\_\_\_\_

\_\_\_\_\_

Contact Information for Notice of Award/Rejection (If different from below): \_\_\_\_\_

\_\_\_\_\_

Project to be completed within 180 days from the Notice to Proceed.

BIDDER: \_\_\_\_\_ DATE: \_\_\_\_\_

SUBMITTED BY:

\_\_\_\_\_  
Legally Authorized Representative Signature

\_\_\_\_\_  
Print Name

\_\_\_\_\_  
Title

\_\_\_\_\_  
Address Line 1

\_\_\_\_\_  
Email Address

\_\_\_\_\_  
Address Line 2

\_\_\_\_\_  
Telephone Number

\_\_\_\_\_  
City, State, ZIP Code

CITY OF NEWARK

Delaware

INVITATION TO BID NO. 24-13

SOUTH COLLEGE INTERCONNECTION

BOOSTER STATION REPLACEMENT

BOND TO ACCOMPANY PROPOSAL

**(Not Required if Certified or Cashier's Check is Used)**

KNOW ALL MEN BY THESE PRESENTS THAT \_\_\_\_\_  
of \_\_\_\_\_ in the County of \_\_\_\_\_  
and State of \_\_\_\_\_ Principal, and \_\_\_\_\_  
of \_\_\_\_\_ as surety, legally authorized to do business in the State of  
Delaware, are held and firmly bound unto the City of Newark in the sum of \_\_\_\_\_  
\_\_\_\_\_ Dollars, to be paid to said City of Newark for use and benefit of the Mayor and City Council of  
Newark, for which payment well and truly to be made, we do bind ourselves, our and each of our heirs,  
executors, administrators, and successors, jointly and separately, for and in the whole, firmly by these  
presents. Sealed with our seals, dated the day of \_\_\_\_\_ in the year of our Lord, Two Thousand  
Twenty Four (2024).

NOW THE CONDITIONS OF THIS OBLIGATION ARE SUCH, that if the above noted bound principal  
\_\_\_\_\_ who has submitted to said City of Newark, a certain  
proposal to enter into a certain contract from Invitation to Bid No. 24-13, South College Interconnection  
Booster Station Replacement shall be awarded said Contract, and if said \_\_\_\_\_  
\_\_\_\_\_ shall well and truly enter into and execute said contract and furnish therewith such surety bond  
or bonds as may be required by the terms of said contract and approved by said City of Newark, said  
notice of award thereof in accordance with the terms of said proposal, then this obligation to be void,  
otherwise shall remain in full force and virtue.

(See next page)

CITY OF NEWARK

Delaware

INVITATION TO BID NO. 24-13

SOUTH COLLEGE INTERCONNECTION

BOOSTER STATION REPLACEMENT

BOND TO ACCOMPANY PROPOSAL (CONT.)

SIGNED AND SEALED IN THE PRESENCE OF:

\_\_\_\_\_  
Witness (Print)

\_\_\_\_\_  
Witness (Signature)

SIGNED (#1): \_\_\_\_\_ (SEAL)  
(Signature)

BY (#1): \_\_\_\_\_ (SEAL)  
(Print)

SIGNED (#2): \_\_\_\_\_ (SEAL)  
(Signature)

BY (#2): \_\_\_\_\_ (SEAL)  
(Print)

CITY OF NEWARK  
Delaware

INVITATION TO BID NO. 24-13

SOUTH COLLEGE INTERCONNECTION  
BOOSTER STATION REPLACEMENT

NON-COLLUSION STATEMENT

Date: \_\_\_\_\_

City of Newark, Delaware

This is to certify that the undersigned bidder \_\_\_\_\_

Has not, either directly or indirectly, entered into any agreement, participated in any collusion, or otherwise taken any action in restraint of free competitive bidding in connection with this proposal submitted to the City of Newark, Delaware on the \_\_\_\_\_ day of \_\_\_\_\_, 20\_\_\_\_.

BY LEGALLY AUTHORIZED REPRESENTATIVE:

\_\_\_\_\_  
(Signature)

\_\_\_\_\_  
(Print)

Sworn to and subscribed before me on this \_\_\_\_\_ day of \_\_\_\_\_, 20\_\_\_\_.

NOTARY PUBLIC:

\_\_\_\_\_  
(Signature)

\_\_\_\_\_  
(Print)

My Commission expires:

\_\_\_\_\_

CITY OF NEWARK  
Delaware

INVITATION TO BID NO. 24-13

SOUTH COLLEGE INTERCONNECTION  
BOOSTER STATION REPLACEMENT

LISTING OF SUBCONTRACTORS

The submitting bidder shall fill in the following listing of all subcontractors they intend to use in the performance of the work outlined herein. No subcontractor shall be substituted for any listed below without the written consent of the City of Newark. The submitting bidder hereby certifies that they have notified all subcontractors that they are obligated to comply with the provisions of this Invitation to Bid, including liability insurance coverage requirements, and all other federal or state laws as they pertain to this project. The submitting bidder shall submit evidence of such compliance upon notice of request.

1. Subcontractor name: \_\_\_\_\_

Address: \_\_\_\_\_

Type of work: \_\_\_\_\_

2. Subcontractor name: \_\_\_\_\_

Address: \_\_\_\_\_

Type of work: \_\_\_\_\_

3. Subcontractor name: \_\_\_\_\_

Address: \_\_\_\_\_

Type of work: \_\_\_\_\_



CITY OF NEWARK

Delaware

INVITATION TO BID NO. 24-13

SOUTH COLLEGE INTERCONNECTION  
BOOSTER STATION REPLACEMENT

LISTING OF SUBCONTRACTORS (CONT.)

4. Subcontractor name: \_\_\_\_\_

Address: \_\_\_\_\_

Type of work: \_\_\_\_\_

Date: \_\_\_\_\_ Bidder: \_\_\_\_\_

Address: \_\_\_\_\_

\_\_\_\_\_

Telephone #: \_\_\_\_\_

Email address: \_\_\_\_\_

Legally authorized representative: \_\_\_\_\_  
(Signature)

\_\_\_\_\_  
(Print)

CITY OF NEWARK  
Delaware

INVITATION TO BID NO. 24-13

SOUTH COLLEGE INTERCONNECTION  
BOOSTER STATION REPLACEMENT

REFERENCES SHEET

Provide the following information for to 24-13 references who will attest to your company's ability to undertake and complete this type of work. Information denoted here must be clearly printed or typed.

1. Reference name: \_\_\_\_\_

Address: \_\_\_\_\_

Telephone #/email: \_\_\_\_\_

2. Reference name: \_\_\_\_\_

Address: \_\_\_\_\_

Telephone #/email: \_\_\_\_\_

3. Reference name: \_\_\_\_\_

Address: \_\_\_\_\_

Telephone #/email: \_\_\_\_\_

## **PART 1 GENERAL**

### **1.1 Scope.**

- A. The Contractor shall furnish and install a factory built, above grade, skid-mounted, water booster pumping system. The pumping system shall be complete with all the necessary internal piping, pumps, motors, valves, control, and other necessary appurtenances installed on a fabricated steel base as shown on the plans and specified herein.
- B. The water booster system shall be complete to the extent specified herein and shall not require field assembly. To ensure total quality control, the complete unit shall be fabricated, assembled, and tested in-house by the station manufacturer.
- C. The water booster pumping system basis of design is manufactured by USEMCO, Inc. located in Tomah, WI.

### **1.2 Quality Assurance**

- A. The manufacturer of the selected equipment shall be regularly engaged in the manufacture, assembly, construction, start-up, and maintenance of water distribution equipment of the type required for this project and possess at least 25 years of successful experience in providing stations of the type, design, function, and quality as required for this project.
- B. The pump station manufacturer shall be required to affix an Underwriters Laboratories (UL) label attesting to its compliance with the UL-QCZJ standard for packaged pumping stations.
- C. All welding shall be in accordance with standard AWS practices, with proper fillet section and continuity to assure a sound, watertight structure. All welds shall be sound and free from embedded scale or slag, shall have tensile strength across the weld not less than that of the thinner of the connected sections, and shall be watertight. All welds in contact with soil or water shall be tested with a dye penetrant to assure the watertight integrity of the weld system.

### **1.3 Permits, Inspections, and Codes.**

- A. Contractor shall file all drawings, pay all fees and obtain permits and certificates of inspection relative to this work. The Contractor shall arrange inspections with the proper authorities and include costs of inspection in his bid.
- B. Completed installation shall conform to all applicable federal, state, and local laws, codes and ordinances.
- C. Nothing in the drawings and specifications shall be construed to conflict with these laws, codes, and ordinances and these standards are hereby included in these specifications.

- D. The Contractor shall be familiar with local jurisdiction and conform with all applicable requirements.
- E. All packaged pumping systems shall be independently Third Party labeled as a system suitable for the intended use by a Nationally Recognized Testing Laboratory in accordance with OSHA Federal Regulators, and NFPA 70, National Electrical Code, Article 409.
- F. All components coming in contact with potable water shall be certified to meet NSF/ANSI 61.
- G. The pump station shall be ETL Labeled to conform to UL standard 508 and UL standard 778 or UL listed (QCZJ).

#### 1.4 **Warranty**

- A. The manufacturer of the pump station shall guarantee for a period of one year from the date station is placed into operation or eighteen months from the date of shipment, whichever occurs first, that the entire station and all equipment therein shall be free from defects in design, materials, and workmanship.
- B. In the event a component fails or is proven defective during the guarantee period, the manufacturer will provide a replacement part without cost, upon return of the defective part.
- C. Warranty shall include defects in the design, material, or construction of the Unit.

#### 1.5 **Submittals**

- A. Submit for engineer's review, four (4) copies of shop drawings, wiring diagrams, unit sizes, weights, performance requirements, and installation data.
- B. Shop drawings shall be submitted per the contract documents. Furnish catalog cut sheets or equipment manufacturer's computerized selection calculations clearly showing performance, dimensional data, rough-in dimensions, capacity, curves, pressure drop, code compliance, electrical data.
- C. Shop drawings will not be reviewed by the engineer unless they are clearly stamped by the contractor. Prior to submitting shop drawings check for dimensional correctness, interferences, electrical voltage coordination, and conformance to specifications and plans. Stamp drawings "approved" with date indicating coordination has occurred with the contract documents prior to release to engineer's review. Identify submittal with project name, equipment designation number, and specification section.
- D. Should any work occur before approved copies of shop drawings are received, the contractor will be responsible for removal or modification of work that does not comply with the specifications.
- E. Engineer's review of shop drawings does not relieve the contractor from responsibility for errors, omissions, deficiencies, or deviations from the contract drawings and specifications.

- F. The equipment submittal shall have a cover sheet with the name of the project and the equipment manufacturer's representative and contact information.
- G. The submittal shall include data sheets covering all individual components that make up the booster pump station and the UL file number under which the manufacturer is listed.
- H. Submittals shall include the following:
  - a. 11"x17" mechanical drawing
  - b. Booster pump station manufacturer's warranty
  - c. Catalogue cut sheets on each individual component that comprise the booster pump station
  - d. Copy of the manufacturer's UL label
  - e. Complete set of wiring schematics
  - f. Drawing of Control Panel Layout

#### 1.6 **Sequence of Operation**

- A. Basic Operation:
  - a. The booster pump station is to provide water service to a closed distribution system at a constant pressure. Pumps will be initiated manually by City personnel at the station.

#### 1.7 **Station Design Criteria**

- A. Electrical Service – 208V, 3 phase
- B. Single Pump Duty Point – 1200 GPM at 25 FT of TDH
- C. Prefabricated building to house all equipment.

### **PART 2 PRODUCTS**

#### 2.1 **Structural Support for Water Booster Pumping Systems**

- A. The pumping system shall be built on a steel base.
- B. The equipment base shall be fabricated from a minimum of 3/8" structural grade steel plate, reinforced with adequately sized steel tubing to prevent deflection due to equipment weight and stressed imposed from lifting and setting of equipment. The steel plate and structural steel employed in the equipment base shall meet or exceed the requirements of ASTM A-36.
- C. Lifting eyes shall be placed about the perimeter of the equipment base to facilitate lifting and handling of the station.

## 2.2 Equipment Building

### A. General:

- a. The booster pump station will be shipped complete with a factory assembled modular building affixed to the steel equipment base supporting the booster pumps as shown on the plans.
- b. The completed booster station shall be one piece when delivered and require only off loading, installation on the prescribed foundation slab, pipeline hook up and electrical service to complete the installation.

### B. Construction:

- a. All sidewall and ceiling panels shall consist of interior and exterior metal skins formed with steel dies and roll-forming equipment and checked with gauges for uniformity and accuracy. The panel shall be furnished with an embossed finish pressed into the galvanized steel panel.
- b. Polyurethane shall be foamed-in-place (poured, not frothed) and, when completely heat-cured, shall bond to the metal skins to form rigid 4" thick insulated panel.
- c. Overall coefficient of heat transfer ("U" factor) shall be a minimum of 0.033 (R-30) for 4" thick walls.
- d. Wood reinforcement shall be placed inside the wall and ceiling panels where required to support the station equipment loads. Any wood reinforcement in a wall and ceiling panel shall be totally enclosed within the panel and clad with the exterior and/or interior metal skins.
- e. To ensure tight joints, panel edges must have foamed-in-place tongues and groovers with a flexible vinyl gasket also foamed-in-place on the interior and exterior of all tongue edges.
- f. Panels shall be equipped with cam lock joining devices. The distance between locks shall not exceed 46". Each locking device shall consist of a cam-action, hooked locking arm placed in one panel, and a steel rod positioned in the adjoining panel, so that when the locking arm is rotated, the hook engages over the rod and draws the panel tightly together with cam action. The locking arms and steel rods shall be housed in individual steel pockets and set into the panel. Press fit caps shall be provided to close lock wrench holes. A cam lock wrench shall be supplied with the building.
- g. The exterior of the building shall be a minimum of 0.018" (26 ga.) thick galvanized steel panel. The building exterior shall be covered with panels that have natural aggregate embedded in a reinforced polymer to produce a composite panel that is lightweight, fire resistant, and durable. The panels shall be attached to wood reinforcement panels that are embedded in the building panels. The panels shall be warranted to be free from unnatural

discoloration, cracking, or aggregate loss for 15 years. Acceptable products are O'MNIS Steni medium aggregate in Smokey Mountain Gray or approved equal.

- h. Interior of building shall be a minimum of 0.018" (26 ga.) thick galvanized steel panel, protected by a spray and baked white color polyester protective coating.
- i. Hinged entrance double door shall be a steel commercial type, insulated hollow core. Matching metal jambs shall be furnished to fit prefabricated panels without the use of any interior framing. Jamb member shall attach to panels with sheet metal screws. The door shall be supplied with weather-stripping and a wiper gasket. Entrance openings shall be a minimum 72"x78" clear opening size. Hardware for doors shall be cylindrical lockset with satin stainless-steel finish. Each door shall have three tamper-proof pinned butt hinges. All doors for outdoor structures shall be supplied with a metal shield above the door to divert rain and snow from the door opening. An extruded aluminum sill plate shall be provided on outdoor buildings.
- j. The ceiling panels shall be covered by a pitched truss roof with standing seam metal covering. The roof shall be a hip type, 3:12 minimum pitch with 12" overhang on all sides. Roof peak is to run parallel to the station longest dimension. Mounting strips to be installed in modular buildings for mounting of the roof trusses. Trusses to be spaced on a maximum of 24" centers, covered with exterior grade plywood, 30# underlayment and covered with 24-gauge steel Medallion-Lok metal panels as manufactured by McElroy metals. The panels shall have a factory applied Kynar 500 coating.

C. Ventilation

- a. A ventilating system shall be provided to maintain a fresh air system in the equipment building. The exhaust blower shall be sized and rated to change the equipment building air 6 times per hour.
- b. The blower shall be a centrifugal, squirrel cage design with statically balanced wheel to assure quiet performance and maximum air delivery.
- c. The blower shall be thermostatically controlled and shall also be provided with an automatic and a manual switch located near the door.

D. Heating and Air Conditioning

- a. Provide a wall-mount, self-contained, air conditioner/heating unit.
- b. The unit shall feature aluminum finned copper coils and twin multi-speed blowers and compressors.
- c. Unit shall be housed in a galvanized, 20-gauge, zinc coated steel cabinet. The unit shall include an economizer which allows 100% outside air through air inlet openings.

- d. Unit shall be sized to maintain interior temperature at 70 degrees F with outside temperature of 100-degree F and sized to account for pumping and other equipment heat rejection with all the equipment operating. Heating capabilities shall be provided to maintain 65-degree F interior temperature at -20 degrees F outside temperature.
- E. Interior Lighting
  - a. The building shall include no less than three interior light fixtures.
  - b. Light fixtures shall be enclosed and gasketed, 48" minimum length LED type that are UL listed for wet locations.
  - c. A UL listed; CSA certified light switch shall be located adjacent to personnel entrances. It shall be mounted in a weatherproof enclosure.
- F. Emergency Lighting
  - a. A 12-volt emergency lighting fixture shall be provided on the interior of the pumping station.
  - b. Emergency light fixtures shall be UL listed for damp location use.
  - c. Emergency light fixtures shall have two adjustable heads that allow the operator to direct light where it will be most useful.
  - d. Emergency light fixtures shall have a maintenance free, sealed lead calcium, 6.0 volt, battery backup with a maximum full recharge time of 24 hours and provide one and a half hour emergency operation.
  - e. Lamps shall be rated for 5.4 watts each.
  - f. Emergency light fixtures shall be provided with a test switch and LED charge/AC voltage indicator.
  - g. Emergency light fixture housing shall be made from impact resistant, injection molded thermoplastic.
- G. Exterior Lighting
  - a. Exterior light fixtures shall be UL listed 120-volt, 70 watt, weather-proof HPS type.
  - b. Exterior light fixtures shall be equipped with a photo-cell to allow for automatic dusk to dawn operation.
  - c. Exterior light fixture housings shall be one piece, injection molded, bronze polycarbonate.
- H. Convenience Receptacles
  - a. Receptacles shall be duplex, ground fault circuit interrupter type receptacles.
  - b. Receptacles shall be mounted in weather-proof enclosures.



- c. Receptacles shall be UL and CSA listed.
  - d. A total of four receptacles shall be provided. Three receptacles shall be evenly spaced on the interior of the equipment building. One receptacle shall be located on the exterior of the building, adjacent to the heating and air conditioning unit.
- I. Dehumidifier
- a. Capacity of 25 pints per 24 hours.
  - b. Compressor shall be rated for 1/5 horsepower, 4/1 amps, 400 watts.
  - c. Condensate shall be piped to the nearest floor drain or building exterior.
  - d. 120-volt AC operation by dial controlled, adjustable humidistat.
  - e. UL listed rubber cord.

## 2.3 Mechanical

### A. Close-Coupled, End Suction, Centrifugal Pumps

- a. The pump shall be directly coupled to the motor. The keyed straight bore impeller shall be mounted directly to the motor shaft. The pump and motor shall be connected by an ASTM A48, Class 30 cast iron bracket with machined registers to assure proper alignment.
- b. The pump casing shall be tangential discharge, and of back pullout design allowing for removal of rotating element without disturbing piping connections. The casing shall be constructed of ASTM A48, Class 30 cast iron. All casing sections shall have heavy wall thickness to provide long life under abrasive and corrosive operating conditions. All mating surfaces shall have register fits to ensure proper alignment. Piping connections shall be ANSI 125# flat face drilled flange. Flange face surface finish shall be a minimum of 250 micro-inch finish.
- c. The pump backplate/bracket shall be constructed of ASTM A48, Class 30 cast iron, and be connected to the pump casing. All mating surfaces shall have register fits to ensure proper alignment.
- d. Replaceable suction wear ring shall be provided. The rings shall be peripheral design requiring no axial adjustment and shall be press fit into the case and the backplate. The rings shall be constructed of ASTM B271 C95800 or ASTM B505 C95800 bronze.
- e. The impeller shall be constructed of heavy section ASTM B148 C95800 bronze. The impeller will be a multi-vane design for clear liquids pumping. Internal vane edges shall be well rounded to present smooth flow. Impeller shall have a straight non-tapered bore, be statically balanced, keyed to the shaft and further secured with a stainless steel washer and a stainless steel impeller lock

screw. The impeller shall be fixed at location with no expected or required adjustment.

- f. The shaft shall be of high strength steel. The shaft shall be accurately machined and polished and of sufficient size to transmit full driver output without excessive flexure or stressing. All steps in the shaft shall have radiuses to reduce stress concentrations.
- g. The shaft shall be protected by a renewable shaft sleeve which extends through the stuffing box and under the gland. The sleeve shall have a heat-shrink fit to prevent leakage along the shaft and shall be positively locked to prevent rotation. The sleeve O.D. shall be a minimum of 03.75-inches wider than the shaft and constructed of 303 or 416 stainless steel.
- h. The motor shall be open drip-proof (ODP). It shall be non-overloading exclusive of the service factor at any point on the pump head capacity curve. The motor shall be supplied with Class F insulation and have a 1.15 service factor. The motor bearings shall be selected to withstand thrust loads. The motors shall be equipped with grease fittings and automatic grease reliefs. Motors used in conjunction with variable frequency drives shall be inverter duty rated.
- i. Design Conditions:
  - i. Flow – 1200 GPM
  - ii. Total Dynamic Head – 25 feet
  - iii. Minimum Shutoff Head – 35 feet
  - iv. Efficiency @ Design Point – 80%
  - v. Minimum Motor HP – 10 HP
- j. The following spare parts shall be provided for each pump:
  - i. Shaft sleeve
  - ii. Mechanical sleeve
  - iii. Set of all gaskets and O-rings

B. Pipe, Valves, and Fittings

a. Piping:

- i. All internal transmission pipe and fittings shall be ductile iron class 52. All wetted parts shall be NSF 61 certified for use with potable water.
- ii. Flanges shall conform to AWWA C115. Bolt circle and holes shall match those of ANSI B16.1, Class 125 flanges and ANSI B16.5, Class 150 flanges.
- iii. Pipe and fittings shall be shipped with factory or shop applied red epoxy primer exterior coating.

- iv. Pipe and fittings interior shall be coated with double cement mortar lining as specified in AWWA C104. Coating shall be NSF 61 certified for use with potable water.
- v. All pipe and fittings shall be manufactured domestically and conform to City standards and specifications.

b. Valves

i. Gate Valves:

- 1. Gate valves shall comply with the latest revision of AWWA standard C509 covering resilient seated gate valves for all water supply service. Valves shall be certified to NSF/ANSI 61 and NSF/ANSI 372 for use with potable water.
- 2. Gate valves shall be rated for a minimum of 150 PSI.
- 3. Flanges shall be drilled in accordance with ASME B16.1, Class 125 flanges or ASME B16.42, Class 150 flanges.
- 4. Gate valves shall have a cast iron body, bonnet and O-ring plate.
- 5. The wedge shall be totally encapsulated with rubber. The sealing rubber shall be permanently bonded to the wedge to meet the requirements of ASTM D429.
- 6. Gate valves shall be supplied with O-ring seals at all pressure retaining joints. No flat gaskets shall be allowed.
- 7. Gate valves shall be non-rising stem design, opening by turning left and provided with a hand wheel with the word "open" and arrow to indicate the direction to open.
- 8. The valve stem shall be cast bronze with integral collars in full compliance with AWWA. Valve stem shall operate with bronze stem nuts independent of wedge and stem. Valve stem shall have two O-rings located above the thrust collar and one O-ring located below the thrust collar. Stem O-rings shall be replaceable with the valve fully opened and subjected to full pressure. The valve stem shall have two low torque thrust bearings located above and below the stem collar to reduce friction during operation.
- 9. The waterway shall be smooth, unobstructed and free of all pockets, cavities, and depressions in the seat area.
- 10. Gate valves shall be manufactured by Mueller Co.

ii. Check Valves:

- 1. Check valves shall be globe style, swing type check valves designed, manufactured, and tested in accordance with AWWAC508 and in

accordance with MSS SP-71 or MSS SP-136. Valves shall be certified to NSF/ANSI 61 and NSF/ANSI 372 for use with potable water.

2. Check valves shall be rated for a minimum of 150 PSI.
3. Flanges shall be drilled in accordance with ASME B16.1, Class 125 flanges or ASME B16.42, Class 150 flanges.
4. The valve body shall be full flow equal to nominal pipe diameter area at all points through the valve and shall be equipped with a threaded adjustable open stop. The body seat shall be O-ring sealed and field replaceable without removing the valve from the line. The end flanges shall contain integrally cast mounting pads.
5. The top access port shall be full size, allowing removal of the disc without removing the valve from the line. The access cover shall be domed in shape to provide flushing action over the disc.
6. The disc shall be of one-piece construction and connected to the shaft with a disc arm and two pivot pins.
7. The disc seat shall be resilient with an integral O-ring type sealing surface for drop tight shut-off at high and low pressures and for easy replacement in the field without removing the valve from the line.
8. The shaft seals shall consist of V-type packing in a fixed gland with an adjustable follower designed to prevent over compression of the packing and to meet design parameter of the packing manufacturer. Removable, slotted shims shall be provided under the follower flanges to provide for adjustment and prevent overloading the packing.
9. The valve shall be factory equipped with a lever and weight assembly. The lever shall be equipped with three holes for adjusting the bolted weight assembly. When the valve is closed, the lever and weight shall be located 30 degrees below horizontal.

iii. Restrained Flanged Coupling Adapters:

1. Coupling adapters shall be rated for a minimum of 150 PSI.
2. Flanges shall be drilled in accordance with ASME B16.1, Class 125 flanges or ASME B16.42, Class 150 flanges.
3. Hardware shall be type 316 stainless steel.
4. Manufactured by EBAA Iron Megaflange 2100 or approved equal.

## 2.4 Electrical

### A. General

- a. The electrical system shall be rated for 208 volt, 3 phase service.
- b. Clear space shall be provided in front of the panel to adequately meet the requirements of the National Electrical Code (NEC).
- c. All wiring shall comply with the NEC and applicable state and local codes. Wiring shall be completely factory installed except for power lines that run to the control panel continuously from the external disconnect switch.
- d. All wiring within the building and outside the control panel shall be run in PVC rigid conduit except where liquidtight flexible metallic conduit is used to connect the pump motors. Conduit shall be sized for the type, number, and size of equipment conductors to be carried in compliance with the NEC.
- e. Accessory items such as the dehumidifier, with approved manufacturer's rubber cord may be plugged into polarized grounded outlets.
- f. It shall be the responsibility of the local electrical contractor to furnish and install correctly sized service wires from the service pole outside the building to the Control Panel. The electrical contractor shall also be responsible for any exterior disconnects or switching mechanisms.

### B. Electrical Control System

- a. The electrical control system shall consist of 4 major sections, assembled into a NEMA 1 enclosure fabricated of 14-gauge steel. The control shall consist of motor control, electrical load center, control logic, and alarms.
- b. All components (disconnects, transformers and control devices, and components) shall be installed in the control panel in a manner to provide the minimum wire bending clearances per NEC.
- c. All wiring shall be stranded copper conductors with 90°C insulation.
- d. Conductors shall be numbered and identified at all termination points.
- e. All wiring shall be installed in nylon wire ways where possible and laced with nylon tie straps.
- f. All disconnects, transformers, controllers, control devices, selector switches, and indicator lights shall be provided with nameplates or labels indicating their respective function and/or identification in reference to the engineered electrical schematic diagrams.
- g. A factory "as-built" wiring schematic shall be inside of the controller upon shipment from the manufacturer.
- h. The entire assembly shall be wired in accordance with the NEC (NFPA70) and shall be UL 508 listed.

C. Power Distribution

- a. A circuit breaker main disconnect with through-the-door operator shall be provided.
- b. Branch circuit protection for each pump shall be provided by pad-lockable, motor starter protectors, thermal-magnetic circuit breakers or fuses as applicable.

D. Panel Mount Load Center

- a. As part of the water booster control panel, an electrical distribution center consisting of thermal magnetic circuit breakers with a capacity of 15 amps, shall be provided for each branch circuit including the following:
  - i. Control
  - ii. Blower
  - iii. HVAC
  - iv. Convenience Receptacles
  - v. Lighting
  - vi. Dehumidifier
- b. The circuit breakers shall indicate when the circuit is open and shall have means provided for manual switching. All breakers shall be labeled to function with permanently attached phenolic nameplates.

E. Surge and Lightning Protection

- a. The electrical control system shall be equipped with a UL-1449 listed, 3 phase, type 1 surge protective device designed to provide surge and lightning suppression.
- b. Surge protective device shall utilize metal oxide varistor fusing with a response time of less than 50 nanoseconds.
- c. The surge protective devices shall be equipped with LED indicators to provide a visual indication of the device's operational status.
- d. The surge protective device shall carry an SCCR rating of not less than 200 kA and a Surge Current Rating not less than 40 kA per phase.

F. Selector Switches

- a. Selector switches shall be of the heavy duty oil-tight non-illuminated type with rotary action and with multiple contact blocks mounted in tandem as required.
- b. Proper legend plates shall be provided for each switch.

G. Pilot Devices

- a. Pilot lights shall be 30mm push-to-test type.

b. Pilot lights shall be provided for the following:

- i. Pump Run
- ii. Pump Fail
- iii. Low Suction Pressure
- iv. High Discharge Pressure

H. SCADA

a. The following contacts shall be provided for SCADA integration:

- i. Call to Run
- ii. Low Suction/No Flow
- iii. Pumps Failure
- iv. High Discharge Pressure
- v. Common Alarm

I. Variable Frequency Drives (VFD)

a. General:

- i. VFDs shall be Allen Bradley Powerflex 400.
- ii. The manufacturer of the VFD shall be a certified ISO 9001 and ISO 14000 facility.
- iii. The VFD, including its internal electronic thermal overload protection circuit, shall be UL and cUL Listed in accordance to UL 508C, Power Conversion Equipment.
- iv. UL/cUL labels shall be attached on the outside of each VFD as verification.
- v. The VFD shall be designed in accordance with NEMA, IEC, EN, UL, and CSA standards.
- vi. The VFD manufacturer shall have a minimum of 20 years of experience in the design, construction, and application of VFDs.

b. Construction:

- i. The VFD shall convert the input AC mains power to an adjustable frequency and adjustable voltage as defined in the following sections.
- ii. 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.
- iii. The DC bus shall have external connections for external braking and allow for customer common DC Bus for multiple drive regeneration.

- iv. The outpower power section shall change fixed DC voltage to adjustable AC voltage.
  - v. The VFD shall be rated UL Type 1 and shall be UL Listed as a plenum rated VFD.
  - vi. The VFD shall employ built-in RS-485 communication via an RJ45 connection or terminal block.
  - vii. The VFD shall employ built-in Modbus-RTU communication via terminal block connection.
  - viii. The VFD shall employ a standard control panel with built-in parameter copy functionality.
  - ix. The VFD shall utilize one (1) connector slots for internally mounting plug-in options.
  - x. The VFD shall employ a removable terminal block.
  - xi. The VFD shall employ sink/source selectable control logic.
  - xii. The VFD shall employ modular cooling fans with no tools required to exchange.
- c. Environmental Ratings:
- i. The VFD shall be designed to operate in the following Ambient Temperature range: Non-freezing.
  - ii. Variable Torque and Constant Torque loads: -10C to +50C (14 to 122F)
  - iii. The storage temperature shall be -20C to +65C (-4 to 149F), non-condensing. Applicable for short periods, such as during transit.
  - iv. The maximum relative humidity shall be 90% at 50C (122F), non-condensing.
  - v. The VFD shall be rated to operate altitudes less than or equal to 1000m (3280 ft).
  - vi. The VFD shall be designed according to IEC 60068-2-6 to resist vibration.
- d. VFD Ratings:
- i. The speed range shall be from a minimum of 0.5 Hz to a maximum of 400 Hz, adjustable by increments of 0.01 Hz. Operation above 60Hz shall require programming changes to avoid over speeding the application.
  - ii. The input voltage frequency range shall be 47.5 to 63 Hz.
  - iii. The displacement power factor shall not be less than 0.93 with option DC line reactor at 100% load factor.



- iv. The efficiency of the VFD at 100% speed and load shall not be less than 95%.
- v. The VFD shall conform to the European Union Electromagnetic Compatibility directive, CE labeled.
- vi. Frequency precision shall not be less than:
  - 1. Using analog input: within +/- 0.2% of maximum output frequency
  - 2. Using digital input: within +/- 0.01% of set output frequency
- vii. The over-current capacity shall be:
  - 1. Variable torque (LD): 120% for 1 min or 150% for 3 sec, at 50C
  - 2. Variable torque (SLD): 110% for 1 min or 120% for 3 sec, at 40C
- viii. The VFD shall minimize the audible motor noise through the use of an adjustable carrier frequency.
- ix. The speed control range shall be 20:1 while running between 3 and 60 hz.
- e. Protection:
  - i. The VFD shall be UL 508C listed for use on distribution systems with 65kArms available fault current, based upon the UL short-circuit test.
  - ii. Upon power-up and before operational control is allow to being, the VFD shall check for valid operation of memory, pre-charge circuit, fan operation, and option board communication.
  - iii. The VFD shall be protected against short circuits between the output phases and ground, and the logic and analog outputs.
  - iv. Once operation, monitoring shall continually take place and an abnormality will result in an alarm.
  - v. The following circuit protection shall be allowed:
    - 1. The VFD shall be rated for use with an appropriate UL class fuse.
    - 2. Alternatively, circuit breakers may be used, provided that they are listed or certified by an accredited electrical testing laboratory such as Underwriters Laboratories.
  - vi. 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.
  - vii. 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.
  - viii. Upon loss of the analog speed reference signal:

1. The VFD shall follow the programmed deceleration ramp to a controlled stop.
2. Hold the VFD speed based upon the last good value and trigger a warning alarm.
- ix. The VFD shall have solid state I<sup>2</sup>t 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.
- x. The VFD shall include Metal Oxide Varistors (MOVs) wired to the incoming AC terminals.
- xi. STOP key on the keypad shall be functional at all time, drive mode insensitive.
- xii. The VFD shall be insensitive to input power phase sequence.
- xiii. 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.
- xiv. The output frequency shall be parameter setting enabled to fold back when the motor is overloaded.
- xv. 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.
- xvi. The VFD shall include an output timer function so that peripheral equipment maintenance can be scheduled.
- xvii. The VFD shall include parameter selectable input and output phase loss protection.
- xviii. The VFD basic insulation level shall be tested based upon ANSI/IEEE C62.41-1999.
- f. Adjustments and Configurations:
  - i. The VFD shall be factory preset to operate most common applications.
  - ii. Choice of four (4) types of acceleration and deceleration patterns shall be available: liner, S-curved shaped, two types, and backlash compensated.
  - iii. The acceleration and deceleration ramps shall be individually adjustable from 0.00 to 3600 seconds.
  - iv. The volts per hertz ratios shall be user selectable.
  - v. 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.

- vi. 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 continuous operation.
  - vii. Cooling fan control shall be selectable. Operates continuously during run operation, and dependent upon temperature at stop.
  - viii. The VFD shall have adjustable acceleration/deceleration ramp profiles.
  - ix. The VFD shall have the ability to start into a reverse rotating motor and achieve the set speed.
  - x. 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.
  - xi. The VFD shall have coast to stop functionality by parameter setting.
  - xii. The VFD shall automatically compute the motor's slip compensation.
  - xiii. The VFD shall be able to limit motor rotation to only one direction.
  - xiv. The VFD shall have two (2) output current detection functions which are able to trigger individual alarms.
  - xv. Zero current detection level.
  - xvi. High output current detection.
  - xvii. The VFD shall include two (2) parameters for user entry. (Unit or machine number, installation date).
- g. Operational Features:
- i. The VFD shall allow the motor to be switched in sequence to line power when operating at the base frequency.
  - ii. 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.
  - iii. There shall be regenerative avoidance function to minimize the effect of opposite rotation of another fan within the same duct.
  - iv. The VFD shall incorporate PID control for process controls.
  - v. The VFD shall include the capability to monitor values of PID setpoint, process value, and deviation.
  - vi. The VFD shall allow for controlled deceleration to stop following an input power loss.
  - vii. The VFD shall be able to run at set hold time at the start frequency to smooth motor start.

- viii. Communication shall be RS-485, Modbus RTU, or as determined by the Integrator.
- h. Operator Interface:
  - i. Six (6) key control panel with setting dial shall be mounted on each drive and shall be removable and interchangeable. Customer control shall include the following functionality:
    - 1. Furnished with each VFD as standard.
    - 2. Batch parameter read, copy and verification functionality.
    - 3. Four (4) digit numerical display.
    - 4. Standard RS-485 communication through a RJ 45 port.
    - 5. Allows direct access for parameter changes.
    - 6. Includes an electronic parameter write disable feature.
    - 7. 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.
    - 8. Forward, Reverse and Stop keys command normal starting and stopping as programmed when the VFD is in keypad control mode.
    - 9. Display of I/O and output terminal ON/OFF states.
    - 10. STOP key is functional at all times, drive mode insensitive.
    - 11. Can be mounted at a distance of 20 meters from the VFD.
  - i. Control:
    - i. 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.
    - ii. All logic connections shall be furnished on a removable terminal strip.
    - iii. External devices shall be able to be connected to the terminal strip for starting/stopping the VFD, speed control, and indicating operation status.
    - iv. Speed command input shall be by means of:
      - 1. Keypad
      - 2. Analog input
      - 3. Serial communications
      - 4. Floating point input shall accept a three-wire input

5. There shall be three (3) parameter assignable analog inputs.
  6. The selection consists of the following configurations: 0-5Vdc, 0-10Vc, 4-20mA dc, -5 to +5 Vdc, and -10 to +10 Vdc
  7. Two (2) terminals shall be selectable for either voltage or current reference input.
  8. Combinations of the above speed references can be selected and be switched via remote terminal.
- v. There shall be twelve (12) logic inputs that are parameter assignable.
1. 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.
  2. Optional 3-digit BCD or 12-bit binary input terminals shall be available as relay contact or open collector signals.
- vi. Output signals shall consist of:
1. Five (5) open collector outputs shall be available, which are parameter assignable and are optically isolated.
  2. Can be selected for positive or negative logic.
  3. The selection of assignments shall consist of: running, up to speed, power failure/under-voltage, overload, output frequency detection (first and 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 (MC-1-MC3), fan fault, heatsink overheat pre-alarm, power savings, minor and major fault outputs as standard selection.
  4. The VFDs output terminals shall allow control through network commands.
  5. Optional relay output contact signals (3) shall be available and selectable.
  6. Optional digital outputs (5) shall be available and selectable through open collector terminals.
  7. Pulse or analog output signal shall be selectable in the form of either:
    - a. Analog output signal, 4-20mAdc
    - b. Analog output signal, 0-10Vdc

8. Two (2) Form (C) relay outputs with selectable Normally Open or Normally Closed alarm outputs shall be available.
  - a. Alarm terminals shall be individually parameter assignable.

vii. Braking

1. The VFD shall provide terminals for adding an external braking unit to allow for dissipation of excessive electrical energy from the motor.
2. 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.

2.5 **Instrumentation**

A. Pressure Gauges

- a. Pressure gauges shall be provided to indicate suction and discharge pressure.
- b. Gauges shall have 4 ½-inch minimum diameter faces with molded black phenolic case, turret type with snap ring face mounting.,
- c. The gauge internal construction shall include phosphor bronze bourdon tube with bronze movement and shall be liquid filled.
- d. Gauges shall have ½" NPT bottom connections, flexible sensing lines, bronze snubbers and needle valves.

B. Pressure Transmitters

- a. Variable capacitance transmitters shall be provided for station inlet and discharge pressure.
- b. Transmitters shall provide a 4-20 mA signal to the programmable controller. The transmitters shall have adjustments for zero and span.
- c. The housing shall be welded 17-4 PH stainless steel and have the following performance requirements:
  - i. Accuracy of 0.13% FS at constant temperature
  - ii. Non-repeatability 0.02% FS
  - iii. Ambient operating temperature -40F to 260F

C. Flow Meter

- a. The electromagnetic flow meter (Siemens MAG 5100W) shall consist of a flow sensor based on Faraday's Law of Electromagnetic Induction and micro-processor based signal converter (Siemens MAG 6000).
  - i. Sensor:
    1. Flow tube and liner material shall be constructed of composite elastomer (hard and soft rubber) surrounded by two integral coils. Measurement and grounding electrodes shall be 316 stainless steel. Connecting flanges shall be carbon steel.
    2. A minimum of 5 pipe diameters up stream and 3 pipe diameters down stream are required.
    3. Operating temp: -20 to +160F.
    4. Enclosure: NEMA 4X.
    5. Display: Background illumination with alphanumeric 3-line, 20-character display to indicate flow rate, totalized values, settings, and faults.
    6. Power supply: 115/230 VAC or 11-24 VDC.
    7. Operating temp: -5 to +120F.
    8. Outputs: 0-20mA or 4-20mA into 800 ohms max. One relay rated at 42 VAC/2A, 24DC/1A. Digital (frequency or pulse) for external display of flow rate or totalizer.
    9. Communications: Confirm with integrator.
    10. Sensor and signal convertor performance:
      - a. Flow range: 1.5 fps to 33 fps for accuracies stated below
      - b. Accuracy: 0.5% of actual flow.
      - c. Bi-directional flow capabilities shall be standard.
    11. Totalizer: Two eight-digit counters for forward, net, or reverse flow.
    12. Spare parts: One set of manufacturer recommended spare parts; extra operation manuals as required.

## 2.6 Corrosion Protection

- A. All mill scale, rust, weld flux, and other foreign matter shall be removed from all steel surfaces by shot blasting to SSPC SP-10 specification for near-white blast cleaning. Surface irregularities shall be removed by grinding.
- B. All steel surfaces shall receive a minimum of 2 coats of hi-build epoxy coating. The coatings shall be applied to 3 mils dry film thickness each coat.

- C. A paint touchup kit shall be provided with the station for coating areas damaged in shipping.

### **PART 3 DESIGN, ASSEMBLY, AND TESTING**

#### **3.1 Factory Testing**

- A. Factory Certified Pump Performance Testing
  - a. A certified performance test shall be performed by the pump manufacturer on each pump utilizing its specified electric motor.
  - b. All test shall be performed in accordance with the Hydraulic Institute Test Standards for Centrifugal Pumps.
  - c. Six evenly spaced test points shall be taken and shall include conditions at shut-off and the operating points specified. Preliminary test data must be submitted to the owner seven days prior to the actual test date.
  - d. Data shall be generated showing duty point at full capacity for each pump.
- B. System Tests
  - a. Prior to assembly, all station components shall be inspected for quality and tested for proper function and freedom from defects.
  - b. Upon completion, the station shall be connected to a test tank and an operational test performed under simulated field conditions while a final inspection is conducted. Any deficiencies or irregularities shall be corrected at the factory.
  - c. All piping and connections shall be hydrostatically tested.
- C. Copy of tests to be kept on file by the manufacturer for troubleshooting references.

### **PART 4 DESIGN, ASSEMBLY, AND TESTING**

#### **4.1 Installation**

- A. Unloading of the package should be done using a spreader bar to ensure the lifting cables/slides do not damage piping, control panels, etc.
- B. Level the skid using metal wedges or shims if necessary, and as required.
- C. Make system connections.
- D. Electrical connections should be completed to the pump control panel as required.

#### **4.2 Start-up Services**

- A. Start-up service technician shall be a certified booster station technician by the system manufacturer or authorized service representative.
- B. Start-up supervision shall be provided for one, eight-hour day for the purpose of start-up supervision and operator training.



- C. The start-up service technician shall prepare a service report following start-up and distributed as follows:
- a. Manufacturer's file
  - b. Engineer's file
  - c. Contractor's file
  - d. Owner's file

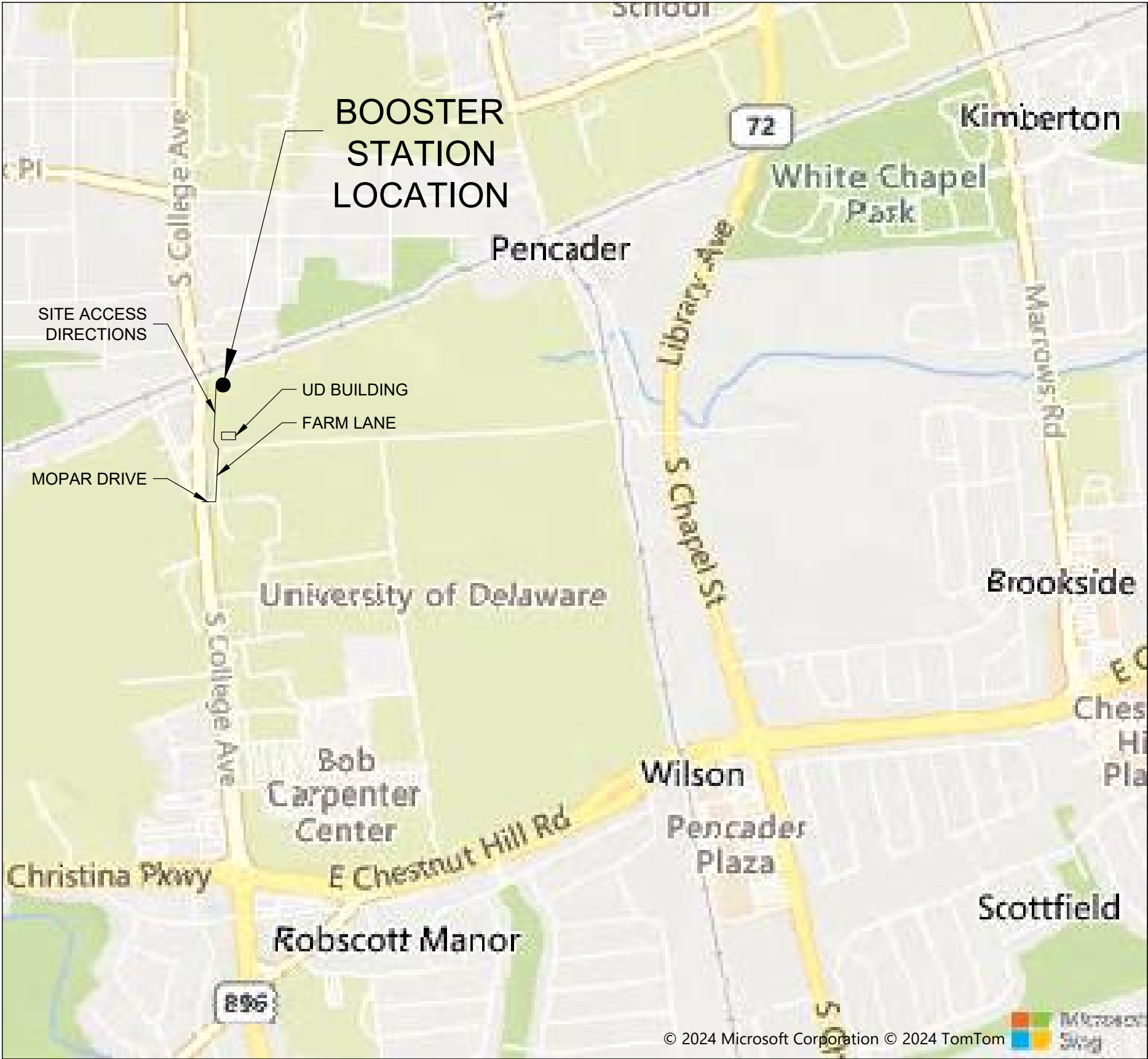
**END OF SECTION**

CITY OF NEWARK  
PUBLIC WORKS & WATER RESOURCES DEPARTMENT  
NEW CASTLE COUNTY, DELAWARE

SOUTH COLLEGE INTERCONNECTION  
BOOSTER STATION REPLACEMENT

ISSUE TO BID NO. 24-13

| DRAWING INDEX |           |                                  |
|---------------|-----------|----------------------------------|
| DRAWING NO.   | SHEET NO. | SHEET TITLE                      |
| G-001         | 1         | COVER                            |
| G-002         | 2         | GENERAL NOTES, LEGEND, & SYMBOLS |
| C-101         | 3         | SITE PLANS                       |
| M-101         | 4         | PROCESS PLAN AND SECTION         |
| M-501         | 5         | DETAILS                          |
| E-501         | 6         | SINGLE LINE DIAGRAM AND DETAILS  |



LOCATION MAP  
1" = 1,000 FT

PLAN PURPOSE: DESIGN OF A NEW BOOSTER STATION TO  
REPLACE THE EXISTING ACADEMY STREET BOOSTER STATION.



MISS UTILITY  
of  
DELMARVA

PREPARED BY:



**JOHNSON, MIRMIRAN & THOMPSON**  
121 Continental Drive, Suite 300 Newark, DE 19713

ENGINEER SEAL



| REV. | DESCRIPTION | DRAWN | DATE |
|------|-------------|-------|------|
| 1    | -           | -     | -    |
| 2    | -           | -     | -    |
| 3    | -           | -     | -    |
| 4    | -           | -     | -    |
| 5    | -           | -     | -    |
| 6    | -           | -     | -    |
| 7    | -           | -     | -    |

PREPARED FOR:



**NEWARK  
DELAWARE**  
*Committed to Service Excellence*  
220 SOUTH MAIN STREET  
302-366-7000

| APPROVALS     | DATE     |
|---------------|----------|
| DRAWN BY: EP  | 09-24-24 |
| CHECKED BY:   |          |
| ENGINEER: CRB | 09-24-24 |
| OPERATIONS:   |          |
| REVISION:     |          |

CITY OF NEWARK  
PUBLIC WORKS & WATER RESOURCES DEPARTMENT  
SOUTH COLLEGE INTERCONNECTION  
BOOSTER STATION REPLACEMENT  
ISSUE TO BID NO. 24-13

|              |             |              |
|--------------|-------------|--------------|
| SHEET TITLE: | COVER SHEET |              |
| SCALE:       | N/A         | DWG NO.      |
| SHEET NO:    | 1 OF 6      | <b>G-001</b> |



GENERAL CONSTRUCTION NOTES

1. ALL CONSTRUCTION, UNLESS OTHERWISE NOTED, SHALL BE IN ACCORDANCE WITH THE CONTRACT DOCUMENTS AND THE CITY OF NEWARK DEPARTMENT OF PUBLIC WORKS AND WATER RESOURCES DETAIL STANDARDS FOR ROAD AND UTILITY CONSTRUCTION, DETAILS AND SUPPLEMENTS.
2. DRAWINGS HAVE BEEN CREATED FROM THE DELAWARE FIRSTMAP OPEN DATA INFORMATION, WATER SYSTEM GIS, AND LIMITED SURVEY DATA. ADDITIONAL BURIED UTILITIES OR STRUCTURES MAY BE ENCOUNTERED. NO EXCAVATIONS WERE CONDUCTED DURING THE PREPARATION OF THESE PLANS. THE CONTRACTOR SHALL VERIFY ALL INFORMATION TO HIS/HER OWN SATISFACTION. EXACT LOCATION AND COMPLETENESS IS NOT GUARANTEED.
3. ALL ELEVATIONS AND CONTOURS REFERRED TO ON THE CONTRACT DRAWINGS AND IN THE SPECIFICATIONS ARE BASED UPON THE NAD 83 DELAWARE STATE PLANE PROJECTION.
4. THE CONTRACTOR SHALL BE FULLY RESPONSIBLE FOR ANY AND ALL DAMAGES WHICH HAVE OCCURRED BY HIS/HER FAILURE NOT TO EXACTLY LOCATE AND PRESERVE ANY AND ALL EXISTING UTILITIES, STRUCTURES AND OTHER FEATURES AFFECTING HIS/HER WORK. ITEMS SHALL BE REPLACED WITH THE SAME TYPE OF MATERIAL THAT WAS REMOVED OR DAMAGED DURING CONSTRUCTION OR AS DIRECTED BY THE ENGINEER.
5. THE SIZES OF WATER MAIN PIPES, AND OTHER UTILITIES DEPICTED ON THE PLANS ARE EXAGGERATED FOR ILLUSTRATIVE PURPOSES. PIPE LENGTHS ARE APPROXIMATE.
6. ALL DISTANCES MUST BE FIELD VERIFIED PRIOR TO CONSTRUCTION AND ARE THE RESPONSIBILITY OF THE CONTRACTOR.
7. THE CONTRACTOR IS RESPONSIBLE FOR CONTACTING "MISS UTILITY" AT 1-800-282-8555, PRIOR TO ANY EXCAVATION WORK.
8. THE CONTRACTOR IS RESPONSIBLE FOR COORDINATING THE LOCATION AND ACTIVITIES OF HIS/HER FORCES WITH THE OWNER AND ABUTTING PROPERTY OWNERS TO MINIMIZE INTERFERENCE WITH EXISTING UTILITIES, PEDESTRIAN TRAFFIC AND PROPERTY ACCESS. PEDESTRIAN AND VEHICLE ACCESS SHALL BE MAINTAINED AT ALL TIMES. THE CONTRACTOR IS RESPONSIBLE FOR CONTACTING THE CITY OF NEWARK DEPARTMENT OF PUBLIC WORKS AND WATER RESOURCES PROJECT MANAGER, MARK NEIMEISTER, AT 302-366-7000, TWO (2) WEEKS IN ADVANCE AND 48 HOURS PRIOR TO THE START OF CONSTRUCTION.
9. THE CONTRACTOR IS NOT RESPONSIBLE FOR NOTIFYING THE OWNER OF IMPACTED PROPERTIES. THE CITY SHALL NOTIFY THE OWNER OF IMPACTED PROPERTIES AT LEAST ONE (1) WEEK IN ADVANCE AND AGAIN 24 HOURS PRIOR TO STARTING WORK SHOWN ON THESE PLANS.
10. THE PLANS AND SPECIFICATIONS DO NOT INCLUDE PROVISIONS FOR CONSTRUCTION SAFETY. A HEALTH AND SAFETY PLAN MUST BE SUBMITTED BY THE CONTRACTOR PRIOR TO STARTING WORK.
11. THE CONTRACTOR SHALL TAKE ALL NECESSARY PRECAUTIONS TO PROTECT ALL EXISTING UTILITIES, CURBS, SIDEWALK, PAVING, SHRUBS, FENCING, ETC. ANY AND ALL DAMAGE DONE TO SAME SHALL BE IMMEDIATELY AND COMPLETELY REPAIRED AT THE CONTRACTOR'S EXPENSE.
12. METHODS, PROCEDURES AND THE SEQUENCES (OTHER THAN THAT NOTED ON THE DRAWINGS) OF CONSTRUCTION ARE THE RESPONSIBILITY OF THE CONTRACTOR.
13. ROADWAYS SHALL BE KEPT CLEAN AT ALL TIMES. ALL SOIL SPILLED, DROPPED, WASHED OR TRACKED ONTO ROADWAYS OR OTHER IMPERVIOUS SURFACES MUST BE REMOVED IMMEDIATELY.
14. ALL WORK SHALL BE CONDUCTED IN THE PUBLIC RIGHT OF WAY OR WITHIN EXISTING UTILITY EASEMENTS. IF THE CONTRACTOR DESIRES TO WORK OUTSIDE OF THE PUBLIC RIGHT OF WAY OR EXISTING UTILITY EASEMENTS, THEY SHALL BEAR ALL COSTS FOR OBTAINING TEMPORARY CONSTRUCTION EASEMENTS TO PERFORM THE WORK.

SUGGESTED SEQUENCE OF CONSTRUCTION

1. FIELD VERIFY ALL DIMENSIONS OF THE EXISTING CONCRETE PAD AND PIPE STUBS PRIOR TO FABRICATION OF THE BOOSTER STATION.
2. PREPARE AND INSTALL FORMWORK, REBAR, AND CONCRETE FOR PAD EXTENSIONS.
3. ALLOW CONCRETE TO CURE FOR A MINIMUM OF 7 DAYS PRIOR TO SETTING THE NEW PREFABRICATED STATION.
4. PROCURE AND SETUP A CRANE FOR SETTING OF THE NEW BUILDING. COORDINATE WITH PREFABRICATED STATION SUPPLIER FOR LIFTING AND DELIVERY PLAN.
5. COMPLETE CIVIL, ELECTRICAL, MECHANICAL WORK, ETC.
6. TEST AND DISINFECT PIPING IN ACCORDANCE WITH CITY STANDARDS.
7. START-UP AND TEST PUMPS AND STATION EQUIPMENT.

EROSION AND SEDIMENT CONTROL NOTES

1. THE CONTRACTOR SHALL PROVIDE AND INSTALL ALL SEDIMENT AND EROSION CONTROL MEASURES NECESSARY TO CONSTRUCT THE WORK OUTLINED IN THE PLANS AND SPECIFICATIONS IN ACCORDANCE WITH THE DELAWARE EROSION AND SEDIMENT CONTROL HANDBOOK, REV. 07/2023 (DNREC), INCLUDING ALL REVISIONS FOLLOWING THIS DATE, OR AS APPROVED BY THE CITY OF NEWARK.
2. IT IS ANTICIPATED THAT NO DESIGNATED STOCKPILE AREA IS REQUIRED AND THE EXCAVATED MATERIAL SHALL NOT BE STOCKPILED OVERNIGHT.
3. THE CONTRACTOR SHALL RESTORE UNPAVED AREAS OF SITE DISTURBANCE. RESTORATION INCLUDES CLEANUP, FINISH GRADING, REPLACEMENT OF ALL APPURTENANCES REMOVED TO FACILITATE CONSTRUCTION, TOPSOILING, FERTILIZING, LIME, SEED AND MULCH AS SHOWN ON THE DRAWINGS AND AS STATED IN THE SPECIFICATIONS. TOPSOIL AVAILABLE ON SITE SHALL BE SUPPLEMENTED AS NECESSARY TO PROVIDE A UNIFORM THICKNESS OF 4 INCHES OVER ALL DISTURBED AREAS. REFER TO THE CITY'S STANDARD SPECIFICATIONS AND DETAILS FOR SEEDING REQUIREMENTS.

PRE-ENGINEERED METAL BUILDING NOTES:

1. DESIGN BASIS:

1.1. IBC 2021

1.2. ASCE 7-22

1.3. ROOF LIVE LOAD: 20 PSF

1.4. MEP DEAD LOADS: 5 PSF MINIMUM AT ROOF OR ACTUAL WEIGHTS, WHICHEVER IS GREATER.

1.5. BUILDING RISK CATEGORY: 1

1.6. ULTIMATE WIND SPEED: 105 MPH

1.7. SEISMIC RISK CATEGORY: 1

1.8. SEISMIC DESIGN CRITERIA: BY BUILDING MANUFACTURER

1.9. GROUND SNOW LOAD, P<sub>g</sub> = 31 LB/FT<sup>2</sup>
2. THE PREFABRICATED BUILDING SHALL BE A MANUFACTURER'S STANDARD AND PRE-FABRICATED STRUCTURE OF THE APPROXIMATE INSIDE AREA SHOWN. OVERALL DIMENSIONS AND CONSTRUCTION DETAILS MAY VARY TO SUIT THE MANUFACTURER'S STANDARD DESIGN.
3. BUILDING SHALL CONFORM TO ALL APPLICABLE BUILDING CODES AND PROVISIONS FOR NEW CASTLE COUNTY AND THE 2021 INTERNATIONAL BUILDING CODE.
4. SUBMITTALS:

4.1. STANDARD DRAWINGS AND DESIGN ANALYSIS SHALL BEAR THE SEAL OF A STRUCTURAL ENGINEER REGISTERED IN THE STATE OF DELAWARE.

4.2. SUBMIT BUILDING SHOP DRAWINGS AND FINAL FOUNDATION LOADS PRIOR TO INITIATION OF THE FOUNDATION WORK.

4.3. SHOP DRAWINGS SHALL INCLUDE DETAILS OF ALL MAIN MEMBERS, TYPICAL CONNECTIONS SHOWING BOLT HOLES AND WELDS, AND ERECTION DRAWINGS.
5. ALL BUILDING COMPONENTS ABOVE THE CONCRETE SLAB FOUNDATIONS INCLUDED COLUMN BASE PLATES OR WALL ANCHORAGE SYSTEMS TO BE PROVIDED BY THE BUILDING MANUFACTURER. CONTRACTOR TO COORDINATE AND BUILD INTO THE WORK. ALL ANCHORAGE DEVICES AND OTHER EMBEDDED ITEMS REQUIRED TO BE SET INTO CONCRETE OR CONCRETE MASONRY.
6. ALL PREFABRICATED BUILDING ANCHOR BOLTS TO BE OF A DIAMETER, QUANTITY, EMBEDMENT, AND LOCATION AS DESIGNED BY THE PREFABRICATED BUILDING MANUFACTURER. ANCHOR BOLTS TO BE FURNISHED AND INSTALLED BY THE CONCRETE SUBCONTRACTOR AT LOCATIONS AND PROJECTIONS SHOWN ON THE FINAL ANCHOR BOLT LAYOUT PLANS AND DETAILS AS PREPARED BY THE PREFABRICATED BUILDING MANUFACTURER.
7. MODIFICATIONS OF THE FOUNDATIONS, AS SHOWN HEREON, REQUIRED TO ACCOMMODATE DETAILS OF THE METAL BUILDING MUST BE DESIGNED AND DOCUMENTED BY THE CONTRACTOR. DESIGN CALCULATIONS AND CONSTRUCTION DOCUMENTS MUST BE PREPARED UNDER THE SUPERVISION OF AND SEALED BY A PROFESSIONAL ENGINEER IN THE STATE OF DELAWARE. IN THE EVENT THE CONTRACTOR CHOOSES TO ALTER THE FOUNDATIONS SHOWN ON THESE DRAWINGS IN ORDER TO ACCOMMODATE THE PARTICULAR REQUIREMENTS OF THE BUILDING, ANY ADDITIONAL COSTS ASSOCIATED WITH REDESIGN, DOCUMENTATION, SUBMITTALS AND CONSTRUCTION SHALL BE THE SOLE RESPONSIBILITY OF THE CONTRACTOR, ANY MODIFICATIONS TO THE FOUNDATIONS SHOWN ON THESE DRAWINGS ARE SUBJECT TO THE APPROVAL OF THE OWNER.
8. BASED UPON THE FINAL CALCULATED FRAME REACTIONS PROVIDED BY THE PRE-ENGINEERED BUILDING MANUFACTURER, THE CONTRACTOR SHALL VERIFY THAT FOUNDATIONS INDICATED ON THE DRAWINGS ARE SUFFICIENT TO SUPPORT THE STRUCTURE AND TO RESIST ANY UPLIFT DUE TO WIND LOADING.
9. BOLTS SHALL BE PROPERLY PLACED, ALIGNED, AND SECURELY TIED TO REMAIN IN PLACE DURING PLACEMENT OF THE CONCRETE.
10. FOUNDATIONS:

10.1. THE NEW CONCRETE TURNDOWN FOOTINGS HAVE BEEN DESIGNED WITHOUT BUILDING REACTIONS FORM THE PREMANUFACTURED BUILDING DESIGNER AND ARE SUBJECT TO CHANGE ONCE BUILDING REACTIONS HAVE BEEN REVIEWED.

10.2. UNLESS NOTED OTHERWISE ON PLANS, BOTTOM OF EXTERIOR FOOTINGS SHALL BE -36" BELOW EXTERIOR GRADE.

EXISTING LEGEND

- OVERHEAD ELECTRIC LINE
- UNDERGROUND WATER LINE
- EXISTING ROADWAY
- FIELD LINE
- CONTOUR LINE
- OVERHEAD SIDEWALK
- FENCE LINE

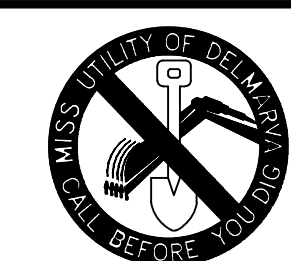
- CONCRETE
- WATER VALVE
- WATER MANHOLE
- REDUCER
- HYDRANT
- GUY WIRE
- UTILTY POLE
- UNDERGROUND UTILITY VAULT

PROPOSED LEGEND

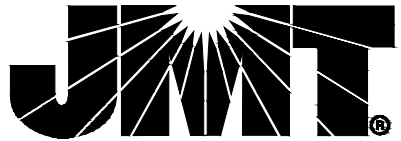
- CONCRETE
- BUILDING
- UNDERGROUND ELECTRIC
- CENTERLINE
- FENCE LINE

RESPONSIBILITY TABLE

| ITEM | TASK                                                                                                   | GENERAL CONTRACTOR | PREFABRICATED STATION SUPPLIER | SYSTEM INTEGRATOR |
|------|--------------------------------------------------------------------------------------------------------|--------------------|--------------------------------|-------------------|
| 1    | PROVIDE AND INSTALL CONCRETE PAD EXTENSIONS, SITE FENCING, AND STONE RAMP ENTRANCES                    | •                  |                                |                   |
| 2    | PROVIDE CRANE AND MOUNT PREFABRICATED STATION                                                          | •                  |                                |                   |
| 3    | PROVIDE AND INSTALL CONDUCTORS/WIRE/CABLE AND CONDUIT WITH FITTINGS FOR ELECTRICAL SERVICE TO BUILDING | •                  |                                |                   |
| 4    | INSTALL FINAL PIPING CONNECTIONS TO EXISTING PIPE STUBS                                                | •                  |                                |                   |
| 5    | TEST AND DISINFECT PIPING. STARTUP AND TEST STATION                                                    | •                  |                                |                   |
| 6    | PROVIDE AND INSTALL PUMPS, PIPING, VALVES, FITTINGS, AND SUPPORTS                                      |                    | •                              |                   |
| 7    | PROVIDE AND INSTALL ACCESS DOORS, LOUVERS, EXHAUST FAN, AND UNIT HEATER                                |                    | •                              |                   |
| 8    | PROVIDE AND INSTALL INTERIOR AND EXTERIOR LIGHTING AND RECEPTACLES                                     |                    | •                              |                   |
| 10   | PROVIDE AND INSTALL CONDUCTORS/WIRE/CABLE AND CONDUIT WITH FITTINGS AND SUPPORT HARDWARE FOR STATION   |                    | •                              |                   |
| 11   | PROVIDE INSTRUMENTATION AND WIRING DEVICES                                                             |                    | •                              |                   |
| 12   | PROVIDE POWER TO CONTROL PANEL                                                                         |                    | •                              |                   |
| 13   | PROVIDE CELLULAR ANTENNA AND ANTENNA CABLING WITH FITTINGS AND SUPPORT HARDWARE                        |                    |                                | •                 |
| 14   | PROVIDE CONTROL PANEL WITH ALL REQUIRED COMPONENTS AND HMI                                             |                    |                                | •                 |
| 15   | PROVIDE PROGRAMMING AND SYSTEMS STARTUP                                                                |                    |                                | •                 |
| 16   | PROVIDE HMI SCREENS AS REQUIRED BY OWNER                                                               |                    |                                | •                 |
| 17   | PROVIDE SCADA SYSTEM INTEGRATION STARTUP AND TESTING                                                   |                    |                                | •                 |



MISS UTILITY  
or  
DELMARVA



PREPARED BY:  
**JOHNSON, MIRMIRAN & THOMPSON**  
121 Continental Drive, Suite 300 Newark, DE 19713

ENGINEER SEAL

CHRISTOPHER R. BRIDGES

Professional Engineer

DE 18168

REV.

DESCRIPTION

DRAWN

DATE

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PREPARED FOR:



220 SOUTH MAIN STREET  
302-366-7000

APPROVALS

DRAWN BY: EP

CHECKED BY:

ENGINEER: CRB

OPERATIONS:

REVISION:

DATE

09-24-24

09-24-24

CITY OF NEWARK  
PUBLIC WORKS & WATER RESOURCES DEPARTMENT  
SOUTH COLLEGE INTERCONNECTION  
BOOSTER STATION REPLACEMENT  
ISSUE TO BID NO. 24-13

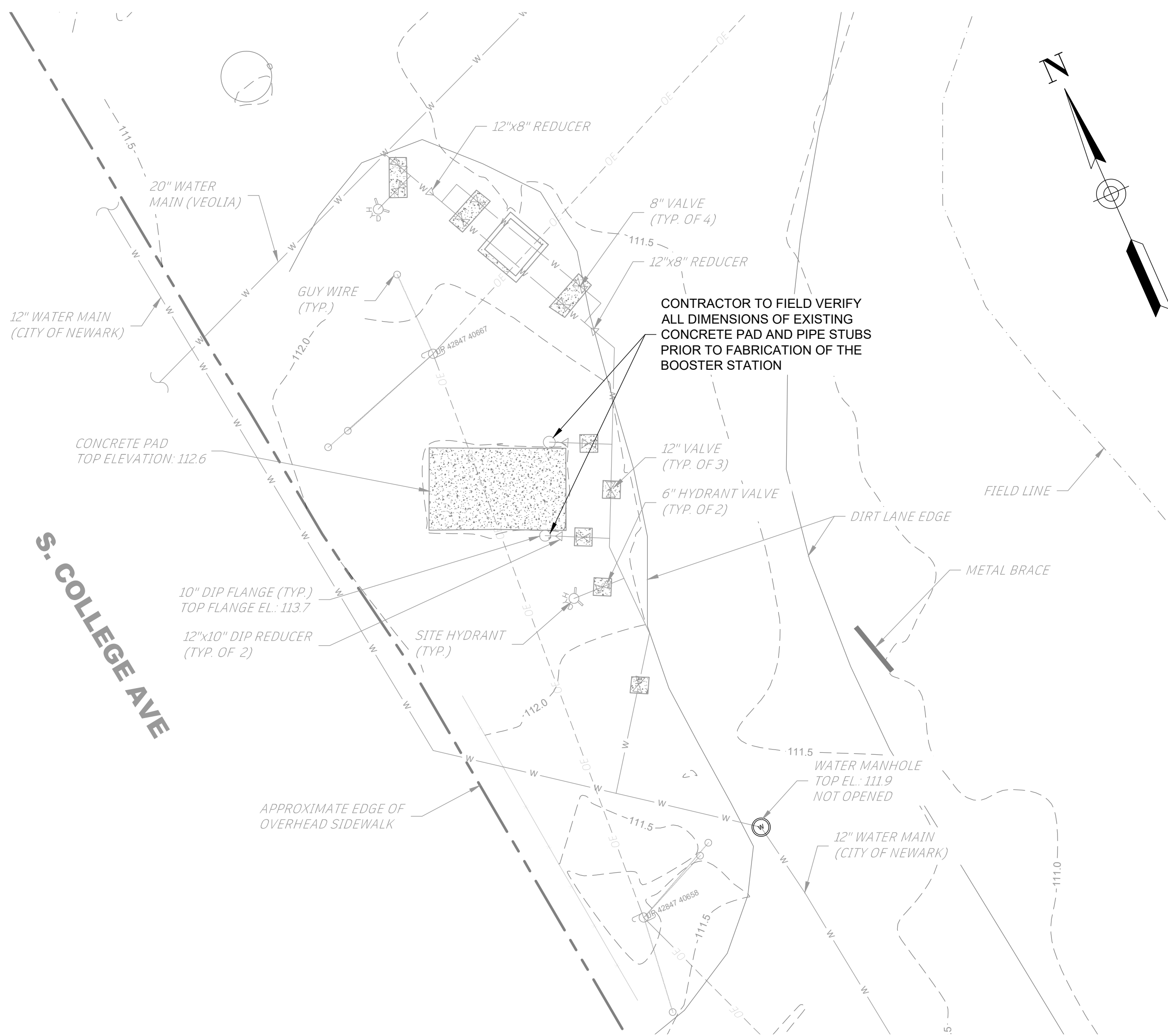
SHEET TITLE:  
GENERAL NOTES, LEGEND, & SYMBOLS

SCALE: N/A

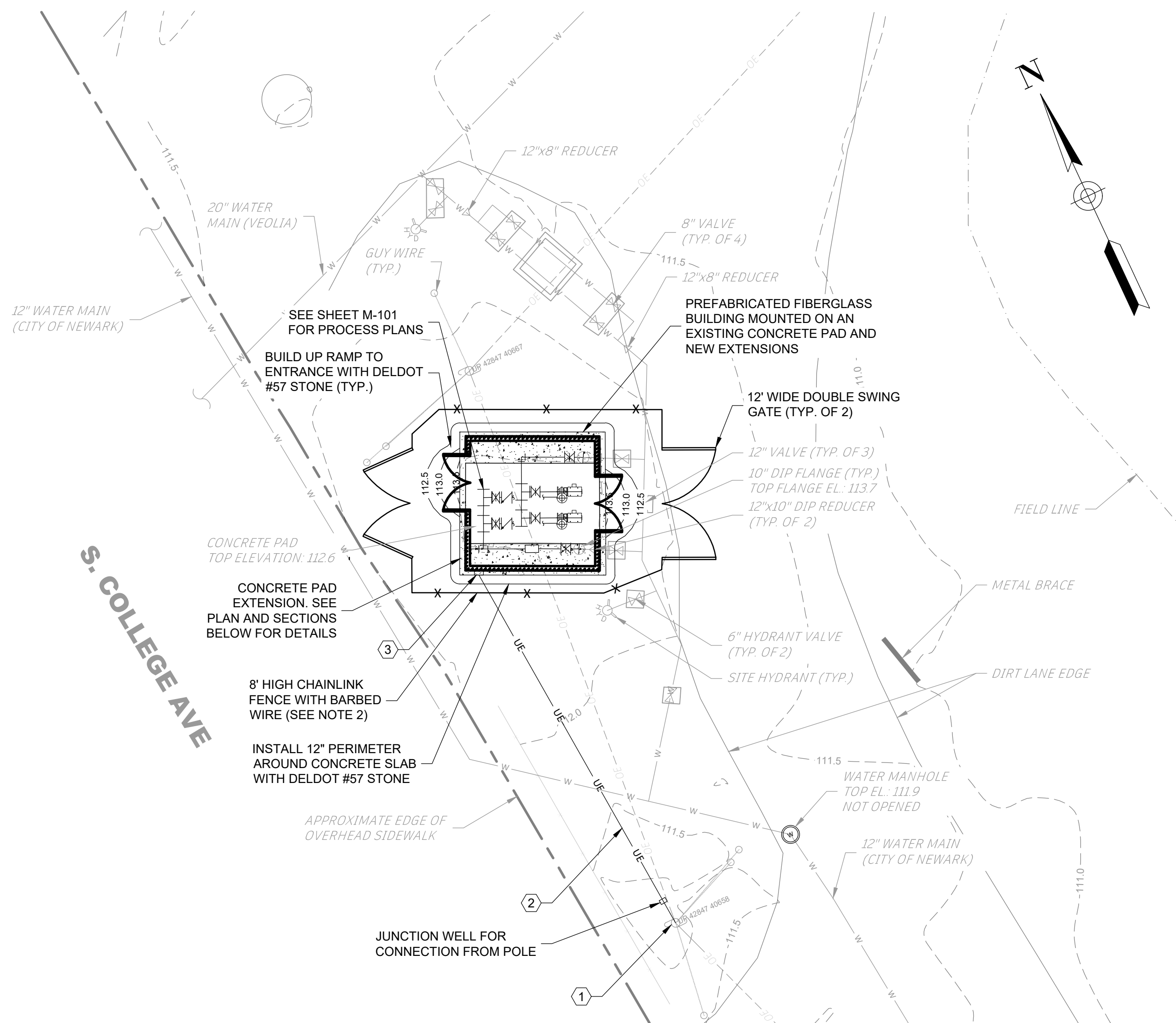
SHEET NO: 2 OF 6

DWG NO.  
G-002

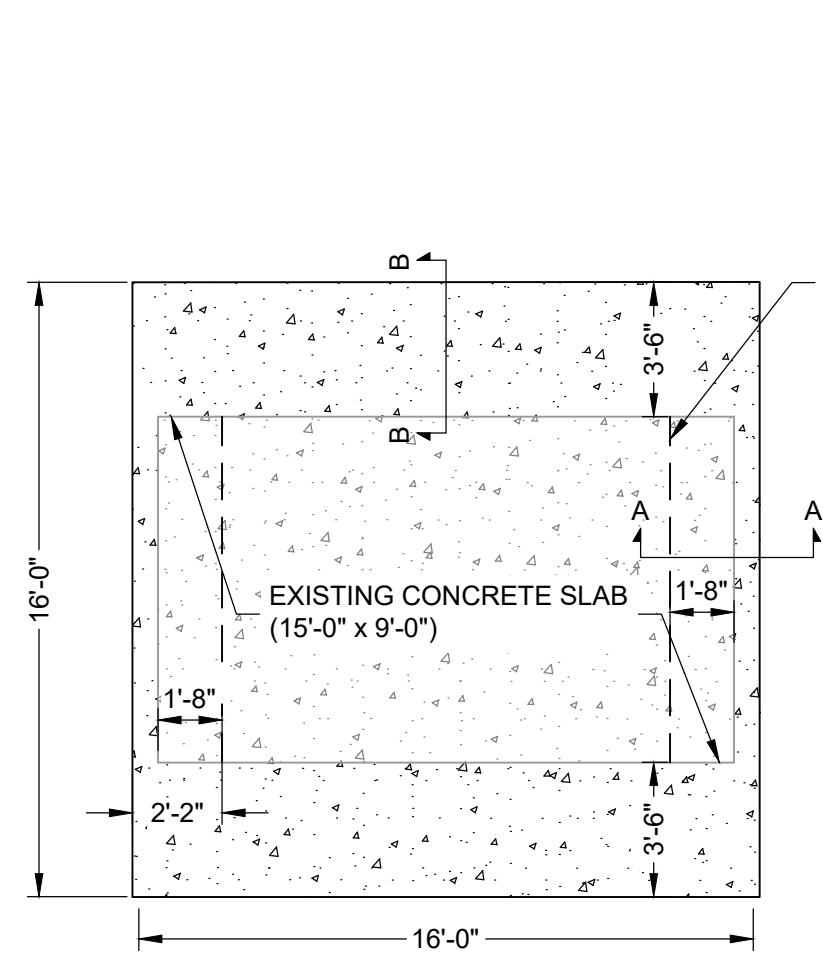




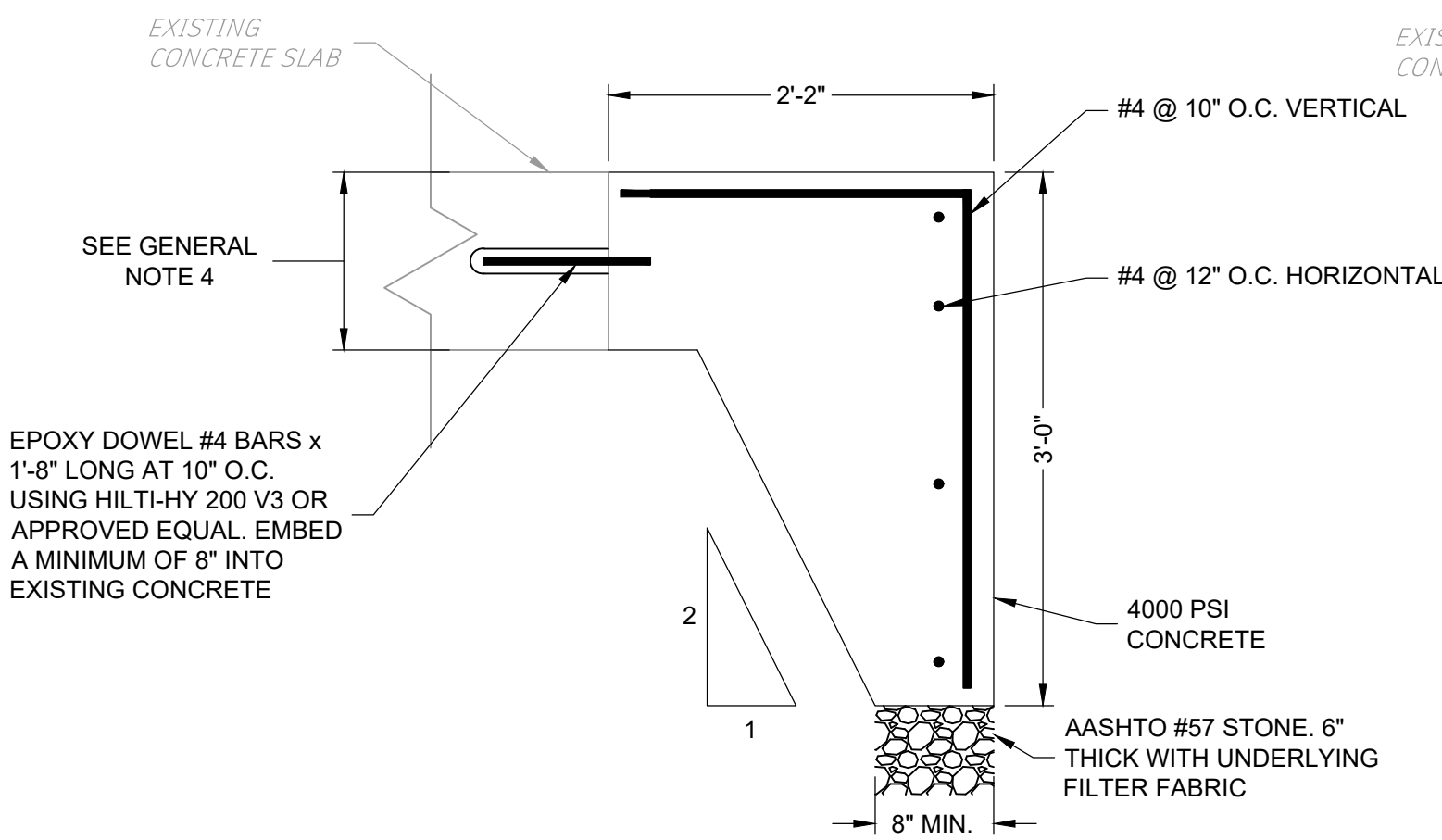
**EXISTING SITE PLAN**  
1" = 10'



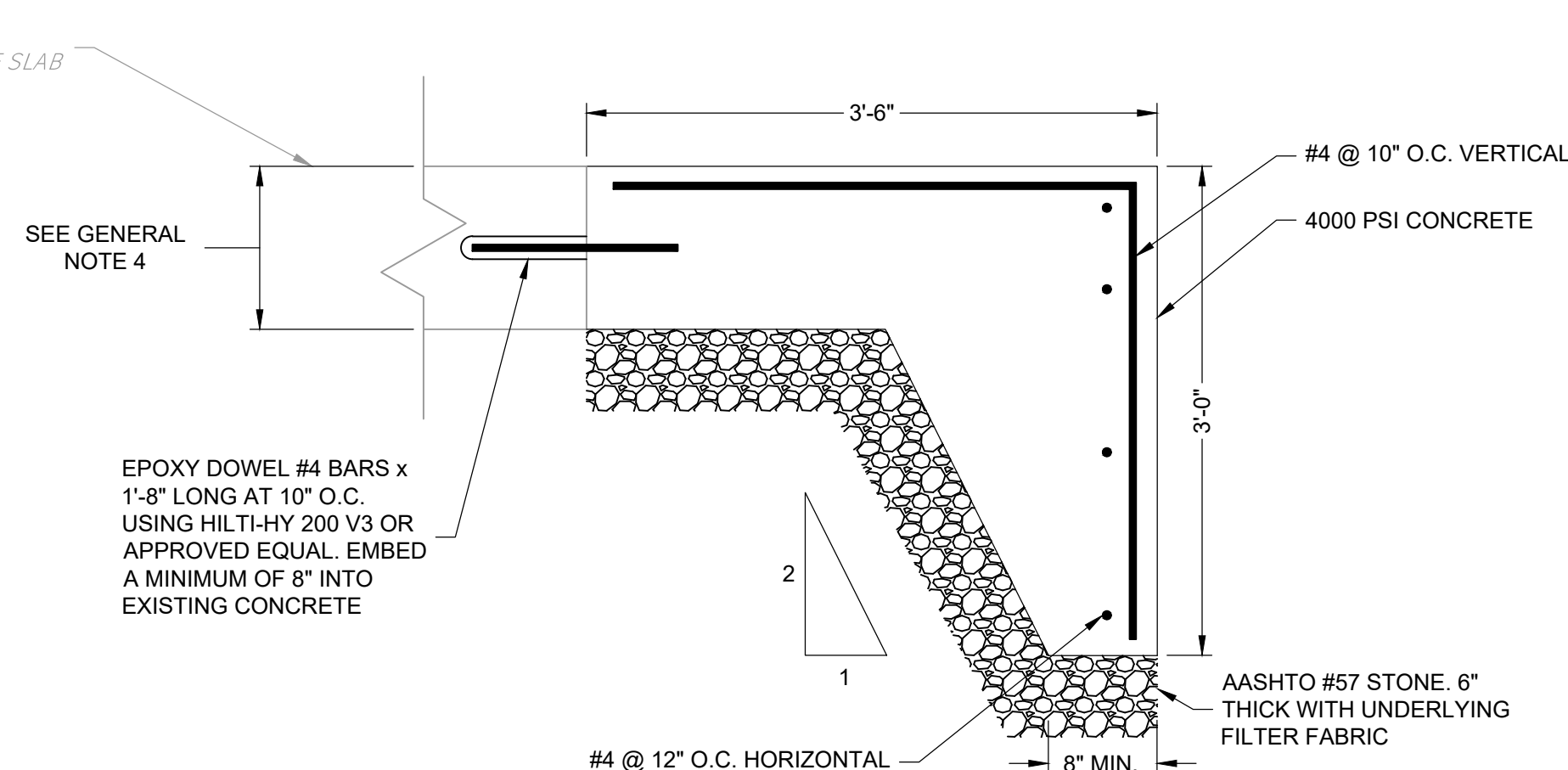
**PROPOSED SITE PLAN**  
1" = 10'



**CONCRETE PAD EXTENSION**  
1" = 5'



**SECTION A**  
1" = 1'



**SECTION B**  
1" = 1'

**GENERAL NOTES:**

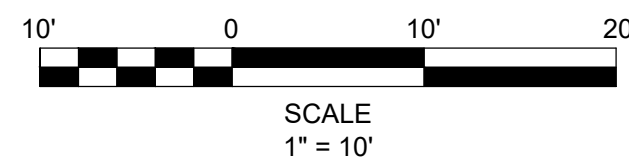
1. REFER TO SUGGESTED CONSTRUCTION SEQUENCE AND RESPONSIBILITY TABLE ON SHEET G-002.
2. COORDINATE MARKOUT OF EXISTING UNDERGROUND WATER LINES WITH THE CITY PRIOR TO INSTALLATION OF THE CHAINLINK FENCE. SEE FENCE AND GATE DETAIL ON M-501.
3. FOUNDATIONS SHOWN ARE PRELIMINARY. THE PRELIMINARY DESIGN ASSUMED WALL REACTIONS OF 1,000 LBS PER FOOT ALONG THE PERIMETER.
4. CONTRACTOR TO VERIFY EXISTING SLAB THICKNESS AND COMMUNICATE WITH ENGINEER TO CONFIRM REINFORCEMENT DOWELS AND FOUNDATION DIMENSIONS.

**CONTRACTOR RESPONSIBILITIES FOR ELECTRICAL SERVICE:**

- C1. CONTRACTOR SHALL CONTACT CITY OF NEWARK ELECTRIC DEPARTMENT TO COORDINATE THE WORK.
- C2. INSTALLATION SHALL BE IN ACCORDANCE WITH CITY OF NEWARK'S REQUIREMENTS.
- C3. PROVIDE BELOW-GRADE CONDUIT AND CONDUCTORS FROM UTILITY APPROVED METER SOCKET TO DESIGNATED UTILITY POLE. COIL AND PROTECT CONDUCTORS AT BASE OF UTILITY POLE FOR INSTALLATION AND TERMINATION BY CITY OF NEWARK.

**ELECTRICAL KEY NOTES:**

1. UTILITY SHALL PROVIDE POLE-MOUNTED TRANSFORMER FOR NEW SERVICE. CONTRACTOR SHALL COORDINATE ALL CONDUIT AND WIRING REQUIREMENTS.
2. PROVIDE (2)-2" UNDERGROUND PVC-SCH 80 CONDUITS FROM UTILITY POLE.
3. UTILITY DISCONNECT AND METER. COORDINATE UTILITY METER AND DISCONNECT FINAL LOCATION WITH UTILITY PROVIDER.



BEFORE YOU DIG CALL  
1-800-282-8555 (in Del.)  
1-800-441-8555 (Md., Va.)  
PROTECT YOURSELF. GIVE TWO  
WORKING DAYS NOTICE

MISS UTILITY  
OF  
DELMARVA

PREPARED BY:



**JOHNSON, MIRMIAN & THOMPSON**  
121 Continental Drive, Suite 300 Newark, DE 19713

ENGINEER SEAL



| REV. | DESCRIPTION | DRAWN | DATE |
|------|-------------|-------|------|
| 1    | -           | -     | -    |
| 2    | -           | -     | -    |
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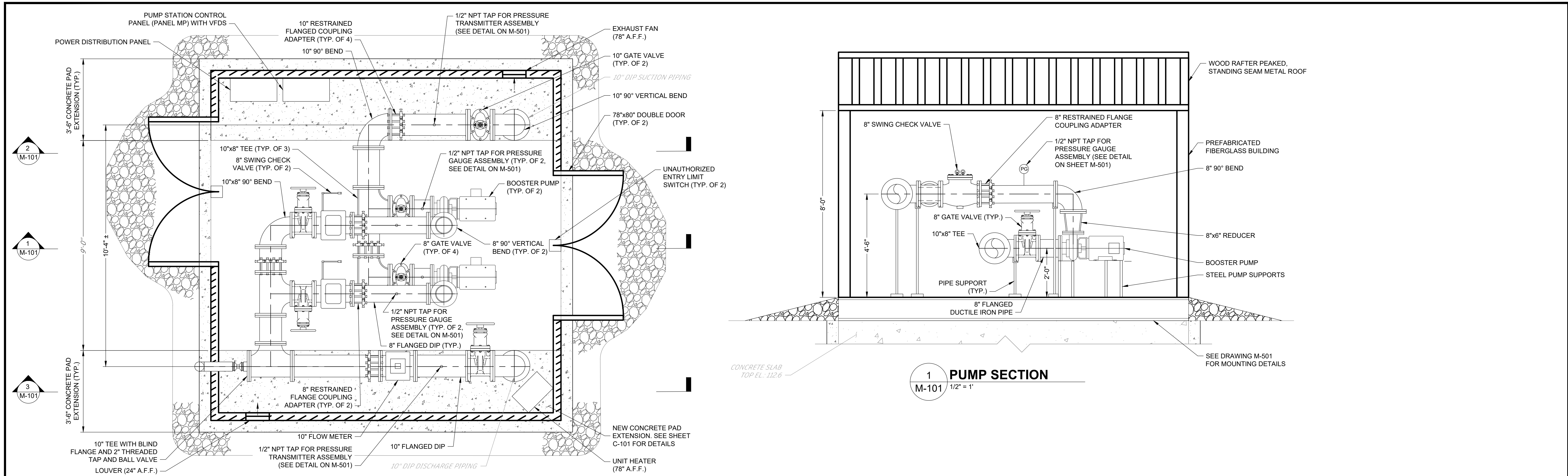


220 SOUTH MAIN STREET  
302-366-7000

| APPROVALS     | DATE     |
|---------------|----------|
| DRAWN BY: EP  | 09-24-24 |
| CHECKED BY:   |          |
| ENGINEER: CRB | 09-24-24 |
| OPERATIONS:   |          |
| REVISION:     |          |

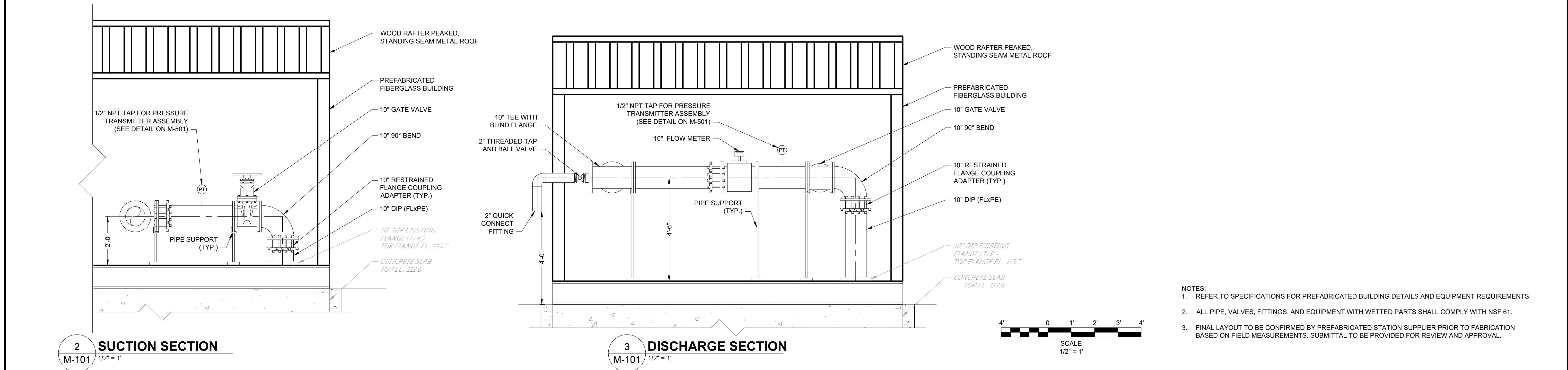
| CITY OF NEWARK<br>PUBLIC WORKS & WATER RESOURCES DEPARTMENT                            |         |       |
|----------------------------------------------------------------------------------------|---------|-------|
| SOUTH COLLEGE INTERCONNECTION<br>BOOSTER STATION REPLACEMENT<br>ISSUE TO BID NO. 24-13 |         |       |
| SHEET TITLE: SITE PLANS                                                                |         |       |
| SCALE: 1" = 10'                                                                        | DWG NO. | C-101 |
| SHEET NO: 3 OF 6                                                                       |         |       |





PROPOSED FLOOR PLAN - BASIS OF DESIGN  
1/2" = 1'

1 PUMP SECTION  
1/2" = 1'



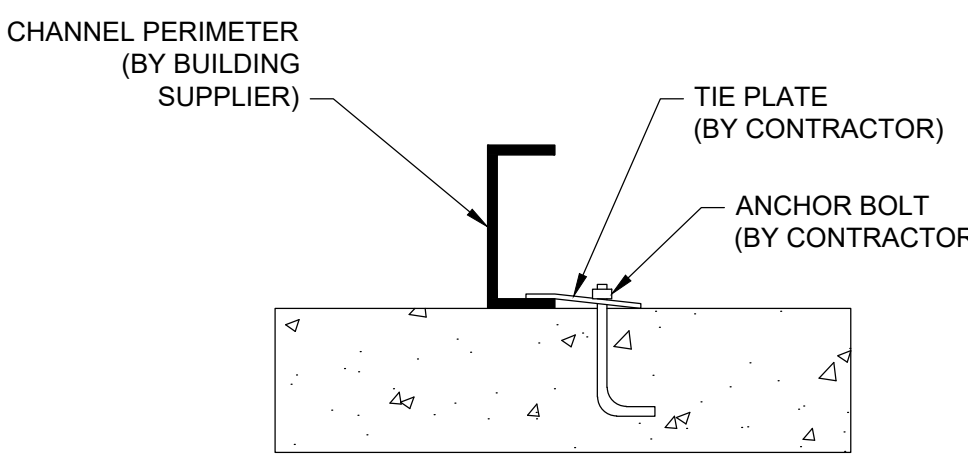
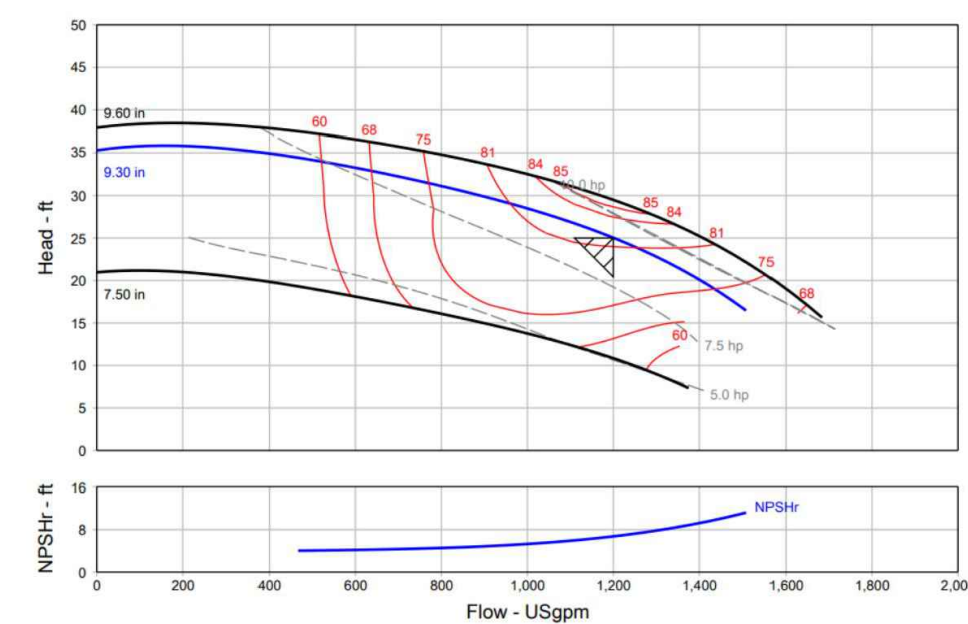
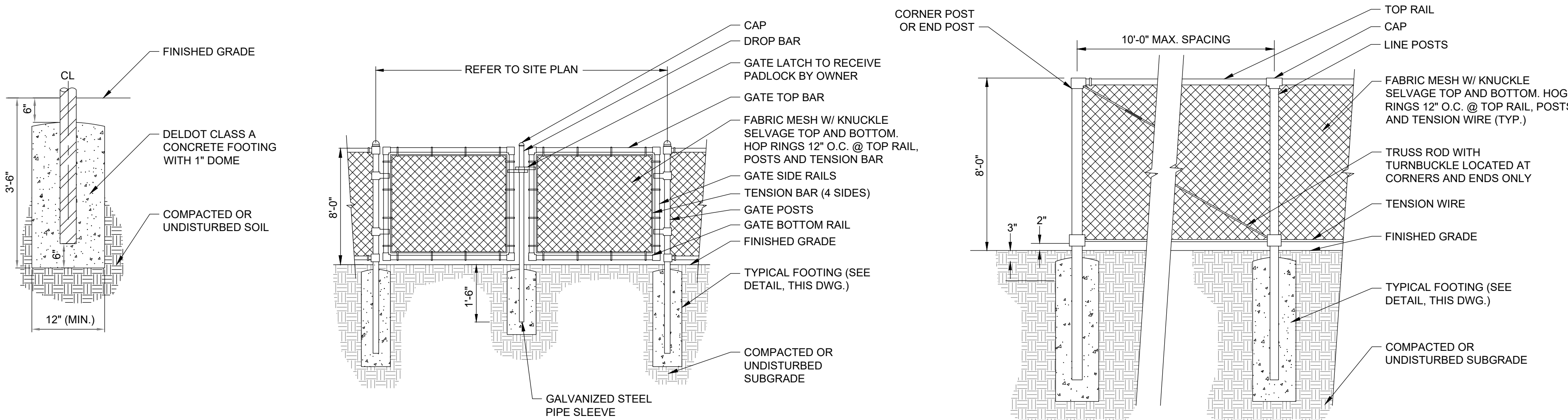
2 SUCTION SECTION  
1/2" = 1'

3 DISCHARGE SECTION  
1/2" = 1'

- NOTES:
1. REFER TO SPECIFICATIONS FOR PREFABRICATED BUILDING DETAILS AND EQUIPMENT REQUIREMENTS.
  2. ALL PIPE, VALVES, FITTINGS, AND EQUIPMENT WITH WETTED PARTS SHALL COMPLY WITH NSF 61.
  3. FINAL LAYOUT TO BE CONFIRMED BY PREFABRICATED STATION SUPPLIER PRIOR TO FABRICATION BASED ON FIELD MEASUREMENTS. SUBMITTAL TO BE PROVIDED FOR REVIEW AND APPROVAL.

|                                    |                                                                                                                   |                   |      |             |       |      |                                                            |           |      |                                                                                                                                                                                                                                           |                         |
|------------------------------------|-------------------------------------------------------------------------------------------------------------------|-------------------|------|-------------|-------|------|------------------------------------------------------------|-----------|------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------|
| <br>MISS UTILITY<br>of<br>DELMARVA | <br>PREPARED BY:<br><b>JOHNSON, MIRMIIRAN &amp; THOMPSON</b><br>121 Continental Drive, Suite 300 Newark, DE 19713 | <br>ENGINEER SEAL | REV. | DESCRIPTION | DRAWN | DATE | PREPARED FOR:<br><br>220 SOUTH MAIN STREET<br>302-366-7000 | APPROVALS | DATE | CITY OF NEWARK<br>PUBLIC WORKS & WATER RESOURCES DEPARTMENT<br>SOUTH COLLEGE INTERCONNECTION<br>BOOSTER STATION REPLACEMENT<br>ISSUE TO BID NO. 24-13<br>SHEET TITLE:<br>PROCESS PLAN AND SECTION<br>SCALE: 1/2" = 1'<br>SHEET NO: 4 OF 6 | DWG NO.<br><b>M-101</b> |
|                                    |                                                                                                                   |                   | 1    | 2           | 3     | 4    |                                                            | 5         | 6    |                                                                                                                                                                                                                                           |                         |





NOTES:

1. TIE PLATES AND ANCHOR BOLT SIZING, SPACING, AND EMBEDMENT TO BE DETERMINED BY BUILDING MANUFACTURER. PROVIDE CALCULATIONS SIGNED AND SEALED BY AN ENGINEER REGISTERED IN THE STATE OF DELAWARE.

1 TYPICAL FOOTING  
C-501 NOT TO SCALE

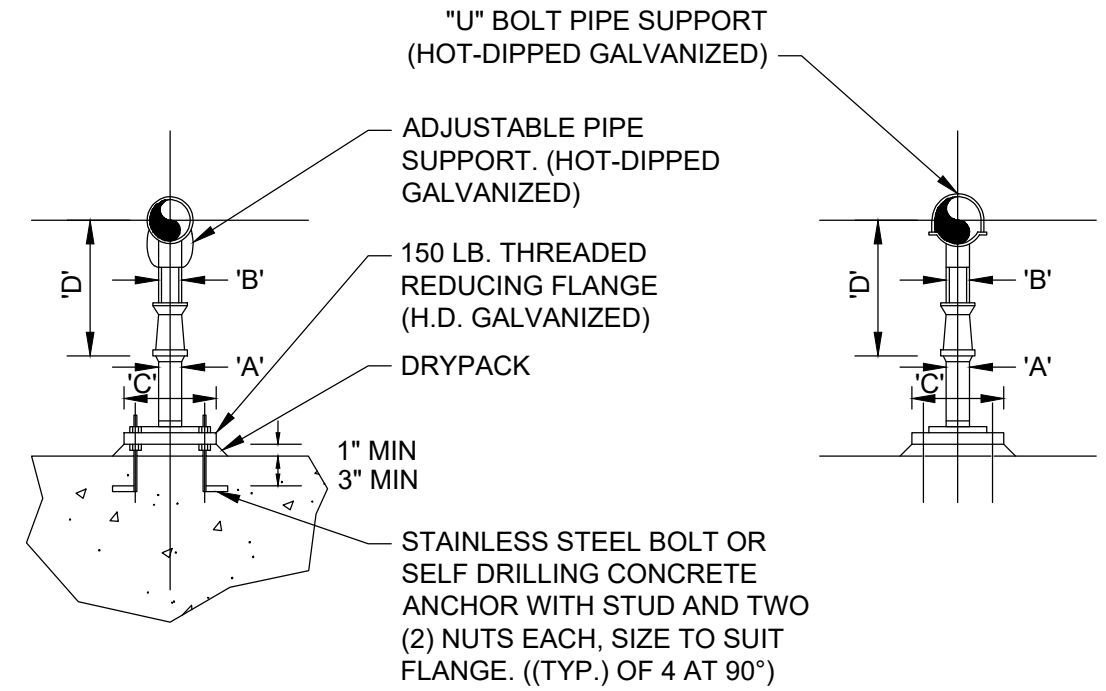
2 CHAINLINK DOUBLE SWING GATE  
C-501 NOT TO SCALE

3 CHAINLINK FENCE  
C-501 NOT TO SCALE

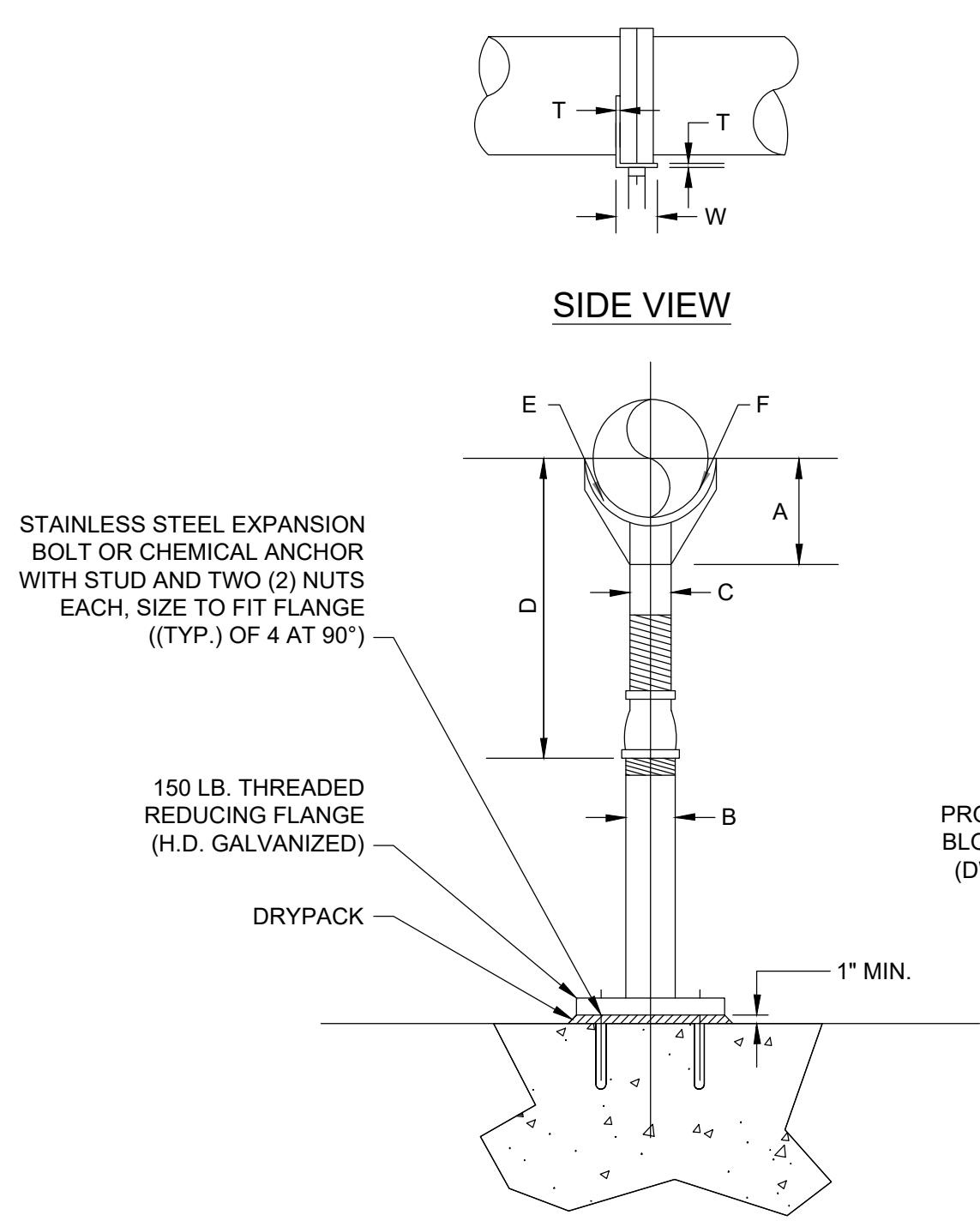
4 PUMP CURVES  
C-501 NOT TO SCALE

5 ANCHOR SYSTEM  
C-501 NOT TO SCALE

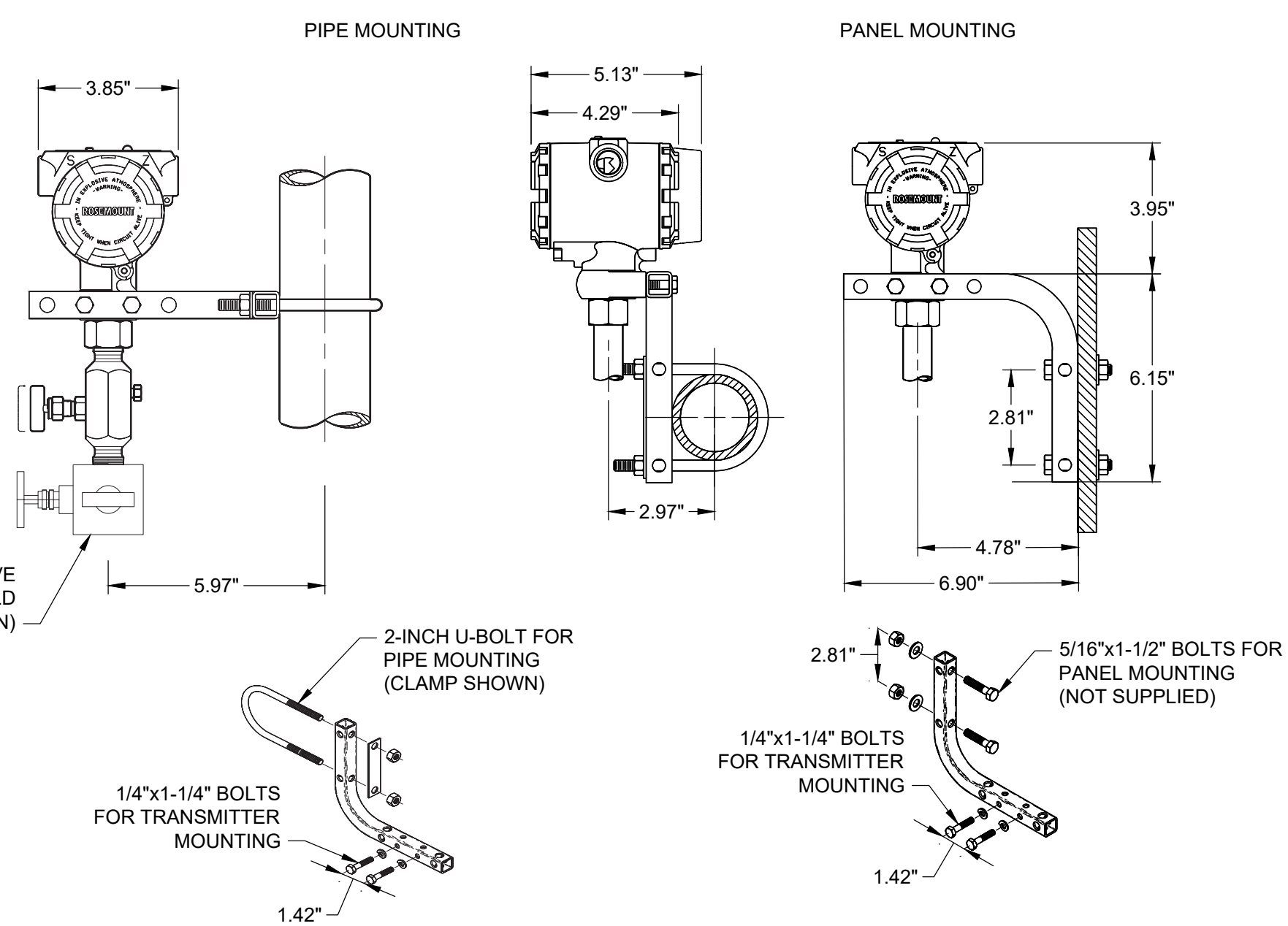
| DIMENSIONS IN INCHES |         |                         |         |         |                       |               |      |        |
|----------------------|---------|-------------------------|---------|---------|-----------------------|---------------|------|--------|
| NOMINAL PIPE SIZE    | 'A'     | 'B' AS INDICATED ON DWG | 'C'     | 'D'     | 'E' NO. OF BOLT SLOTS | 'F' BOLT SIZE | 'T'  | 'W'    |
| 1/2"                 | 3"      | 2 1/2"                  | 3/4"    | 6"      | 2                     | 1/2"          | 1/4" | 1 3/4" |
| 3/4"                 | 3 3/16" | 2 1/2"                  | 3/4"    | 6 3/16" | 2                     | 1/2"          | 1/4" | 1 3/4" |
| 1"                   | 3 3/8"  | 2 1/2"                  | 3/4"    | 6 3/8"  | 2                     | 1/2"          | 1/4" | 1 3/4" |
| 1 1/4"               | 3 9/16" | 2 1/2"                  | 3/4"    | 6 9/16" | 2                     | 1/2"          | 1/4" | 1 3/4" |
| 1 1/2"               | 3 3/4"  | 2 1/2"                  | 3/4"    | 6 3/4"  | 2                     | 1/2"          | 1/4" | 1 3/4" |
| 2"                   | 4 1/4"  | 2 1/2"                  | 3/4"    | 7 1/4"  | 2                     | 5/8"          | 1/4" | 1 3/4" |
| 2 1/2"               | 4 5/8"  | 2 1/2"                  | 1 5/16" | 8 5/8"  | 2                     | 5/8"          | 1/4" | 2 1/2" |
| 3"                   | 4 7/8"  | 2 1/2"                  | 1 5/16" | 8 7/8"  | 2                     | 5/8"          | 1/4" | 2 1/2" |
| 3 1/2"               | 5 3/8"  | 2 1/2"                  | 1 5/16" | 9 3/8"  | 2                     | 5/8"          | 1/4" | 2 1/2" |
| 4"                   | 5 3/4"  | 3"                      | 2 3/8"  | 9 3/4"  | 2                     | 5/8"          | 1/4" | 4"     |
| 5"                   | 6 1/4"  | 3"                      | 2 3/8"  | 10 1/4" | 2                     | 3/4"          | 1/4" | 4"     |
| 6"                   | 6 3/4"  | 3"                      | 2 3/8"  | 10 3/4" | 2                     | 3/4"          | 1/4" | 4"     |
| 8"                   | 9 1/8"  | 3"                      | 2 3/8"  | 13 1/8" | 2                     | 3/4"          | 3/8" | 3 7/8" |
| 10"                  | 10 3/8" | 3"                      | 2 3/8"  | 14 3/8" | 2                     | 7/8"          | 3/8" | 3 7/8" |
| 12"                  | 11 7/8" | 3"                      | 2 3/8"  | 15 7/8" | 2                     | 7/8"          | 3/8" | 3 7/8" |
| 14"                  | 14 1/4" | 4"                      | 2 7/8"  | 18 1/4" | 2                     | 1"            | 3/8" | 4 3/8" |
| 16"                  | 15 1/2" | 4"                      | 2 7/8"  | 19 1/2" | 2                     | 1"            | 3/8" | 4 3/8" |
| 18"                  | 17"     | 6"                      | 3 1/2"  | 21"     | 2                     | 1 1/8"        | 1/2" | 5"     |
| 20"                  | 18 1/4" | 6"                      | 3 1/2"  | 22 1/4" | 2                     | 1 1/8"        | 1/2" | 5"     |
| 24"                  | 21 3/4" | 6"                      | 3 1/2"  | 25 3/4" | 2                     | 1 1/4"        | 1/2" | 5"     |



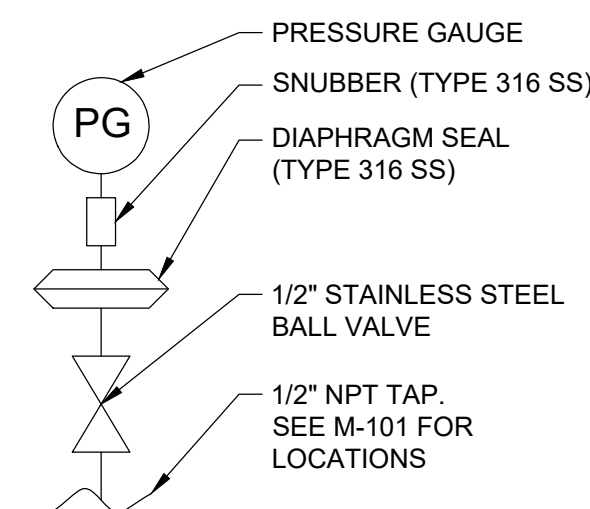
6 ADJUSTABLE PIPE SUPPORT  
C-501 NOT TO SCALE



7 FLANGE PIPE SUPPORT  
C-501 NOT TO SCALE



8 PRESSURE TRANSMITTER MOUNTING  
C-501 NOT TO SCALE

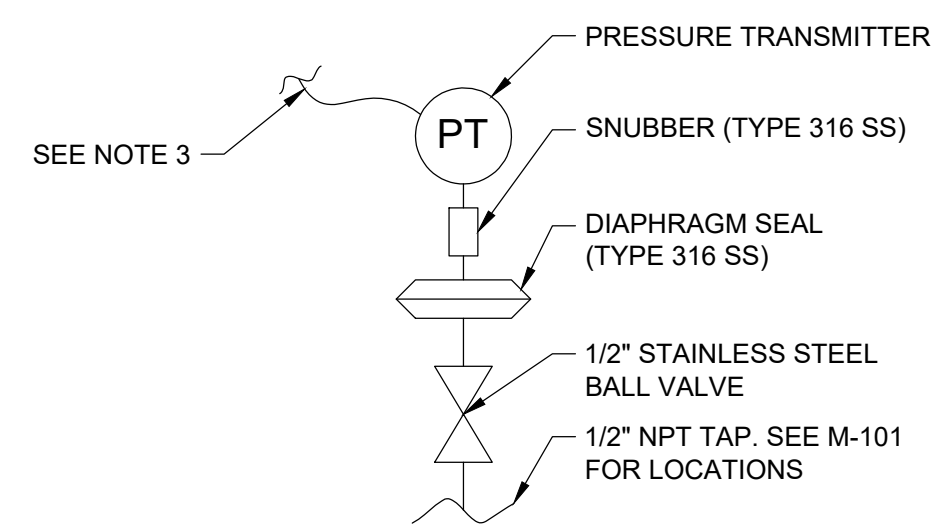


NOTES:

1. PIPE, VALVES, AND FITTINGS SHALL BE TYPE 316 STAINLESS STEEL.

2. REFER TO SPECIFICATIONS FOR PRODUCT REQUIREMENTS.

9 PRESSURE GAUGE ASSEMBLY  
C-501 NOT TO SCALE



NOTES:

1. PIPE, VALVES, AND FITTINGS SHALL BE TYPE 316 STAINLESS STEEL.

2. PRESSURE TRANSMITTER SHALL BE MANUFACTURED BY ROSEMOUNT, MODEL 2088, GAUGE MEASUREMENT, WITH AN OPERATING RANGE OF -14.7 TO 150 PSI. TRANSMITTER OUTPUT SHALL BE 4-20mA. ALL COMPONENTS SHALL BE COMPRISED OF 316L STAINLESS STEEL, RATED FOR NSF DRINKING WATER APPROVAL.

10 PRESSURE TRANSMITTER ASSEMBLY  
C-501 NOT TO SCALE



MISS UTILITY  
OF  
DELMARVA

BEFORE YOU DIG CALL  
1-800-282-8555 (in Del.)  
1-800-441-8555 (Md., Va.)  
PROTECT YOURSELF, GIVE TWO  
WORKING DAYS NOTICE

PREPARED BY:



JOHNSON, MIRMIRAN & THOMPSON  
121 Continental Drive, Suite 300 Newark, DE 19713

ENGINEER SEAL



| REV. | DESCRIPTION | DRAWN | DATE |
|------|-------------|-------|------|
| 1    | -           | -     | -    |
| 2    | -           | -     | -    |
| 3    | -           | -     | -    |
| 4    | -           | -     | -    |
| 5    | -           | -     | -    |
| 6    | -           | -     | -    |
| 7    | -           | -     | -    |

PREPARED FOR:

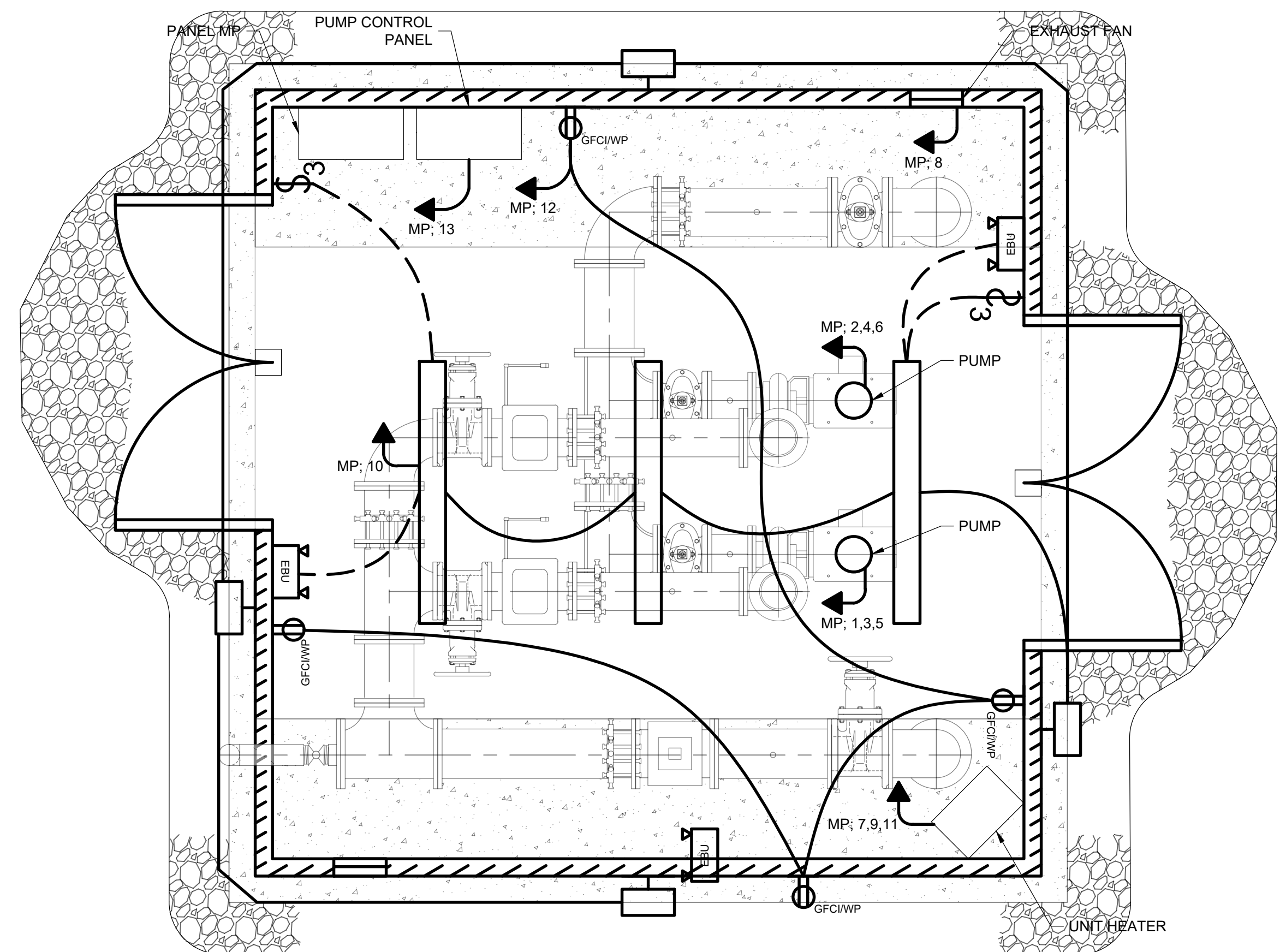
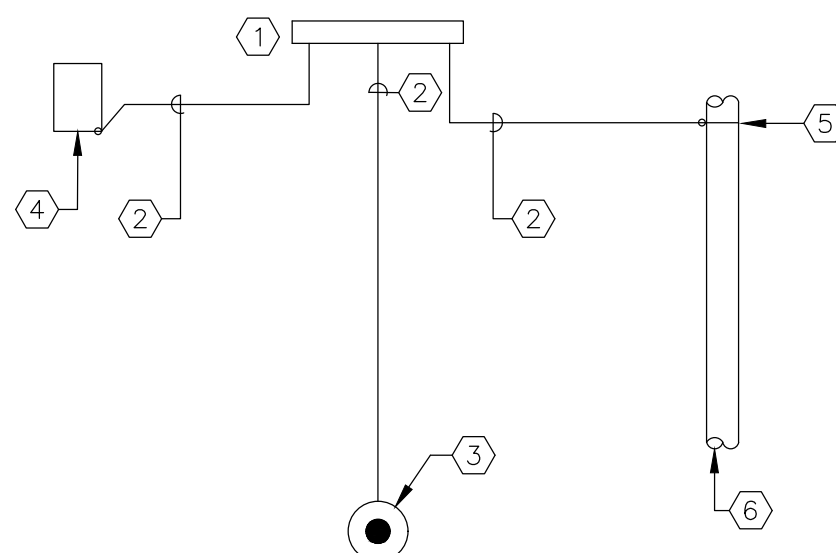
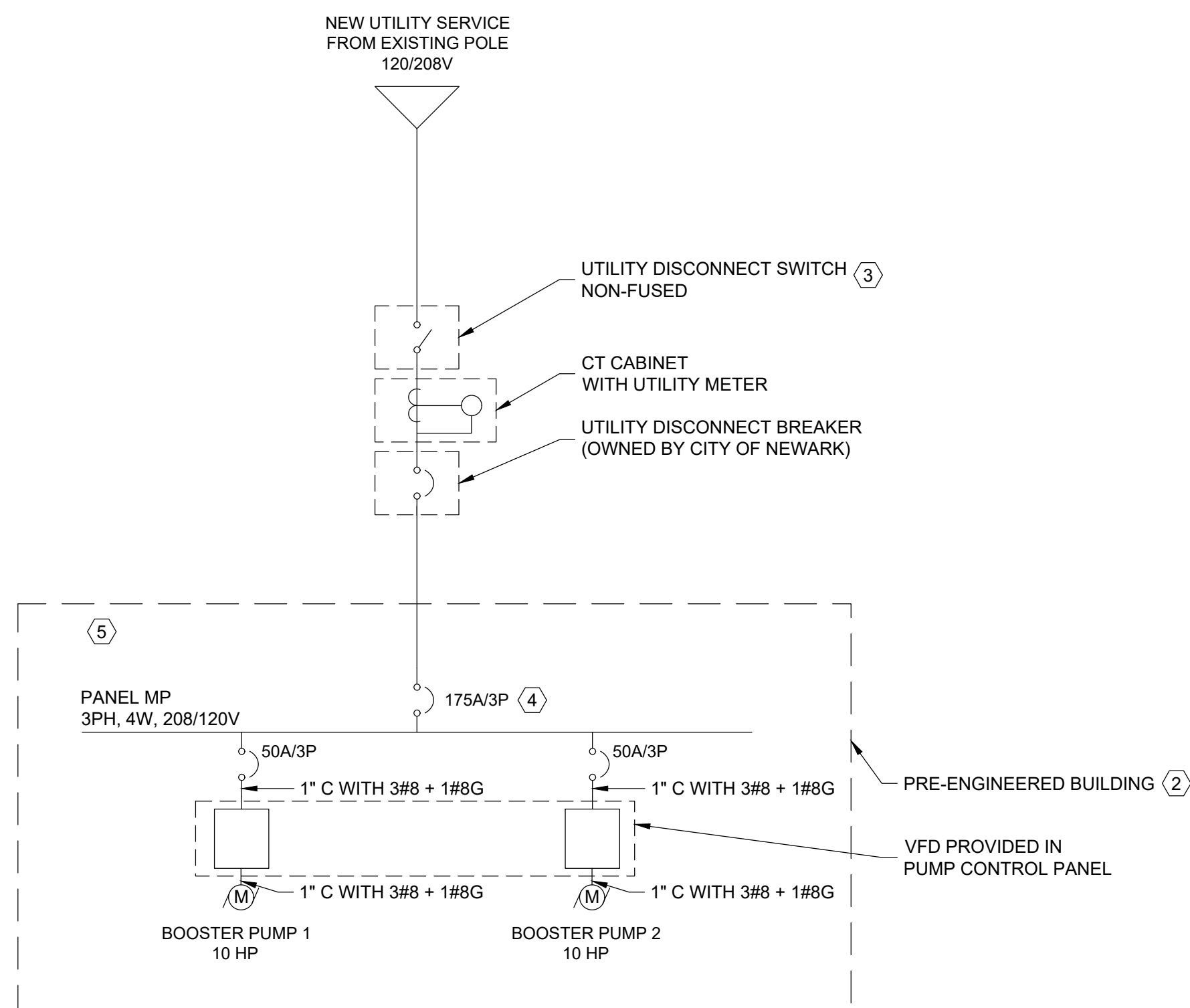


220 SOUTH MAIN STREET  
302-366-7000

| APPROVALS     | DATE     |
|---------------|----------|
| DRAWN BY: EP  | 09-24-24 |
| CHECKED BY:   |          |
| ENGINEER: CRB | 09-24-24 |
| OPERATIONS:   |          |
| REVISION:     |          |

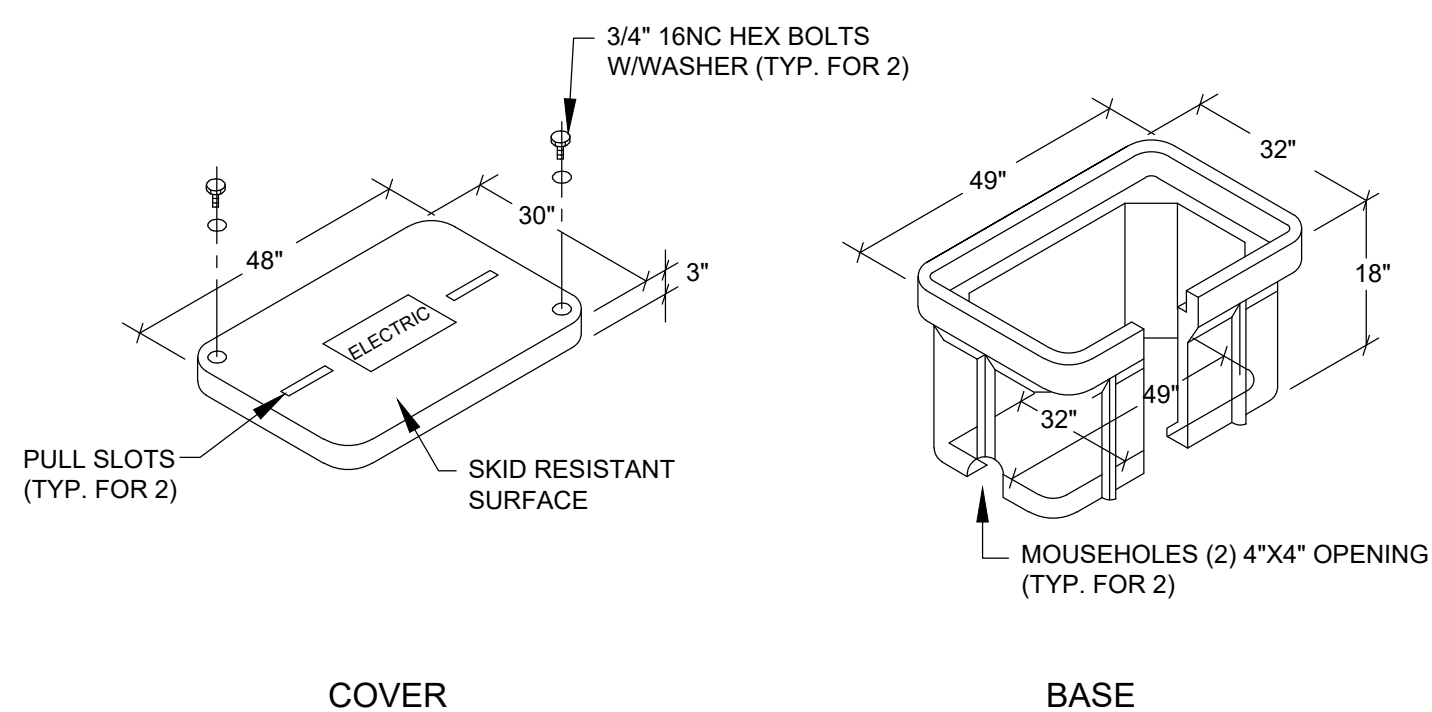
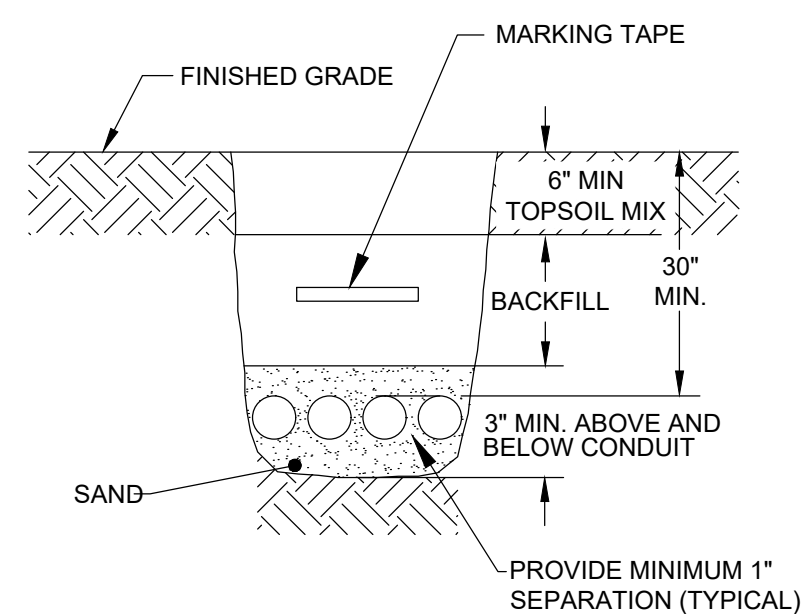
| CITY OF NEWARK<br>PUBLIC WORKS & WATER RESOURCES DEPARTMENT                            |         |       |
|----------------------------------------------------------------------------------------|---------|-------|
| SOUTH COLLEGE INTERCONNECTION<br>BOOSTER STATION REPLACEMENT<br>ISSUE TO BID NO. 24-13 |         |       |
| SHEET TITLE: DETAILS                                                                   |         |       |
| SCALE: AS NOTED                                                                        | DWG NO. |       |
| SHEET NO: 5 OF 6                                                                       |         | M-501 |





BURIED CONDUIT DETAIL NOTES:

1. CAUTION, DIRECT BURIAL DEPTHS MAY REQUIRE DERATING. SEE N.E.C.
2. IDENTIFY TYPE OF CONDUIT BEING BURIED.
3. THIS DETAIL IS GENERALLY USED FOR BURIED PVC CONDUIT. REFER TO CONCRETE ENCASED DUCTBANK DETAILS FOR ALL CONDUITS CROSSING UNDER PAVEMENTS WHICH CONSIST OF BUT IS NOT LIMITED TO: ROADWAYS, PARKING LOTS AND SIDEWALKS.

[illegible]