



City of Frostproof

Invitation to Bid

City of Frostproof
Extension on Fir Avenue & 5th Street West

Cut along border and affix this label to your sealed bid envelope to identify it as a “Sealed Bid”. Be sure to include the name of the company submitting the bid where requested.

<p style="text-align: center;">SEALED BID – DO NOT OPEN</p> <p>RFP TITLE: City of Frostproof Extension on Fir Avenue & 5th Street West</p> <p>DUE DATE/TIME: October 15th, 2:00PM</p> <p>SUBMITTED BY: _____ Name of Company</p> <p>DELIVER TO: City of Frostproof City Clerk’s Office 111 W First St. Frostproof, FL 33843</p>
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Please Note: From time to time, addenda may be issued to this Invitation to Bid. Any such addenda will be posted on the same website, www.cityoffrostproof.com, from which you obtained this Invitation to Bid. Before submitting your bid, you should check our website to download any addenda that may have been issued.

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**SECTION 00100
INVITATION TO BID**

NOTICE IS HEREBY GIVEN that the City of Frostproof is accepting sealed bids for:
City of Frostproof Extension on Fir Avenue & 5th Street West

At 2:00 P.M., prevailing time, on October 15th, 2024 in the Council Chambers at City Hall 2nd Floor, 111 West First Street Frostproof, Florida, 33843 bids will be opened and read aloud.

An original and three (3) copies of all bids, including all executed documents and needed attachments, shall be placed in a sealed envelope, with label from page 2 of the ITB affixed, and delivered prior to the opening deadline, **2:00 P.M., prevailing time, on Tuesday, October 15th, 2024. The deadline for questions is October 8th, 2024.**

Intent

The City of Frostproof is seeking a qualified Contractor/Contractor/Vendor to perform City of Frostproof Extension on Fir Avenue & 5th Street West.

Pre-Bid Meeting

A **Non-Mandatory** Pre-Bid Meeting will be held at **10:00 A.M. on, September 24th, 2024** in the Council Chambers at City Hall 2nd Floor, 111 West First Street Frostproof, Florida, 33843. Sites inspection will follow the meeting.

Responding to the Invitation to Bid

All persons and firms wishing to submit bids must obtain a complete copy of the Invitation to Bid and submit all required forms as outlined in the solicitation document with their response. Bids and related forms can be accessed on the City's website, www.cityoffrostproof.com or by contacting Asst. Clerk, via email at Clerk@cityoffrostproof.com or by phone 863-635-7854.

Faxed or e-mailed responses will not be accepted. Responses may be hand delivered, mailed, or delivered via courier service to the following address:

City of Frostproof City Clerk's Office 111 West 1 st Street Frostproof, FL 33843
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General Scope of Work:

The work included in this contract consists of extending wastewater utilities along 5th Street West and Fir Avenue South. The project includes the installation of gravity sewer, force main, and one public lift station. The project will include notes on the construction plans and a bid alternative for septic tank abandonment.

All work to be Substantially Complete within three hundred and sixty-five (365) calendar days. Substantial Completion is defined as the new system is ready for beneficial use by the Owner. The date of Final Completion will be 30 days following the date of Substantial Completion. Final Completion shall be defined as completion of all action items developed during the substantial completion inspection by the Engineer and Owner. Unless the period for Substantial Completion is extended otherwise by the Contract Documents, the Contractor will be assessed liquidated damages in the amount of \$300 per calendar day past the date of Substantial Completion. In addition, for Final Completion, the Contractor will be assessed liquidated damages in the amount of \$300 per calendar day past the date of Final Completion.

Selection of Successful Bidder:

The City of Frostproof shall be the sole judge of the bid and the resulting agreement that is in its best interest and its decision shall be final. All bidding and award procedures undertaken by the City in regard to this project shall be consistent with the City's adopted procurement procedures. The City reserves the right to seek clarification from prospective firms on any issue in a bid, or take any other action it feels necessary to properly evaluate the bids and construct a solution in the City's best interest.

General Information and Requirements

1. In accordance with Chapter 119, Florida Statutes, all bids received, and all materials contained therein, are not considered **public records** until a decision is announced or 30 days have passed, whichever is earlier. Public records are subject to disclosure to any person, organization, or firm, including other firms responding to this ITB.
2. In accordance with Section 287.133, Florida Statutes, a person or affiliate who has been placed on the convicted Contractor/Contractor/Vendor list following a conviction for a public entity crime may not submit a bid or bid on a contract to provide any goods or services to a public entity and may not be awarded or perform work as a contractor, supplier, subcontractor, or consultant under a contract with any public entity, and may not transact business with any public entity in excess of the threshold amount provided in Section 287.017-for CATEGORY TWO for a period of 36 months from the date of being placed on the convicted Contractor/Contractor/Vendor list.
3. The City reserves the right to accept or reject any or all bids, or part thereof, to waive any informalities or technicalities, or to award contracts in the best interest of the City. In all instances, the City's decision shall be final.
4. The City of Frostproof is exempt from taxes imposed by the State and Federal Government. Bids shall not include any taxes or fees.
5. Prospective firms must submit bids strictly in accordance with the specifications outlined in the ITB. Each variance, if any, to the specifications shall be specifically stated in the bid.
6. Prospective firms warrant by virtue of submission of bids that all prices, terms, and conditions stated shall be honored for a period of ninety (90) days after the opening of bids. **Any** changes at the time an order is placed shall result in automatic disqualification of the Contractor/Contractor/Vendor.
7. The original bid shall be signed, in blue ink, by a corporate officer, partner, or proprietor.
8. The City reserves the right to reject any or all items if in its sole judgment the item does not meet the needs of the City, or for any reason it deems suitable.
9. Prospective firms are hereby warned not to contact any City employee or official on matters relating to this ITB, except as indicated herein. Any attempt to do so, or engage in lobbying or any other activity interfering with the evaluation process may result in immediate disqualification of the Contractor/Contractor/Vendor from **any** City business.
10. Prospective firms quoting State of Florida contract pricing must provide the state contract number and date of expiration in their bids or bids. Firms will be required to provide a copy of the entire contract prior to the placing of orders by the City.
11. Prospective firms hereby warrant by virtue of submission of bids that any and all terms, conditions, and requirements as stated in this document are valid, enforceable, and binding upon the selected Contractor/Contractor/Vendor.

Specific Information and Requirements

1. Answers to questions submitted about this ITB or the Project will be provided to all known prospective bidders.
2. The selected firm may not discriminate against any employee employed in the performance of services, or against any applicant for employment because of race, religion, color, handicap, national origin, age, gender, or marital status.
3. Bids shall include all information required in the Invitation to Bid. Bidders shall use City standard forms as included in the Bid to submit all information, or shall follow the format dictated or include the information required herein where no form is provided. Bid documents shall be arranged in order as indicated on the Bid Contents Form.
4. The City will allow the use of **approved** subcontractors or third parties in performing work outlined in this ITB.

Evaluation of Bids

The City of Frostproof shall be the sole judge of the Bid and the resulting agreement that is in its best interest and its decision shall be final. All bid and award procedures undertaken by the City in regard to this project shall be consistent with the City's adopted procurement procedures. The City reserves the right to seek clarification from prospective firms on any issue in a bid, or take any other action it feels necessary to properly evaluate the bids and construct a solution in the City's best interest.

In evaluating Bids, Owner will consider whether the Bids comply with the prescribed requirements, and such alternates, unit prices, and other data, as may be requested in the Bid Form or prior to the Notice of Award.

In the comparison of Bids, alternates will be applied in the same order of priority as listed in the Bid Form. For comparison purposes alternates will be accepted, following the order of priority established in the Bid Form, until doing so would cause the budget to be exceeded. After determination of the Successful Bidder based on this comparative process and on the responsiveness, responsibility, and other factors set forth in these Instructions, the award may be made to said Successful Bidder on its base Bid and any combination of its additive alternate Bids for which Owner determines funds will be available at the time of award.

**SECTION 00110
BIDDER INSTRUCTIONS AND GENERAL
INFORMATION**

BIDDER INSTRUCTIONS: To ensure acceptance of this bid, follow these instructions.

BID DOCUMENTS MUST BE DELIVERED TO THE CITY CLERK PRIOR TO THE TIME AND DATE SPECIFIED. THERE WILL BE NO EXCEPTIONS.

1. **EXECUTION OF BID:** Bid must contain an original signature of an authorized representative in the space provided on the signature page. Bid must be typed or printed in blue ink. Erasable ink is not permitted. Corrections made by bidder to any bid entry must be initialed by the person who signs the bid.
2. **NO BID:** Bidder not interested in submitting a bid should return a “no bid,” with an indication of the reason for no bid and the interest in future bid solicitations.
3. **BID OPENING:** It is the responsibility of the bidder to assure that their bid is delivered at the proper time and place prior to the bid opening. All bid openings shall be public, at 2:00 p.m. prevailing time, on the date specified in the Notice to Bidders. Bids, which for any reason are not so delivered, will not be considered. **BID SUBMITTAL FORMS USING FACSIMILE OR E-MAIL WILL NOT BE ACCEPTED.**

NOTE: Bidders may call or email the Asst Clerk only for bid results. The bid will become a public record and will be posted to the City of Frostproof website at www.cityoffrostproof.com when a decision is announced or thirty (30) working days after the bid opening date. All public records may be examined during normal working hours by appointment.

4. **CITY AS GATEKEEPER OF DOCUMENTS:** This document is issued by City of Frostproof and as such shall be the sole distributor of all addenda(s) and/or changes to these documents. It is the responsibility of the bidder to determine issuance of documents directly with the Purchasing Division. The City is not responsible for any solicitations issued through subscriber, publications, or other sources not connected with the City and the Bidder should not rely on such sources for information regarding the solicitation.
5. **TAXES:** Bidders are responsible for the payment of any applicable taxes that are connected to the purchase of any materials or subcontractors used in the execution of this bid.
6. **MISTAKES:** Bidders are required to examine the specifications, delivery schedule, bid prices and all instructions pertaining to the requirements of this bid. Failure to do so will be at bidder's risk. In case of a mistake in extension of a unit price, the unit price will govern. Corrections made by bidder to any bid entry must be initialed by the person who signs the bid.
7. **INVOICING AND PAYMENT:** The successful bidder shall submit a properly detailed invoice to the City at the prices bid. **An original invoice shall be submitted to the City Manager via Post Office Box #308, or at City Hall 111 West First Street, Frostproof, Florida 33843.** The Contractor/Contractor/Vendor shall include the bid number and/or the purchase order number on all invoices. Invoices will be processed for payment when

approved.

8. **CONFLICT OF INTEREST:** All bidders must disclose, with their bid, the name of any officer, Director or agent who is also an employee of the City. Furthermore, all Bidders must disclose the name of any City employee who owns, directly or indirectly, any interest of any amount in the bidder's firm or any of their branches. Award of this bid shall be subject to the provisions of Chapter 112, Florida Statutes.
9. **WARRANTY:** Unless otherwise specified, the bidder agrees that the services furnished under this bid shall be covered by the most favorable commercial warranty the bidder gives to any customer for comparable services, and that the rights and remedies provided herein are in addition to and do not limit any rights afforded to the City by any provision of this bid.
10. **ADDENDUM:** Any changes in the bid shall be made in the form of a written addendum by the City Clerk or her representative. No other person shall be authorized to make changes verbally or in writing.
11. **LIABILITY:** The Contractor/Contractor/Vendor shall hold and save the City, its elected and appointed officials, agents and employees harmless from liability of any kind in the performance of this bid and against claims by third parties resulting from the supplier's breach of contract or the supplier's negligence.
12. **PATENTS AND ROYALTIES:** The bidder, without exception, shall indemnify and save Harmless the City and its employees from liability of any nature or kind, including cost and expenses for, or on account of, any copyrighted, patented or non-patented invention, process, or article manufactured and used in the performance of this bid. If the bidder uses any design, device or material covered by letters, patent or copyright, it is mutually agreed and understood without exception that the bid prices shall include all royalties or cost arising from the use of such design, device or material in any way involved in the work.
13. **BID PROTEST:** Any bidder desiring to file a bid protest, with respect to a recommended award of any bid, shall do so by filing a written protest. The written protest must be in the possession of the Asst Clerk within 72 working hours of electronic posting of the bid award, unless only one bid was received.

**FAILURE TO FOLLOW BID PROTEST PROCEDURE REQUIREMENTS
WITHIN THE TIME FRAMES PRESCRIBED HEREIN AS ESTABLISHED BY
THE CITY OF FROSTPROOF, FLORIDA, SHALL CONSTITUTE A WAIVER
OF THE BIDDER'S RIGHT TO PROTEST AND ANY RESULTING CLAIM.**

14. **INDEMNIFICATION:** In consideration of Ten Dollars (\$10.00) and other valuable Considerations, Contractor shall defend (by counsel reasonably acceptable to City), indemnify and hold Harmless the City, its employees and agents from and against, including, but not limited to, all liability, claims, suits, demands, damages, losses and costs, including attorney fees, arising out of or resulting from the performance of its services, provided that any such liability, claims, suit, demand, damage, loss or expense is (a) attributable to bodily injury, sickness, disease or death, or injury to or destruction of tangible property (other than the service itself), including the loss of use resulting there from; and (b) caused in whole in part by an act or omission of the contractor, any subcontractor, anyone directly or indirectly employed by any of them, or anyone for whose acts any of them may be liable, whether or not it is caused

in whole or in part by the negligence or other fault of a party indemnified hereunder. The contractor shall indemnify and hold harmless the City and anyone directly or indirectly employed by it from and against all claims, suits, demands, damages, losses and expenses (including attorney fees) arising out of any infringement or patent rights or copyrights held by others and shall defend all such claims in connection with any alleged infringement of such rights.

15. **PUBLIC ENTITY:** A person or affiliate who has been placed on the convicted Contractor/Contractor/Vendor list following a conviction for a public entity crime may not submit a bid on a contract to provide any goods or services to a public entity, may not submit a bid on a contract with a public entity for construction or repair of a public building or public work, may not submit bids on leases of real property to a public entity, may not be awarded or perform public entity in excess of the threshold amount provided in Section 287.017, Florida Statutes, for CATEGORY TWO for a period of 36 months from the date of being placed on the convicted Contractor/Contractor/Vendor list. When submitting this bid, the bidder hereby certifies that they complied with said statute.
16. **PREFERENCE FOR DRUG FREE WORKPLACE:** Whenever two or more bids, which are equal with respect to price, quality and service, are received, preference shall be given to a bid received from a business that certifies that it has implemented a drug free workplace program in accordance with Section 287.087, Florida Statutes. In order to receive preference, a signed certification of compliance must be submitted with the bid response.
17. **PRICES, TERMS AND PAYMENT:** Firm prices shall be proposed and include all packing, handling, shipping charges and delivery to any point within the City. Price bid shall be firm for sixty (60) days.
18. **SAFETY STANDARDS:** Unless otherwise stipulated in the bid, all manufactured items and fabricated assemblies shall comply with applicable requirements of Occupational Safety and Health Act (OSHA) and carry evidence of Underwriters Laboratories' Listings (UL).
19. **PACKAGING:** All containers shall be suitable for storage or shipment, and all prices should include standard commercial packaging.
20. **MEETS SPECIFICATIONS:** It is understood and agreed that any item offered or shipped as a result of this bid shall be new (current model at the time of this bid) unless otherwise specified in the specifications. The bidder represents that all equipment offered under this specification should meet or exceed the minimum requirements specified. Bidder shall strictly adhere to delivery specifications.
21. **SILENCE OF SPECIFICATIONS:** The apparent silence of specifications and/or any supplemental specifications to any details or the omission from any detailed description concerning any point shall be regarded as meaning that only the best commercial practices are to prevail and that only materials of first quality and correct type, size and design are to be used. All Workmanship is to be first quality. All interpretations of these specifications shall be made upon the basis of this statement.
22. **GOVERNMENTAL RESTRICTIONS:** In the event that any governmental restrictions may be imposed which would necessitate alteration of the material, quality, workmanship or performance of the items offered on this bid prior to delivery, it shall be the responsibility of

the supplier to notify the City Clerk at once in writing. Their letter shall indicate the specific regulation, which required an alteration. The City reserves the right to accept any such alteration, including any price adjustments, or to cancel the contract at no expense to the City.

23. **TOXIC SUBSTANCE:** Notice of successful Contractor/Contractor/Vendor (s) to provide to City toxic substances (As listed in Chapter 442, Appendix “G” of the Florida Statutes) if applicable.
- a. Chapter 442 of the FS states that manufacturers, importers or distributors of any toxic Substance shall prepare and provide each direct purchaser of such toxic substance with Material Safety Data Sheet (s), herein referred to as MSDS, which to the best of manufacturer’s, importer’s or distributor’s knowledge, is current, accurate and complete based on information then reasonably available to the manufacturer, importer or distributor. Upon notification of a new or revised MSDS the manufacturer, importer or distributor, on a timely basis not to exceed three (3) months after notification, shall provide the City with the revised information as it becomes available to the manufacturer, importer or distributor.
 - b. Failure to provide the MSDS, when applicable, shall be cause of rejection of bid.
24. **INSPECTION, ACCEPTANCE AND TITLE:** Inspection and acceptance will be at the designated facility unless otherwise indicated. Title and risk of loss or damage to all items shall be the responsibility of the contract supplier until accepted by the City, unless loss or damage results from negligence by the City.
25. **SAMPLES:** Samples of items, when called for or voluntarily provided, must be furnished free of expense and may, upon request be returned at the bidder’s expense. Each individual sample must be labeled with bidder’s name, manufacturer’s brand name and number, bid number and item reference. Sample of successful bidder’s items may remain on file with Purchasing for the term of the contract. Request for return of samples shall be accompanied by instructions, which include shipping authorization and name of carrier, and must be received within ninety (90) days after bid opening date. If instructions are not received within this time, the Purchasing Division shall dispose of the samples.
26. **PUBLIC RECORDS:** Contractor acknowledges that it is acting on behalf of a Public agency and that this Agreement is subject to the provisions of §119.0701, Florida Statutes, and that Contractor must comply with the public records laws of the State of Florida. Contractor shall:
- a. Keep and maintain public records that ordinarily and necessarily would be required by the public agency in order to perform the service.
 - b. Provide the public with access to public records on the same terms and conditions that the public agency would provide the records and at a cost that does not exceed the cost provided in this chapter or as otherwise provided by law.
 - c. Ensure that public records that are exempt or confidential and exempt from public records disclosure requirements and not.
 - d. Meet all requirements for retaining public records and transfer, at no cost, to the public agency all public records in possession of the contractor upon termination of the contract and destroy any duplicate public records that are exempt or confidential and exempt from public records disclosure requirements. All records stored electronically must be provided to the public agency in a format that is compatible with the information technology systems of the public agency.

GENERAL INFORMATION

1. **DEFINITIONS:** The term “City” means the City of Frostproof, a Florida municipal corporation, and its authorized designees, agents or employees.
2. **AWARD (S):** The award of this bid shall be based on the City’s evaluation of Contractors and Bids that may include additives.
3. **NON-CONFORMANCE TO BID CONDITIONS:** Services not delivered as per delivery date in bid and purchase order may result in bidder being found in default, in which event any and all re-procurement costs may be charged against the defaulting Contractor/Contractor/Vendor. This non-conformance to bid conditions may result in immediate cancellation of the purchase order.
 - **ASSIGNMENT:** Any purchase order issued pursuant to this bid and the monies, which may become due therein, are not assignable, except with the prior written approval of the City Clerk.
4. **DISPUTES:** In the event of any doubt or difference of opinion as to the methods provided herein, or the level of performance rendered, the decision of the City Manager shall be final and binding on both parties.
5. **FACILITIES:** The City reserves the right to inspect the bidder’s facilities at any time, with prior notice.
6. **PLACING OF ORDERS:** The award of this bid does not constitute an order. Before any services can be performed, the successful bidder must receive a written Purchase Order in accordance with the practices of the City.
7. **PRECEDENCE:** Any requirement set forth in any section of the bid documents shall be binding as if called for by all sections. If there is a difference in the terms anywhere in this document, the most restrictive shall prevail.
8. **ADDITIONS/REVISIONS/DELETIONS:** Additions, revisions or deletions to the general conditions, specifications or bid price sheets that change the intent of the bid will cause the bid to be non-responsive and the bid will not be considered. The City Manager shall be the sole judge as to whether or not any addition, revision or deletion changes the intent of the bid.

9. The City Manager reserves the right to terminate or suspend the award of this bid, in whole or in part, when it is in the best interest of the City to do so. The City Manager will notify the Contractor/Contractor/Vendor, in writing, of any such action with notice of the effective date of termination or suspension. This notice shall also specify the state of the work at the time of termination or suspension.

If the City determines that the performance of the Contractor/Contractor/Vendor does not comply with the bid Requirements, the City may:

- Immediately suspend the work; and
 - Notify the Contractor/Contractor/Vendor of the non-performance with a requirement that the deficiency be corrected within ten (10) days of notification.
10. **PRICE ADJUSTMENTS:** Any price decrease executed during the contract period, either by reason of market change or on the part of the contractor to other customers, shall be passed on to the City.
11. **CANCELLATION:** All annual bid obligations shall prevail for at least one hundred eighty (180) Days after effective date of the bid, unless bid conditions are breached as specified hereinafter that period, for the protection of both parties, either party may cancel this bid in whole or part by giving thirty (90) days prior notice in writing to the other party. The City reserves the right to cancel any bid after reasonable written notice to the successful bidder should the service not be in the best interest of the City. Should the service rendered for any bid cause or threaten endangerment to public safety or welfare, the Purchasing Director may cancel the bid immediately.
12. **PLANS AND SPECIFICATIONS:** The specifications and other bid documents upon which the prices in the Contractor/Contractor/Vendor's bid are based on, are hereby made a part of the purchase order by reference hereto.
13. **ANNUAL APPROPRIATIONS:** The contractor acknowledges that the City, during any fiscal year, shall not expend money, incur any liability, or enter into any agreement which, by its terms, involves the expenditure of money in excess of the amounts budgeted or the reduction of revenues for those budgeted agreements that may be available for expenditure during such fiscal year. Any agreement, verbal or written, made in violation of this subsection is null and void, and no money may be paid on such agreement. Nothing herein contained shall prevent the making of agreement for a period exceeding one year, but any agreement so made shall be executor only for the value of the services to be rendered or agreed to be paid for in succeeding fiscal years. Accordingly, the City's performance and obligation to pay under this agreement is contingent upon annual appropriation.
14. **INSURANCE REQUIREMENTS:**

Unless otherwise stated in the specifications, the following insurance requirements must be met before delivery of goods or services.

Worker's Compensation Coverage is to apply for all employees for statutory limits in compliance with the applicable state and federal laws. The policy must include Employer's Liability with a limit of \$3,000,000 each accident, \$1,000,000 each employee, \$1,000,000 policy limit for disease.

Commercial General Liability – Occurrence form required (Contractor/Vendor) shall maintain commercial general liability (CGL) insurance with a limit of not less than \$3,000,000 each occurrence. If such CGL insurance contains a general aggregate limit, it shall apply separately to this location/project in the amount of \$6,000,000. Products and completed operations aggregate shall be \$6,000,000. CGL insurance shall be written on an occurrence form and shall include bodily injury and property damage liability for premises, operations, independent contractors, products and completed operations, contractual liability, broad form property damage and property damage resulting from explosion, collapse or underground (x,c,u) exposures, personal injury and advertising injury. Fire damage liability shall be included at \$100,000.

Commercial Automobile Liability Insurance (Contractor/Vendor) shall maintain automobile liability insurance with a limit of not less than \$3,000,000 each accident for bodily injury and property damage liability. Such insurance shall cover liability arising out of any auto (including owned, hired and non-owned autos). The policy shall be endorsed to provide contractual liability coverage.

Evidence of Insurance The Contractor/Vendor shall furnish the City of Frostproof with Certificates of Insurance. The Certificates are to be signed by a person authorized by that insurer to bind coverage on its behalf. The City of Frostproof is to be specifically included as an additional insured on all policies except Workers' Compensation. In the event the insurance coverage expires prior to the completion of the contract, a renewal certificate shall be issued 30-days prior to said expiration date. The policy shall provide a 30-day notification clause in the event of cancellation or modification to the policy. All certificates of insurance must be on file with and approved by the City of Frostproof before the commencement of any work activities.

**SECTION 00120
SPECIAL CONDITIONS**

1. Award of bids will be based on an overall low average of point scores from Contractor/Contractor/Vendors otherwise meeting all Contractor/Contractor/Vendor qualifications and specifications. The City reserves the right to reject any or all bids and/or waive any minor irregularities in the bids received, whichever would be in the best interest of the City.
2. **ANNUAL APPROPRIATIONS:** The Contractor/Contractor/Vendor acknowledges that the City, during any fiscal year, shall not expend money, incur any liability, or enter into any agreement which, by its terms, involves the expenditure of money in excess of the amounts budgeted or the reduction of revenues for those budgeted agreements that may be available for expenditure during such fiscal year. Any agreement, verbal or written, made in violation of this subsection is null and void, and no money may be paid on such agreement. Nothing herein contained shall prevent the making of agreement for a period exceeding one year, but any agreement so made shall be executory only for the value of the services to be rendered or agreed to be paid for in succeeding fiscal years. Accordingly, the City's performance and obligation to pay under this agreement is contingent upon annual appropriation.
3. All price bids shall remain unchanged during the period of performance, as specified herein.
4. **PERFORMANCE OF WORK:** The work required under this bid shall be performed by the entity submitting the bid.
5. Any contract may be cancelled by either party without cause by giving sixty (60) days notice in writing. This contract is subject to immediate cancellation by the City for poor service and delivery.
6. **SEALED BIDS:** All bid submittals must be completed and submitted in a sealed parcel. **BID SUBMITTAL SHALL INCLUDE ONE (1) ORIGINAL AND THREE (3) COPIES.** The **Original** bid submittal(s) shall be submitted on the forms provided by the City. All bids are subject to the conditions herein; failure to comply will subject bid to rejection.
7. If it becomes necessary to revise or amend any part of this bid, an addendum will be issued and will be posted on the City's website at www.cityoffrostproof.com. **It is the sole responsibility of the bidders to check the website or call the City Clerk (863-635-7854) to ensure that all available information has been received prior to submitting a bid.**
8. Bidders are advised that in the interests of waste reduction and maximizing the potential for recycling, they are asked to adhere to the following in preparing their bids:
 - Return only the required bid submittal pages
 - Avoid comb, velo binding, and plastic binders
 - Avoid plastic dividers and/or plastic tabs
 - Use post-consumer recycled content paper to the extent practicable
9. Contractor/Contractor/Vendors must possess either a City Business Tax Receipt (f/k/a Business License) or an Occupational License from any other government entity located within the State

of Florida in order to do business with the City of Frostproof. **A copy of such license must be submitted with your bid submittal.**

Submittal Check List

ALL RESPONDERS SHALL INCLUDE IN THEIR SUBMITTALS:

1. Itemized Cost, Total Base Bid and Additive Bid Item Costs and other supporting documentation for evaluation consideration.
2. Copy of business license or tax receipt
3. Contractor/Vendor's application, W-9 and Public Entity Crime Statement
4. Insurance Submittal Page, Certificate of Insurance, Signature Submittal Page, Bid and Addendum Acknowledgement
5. Non-Collusion Affidavit of Prime Bidder, Drug-free Workplace Form, Indemnification
6. Evidence of Florida licensure.
7. A list of at least three government agency references on a similar project, with appropriate names, titles and phone numbers the City may contact in order to assist in the evaluation of past performance.
8. The firm name and contact person, address, telephone number, fax number and email address of the office from which the services are being provided.
9. Bid Bond (5%)

BID FORM

1. The undersigned Bidder does hereby declare that he has carefully examined the Invitation to Bid, the Plans, and drawings and the Contract Documents and Specifications relating to the above entitled matter and the work, and has also examined the site.
2. The undersigned Bidder hereby declares that he has based his proposal on the conditions as they exist on site and has noted all items of work required of the project that is not illustrated on the plans.
3. The undersigned does hereby offer and agree to furnish all materials, to fully and faithfully construct, perform and execute all work in the above titled matter in accordance with the Plans, Drawings and Specifications relating thereto.
4. The undersigned does hereby declare that the prices so stated cover all expenses of every kind incidental to the completion of said work, and the contract therefore, including all claims that may arise through damages or any other causes whatsoever.
5. The undersigned does hereby declare and agree that he will accept the following lump sum prices for the various items of the work for additions to or deductions from the approximate quantities.
6. The undersigned does hereby declare that he shall make no claim on account of variation of the approximate estimate in the QUANTITIES or work to be done, nor on account of any misunderstanding or misconception of the nature of the work to be done or the grounds or place where it is to be done.
7. The undersigned does also declare and agree that he will commence the work within ten (10) days after notification by the ENGINEER to do so and will complete the work fully and in every respect on or before the time specified in said contract.
8. The undersigned further agrees that the UNIT PRICES submitted on the Bid Form shall govern all errors in extension or addition and shall void the total base bid submitted on the attached sheet. The corrected extension and addition of all items shall be considered to be the correct base bid for comparison purposes.
9. The undersigned further agrees that the UNIT PRICES submitted on the Bid Form will expire if a contract is not executed within ninety (90) days from the date of bid deadline, and that the Contractor will be fully released from any obligations of this Bid Form.
10. The undersigned agrees that this bid is based on substantially completing the project within three hundred and sixty five (365) calendar days from the date of Notice to Proceed. The Contractor further agrees to pay, as liquidated damages, the sum of three-hundred (\$300) dollars for each consecutive calendar day thereafter.
11. By submission of this bid, each bidder certifies, and in the case of a joint bid each party thereto certifies as to its own organization, that this bid has been arrived at independently, without consultation, communication or agreement as to any matter relating to this bid with any other bidder or with any competitor.

Total Base Bid amounts are to be shown in both words and figures. In case of discrepancies, the amount in words will govern.

TOTAL BASE BID: \$ _____

WORDS: _____

THIS PROPOSAL DATED THIS _____ day of _____, _____

ATTEST:

Witness

Printed Name

By:

Authorized Signature
(Principal)

Printed Name, Title

Company Name

Address:

Employee I.D. No.

Fla. State Certified General
Contractor's License Number

Phone No. _____

EXTENSION ON FIR AVENUE AND 5TH ST. W.					
ITEM	DESCRIPTION	QUANTITY		UNIT PRICE	AMOUNT
I. MISCELLANEOUS					
1	Mobilization/Demobilization (Not to Exceed 10% of Bid)	1	LS		\$
2	Erosion and Sediment Control, Davis-Bacon Compliance, Utility Locates, and Pre-construction Video	1	LS		\$
3	Maintenance of Traffic (MOT)	1	LS		\$
4	As-Built Survey and Project Closeout	1	LS		\$
5	Construction Testing and Staking	1	LS		\$
SUBTOTAL					\$
II. PROPOSED IMPROVEMENTS					
6	8" Gravity Sewer PVC	1,131	LF		\$
7	2" HDPE DR 11 Force Main HDD (Including Fittings, Restraints, Trenches, Excavation, and Restoration)	526	LF		\$
8	Manhole	6	EA		\$
9	Gravity Sewer Lateral Single Service	5	EA		\$
10	Gravity Sewer Lateral Double Service	6	EA		\$
11	Complete Lift Station Package	1	EA		\$
12	Asphalt Roadway (Full Depth Replacement)	1,390	SY		\$
13	Septic Tank/ Laundry Tank Abandonment (Includes Private Lateral Installation)	15	EA		\$
SUBTOTAL					\$
SUMMARY					
I. MISCELLANEOUS					\$
II. PROPOSED IMPROVEMENTS					\$
CONTRACT CONTINGENCY (10%)					\$
CONSTRUCTION TOTAL					\$
Notes:					

Costs taken from historical bid tabulations from existing projects.

The Consultant has no control over the cost of labor, materials, equipment, or over the Contractor's methods of determining prices or over competitive bidding or market conditions. Opinions of probable costs provided herein are based on the information known to Consultant at this time and represent only the Consultant's judgement as a design professional familiar with the construction industry. The Consultant cannot and does not guarantee that proposals, bids, or actual construction costs will not vary from its opinions of probable costs

BID AND ADDENDUM ACKNOWLEDGMENT

Receipt of Addenda Acknowledgement

Bidder shall acknowledge below the receipt of any and all Addenda, if any, to the Plans and Specifications, listing the Addenda by number and date.

Addendum No.: _____ Date: _____ Signature: _____

Addendum No.: _____ Date: _____ Signature: _____

Addendum No.: _____ Date: _____ Signature: _____

Addendum No.: _____ Date: _____ Signature: _____

Addendum No.: _____ Date: _____ Signature: _____

Bid Acknowledgement

This acknowledgment shall be signed, in blue ink, by a corporate officer, partner, or proprietor:

I certify that this bid is made without prior understanding, agreement, or connection with any corporation, firm, or person submitting a bid for the same construction, service, or material and is in all respects fair and without collusion or fraud. I agree to adhere to all conditions of this bid and certify that I have read and understand the solicitation documents in their entirety. I have completed and submitted all bid submittals and I am authorized to sign this bid for the Bidder.

Authorized Signature _____
Date

Name of Authorized Person: _____

Title / Position of Authorized Person: _____

SECTION 00310
SIGNATURE ACKNOWLEDGEMENT
(SUBMITTAL PAGE)

To The City of Frostproof, a Florida municipal corporation:

Date: _____

I certify that this bid is made without prior understanding, agreement or connection with any corporation, firm or person submitting a bid for the same construction, service or material and is in all respects fair and without collusion or fraud. I agree to abide by all conditions of this bid and certify that I have read and understand the bid documents. I have completed and submitted all bid submittal forms, and I am authorized to sign this bid for the bidder. In submitting a bid to the City, the bidder offers and agrees that if the bid is accepted, the bidder will convey, sell, assign or transfer to the City all rights, titles and interests in and to all causes of action it may now or hereafter acquire under the Anti-Trust Laws of the United States and the State of Florida for price fixing relating to the particular commodities or services purchased or acquired by the City. At the City's discretion, such assignment shall be made and become effective at the time the City tenders final payment to the bidder.

CONTRACTOR/CONTRACTOR/VENDOR NAME

AUTHORIZED SIGNATURE (MANUAL)

MAILING ADDRESS

NAME (TYPED OR PRINTED)

CITY, STATE AND ZIP CODE

TITLE (TYPED OR PRINTED)

(AREA CODE) TELEPHONE NUMBER

TOLL FREE NUMBER

(AREA CODE) FAX NUMBER

E-MAIL ADDRESS

Any other Government Agency may use this bid. YES NO N/A

A City check will be accepted as method of payment. YES NO

NOTE: If Bidder checks "yes" above, Bidder agrees that the City will use a City check for the payment of any and all invoices submitted as a result of the performance of this bid.

SECTION 00320
NON-COLLUSIOIN AFFIDAVIT OF PRIME BIDDER
(SUBMITTAL PAGE)

State of _____

County of _____

_____ Being first Duly sworn, deposes and says that:

1. He/She is _____ of _____, the Bidder that has submitted the attached Bid;
2. He/She is fully informed respecting the preparation and contents of the attached Bid and of all pertinent circumstances respecting such Bid;
3. Such Bid is genuine and is not a collusive or sham Bid;
4. Neither the said Bidders nor any of its elected and appointed officials, partners, owners, agents, representatives, employees or parties in interest, including this affiliate has in any way colluded, conspired, connived or agreed, directly or indirectly, with any other Bidder, firm or person to submit a collusive or sham Bid in connection with such Contract or has in any manner, directly or indirectly, sought by agreement or collusion of communication or conference with any other Bidder, firm or person to fix the price or prices in the attached bid of any other Bidder, or to fix any overhead, profit or cost element of the Bid Price or the Bid Price of any other Bidder, or to secure through any collusion, conspiracy, connivance or unlawful agreement any advantage against the City or any person interested in the proposed Contract; and
5. The price or prices quoted in the attached Bids are fair and proper and are not tainted by any collusion, conspiracy, connivance or unlawful agreement on the part of the Bidder or any of its agents, representatives, owners, employees or parties in interest, including this affiliate.

Signed: _____

Title: _____

Subscribed and sworn to before me this _____ day of _____, 20 _____

Notary Public

My Commission Expires: _____

SECTION 00400
DRUG-FREE WORKPLACE FORM
(SUBMITTAL PAGE)

The undersigned Contractor/Contractor/Vendor in accordance with Florida Statute 287.087 hereby certifies

That _____ does:
(Name of Business)

1. Publish a statement notifying employees that the unlawful manufacture, distribution, dispensing, possession or use of a controlled substance is prohibited in the workplace and specifying the actions that will be taken against employee for violations of such prohibition
2. Inform employees about the dangers of drug abuse in the workplace, the business's policy of maintaining a drug-free workplace, any available drug counseling, rehabilitation programs, employee assistance programs and the penalties that may be imposed upon employees for drug abuse violations.
3. Give each employee engaged in providing the commodities or contractual services that are under bid a copy of the statement specified in subsection (1).
4. In the statement specified in subsection (1), notify the employee that, as a condition of working on the commodities or contractual services that are under bid, the employee will abide by the Terms of the statement and will notify the employer of any conviction of, plea of guilty or nolo contendere to, any violation of Chapter 1893 or of any controlled substance law of United States any state, for a violation occurring in the workplace no later than five (5) days after such Conviction.
5. Impose a sanction on or require the satisfactory participation in a drug abuse assistance or Rehabilitation program, if such is available in the employee's community, by any employee who is so convicted.
6. Make a good faith effort to continue to maintain a drug-free workplace through implementation of this section.

As the person authorized to sign the statement, I certify that this firm complies fully with the above requirements.

Bidder's Signature

Date

SECTION 00500
PERFORMANCE AND PAYMENT
BOND

The successful Bidder, simultaneously with the execution of the Agreement, shall furnish a Performance and Payment Bond in an amount equal to 100 percent (100%) of the Contract Price. The Bond shall be secured from a Surety Company listed on the Treasury Department's most current list and acceptable to the Owner.

Performance and Payment Bonds may be submitted on a standard form used by the Bidder's Surety Company. The Owner reserves the right to accept or reject the style and content of the Performance Bond Form submitted by the Bidder.

Performance and Payment Bonds shall be submitted with the executed Agreement.

Attorneys-in-fact who sign BID BONDS or PAYMENT BONDS and PERFORMANCE BONDS must file with each BOND a certified and effective dated copy of their Power of Attorney.

END OF SECTION

**SECTION 00600
(DRAFT) AGREEMENT**

This Agreement made this ____ day of _____, ____ by and between The City of Frostproof hereinafter called "Owner", and _____ doing business as a corporation hereinafter call "Contractor", for the Extension Fir Ave & 5th St West as described in the Construction Documents and Specification Manual provided by Kimley-Horn and Associates, Inc.

WITNESSETH: That for and in consideration of the payments and agreements hereinafter mentioned:

1. The Contractor will furnish all of the material, supplies, tools, equipment, labor and other services necessary for construction and completion of the work described in the Contract Documents and comply with the terms therein for the sum of \$ _____ as detailed in the Bid Schedule.
2. The Contractor will furnish a Performance and Payment Bond, in an amount equal to 100 percent (100%) of the Contract Price, and submit such Bond to the Owner within ten (10) calendar days from the date of the Notice of Award.
3. The Contractor will purchase and maintain such comprehensive general liability and other insurance such as required by the General and Supplementary Conditions and furnish Certificates of Insurance to the Owner within ten (10) calendar days from the date of the Notice of Award.
4. The Contractor will commence the work required by the Contract Documents within ten (10) calendar days after the date of the Notice to Proceed for the proposed work and will achieve Substantial Completion (**operational**) within 365 calendar days. Substantial Completion is defined as the new system is ready for beneficial use by the Owner. The date of Final Completion will be 30 days following the date of Substantial Completion. Final Completion shall be defined as completion of all action items developed during the substantial completion inspection by the Engineer and Owner. Unless the period for Substantial Completion is extended otherwise by the Contract Documents, the Contractor will be assessed liquidated damages in the amount of \$300 per calendar day past the date of Substantial Completion. In addition, for Final Completion, the Contractor will be assessed liquidated damages in the amount of \$300 per calendar day past the date of Final Completion.
5. The Owner will pay to the Contractor in the manner and at such times as set forth in the General Conditions such amounts as required by the Contract Documents.
6. Progress payments will be made in an amount equal to 90% (ninety percent) of the value of work completed, and may include 90% (ninety percent) of the value of materials and equipment not incorporated into the work, but delivered and suitably stored, less, in each case, the aggregate of payments previously made. At the sole discretion of the Owner, monthly progress payments may be increased after 50% (fifty percent) of the work is completed to 95% (ninety-five percent) of the value of work completed and materials and equipment not incorporated but delivered and suitably stored (less the aggregate of previous payments) provided that:
 - (a) Contractor is making satisfactory progress, and
 - (b) There is no specific cause for greater withholding.

However, the Owner may subsequently resume retaining 10% (ten percent) of the value of work completed and materials delivered if, in sole determination of the Owner, the Contractor is not performing according to the Contract Documents or not complying with the current progress schedule.

7. The Contractor will provide the Owner with a list of all Sub-contractors and Suppliers used by the Contractor in performing the work covered by this Contract. The Contractor will be required to submit to the Owner appropriate partial Release of Lien from the appropriate Suppliers and Sub-contractors with each Application for Payment before payment is made by the Owner. Final payment will be paid to the Contractor when the Contractor and all Sub-contractors and Suppliers have provided the Owner with their final Release of Lien.
8. The term "Contract Documents" means and includes the following:
 - A. Invitation For Bids
 - B. Bid
 - C. Bid Bond
 - D. Agreement
 - E. Performance and Payment Bond
 - F. Certificate of Insurance
 - G. General Conditions
 - H. Special Provisions
 - I. Notice Of Award
 - J. Notice To Proceed
 - K. Change Order Form
 - L. Application For Payment Form
 - M. Certificate of Substantial Completion
 - N. Release of Lien Forms
 - O. Drawings and Technical Specifications prepared by Kimley-Horn & Associates, Inc.
9. This Agreement shall be binding upon all parties hereto and their respective heirs, executors, administrators, successors, and assigns.
10. The Contractor agrees that all materials, techniques, methods and safety are exclusively the responsibility of the Contractor and not the Engineer or Owner.
11. Contractor agrees to immediately notify Owner if Contractor is adjudged as bankrupt or insolvent, or makes a general assignment for the benefit of its creditors, or if a trustee or receiver is appointed for the Contractor or for any of its property, or if Contractor files a petition or take advantage of any debtor's act, or to reorganize under the bankruptcy or applicable laws.
12. The Contractor shall indemnify and save harmless The City of Frostproof its officers, agents and employees from all suits, actions or claims of any character, name and description brought for, or on account of any injuries, deaths or damages received or sustained by any person, persons or property by or from the Contractor, his agents or employees, or by, or in consequence of, any neglect in safeguarding the work or through the use of unacceptable materials in the construction of the improvement, or by, or on account of, any act or omission, neglect, or misconduct of the Contractor, his agents or employees, or by, or on account of, any claims or amounts recovered for any infringement of patent, trademarks, or copyright or from any claims or amounts arising or recovered under the Workmen's Compensation Law or any other laws, by-laws, ordinances, order or other decree, and so much of the money due to Contractor under any virtue of his contract as shall be considered necessary to the Engineer, may be retained for use of the Owner, or in case of money

is due, his Surety shall be held until such suit or lawsuits, action or actions, claim or claims, for injuries, deaths or damages, as aforesaid, shall have been settled and suitable evidence to that effect furnished to the Owner. The Contractor agrees to furnish insurance coverage in the type and amounts stipulated by the Specifications and Contract Documents. Nothing contained herein shall be construed as a waiver of the City's sovereign immunity. This indemnification clause shall survive the termination of this agreement.

13. Public Records.

- A. Contractor shall comply with Florida Public Records law under Chapter 119, F.S. Records made or received in conjunction with this Agreement are public records under Florida law, as defined in Section 119.011(12), F.S. Contractor shall keep and maintain public records required to perform the services under this Agreement.
- B. This Agreement may be unilaterally canceled by the City for refusal by Contractor to either provide public records to the City upon request, or to allow inspection and copying of all public records made or received by the Contractor in conjunction with this Agreement and subject to disclosure under Chapter 119, F.S., and Section 24(a), Article I, Florida Constitution.
- C. If Contractor meets the definition of "contractor" found in Section 119.0701(1)(a), F.S.; [i.e., an individual, partnership, corporation, or business entity that enters into a contract for services with a public agency and is acting on behalf of the public agency], then the following requirements apply:
 - (1) Pursuant to Section 119.0701, F.S., a request to inspect or copy public records relating to this Agreement for services must be made directly to the City. If the City does not possess the requested records, the City shall immediately notify Contractor of the request, and Contractor must provide the records to the City or allow the records to be inspected or copied within a reasonable time. If Contractor fails to provide the public records to the City within a reasonable time, Contractor may be subject to penalties under s. 119.10, F.S.
 - (2) Upon request from the City's custodian of public records, Contractor shall provide the City with a copy of the requested records or allow the records to be inspected or copied within a reasonable time at a cost that does not exceed the cost provided in Chapter 119, Florida Statutes, or as otherwise provided by law.
 - (3) Contractor shall identify and ensure that all public records that are exempt or confidential and exempt from public records disclosure requirements are not disclosed except as authorized by law for the duration of the Agreement term and following completion of the Agreement if the Contractor does not transfer the records to the City.
 - (4) Upon completion of the Agreement, Contractor shall transfer, at no cost to City, all public records in possession of Contractor or keep and maintain public records required by the City to perform the services under this Agreement. If the Contractor transfers all public records to the City upon completion of the Agreement, the Contractor shall destroy any duplicate public records that are exempt or confidential and exempt from public disclosure requirements. If the Contractor keeps and maintains public records upon completion of the Agreement, the Contractor shall meet all applicable requirements for retaining public records. All records that are stored electronically must be provided to City, upon request from the City's custodian of public records, in a format that is accessible by and compatible with the information technology systems of City.

14. This Agreement and the Contract Documents shall be governed by the law of the State of Florida. Venue for any dispute before a court of law shall be in state court, in Polk County, Florida. The parties agree to

waive any right to trial by jury, and Contractor waives any right to litigate in federal court including the basis of diversity jurisdiction.

15. No provision, requirement, default, or breach of this Agreement may be waived by either party except in writing, except that Contractor's claims for extra compensation, arising from changes in the Work or other causes, shall be waived unless written claim is made therefor within twenty (20) days of the event on which such claim is based.
16. All exhibits hereto are incorporated herein as part of this Agreement. The captions appearing with the article or section number designations of this Agreement are for convenience only and are not a part of this Agreement and do not in any way limit or amplify the terms and provisions of this Agreement and should not be used in construing this Agreement. Terms and conditions of this Agreement are the product of mutual draftsmanship by both parties, each being represented by counsel if so desired, and any ambiguities in this Agreement or any documentation prepared pursuant to it shall not be construed against either of the parties because of authorship. The parties acknowledge that all the terms of this Agreement were negotiated at arms' length, and that each party, being represented by counsel if so desired, is acting to protect its own interests.
17. In the event that any of the terms or provisions of this Agreement are declared invalid or unenforceable by any Court of competent jurisdiction or any Federal or State government agency having jurisdiction over the subject matter of this Agreement, and the remaining provisions and applications in the Agreement can be given effect without the invalid provision, the remaining terms and provisions that are not affected thereby shall remain in full force and effect.
18. This Agreement will be effective on the date fully executed by both parties. No amendment, modification, or alteration of the terms hereof shall be binding unless the same is in writing, dated subsequent to the date hereof, and duly executed by each party.

IN WITNESS WHEREOF, the parties thereto have executed, or caused to be executed by their duly authorized officials, this Agreement in triplicate each of which shall be deemed an original on the date first above written.

OWNER:

BY: _____
NAME: _____
Please Type/Print

TITLE: _____
DATE: _____

ATTEST:

NAME: _____
Please Type/Print

TITLE: _____

CONTRACTOR: _____
BY: _____
NAME: _____
Please Type/Print

ADDRESS: _____

DATE: _____

ATTEST:

NAME: _____
Please Type/Print

TITLE: _____

**SECTION 00700
INSURANCE
(SUBMITTAL PAGE)**

By signing below the Bidder is stating that they fully understand the insurance requirements for the project and if awarded the bid will provide all insurance coverage as required in ITB.

The requirements are as follows:

- Bidder is insured with a company licensed to do business in the State of Florida
- The insurance company is rated A VIII or better by A.M. Best Rating Company (Workers Compensation, General and Automobile policies)
- The City will be named as an additional insured for general and automobile liability
- The certificate will contain a 30-day written notice of cancellation and a 10-day written notice of non-payment
- The General Liability and Worker's Compensation policies will contain waiver of subrogation in favor of The City

Company Name

Bidder (signature)

INDEMNIFICATION

To the fullest extent permitted by laws and regulations, and in consideration of the amount stated on any Purchase Order, the Contractor shall defend, indemnify, and hold harmless the City, its elected or appointed officials, directors, agents, guests, invitees, and employees from and against all liabilities, damages, losses, and costs, direct, indirect, or consequential (including but not limited to reasonable fees and charges of engineers, architects, attorneys, and other professionals and court and arbitration costs) arising out of or resulting from any acts of negligence, recklessness or intentional wrongful misconduct in the performance of the work by the Contractor, any Subcontractor, or any person or organization directly or indirectly employed by any of them to perform or furnish any of the work or anyone for whose acts any of them may be liable.

In any and all claims against the City, or any of its elected and appointed officials, directors, agents, or employees by any employee of the Contractor, any Subcontractor, any person or organization directly or indirectly employed by any of them to perform or furnish any of the work or anyone for whose acts any of them may be liable, this indemnification obligation shall not be limited in any way by any limitation on the amount or type of damages, compensation, or benefits payable by or for the Contractor or any Subcontractor or other person or organization under workers' or workmen's compensation acts, disability benefit acts, or other employee benefit acts, nor shall this indemnification obligation be limited in any way by any limitation on the amount or type of insurance coverage provided by the City, the Contractor, or any of his Subcontractors. To the extent this Indemnification conflicts with any provision of Florida Law or Statute, this indemnification shall be deemed to be amended in such manner as to be consistent with such Law or Statute.

Subrogation: The Contractor and his Subcontractors agree by entering into this contract to a Waiver of Subrogation for each required policy herein. When required by the insurer, or should a policy condition not permit Contractor or Subcontractor to enter into a pre-loss agreement to waive subrogation without an endorsement, then Contractor or Subcontractor agrees to notify the insurer and request the policy be endorsed with a Waiver of Transfer of Rights of Recovery Against Others, or its equivalent. This Waiver of Subrogation requirement shall not apply to any policy, which includes a condition specifically prohibiting such an endorsement, or voids coverage should Contractor or Subcontractor enter into such an agreement on a pre-loss basis.

Release of Liability: Acceptance of the Contractor of the last payment shall be a release to the City and every officer and agent thereof, from all claims and liability hereunder for anything done or furnished for, or relating to the work, or for any act or neglect of the City or of any person relating to or affecting the work.

Savings Clause: The parties agree that to the extent the written terms of this Indemnification conflict with any provisions of Florida laws or statutes, in particular Sections 725.06 and 725.08 of the Florida Statutes, the written terms of this indemnification shall be deemed by any court of competent jurisdiction to be modified in such a manner as to be in full and complete compliance with all such laws or statutes and to contain such limiting conditions, or limitations of liability, or to not contain any unenforceable, or prohibited term or terms, such that this Indemnification shall be enforceable in accordance with and to the greatest extent permitted by Florida Law.

BY: _____
Signature of Owner or Officer

ATTEST: _____
Corporate Secretary or Witness

DATE: _____

Organization Phone Number

State of: _____

County of: _____

The foregoing instrument was acknowledged before me this _____ day of _____ 2023 by _____, of _____, He/She is personally known to me or has produced _____ as Identification, and did _____/did not _____ take an oath.

Notary Seal

Signature of Person Taking Acknowledgment

**SWORN STATEMENT PURSUANT TO SECTION 287.133(3)(a), FLORIDA STATUTES, ON
PUBLIC ENTITY CRIMES**

THIS FORM MUST BE SIGNED AND SWORN TO IN THE PRESENCE OF A NOTARY PUBLIC OR OTHER OFFICIAL AUTHORIZED TO ADMINISTER OATHS.

1. This sworn statement is submitted to _____
[print name of the public entity]

by _____
[print individual's name and title]

for _____
[print name of entity submitting sworn statement]

whose business address is _____

and (if applicable) its Federal Employer Identification Number (FEIN) is _____

(if the entity has no FEIN, include the Social Security Number of the individual signing this sworn statement: _____.)

2. I understand that a "public entity crime" as defined in Paragraph 287.133(1)(g), Florida Statutes, means a violation of any state or federal law by a person with respect to and directly related to the transaction of business with any public entity or with an agency or political subdivision of any other state or of the United States, including, but not limited to, any bid or contract for goods or services to be provided to any public entity or an agency or political subdivision or any other state or of the United States and involving antitrust, fraud, theft, bribery, collusion, racketeering, conspiracy, or material misrepresentation.

3. I understand that "convicted" or "conviction" as defined in Paragraph 287.133(1)(b), Florida Statutes, means a finding of guilt or a conviction of a public entity crime, with or without an adjudication of guilt, in any federal or state trial court of record relating to charges brought by indictment or information after July 1, 1989, as a result of a jury verdict, non-jury trial, or entry of a plea of guilty or nolo contendere.

4. I understand that an "affiliate" as defined in Paragraph 287.133(1)(a), Florida Statutes, means:

1. A predecessor or successor of a person convicted of a public entity crime; or
2. An entity under the control of any natural person who is active in the management of the entity and who has been convicted of a public entity crime. The term "affiliate" included those elected or appointed officials, directors, executives, partners, shareholders, employees, members, and agents who are active in the management of an affiliate.

The ownership by one person of shares constituting a controlling interest in another person, or a pooling of equipment or income among persons when not for fair market value under an arm's length agreement, shall be a prima facie case that one person controls another person. A person who knowingly enters into a joint venture with a person who has been convicted of a public entity crime in Florida during the preceding 36 months shall be considered an affiliate.

5. I understand that a "person" as defined in Paragraph 287.133(1)(e), Florida Statutes, means any natural person or entity organized under the laws of any state or of the United States with the legal power to enter into a binding contract and which bids or applies to bid on contracts for the provision of goods or services let by a public entity, or which otherwise transacts or applies to transact business with a public entity. The term "person" includes those elected and appointed officials, directors, executives, partners, shareholders, employees, members, and agents who are active in management of an entity.

6. Based on information and belief, the statement which I have marked below is true in relation to the entity submitting this sworn statement. [indicate which statement applies]

____ Neither the entity submitting this sworn statement, nor any of its elected and appointed officials, directors, executives, partners, shareholders, employees, members, or agents who are active in the management of the entity, nor any affiliate of the entity has been charged with and convicted of a public entity crime subsequent to July 1, 1989.

____ The entity submitting this sworn statement, or one or more of its elected and appointed officials, directors, executives, partners, shareholders, employees, members, or agents who are active in the management of the entity, or an affiliate of the entity has been charged with and convicted of a public entity crime subsequent to July 1, 1989.

____ The entity submitting this sworn statement, or one or more of its elected and appointed officials, directors, executives, partners, shareholders, employees, members, or agents who are active in the management of the entity, or an affiliate of the entity has been charged with and convicted of a public entity crime subsequent to July 1, 1989. However, there has been a subsequent proceeding before a Hearing Officer of the State of Florida, Division of Administrative hearings and the Final Order entered by the Hearing Officer determined that it was not in the public interest to place the entity submitting this sworn statement on the convicted Contractor/Contractor/Vendor list. [attached is a copy of the final order]

I UNDERSTAND THAT THE SUBMISSION OF THIS FORM TO THE CONTRACTING OFFICER FOR THE PUBLIC ENTITY IDENTIFIED IN PARAGRAPH 1 (ONE) ABOVE IS FOR THAT PUBLIC ENTITY ONLY AND, THAT THIS FORM IS VALID THROUGH DECEMBER 31 OF THE CALENDAR YEAR IN WHICH IT IS FILED. I ALSO UNDERSTAND THAT I AM REQUIRED TO INFORM THE PUBLIC ENTITY PRIOR TO ENTERING INTO A CONTRACT IN EXCESS OF THE THRESHOLD AMOUNT PROVIDED IN SECTION 287.017, FLORIDA STATUTES FOR CATEGORY TWO OF ANY CHANGE IN THE INFORMATION CONTAINED IN THIS FORM.

[signature]

STATE OF FLORIDA
COUNTY OF POLK

The foregoing instrument was acknowledged before me this _____
by _____ who is personally known to me and who did ___ did not ___
take an oath.

Notary Public

Notary Seal

**SECTION 00800
GENERAL CONDITIONS**

<u>Section</u>	<u>Description</u>	<u>Page No.</u>
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1.0 GENERAL

The purpose of this section is to identify terms, clarify the intent of the plans and specifications, designate liabilities and warranties, specify the schedule of payment, and describe bonding and insurance requirements. These general conditions apply to the work as a whole and to each and all branches of the work. The subcontractor shall be supplied with a copy of these general conditions and no arrangements with the subcontractor are to be such as to conflict with the general conditions. They shall also apply to any extra work or modifications.

2.0 DEFINITIONS

- A. **ADDENDA** – Written or graphic instruments issued prior to the execution of the Agreement that modify or interpret the Contract Documents, Drawings and Specifications, by additions, deletions, clarifications, or corrections.
- B. **BID** – The offer or bid of the BIDDER submitted on the prescribed form setting forth the price for the WORK to be performed.
- C. **BIDDER** – Any person, firm, or corporation submitting a BID for the WORK.
- D. **BONDS** – Bid, Performance-Payment Bond, and other instruments of surety, furnished by the CONTRACTOR and the CONTRACTOR’S surety in accordance with the CONTRACT DOCUMENTS.
- E. **CHANGE ORDER** – A written order to the CONTRACTOR authorizing an addition, deletion, or revision in the WORK within the general scope of the CONTRACT DOCUMENTS, or authorizing an adjustment in the CONTRACT PRICE or CONTRACT TIME.
- F. **CONTRACT DOCUMENTS** – The contract, including Advertisement for BIDS, Information for BIDDERS, BID, BID BOND, Agreement, Performance Payment Bond, NOTICE OF AWARD, NOTICE TO PROCEED, CHANGE ORDER, DRAWINGS, SPECIFICATIONS, and ADDENDA.
- G. **CONTRACT PRICE** – The total monies payable to the CONTRACTOR under the terms and conditions of the CONTRACT DOCUMENTS.
- H. **CONTRACT TIME** – The number of calendar days stated in the CONTRACT DOCUMENTS for the completion of the WORK.
- I. **CONTRACTOR** – The person, firm, or corporation with whom the OWNER has executed the Agreement.
- J. **DRAWINGS** – The parts of the CONTRACT DOCUMENTS which show the characteristics and scope of the WORK to be performed and which have been prepared or approved by the ENGINEER.

- K. ENGINEER – The person, firm, or corporation designated by the Owner as consultant, who shall represent the Owner in the inspection, monitoring, and administration of the work. The word Engineer shall include officers, agents and employees of the Engineer.
- L. FIELD ORDER – A written order effecting a change in the WORK not involving an adjustment in the CONTRACT PRICE or an extension of the CONTRACT TIME, issued by the ENGINEER to the CONTRACTOR during construction.
- M. NOTICE OF AWARD – The written notice of the acceptance of the BID from the OWNER to the successful BIDDER.
- N. NOTICE TO PROCEED – Written communication issued by the OWNER to the CONTRACTOR authorizing him/her to proceed with the WORK and establishing the date for commencement of the WORK.
- O. OWNER – A public or quasi-public body or authority, corporation, association, partnership, or an individual for whom the WORK is to be performed.
- P. PROJECT – The undertaking to be performed as provided in the CONTRACT DOCUMENTS.
- Q. SHOP DRAWINGS – All drawings, diagrams, illustrations, brochures, schedules and other data which are prepared by the CONTRACTOR, a SUBCONTRACTOR, manufacturer, SUPPLIER or distributor, which illustrate how specific portions of the WORK shall be fabricated or installed.
- R. SPECIFICATIONS – A part of the CONTRACT DOCUMENTS consisting of written descriptions of a technical nature of materials, equipment, construction systems, standards and workmanship.
- S. SUBCONTRACTOR – An individual, firm, or corporation having a direct contract with CONTRACTOR or with any other SUBCONTRACTOR for the performance of a part of the WORK at the site.
- T. SUPPLIER – Any person or organization who supplies materials or equipment for the WORK, including that fabricated to a special design, but who does not perform labor at the site.
- U. WORK – All labor necessary to produce the construction required by the CONTRACT DOCUMENTS, and all materials and equipment incorporated or to be incorporated in the PROJECT.
- V. WRITTEN NOTICE – Any notice to any party of the Agreement relative to any part of this Agreement in writing and considered delivered and the service thereof completed, when posted by certified or registered mail to the said party at their last given address or delivered in person to said party or their authorized representative on the WORK.

3.0 SUPERVISION AND INSPECTION

The supervision by the Engineer of the work is for the purpose of assuring the Owner that the terms of the contract documents are being properly executed and while the Engineer is instructed to give the Contractor all possible assistance, it is not intended to relieve the Contractor from responsibility for the work and any work which proves faulty must be made right by him.

It is not incumbent upon the Engineer to notify the Contractor to begin, to stop, to resume, or to give early notice or rejection of faulty materials or workmanship, or in any case to superintend to the extent of relieving the Contractor of responsibility or of any consequences of neglect or carelessness of himself or his subordinates.

It is mutually agreed that the Engineer shall decide all questions, difficulties, and disputes of whatever nature, which may arise relative to the interpretation of the plans, construction, prosecution and fulfillment of this contract, and as to type, quantity and value of any work done, the materials furnished under or by means of this contract; and their estimates and decisions upon all claims, questions and disputes shall be final and conclusive upon the parties hereto.

The Engineers and their representatives shall at all times have safe access to the work, wherever it is in preparation or progress, and the Contractor shall provide proper facilities for such access and inspection.

If the specifications, the Engineer's instruction, laws or ordinances of any public authority require any work to be specially tested or approved, the Contractor shall give the Engineer timely notice of its readiness for inspection, and if the inspection is by another authority than the Engineer, of the date fixed for such inspection. Inspections by the Engineer shall be promptly made and where practicable at the source of supply.

All work done and materials furnished shall be subject at all times to inspection by the Engineer and any part condemned by them shall be, as soon as possible, removed and replaced at the Contractor's expense. If the Contractor refuses to replace or delays an unwarranted length of time in replacing such condemned work, the Engineer may stop the Contractor and the work, and all expenses pertaining thereto shall be deducted from the amount due, or to become due to the Contractor from the Owner.

Inspectors may be appointed to see that instructions of the Engineer are carried out and that the plans and specifications are so complied with. The Engineer shall not be barred from re-inspecting at any time, work passed on by the inspector, and making additional rejections for causes which may have been existent but not formerly apparent.

If any work should be covered up without the approval or consent of the Engineer, it must, if required by the Engineer, be uncovered for examination at the Contractor's expense. Re-examination of questioned work may be ordered by the Engineer, and if so ordered, the work must be uncovered by the Contractor. If such work is found to be in accordance with the Contract Documents, the Owner shall pay the cost of uncovering and replacement. If said work is found to be not in accordance with the Contract Documents, the Contractor shall pay the cost.

4.0 SUPERINTENDENCE - SUPERVISION

The Contractor shall keep on his work during its progress a competent Superintendent and any necessary assistants all satisfactory to the Engineer. The superintendent shall not be changed except with the consent of the Engineer, unless the superintendent proves to be unsatisfactory to the Contractor and ceases to be in his employ. The superintendent shall represent the Contractor in his absence and all directions given to him shall be as binding as if given to the Contractor. Other directions shall be confined on written request in each case. The Contractor shall give efficient supervision of the work, using his best skill and attention. The superintendent shall be present on the site at all times, as required, to perform adequate supervision and coordination of the work to the Engineer's satisfaction.

If the Contractor, in the course of the work, finds any discrepancy between the drawings and the physical conditions of the locality, or any errors or omissions in drawings or in layout as given by points and instruction, it shall be his duty to immediately inform the Engineer, in writing, and the Engineer shall promptly verify the same. Any work done after such discovery shall be done at the Contractor's risk.

5.0 TESTING

Unless specified otherwise the Contractor will designate an independent testing laboratory to be used for testing of materials and quality of construction on the project, and will pay the costs incurred by that testing laboratory. The Contractor shall pay the cost for any re-tests due to failures. The Contractor shall be responsible for causing to be performed all tests required in the specifications, prior to advancing to the next phase of construction. It shall be the responsibility of the Contractor to notify the Engineer at least 48 hours in advance of any testing which he has scheduled so that the Engineer may witness the test or the taking of test samples. The Engineer may select the location of the entity to be tested or may leave it to the discretion of the technician employed by the laboratory if he so chooses. The Contractor shall cause the Owner to be furnished with all certified test reports which verify satisfactory completion of the work.

6.0 SURVEY

From the Survey provided by Civil Surv., unless otherwise specified in the contract documents, the Contractor shall develop and make all detail surveys needed for construction such as slope stakes, batter boards, stakes for pipe locations and other working points, lines, elevations, and cut sheets. The Contractor shall carefully preserve bench marks, reference points and stakes and, in case of willful or careless destruction, shall be charged with the resulting expense and shall be responsible for any mistake that may be caused by their unnecessary loss or disturbance. The Engineer shall have such monuments restored and/or replaced by approved and qualified personnel, at the Contractor's expense. Sufficient monies will be withheld from payments to the Contractor to pay these costs. If the work requires the relocation or movement of such a monument, the Contractor shall notify the Engineer of such requirements, and the Contractor shall reference and re-set any monuments at no cost to the Owner.

The Contractor shall employ a competent surveyor satisfactory to the Owner and the Engineer to lay out the work from the bench marks, grade, dimensions, points and lines noted on the working drawings, established at the site, or supplied by the Engineer. All work of every description shall be laid out and checked by the Contractor who will be held solely responsible for its correctness, and all expenses in connection with this work shall be paid for by the Contractor. The work may

be checked by the Engineer and, in the event of discrepancy, his decision shall be final.

No special compensation will be made to the Contractor to defray costs of any of the work or delays occasioned by making surveys and measurements, but such costs shall be considered as having been included in the price stipulated for the several items of the work to be done under this contract.

7.0 DRAWINGS AND SPECIFICATIONS

The intent of the Drawings and Specifications is that the Contractor shall furnish all labor, materials, tools, equipment, and transportation necessary for the proper execution of the Work in Accordance with the contract documents and all incidental work necessary to complete the Project in an acceptable manner, ready for use by the Owner. In case of conflict between the Drawing and Specifications, the more stringent shall govern. Figure dimensions on Drawings shall govern over scaled dimensions.

Any discrepancies found between the Drawings and Specifications and site conditions or any inconsistencies or ambiguities in the Drawings or Specifications shall be immediately reported to the Engineer, in writing, who shall promptly correct such inconsistencies or ambiguities in writing. Work done by the Contractor after discovery of such discrepancies, inconsistencies or ambiguities shall be done at the Contractor's risk.

The Contractor shall be furnished three (3) copies of the plans and specifications upon notice to begin work. Should the Contractor desire more than three (3) sets of these plans, he may obtain these by paying the cost of reproduction. The Contractor shall keep one (1) copy of all drawings and specifications at the site in good order, available to the Engineer and his representatives.

8.0 SHOP DRAWINGS

The Contractor shall promptly submit electronic copies of all shop drawings and schedule required for the work of the various trades and the Engineer shall pass upon them with reasonable promptness making any desired corrections that are necessary in order to meet the intent of the plans and specifications. The Contractor shall make any corrections required by the Engineer, file with him and furnish revised electronic copies. The Engineer's approval of such drawings or schedules shall not relieve the Contractor of his responsibility for deviation from drawings or specifications unless he has called the Engineer's attention to such deviation at the time of submission, nor shall it relieve him from responsibility for errors of any sort in the shop drawings or schedules.

When submitted for the Engineer's review, Shop Drawings shall bear the Contractor's certification that he has reviewed, checked and approved the Shop Drawings and that they are in conformance with the requirements of the Contract Documents.

9.0 MATERIALS, SERVICES, AND FACILITIES

It is understood that, except as otherwise specifically stated in the Contract Documents, the Contractor shall provide and pay for all materials, labor, tools, equipment, water, light, power, transportation, supervision, temporary construction of any nature, and all other services and facilities of any nature whatsoever necessary to execute, complete, and deliver the Work within the specified time.

Materials and equipment shall be so stored as to insure the preservation of their quality and fitness for the Work. Stored materials and equipment to be incorporated in the Work shall be located so as to facilitate prompt inspection.

Manufactured articles, materials, and equipment shall be applied, installed, connected, erected, used, cleaned, and conditioned as directed by the manufacturer.

Materials, supplies, or equipment to be incorporated into the Work shall not be purchased by the Contractor or the Subcontractor subject to a chattel mortgage or under a conditional sale contract or other agreement by which interest is retained by the seller.

10.0 SUBSTITUTIONS

Whenever a material, article, or piece of equipment is identified on the Drawings or Specifications by reference to brand name or catalog numbers, it shall be understood that this is referenced for the purpose of defining the performance or other salient requirements and that other products or equal capacities, quality and function shall be considered. The Contractor may recommend the substitution of a material, article or piece of equipment of equal substance and function for those referred to in the Contract Documents by reference to brand name or catalog number, and if, in the opinion of the Engineer, such material, article, or piece of equipment is of equal substance and function to that specified, the Engineer may approve its substitution and use by the Contractor. Any cost differential shall be deductible from the Contract Price and the Contract Documents shall be appropriately modified by Change Order. The Contractor warrants that if substitutes are approved, no major changes in the function or general design of the Project will result. Incidental changes or extra component parts required to accommodate the substitute will be made by the Contractor without a change in the Contract Price or Contract Time.

11.0 COMPLIANCE WITH STATUTES

The Contractor and all subcontractors shall secure all licenses and permits and comply with all laws, regulations and building codes as required by the State, City or Town, and County or agencies thereof, in which the project is to be constructed, also with all regulations for the protection of workers and in respect to wages and hours which may be promulgated by the Federal Government, and Laws of Florida, relating to prevailing wage rate for laborers, mechanics and apprentices on certain public works when said law is applicable.

12.0 PROTECTION OF WORK, PROPERTY, AND PERSONS

The Contractor will be responsible for initiating, maintaining and supervising all safety precautions and programs in connection with the Work. The Contractor will take all necessary precautions for the safety of, and will provide the necessary protection to prevent damage, injury or loss to all employees on the Work and all materials or equipment to be incorporated therein, whether stored on or off the site, and other property at the site or adjacent thereto, including trees, shrubs, lawns, walks, pavements, roadway, structures and utilities not designated for removal, relocation or replacement in the course of construction.

The Contractor will comply with all applicable laws, ordinances, rules, regulations and orders of any public body having jurisdiction. The Contractor will erect and maintain, as required by the conditions and progress of the Work, all necessary safeguards for safety and protection. The Contractor will notify owners of adjacent utilities when prosecution of the Work may affect them.

The Contractor will remedy all damage, injury or loss to any property caused, directly or indirectly, in whole or part, by the Contractor, any Subcontractor or anyone directly or indirectly employed by any of them or anyone of whose acts any of them be liable, except damage or loss attributable to the fault of the Contract Documents or to the acts or omissions of the Owner, of the Engineer or anyone employed by either of them or anyone whose acts either of them may be liable, and not attributable, directly or indirectly, in whole or in part, to the fault or negligence of the Contract.

In emergencies affecting the safety of persons or the Work or property at the site or adjacent thereto, the Contractor, without special instructions or authorization from the Engineer or Owner, shall act to prevent threatened damage, injury or loss. The Contractor will give the Engineer promptly, written notice of any significant changes in the Work or deviations from the Contract Documents caused thereby, and a Change Order shall thereupon be issued covering the changes and deviations involved.

13.0 CHANGES IN THE WORK

The Owner, without invalidating the contract, may order extra work to be done, or make changes by altering, adding to or deducting from the work, the Contract sum being adjusted accordingly. All such work shall be executed under the conditions of the original contract except that any claim for extension of time caused thereby shall be adjusted at the time of ordering such changes.

In giving instructions, the Engineer shall have the authority to make minor changes in the work, not involving extra cost, and not consistent with the purpose of the work, but otherwise, except in an emergency endangering life or property, no extra work or change shall be made unless in pursuance of a written order by the Engineer, and no claim for additions to the contract sum shall be valid unless so ordered.

14.0 CHANGES IN CONTRACT PRICE

The Contract Price may be changed only by a Change Order. The value of any Work covered by a Change Order or of any claim for increase or decrease in the Contract Price shall be determined by one or more of the following methods in the order of precedence listed below:

- A. By unit price named in Contract and subsequently agreed upon.
- B. By a lump sum mutually agreed upon by the Engineer and Contractor; or
- C. If no such unit prices are set forth and if the parties cannot agree upon a lump sum, then by the actual net cost in money to the Contractor of the wages of applied labor (including premiums for Workmen's Compensation Insurance, and Social Security taxes); plus twenty per centum (20%) as compensation or all items of profit, administration, overhead, superintendence, insurance other than Workmen's Compensation Insurance, materials used in temporary structures, allowances made by the Contractor to Subcontractors, additional premiums upon the performance bond of the Contractor and the use of small tools; plus the net cost to the Contractor for the materials required in the extra work; plus the cost of rental for plant equipment (other than small tools) required and approved for the extra work.

The Owner may at any time, by a written order, without notice to the Sureties, and without invalidating the Contract, require the performance of such extra work or substantial changes in the work as it may find necessary or desirable, and the Contract amount shall be adjusted by

Change Order as discussed above.

If the Contractor claims that any instruction or drawings or otherwise involve extra cost under this contract, he shall give the Engineer written notice thereof within a reasonable time after the receipt of such instruction, and in any event before proceeding to execute the work, except in emergency endangering lives or property, and the procedure shall then be as provided for in this section.

15.0 TIME FOR COMPLETION AND LIQUIDATED DAMAGES

The date of beginning and time for completion of the Work are essential conditions of the Contract Documents and the Work embraced shall be commenced on a date specified in the Notice to Proceed.

The Contractor will proceed with the Work at such rate of progress to insure full completion within the Contract Time. It is expressly understood and agreed, by and between the Contractor and the Owner, that the Contract Time for the completion of the Work described herein is a reasonable time, taking into consideration the average climatic and economic conditions and other factors prevailing in the locality of the Work.

If the Contractor shall fail to complete the Work within the Contract Time, or extension of time granted by the Owner, then the Contractor will pay to the Owner the amount for liquidated damages as specified in the Bid Documents for each calendar day that the Contractor shall be in default after the time stipulated in the Contract Documents.

The Contractor shall not be charged with liquidated damages or any excess cost when the delay in completion of the Work is due to the following and the Contractor has promptly given Written Notice of such delay to the Owner or Engineer.

- A. To any preference, priority, or allocation under duly issued by the Owner.
- B. To unforeseeable causes beyond the control and without the fault or negligence of the Contractor, including but not restricted to, acts of God, or of the public enemy, acts of the Owner, acts of another Contractor in the performance of a contract with the Owner, fires, floods, epidemics, quarantine restrictions, strikes, freight embargoes, and abnormal and unforeseeable weather.

16.0 CORRECTION OF WORK

The Contractor shall promptly remove from the premises all Work rejected by the Engineer for failure to comply with the Contract Documents, whether incorporated in the construction or not, and the Contractor shall promptly replace and re-execute the Work in accordance with the Contract Documents and without expense to the Owner and shall bear the expense of making good all Work of other Contractors destroyed or damaged by such removal or replacement.

All removal and replacement work shall be done at the Contractor's expense. If the Contractor does not take action to remove such rejected work within ten (10) days after receipt of Written Notice, the Owner may remove such work and store the materials at the expense of the Contractor.

17.0 SUB-SURFACE DATA

All sub-surface data shown on the plans, such as; ground water elevation, soil conditions, underground structure locations, sewer lines, water lines, telephone cables, conduit, electric cables, and etc., are shown on plans for the Contractor's general information only, and such information shown is not warranted or guaranteed by the Engineer.

The Contractor will be required, at his own expense, to do everything necessary to locate, (including excavation of test pits) protect, support, and sustain water, gas and service pipe, storm and sanitary sewers, existing structures, electric light and power lines, telephone poles, conduits, roads and other fixtures on the site of the work. In case any of the said water, gas, and service pipes, storm and sanitary sewers, existing structures, electric light and power lines, telephone poles, conduits, road and other fixtures be damaged, they shall be repaired, but the cost thereof shall be considered as having been included in the prices stipulated for the various items of work to be done under contract.

The Contractor shall promptly, and before such conditions are disturbed, except in the event of an emergency, notify the Owner by Written Notice of:

- A. Sub-surface or latent physical conditions at the site differing materially from those indicated in the Contract Documents; or
- B. Unknown physical conditions at the site, of an unusual nature, differing materially from those ordinarily encountered and generally recognized as inherent in Work of the character provided for in the Contract Documents.

The Owner shall promptly investigate the conditions, and if it is found that such conditions do so materially differ and cause an increase or decrease in the cost of, or in the time required for, performance of the Work, an equitable adjustment shall be made and the Contract Documents shall be modified by a Change Order. Any claim of the Contractor for adjustment hereunder shall not be allowed, unless the required Written Notice has been given; provided that the Owner may, if the Owner determines the facts so justify, consider and adjust any claims asserted before the date of final payment.

18.0 SUSPENSION OF WORK, TERMINATION AND DELAY

The Owner may suspend the Work or any portion thereof for a period of not more than ninety (90) days or such further time as agreed upon by the Contractor, by Written Notice to the Contractor and the Engineer which shall fix the date on which work shall be resumed. The Contractor will resume that work on the date so fixed. The Contractor will be allowed an increase in the Contract Price or an extension of the Contract Time, or both, directly attributable to any suspension.

If the Contractor is adjudged as bankrupt or insolvent, or makes a general assignment for the benefit of its creditors, or if a trustee or receiver is appointed for the Contractor or for any of its property, or if the Contractor files a petition to take advantage of any debtor's act, or to reorganize under the bankruptcy or applicable laws, or repeatedly fails to supply sufficient skilled workmen or suitable materials or equipment or disregards laws, ordinances, rules, regulations or orders of any public body having jurisdiction of the Work or disregards the authority of the Engineer, or otherwise violates any provision of the Contract Documents, then the Owner may, without prejudice to any other right or remedy and after giving the Contractor and its surety a minimum of ten (10) days from delivery of a Written notice, terminate the services of the Contractor and take possession of the Project and of all materials, equipment, tools, construction equipment and machinery thereon owned by the Contractor, and finish the Work by whatever method the Owner may deem expedient. In such case the Contractor shall not be entitled to receive any further payment until the Work is finished. If the unpaid balance of the Contract Price exceeds the direct and indirect costs of completing the Project, including compensation for additional professional services, such excess SHALL BE PAID TO THE CONTRACTOR. If such cost exceeds such unpaid balance, the Contractor will pay the difference to the Owner. Such costs incurred by the Owner will be determined by the Engineer and incorporated in a Change Order.

Where the Contractor's services have been so terminated by the Owner, said termination shall not affect any right of the Owner against the Contractor then existing or which may thereafter accrue. Any retention or payment of monies by the Owner due the Contractor will not release the Contractor from compliance with the Contract Documents.

After ten (10) days from delivery of a Written Notice to the Contractor and the Engineer, the Owner may, without cause and without prejudice to any other right or remedy, elect to abandon the Project and terminate the Contract. In such case the Contractor shall be paid for all Work executed and any expense sustained plus reasonable profit.

If, through no act or fault of the Contractor, the Work is suspended for a period of more than ninety (90) days by the Owner or under an order of court or other public authority, or the Engineer fails to act on any request for payment within thirty (30) days after it is submitted, or if the Owner fails to pay the Contractor substantially the sum approved by the Engineer, or awarded by arbitrators within thirty (30) days of its approval and presentation, then the Contractor may, after ten (10) days from delivery of a Written Notice to the Owner and the Engineer, terminate the Contract and recover from the Owner payment for all Work executed and all expenses sustained. In addition and in lieu of terminating the Contract, if the Engineer has failed to act on a request for payment or if the Owner has failed to make any payment as aforesaid, the Contractor may upon ten (10) days Written Notice to the Owner and the Engineer, stop the Work until paid all amounts then due, in which event and upon resumption of the Work, Change Order shall be issued for adjusting the Contract Price or extending the Contract Time or both to compensate for the costs and delays attributable to the stoppage of the Work.

If the performance of all or any portion of the Work is suspended, delayed, or interrupted as a result

of a failure of the Owner or Engineer to act within the time specified in the Contract Documents, or if no time is specified, within a reasonable time, an adjustment in the Contract Price or an extension of the Contract Time, or both, shall be made by Change Order to compensate the Contractor for the costs and delays necessarily caused by the failure of the Owner or Engineer.

19.0 PAYMENTS TO THE CONTRACTOR

If a pay request is submitted by the Contractor no later than the 1st day of each calendar month, then no later than the 30th day of each calendar month, the Owner will make partial payments to the Contractor on the basis of a certified estimate of the work performed during the preceding calendar month by the Contractor. Upon such estimate being made and certified by the Engineer and approved by the Owner, the Owner will pay to the Contractor ninety (90) percent of the amount established in such an estimate as the value of the work completed. Such payment shall be considered, however, only as an advance payment and not as part of the final payment to the Contractor.

All payment requests for materials and Work requiring testing shall be accompanied by certified test reports which must be approved by the Engineer as being in compliance with the Specifications before payment will be authorized.

Materials in reasonable quantities which are delivered for incorporation in the work but not yet so used may be included on monthly estimates for payment. The Contractor shall submit with the monthly estimate to reflect the unincorporated material an original and one (1) copy of itemized receipted invoices certifying to the delivery of the quantity set forth on the estimate to the site of the work, upon the property of the Owner.

The Contractor shall mark or identify such material and shall be solely responsible for its safekeeping and usability at the time it is to be incorporated in the structure or project and shall, at his own expense, care for and protect the same and take out insurance against theft, loss from any other cause, damage, destruction and/or such other risks as may be involved, which would render the aforesaid materials unfit or unavailable for incorporation into the Project.

Payment for materials stored at the site shall be based on actual cost for same as shown by the receipted invoices and shall not exceed the cost of materials as indicated on the approved "breakdown sheet" for the particular items involved. It is understood and agreed that should the Owner at any time during the progress of the work consider the amount withheld on monthly estimates for payment to be in excess of the amount necessary to complete the work or necessary for the full and ample protection of the Owner, then the Owner, with the written consent of the Contractor's Surety, may reduce the percentage retained to an amount sufficient for the Owner's proper protection.

No estimate given, nor payments made, shall be conclusive of the performance of the contract either wholly or in part, and no estimates, payments or certificates of final payment shall be construed to be an acceptance of inferior or defective work or materials.

The Owner may withhold or, on account of subsequently discovered evidence, multiply the whole or a part of any certificate to such extent as may be necessary to protect himself from loss on account of:

A. Defective work not remedied.

- B. Claims filed or reasonable evidence indicting probable filing of claims.
- C. Failure of the Contractor to make payments promptly to subcontractors or for material, labor, or equipment.
- D. A reasonable doubt that the contract can be completed for the balance then unpaid.
- E. Damage to another Contractor.
- F. Failure of Contractor to clean-up or restore the project site or right-of-ways.
- G. Insolvency of Contractor.
- H. Manifest intent of Contractor not to proceed diligently or to complete this Contract.

When the above grounds are removed, payment shall be made for amounts withheld because of them.

20.0 LIENS AND FINAL PAYMENT

Neither the final payment nor any part of the retained percentage shall become due until the Contractor, if required, shall deliver to the Owner a complete release of all liens arising out of this Contract, or receipts in full in lieu thereof and, if required in either case, an affidavit that so far as he has knowledge or information the releases and receipts include all the labor and material for which alien could be filed, but the Contractor may if any subcontractor refuses to furnish a release or receipt in full, furnish a bond satisfactory to the Engineer, to indemnify the Owner against any lien. If any lien remains unsatisfied after all payments are made, the Contractor shall refund to the Owner all monies that the latter may be compelled to pay in discharging such a lien, including all costs including administrative costs and a reasonable attorney's fee.

The final payment shall not become due and payable until the Contractor shall have furnished the Owner with satisfactory evidence that all labor, materials, outstanding claims and indebtedness of whatsoever nature arising out of the performance of the Contractor have been paid, and until the Contractor shall have furnished a written statement to such effect executed by the Contractor and Sureties, which will further provide that payment to the Contractor of the final estimate, shall not relieve any Surety of its obligation to the Owner as set forth in the Surety Bonds. Where one or more claims against the Contractor, which are in controversy, appear unsatisfied, the Owner shall have the discretion to direct final payment to be made, or a partial payment to be made, from the retained percentage, should it be determined that the withholding of the entire final payment would work a hardship on the Contractor or delay the final payments of other Contractors or Subcontractors on the Project. In such cases, the Contractor and Sureties shall provide the evidences and statements required under this paragraph, but shall itemize the claims which remain unsatisfied, giving the reason therefore, and the statements of the Surety Companies shall provide that the final payment or partial payment, as the case may be, shall not relieve any Surety of any obligations to the Owner, as set forth in the Surety Bonds. If only partial payment is permitted under this paragraph from the retained percentage, the final payment shall not be made until the Contractor shall have furnished satisfactory evidence and a statement from the Surety that all claims against the Contractor have been paid and that payment to the Contractor shall have furnished satisfactory evidence and a statement from the Surety that all claims against the contractor have been paid and that payment to the Contractor of the Contract balance shall not relieve the Surety of any of its obligations to the Owner as provided in the Surety's Bond.

21.0 ACCEPTANCE OF THE WORK, GUARANTEE, AND RELEASE

Following the completion of this contract, as such completion is defined in the specifications and

as soon thereafter as practicable, the Owner, his representative or the Engineer will inspect the work and the Engineer will make a final estimate of the amount and value of work done by the Contractor. If the said work appears to be satisfactory and appears to be done in accordance with the provisions and terms of the Contract Documents, the Owner, upon notice of completion from the Engineer, and within thirty-six (36) days after the final estimate of work is made and certified by the Engineer as correct and unpaid and is approved, will pay to the Contractor the full value of the work done under this Contract, less any amounts previously paid and less any advances whatsoever, and the Owner will certify the work as completed and will accept it. Said acceptance will, however, be in all events conditional upon the subsequent remedying by the Contractor of defects in workmanship or materials which may become apparent within a period of one (1) year following the date of acceptance as herein required. In the event the Owner refuses or declines to certify the work as completed and accepted and make final payment therefore within thirty-six (36) days after notice and certification from the Engineer as provided for herein, the Owner shall immediately set forth in writing to the Contractor and the Engineer the reasons for such non-acceptance of the Work. After all valid reasons for non-acceptance have been removed, the Owner shall execute the final certificate of completion and acceptance and shall make final payment hereunder.

All prior estimates and payments, including those relating the extra work, shall be subject to correction or adjustment by the final cost estimate. Such final payment, however, shall not serve as a release of the Contractor or of his Sureties from the previously required guarantee against defects in contract performance for a period of one (1) year following the date of acceptance of the Work by the Owner.

The acceptance by the Contractor of the final payment, made as aforesaid, shall operate as and shall be released to the Owner and to the Engineer and every member and agent of both said parties from all claims and liabilities to the Contractor for anything done or furnished for, or relating to the Work, or for any act of neglect of the Owner or the Engineer or of any person relating to or effecting the work, but this final payment shall not relieve the Contractor from his indemnity, guarantee and/or warranty obligations under the terms of the contract.

As soon as is practical after twelve (12) months have elapsed from the date of completion as herein defined, and as certified by the Engineer, the Owner shall make a review and re-inspection of the Work and performance of this Contract, or cause the same to be made. If the said performance and work shall be found satisfactory and the work not to have deteriorated through defects in workmanship or materials, the Owner shall certify the release of the surety on the bond for performance of contract. If however, the review and re-inspection, or any prior inspection, discloses defects due to the non-fulfillment of this contract, or non-compliance with its requirements, the Owner shall so notify the Contractor in writing, and thereupon the Contractor shall, at his own expense, repair or replace and shall make good all defects in workmanship, materials, and guarantee, and shall rectify any non-compliance and such repairs and fulfillment shall be a prerequisite to the release of the Surety on the bond. If, however, the Contractor shall, after due notice, refuse or neglect to make good the defects to the satisfaction of the Owner, then the Owner may, and is hereby empowered to, proceed in the manner prescribed in the event of abandonment or forfeiture of the work by the Contractor, in which case completion by the Owner and the payment of claims for material and labor and other expense as provided in such procedures, shall be a prerequisite to the release of the surety on the Bond for Performance of Contract. Within thirteen (13) months after the date of acceptance of the work, or as soon thereafter as practical, as herein before provided, following a re-inspection, and provided further that any repairs necessitated by defects in material or workmanship as determined by the Owner in the re-inspection shall have been made, the Owner will in writing finally release the Contractor, his sureties and all parties hereunder.

22.0 INSURANCE

The Contractor shall purchase and maintain such insurance as will protect it from claims set forth below which may arise out of, or result from, the Contractor's execution of the Work, whether such execution be by the Contractor, any Subcontractor, or by anyone directly or indirectly employed by any of them, or by anyone for whose acts any of them may be liable:

- A. Claims under workmen's compensation, disability benefits and other similar benefit acts;
- B. Claims for damages because of bodily injury, occupational sickness or disease, or death of employees;
- C. Claims for damages because of bodily injury, sickness or disease or death of any person other than employees;
- D. Claims for damages insured by usual personal injury liability coverage which are sustained (1) by any person as a result of an offense directly or indirectly related to the employment of such person by the Contractor, or (2) by any other person;
- E. Claims for damages because of injury to or destruction of tangible property, including loss of use resulting therefrom.

Certificates of Insurance acceptable to the Owner shall be filed with the Owner prior to commencement of the Work. These Certificates shall contain a provision that coverage's afforded under the policies will not be cancelled unless at least fifteen (15) days prior Written Notice has been given to the Owner.

The Contractor shall procure and maintain, at the Contractor's own expense, during the Contract Time, Liability Insurance as hereinafter specified.

23.0 CONTRACT SECURITY

The bidder to who the contract is awarded must, within ten (10) calendar days following notice of award, present himself for signing of the contract and the plans, and to substitute for the bid security, a surety performance-payment bond in the amount of one hundred percent (100%) of the contract price, conditioned that the Contractor will faithfully perform all work of this contract and promptly pay for all materials furnished and labor supplied or performed in the prosecution of all work. All bonds and insurance shall be issued by companies authorized to transact business in the State of Florida

**SECTION 00850
SPECIAL PROVISIONS**

PART 1 – GENERAL

The Special Provisions of these specifications are intended as modifications or supplements to Information for Bidders; General Conditions; or Technical Specifications, in the intent that any provisions of this section shall govern. If at any time the plans or specifications for this project are unclear, the Contractor shall contact the Engineer immediately.

1.01 CONSTRUCTION STAKEOUT

Base lines and benchmarks shall be established by the project surveyor for the Contractor's use. The Contractor will be responsible for performing construction stakeout.

1.02 INSPECTION AND TESTING:

- A. GENERAL –The Project Engineer or representative inspector under the Engineer's direct supervision shall provide periodic construction observation.

During construction and at the time periodic inspections are required, the Owner shall be notified by telephone at least forty-eight (48) hours in advance of all required system tests.

The Engineer, Owner, Architect or authorized representative shall be present to observe and witness each test, unless agreed otherwise ahead of time.

In case of dispute between the Contractor and the Project Engineer/Architect regarding the quality of the construction or interpretation of these standards, the matter shall be referred to the Owner for resolution and the decision of the Owner shall govern both parties.

- B. INSPECTIONS – Construction inspections will periodically be conducted by the Project Engineer or an authorized representative. The Contractor shall complete each specified item of work listed below which pertains to the project and notify the project engineer or his representative at least forty-eight (48) hours in advance of a request for inspection. The Contractors project superintendent shall be present at all inspections and upon request by the inspector, furnish construction equipment to aid in the inspection.

The following are mandatory inspections which shall be conducted when the item of work applies to the subject project.

1. Soil/Density Testing.
2. Monitoring Well Construction Inspection.
3. Utility/Infrastructure/Building Testing
4. When all construction is completed. The Contractor, Inspector and Engineer shall prepare a punch list indicating any unfinished items at this time.
5. Final Inspection – Final inspection will be conducted following the correction of the punch list items.

All inspections shall be conducted and approved by the Project Engineer or his representative prior to approval of the payment request for the item of work.

1.03 LEGAL REQUIREMENTS:

The Contractor's attention is directed to the safety regulations promulgated by the State of Florida, Department of Commerce and to the provisions of Chapter 403, Florida Statutes, regarding control of air and water pollution as well as the Rules and Regulations of the Department of Environmental Regulation.

The Contractor shall be responsible for obtaining all permits and obeying all Federal, State, County and City laws, by-laws, ordinances, resolutions, and regulations which pertain to his work. The Contractor is responsible for obtaining all permits related to Duke Energy; permitting costs incurred will be reimbursed to the contractor through a Change Order.

The Contractor shall take care to strictly observe all applicable OSHA, State, Local or other Federal Standards with respect to the safety of persons during construction.

1.04 TRAFFIC MAINTENANCE:

The Contractor shall be responsible for Maintenance of Traffic. Traffic Maintenance shall be in conformance with the Manual of Traffic Control and Safe Practices of the Florida Department of Transportation. The Public shall, at all times, be protected by barricades, flashers and other safety devices.

1.05 PRIVATE PROPERTY PROTECTION:

The Contractor shall not trespass onto private property outside of the right-of-way and easements shown on the plans without the written permission of the individual property owner. The Contractor shall be solely responsible for any claims that may arise out of damage to private property resulting from trespass onto private property. The Contractor shall promptly settle all such claims without delay. The written permission of the private property's owner shall be available for inspection by the Engineer or the Owner upon request.

1.06 START-UP TESTING/TRAINING

The Contractor shall provide start up training and testing as required to ensure the new system operates as intended. Startup testing shall be closely coordinated with the City and the Engineer.

1.07 AS-BUILTS

The Contractor shall be responsible to provide as-built information to the Engineer at the time of project completion.

Final as-built information shall be prepared by a Florida Licensed Surveyor. As-built information must be submitted prior to final pay request approval.

An As-Built or Record Survey performed in accordance with Chapter 5J-17, Florida Administrative Code (F.A.C.), pursuant to Chapter 472, Florida Statutes (F.S.) shall be required. The survey shall depict all pertinent easement lines, right of way lines or boundary lines as well as the horizontal and vertical location of all underground and above ground water, wastewater and reclaimed water piping and related appurtenances. The piping shall be shown at intervals not to exceed 100 feet. Sufficient "spot" elevations shall be shown in order to determine grading over and adjacent to the piping as well as the amount of cover over the piping. All bends, vaults, concrete

pads, and valves shall be shown on the survey. Tops of all vaults and inverts of all piping shall be shown on the survey.

For any other instance not described above, it is the Surveyor's responsibility to determine the type of survey required based upon actual site activity and construction. Examples of survey type include but are not limited to:

- i. As-Built or Record Survey
- ii. Construction Layout Survey, etc.

AS-BUILT SURVEY shall show location of all underground and above ground water, wastewater and reclaimed water piping and related appurtenances, based upon record survey information. All above ground piping and surface utility features such as valves, hydrants, blow-offs, manholes, cleanouts, etc. shall be clearly shown and referenced to a minimum of two permanent surface improvements and/or surveyed road centerlines points.

AS-BUILT SURVEY shall identify actual installed pipe, valves, fittings, hydrants and other assets. All assets that are different from those shown on the approved PLANS shall be attributed with materials, class, pressure rating, specifications, etc.

AS-BUILT SURVEY shall clearly show all field changes of dimension and detail including changes made by field order or by change order and shall clearly show all details not on original contract drawings but constructed in the field. All equipment and piping relocation shall be clearly shown.

AS-BUILT SURVEY shall clearly show the actual horizontal locations, distances, and vertical elevations of all utility assets. State plane coordinates shall be utilized for horizontal locations. Dimensions between all manholes, slope of gravity mains, invert and top elevations shall be shown.

After the successful completion of all water and wastewater, improvements, a final as-built (Signed and Sealed PDF and CAD File) survey prepared by a licensed surveyor shall be submitted to the City of Frostproof and the Engineer of Record.

**SECTION 01700
CONTRACT CLOSEOUT
PART 1 – GENERAL**

1.01 REQUIREMENTS INCLUDED

Comply with requirements stated in General Conditions and in Specifications for administrative procedures in closing out the Work.

1.02 SUBSTANTIAL COMPLETION:

- A. When Contractor considers the Work is substantially complete, he shall submit to the Engineer:
 - 1. A written notice that the Work, or designated portion thereof, is substantially complete.
 - 2. A list of items to be completed or corrected.
- B. Within a reasonable time after receipt of such notice, the Engineer will make an inspection to determine the status of completion.
- C. Should the Engineer determine that the Work is not substantially complete:
 - 1. The Engineer will promptly notify the Contractor, in writing, giving the reasons therefore.
 - 2. Contractor shall remedy the deficiencies in the Work, and send a second written notice to substantial completion to the Engineer.
 - 3. The Engineer will re-inspect the Work.
- D. When the Engineer finds that the Work is substantially complete, he will:
 - 1. Prepared and deliver to Owner a tentative Certificate of Substantial Completion with a tentative list of items to be completed or corrected before final payment.
 - 2. After consideration of any objections made by the Owner as provided in Conditions of the Contract, and when the Engineer considers the Work substantially complete, he will execute and deliver to the Owner and the Contractor a definite Certificate of Substantial Completion with a revised tentative list of items to be completed or corrected.

1.03 FINAL INSPECTION:

- A. When Contractor considers the Work is complete, he shall submit written certification that:
 - 1. Contract Documents have been reviewed.
 - 2. Work has been completed in accordance with Contract Documents.
 - 3. Work has been completed with the list of items to be corrected.
 - 4. Equipment and systems have been tested in the presence of the Owner's representative and are operational.
 - 5. Work is completed and ready for final inspection.

- B. The Engineer will make an inspection to verify the status of completion with reasonable promptness after receipt of such certification.
- C. Should the Engineer consider that the Work is incomplete or defective:
 - 1. The Engineer will promptly notify the Contractor in writing, listing the incomplete or defective work.
 - 2. Contractor shall take immediate steps to remedy the stated deficiencies, and send a second written certification to the Engineer that the Work is complete.
 - 3. The Engineer will re-inspect the Work
- D. When the Engineer finds that the Work is acceptable under the Contract Documents, he shall request the Contractor to make closeout submittals.

1.04 RE-INSPECTION FEES:

Should the Engineer perform re-inspections due to failure of the Work to comply with the claims of status of completion made by the Contractor:

- 1. Owner will compensate the Engineer for such additional services.
- 2. Owner will deduct the amount of such compensation from the final payment to the Contractor.

1.05 CONTRACTOR'S CLOSEOUT SUBMITTALS TO ENGINEER

- A. Evidence of compliance with requirements of governing authorities.
- B. Project Record Documents.
- C. Operating and Maintenance Data, Instructions to Owner's Personnel.
- D. Warranties and Bonds.
- E. Keys and Keying Schedule.
- F. Spare Parts and Maintenance Materials.
- G. Evidence of Payment and Release of Liens.
- H. Certificate of Insurance for Products and Completed Operations.
- I. Contractor's Final Affidavit.
- J. Lien Waivers from Subcontractors and Suppliers.

1.06 FINAL ADJUSTMENT OF ACCOUNTS

- A. Submit a final statement of accounting to the Engineer.
- B. Statement shall reflect all adjustments to the Contract Sum:
 - 1. The original Contract Sum.
 - 2. Additions and deductions resulting from:
 - a. Previous Change Orders
 - b. Unit Prices
 - c. Deductions for uncorrected Work
 - d. Penalties and Bonuses

- e. Deductions for liquidated damages
 - f. Deductions for re-inspection payments
 - g. Other adjustments
- 3. Total Contract Sum, as adjusted.
 - 4. Previous payments.
 - 5. Adjustment in Contract Time.
 - 6. Sum remaining due.
- C. Engineer will prepare a final Change Order, reflecting approved adjustment to the Contract Sum, which were not previously made by Change Orders.

1.07 FINAL APPLICATION FOR PAYMENT

- A. Contractor shall submit the final Application for Payment in accordance with procedures and requirement stated in the General Conditions.

PART 2 – PRODUCTS (NOT USED)

PART 3 – EXECUTION (NOT USED)

END OF SECTION

TECHNICAL SPECIFICATIONS



TECHNICAL SPECIFICATIONS

CITY OF FROSTPROOF
Extension on Fir Ave. & 5th St. W.
Frostproof, FL.

Prepared for:

City of Frostproof
111 West First Street
Frostproof, Florida, 33843
Phone: 863-635-7855

Prepared by:

*Kimley-Horn and Associates, Inc.
Lakeland, Florida*

046414319

June 2024

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Kimley»Horn

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END OF SECTION

SECTION 01 10 00

SUMMARY

PART 1 - GENERAL

1.1 SUMMARY

- A. The Work specified herein shall include modification and installation of 1,130 feet of gravity sewer, 530 feet of force main, one public lift station near intersection of 5th St and Fir Ave, HDPE Piping, Lift Station, Manholes, Erosion and Sediment Control, Septic Tank Abandonment, and Asphalt removal and repair in the City of Frostproof, City and County Limits and City Service Area, as well as all modifications necessary for the completion of construction. The project is located along Fir Avenue and 5th Street West, Frostproof, FL 33843.
- B. Section Includes:
 - 1. Contract description.
 - 2. Work by Owner or other Work at the Site.
 - 3. Owner-furnished products.
 - 4. Contractor's use of Site and premises.
 - 5. Future work.
 - 6. Work sequence.
 - 7. Owner occupancy.
 - 8. Permits.
 - 9. Specification conventions.

1.2 CONTRACT DESCRIPTION

- A. Work of the Project includes construction of a lift station, manholes, gravity sewer, septic tank abandonment, and force mains that will serve the City of Frostproof.
- B. Perform Work of each Contract under provisions of the Contract with Owner according to Conditions of Contract.

1.3 WORK BY OWNER OR OTHERS

- A. If work performed by the Owner or under Owner-awarded contracts interfere with each other due to work being performed at the same time or at the same Site, Owner will determine the sequence of work under all contracts according to "Work Sequence" and "Contractor's Use of Site and Premises" Articles in this Section.
- B. Coordinate Work with utilities of Owner and public or private agencies.
- C. Work under this Contract includes:
 - 1. Work as indicated on Drawings and defined herein.

- D. Items noted NIC (Not in Contract), will be furnished and installed by Owner.

1.4 CONTRACTOR'S USE OF SITE AND PREMISES

- A. Limit use of Site and premises to allow:
 - 1. Owner occupancy.
 - 2. Work by Owner.
 - 3. Work by Others as directed by the Owner.
 - 4. Use of Site and premises by the public as directed by the Owner.
- B. Construction Operations: Limited to areas indicated on Drawings or as described herein.
 - 1. Noisy and Disruptive Operations (such as Use of Jack Hammers and Other Noisy Equipment): Not allowed in close proximity to existing buildings during regular hours of operation. Coordinate and schedule such operations with Owner to minimize disruptions.
- C. Time Restrictions for Performing Work:
 - 1. Working Hours shall be in accordance with the General Conditions.
 - 2. Some Work including, but not limited to, abandonments existing piping systems, as well as connections, replacements, extensions thereto and thereof may necessitate work being done after or before normal work hours, said decision resting solely with the Engineer.
 - a. Normally such extended hours will be required only to maintain service to existing customers or to minimize inconvenience to those customers or members of the public.
 - b. This shall be considered incidental to the construction and no additional compensation shall be allowed, therefore.
- D. Utility Outages and Shutdown:
 - 1. Coordinate and schedule electrical and other utility outages with Owner.
 - 2. Outages: Allowed only at previously agreed upon times.
 - 3. At least one week before scheduled outage, submit Outage Request Plan to Owner itemizing the dates, times, and duration of each requested outage.
- E. Sound Level Restrictions: Sound pressure level measured at boundary of Site shall not exceed 40 dBA.

1.5 WORK SEQUENCE

- A. Construct Work in order to accommodate Owner's occupancy requirements during construction period. Coordinate construction schedule and operations with Owner.
- B. Sequencing of Construction Plan: Before start of construction, submit one (1) electronic copy of construction plan regarding phasing of all Work for acceptance by Owner. After acceptance of plan, construction sequencing shall comply with accepted plan unless deviations are accepted by Owner in writing.

1.6 OWNER OCCUPANCY

- A. Owner will occupy Site for conduct of normal operations.
- B. Cooperate with Owner to minimize conflict and to facilitate Owner's operations.
- C. Schedule the Work to accommodate Owner occupancy.

1.7 PERMITS

- A. The Contractor shall apply for and obtain the NPDES/NOI permit and any other permits not obtained that are required for construction of this project.
- B. The Owner will obtain the FDEP permit and permits required for work within the City and County Rights of Way.
 - 1. The Contractor shall verify existence of the approved permits prior to commencing any work.
- C. Work within City Rights-of-Way:
 - 1. All work in City rights-of-way or property shall be in full compliance with all requirements of the permit, current service area agreement and to the satisfaction of the City of Frostproof. Work within the rights-of-way of public thoroughfares which are not under the jurisdiction of the City shall conform to the requirements of the agency having jurisdiction. Installation shall include all the required work and necessary signs to provide the required traffic control, detours, and any other work to maintain traffic.
 - 2. The Contractor shall notify the City of Frostproof Public Works Department and City Engineer's Office at least 24 hours prior to commencing work within the City rights-of-way and shall pay for any additional tests that the City may require.
 - 3. In the event of conflict between the requirements of these Specifications and Details and those of the City of Frostproof, the more stringent requirements as determined by the Engineer, shall govern.
 - 4. The costs of any and all items of work required by the City of Frostproof, payment for which is not specifically provided by bid items in the Proposal, shall be included in the prices of bid items to which said items of work are related, incidental, or appurtenant. No additional compensation shall be allowed, therefore.
 - 5. The Contractor shall furnish copies of written approval or acceptance of the work by the City of Frostproof to the Engineer along with the particular Periodic Estimate for Partial Payment on which payment for the work is requested. Final approval of the Project will not be issued until such approval has been furnished.
- D. Work within County Rights-of-Way:
 - 1. All work in County Rights-of-way shall be in full compliance with the County rights-of-way permit and Owner requirements.
 - 2. The costs of any and all items of work required by the County, pavement for which is not specifically provided by bid items in the proposal, shall be included

in the prices of bid items to which said items of work are related, incidental, or appurtenant. No additional compensation shall be allowed, therefore.

3. In the event of conflict between the requirements of these Specifications and Details and those of the County, the more stringent requirements as determined by the Engineer, shall govern.

1.8 SPECIFICATION CONVENTIONS

- A. These Specifications are written in imperative mood and streamlined form. This imperative language is directed to Contractor unless specifically noted otherwise. The words "shall be" are included by inference where a colon (:) is used within sentences or phrases.

PART 2 - PRODUCTS - Not Used

PART 3 - EXECUTION - Not Used

END OF SECTION

SECTION 01 22 00
MEASUREMENT AND PAYMENT

PART 1 - GENERAL

1.1 DESCRIPTION

- A. The scope of this section of the Contract Documents is to further define the items included in each Bid Item in the Bid Form section of the Contract Documents. Payment will be made based on the specified items included in the description in this section for each bid item.
- B. All contract prices included in the Bid Form section will be full compensation for all shop drawings, working drawings, labor, materials, tools, equipment and incidentals necessary to complete the construction as shown on the Drawings and/or as specified in the Contract Documents to be performed under this Contract. Actual quantities of each item bid on a unit price basis will be determined upon completion of the construction in the manner set up for each item in this section of the Specifications. Payment for all items listed in the Bid Form will constitute full compensation for all work shown and/or specified to be performed under this Contract.
- C. The items listed starting with Article 1.10 of this Section refer to and are the same pay items listed in the Bid Form and constitute all pay items for completing the Work. No direct or separate payment will be made for providing miscellaneous temporary or accessory works, plant services, CONTRACTOR's or ENGINEER's field offices, layout surveys, Project signs, sanitary requirements, testing, safety provisions and safety devices, submittals and record drawings, water supplies, power and fuel, traffic maintenance, removal of waste, security, coordination with CITY's operations, information technology (including hardware, software, and services) required during construction, bonds, insurance, or other requirements of the General Conditions, Supplementary Conditions, General Requirements, and other requirements of the Contract Documents. Compensation for all services, items, materials, and equipment shall be included in prices stipulated for the lump sum and unit price pay items listed in this Section and included in the Contract.
- D. Each lump sum and unit price shall include an amount considered by CONTRACTOR to be adequate to cover CONTRACTOR's overhead and profit for each separately identified item.

1.2 ENGINEER'S ESTIMATE OF QUANTITIES

- A. ENGINEER's estimated quantities for items of Unit Price Work, as included in the Contract, are approximate only and are included solely for purpose of comparing Bids and pricing. CITY does not expressly or by implication agree that nature of materials encountered below the ground surface or actual quantities of material encountered or required will correspond with the quantities included in the Contract at the time of award and reserves right to increase or decrease quantities or to eliminate quantities as OWNER may deem necessary. Unless indicated otherwise in the Supplementary Conditions, CONTRACTOR or CITY will not be entitled to adjustment in price of Unit Price Work items as a result of change in estimated quantity and agree to accept the unit prices accepted in the Bid as complete and total compensation for additions caused by changes or alterations in the Unit Price Work directed by OWNER.

1.3 ADJUSTMENT OF UNIT PRICES FOR INCREASE OR DECREASE OF ESTIMATED QUANTITIES

- A. Increases or decreases in the quantity of an item of Unit Price Work will be determined by comparing total payable quantity of Unit Price Work with ENGINEER's estimated quantity indicated in the Contract Documents.
- B. Provisions, if any, regarding adjustment of unit prices due to variations in actual quantities from the estimated quantities awarded with the Contract, are in the Supplementary Conditions.
 - 1. ENGINEER's review for possible unit price cost adjustment, when provision for such adjustment is indicated in the Supplementary Conditions, will be at a time ENGINEER deems reasonable and proper.
 - 2. Payment for Unit Price Work item that has an as-awarded computed total value of less than the percent (indicated in the Supplementary Conditions) of the sum of the as-awarded total Contract Price will be made at the unit price in the Contract, regardless of an increase or decrease in quantity.

1.4 RELATED PROVISIONS

- A. Payments to CONTRACTOR: Refer to General Conditions, Supplemental Conditions, and Agreement.
- B. Changes in Contract Price: Refer to General Conditions and Supplemental Conditions.

1.5 WORK OUTSIDE AUTHORIZED LIMITS

- A. No payment will be made for work constructed outside the authorized limits of work.

1.6 MEASUREMENT STANDARDS

- A. Unless otherwise specified for the particular items involved, all measurements of distance shall be taken horizontally or vertically.

1.7 AREA MEASUREMENTS

- A. In the measurement of items to be paid for on the basis of area of finished work, the lengths and/or widths to be used in the calculations shall be the final dimensions measured along the surface of the completed work within the neat lines shown or designated.

1.8 LUMP SUM ITEMS

- A. Where payment for items is shown to be paid for on a lump sum basis, no separate payment will be made for any item of work required to complete the lump sum items. Lump sum contracts shall be complete, tested and fully operable prior to request for final payment. Contractor may be required to provide a break-down of the lump sum totals.

1.9 UNIT PRICE ITEM

- A. Separate payment will be made for the items of work described herein and listed on the Bid Form. Any related work not specifically listed but required for satisfactory completion of the work shall be considered to be included in the scope of the appropriate listed work items.

No separate payment will be made for the following items and the cost of such work shall be included in the applicable pay items of work. Final payments shall not be requested by the Contractor or made by the City until as-built (record) drawings have been submitted and approved by the City.

1. Project signs and photographs.
2. Removal, repair, replacement or relocation of all signs, walls, private irrigation systems and related items.
3. Rubbish and spoil removal.
4. Shop Drawings/Submittals, Working Drawings.
5. Clearing, grubbing and grading except as hereinafter specified.
6. Trench excavation, including necessary pavement removal and rock removal, except as otherwise specified.
7. Dewatering and disposal of surplus water.
8. Structural fill, backfill, and grading.
9. Replacement of unpaved roadways, and shrubbery plots.
10. Cleanup & miscellaneous work.
11. Foundation and borrow materials, except as hereinafter specified.
12. Testing and placing system in operation.
13. Any material and equipment required to be installed and utilized for the tests.
14. Pipe, structures, pavement replacement, asphalt and shell driveways and/or appurtenances included within the limits of lump sum work, unless otherwise shown.
15. Maintaining the existing quality of service during construction.
16. Appurtenant work as required for a complete and operable system.
17. Seeding and hydromulching.

1.10 BASE BID ITEMS

A. Item 1 – Mobilization/ Demobilization:

1. Method of Measurement:
 - a. Lump Sum (LS): The Lump Sum price for Item 1 shall be full compensation for mobilization/demobilization activities required for all Work as shown and specified.
2. Payments shall include, but not limited to, all costs for mobilizing, demobilizing, general conditions for project, bonds and insurance, and temporary facilities in accordance with the Contract Documents.
3. Payment for mobilization / demobilization shall not exceed 10 percent (10%) of the total Contract cost unless the Contractor can prove to the City that actual mobilization/demobilization cost exceeds 10 percent (10%).

Partial payments for this Bid Item will be made in accordance with the following schedule:

Percent of Original Contract Amount:	Percent Allowable Payment of Mobilization/Demobilization Bid Item Price:
5	25
10	35
25	45
50	50
75	75
100	100

These payments will be subject to the standard retainage provided in the Contract. Payment of the retainage will be made after completion of the work and demobilization.

B. Item 2 – Erosion and Sediment Control, Davis-Bacon Compliance, Utility Locates, and Pre-Construction Video:

1. Method of Measurement:
 - a. Lump Sum (LS): The Lump Sum price for Item 2 shall be full compensation for erosion and sediment control, Davis-Bacon compliance, utility locates, and pre-construction video of the existing site conditions including private property where service lateral construction and septic tank abandonment is necessary as specified in the Contract Documents.
2. Payments shall include, but is not limited to, all labor, materials, and equipment required for demolition and removal, maintaining erosion and sediment control measures, Davis-Bacon compliance, utility locates, incidentals required for pre-construction video.

C. Item 3 – Maintenance of Traffic:

1. Method of Measurement:
 - a. Lump Sum (LS): The Lump Sum price for Item 3 shall be full compensation for furnishing Maintenance of Traffic for the duration of the project as specified in the Contract Documents.
2. Payment for all work included in this Bid Items will be made at the applicable Contract lump sum bid for the maintenance of traffic during the construction of the proposed improvements. Payment shall represent full compensation for all labor, materials, necessary equipment, coordination, and incidentals necessary to safely complete the work while complying to FDOT Design Standards Index 102-600 Series, ready for approval and acceptance by the City.

D. Item 4 – As-built Survey and Project Closeout:

1. Method of Measurement:
 - a. Lump Sum (LS): The Lump Sum price for Item 4 shall represent full compensation for as-built surveys and other required certifications to put the proposed project into service. All items are subject to approval by the Engineer and the City. As-built Survey shall conform to City Public Works Standards.
2. Payments shall include, but is not limited to, all labor, materials, costs, and equipment required for as-built survey, drawings, or any other required certifications to put the project into service, and project closeout in accordance with the Contract Documents.

E. Item 5 – Construction Testing and Staking:

1. Method of Measurement:
 - a. Lump Sum (LS): The Lump sum Price for Item 5 shall represent full compensation for Construction Testing and Staking in accordance with the Contract Documents.
2. Payments shall include, but is not limited to, all labor, materials, equipment, and incidentals necessary to complete the work for construction testing and staking, ready for approval and acceptance by the City.

F. Item 6 – 8” Gravity Sewer PVC:

1. Method of Measurement:
 - a. Linear Foot (LF): The quantity to be paid shall be the actual number of linear feet of 8” Gravity Sewer furnished and installed in accordance with the Contract Documents.
2. Payment shall include, but is not limited to, all labor, materials, and equipment required for erosion and sediment control, excavation, dewatering, bedding, backfilling, dewatering, shoring and bracing, compaction, disposal of excess material, pipe, installation, cleaning, testing, and all incidentals and appurtenances required to complete the installation as shown and specified in the Contract Documents.

G. Item 7 –Force Main:

1. Method of Measurement:
 - a. Linear Foot (LF): The quantity to be paid shall be the actual number of linear feet of Force Main furnished and installed in accordance with the Contract Documents.

Class of pipe to be as specified or as listed on the Bid Form.

BID ITEM	DESCRIPTION	UNITS
7	2" HDPE DR 11 Force Main HDD (Including Fittings, Restraints, Trenches, Excavation, and Restoration)	LF

2. Payment shall include, but is not limited to, all labor, materials, and equipment required for erosion and sediment control, excavation, bedding, backfilling, directional drill of 2” HDPE DR 11 Force Main, any necessary fusing, transition fittings, dewatering, shoring and bracing, compaction, tracer wire and tape, pipe restraints, adapters, sawcut and removal of roadway and concrete, installation, cleaning, testing, equipment, any restoration (i.e. frackout, sodding, asphalt roadway, and concrete), all incidental items disturbed during performance of work, and appurtenances required to complete the installation as shown and specified in the Contract Documents.

H. Items 8 – Gravity Sewer Manhole:

1. Method of Measurement:
 - a. Each (EA): The quantity to be paid shall be the actual number of gravity sewer manholes furnished and installed in accordance with the Contract Documents.

Depth of Manhole to be as specified or as listed on the Bid Form.

BID ITEM	DESCRIPTION	UNITS
8	Manhole	EA

2. Payment shall include, but is not limited to, all labor, materials, and equipment required for erosion and sediment control, excavation, dewatering, manhole, gravel, structure installation, coating, lining, leak testing, lining, backfill, compaction, shoring and bracing, pipe connections, testing, and all incidentals and appurtenances required to complete the installation as shown and specified in the Contract Documents.

I. Item 9 and 10 – Gravity Sewer Lateral Services:

1. Method of Measurement:
 - a. Each (EA): The quantity to be paid shall be the actual number of gravity sewer services furnished and installed in accordance with the Contract Documents.

Gravity Sewer Services to be as specified or as listed on the Bid Form.

BID ITEM	DESCRIPTION	UNITS
9	Gravity Sewer Lateral Single Service	EA
10	Gravity Sewer Lateral Double Service	EA

2. Payment shall include, but is not limited to, all labor, materials, and equipment required for erosion and sediment control, excavation, backfill, compaction, shoring and bracing, pipe connections, concrete, cleanout, fittings, pipe installation, cleaning, dewatering, testing, and all incidentals and appurtenances required to complete the installation as shown and specified in the Contract Documents.
3. All service locations shown on the Contract Drawings are approximate and it shall be the responsibility of the Contractor to contract all homeowners for locating the owner’s existing service lateral and lot lines and determine, subject to approval by the City, the best locations and depth for each service lateral. Locations of all connections at the main line sewer and at the property line by station and offset method shall be recorded on the as-built drawings to be furnished to the City by the Contractor.

J. Item 11 – Complete Lift Station Package:

1. Method of Measurement:
 - a. Lump Sum (LS): The Lump sum Price for Item 11 shall represent full compensation for furnishing and installing the hatch covers, wet well floats, valve vault, wet well, supports, grout, valves, fittings, hardware, appurtenances, pipe penetrations, submersible pumps, concrete pad, concrete drive, PVC fence, water service, water meter, water backflow, installation, hose bib, control panel, restoration, fittings, restraints, conduit, associated electrical and instrumentation, bends, coatings/liners, pump outs, dewatering, associated piping, start-up, and testing in accordance with Contract Documents.
2. Payments shall include, but is not limited to, all labor, materials, equipment, and incidentals necessary to complete the work, ready for approval and acceptance by the City.
 - a. Payments related to Duke Energy permitting will be reimbursed by the City through a change order.

K. Item 12 – Asphalt Roadway (Full Depth Replacement)

1. Method of Measurement:
 - a. Square Yard (SY): The quantity to be paid shall be the actual number of square yards of full depth asphalt roadway replaced and installed in accordance with the Contract Documents.
 - b. Payment for all work included under this Bid Item will be made at the Contract unit price bid per square yard of base, subbase and asphalt furnished, installed, and tested, grading, compaction, testing, priming and tack coats, and all incidentals and appurtenances required to complete the asphalt repair as shown and specified in the Contract Documents. Measurement will be based on the actual number of square yards of road restoration installed, tested, complete and approved. The measurement will include the disturbed areas located within the limits of the saw cut or as specified, but not greater than the width of the existing roadway prior to construction. Payment will include complete restoration of the roadway section in accordance with the applicable details on the Contract Drawings. No payment for restoration of a private driveway outside the right-of-way shall be made under this Bid Item. No additional payment shall be made for installing layers of base, subbase, or asphalt thicker than what is specified on the Contract documents. Payment shall include all items and incidentals necessary to complete the road restoration, including restoring pavement markings and signalization loops, in accordance with the requirements of City of Frostproof and Polk County ready for approval and acceptance by the City and County.

L. Item 13 – Septic/Laundry Tank Abandonment (Includes Private Lateral Installation):

1. Method of Measurement:
 - a. Each (EA): The quantity to be paid shall be the actual number of septic and laundry tanks to be abandoned in accordance with the Contract Documents.
2. Payments shall include, but is not limited to, all labor, materials, and equipment within private property required for fittings, pipe installation, restoration, dewatering, compaction, pumping tanks, cleaning, fill material, locating tanks and drain lines, permitting, disposal, testing, bedding, excavation, abandonment of existing septic / laundry tanks per department of health requirements, backfill, pipe connections, and all incidentals and appurtenances required as shown and specified in the Contract Documents.
3. It shall be the responsibility of the Contractor to contact all homeowners/owners for locating the owner's existing service lateral and determine, subject to approval by the City, the best locations and depth for each service lateral. Locations of all connections at the existing drain line and cleanout by station and offset method shall be recorded on the as-built drawings to be furnished to the City by the Contractor.

M. Item 14 – 10% Contract Contingency

1. Payment for all work under this Bid Item shall be made only at the City's discretion. This Bid Item shall not exceed 10% of the Bidders Total Base Bid. The Bidder shall calculate and enter a dollar amount for this Bid Item (10% of total improvements not including additive bid items).

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION

SECTION 01 25 00
SUBSTITUTION PROCEDURES

PART 1 - GENERAL

1.1 SECTION INCLUDES

- A. Quality assurance.
- B. Product options.
- C. Product substitution procedures.

1.2 QUALITY ASSURANCE

- A. Contract is based on products and standards established in Contract Documents without consideration of proposed substitutions.
- B. Products specified define standard of quality, type, function, dimension, appearance, and performance required.
- C. Substitution Proposals: Permitted for specified products except where specified otherwise. Do not substitute products unless substitution has been accepted and approved in writing by Engineer.

1.3 PRODUCT OPTIONS

- A. See Section 01 60 00 - Product Requirements.

1.4 PRODUCT SUBSTITUTION PROCEDURES

- A. Engineer will consider requests for substitutions only within 30 days after date established in Notice to Proceed.
- B. Substitutions may be considered when a product becomes unavailable through no fault of Contractor.
- C. Document each request with complete data, substantiating compliance of proposed substitution with Contract Documents, including:
 - 1. Manufacturer's name and address, product, trade name, model, or catalog number, performance and test data, and reference standards.

2. Itemized point-by-point comparison of proposed substitution with specified product, listing variations in quality, performance, and other pertinent characteristics.
 3. Reference to Article and Paragraph numbers in Specification Section.
 4. Cost data comparing proposed substitution with specified product and amount of net change to Contract Sum.
 5. Changes required in other Work.
 6. Availability of maintenance service and source of replacement parts as applicable.
 7. Certified test data to show compliance with performance characteristics specified.
 8. Samples when applicable or requested.
 9. Other information as necessary to assist Architect/Engineer's evaluation.
- D. A request constitutes a representation that Contractor:
1. Has investigated proposed product and determined that it meets or exceeds quality level of specified product.
 2. Will provide same warranty for substitution as for specified product.
 3. Will coordinate installation and make changes to other Work that may be required for the Work to be complete with no additional cost to Owner.
 4. Waives claims for additional costs or time extension that may subsequently become apparent.
 5. Will coordinate installation of the accepted substitute, making such changes as may be required for the Work to be complete in all respects.
 6. Will reimburse Owner and Engineer for review or redesign services associated with reapproval by authorities having jurisdiction.
- E. Substitutions will not be considered when they are indicated or implied on Shop Drawing or Product Data submittals without separate written request or when acceptance will require revision to Contract Documents.
- F. Substitution Submittal Procedure:
1. Submit requests for substitutions to the Engineer in writing.
 2. Submit three copies of Request for Substitution for consideration. Limit each request to one proposed substitution.
 3. Submit Shop Drawings, Product Data, and certified test results attesting to proposed product equivalence. Burden of proof is on proposer.
 4. Engineer will notify Contractor in writing of decision to accept or reject request.

PART 2 - PRODUCTS - Not Used

PART 3 - EXECUTION - Not Used

END OF SECTION

SECTION 01 30 00

ADMINISTRATIVE REQUIREMENTS

PART 1 - GENERAL

1.1 SECTION INCLUDES

- A. Coordination and Project conditions.
- B. Preconstruction meeting.
- C. Progress meetings.
- D. Preinstallation meetings.
- E. Closeout meeting.

1.2 COORDINATION AND PROJECT CONDITIONS

- A. Coordinate scheduling, submittals, and Work of various Sections of Project Manual to ensure efficient and orderly sequence of installation of interdependent construction elements.
- B. Verify that utility requirements and characteristics of operating equipment are compatible with existing utilities. Coordinate Work of various Sections having interdependent responsibilities for installing, connecting to, and placing operating equipment in service.
- C. Coordinate space requirements, supports, and installation of mechanical and electrical Work indicated diagrammatically on Drawings. Follow routing shown for pipes, ducts, and conduit as closely as practical; place runs parallel with lines of building. Use spaces efficiently to maximize accessibility for other installations, for maintenance, and for repairs.
 - 1. Coordination Drawings: Prepare as required to coordinate all portions of Work. Show relationship and integration of different construction elements that require coordination during fabrication or installation to fit in space provided or to function as intended. Indicate locations where space is limited for installation and access and where sequencing and coordination of installations are important.
- D. Coordination Meetings: In addition to other meetings specified in this Section, hold coordination meetings with personnel and Subcontractors to ensure coordination of Work.
- E. In finished areas, except as otherwise indicated, conceal pipes, ducts, and wiring within construction. Coordinate locations of fixtures and outlets with finish elements.

- F. Coordinate completion and clean-up of Work of separate Sections in preparation for Substantial Completion.
- G. After Owner's occupancy of premises, coordinate access to Site for correction of defective Work and Work not complying with Contract Documents, to minimize disruption of Owner's activities.

1.3 PRECONSTRUCTION MEETING

- A. Owner will schedule and preside over meeting after Notice of Award.
- B. Attendance Required: Per General Conditions.
- C. Minimum Agenda:
 - 1. Distribution of Contract Documents.
 - 2. Submission of list of Subcontractors, list of products, schedule of values, and Progress Schedule.
 - 3. Designation of personnel representing parties in Contract.
 - 4. Communication procedures.
 - 5. Procedures and processing of requests for interpretations, field decisions, submittals, substitutions, Applications for Payments, proposal request, Change Orders, and Contract closeout procedures.
 - 6. Scheduling.
 - 7. Critical Work sequencing.
 - 8. Status of required permits.

1.4 PROGRESS MEETINGS

- A. Schedule and administer meetings throughout progress of the Work at maximum monthly intervals.
- B. Make arrangements for meetings, prepare agenda with copies for participants, and preside over meetings.
- C. Attendance Required: Job superintendent, major Subcontractors and suppliers, Engineer, and Owner, as appropriate to agenda topics for each meeting.
- D. Minimum Agenda:
 - 1. Review minutes of previous meetings.
 - 2. Review of Work progress.
 - 3. Field observations, problems, and decisions.
 - 4. Identification of problems impeding planned progress.
 - 5. Review of submittal schedule and status of submittals.
 - 6. Review of off-Site fabrication and delivery schedules.
 - 7. Maintenance of Progress Schedule.
 - 8. Corrective measures to regain projected schedules.
 - 9. Planned progress during succeeding work period.

10. Coordination of projected progress.
11. Maintenance of quality and work standards.
12. Effect of proposed changes on Progress Schedule and coordination.
13. Other business relating to Work.

- E. Contractor: Record minutes and distribute copies to participants and those affected by decisions made within two (2) days after meeting.

1.5 PREINSTALLATION MEETINGS

- A. When required in individual Specification Sections, convene preinstallation meetings at Project Site before starting Work of specific Section.
- B. Require attendance of parties directly affecting, or affected by, Work of specific Section.
- C. Notify Engineer five (5) days in advance of meeting date.
- D. Prepare agenda and preside over meeting:
1. Review conditions of installation, preparation, and installation procedures.
 2. Review coordination with related Work.
- E. Record minutes and distribute copies to participants and those affected by decisions made within two (2) days after meeting.

1.6 CLOSEOUT MEETING

- A. Schedule Project closeout meeting with sufficient time to prepare for requesting Substantial Completion. Preside over meeting and be responsible for minutes.
- B. Attendance Required: Contractor, major Subcontractors, Engineer, Owner, and others appropriate to agenda.
- C. Notify Engineer and Owner five (5) days in advance of meeting date.
- D. Minimum Agenda:
1. Start-up of facilities and systems.
 2. Operations and maintenance manuals.
 3. Testing, adjusting, and balancing.
 4. System demonstration and observation.
 5. Operation and maintenance instructions for Owner's personnel.
 6. Contractor's inspection of Work.
 7. Contractor's preparation of an initial "punch list."
 8. Procedure to request Engineer inspection to determine date of Substantial Completion.
 9. Completion time for correcting deficiencies.
 10. Inspections by authorities having jurisdiction.

11. Certificate of Occupancy, if required, and transfer of insurance responsibilities.
12. Final cleaning.
13. Preparation for final inspection.
14. Closeout Submittals:
 - a. Project record documents.
 - b. Operating and maintenance documents.
 - c. Operating and maintenance materials.
 - d. Affidavits.
15. Final Application for Payment.
16. Contractor's demobilization of Site.
17. Maintenance.

- E. Record minutes and distribute copies to participants and those affected by decisions made within two (2) days after meeting.

PART 2 - PRODUCTS - Not Used

PART 3 - EXECUTION – Not Used

END OF SECTION

SECTION 01 32 16

CONSTRUCTION PROGRESS SCHEDULE

PART 1 - GENERAL

1.1 SECTION INCLUDES

- A. Submittals.
- B. Bar chart schedules.
- C. Review and evaluation.
- D. Updating schedules.
- E. Distribution.

1.2 SUBMITTALS

- A. Submit preliminary progress schedule in accordance with the General Conditions.
- B. Schedule Updates:
 - 1. Overall percent complete, projected and actual.
 - 2. Completion progress by listed activity and subactivity, to within five (5) working days prior to submittal.
 - 3. Changes in Work scope and activities modified since submittal.
 - 4. Delays in submittals or resubmittals, deliveries, or Work.
 - 5. Adjusted or modified sequences of Work.
 - 6. Other identifiable changes.
 - 7. Revised projections of progress and completion.

1.3 BAR CHART SCHEDULES

- A. Format: Bar chart Schedule, to include at least:
 - 1. Identification and listing in chronological order of those activities reasonably required to complete the Work, including:
 - a. Subcontract Work.
 - b. Major equipment design, fabrication, factory testing, and delivery dates including required lead times.
 - c. Move-in and other preliminary activities.
 - d. Equipment and equipment system test and startup activities.
 - e. Project closeout and cleanup.
 - f. Work sequences, constraints, and milestones.
 - 2. Listings identified by Specification Section number.

3. Identification of the following:
 - a. Horizontal time frame by year, month, and week.
 - b. Duration, early start, and completion for each activity and subactivity.
 - c. Critical activities and Project float.
 - d. Subschedules to further define critical portions of Work.

B. Sheet Size: 11 inches high x 17 inches wide.

1.4 REVIEW AND EVALUATION

- A. Participate in joint review and evaluation of schedules with Engineer at each submittal.
- B. Evaluate Project status to determine Work behind schedule and Work ahead of schedule.
- C. After review, revise schedules incorporating results of review, and resubmit within five (5) days.

1.5 UPDATING SCHEDULES

- A. Maintain schedules to record actual start and finish dates of completed activities.
- B. Indicate progress of each activity to date of revision, with projected completion date of each activity. Update schedules to depict current status of Work.
- C. Identify activities modified since previous submittal, major changes in Work, and other identifiable changes.
- D. Upon approval of a Change Order, include the change in the next schedule submittal.
- E. Indicate changes required to maintain Date of Substantial Completion.
- F. Submit sorts as required to support recommended changes.
- G. Prepare narrative report to define problem areas, anticipated delays, and impact on schedule. Report corrective action taken or proposed and its effect.

1.6 DISTRIBUTION

- A. Following joint review, distribute copies of updated schedules to Contractor's Project site file, to Subcontractors, suppliers, Engineer, Owner, and other concerned parties.
- B. Instruct recipients to promptly report, in writing, problems anticipated by projections shown in schedules.

PART 2 - PRODUCTS - Not Used

PART 3 - EXECUTION - Not Used

END OF SECTION

SECTION 01 33 00
SUBMITTAL PROCEDURES

PART 1 - GENERAL

1.1 SECTION INCLUDES

- A. Definitions.
- B. Submittal procedures.
- C. Construction progress schedules.
- D. Proposed product list.
- E. Product data.
- F. Electronic CAD files of Project Drawings.
- G. Shop Drawings.
- H. Samples.
- I. Other submittals.
- J. Test reports.
- K. Certificates.
- L. Manufacturer's instructions.
- M. Manufacturer's field reports.
- N. Erection Drawings.
- O. Construction photographs.
- P. Contractor review.
- Q. Engineer review.

1.2 DEFINITIONS

- A. Action Submittals: Written and graphic information and physical samples that require Engineer's responsive action.

- B. Informational Submittals: Written and graphic information and physical Samples that do not require Engineer's responsive action. Submittals may be rejected for not complying with requirements.

1.3 SUBMITTAL PROCEDURES

- A. Transmit each submittal with Engineer-accepted form.
- B. In addition to the specified number of hard copies, one (1) electronic copy of each submittal shall be transmitted to the Engineer. The electronic copy shall be in Portable Document Format (.pdf) unless otherwise specified.
- C. Sequentially number transmittal forms. Mark revised submittals with original number and sequential alphabetic suffix.
- D. Identify: Project, Contractor, Subcontractor and supplier, pertinent Drawing and detail number, and Specification Section number appropriate to submittal.
- E. Apply Contractor's stamp, signed or initialed, certifying that review, approval, verification of products required, field dimensions, adjacent construction Work, and coordination of information is according to requirements of the Work and Contract Documents.
- F. Schedule submittals to expedite Project, and deliver to Engineer. Coordinate submission of related items.
- G. Identify variations in Contract Documents and product or system limitations that may be detrimental to successful performance of completed Work.
- H. Allow space on submittals for Contractor and Engineer review stamps.
- I. When revised for resubmission, identify changes made since previous submission.
- J. Distribute copies of reviewed submittals as appropriate. Instruct parties to promptly report inability to comply with requirements.
- K. Submittals not requested will not be recognized nor processed.
- L. Incomplete Submittals: Engineer will not review. Complete submittals for each item are required. Delays resulting from incomplete submittals are not the responsibility of Engineer.

1.4 CONSTRUCTION PROGRESS SCHEDULES

- A. Comply with General Conditions and Section 01 32 16 - Construction Progress Schedule.

1.5 PROPOSED PRODUCT LIST

- A. Within fifteen (15) days after date of Notice to Proceed, submit list of major products proposed for use, with name of manufacturer, trade name, and model number of each product.
- B. For products specified only by reference standards, indicate manufacturer, trade name, model or catalog designation, and reference standards.

1.6 PRODUCT DATA

- A. Product Data: Action Submittal: Submit to Engineer for review for assessing conformance with information given and design concept expressed in Contract Documents.
- B. Submit number of copies Contractor requires, plus three (3) copies Engineer will retain.
- C. Mark each copy to identify applicable products, models, options, and other data. Supplement manufacturers' standard data to provide information specific to this Project.
- D. Indicate product utility and electrical characteristics, utility connection requirements, and location of utility outlets for service for functional equipment and appliances.
- E. After review, produce copies and distribute according to "Submittal Procedures" Article and for record documents described in Section 01 70 00 - Execution and Closeout Requirements.

1.7 ELECTRONIC CAD FILES OF PROJECT DRAWINGS

- A. Electronic CAD Files of Project Drawings: May only be used to expedite production of Shop Drawings for the Project. Use for other Projects or purposes is not allowed.
- B. Electronic CAD Files of Project Drawings: Distributed only under the following conditions:
 - 1. Use of files is solely at receiver's risk. Engineer does not warrant accuracy of files. Receiving files in electronic form does not relieve receiver of responsibilities for measurements, dimensions, and quantities set forth in Contract Documents. In the event of ambiguity, discrepancy, or conflict between information on electronic media and that in Contract Documents, notify Engineer of discrepancy and use information in hard-copy Drawings and Specifications.
 - 2. CAD files do not necessarily represent the latest Contract Documents, existing conditions, and as-built conditions. Receiver is responsible for determining and complying with these conditions and for incorporating addenda and modifications.
 - 3. User is responsible for removing information not normally provided on Shop Drawings and removing references to Contract Documents. Shop Drawings submitted with information associated with other trades or with references to Contract Documents will not be reviewed and will be immediately returned.

4. Receiver shall not hold Engineer responsible for data or file clean-up required to make files usable, nor for error or malfunction in translation, interpretation, or use of this electronic information.
5. Receiver shall understand that even though Engineer has computer virus scanning software to detect presence of computer viruses, there is no guarantee that computer viruses are not present in files or in electronic media.
6. Receiver shall not hold Engineer responsible for such viruses or their consequences, and shall hold Engineer harmless against costs, losses, or damage caused by presence of computer virus in files or media.

1.8 SHOP DRAWINGS

- A. Shop Drawings: Action Submittal: Submit to Engineer for assessing conformance with information given and design concept expressed in Contract Documents.
- B. Indicate special utility and electrical characteristics, utility connection requirements, and location of utility outlets for service for functional equipment and appliances.
- C. When required by individual Specification Sections, provide Shop Drawings signed and sealed by a Professional Engineer licensed in the State of Florida responsible for designing components shown on Shop Drawings.
 1. Include signed and sealed calculations to support design.
 2. Submit Shop Drawings and calculations in form suitable for submission to and approval by authorities having jurisdiction.
 3. Make revisions and provide additional information when required by authorities having jurisdiction.
- D. After review, produce copies and distribute according to "Submittal Procedures" Article and for record documents described in Section 01 70 00 - Execution and Closeout Requirements.

1.9 SAMPLES

- A. Samples: Action Submittal: Submit to Engineer for assessing conformance with information given and design concept expressed in Contract Documents.
- B. Samples for Selection as Specified in Product Sections:
 1. Submit to Engineer for aesthetic, color, and finish selection.
 2. Submit Samples of finishes, textures, and patterns for Engineer selection.
- C. Submit Samples to illustrate functional and aesthetic characteristics of products, with integral parts and attachment devices. Coordinate Sample submittals for interfacing work.
- D. Include identification on each Sample, with full Project information.
- E. Submit number of Samples specified in individual Specification Sections; Engineer will retain one (1) Sample.

- F. Reviewed Samples that may be used in the Work are indicated in individual Specification Sections.
- G. Samples will not be used for testing purposes unless specifically stated in Specification Section.
- H. After review, produce copies and distribute according to "Submittal Procedures" Article and for record documents described in Section 01 70 00 - Execution and Closeout Requirements.

1.10 OTHER SUBMITTALS

- A. Closeout Submittals: Comply with Section 01 70 00 - Execution and Closeout Requirements.
- B. Informational Submittal: Submit data for Engineer's knowledge as Contract administrator or for Owner.
- C. Submit information for assessing conformance with information given and design concept expressed in Contract Documents.

1.11 TEST REPORTS

- A. Informational Submittal: Submit reports for Engineer's knowledge as Contract administrator or for Owner.
- B. Submit test reports for information for assessing conformance with information given and design concept expressed in Contract Documents.

1.12 CERTIFICATES

- A. Informational Submittal: Submit certification by manufacturer, installation/application Subcontractor, or Contractor to Engineer, in quantities specified for Product Data.
- B. Indicate material or product conforms to or exceeds specified requirements. Submit supporting reference data, affidavits, and certifications as appropriate.
- C. Certificates may be recent or previous test results on material or product but must be acceptable to Engineer.

1.13 MANUFACTURER'S INSTRUCTIONS

- A. Informational Submittal: Submit manufacturer's installation instructions for Engineer's knowledge as Contract administrator or for Owner.
- B. Submit printed instructions for delivery, storage, assembly, installation, startup, adjusting, and finishing, to Engineer in quantities specified for Product Data.

- C. Indicate special procedures, perimeter conditions requiring special attention, and special environmental criteria required for application or installation.

1.14 MANUFACTURER'S FIELD REPORTS

- A. Informational Submittal: Submit reports for Engineer's knowledge as Contract administrator or for Owner.
- B. Submit report in duplicate within five (5) days of observation to Engineer for information.
- C. Submit reports for information for assessing conformance with information given and design concept expressed in Contract Documents.

1.15 PRECONSTRUCTION VIDEO

- A. The Contractor, in the presence, and to the satisfaction of the Engineer and Owner, shall video tape all areas of the construction, staging, etc. A copy of the video tapes shall be delivered to the Owner and Engineer in electronic format compatible with Microsoft Windows and approved as acceptable before any work or site mobilization occurs.

1.16 CONTRACTOR REVIEW

- A. Review for compliance with Contract Documents and approve submittals before transmitting to Engineer.
- B. Contractor shall be Responsible for:
 1. Determination and verification of materials including manufacturer's catalog numbers.
 2. Determination and verification of field measurements and field construction criteria.
 3. Checking and coordinating information in submittal with requirements of Work and of Contract Documents.
 4. Determination of accuracy and completeness of dimensions and quantities.
 5. Confirmation and coordination of dimensions and field conditions at Site.
 6. Construction means, techniques, sequences, and procedures.
 7. Safety precautions.
 8. Coordination and performance of Work of all trades.
- C. Stamp, sign or initial, and date each submittal to certify compliance with requirements of Contract Documents.
- D. Do not fabricate products or begin Work for which submittals are required until approved submittals have been received from Engineer.

1.17 ENGINEER REVIEW

- A. Do not make "mass submittals" to Engineer. "Mass submittals" are defined as six or more submittals or items in one day or 20 or more submittals or items in one week. If "mass submittals" are received, Engineer's review time will be extended as necessary to perform proper review. Engineer will review "mass submittals" based on priority determined by Engineer after consultation with Owner and Contractor.
- B. Informational submittals and other similar data are for Engineer's information, do not require Engineer's responsive action, and will not be reviewed or returned with comment.
- C. Submittals made by Contractor that are not required by Contract Documents may be returned without action.
- D. Submittal approval does not authorize changes to Contract requirements unless accompanied by Change Order.
- E. Owner may withhold monies due to Contractor to cover additional costs beyond the second submittal review.

PART 2 - PRODUCTS - Not Used

PART 3 - EXECUTION - Not Used

END OF SECTION

SECTION 01 40 00
QUALITY REQUIREMENTS

PART 1 - GENERAL

1.1 SECTION INCLUDES

- A. Quality control.
- B. Tolerances.
- C. References.
- D. Labeling.
- E. Testing and inspection services.
- F. Manufacturers' field services.

1.2 QUALITY CONTROL

- A. Monitor quality control over suppliers, manufacturers, products, services, Site conditions, and workmanship, to produce Work of specified quality.
- B. Comply with specified standards as the minimum quality for the Work except where more stringent tolerances, codes, or specified requirements indicate higher standards or more precise workmanship.
- C. Perform Work using persons qualified to produce required and specified quality.
- D. Products, materials, and equipment may be subject to inspection by Engineer and Owner at place of manufacture or fabrication. Such inspections shall not relieve Contractor of complying with requirements of Contract Documents.
- E. Supervise performance of Work in such manner and by such means to ensure that Work, whether completed or in progress, will not be subjected to harmful, dangerous, damaging, or otherwise deleterious exposure during construction period.

1.3 TOLERANCES

- A. Monitor fabrication and installation tolerance control of products to produce acceptable Work. Do not permit tolerances to accumulate.
- B. Comply with manufacturers' recommended tolerances and tolerance requirements in reference standards. When such tolerances conflict with Contract Documents, request clarification from Engineer before proceeding.

- C. Adjust products to appropriate dimensions; position before securing products in place.

1.4 REFERENCES

- A. For products or workmanship specified by association, trade, or other consensus standards, comply with requirements of standard except when more rigid requirements are specified or are required by applicable codes.
- B. Conform to reference standard by date of issue current as of date of Contract Documents except where specific date is established by code.
- C. Obtain copies of standards and maintain on Site when required by product Specification Sections.
- D. When requirements of indicated reference standards conflict with Contract Documents, request clarification from Engineer before proceeding.
- E. Neither contractual relationships, duties, or responsibilities of parties in Contract nor those of Engineer shall be altered from Contract Documents by mention or inference in reference documents.

1.5 LABELING

- A. Attach label from agency approved by authorities having jurisdiction for products, assemblies, and systems required to be labeled by applicable code.
- B. Label Information: Include manufacturer's or fabricator's identification, approved agency identification, and the following information, as applicable, on each label:
 - 1. Model number.
 - 2. Serial number.
 - 3. Performance characteristics.
- C. Manufacturer's Nameplates, Trademarks, Logos, and Other Identifying Marks on Products: Not allowed on surfaces exposed to view in public areas, interior or exterior.

1.6 TESTING AND INSPECTION SERVICES

- A. Contractor shall employ and pay for specified services of an independent firm to perform all testing and inspection.
- B. Independent firm will perform tests, inspections, and other services specified in individual Specification Sections and as required by Engineer.
- C. Testing, inspections, and source quality control may occur on or off Project Site. Perform off-Site testing as required by Engineer or Owner.

- D. Reports shall be submitted by independent firm to Engineer, Contractor, and authorities having jurisdiction, in duplicate, indicating observations and results of tests and compliance or noncompliance with Contract Documents.
 - 1. Submit final report indicating correction of Work previously reported as noncompliant.
- E. Cooperate with independent firm; furnish samples of materials, design mix, equipment, tools, storage, safe access, and assistance by incidental labor as requested.
 - 1. Notify Engineer and independent firm 48 hours before expected time for operations requiring services.
 - 2. Make arrangements with independent firm and pay for additional Samples and tests required for Contractor's use.
- F. Employment of testing agency or laboratory shall not relieve Contractor of obligation to perform Work according to requirements of Contract Documents.
- G. Retesting or re-inspection required because of nonconformance with specified or indicated requirements shall be performed by same independent firm on instructions from Engineer.
- H. Agency Responsibilities:
 - 1. Test Samples of mixes submitted by Contractor.
 - 2. Provide qualified personnel at Site. Cooperate with Engineer and Contractor in performance of services.
 - 3. Perform indicated sampling and testing of products according to specified standards.
 - 4. Ascertain compliance of materials and mixes with requirements of Contract Documents.
 - 5. Promptly notify Engineer and Contractor of observed irregularities or nonconformance of Work or products.
 - 6. Perform additional tests required by Engineer.
 - 7. Attend preconstruction meetings and progress meetings.
- I. Agency Reports: After each test, promptly submit two (2) copies of report to Engineer, Contractor, and authorities having jurisdiction. When requested by Engineer, provide interpretation of test results. Include the following:
 - 1. Date issued.
 - 2. Project title and number.
 - 3. Name of inspector.
 - 4. Date and time of sampling or inspection.
 - 5. Identification of product and Specification Section.
 - 6. Location in Project.
 - 7. Type of inspection or test.
 - 8. Date of test.
 - 9. Results of tests.
 - 10. Conformance with Contract Documents.

- J. Limits on Testing Authority:
 - 1. Agency or laboratory may not release, revoke, alter, or enlarge on requirements of Contract Documents.
 - 2. Agency or laboratory may not approve or accept any portion of the Work.
 - 3. Agency or laboratory may not assume duties of Contractor.
 - 4. Agency or laboratory has no authority to stop the Work.

1.7 MANUFACTURER'S FIELD SERVICES

- A. When specified in individual Specification Sections, require material or product suppliers or manufacturers to provide qualified staff personnel to observe Site conditions, conditions of surfaces and installation, quality of workmanship, startup of equipment, testing, adjusting, and balancing of equipment, and commissioning as applicable, and to initiate instructions when necessary.
- B. Submit qualifications of observer to Engineer thirty (30) days in advance of required observations. Observer is subject to approval of Engineer.
- C. Report observations and Site decisions or instructions given to applicators or installers that are supplemental or contrary to manufacturer's written instructions.
- D. Refer to Section 01 33 00 - Submittal Procedures, "Manufacturer's Field Reports" Article.

PART 2 - PRODUCTS - Not Used

PART 3 - EXECUTION - Not Used

END OF SECTION

SECTION 01 50 00

TEMPORARY FACILITIES AND CONTROLS

PART 1 - GENERAL

1.1 SECTION INCLUDES

- A. Temporary Utilities:
 - 1. Temporary electricity.
 - 2. Temporary lighting for construction purposes.
 - 3. Temporary heating.
 - 4. Temporary cooling.
 - 5. Temporary ventilation.
 - 6. Temporary water service.
 - 7. Temporary sanitary facilities.

- B. Construction Facilities:
 - 1. Vehicular access.
 - 2. Parking.
 - 3. Progress cleaning and waste removal.
 - 4. Project identification.
 - 5. Traffic regulation.
 - 6. Fire-prevention facilities.

- C. Temporary Controls:
 - 1. Barriers.
 - 2. Enclosures and fencing.
 - 3. Security.
 - 4. Water control.
 - 5. Dust control.
 - 6. Erosion and sediment control.
 - 7. Noise control.
 - 8. Pest and rodent control.
 - 9. Pollution control.

- D. Removal of utilities, facilities, and controls.

1.2 REFERENCES

- A. ASTM International:
 - 1. ASTM E 84 - Standard Test Method for Surface Burning Characteristics of Building Materials.
 - 2. ASTM E 90 - Standard Test Method for Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions and Elements.

3. ASTM E 119 - Standard Test Methods for Fire Tests of Building Construction and Materials.

1.3 TEMPORARY ELECTRICITY

- A. Provide and pay for power service required from utility source as needed for construction operation.
- B. Provide temporary electric feeder from existing building electrical service, if applicable, at location as directed by Owner. Do not disrupt Owner's use of service.
- C. Power Service Characteristics: as required for construction operations.
- D. Provide power outlets with branch wiring and distribution boxes located as required for construction operations. Provide suitable, flexible power cords as required for portable construction tools and equipment.
- E. Provide main service disconnect and overcurrent protection at location meeting all applicable codes and regulations.
- F. Permanent convenience receptacles may be used during construction.

1.4 TEMPORARY LIGHTING FOR CONSTRUCTION PURPOSES

- A. Provide and maintain lighting necessary for safe and functional construction operations.
- B. Provide and maintain one (1) watt/sq ft lighting to exterior staging and storage areas after dark for security purposes.
- C. Provide and maintain 0.25 watt/sq ft HID lighting to interior work areas after dark for security purposes.
- D. Provide branch wiring from power source to distribution boxes with lighting conductors, pigtails, lamps, and the like, for specified lighting levels.
- E. Maintain lighting and provide routine repairs.
- F. Permanent building lighting may be used upon written permission from the Owner during construction, if applicable.

1.5 TEMPORARY HEATING

- A. Provide and pay for heating devices and heat as needed to maintain specified conditions for construction operations.
- B. Contractor shall be responsible for all operation and maintenance costs associated with temporary heating.

- C. Maintain minimum ambient temperature as required in individual Sections of the Contract Documents.

1.6 TEMPORARY COOLING

- A. Provide and pay for cooling devices and cooling as needed to maintain specified conditions for construction operations.
- B. Contractor shall be responsible for all operation and maintenance costs associated with temporary heating.
- C. Maintain maximum ambient temperature as required in individual Sections of the Contract Documents.

1.7 TEMPORARY VENTILATION

- A. Ventilate enclosed areas to achieve curing of materials, to dissipate humidity, and to prevent accumulation of dust, fumes, vapors, or gases.

1.8 TEMPORARY WATER SERVICE

- A. Provide suitable quality water service as needed to maintain specified conditions for construction operations.
- B. Contractor shall be responsible for coordination, cost of temporary connection(s), and cost of temporary water.
- C. Extend branch piping with outlets located so that water is available by hoses with threaded connections.

1.9 TEMPORARY SANITARY FACILITIES

- A. Provide and maintain required facilities and enclosures. Existing facility use is not permitted. Provide facilities at time of Project mobilization.

1.10 VEHICULAR ACCESS

- A. Construct temporary all-weather access roads from public thoroughfares to serve construction area, of width and load-bearing capacity to accommodate unimpeded traffic for construction purposes.
- B. All temporary vehicular access crossing public rights-of-way, property, or easements shall be coordinated with the authority having jurisdiction and comply with all applicable regulations.
- C. Construct temporary bridges and culverts to span low areas and allow unimpeded drainage.

- D. Extend and relocate vehicular access as Work progress requires and provide detours as necessary for unimpeded traffic flow.
- E. Locate as indicated on Drawings or approved by Engineer.
- F. Provide unimpeded access for emergency vehicles. Maintain twenty (20) foot-wide driveways with turning space between and around combustible materials.
- G. Provide and maintain access to fire hydrants and control valves free of obstructions.
- H. Provide means of removing mud from vehicle wheels before entering streets.
- I. Use designated existing on-Site roads for construction traffic upon written approval from the Owner.

1.11 PARKING

- A. Provide temporary parking areas to accommodate construction personnel.
- B. Locate as indicated on Drawings or approved by Engineer.
- C. Off-Site Parking:
 - 1. If Site space is not adequate, provide additional off-Site parking.
 - 2. The Contractor shall provide to the Engineer written permission or executed permit from property owner prior to utilizing off-Site parking that is not on City property.
- D. Use of designated areas of existing on-Site streets and driveways used for construction traffic is not permitted. Tracked vehicles are not allowed on paved areas.
- E. Use of designated areas of existing parking facilities used by construction personnel is permitted upon written approval from the Owner.
- F. Do not allow heavy vehicles or construction equipment in parking areas.
- G. Do not allow vehicle parking on existing pavement.
- H. Permanent Pavements and Parking Facilities:
 - 1. Bases for permanent roads and parking areas may be used for construction traffic.
 - 2. Avoid traffic loading beyond paving design capacity. Tracked vehicles are not allowed.
 - 3. Use of permanent parking structures is not permitted.
- I. Maintenance:
 - 1. Maintain traffic and parking areas in sound condition free of excavated material, construction equipment, products, mud, snow, ice, and the like.

2. Maintain existing and permanent paved areas used for construction; promptly repair breaks, potholes, low areas, standing water, and other deficiencies, to maintain paving and drainage in original condition.

J. Removal, Repair:

1. Remove temporary materials and construction before Substantial Completion.
2. Remove underground Work and compacted materials to depth of two (2) feet; fill and grade Site as indicated.
3. Repair existing facilities damaged by use, to original condition.

K. Mud from Site vehicles: Provide means of removing mud from vehicle wheels before entering streets.

1.12 PROGRESS CLEANING AND WASTE REMOVAL

- A. Maintain areas free of waste materials, debris, and rubbish. Maintain Site in clean and orderly condition.
- B. Remove debris and rubbish from pipe chases, plenums, attics, crawl spaces, and other closed or remote spaces, before enclosing spaces.
- C. Broom and vacuum clean interior areas before starting surface finishing, and continue cleaning to eliminate dust.
- D. Collect and remove waste materials, debris, and rubbish from Site and dispose of off-Site as required to maintain a safe, neat, and orderly Site.
- E. Open free-fall chutes are not permitted. Terminate closed chutes into appropriate containers with lids.

1.13 PROJECT IDENTIFICATION

A. Project Identification Sign:

1. Project Identification Sign shall comply with Owner standards.
2. Main signage boards shall be 3/4-inch pressure treated plywood mounted on a two-inch (2") x four-inch (4") pressure treated wood frame painted on all sides.
3. Sign portability:
 - a. Each sign shall consist of two of the above described plywood sheets and frames hinged together at the top to form a two-sided sign that folds together for transportation from location to location, transportation provided by the Contractor.
 - b. When installed at the site, the hinged connection will allow the bottom portion to move outward forming a triangle with the ground, allowing the sign to stand on its own.
 - c. The sign faces shall be positioned so that oncoming traffic from both directions can read one side.
4. Lettering shall be black intermediate grade vinyl or approved equal.

5. Border Line shall be black, a minimum of one half inch (1/2") wide, and inset one inch (1") from the board edge.
- B. Project Informational Signs:
1. Painted informational signs of same colors and lettering as Project identification sign or standard products; size lettering for legibility at 100-foot distance.
 2. Provide sign at each field office and storage shed, and provide directional signs to direct traffic into and within Site. Relocate as Work progress requires.
 3. Provide directional traffic signs to and within Site as required by the agency having jurisdiction.
 4. No other signs are allowed without Owner's permission except those required by law.
- C. Finishes, Painting: Adequate to withstand weathering, fading, and chipping for duration of construction.
- D. Show content, layout, lettering, color, foundation, structure, sizes, and grades of members.
- E. Sign Materials:
1. Structure and Framing: New wood or metal, structurally adequate.
 2. Sign Surfaces: Exterior grade plywood with medium-density overlay, minimum of 3/4 inches thick, standard large sizes to minimize joints.
 3. Rough Hardware: Galvanized.
 4. Paint and Primers: Exterior quality, two (2) coats; sign background of color as selected.
 5. Lettering: Exterior quality paint or precut vinyl self-adhesive products, colors as selected.
- F. Installation:
1. Install Project identification sign within fifteen (15) days after date established by Notice to Proceed.
 2. Erect at location of high public visibility adjacent to main entrance to Site.
 3. Erect supports and framing on secure foundation, rigidly braced and framed to resist wind loadings.
 4. Install sign surface plumb and level, with butt joints. Anchor securely.
 5. Paint exposed surfaces of sign, supports, and framing.
- G. Maintenance: Maintain clean signs and supports; repair deterioration and damage.
- H. Removal: Remove signs, framing, supports, and foundations at completion of Project and restore area.
- 1.14 TRAFFIC REGULATION
- A. Signs, Signals, and Devices:
1. Post-Mounted and Wall-Mounted Traffic Control and Informational Signs: As approved by authorities having jurisdiction.

2. Traffic Control Signals: As approved by local jurisdictions.
 3. Traffic Cones, Drums, Flares, and Lights: As approved by authorities having jurisdiction.
 4. Flag Person Equipment: As required by authorities having jurisdiction.
- B. Flag Persons: Provide trained and equipped flag persons to regulate traffic when construction operations or traffic encroach on public traffic lanes.
- C. Flares and Lights: Use flares and lights during hours of low visibility to delineate traffic lanes and to guide traffic.
- D. Haul Routes:
1. Consult with authorities having jurisdiction and establish public thoroughfares to be used for haul routes and Site access.
 2. Confine construction traffic to designated haul routes.
 3. Provide traffic control at critical areas of haul routes to regulate traffic and to minimize interference with public traffic.
- E. Traffic Signs and Signals:
1. Provide signs at approaches to Site and on Site, at crossroads, detours, parking areas, and elsewhere as needed to direct construction and affected public traffic.
 2. Provide, operate, and maintain traffic control signals to direct and maintain orderly flow of traffic in areas under Contractor's control and areas affected by Contractor's operations.
 3. Relocate signs and signals as Work progresses, to maintain effective traffic control.
- F. Removal:
1. Remove equipment and devices when no longer required.
 2. Repair damage caused by installation.
 3. Remove post settings completely.

1.15 FIRE-PREVENTION FACILITIES

- A. Prohibit smoking within buildings under construction and demolition. Designate area on Site where smoking is permitted. Provide approved ashtrays in designated smoking areas.
- B. Establish fire watch for cutting, welding, and other hazardous operations capable of starting fires. Maintain fire watch before, during, and after hazardous operations until threat of fire does not exist.
- C. Portable Fire Extinguishers: NFPA 10; 10-pound capacity, 4A-60B: C UL rating.
1. Provide minimum of one (1) fire extinguisher in every construction trailer and storage shed.
- D. Provide fire extinguishers for construction equipment as required by applicable federal, state, and local codes.

1.16 BARRIERS

- A. Provide barriers to prevent unauthorized entry to construction areas, to allow for Owner's use of Site, and to protect existing facilities and adjacent properties from damage from construction operations and demolition.
- B. Provide barricades and covered walkways required by authorities having jurisdiction for public rights-of-way and for public access to existing building.
- C. Tree and Plant Protection: Preserve and protect existing trees and plants designated to remain.
 - 1. Protect areas within drip lines from traffic, parking, storage, dumping, chemically injurious materials and liquids, ponding, and continuous running water.
 - 2. Provide 6-foot-high barriers around drip line, with access for maintenance.
 - 3. Replace trees and plants damaged by construction operations.
- D. Protect non-owned vehicular traffic, stored materials, Site, and structures from damage.

1.17 ENCLOSURES AND FENCING

- A. Construction: Commercial-grade chain-link fence unless otherwise shown or specified.
- B. Provide 7-foot-high fence around construction Site and storage area(s); equip with vehicular and pedestrian gates with locks.
- C. Exterior Enclosures:
 - 1. Provide temporary weathertight closure of exterior openings to accommodate acceptable working conditions and protection for products, to allow for temporary heating, cooling, and maintenance of required ambient temperatures identified in individual Specification Sections, and to prevent entry of unauthorized persons. Provide access doors with self-closing hardware and locks.

1.18 SECURITY

- A. Security Program:
 - 1. Protect Work on existing premises and Owner's operations from theft, vandalism, and unauthorized entry.
 - 2. Initiate program in coordination with Owner's existing security system at Project mobilization.
 - 3. Maintain program throughout construction period until directed by Engineer.
- B. Entry Control:
 - 1. Restrict entrance of persons and vehicles to Project Site and existing facilities.
 - 2. Allow entrance only to authorized persons with proper identification.
 - 3. Maintain log of workers and visitors and make available to Owner on request.
 - 4. Coordinate access of Owner's personnel to Site in coordination with Owner's security forces.

- C. Personnel Identification:
 - 1. Provide identification badge for each person authorized to enter premises.
 - 2. Badge to Include: Personal photograph, name, expiration date, and employer.
 - 3. Maintain list of accredited persons and submit copy to Owner on request.
 - 4. Require return of badges at expiration of employment on the Work.

1.19 WATER CONTROL

- A. Grade Site to drain. Maintain excavations free of water. Provide, operate, and maintain necessary pumping equipment.
- B. Protect Site from puddles or running water. Provide water barriers as required to protect Site from soil erosion.

1.20 DUST CONTROL

- A. Execute Work by methods that minimize raising dust from construction operations.
- B. Provide positive means to prevent airborne dust from dispersing into atmosphere.

1.21 EROSION AND SEDIMENT CONTROL

- A. Plan and execute construction by methods to control surface drainage from cuts and fills from borrow and waste disposal areas. Prevent erosion and sedimentation.
- B. Minimize surface area of bare soil exposed at one time.
- C. Provide temporary measures including berms, dikes, drains, and other devices to prevent water flow.
- D. Construct fill and waste areas by selective placement to avoid erosive surface silts and clays.
- E. Periodically inspect earthwork to detect evidence of erosion and sedimentation. Promptly apply corrective measures.

1.22 NOISE CONTROL

- A. Provide methods, means, and facilities to minimize noise produced by construction operations.

1.23 PEST AND RODENT CONTROL

- A. Provide methods, means, and facilities to prevent pests and insects from damaging the Work.
- B. Provide methods, means, and facilities to prevent rodents from accessing or invading premises.

1.24 POLLUTION CONTROL

- A. Provide methods, means, and facilities to prevent contamination of soil, water, and atmosphere from discharge of noxious, toxic substances and pollutants produced by construction operations.
- B. Comply with pollution and environmental control requirements of authorities having jurisdiction.

1.25 REMOVAL OF UTILITIES, FACILITIES, AND CONTROLS

- A. Remove temporary utilities, equipment, facilities, and materials before Substantial Completion inspection.
- B. Clean and repair damage caused by installation or use of temporary Work.
- C. Restore existing facilities used during construction to original condition. Restore permanent facilities used during construction to specified condition.

PART 2 - PRODUCTS - Not Used

PART 3 - EXECUTION - Not Used

END OF SECTION

SECTION 01 60 00
PRODUCT REQUIREMENTS

PART 1 - GENERAL

1.1 SECTION INCLUDES

- A. Products.
- B. Product delivery requirements.
- C. Product storage and handling requirements.
- D. Product options.
- E. Equipment electrical characteristics and components.

1.2 PRODUCTS

- A. At minimum, comply with specified requirements and reference standards.
- B. Specified products define standard of quality, type, function, dimension, appearance, and performance required.
- C. Furnish products of qualified manufacturers that are suitable for intended use. Furnish products of each type by single manufacturer unless specified otherwise. Confirm that manufacturer's production capacity can provide sufficient product, on time, to meet Project requirements.
- D. Do not use materials and equipment removed from existing premises except as specifically permitted by Contract Documents.
- E. Furnish interchangeable components from same manufacturer for components being replaced.

1.3 PRODUCT DELIVERY REQUIREMENTS

- A. Transport and handle products according to manufacturer's instructions.
- B. Promptly inspect shipments to ensure products comply with requirements, quantities are correct, and products are undamaged.
- C. Provide equipment and personnel to handle products; use methods to prevent soiling, disfigurement, or damage.

1.4 PRODUCT STORAGE AND HANDLING REQUIREMENTS

- A. Store and protect products according to manufacturer's instructions.
- B. Store products with seals and labels intact and legible.
- C. Store sensitive products in weathertight, climate-controlled enclosures in an environment suitable to product.
- D. For exterior storage of fabricated products, place products on sloped supports aboveground.
- E. Provide off-Site storage and protection when Site does not permit on-Site storage or protection.
- F. Cover products subject to deterioration with impervious sheet covering. Provide ventilation to prevent condensation and degradation of products.
- G. Store loose granular materials on solid flat surfaces in well-drained area. Prevent mixing with foreign matter.
- H. Provide equipment and personnel to store products; use methods to prevent soiling, disfigurement, or damage.
- I. Arrange storage of products to permit access for inspection. Periodically inspect to verify products are undamaged and are maintained in acceptable condition.

1.5 PRODUCT OPTIONS

- A. Products Specified by Reference Standards or by Description Only: Products complying with specified reference standards or description.
- B. Products Specified by Naming One or More Manufacturers: Products of one of manufacturers named and complying with Specifications; no options or substitutions allowed.
- C. Products Specified by Naming One or More Manufacturers with Provision for Substitutions: Submit Request for Substitution for any manufacturer not named, according to Section 01 25 00 - Substitution Procedures.

PART 2 - PRODUCTS

2.1 EQUIPMENT ELECTRICAL CHARACTERISTICS AND COMPONENTS

- A. Wiring Terminations: Furnish terminal lugs to match branch circuit conductor quantities, sizes, and materials indicated. Include lugs for terminal box.

- B. Cord and Plug: Furnish minimum 6-foot long cord and plug including grounding connector for connection to electric wiring system. Cord of longer length may be specified in individual Specification Sections.

PART 3 - EXECUTION - Not Used

END OF SECTION

SECTION 01 70 00

EXECUTION AND CLOSEOUT REQUIREMENTS

PART 1 - GENERAL

1.1 SECTION INCLUDES

- A. Field engineering.
- B. Closeout procedures.
- C. Starting of systems.
- D. Demonstration and instructions.
- E. Project record documents.
- F. Operation and maintenance data.
- G. Manual for materials and finishes.
- H. Manual for equipment and systems.
- I. Spare parts and maintenance products.
- J. Product warranties and product bonds.
- K. Examination.
- L. Preparation.
- M. Execution.
- N. Cutting and patching.
- O. Protecting installed construction.
- P. Final cleaning.

1.2 FIELD ENGINEERING

- A. Employ land surveyor registered in State of Florida and acceptable to Engineer.
- B. Locate and protect survey control and reference points. Promptly notify Engineer of discrepancies discovered.
- C. Control datum for survey is indicated on Drawings.

- D. Prior to beginning Work, verify and establish floor elevations of existing facilities to ensure that new Work will meet existing elevations in smooth and level alignment except where specifically detailed or indicated otherwise.
- E. Verify setbacks and easements; confirm Drawing dimensions and elevations.
- F. Provide field engineering services. Establish elevations, lines, and levels using recognized engineering survey practices.
- G. Submit copy of Site drawing and certificate signed by land surveyor certifying elevations and locations of the Work are in conformance with Contract Documents.
- H. Maintain complete and accurate log of control and survey Work as Work progresses.
- I. Protect survey control points prior to starting Site Work; preserve permanent reference points during construction.
- J. Promptly report to Engineer loss or destruction of reference point or relocation required because of changes in grades or other reasons.
- K. Replace dislocated survey control points based on original survey control. Make no changes without prior written notice to Engineer.
- L. Final Survey: Prior to Substantial Completion, prepare final survey illustrating locations, dimensions, angles, and elevations of all Work including monitoring well survey data requirements and the relationship to permanent bench marks and property lines.
 - 1. All elevations shall be referenced to N.A.V.D 88.
 - 2. All drawings shall have their boundaries tied into the City of Frostproof GPS horizontal control network with a minimum of two corners at each end of one boundary line identified by state plane coordinates.
 - 3. Include certification, signed by surveyor, that the survey meets State of Florida applicable standards of practice for As-Built/Record Surveys.

1.3 CLOSEOUT PROCEDURES

- A. Prerequisites to Substantial Completion: Complete following items before requesting Certification of Substantial Completion, either for entire Work or for portions of Work:
 - 1. Submit maintenance manuals, Project record documents, digital images of construction photographs, and other similar final record data in compliance with this Section.
 - 2. Complete facility startup, testing, adjusting, balancing of systems and equipment, demonstrations, and instructions to Owner's operating and maintenance personnel as specified in compliance with this Section.
 - 3. Conduct inspection to establish basis for request that Work is substantially complete. Create comprehensive list (initial punch list) indicating items to be completed or corrected, value of incomplete or nonconforming Work, reason for

- being incomplete, and date of anticipated completion for each item. Include copy of list with request for Certificate of Substantial Completion.
4. Obtain and submit releases enabling Owner's full, unrestricted use of Project and access to services and utilities. Include certificate of occupancy, operating certificates, and similar releases from authorities having jurisdiction and utility companies.
 5. Deliver tools, spare parts, extra stocks of material, and similar physical items to Owner.
 6. Make final change-over of locks and transmit keys directly to Owner. Advise Owner's personnel of change-over in security provisions.
 7. Discontinue or change over and remove temporary facilities and services from Project Site, along with construction tools, mockups, and similar elements.
 8. Perform final cleaning according to this Section.
- B. Substantial Completion Inspection:
1. When Contractor considers Work to be substantially complete, submit to Engineer:
 - a. Written certificate that Work, or designated portion, is substantially complete.
 - b. List of items to be completed or corrected (initial punch list).
 2. Within seven (7) days after receipt of request for Substantial Completion, Engineer will make inspection to determine whether Work or designated portion is substantially complete.
 3. Should Engineer determine that Work is not substantially complete:
 - a. Engineer will promptly notify Contractor in writing, stating reasons for its opinion.
 - b. Contractor shall remedy deficiencies in Work and send second written request for Substantial Completion to Engineer.
 - c. Engineer will reinspect Work.
 - d. Redo and Inspection of Deficient Work: Repeated until Work passes Engineer's inspection.
 4. When Engineer finds that Work is substantially complete, Engineer will:
 - a. Prepare Certificate of Substantial Completion, accompanied by Contractor's list of items to be completed or corrected as verified and amended by Engineer and Owner (final punch list).
 - b. Submit Certificate to Owner and Contractor for their written acceptance of responsibilities assigned to them in Certificate.
 5. After Work is substantially complete, Contractor shall:
 - a. Allow Owner occupancy of Project under provisions stated in Certificate of Substantial Completion.
 - b. Complete Work listed for completion or correction within time period stipulated.
- C. Prerequisites for Final Completion: Complete following items before requesting final acceptance and final payment.

1. When Contractor considers Work to be complete, submit written certification that:
 - a. Contract Documents have been reviewed.
 - b. Work has been examined for compliance with Contract Documents.
 - c. Work has been completed according to Contract Documents.
 - d. Work is completed and ready for final inspection.
2. Submittals: Submit following:
 - a. Final punch list indicating all items have been completed or corrected.
 - b. Final payment request with final releases and supporting documentation not previously submitted and accepted. Include certificates of insurance for products and completed operations where required.
 - c. Specified warranties, workmanship/maintenance bonds, maintenance agreements, and other similar documents.
 - d. Accounting statement for final changes to Contract Sum.
 - e. Contractor's affidavit of payment of debts and claims.
 - f. Contractor affidavit of release of liens.
 - g. Consent of surety to final payment.
3. Perform final cleaning for Contractor-soiled areas according to this Section.

D. Final Completion Inspection:

1. Within seven (7) days after receipt of request for final inspection, Engineer will make inspection to determine whether Work or designated portion is complete.
2. Should Engineer consider Work to be incomplete or defective:
 - a. Engineer will promptly notify Contractor in writing, listing incomplete or defective Work.
 - b. Contractor shall remedy stated deficiencies and send second written request to Engineer that Work is complete.
 - c. Engineer will reinspect Work.
 - d. Redo and Inspection of Deficient Work: Repeated until Work passes Engineer's inspection.

1.4 STARTING OF SYSTEMS

- A. Coordinate schedule for startup of various equipment and systems.
- B. Notify Engineer seven (7) days prior to startup of each item.
- C. Verify that each piece of equipment or system has been checked for proper lubrication, drive rotation, belt tension, control sequence, and for conditions which may cause damage.
- D. Verify that tests, meter readings, and electrical characteristics agree with those required by equipment or system manufacturer.
- E. Verify that wiring and support components for equipment are complete and tested.

- F. Execute startup under supervision of manufacturer's representative or Contractors' personnel according to manufacturer's instructions.
- G. When specified in individual Specification Sections, require manufacturer to provide authorized representative who will be present at Site to inspect, check, and approve equipment or system installation prior to startup and will supervise placing equipment or system in operation.
- H. Submit a written report according to Section 01 33 00 - Submittal Procedures that equipment or system has been properly installed and is functioning correctly.

1.5 DEMONSTRATION AND INSTRUCTIONS

- A. Demonstrate operation and maintenance of products to Owner's personnel two (2) weeks prior to date of Substantial Completion.
- B. Demonstrate Project equipment and instruct in classroom environment at a location determined by the Owner and instructed by authorized manufacturer's representative who is knowledgeable about the Project.
- C. Use operation and maintenance manuals as basis for instruction. Review contents of manual with Owner's personnel in detail to explain all aspects of operation and maintenance.
- D. Demonstrate startup, operation, control, adjustment, troubleshooting, servicing, maintenance, and shutdown of each item of equipment at scheduled time, at equipment location.
- E. Prepare and insert additional data in operations and maintenance manuals when need for additional data becomes apparent during instruction.
- F. Required instruction time for each item of equipment and system is specified in individual Specification Sections.

1.6 PROJECT RECORD DOCUMENTS

- A. Maintain on Site one set of the following record documents; record actual revisions to the Work:
 - 1. Drawings.
 - 2. Specifications.
 - 3. Addenda.
 - 4. Change Orders and other modifications to the Contract.
 - 5. Reviewed Shop Drawings, product data, and Samples.
 - 6. Manufacturer's instruction for assembly, installation, and adjusting.
- B. Ensure entries are complete and accurate, enabling future reference by Owner.
- C. Store record documents separate from documents used for construction.

- D. Record information concurrent with construction progress, not less than weekly.
- E. Specifications: Legibly mark and record, at each product Section, description of actual products installed, including the following:
 - 1. Manufacturer's name and product model and number.
 - 2. Product substitutions or alternates used.
 - 3. Changes made by Addenda and modifications.
- F. As-Built Drawings:
 - 1. As-Built Drawings, provided in AutoCAD and PDF via email, shall be prepared, signed, and sealed by a Professional Mapper and Surveyor (PMS), licensed to practice in the State of Florida. If the project was designed by an Engineer hired by the Developer.
 - 2. The following information is required on all As-Built Drawings. The Contractor shall note that additional information may be required by the Engineer when deemed necessary.
 - a. Include Contract modifications such as Addenda, supplementary instructions, change directives, field orders, minor changes in the Work, and Change Orders.
 - b. Unless otherwise specified, the original construction plans, with as-built information shown, will be accepted for those projects contracted by the City.
 - c. The drawings shall be revised (redrawn) to scale to indicate final as-built data (true to scale) and in accordance to all construction changes. Only changing a station and off-set note or just adding notes is not acceptable for horizontal changes. In making changes to the drawings, utility lines or other features to be changed shall be erased before new lines are drawn, notations to be changed shall be reworded as required.
 - d. Items that were not installed as shown shall be so indicated by placing a "revision cloud" around the as-built information and a note shall be placed on the sheet near the lower right-hand corner in bold marking indicating that the information contained within the cloud is as-built. The as-built date shall also be shown.
 - e. Items that were constructed exactly per plan shall be shown by placing an asterisk adjacent to the as-built information indicating that it was built per plan with no changes.
 - f. Water, Sewer, Lift Station, and Force Main As-Built Drawings:
 - 1) Pipe location and depth.
 - 2) Pipes shall be referenced to power poles (identify power pole number) or other permanent structures such as inlets, sidewalks, edge of pavement, or right-of-way lines. Where no permanent above grade structure exists, pipes shall be referenced to rights-of-way lines and edge of pavement every one hundred feet.
 - 3) Fittings shall be referenced on the drawings. At least two (2) above ground, visible reference distances shall be shown for each fitting. Insets may be used to decrease drawing scale and increase detail. Where water mains are adjusted vertically, fittings and their

- elevations must be shown on As-Builts. Provide a cross-section detail showing the fittings and measurements.
- 4) Where service lines are installed, the services shall be shown in their relative position. Services shall be clearly identified as to single or double services. Where services vary more than two feet (2') from the property corner, the distance from the service to the property corner shall be shown. Show the size and type of service pipe. This may be noted in a legend.
 - 5) Reference all valves two inches (2") in diameter and larger, and any size valves with valve boxes. Valves shall be shown in their relative positions to one another and shall clearly indicate which lines they control.
 - 6) Locations of all lift and pump stations including any small grinder stations. Stations shall include inverts, top and bottom of structure, and diameter.
 - 7) Where pipes are stubbed out, the end of the main shall be referenced by the distance from the end of the pipe to the nearest upstream valve or fitting plus one additional reference.
 - 8) Under general notes, the name of the manufacturer and model number shall be shown for all valves referenced.
 - 9) All As-Built Drawings shall be prepared by using the Owner's Standard Legend and Abbreviations.
 - 10) The size and type of utility mains shall be indicated between all valves and tees.
 - 11) The following items shall be located by Global Positioning System (GPS) equipment: valve boxes, meter boxes, fire hydrants, fittings, casings and points of connection to the existing system. Depending on the type of project there may be other features that require GPS location.
3. Procedure for Submitting As-Built Drawings:
- a. Original Submittal: Three (3) copies of all required As-Built materials, including Valve Tie Sheets, shall be submitted to the Engineer. No originals or certified copies shall be submitted in the Original Submittal. Submittals must be furnished with a cover sheet or letter of transmittal. As-Builts submitted without cover sheets will not be accepted. In lieu of paper submittals, As-Builts can be submitted electronically until the final submittal.
 - b. As-Built Review: The Original Submittal shall be reviewed for content and compliance to the specified requirements. If the As-Builts are found to be incomplete, one set will be returned with comments marked in red. The Contractor shall correct the As-Builts as indicated.
 - c. Resubmittal: After corrections, additions, or deletions are complete, the As-Builts shall be resubmitted. Three (3) sets of those items that were returned for corrections along with the red lined set shall be resubmitted. Resubmittal without the red lined set will be refused. No resubmittals will

be accepted without a cover sheet. No originals or certified copies shall be submitted with the Resubmittal.

- d. Final Submittal: After all As-Builts have been reviewed and comply with all specified requirements, the Engineer shall notify the Contractor to submit final As-Builts. Final As-Builts shall include a cover letter, two copies of the As-Builts signed, sealed and dated by a professional mapper and surveyor, and one electronic file with one reproducible original. The Final Submittal shall also include As-Built Drawings in AutoCAD .dwg format. The Contractor shall verify the version of AutoCAD utilized by the Owner to prevent file compatibility issues.

1.7 OPERATION AND MAINTENANCE DATA

- A. Submit in PDF composite electronic indexed file.
- B. Submit data bound in 8-1/2 x 11-inch text pages, three D side ring binders with durable plastic covers.
- C. Prepare binder cover with printed title "OPERATION AND MAINTENANCE INSTRUCTIONS," title of Project, and subject matter of binder when multiple binders are required.
- D. Internally subdivide binder contents with permanent page dividers, logically organized as described below; with tab titling clearly printed under reinforced laminated plastic tabs.
- E. Drawings: Provide with reinforced punched binder tab. Bind in with text; fold larger drawings to size of text pages.
- F. Contents: Prepare table of contents for each volume, with each product or system description identified, typed on white paper, in three parts as follows:
 1. Part 1: Directory, listing names, addresses, and telephone numbers of Engineer, Contractor, Subcontractors, and major equipment suppliers.
 2. Part 2: Operation and maintenance instructions, arranged by system and subdivided by Specification Section. For each category, identify names, addresses, and telephone numbers of Subcontractors and suppliers. Include the following:
 - a. Significant design criteria.
 - b. List of equipment.
 - c. Parts list for each component.
 - d. Operating instructions.
 - e. Maintenance instructions for equipment and systems.
 - f. Maintenance instructions for finishes, including recommended cleaning methods and materials, and special precautions identifying detrimental agents.
 - g. Safety precautions to be taken when operating and maintaining or working near equipment.

3. Part 3: Project documents and certificates, including the following:
 - a. Shop Drawings and product data.
 - b. Air and water balance reports.
 - c. Certificates.
 - d. Photo copies of warranties.

1.8 MANUAL FOR MATERIALS AND FINISHES

- A. Submit two (2) copies of preliminary draft or proposed formats and outlines of contents before start of Work. Engineer will review draft and return one (1) copy with comments.
- B. For equipment or component parts of equipment put into service during construction and operated by Owner, submit documents within ten (10) days after acceptance.
- C. Submit one copy of completed volumes before Substantial Completion. Draft copy to be reviewed and returned after Substantial Completion, with Engineer comments. Revise content of document sets as required prior to final submission.
- D. Submit three (3) sets of revised final volumes within ten (10) days after final inspection.
- E. Submit in PDF composite electronic indexed file of final manual within ten (10) days after final inspection.
- F. Building Products, Applied Materials, and Finishes: Include product data, with catalog number, size, composition, and color and texture designations. Include information for re-ordering custom-manufactured products.
- G. Instructions for Care and Maintenance: Include manufacturer's recommendations for cleaning agents and methods, precautions against detrimental agents and methods, and recommended schedule for cleaning and maintenance.
- H. Moisture Protection and Weather Exposed Products: Include product data listing applicable reference standards, chemical composition, and details of installation. Include recommendations for inspections, maintenance, and repair.
- I. Additional Requirements: As specified in individual product Specification Sections.
- J. Include listing in table of contents for design data, with tabbed fly sheet and space for insertion of data.

1.9 MANUAL FOR EQUIPMENT AND SYSTEMS

- A. Submit two (2) copies of preliminary draft or proposed formats and outlines of contents before start of Work. Engineer will review draft and return one (1) copy with comments.

- B. For equipment, or component parts of equipment put into service during construction and operated by Owner, submit documents within ten (10) days after acceptance.
- C. Submit one copy of completed volumes before Substantial Completion. Draft copy will be reviewed and returned after Substantial Completion, with Engineer comments. Revise content of document sets as required prior to final submission.
- D. Submit three (3) sets of revised final volumes within ten (10) days after final inspection.
- E. Submit in PDF composite electronic indexed file of final manual within ten (10) days after final inspection.
- F. Each Item of Equipment and Each System: Include description of unit or system and component parts. Identify function, normal operating characteristics, and limiting conditions. Include performance curves, with engineering data and tests, and complete nomenclature and model number of replaceable parts.
- G. Panelboard Circuit Directories: Provide electrical service characteristics, controls, and communications; typed.
- H. Include color-coded wiring diagrams as installed.
- I. Operating Procedures: Include startup, break-in, and routine normal operating instructions and sequences. Include regulation, control, stopping, shutdown, and emergency instructions. Include summer, winter, and special operating instructions.
- J. Maintenance Requirements: Include routine procedures and guide for preventative maintenance and troubleshooting; disassembly, repair, and reassembly instructions; and alignment, adjusting, balancing, and checking instructions.
- K. Include servicing and lubrication schedule and list of lubricants required.
- L. Include manufacturer's printed operation and maintenance instructions.
- M. Include sequence of operation by controls manufacturer.
- N. Include original manufacturer's parts list, illustrations, assembly drawings, and diagrams required for maintenance.
- O. Include control diagrams by controls manufacturer as installed.
- P. Include Contractor's coordination drawings with color-coded piping diagrams as installed.
- Q. Include charts of valve tag numbers, with location and function of each valve, keyed to flow and control diagrams.
- R. Include list of original manufacturer's spare parts, current prices, and recommended quantities to be maintained in storage.

- S. Include test and balancing reports as specified in Section 01 40 00 - Quality Requirements.
- T. Additional Requirements: As specified in individual product Specification Sections.
- U. Include listing in table of contents for design data with tabbed dividers and space for insertion of data.

1.10 SPARE PARTS AND MAINTENANCE PRODUCTS

- A. Furnish spare parts, maintenance, and extra products in quantities specified in individual Specification Sections.
- B. Deliver to Project Site and place in location as directed by Owner; obtain receipt prior to final payment.

1.11 PRODUCT WARRANTIES AND PRODUCT BONDS

- A. Obtain warranties and bonds executed in duplicate by responsible Subcontractors, suppliers, and manufacturers within ten (10) days after completion of applicable item of Work.
- B. Execute and assemble transferable warranty documents and bonds from Subcontractors, suppliers, and manufacturers.
- C. Verify documents are in proper form, contain full information, and are notarized.
- D. Co-execute submittals when required.
- E. Include table of contents and assemble in three D side ring binder with durable plastic cover.
- F. Submit prior to final Application for Payment.
- G. Time of Submittals:
 - 1. For equipment or component parts of equipment put into service during construction with Owner's permission, submit documents within ten (10) days after acceptance.
 - 2. Make other submittals within ten (10) days after date of Substantial Completion, prior to final Application for Payment.
 - 3. For items of Work for which acceptance is delayed beyond Substantial Completion, submit within ten (10) days after acceptance, listing date of acceptance as beginning of warranty or bond period.

PART 2 - PRODUCTS - Not Used

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Verify that existing Site conditions and substrate surfaces are acceptable for subsequent Work. Beginning new Work means acceptance of existing conditions.
- B. Verify that existing substrate is capable of structural support or attachment of new Work being applied or attached.
- C. Examine and verify specific conditions described in individual Specification Sections.
- D. Verify that utility services are available with correct characteristics and in correct locations.

3.2 PREPARATION

- A. Clean substrate surfaces prior to applying next material or substance according to manufacturer's instructions.
- B. Seal cracks or openings of substrate prior to applying next material or substance.
- C. Apply manufacturer-required or -recommended substrate primer, sealer, or conditioner prior to applying new material or substance in contact or bond.

3.3 EXECUTION

- A. Comply with manufacturer's installation instructions, performing each step in sequence. Maintain one set of manufacturer's installation instructions at Project Site during installation and until completion of construction.
- B. When manufacturer's installation instructions conflict with Contract Documents, request clarification from Engineer before proceeding.
- C. Verify that field measurements are as indicated on approved Shop Drawings or as instructed by manufacturer.
- D. Secure products in place with positive anchorage devices designed and sized to withstand stresses, vibration, physical distortion, or disfigurement.
 - 1. Secure Work true to line and level and within specified tolerances, or if not specified, industry-recognized tolerances.
 - 2. Physically separate products in place, provide electrical insulation, or provide protective coatings to prevent galvanic action or corrosion between dissimilar metals.
 - 3. Exposed Joints: Provide uniform joint width and arrange to obtain best visual effect. Refer questionable visual-effect choices to Engineer for final decision.

- E. Allow for expansion of materials and movement of structures.
- F. Climatic Conditions and Project Status: Install each unit of Work under conditions to ensure best possible results in coordination with entire Project.
 - 1. Isolate each unit of Work from incompatible Work as necessary to prevent deterioration.
 - 2. Coordinate enclosure of Work with required inspections and tests to minimize necessity of uncovering Work for those purposes.
- G. Mounting Heights: Where not indicated, mount individual units of Work at industry recognized standard mounting heights for particular application indicated.
 - 1. Refer questionable mounting heights choices to Engineer for final decision.
 - 2. Elements Identified as Accessible to Handicapped: Comply with applicable codes and regulations.
- H. Adjust operating products and equipment to ensure smooth and unhindered operation.
- I. Clean and perform maintenance on installed Work as frequently as necessary through remainder of construction period. Lubricate operable components as recommended by manufacturer.

3.4 CUTTING AND PATCHING

- A. Employ skilled and experienced installers to perform cutting and patching.
- B. Submit written request in advance of cutting or altering elements affecting:
 - 1. Structural integrity of element.
 - 2. Integrity of weather-exposed or moisture-resistant elements.
 - 3. Efficiency, maintenance, or safety of element.
 - 4. Visual qualities of sight-exposed elements.
 - 5. Work of Owner or separate contractor.
- C. Execute cutting, fitting, and patching including excavation and fill to complete Work and to:
 - 1. Fit the several parts together, to integrate with other Work.
 - 2. Uncover Work to install or correct ill-timed Work.
 - 3. Remove and replace defective and nonconforming Work.
 - 4. Remove samples of installed Work for testing.
 - 5. Provide openings in elements of Work for penetrations of mechanical and electrical Work.
- D. Execute Work by methods to avoid damage to other Work and to provide proper surfaces to receive patching and finishing.
- E. Cut masonry and concrete materials using masonry saw or core drill.
- F. Restore Work with new products according to requirements of Contract Documents.

- G. Fit Work tight to pipes, sleeves, ducts, conduits, and other penetrations through surfaces.
- H. Maintain integrity of wall, ceiling, or floor construction; completely seal voids.
- I. Refinish surfaces to match adjacent finishes. For continuous surfaces, refinish to nearest intersection; for assembly, refinish entire unit.
- J. Identify hazardous substances or conditions exposed during the Work to Engineer for decision or remedy.

3.5 PROTECTING INSTALLED CONSTRUCTION

- A. Protect installed Work and provide special protection where specified in individual Specification Sections.
- B. Provide temporary and removable protection for installed products. Control activity in immediate Work area to prevent damage.
- C. Prohibit traffic from landscaped areas.

3.6 FINAL CLEANING

- A. Execute final cleaning prior to final Project assessment.
 - 1. Employ experienced personnel or professional cleaning firm.
- B. Clean interior and exterior glass and surfaces exposed to view; remove temporary labels, stains, and foreign substances; polish transparent and glossy surfaces.
- C. Clean equipment and fixtures to sanitary condition with appropriate cleaning materials.
- D. Replace filters of operating equipment.
- E. Clean debris from drainage systems.
- F. Clean Site; sweep paved areas, rake clean landscaped surfaces.
- G. Remove waste and surplus materials, rubbish, and construction facilities from Site.

END OF SECTION

SECTION 02 41 19

DEMOLITION

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Preparation.
 - 2. Salvage requirements.
 - 3. Demolition.

1.2 SUBMITTALS

- A. Section 01 33 00 - Submittal Procedures: Requirements for submittals.
- B. Demolition Schedule: Indicate overall schedule and interruptions required for utility and building services.
- C. Shop Drawings:
 - 1. Indicate demolition and removal sequence.
 - 2. Indicate location of items designated for reuse and Owner's retention.
 - 3. Indicate location and construction of temporary work.

1.3 CLOSEOUT SUBMITTALS

- A. Section 01 70 00 - Execution and Closeout Requirements: Requirements for submittals.
- B. Project Record Documents: Accurately record actual locations of capped utilities, concealed utilities discovered during demolition, and subsurface obstructions.

1.4 QUALITY ASSURANCE

- A. Conform to applicable codes and regulations for demolition work, dust control, and products requiring electrical disconnection and re-connection.
- B. Conform to applicable codes and regulations for procedures when hazardous or contaminated materials are discovered.
- C. Obtain required permits from authorities having jurisdiction.
- D. Perform Work in accordance with federal, state, and local regulations.

1.5 SEQUENCING

- A. Section 01 10 00 - Summary: Requirements for sequencing.
- B. Owner may conduct salvage operations before demolition begins to remove materials Owner chooses to retain.

1.6 SCHEDULING

- A. Section 01 30 00 - Administrative Requirements: Requirements for scheduling.
- B. Schedule Work to coincide with new construction.
- C. Cooperate with Owner in scheduling noisy operations and waste removal that may impact Owners operation in adjoining spaces.
- D. Coordinate utility and building service interruptions with Owner.
 - 1. Do not disable or disrupt building fire or life safety systems without five (5) days prior written notice to Owner.
 - 2. Schedule tie-ins to existing systems to minimize disruption.

1.7 PROJECT CONDITIONS

- A. Conduct demolition to minimize interference with adjacent facilities.
- B. Cease operations immediately if structure appears to be in danger and notify Engineer. Do not resume operations until directed.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION

3.1 PREPARATION

- A. Notify affected utility companies before starting work and comply with applicable requirements.
- B. Mark location and termination of utilities.
- C. Erect, and maintain temporary barriers and security devices, including warning signs and lights, and similar measures, for protection of the public, Owner, and existing improvements indicated to remain.
- D. Layout cuts in post tensioned concrete elements to avoid cutting concrete within 12 inches of any stressing tendon. Notify Engineer five (5) days in advance of cutting post-tensioned concrete.

- E. Erect and maintain weatherproof closures for exterior openings.
- F. Provide and maintain temporary measures to prevent spread of dust, odors, and noise.
- G. Prevent movement of existing structures, utilities, or other facilities pertaining or adjacent to demolition activities; provide temporary bracing and shoring required.
- H. Do not close or obstruct building egress path.

3.2 SALVAGE REQUIREMENTS

- A. Coordinate with Owner to identify components and equipment required to be removed and delivered to Owner.
- B. Tag components and equipment Owner designates for salvage.
- C. Protect designated salvage items from demolition operations until items can be removed.
- D. Carefully remove components and equipment indicated to be salvaged.
- E. Disassemble as required to permit removal.
- F. Package small and loose parts to avoid loss.
- G. Mark equipment and packaged parts to permit identification and consolidation of components of each salvaged item.
- H. Prepare assembly instructions consistent with disassembled parts. Package assembly instructions in protective envelope and securely attach to each disassembled salvaged item.
- I. Deliver salvaged items to Owner. Obtain signed receipt from Owner.

3.3 DEMOLITION

- A. Conduct demolition and/or removal operations, and the removal of equipment and debris to ensure minimum interference with roadways, walkways, and parking areas both onsite and offsite, and to ensure minimum interference with occupied or used facilities.
- B. Coordinate demolition activities to minimize impacts with Owner's operations.
- C. Maintain protected egress from and access to adjacent existing buildings and parking areas at all times.
- D. Do not close or obstruct roadways, driveways, parking areas, or sidewalks without prior written approval from the Engineer.

- E. Cease operations immediately when any structure or facility appears to be in danger and notify Engineer.
- F. Partial demolition of existing concrete structures and slabs shall include saw cutting in neat, orderly lines.
- G. Disconnect and remove designated utilities within demolition areas.
- H. Cap and identify abandoned utilities at termination points when utility is not completely removed. Annotate Record Drawings indicating location and type of service for capped utilities remaining after demolition.
- I. Demolish in orderly and careful manner. Protect existing improvements and facilities.
- J. Carefully remove components indicated to be reused.
 - 1. Disassemble components as required to permit removal.
 - 2. Package small and loose parts to avoid loss.
 - 3. Mark components and packaged parts to permit reinstallation.
 - 4. Store components, protected from construction operations, until reinstalled.
- K. Remove demolished materials from site except where specifically noted otherwise. Do not burn or bury materials on site.
- L. Remove materials as Work progresses. Upon completion of Work, leave areas in clean condition.
- M. Remove temporary Work.

END OF SECTION

SECTION 03 30 00

CONCRETE

PART 1 – GENERAL

1.1 DESCRIPTION

A. Scope:

1. Contractor shall provide all labor, materials, equipment, and incidentals as shown, specified, and required to furnish and install concrete, reinforcing, and related materials.
2. The Work includes:
 - a. Providing concrete consisting of portland cement, fine and coarse aggregates, water, and approved admixtures; combined, mixed, transported, placed, finished, and cured.
 - b. Fabricating and placing reinforcing, including ties and supports.
 - c. Design, erection, and removal of formwork.
 - d. Building into the concrete all sleeves, frames, anchorage devices, inserts, and other items required to be embedded in concrete.
 - e. Providing openings in concrete as required to accommodate Work under this and other Sections.

B. Coordination:

1. Review installation procedures under other Sections and coordinate installation of items to be installed in the concrete Work.

C. Classifications of Concrete:

1. Class “A” concrete shall be steel-reinforced and includes all concrete unless otherwise shown or indicated.
2. Class “B” concrete shall be placed without forms or with simple forms, with little or no reinforcing. Class “B” concrete shall only be used where shown or indicated.

1.2 REFERENCES

A. Standards referenced in this Section are:

1. ACI 224R, Control of Cracking in Concrete Structures.
2. ACI 301, Specifications for Structural Concrete for Buildings.
3. ACI 304R, Guide for Measuring, Mixing, Transporting and Placing Concrete.
4. ACI 305R, Specification for Hot Weather Concreting.
5. ACI 306R, Cold Weather Concreting.
6. ACI 309R, Guide for Consolidation of Concrete.

7. ACI 318, Building Code Requirements for Structural Concrete and Commentary.
8. ACI 347, Guide to Formwork for Concrete.
9. ACI SP-66, ACI Detailing Manual.
10. ASTM A82/A82M, Specification for Steel Wire, Plain, for Concrete Reinforcement.
11. ASTM A185/A185M, Specification for Steel Welded Wire Reinforcement, Plain, for Concrete.
12. ASTM A615/A615M, Specification for Deformed and Plain Carbon-Steel Bars for Concrete Reinforcement.
13. ASTM C31/C31M, Practice for Making and Curing Concrete Test Specimens in the Field.
14. ASTM C33/C33M, Specification for Concrete Aggregates.
15. ASTM C39/C39M, Test Method for Compressive Strength of Cylindrical Concrete Specimens.
16. ASTM C42/C42M, Test Method for Obtaining and Testing Drilled Cores and Sawed Beams of Concrete.
16. ASTM C94/C94M, Specification for Ready-Mixed Concrete.
17. ASTM C138/C138M, Test Method for Density (Unit Weight), Yield, and Air Content (Gravimetric) of Concrete.
18. ASTM C143/C143M, Test Method for Slump of Hydraulic-Cement Concrete.
19. ASTM C150/C150M, Specification for Portland Cement.
20. ASTM C172, Practice for Sampling Freshly Mixed Concrete.
21. ASTM C231, Test Method for Air Content of Freshly Mixed Concrete by the Pressure Method.
22. ASTM C260, Specification for Air-Entraining Admixtures for Concrete.
23. ASTM C309, Specification for Liquid Membrane-Forming Compounds for Curing Concrete.
24. ASTM C494/C494M, Specification for Chemical Admixtures for Concrete.
25. ASTM C579, Methods for Compressive Strength of Chemical-Resistant Mortars, Grouts, Monolithic Surfacing, and Polymer Concretes.
26. ASTM C1064/C1064M, Standard Test Method for Temperature of Freshly Mixed Hydraulic-Cement Concrete.
27. ASTM D1752, Specification for Preformed Sponge Rubber Cork and Recycled PVC Expansion Joint Fillers for Concrete Paving and Structural Construction.
28. ASTM E96/E96M, Test Methods for Water Vapor Transmission of Materials
29. ASTM E154, Test Methods for Water Vapor Retarders Used in Contact with Earth Under Concrete Slabs, on Walls, or as Ground Cover.
30. CRD-C 572, U. S. Army Corps of Engineers Specification for Polyvinylchloride Waterstops.

31. CRSI 1MSP, Manual of Standard Practice.

1.3 QUALITY ASSURANCE

A. Laboratory Trial Batch:

1. Employ independent testing laboratory experienced in design and testing of concrete materials and mixes to perform material evaluation tests and to design concrete mixes.
2. Each concrete mix design specified shall be verified by laboratory trial batch, unless indicated otherwise.
3. Perform the following testing on each trial batch:
 - a. Aggregate gradation for fine and coarse aggregates.
 - b. Slump.
 - c. Air content.
 - d. Compressive strength based on three cylinders each tested at seven days and at 28 days.
4. Submit for each trial batch the following information:
 - a. Project identification name and number (if applicable).
 - b. Date of test report.
 - c. Complete identification of aggregate source of supply.
 - d. Tests of aggregates for compliance with the Contract Documents.
 - e. Scale weight of each aggregate.
 - f. Absorbed water in each aggregate.
 - g. Brand, type, and composition of cementitious materials.
 - h. Brand, type, and amount of each admixture.
 - i. Amounts of water used in trial mixes.
 - j. Proportions of each material per cubic yard.
 - k. Gross weight and yield per cubic yard of trial mixtures.
 - l. Measured slump.
 - m. Measured air content.
 - n. Compressive strength developed at seven days and 28 days, from not less than three test cylinders cast for each seven day and 28-day test, and for each design mix.

1.4 SUBMITTALS

A. Action Submittals: Submit the following:

1. Shop Drawings:
 - a. List of concrete materials and concrete mix designs proposed for use. Include results of tests performed to qualify the materials and to establish the mix designs. Do not start laboratory trial batch testing until this submittal is approved by Engineer.
 - b. Laboratory Trial Batch Reports: Submit laboratory test reports for concrete cylinders, materials, and mix design tests.
 - c. Concrete placement drawings showing the location and type

- of all joints.
- d. Drawings for fabricating, bending, and placing concrete reinforcing. Comply with ACI SP-66. For walls and masonry construction, provide elevations to a minimum scale of 1/4-inch to one foot. Show bar schedules, stirrup spacing, adhesive dowels, splice lengths, diagrams of bent bars, arrangements, and assemblies, as required for fabricating and placing concrete reinforcing.
- 2. Product Data:
 - a. Manufacturer's specifications with application and installation instructions for proprietary materials and items, including admixtures and bonding agents.
- 3. Samples:
 - a. Samples: Submit samples of materials as specified and as otherwise requested by Engineer, including names, sources, and descriptions.
- B. Informational Submittals: Submit the following:
 - 1. Delivery Tickets: Copies of all delivery tickets for each load of concrete delivered to or mixed at the Site. Each delivery tickets shall contain the information in accordance with ASTM C94/C94M along with project identification name and number (if any), date, mix type, mix time, quantity and amount of water introduced.
 - 2. Site Quality Control Submittals:
 - a. Report of testing results for testing of field concrete cylinders for each required time period. Submit within 24 hours after completion of associated test. Test report shall include results of all testing required at time of sampling.

1.5 PRODUCT DELIVERY, STORAGE AND HANDLING

- A. Transportation, Delivery, and Handling:
 - 1. Deliver concrete reinforcing products to Site bundled, tagged, and marked. Use metal tags indicating bar size, lengths, and other information corresponding to markings on approved Shop Drawings.
 - 2. Materials used for concrete shall be clean and free from foreign matter during transportation and handling, and kept separate until measured and placed into concrete mixer.
 - 3. Implement suitable measures during hauling, piling, and handling to ensure that segregation of coarse and fine aggregate particles does not occur and grading is not affected.
 - 4. Deliver grout materials from manufacturers in unopened containers that bear intact manufacturer labeling.
- B. Storage:
 - 1. Store formwork materials above ground on framework or blocking. Cover wood for forms and other accessory materials with protective,

- waterproof covering. Provide for adequate air circulation or ventilation under cover.
2. Store concrete reinforcing materials to prevent damage and accumulation of dirt and excessive rust. Store on heavy wood blocking so that reinforcing does not come into contact with the ground. Space framework or blocking supports to prevent excessive deformation of stored materials.
 3. Store concrete joint materials on platforms or in enclosures or covered to prevent contact with ground and exposure to weather and direct sunlight.
 4. For storage of concrete materials, provide bins or platforms with hard, clean surfaces.
 5. Comply with Section 01 60 00, Product Requirements.

PART 2 – PRODUCTS

2.1 CONCRETE MATERIALS

- A. Portland Cement: ASTM C150/C150M, Type II.
- B. Aggregates: ASTM C33/C33M.
 1. Fine Aggregate: Clean, sharp, natural sand free of loam, clay, lumps, and other deleterious substances. Dune sand, bank run sand, and manufactured sand are unacceptable.
 2. Coarse Aggregate:
 - a. Clean, uncoated, processed aggregate containing no clay, mud, loam, or foreign matter.
 - b. Coarse aggregate shall comply with the following:
 - 1) Crushed stone, processed from natural rock or stone.
 - 2) Washed gravel, either natural or crushed. Slag, pit gravel, and bank-run gravel are not allowed.
 - c. Coarse Aggregate Size: ASTM C33/C33M, Nos. 57 or 67, unless otherwise approved by Engineer.
- C. Water: Clean, potable.
- D. Admixtures:
 1. Air-Entraining Admixture: ASTM C260.
 2. Water-Reducing Admixture: ASTM C494/C494M, Type A.
 3. Water Reducing and Set-Adjusting Admixtures: ASTM C494/C494M, Types D and E.
 4. High Range Water-Reducing Admixture: ASTM C494/C494M, Type F/G.
 5. Use only admixtures that have been tested and approved in the mix designs.
 6. Do not use calcium chloride or admixtures containing chloride ions.

2.2 CONCRETE MIX

- A. General:
 - 1. Normal weight: 145 pounds per cubic foot.
 - 2. Use air-entraining admixture in all concrete. Provide not less than four percent, nor more than eight percent, entrained air for concrete exposed to freezing and thawing, and provide from three to five percent entrained air for other concrete.

- B. Proportioning and Design of Class “A” Concrete Mix:
 - 1. Minimum compressive strength at 28 days: 4,500 psi.
 - 2. Maximum water-cement ratio by weight: 0.42.
 - 3. Minimum cement content: 564 pounds per cubic yard.

- C. Slump Limits:
 - 1. Proportion and design mixes to result in concrete slump at point of placement of not less than one inch and not more than four inches.
 - 2. When using high-range water reducers, slump prior to addition of admixture shall not exceed three inches. Slump after adding admixture shall not exceed eight inches at point of placement.

- D. Adjustment of Concrete Mixes:
 - 1. Concrete mix design adjustments may be requested by Contractor when warranted by characteristics of materials, Site conditions, weather, test results, or other, similar circumstances.
 - 2. Submit for Engineer’s approval laboratory test data for adjusted concrete mix designs, including compressive strength test results.
 - 3. Implement adjusted mix designs only after Engineer’s approval.
 - 4. Adjustments to concrete mix designs shall not result in additional costs to Owner.

2.3 FORM MATERIALS

- A. Provide form materials with sufficient stability to withstand pressure of placed concrete without bow or deflection. Contractor shall be responsible for designing the formwork system to resist all applied loads including pressures from fluid concrete and construction loads.

- B. Smooth Form Surfaces: Acceptable panel-type to provide continuous, straight, smooth, as-cast surfaces in accordance with ACI 301.

- C. Unexposed Concrete Surfaces: Material to suit project conditions.

- D. Provide 3/4-inch chamfer at all external corners. Chamfer is not required at re-entrant corners unless otherwise shown or indicated.

- E. Form Ties:
 - 1. Provide factory-fabricated, removable, or snap-off metal form ties, that prevent form deflection and prevent spalling of concrete surfaces upon removal. Materials used for tying forms are subject to approval of Engineer.
 - 2. Unless otherwise shown or indicated, provide ties so that portion remaining within concrete after removal of exterior parts is at least 1.5 inches from outer surface of concrete. Unless otherwise shown or indicated, provide form ties that, upon removal, will leave a uniform, circular hole not larger than one-inch diameter in the concrete surface.
 - 3. Ties for exterior walls, below-grade walls, and walls subject to hydrostatic pressure shall be provided with waterstops.
 - 4. Wire ties are unacceptable.

2.4 REINFORCING MATERIALS

- A. Reinforcing Bars: ASTM A615/A615M, Grade 60 deformed bars.
- B. Welded Wire Fabric: ASTM A185/A185M.
- C. Steel Wire: ASTM A82/A82M.
- D. Provide supports for reinforcing including bolsters, chairs, spacers, and other devices for spacing, supporting, and fastening reinforcing in place.
 - 1. Use wire bar-type supports complying with CRSI MSP1 recommendations, except as specified in this Section. Do not use wood, brick, or other unacceptable materials.
 - 2. For slabs on grade, use precast concrete blocks, four inches square minimum with compressive strength equal to or greater than the surrounding concrete, or supports with sand plates or horizontal runners where base materials will not support chair legs.
 - 3. For all concrete surfaces where legs of supports are in contact with forms, provide supports having either hot-dip galvanized, plastic-protected, or stainless steel legs in accordance with CRSI MSP1.
 - 4. Provide precast concrete supports over waterproof membranes.
- E. Adhesive Dowels:
 - 1. Dowels:
 - a. Dowel reinforcing bars shall comply with ASTM A615, Grade 60.
 - 2. Adhesive:
 - a. For requirements for adhesive, refer to Section 05 05 33, Anchor Systems.

2.5 RELATED MATERIALS

- A. Waterstops:
1. PVC Waterstops:
 - a. Manufacturers: Provide products of one of the following:
 - 1) W.R. Meadows, Inc.
 - 2) Greenstreak Plastic Products Company.
 - 3) Or approved equal.
 - b. PVC Waterstops shall comply with CRD-C 572. Do not use reclaimed or scrap material.
 - c. Minimum Thickness: 3/8-inch.
 - d. Provide waterstops with minimum of seven ribs equally spaced at each end on each side with the first rib located at the edge. Each rib shall be minimum 1/8-inch in height.
 - e. Construction Joints: Waterstops shall be six-inch wide flat-strip type.
 - f. Expansion Joints: Waterstops shall be nine-inch wide centerbulb type.
 3. Hydrophilic Waterstops:
 - a. Products and Manufacturers: Provide one of the following:
 - 1) Duroseal Gasket, by BBZ USA, Inc.
 - 2) Adeka Ultraseal MC-2010M, by Asahi Denka Kogyo K.K.
 - 3) Hydrotite, by Greenstreak Plastic Products Company.
 - 4) Or equal.
 - b. Hydrophilic waterstop materials shall be bentonite-free and shall expand by minimum of 80 percent of dry volume in the presence of water to form a watertight joint seal without damaging the concrete in which it is cast.
 - c. Waterstop material shall be composed of resins and polymers that absorb water and cause a completely reversible and repeatable increase in volume.
 - d. Waterstop material shall be dimensionally stable after repeated wet-dry cycles with no deterioration of swelling potential.
 - e. Select material in accordance with manufacturer's recommendations for type of liquid to be contained.
 - f. Minimum cross-sectional dimensions: 3/16-inch by 3/4-inch.
 - g. Location of hydrophilic waterstops shall be as shown or indicated on the Drawings, or where approved by Engineer.
 - h. Hydrophilic Sealant: Shall adhere firmly to concrete, metal, and PVC in dry or damp condition and be indefinitely elastic when cured.
 - 1) Products and Manufacturers: Provide one of the following:
 - a) Duroseal Paste, by BBZ USA, Inc.

- b) Adeka Ultraseal P-201, by Asahi Denka Kogyo K.K.
- c) Hydrotite, by Greenstreak Plastic Products Company.
- d) Or approved equal.

B. Vapor Retarder:

- 1. Products and Manufacturers: Provide one of the following:
 - a. Stego Wrap 10-mil Vapor Retarder, by Stego Industries LLC.
 - b. Griffolyn 10-mil, by Reef Industries.
 - c. Moistop Ultra, by Fortifiber Industries.
 - d. Or approved equal.
- 2. Vapor retarder membrane shall comply with the following.
 - a. Water Vapor Transmission Rate, ASTM E96/E96M: 0.04 perms or lower.
 - b. Water Vapor Retarder, ASTM E1745: Meets or exceeds Class C.
 - c. Thickness of Retarder (plastic), ACI 302 1R: Not less than 10 mils.
 - d. Provide accessories by same manufacturer as vapor retarder.

C. Membrane-Forming Curing Compound: ASTM C309, Type I.

D. Epoxy Bonding Agent:

- 1. Two-component epoxy resin bonding agent.
- 2. Products and Manufacturers: Provide one of the following:
 - a. Sikadur 32, Hi-Mod LPL, by Sika Corporation.
 - b. Eucopoxy LPL, by the Euclid Chemical Company.
 - c. Or approved equal.

E. Epoxy-Cement Bonding Agent:

- 1. Three-component blended epoxy resin-cement bonding agent.
- 2. Products and Manufacturers: Provide one of the following:
 - a. Sika Armatec 110 EpoCem, by Sika Corporation.
 - b. Duralprep A.C., by Euclid Chemical Company.
 - c. Or approved equal.

F. Preformed Expansion Joint Filler:

- 1. Provide preformed expansion joint filler complying with ASTM D1752, Type I (sponge rubber) or Type II (cork).

G. Joint Sealant and Accessories:

- 1. For joint sealants and accessories used on isolation joints, control joints, and expansion joints, refer to Section 07 92 00, Joint Sealants.

2.6 GROUT

- A. Non-shrink Grout:
 - 1. Pre-packaged, non-metallic, cementitious grout requiring only the addition of water at the Site.
 - 2. Minimum 28-day Compressive Strength: 7,000 psi.
 - 3. Products and Manufacturers: Provide one of the following:
 - a. NS Grout by Euclid Chemical Company.
 - b. Set Grout by Master Builders, Inc.
 - c. NBEC Grout by Five Star Products, Inc.
 - d. Or approved equal.

- B. Epoxy Grout:
 - 1. Pre-packaged, non-shrink, non-metallic, 100 percent solids, solvent-free, moisture-insensitive, three-component epoxy grouting system.
 - 2. Minimum Seven-day Compressive Strength: 14,000 psi, when tested in accordance with ASTM C579.
 - 3. Products and Manufacturers: Provide one of the following:
 - a. Euco High Strength Grout, by Euclid Chemical Company.
 - b. Sikadur 42, Grout Pak, by Sika Corporation.
 - c. Five Star Epoxy Grout, by Five Star Products, Inc.
 - d. Or approved equal.

- C. Grout Fill:
 - 1. Grout mix shall consist of cement, fine and coarse aggregates, water, and admixtures complying with requirements specified in this Section for similar materials in concrete.

 - 2. Proportion and mix grout fill as follows:
 - a. Minimum Cement Content: 564 pounds per cubic yard.
 - b. Maximum Water-Cement Ratio: 0.45.
 - c. Maximum Coarse Aggregate size: 1/2-inch, unless otherwise indicated.
 - d. Minimum 28-day Compressive Strength: 4,000 psi.

PART 3 – EXECUTION

3.1 INSPECTION

- A. Contractor shall examine the substrate and the conditions under which the Work will be performed and notify Engineer in writing of unsatisfactory conditions. Do not proceed with the Work until unsatisfactory conditions are corrected.

3.2 FORMWORK

- A. Construct formwork in accordance with ACI 347 such that concrete members and structures are of correct size, shape, alignment, elevation, and position.
- B. Provide openings in formwork to accommodate the Work of other trades. Accurately place and securely support items required to be built into formwork.
- C. Clean and adjust forms prior to placing concrete. Apply form release agents or wet forms as required. Re-tighten forms during and after concrete placing, when required, to eliminate cement paste leaks.
- D. Removing Formwork:
 - 1. Comply with ACI 301 and ACI 347, except as otherwise indicated in the Contract Documents.
 - 2. Do not remove formwork and shoring until supported concrete members have acquired minimum of 90 percent of specified compressive strength. Results of suitable quality control tests of field-cured specimens may be submitted to Engineer for review as evidence that concrete has attained sufficient strength for removal of supporting formwork and shoring prior to removal times indicated in the Contract Documents.
 - 3. Removal time for formwork is subject to Engineer's acceptance.
 - 4. Repair form tie-holes following in accordance with ACI 301.

3.3 REINFORCING, JOINTS, AND EMBEDDED ITEMS

- A. Comply with the applicable recommendations of Laws and Regulations and standards referenced in this Section, including CRSI MSP1, for details and methods of placing and supporting reinforcing.
- B. Clean reinforcing to remove loose rust and mill scale, earth, ice, and other materials which act to reduce or destroy bond between reinforcing material and concrete.

- C. Position, support, and secure reinforcing against displacement during formwork construction and concrete placing. Locate and support reinforcing by means of metal chairs, runners, bolsters, spacers, and hangers, as required.
 - 1. Place reinforcing to obtain minimum concrete coverages as shown on the Drawings and as required in ACI 318. Arrange, space, and securely tie bars and bar supports together with 16-gage wire to hold reinforcing accurately in position during concrete placing. Set with ties so that twisted ends are directed away from exposed concrete surfaces.
 - 2. Do not secure reinforcing to formwork using wire, nails or other ferrous metal. Metal supports subject to corrosion shall not be in contact with formed or exposed concrete surfaces.

- D. Provide sufficient quantity of supports of strength required to carry reinforcing. Do not place reinforcing more than two inches beyond the last leg of continuous bar support. Do not use supports as bases for runways for concrete conveying equipment and similar construction loads.

- E. Splices: Provide standard reinforcing splices by lapping ends, placing bars in contact, and tying tightly with wire. Comply with requirements shown or indicated for minimum lap of spliced bars, as shown on the Drawings.

- F. Install welded wire fabric in lengths as long as practical, lapping adjoining sections a minimum of one full mesh.

- G. Do not place concrete until reinforcing is inspected and Engineer indicates that conditions are acceptable for placing concrete. Concrete placed in violation of this paragraph will be rejected. Notify Engineer in writing at least two working days prior to proposed concrete placement.

- H. Joints:
 - 1. Provide construction, isolation, expansion, and control joints as indicated or required. Locate construction joints so as to not impair the strength and appearance of the structure. Place isolation and control joints in slabs-on-grade to stabilize differential settlement and random cracking.
 - 2. Locations of joints shall be in accordance with the Contract Documents and as approved by Engineer in the Shop Drawings.
 - 3. Where construction joints are indicated to be roughened, intentionally roughen surfaces of previously-placed concrete to amplitude of 1/4-inch.

- I. Installation of Embedded Items: Set and build into the Work anchorage devices and embedded items required for other Work that is attached to, or supported by, cast-in-place concrete. Use setting diagrams, templates, and instructions provided under other Sections for locating and setting. Refer to Paragraph 1.1.B of this Section. Do not embed in concrete uncoated

aluminum items. Where aluminum items are in contact with concrete surfaces, coat aluminum to prevent direct contact with concrete.

J. Adhesive Dowels:

1. Adhesive dowels shall be reinforcing bar dowels set in an adhesive in hole drilled into hardened concrete. Comply with adhesive system manufacturer's installation instructions regarding hole diameter, drilling method, embedment depth required to fully develop required tensile strength, and hole cleaning and preparation instructions. Unless more-stringent standards are required by adhesive system manufacturer, comply with the following.
2. Drill holes to adhesive system manufacturer's recommended diameter and depth to develop required tensile strength. Holes shall not be more than 1/4-inch greater than nominal bar diameter, and hole depth shall not be less than twelve times nominal bar diameter. Hammer-drill holes. Cored holes are not allowed.
3. Embedment depths shall be based on concrete compressive strength of 2,000 psi when embedded in existing concrete, and 4,000 psi when embedded in new concrete.
4. Determine location of existing reinforcing steel in vicinity of proposed holes prior to drilling. Adjust location of holes to be drilled to avoid drilling through or damaging existing reinforcing bars only when approved by Engineer.
5. Before setting adhesive dowel, hole shall be free of dust and debris using method recommended by adhesive system manufacturer. Hole shall be brushed, with manufacturer-approved brush and blown clean with clean, dry, oil-free compressed air to remove dust and loose particles. Hole shall be dry as defined by adhesive system manufacturer.
6. Inject adhesive into hole through injection system mixing nozzle and necessary extension tubes, placed to bottom of hole. Withdraw discharge end as adhesive is placed, but keep end of tube immersed to prevent forming air pockets. Fill hole to depth that ensures that excess material is expelled from hole during dowel placement.
7. Twist dowels during insertion into partially-filled hole to guarantee full wetting of bar surface with adhesive. Insert bar slowly to avoid developing air pockets.

3.4 CONCRETE PLACING

- A. Site Mixing: Use drum-type batch machine mixer, mixing not less than 1.5 minutes for one cubic yard or smaller capacity. Increase required mixing time by minimum of 15 seconds for each additional cubic yard or fraction thereof.
- B. Ready-Mixed Concrete: Comply with ASTM C94/C94M.

- C. Concrete Placing:
 - 1. Place concrete in a continuous operation within planned joints or sections in accordance with ACI 304R.
 - 2. Do not begin placing concrete until work of other trades affecting concrete is completed.
 - 3. Wet concrete and subgrade surfaces to saturated surface dry condition immediately prior to placing concrete.
 - 4. Deposit concrete as near its final location as practical to avoid segregation due to re-handling or flowing.
 - 5. Avoid separation of the concrete mixture during transportation and placing. Concrete shall not free-fall for distance greater than four feet during placing.
 - 6. Complete concrete placing within 90 minutes of addition of water to the dry ingredients.

- D. Consolidate placed concrete in accordance with ACI 309R using mechanical vibrating equipment supplemented with hand rodding and tamping, such that concrete is worked around placing and other embedded items and into all parts of formwork. Insert and withdraw vibrators vertically at uniformly-spaced locations. Do not use vibrators to transport concrete within the formwork. Vibration of formwork or placing is not allowed.

- E. Protect concrete from physical damage or reduced strength due to weather extremes during mixing, placing, and curing.
 - 1. In hot weather comply with ACI 305R.
 - 2. In cold weather comply with ACI 306R.

3.5 QUALITY OF CONCRETE WORK

- A. Make concrete solid, compact, smooth, and free of laitance, cracks, and cold joints.

- B. Concrete for liquid-retaining structures and concrete in contact with earth, water, or exposed directly to the elements shall be watertight.

- C. Cut out and properly replace to extent directed by Engineer, or repair to satisfaction of Engineer, surfaces that contain cracks or voids, are unduly rough, or are in defective in any way. Patches or plastering are unacceptable.

- D. Repair, removal and replacement of defective concrete directed by Engineer shall be at no additional cost to Owner.

3.6 CURING

- A. Begin initial curing as soon as free water has disappeared from exposed surfaces. Where possible, keep continuously moist for not less than 72 hours. Continue curing by using moisture-retaining cover or membrane-forming curing compound. Cure formed surfaces by moist curing until formwork is removed. Provide protection, as required, to prevent damage to exposed concrete surfaces. Total curing period shall not be less than seven days. Curing methods and materials shall be compatible with scheduled finishes.

3.7 FINISHING

- A. Slab Finish:
 - 1. After placing concrete slabs, do not work the surface further until ready for floating. Begin floating when surface water has disappeared or when concrete has stiffened sufficiently. Use a wood float only. Check and level surface plane to a tolerance not exceeding 1/4-inch in ten feet when tested with a ten foot straightedge placed on the surface at not less than two different angles. Cut down high spots and fill low spots. Uniformly slope surfaces to drains. Immediately after leveling, re-float the surface to a uniform, smooth, granular texture. Slab surfaces shall receive a float finish. Provide additional trowel finishing as required in this Section.
 - 2. After floating, begin first trowel finish operation using power-driven trowel. Begin final troweling when surface produces a ringing sound as trowel is moved over the surface.
 - 3. Consolidate concrete surface by the final hand troweling operation. Finish shall be free of trowel marks, uniform in texture and appearance, and with a surface plane tolerance not exceeding 1/8-inch in ten feet when tested with a ten-foot straightedge. Grind smooth surface defects that would telegraph through applied floor covering system.
 - 4. Use trowel finish for the following:
 - a. Interior exposed slabs, unless otherwise shown or indicated.
 - b. Apply non-slip broom finish, after troweling, to exterior concrete slab and elsewhere as shown.
- B. Apply chemical floor hardener to exposed interior concrete floor areas when cured and dry, in accordance with hardener manufacturer's instructions.
- C. Formed Finish:
 - 1. Provide smooth form concrete finish at exposed surfaces. Use largest practical form panel sizes to minimize form joints. Exposed surfaces include interior water-contacting surfaces of tanks, whether or not directly visible. All surfaces shall be considered as exposed, unless buried or covered with permanent structural or architectural material.

After removing forms, patch form tie holes and defects in accordance with ACI 301. Remove fins exceeding 1/8-inch in height. Where surface will be coated or will receive further treatment, remove all fins flush with concrete surface.

2. Provide rough form finish at all unexposed surfaces. After removing forms, patch form tie holes and defects in accordance with ACI 301. Remove fins exceeding 1/2-inch in height.

3.8 GROUT PLACING

- A. Place grout as shown and indicated, and in accordance with grout manufacturer's instructions and recommendations. If grout manufacturer's instructions conflict with the Contract Documents, notify Engineer and not proceed until obtaining Engineer's clarification.
- B. Dry-packing is not allowed, unless otherwise indicated.
- C. Manufacturers of proprietary grout materials shall make available upon 72 hours notice the services of qualified, full-time, factory-trained employee to aid in ensuring proper use of grout materials at the Site.
- D. Placing grout shall comply with temperature and weather limitations described in Article 3.4 of this Section.

3.9 FIELD QUALITY CONTROL

- A. Site Testing Services:
 1. Contractor shall employ independent testing laboratory to perform field quality control testing for concrete. Engineer will direct where samples are obtained.
 2. Testing laboratory will provide all labor, material, and equipment required for sampling and testing concrete, including: scale, glass tray, cones, rods, molds, air tester, thermometer, and other incidentals required.
- B. Quality Control Testing During Construction:
 1. Perform sampling and testing for field quality control during concrete placing, as follows:
 - a. Sampling Fresh Concrete: ASTM C172.
 - b. Slump: ASTM C143/C143M; one test for each concrete load at point of discharge.
 - c. Concrete Temperature: ASTM C1064/C1064M; one for every two concrete loads at point of discharge, and when a change in the concrete is observed. Test each load when time from batching to placement exceeds 75 minutes.
 - d. Air Content: ASTM C231; one for every two concrete load at

- point of discharge, and when a change in the concrete is observed.
- e. Unit Weight: ASTM C138/C138M; one for every two concrete loads at point of discharge, and when a change in the concrete is observed.
 - f. Compression Test Specimens:
 - 1) In accordance with ASTM C31/C31M, make one set of compression cylinders for each 50 cubic yards of concrete, or fraction thereof, of each mix design placed each day. Each set shall be four standard cylinders, unless otherwise directed by Engineer.
 - 2) Cast, store, and cure specimens in accordance with ASTM C31/C31M.
 - g. Compressive Strength Tests:
 - 1) In accordance with ASTM C39/C39M; one specimen tested at seven days, and three specimens tested at 28 days.
 - 2) Concrete that does not comply with strength requirements will be considered as defective Work.
 - h. Submit test results from certified testing laboratory to Engineer within 24 hours of completion of test.
 - i. When there is evidence that strength of in-place concrete does not comply with the Contract Documents, Contractor shall employ the services of concrete testing laboratory to obtain cores from hardened concrete for compressive strength determination. Cores and tests shall comply with ASTM C42/C42M and the following:

END OF SECTION

SECTION 31 05 13
SOILS FOR EARTHWORK

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Subsoil materials.
 - 2. Granular materials.
 - 3. Topsoil materials.

- B. Related Requirements:
 - 1. Section 31 23 16 - Excavation.
 - 2. Section 31 23 23 - Fill.

1.2 REFERENCE STANDARDS

- A. American Association of State Highway and Transportation Officials:
 - 1. AASHTO T 180 - Standard Method of Test for Moisture-Density Relations of Soils Using a 4.54-kg Rammer and a 457-mm Drop.

- B. ASTM International:
 - 1. ASTM D698 - Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft³).
 - 2. ASTM D1557 - Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lbf/ft³).
 - 3. ASTM D2487 - Standard Practice for Classification of Soils for Engineering Purposes (Unified Soil Classification System).
 - 4. ASTM D6938 - Standard Test Methods for In-Place Density and Water Content of Soil and Soil-Aggregate by Nuclear Methods (Shallow Depth).

1.3 SUBMITTALS

- A. Section 01 33 00 - Submittal Procedures: Requirements for submittals.

- B. Product Data: Submit name of imported materials source.

- C. Samples: Submit, in airtight containers, 10-lb. sample of each type of fill to testing laboratory.

- D. Supplier's Certificate: Certify that products meet or exceed specified requirements.

- E. Source Quality-Control Submittals: Indicate results of testing data demonstrating compliance with the Contract Documents.

1.4 QUALITY ASSURANCE

- A. Furnish each subsoil material from single source throughout Work.
- B. Perform Work according to Florida Department of Transportation standards.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Subsoil:
 - 1. Type S1 - Select Fill:
 - a. Type S1 Select Fill shall be AASHTO M 145 Class A-1 or A-3 and as specified in the Florida Department of Transportation Standard Specifications for Road and Bridge Construction.
 - 2. Type S2 – Excavated Onsite Fill:
 - a. Excavated onsite fill may be used upon approval of the Engineer.
 - b. Excavated onsite fill shall be free of lumps larger than 3 inches, rocks larger than 2 inches, debris, and organic matter.
 - c. Liquid Limit < 45.
 - d. Plasticity Index < 25.
- B. Granular Fill:
 - 1. Type S3 Granular Fill shall comply with Section 204 of the Florida Department of Transportation Standard Specifications for Road and Bridge Construction
- C. Topsoil:
 - 1. Type S4 – Imported Topsoil: Comply with the Florida Department of Transportation Standard Specifications for Road and Bridge Construction.
 - 2. Type S5 – Onsite Topsoil:
 - a. Excavated and reused onsite topsoil material may be used upon approval by the Engineer.
 - b. If approved, onsite topsoil shall be stockpiled with appropriate erosion and sediment control measures.
 - c. Onsite topsoil shall be graded and single screened.
 - d. Free of roots, rocks larger than 1/2-inch, subsoil, debris, large weeds, and foreign matter.

2.2 SOURCE QUALITY CONTROL

- A. Section 01 40 00 - Quality Requirements: Requirements for testing, inspection, and analysis.
- B. Testing and Analysis:
 - 1. Subsoil Material: Comply with AASHTO T 180.
 - 2. Topsoil Material: Comply with AASHTO T 180.

3. If tests indicate materials do not meet specified requirements, change material and retest.
- C. Owner Inspection:
1. Make subsoil and topsoil available for inspection at source prior to packaging for shipment.
 2. Notify Owner at least seven days before inspection is allowed.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Excavation:
1. Excavate subsoil and topsoil from designated areas.
 2. Strip topsoil to full depth of topsoil in designated areas.
 3. Remove excess excavated materials, subsoil, and topsoil not intended for reuse from Site.
 4. Remove excavated materials not meeting requirements for subsoil and topsoil materials from Site.
- B. Stockpiling:
1. Stockpile excavated material meeting requirements for subsoil and topsoil materials.
 2. Stockpile materials on Site at locations as indicated. If no stockpile locations are shown, the Contractor shall be responsible for
 3. Stockpile in sufficient quantities to meet Project schedule and requirements.
 4. Separate differing materials with dividers or stockpile apart to prevent intermixing of soil types or contamination.
 5. Stockpile topsoil maximum 8 feet high.
 6. Direct surface water away from stockpile to prevent erosion or deterioration of materials.

3.2 CLEANING

- A. Section 01 70 00 - Execution and Closeout Requirements: Requirements for cleaning.
- B. Stockpile:
1. Remove stockpile and leave area in clean and neat condition.
 2. Grade Site surface to prevent freestanding surface water.

END OF SECTION

SECTION 31 10 00

SITE CLEARING

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Removing surface debris.
 - 2. Removing designated paving, curbs, sidewalks, and other existing features.
 - 3. Removing designated trees, shrubs, and other plant life.
 - 4. Removing abandoned utilities.
 - 5. Excavating topsoil.

1.2 SUBMITTALS

- A. Section 01 33 00 - Submittal Procedures: Requirements for submittals.
- B. Product Data: Submit data for herbicide. Indicate compliance with applicable codes for environmental protection.

1.3 QUALITY ASSURANCE

- A. Conform to applicable code for environmental requirements and disposal of debris.
- B. Perform Work in accordance with Florida Department of Transportation Standard Specifications for Road and Bridge Construction and as shown and specified herein.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Section 01 30 00 - Administrative Requirements: Verification of existing conditions before starting work.
- B. Verify existing plant life designated to remain is tagged or identified.
- C. Identify waste area and salvage area for placing removed materials.

3.2 PREPARATION

- A. Contractor shall contact Sunshine 811 for location of existing utilities at 811 or 1-800-432-4770 a minimum of 48 hours prior beginning Work.
 - 1. Request underground utilities to be located and marked within and surrounding construction areas.

3.3 PROTECTION

- A. Locate, identify, and protect utilities indicated to remain, from damage.
- B. Protect trees, plant growth, and features designated to remain.
- C. Protect bench marks, survey control points, and existing structures from damage or displacement.

3.4 CLEARING

- A. Remove trees and shrubs within the clearing limits shown. Remove stumps and main root ball.
- B. Clear undergrowth and deadwood, without disturbing subsoil.
- C. Apply herbicide to remaining stumps to inhibit growth.

3.5 REMOVAL

- A. Remove debris, rock, and extracted plant life from Site.
- B. Partially remove paving, curbs, sidewalks, and other existing features as indicated on Drawings. Neatly saw cut concrete edges at right angle to surface.
- C. Remove abandoned utilities as shown. Indicated removal termination point for underground utilities on Record Documents.
- D. Continuously clean-up and remove waste materials from site. Do not allow materials to accumulate on site.
- E. Do not burn or bury materials on site. Leave site in clean condition.

3.6 TOPSOIL EXCAVATION

- A. Excavate topsoil from areas as shown to be further excavated, landscaped, or regraded, without mixing with foreign materials for use in finish grading.
- B. Do not excavate wet topsoil.

- C. Stockpile topsoil in storage piles in areas shown, or where otherwise approved by Engineer. Construct storage piles to freely drain surface water. Cover storage piles to prevent windblown dust.
- D. Remove excess topsoil not intended for reuse from Site.

END OF SECTION

SECTION 31 23 16

EXCAVATION

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes general requirements for excavation activities as shown and specified.
- B. Related Requirements:
 - 1. Section 31 23 23 - Fill.

1.2 REFERENCE STANDARDS

- A. Florida Department of Transportation Standard Specifications for Road and Bridge Construction.

1.3 DEFINITIONS

- A. Rock: Material encountered in excavation that cannot be dislodged by a track-type hydraulic excavator, equipped with a 42-inch wide short-tip radius rock bucket, rated at not less than 120 horsepower flywheel power with bucket-curling force of not less than 25,000 lbs and stick-crowd force of not less than 18,000 lbs.
 - 1. Rock shall not include materials such as hardpan, loose rock, concrete or other materials that can be removed by means other than drilling and blasting, but which for reasons of economy in excavating the Contractor chooses to remove by drilling or other means.

1.4 SUBMITTALS

- A. Section 01 33 00 - Submittal Procedures: Requirements for submittals.
- B. Shop Drawings:
 - 1. Excavation Protection Plan:
 - a. Describe sheeting, shoring, and bracing materials and installation, as required, to protect excavations and adjacent structures and property.
 - b. Submit signed and sealed Shop Drawings with design calculations and assumptions to support plan.
- C. Field Quality-Control Submittals: Indicate results of Contractor-furnished tests and inspections.
- D. Qualifications Statement:
 - 1. Submit qualifications for licensed professional.

1.5 QUALITY ASSURANCE

- A. Perform Work according to the Florida Department of Transportation Standard Specifications for Road and Bridge Construction.

1.6 QUALIFICATIONS

- A. Licensed Professional: Professional engineer experienced in design of specified Work and licensed in State of Florida.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION

3.1 PREPARATION

- A. Section 01 70 00 - Execution and Closeout Requirements: Requirements for installation preparation.
- B. Utility Service Locator:
 - 1. Contractor shall contact Sunshine 811 for location of existing utilities at 811 or 1-800-432-4770 a minimum of 2 business days prior beginning Work.
 - 2. Request that underground utilities be located and marked within and immediately surrounding construction areas.
 - 3. Identify required lines, levels, contours, and data.
 - 4. Locate existing underground utilities in areas of work. If utilities are to remain in place, provide adequate means of support and protection during earthwork operations.
 - 5. Should uncharted, or incorrectly charted, piping or other utilities be encountered during excavation, consult utility Owner immediately for directions. Coordinate with Owner and utility companies in keeping respective services and facilities in operation. Repair damaged utilities to satisfaction of utility Owner.
- C. Existing Utilities:
 - 1. Notify utility companies and coordinate protection or relocation of utilities.
 - 2. Protect from damage utilities not indicated to be removed.
 - 3. Do not interrupt existing utilities serving facilities occupied and used by Owner or others, during occupied hours, except when permitted in writing by Engineer and then only after acceptable temporary utility services have been provided.
 - 4. Provide minimum of 2 business days notice to Engineer, and receive written notice to proceed before interrupting any utility.
 - 5. Demolish and completely remove from site existing under-ground utilities indicated to be removed. Coordinate with utility Owner for shut-off of services if lines are active.
 - 6. In the event that an existing utility is broken Contractor shall contact utility owner, Owner, and Engineer immediately. Coordinate repair with utility owner at

their direction. The Contractor shall be responsible for all costs associated with damaged utilities.

7. Utility Poles: Contractor shall communicate directly with utility companies when performing work around utility poles. Contractor shall bear all costs associated with work, including expense of temporarily supporting poles.

- D. When performing trench excavation in excess of 5-feet in depth, comply with OSHA requirements for trench safety standards, 29 CFR 1926, subpart b, and all subsequent revisions or updates adopted by the Department of Labor. Submission of bid and subsequent execution of Contract will serve as certification that all excavation in excess of 5-feet in depth will be in compliance with section 55 3. 62, Florida Statutes.
- E. Use of explosives is not allowed.
- F. Protect structures, utilities, sidewalks, pavements, and other facilities from damage caused by settlement, lateral movement, undermining, washout and other hazards created by earthwork operations.
- G. Protect plant life, lawns, and other features designated to remain as portion of final landscaping.
- H. Protect benchmarks, survey control points, existing structures, fences, sidewalks, paving, curbs, and other existing facilities and objects from excavating equipment and vehicular traffic.
- I. Do not close or obstruct driveways, roadways, sidewalks, or hydrants without permits.
- J. Erect and maintain temporary barriers and security devices, including warning signs, warning lights, and similar measures, for protection of public, Owner, and existing improvements indicated to remain.
 1. Temporary barriers shall be installed and maintained in compliance with authorities having jurisdiction.

3.2 EXCAVATION

- A. Underpin adjacent structures which may be damaged by excavation Work.
- B. Excavate subsoil to accommodate slabs on grade, paving, Site structures, and construction operations.
- C. Compact disturbed load-bearing soil in direct contact with foundations to original bearing capacity, as specified in Section 31 23 23 - Fill.
- D. Slope banks with machine to angle of repose or less until shored.
- E. Do not interfere with 45-degree bearing splay of foundations.

- F. Grade top perimeter of excavation to prevent surface water from draining into excavation.
- G. Trim excavation and remove loose matter.
- H. Removal of Deleterious Materials:
 - 1. Remove excess and unsuitable material from Site.
- I. Notify Engineer of unexpected subsurface conditions.
- J. No payment will be made for correction of unauthorized excavation. Correct over-excavated areas as directed by Engineer.
- K. Remove excavated material from Site.
- L. Stockpile excavated material in area designated on Site as specified in Section 31 05 13 - Soils for Earthwork.
- M. Repair or replace items indicated to remain that have been damaged by excavation.
- N. Except where otherwise authorized, shown or specified, all materials excavated below the bottom of concrete walls, footings, slabs on grade and foundations shall be replaced by, and at the expense of, the Contractor, with concrete placed at the same time and monolithic with the concrete above.

3.3 ROCK REMOVAL

- A. Excavate and remove rock by mechanical method.
 - 1. Drill holes and use expansive tools or wedges to fracture rock.
- B. Cut away rock at bottom of excavation to form level bearing.
- C. Remove shaled layers to provide sound and unshattered base.
- D. In utility trenches, excavate to twelve (12) inches below invert elevation of pipe and twenty-four (24) inches wider than pipe diameter.
- E. Remove excavated materials from site.
- F. Correct unauthorized rock removal in accordance with backfilling and compacting requirements of Section 31 23 23 unless otherwise directed by the Engineer. No payment will be made for unauthorized rock removal or correction thereof.

3.4 EROSION CONTROL, DRAINAGE, AND DEWATERING

- A. Erosion Control:
 - 1. In general, the construction procedures outlined herein shall be implemented to assure minimum damage to the environment during construction. Contractor shall

take any and all additional measures required to conform to the requirements of applicable codes and regulations.

2. Whenever possible, access and temporary roads shall be located and constructed to avoid environmental damage. Provisions shall be made to regulate drainage, avoid erosion, and minimize damage to vegetation.
3. Where areas must be cleared for storage of materials or temporary structures, provisions shall be made for regulating drainage and controlling erosion, subject to the Engineer's approval.
4. Temporary measures shall be applied to control erosion and to minimize the silting of the existing waterways, and natural ponding areas. Such measures shall include, but are not limited to, the use of berms, silt barriers, gravel or crushed stone, mulch, slope drains and other methods. These temporary measures shall be applied to erodible materials exposed by any activities associated with the Work.
 - a. Special care shall be taken to eliminate depressions that could serve as mosquito pools.
 - b. Temporary measures shall be coordinated with the construction of permanent drainage facilities and other Work to the extent practicable to assure economical, effective, and continuous erosion and silt control.
 - c. Contractor shall provide special care in areas with steep slopes. Disturbance of vegetation shall be kept to a minimum to maintain stability.
5. Remove only those shrubs and grasses that must be removed for construction. Protect the remainder to preserve their erosion-control value.
6. Install erosion and sediment control practices where shown on the Drawings and according to applicable standards, codes, and specifications. The practices shall be maintained in effective working condition during construction and until the drainage area has been permanently stabilized.
7. After stabilization, remove all silt barriers, debris, etc., from the Site.
8. In the event of any temporary Work stoppage, Contractor shall take steps to stabilize the Site and prevent erosion.
9. In the event Contractor repeatedly fails to satisfactorily control erosion and siltation, the Owner reserves the right to employ outside assistance or to use its own forces to provide the corrective measures indicated. The Contractor shall be responsible for all costs associated with such corrective measures.
10. Contractor shall prevent blowing and movement of dust from exposed soil surfaces and access roads to reduce on and off-site damage and health hazards. Control may be achieved by irrigation in which the Site shall be sprinkled with water until the surface is moist. The process shall be repeated, as required.

B. Drainage and Dewatering:

1. Contractor shall provide and maintain adequate drainage and dewatering equipment to remove and dispose of all surface water and groundwater entering excavations, or other parts of the Work. Each excavation shall be kept dry during subgrade preparation and continually thereafter until the pipe or structure to be built, therein is inspected by the Engineer and backfill operations have been completed and approved.
 - a. The different working areas on the Site shall be kept free of surface water at all times. Contractor shall install drainage ditches and dikes and shall

- perform all pumping and other Work necessary to divert or remove rainfall and all other accumulations of surface water from the excavations and fill areas. The diversion and removal of surface water shall be performed in a manner that will prevent the accumulation of water behind temporary structures or at any other locations within the construction area where it may be detrimental.
- b. Water used for working or processing, resulting from dewatering operations, or containing oils or sediments that will reduce the quality of the water downstream of the point of discharge, shall not be directly discharged. Such waters shall be diverted through a settling basin or filter before being discharged.
 - c. Contractor will be held responsible for the condition of any pipe, conduit, or channel used for drainage purposes and all such pipes, conduits, or channels shall be left clean and free of sediment.
 - d. Remove water from excavations as fast as it collects.
2. Contractor shall provide, install and operate sufficient trenches, sumps, pumps, hose, piping, well points, deep wells, etc., necessary to depress and maintain the ground water level below the base of the excavations during all stages of construction operations. The groundwater table shall be lowered in advance of excavation, for a sufficient period of time to permit dewatering of fine grain soils, and maintained two feet below the lowest subgrade excavation made until the structure has sufficient strength and weight to withstand horizontal and vertical soil and water pressures from natural ground water.
- a. Design of dewatering system, including both drawings and calculations, shall be performed by a Registered Professional Engineer in the State of Florida and shall be employed by Contractor. Dewatering system shall be designed to avoid settlement or damage to existing structures and utilities.
 - b. The system shall be operated on a 24-hour basis and standby pumping facilities and personnel shall be provided to maintain the continued effectiveness of the system.
 - c. If, in the opinion of the Engineer, the water levels are not being lowered or maintained as required, Contractor shall install additional or alternate dewatering devices as necessary, at no additional cost to the Owner.
 - d. Elements of the system shall be located to allow a continuous dewatering operation without interfering with the construction of the permanent Work. Where portions of the dewatering system are located in the area of permanent construction, Contractor shall submit details of the methods proposed to construct the permanent Work in this location for the approval of the Engineer.
 - e. Controls of groundwater shall continue until the permanent construction provides sufficient dead load to withstand the hydrostatic uplift of the normal groundwater, until concrete has attained sufficient strength to withstand earth and hydrostatic loads, and until all waterproofing Work has been completed.
 - f. Dispose of all water removed from the excavation in a manner that does not endanger any portion of the Work under construction or completed.

- g. Disposal of water removed shall comply with all State and Federal regulations.
- h. Before discontinuing dewatering operations or permanently permitting the rise of the ground water level, computations shall be made to show that any structure affected by the water level rise is protected by backfill or other means to sustain uplift. Use a safety factor of 1.25 when making these computations.
- i. Dewatering operations shall not be discontinued without the prior authorization of the Engineer.

3.5 FIELD QUALITY CONTROL

- A. Section 01 40 00 - Quality Requirements: Requirements for inspecting and testing.
- B. Inspecting: Request visual inspection of bearing surfaces by Engineer before installing subsequent Work.

3.6 PROTECTION

- A. Section 01 70 00 - Execution and Closeout Requirements: Requirements for protecting finished Work.
- B. Prevent displacement or loose soil from falling into excavation and maintain soil stability.
- C. Protect bottom of excavations and soil adjacent to and beneath foundation from freezing.
- D. Protect structures, utilities, sidewalks, pavements, and other facilities from damage caused by settlement, lateral movement, undermining, washout and other hazards created by earthwork operations.

END OF SECTION

SECTION 31 23 23.00

FILL

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes general requirements for backfill activities as shown and specified.
- B. Related Requirements:
 - 1. Section 31 23 16 - Excavation.

1.2 REFERENCE STANDARDS

- A. American Association of State Highway and Transportation Officials:
 - 1. AASHTO T 180 - Standard Method of Test for Moisture-Density Relations of Soils Using a 4.54-kg Rammer and a 457-mm Drop.
- B. ASTM International:
 - 1. ASTM D698 - Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft³).
 - 2. ASTM D1556/D1556M - Standard Test Method for Density and Unit Weight of Soil in Place by Sand-Cone Method.
 - 3. ASTM D1557 - Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lbf/ft³).
 - 4. ASTM D2167 - Standard Test Method for Density and Unit Weight of Soil in Place by the Rubber Balloon Method.
 - 5. ASTM D6031/D6031M - Standard Test Method for Logging In Situ Moisture Content and Density of Soil and Rock by the Nuclear Method in Horizontal, Slanted, and Vertical Access Tubes.
 - 6. ASTM D6938 - Standard Test Method for In-Place Density and Water Content of Soil and Soil-Aggregate by Nuclear Methods (Shallow Depth).

1.3 SUBMITTALS

- A. Section 01 33 00 - Submittal Procedures: Requirements for submittals.
- B. Product Data: Submit manufacturer information for geotextile fabric, indicating fabric and construction.
- C. Samples: Submit, in airtight containers, one 10-lb. sample of each type of fill to testing laboratory.
- D. Materials Source: Submit name of imported materials suppliers.

- E. Manufacturer's Certificate: Certify that products meet or exceed specified requirements.
- F. Field Quality-Control Submittals: Indicate results of Contractor-furnished tests and inspections.

1.4 QUALITY ASSURANCE

- A. Perform Work according to the Florida Department of Transportation Standard Specifications for Road and Bridge Construction.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Select Fill: Type S1, as specified in Section 31 05 13 - Soils for Earthwork.
- B. Crushed Stone: Type S3, as specified in Section 31 05 13 – Soils for Earthwork.
- C. Concrete:
 - 1. Description:
 - a. Structural, as specified in the Florida Department of Transportation Standard Specifications for Road and Bridge Construction .
 - b. Compressive Strength: 4,000 psi.

2.2 ACCESSORIES

- A. Geotextile Fabric: As specified in Florida Department of Transportation Standard Specifications for Road and Bridge Construction .

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Section 01 70 00 - Execution and Closeout Requirements: Requirements for installation examination.
- B. Verify that subdrainage, dampproofing, and waterproofing installations have been inspected.
- C. Verify that underground structures are properly anchored to avoid flotation after backfilling.

3.2 PREPARATION

- A. Section 01 70 00 - Execution and Closeout Requirements: Requirements for installation preparation.

- B. Compact subgrade to specified density requirements for subsequent backfill materials.
- C. Soft Subgrade:
 - 1. Cut out soft areas of subgrade not capable of compaction in place.
 - 2. Backfill with crushed stone and compact to density equal to or greater than specified requirements for subsequent fill material.
- D. Scarify subgrade surface to depth of 6 inches.

3.3 BACKFILLING

- A. Backfill areas to contours and elevations.
- B. Systematically backfill to allow maximum time for natural settlement.
- C. Do not backfill over porous, wet, frozen, or spongy subgrade surfaces, and do not backfill with frozen materials.
- D. Geotextile: Place geotextile fabric prior to placing subsequent fill materials.
- E. Maximum Compacted Depths:
 - 1. Place material in continuous layers to following depths:
 - a. Subsoil Fill: 6 inches.
 - b. Crushed Stone: 6 inches.
 - 2. The Engineer may grant permission to increase lift depth to 12 inches upon proof of successful compaction to the specified densities at the lift depths specified.
- F. Compaction:
 - 1. Pipe Trench Backfill:
 - a. Lowest Zone: Undercuts to within 4 inches of pipe bottom, compact to match soil in trench.
 - b. Bedding Zone: Above Lowest Zone, usually 4 inches below pipe.
 - 1) No Undercut: Loosen soil.
 - 2) Undercut: Leave loose below middle third of pipe and compact outside portions to 100% T99 Standard Proctor Density
 - c. Cover Zone: Extends from Bedding Zone to 12 inches above top of pipe. Compact to 95% T99 Standard Proctor Density
 - d. Top Zone: Extends from Cover Zone to base or final grade. Compact to 100% T99 Standard Proctor Density.
 - 2. Embankment: Compact to 100% Florida Method-1 (FM-1) T99 Standard Proctor Density, Method C.
 - 3. Subgrade: Compact to 98% FM-1 T180 Modified Proctor Density, Method D.
 - 4. Rock Base:

- a. Roadways: Compact to 98% FM-1 T180 Modified Proctor Density.
 - b. Shoulders, Bike Paths, and Shared Use Paths: Compact to 95% FM-1 T180 Modified Proctor Density.
- G. Use placement method that does not disturb or damage foundation perimeter drainage or utilities in trench.
- H. Maintain optimum moisture content of fill materials to attain required compaction density.
- I. Structures:
 - 1. Backfill against supported foundation walls.
 - 2. Backfill simultaneously on each side of unsupported foundation walls until supports are in place.
 - 3. Slope grade away from building minimum 5 percent slope for minimum distance of 10 feet.
- J. Make gradual grade changes and blend slope into level areas.
- K. Remove surplus backfill materials from Site.
- L. Leave fill material stockpile areas free of excess fill materials.

3.4 TOLERANCES

- A. Section 01 40 00 - Quality Requirements: Requirements for tolerances.
- B. Top Surface of Backfilling under Paved Areas: Plus or minus 1 inch from required elevations.
- C. Top Surface of General Backfilling: Plus or minus 1 inch from required elevations.

3.5 FIELD QUALITY CONTROL

- A. Section 01 70 00 - Execution and Closeout Requirements: Requirements for testing, adjusting, and balancing.
- B. Inspecting: Request visual inspection of bearing surfaces by Engineer before installing subsequent Work.
- C. Testing:
 - 1. Laboratory Material Testing: Comply with AASHTO T99 and FM-1 T180 as specified.
 - 2. In-Place Compaction Testing:
 - a. Density Tests: Comply with ASTM D6938.
 - b. Moisture Tests: Comply with ASTM D6031/D6031M.

3. If tests indicate that Work does not meet specified requirements, remove Work, replace, compact, and retest.
 4. Testing Frequency: One (1) moisture and one (1) density test per lift for each 500 feet along the alignment shown.
 5. Proof-roll compacted fill surfaces under slabs on grade and paving.
- D. The Contractor shall be responsible for all settlement of backfill, fills, and embankments which may occur within the correction period stipulated in the General Conditions.
- E. The Contractor shall make, or cause to be made, all repairs or replacements made necessary by settlement within 30 days after notice from the Engineer or Owner.

3.6 PROTECTION

- A. Section 01 70 00 - Execution and Closeout Requirements: Requirements for protecting finished Work.
- B. Reshape and recompact fills subjected to vehicular traffic during construction.

END OF SECTION

SECTION 32 12 16

ASPHALT PAVING

PART 1 - GENERAL

1.1 SUMMARY

- A. Section general requirements for asphalt paving.
- B. Related Requirement:
 - 1. Section 31 23 16 – Excavation.
 - 2. Section 31 23 23 – Fill.

1.2 REFERENCE STANDARDS

- A. American Association of State Highway and Transportation Officials:
 - 1. AASHTO M17 - Standard Specification for Mineral Filler for Bituminous Paving Mixtures.
 - 2. AASHTO M29 - Standard Specification for Fine Aggregate for Bituminous Paving Mixtures.
 - 3. AASHTO M140 - Standard Specification for Emulsified Asphalt.
 - 4. AASHTO M208 - Standard Specification for Cationic Emulsified Asphalt.
 - 5. AASHTO M288 - Standard Specification for Geotextile Specification for Highway Applications.
 - 6. AASHTO M320 - Standard Specification for Performance-Graded Asphalt Binder.
 - 7. AASHTO M324 - Standard Specification for Joint and Crack Sealants, Hot Applied, for Concrete and Asphalt Pavements.
 - 8. AASHTO MP1a - Standard Specification for Performance-Graded Asphalt Binder.
- B. ASTM International:
 - 1. ASTM C1371 - Standard Test Method for Determination of Emittance of Materials Near Room Temperature Using Portable Emissometers.
 - 2. ASTM C1549 - Standard Test Method for Determination of Solar Reflectance Near Ambient Temperature Using a Portable Solar Reflectometer.
 - 3. ASTM D242 - Standard Specification for Mineral Filler For Bituminous Paving Mixtures.
 - 4. ASTM D692 - Standard Specification for Coarse Aggregate for Bituminous Paving Mixtures.
 - 5. ASTM D946 - Standard Specification for Penetration-Graded Asphalt Cement for Use in Pavement Construction.
 - 6. ASTM D977 - Standard Specification for Emulsified Asphalt.

7. ASTM D1073 - Standard Specification for Fine Aggregate for Bituminous Paving Mixtures.
8. ASTM D1188 - Standard Test Method for Bulk Specific Gravity and Density of Compacted Bituminous Mixtures Using Coated Samples
9. ASTM D2027 - Standard Specification for Cutback Asphalt (Medium-Curing Type).
10. ASTM D2397 - Standard Specification for Cationic Emulsified Asphalt.
11. ASTM D2726 - Standard Test Method for Bulk Specific Gravity and Density of Non-Absorptive Compacted Bituminous Mixtures.
12. ASTM D2950 - Standard Test Method for Density of Bituminous Concrete in Place by Nuclear Methods.
13. ASTM D3381 - Standard Specification for Viscosity-Graded Asphalt Cement for Use in Pavement Construction.
14. ASTM D3515 - Standard Specification for Hot-Mixed, Hot-Laid Bituminous Paving Mixtures.
15. ASTM D3549 - Standard Test Method for Thickness or Height of Compacted Bituminous Paving Mixture Specimens.
16. ASTM D3910 - Standard Practices for Design, Testing, and Construction of Slurry Seal.
17. ASTM D6690 - Standard Specification for Joint and Crack Sealants, Hot Applied, for Concrete and Asphalt Pavements.
18. ASTM E408 - Standard Test Methods for Total Normal Emittance of Surfaces Using Inspection-Meter Techniques.
19. ASTM E903 - Standard Test Method for Solar Absorptance, Reflectance, and Transmittance of Materials Using Integrating Spheres.
20. ASTM E1918 - Standard Test Method for Measuring Solar Reflectance of Horizontal and Low-Sloped Surfaces in the Field.
21. ASTM E1980 - Standard Practice for Calculating Solar Reflectance Index of Horizontal and Low-Sloped Opaque Surfaces.

1.3 SUBMITTALS

- A. Section 01 33 00 - Submittal Procedures: Requirements for submittals.
- B. Product Data:
 1. Submit data for milling and paving equipment to be used.
 2. Submit product information for asphalt and aggregate materials.
 3. Submit mix design with laboratory test results supporting design.
- C. Manufacturer's Certificate: Certify Products meet or exceed specified requirements.

1.4 QUALITY ASSURANCE

- A. Mixing Plant: Certified by State of Florida.
- B. Obtain materials from same source throughout.

- C. Perform Work in accordance with Florida Department of Transportation Standard Specifications for Road and Bridge Construction.

1.5 QUALIFICATIONS

- A. Installer: Company specializing in performing Work of this section with minimum five (5) years of documented experience.

1.6 AMBIENT CONDITIONS

- A. Section 01 50 00 - Temporary Facilities and Controls: Ambient conditions control facilities for product storage and installation.
- B. Do not place asphalt mixture when ambient air or base surface temperature is less than FDOT requirements.

PART 2 - PRODUCTS

2.1 ASPHALT PAVING

- A. Performance / Design Criteria:
 - 1. Pavement Design: Superpave Type SP-9.5 or Type SP-12.5 as shown or specified and in accordance with Florida Department of Transportation Standard Specifications for Road and Bridge Construction.
- B. Asphalt Materials:
 - 1. Materials for asphalt paving shall comply with Florida Department of Transportation Standard Specifications for Road and Bridge Construction.

2.2 MIXES

- A. Asphalt Paving Mixtures:
 - 1. Asphalt Paving Mixtures shall comply with Florida Department of Transportation Standard Specifications for Road and Bridge Construction.
- B. Use dry material to avoid foaming. Mix uniformly.

2.3 ACCESSORIES

- A. Geotextile Fabric: AASHTO M288; non-woven, polypropylene.

2.4 SOURCE QUALITY CONTROL

- A. Section 01 40 00 - Quality Requirements: Testing, inspection and analysis requirements.
- B. Submit proposed mix design of each class of mix for review prior to beginning of Work.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Section 01 70 00 - Execution and Closeout Requirements: Requirements for installation examination.
- B. Verify utilities indicated under paving are installed with excavations and trenches backfilled and compacted.
- C. Verify compacted subbase is dry and ready to support paving and imposed loads.
 - 1. Proof roll subbase with a vibratory roller weighing a minimum of eight (8) tons or a sheepsfoot roller, where appropriate, exerting a compression of at least 250 pounds psi on the tamper foot for at least five (5) passes in minimum two (2) perpendicular passes to identify soft spots.
 - 2. Remove soft subbase and replace with compacted fill as specified in Section 31 23 23.
- D. Verify gradients and elevations of base are correct.
- E. Verify manhole frames and drainage structures are installed in correct position and elevation.

3.2 PREPARATION

- A. Prepare subbase in accordance with Florida Department of Transportation standards.

3.3 DEMOLITION

- A. Saw cut and notch existing paving as indicted on Drawings.
- B. Clean existing paving to remove foreign material, excess joint sealant and crack filler from paving surface.
- C. Repair surface defects in existing paving to provide uniform surface to receive new paving.
- D. Remove demolished asphalt from Site and dispose of properly.

3.4 MILLING OF EXISTING ASPHALT PAVEMENT

- A. Perform all milling operations in accordance with Florida Department of Transportation standards.
- B. Remove existing raised pavement markers prior to milling.
- C. Do not disfigure adjacent Work.

- D. Provide a milling machine capable of maintaining a depth of cut and cross slope that will achieve the results specified in the Contract Documents.
 - 1. Milling machine shall have a minimum overall length (out to out measurement excluding the conveyor) of eighteen (18) feet and a minimum cutting width of six (6) feet.
 - 2. Milling machine shall be equipped with a built-in automatic grade control system that can control the transverse slope and the longitudinal profile to produce the specified results.
 - 3. The Engineer will approve any commercially manufactured milling machine that meets the above requirements. If it becomes evident after starting milling that the milling machine cannot consistently produce the specified results, the Engineer will reject the milling machine for further use.
 - 4. The Contractor may use a smaller milling machine when milling to lower the grade adjacent to existing curb or other areas where it is impractical to use the above described equipment.
 - 5. Milling machine shall be equipped with means to effectively limit the amount of dust escaping during the removal operation.
 - 6. For complete pavement removal, the Engineer may approve the use of alternate removal and crushing equipment.
- E. Execute removal to depth not less than the depth(s) shown on the Drawing(s) at each point across full width of surface without detrimental aggregate degradation.
- F. Remove milled asphalt from Site and dispose of properly.

3.5 INSTALLATION

- A. Subbase: Prepare subbase in accordance with Florida Department of Transportation standards.
- B. Prime Coat and Tack Coat: Install in accordance with Florida Department of Transportation standards.
- C. Single Course Asphalt Paving:
 - 1. Install Work in accordance with Florida Department of Transportation standards.
 - 2. Place asphalt within 24 hours of applying primer or tack coat.
 - 3. Place asphalt wearing course to thickness indicated on Drawings.
 - 4. Compact paving by rolling to specified density. Do not displace or extrude paving from position. Hand compact in areas inaccessible to rolling equipment.
 - 5. Perform rolling with consecutive passes to achieve even and smooth finish without roller marks.

- D. Double Course Asphalt Paving:
1. Install Work in accordance with Florida Department of Transportation standards.
 2. Place asphalt binder course within 24 hours of applying primer or tack coat.
 3. Place binder course to thickness indicated on Drawings.
 4. Place wearing course within 24 hours of placing and compacting binder course.
 5. When binder course is placed more than 24 hours before placing wearing course, clean surface and apply tack coat before placing wearing course.
 6. Place wearing course to thickness indicated on Drawings.
 7. Compact each course by rolling to specified density. Do not displace or extrude paving from position. Hand compact in areas inaccessible to rolling equipment.
 8. Perform rolling with consecutive passes to achieve even and smooth finish, without roller marks.
- E. Asphalt Paving Overlay
1. Install Work in accordance with Florida Department of Transportation standards.
 2. Apply tack coat to existing paving surface at rate recommended by geotextile fabric manufacturer.
 3. Place wearing course to thickness indicated on Drawings.
 4. Compact overlay by rolling to specified density. Do not displace or extrude paving from position. Hand compact in areas inaccessible to rolling equipment.
 5. Perform rolling with consecutive passes to achieve even and smooth finish, without roller marks.
- F. Place asphalt mixture when temperature is not more than 15 degrees F less than initial mixing temperature.
- G. Curbs
1. Install extruded asphalt curbs of profile as indicated on Drawings.

3.6 TOLERANCES

- A. Section 01 40 00 - Quality Requirements: Tolerances.
- B. Flatness: Maximum variation of 1/4 inch measured with 10-foot straight edge.
- C. Scheduled Compacted Thickness: Within 3/16 inch.
- D. Variation from Indicated Elevation: Within 1/2 inch.

3.7 FIELD QUALITY CONTROL

- A. Section 01 70 00 - Execution and Closeout Requirements: Requirements for testing, adjusting, and balancing.
- B. Asphalt Paving Mix Temperature: Measure temperature at time of placement.
- C. Asphalt Paving Thickness: ASTM D3549; test one core sample from every 1,000 square yards compacted paving, but not less than one sample for each day of asphalt paving.
- D. Asphalt Paving Density: Monitor the roadway density per FDOT standards with either 6-inch diameter roadway cores, a nuclear density gauge, or other density measuring device, at a minimum frequency of once per 1,500 feet of pavement, but not less than one test for each day of paving.

3.8 PROTECTION

- A. Section 01 70 00 - Execution and Closeout Requirements: Requirements for protecting finished Work.
- B. Immediately after placement, protect paving from mechanical injury until surface temperature is less than 160 degrees F.
- C. Keep sections of newly compacted asphalt concrete, which are to be covered by additional courses, clean until the successive course is laid.
- D. Do not dump embankment or base material directly on the pavement. Dress shoulders before placing the friction course on adjacent pavement.

END OF SECTION

SECTION 32 13 13

CONCRETE PAVING

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Aggregate subbase.
 - 2. Concrete paving for:
 - a. Concrete sidewalks.
 - b. Concrete integral curbs and gutters.
 - c. Concrete parking areas and roads.
- B. Related Requirements:
 - 1. Section 31 23 23 - Fill.

1.2 REFERENCE STANDARDS

- A. American Association of State Highway and Transportation Officials:
 - 1. AASHTO M324 - Standard Specification for Joint and Crack Sealants, Hot Applied, for Concrete and Asphalt Pavements.
- B. American Concrete Institute:
 - 1. ACI 301 - Specifications for Structural Concrete.
 - 2. ACI 304 - Guide for Measuring, Mixing, Transporting, and Placing Concrete.
- C. ASTM International:
 - 1. ASTM A184 - Standard Specification for Fabricated Deformed Steel Bar Mats for Concrete Reinforcement.
 - 2. ASTM A185 - Standard Specification for Steel Welded Wire Fabric, Plain, for Concrete Reinforcement.
 - 3. ASTM A497 - Standard Specification for Steel Welded Wire Fabric, Deformed, for Concrete Reinforcement.
 - 4. ASTM A615 - Standard Specification for Deformed and Plain Billet-Steel Bars for Concrete Reinforcement.
 - 5. ASTM A706 - Standard Specification for Low-Alloy Steel Deformed and Plain Bars for Concrete Reinforcement.
 - 6. ASTM A767 - Standard Specification for Zinc-Coated (Galvanized) Steel Bars for Concrete Reinforcement.
 - 7. ASTM A775 - S Standard Specification for Epoxy-Coated Steel Reinforcing Bars.
 - 8. ASTM A884 - Standard Specification for Epoxy-Coated Steel Wire and Welded Wire Reinforcement.

9. ASTM A934 - Standard Specification for Epoxy-Coated Prefabricated Steel Reinforcing Bars.
10. ASTM C31 - Standard Practice for Making and Curing Concrete Test Specimens in the Field.
11. ASTM C33 - Standard Specification for Concrete Aggregates.
12. ASTM C39 - Standard Test Method for Compressive Strength of Cylindrical Concrete Specimens.
13. ASTM C94 - Standard Specification for Ready-Mixed Concrete.
14. ASTM C143 - Standard Test Method for Slump of Hydraulic Cement Concrete.
15. ASTM C150 - Standard Specification for Portland Cement.
16. ASTM C172 - Standard Practice for Sampling Freshly Mixed Concrete.
17. ASTM C173 - Standard Test Method for Air Content of Freshly Mixed Concrete by the Volumetric Method.
18. ASTM C231 - Standard Test Method for Air Content of Freshly Mixed Concrete by the Pressure Method.
19. ASTM C260 - Standard Specification for Air-Entraining Admixtures for Concrete.
20. ASTM C309 - Standard Specification for Liquid Membrane-Forming Compounds for Curing Concrete.
21. ASTM C494 - Standard Specification for Chemical Admixtures for Concrete.
22. ASTM C595 - Standard Specification for Blended Hydraulic Cements.
23. ASTM C618 - Standard Specification for Coal Fly Ash and Raw or Calcined Natural Pozzolan for Use as a Mineral Admixture in Concrete.
24. ASTM C979 - Standard Specification for Pigments for Integrally Colored Concrete.
25. ASTM C989 - Standard Specification for Ground Granulated Blast-Furnace Slag for Use in Concrete and Mortars.
26. ASTM C1017 - Standard Specification for Chemical Admixtures for Use in Producing Flowing Concrete.
27. ASTM C1064 - Standard Test Method for Temperature of Freshly Mixed Hydraulic-Cement Concrete.
28. ASTM C1116 - Standard Specification for Fiber-Reinforced Concrete and Shotcrete.
29. ASTM C1315 - Standard Specification for Liquid Membrane-Forming Compounds Having Special Properties for Curing and Sealing Concrete.
30. ASTM C1371 - Standard Test Method for Determination of Emittance of Materials Near Room Temperature Using Portable Emissometers.
31. ASTM C1549 - Standard Test Method for Determination of Solar Reflectance Near Ambient Temperature Using a Portable Solar Reflectometer.
32. ASTM D1751 - Standard Specification for Preformed Expansion Joint Filler for Concrete Paving and Structural Construction (Nonextruding and Resilient Bituminous Types).

33. ASTM D1752 - Standard Specification for Preformed Sponge Rubber and Cork Expansion Joint Fillers for Concrete Paving and Structural Construction.
34. ASTM D6690 - Standard Specification for Joint and Crack Sealants, Hot Applied, for Concrete and Asphalt Pavements.
35. ASTM E408 - Standard Test Methods for Total Normal Emittance of Surfaces Using Inspection-Meter Techniques.
36. ASTM E903 - Standard Test Method for Solar Absorptance, Reflectance, and Transmittance of Materials Using Integrating Spheres.
37. ASTM E1918 - Standard Test Method for Measuring Solar Reflectance of Horizontal and Low-Sloped Surfaces in the Field.
38. ASTM E1980 - Standard Practice for Calculating Solar Reflectance Index of Horizontal and Low-Sloped Opaque Surfaces.

1.3 PRE-INSTALLATION MEETINGS

- A. Section 01 30 00 - Administrative Requirements: Pre-installation meeting.
- B. Convene minimum one week prior to commencing work of this section.

1.4 SUBMITTALS

- A. Section 01 33 00 - Submittal Procedures: Requirements for submittals.
- B. Product Data:
 1. Submit data on concrete materials, joint filler, admixtures, and curing compounds.
- C. Design Data:
 1. Submit concrete mix design for each concrete strength. Submit separate mix designs when admixtures are required for the following:
 - a. Hot and cold weather concrete work.
 2. Identify mix ingredients and proportions, including admixtures.
 3. Identify chloride content of admixtures and whether or not chloride was added during manufacture.
- D. Source Quality Control Submittals: Indicate results of factory tests and inspections.

1.5 QUALITY ASSURANCE

- A. Perform Work according to ACI 30 and in accordance with Florida Department of Transportation Standard Specifications for Road and Bridge Construction.
- B. Obtain cementitious materials from same source throughout.

1.6 QUALIFICATIONS

- A. Manufacturer: Company specializing in manufacturing Products specified in this section with minimum five (5) years documented experience.
- B. Installer: Company specializing in performing work of this section with minimum five (5) years documented experience.

1.7 AMBIENT CONDITIONS

- A. Section 01 50 00 - Temporary Facilities and Controls: Ambient conditions control facilities for product storage and installation.
- B. Do not place concrete when base surface temperature is less than 40 degrees F, or surface is wet or frozen.

PART 2 - PRODUCTS

2.1 AGGREGATE SUBBASE

- A. Aggregate Subbase: As specified in Florida Department of Transportation Standard Specifications for Road and Bridge Construction.

2.2 CONCRETE PAVING

- A. Performance / Design Criteria:
 - 1. Pavement shall be designed for the intended service as shown on the Drawings in accordance with the Florida Department of Transportation Standard Specifications for Road and Bridge Construction.
- B. All concrete, reinforcement, and formwork shall conform to the Florida Department of Transportation Standard Specifications for Road and Bridge Construction.

2.3 FABRICATION

- A. Fabricate reinforcing according to Florida Department of Transportation standards.
- B. Form standard hooks for 180-degree bends, 90-degree bend, and seismic hooks as indicated on Drawings.

2.4 MIXES

- A. Concrete mix shall be in accordance with the Florida Department of Transportation Standard Specifications for Road and Bridge Construction.

2.5 CONCRETE CURB AND GUTTER

- A. Concrete curb and gutter shall be in accordance with Florida Department of Transportation Standard Specifications for Road and Bridge Construction.

2.6 CONCRETE MATERIALS

A. Concrete:

- 1. All concrete shall be Class I as specified in Florida Department of Transportation Standard Specifications for Road and Bridge Construction, Section 346, "Portland Cement Concrete".

B. Forms:

- 1. Description: Forms shall be either wood or metal.
- 2. Forms shall be straight, free from warps or bends, and of sufficient strength and rigidity to resist the pressure of the concrete without distortion.
- 3. Height: Equal to full depth of finished sidewalk.
- 4. Flexible forms shall be used for all headers constructed on a radius.

C. Steel Reinforcement:

- 1. Deformed Reinforcing:
 - a. Steel: Comply with ASTM A615/A615M.
 - b. Yield Grade: 60 ksi.
 - c. Billet Bars: Deformed.
 - d. Finish: Uncoated.
- 2. Deformed Bar Mats:
 - a. Description: Steel bars.
 - b. Comply with ASTM A184/A184M.
 - c. Fabrication: Comply with ASTM A615 or ASTM A706.
 - d. Yield Strength: 60 ksi.
 - e. Finish: Uncoated.
- 3. Welded Plain-Wire Fabric:
 - a. Comply with ASTM A1064/A1064M.
 - b. Finish: Uncoated.
- 4. Dowels:
 - a. Description: Plain steel bars.
 - b. Comply with ASTM A615.
 - c. Yield Strength: 60 ksi.
 - d. Length: As indicated on Drawings.
 - e. Ends: Square, with burrs removed.
 - f. Finish: Uncoated.
- 5. Tie Wire:
 - a. Type: Annealed.
 - b. Minimum Size: 16 gauge.
 - c. Finish: Uncoated.

- D. Glass-Fiber Reinforcement:
 - 1. Description: Alkali-resistant, glass-fiber rovings specifically formulated for use in concrete.
 - 2. Length: Varying from 1-1/2 to 2 inches.

2.7 ACCESSORIES

- A. Joint materials, curing compounds, liquid surface sealers, surface retarders, and joint sealers shall comply with FDOT standards.

2.8 SOURCE QUALITY CONTROL

- A. Section 014000 - Quality Requirements: Testing and Inspection Services.
- B. Submit proposed mix design of each class of concrete to appointed firm for review prior to commencement of Work.
- C. Tests on cement, aggregates, and mixes will be performed to ensure conformance with specified requirements.
- D. Test samples according to ACI 301.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Section 01 70 00 - Execution and Closeout Requirements: Requirements for installation examination.
- B. Verify compacted subbase is dry and ready to support paving and imposed loads.
- C. Verify gradients and elevations of base are correct.

3.2 PREPARATION

- A. Section 01 70 00 - Execution and Closeout Requirements: Requirements for installation preparation.
- B. Moisten substrate to minimize absorption of water from fresh concrete.
- C. Coat surfaces of manhole, catch basin, and inlet frames with oil to prevent bond with concrete paving.
- D. Notify Engineer minimum 24 hours prior to commencement of concreting operations.

3.3 INSTALLATION

- A. Base Course:
 - 1. Prepare base course according to FDOT standards.
- B. Forms:
 - 1. Place and secure forms and screeds to correct location, dimension, profile, and gradient.
 - 2. Assemble formwork to permit easy stripping and dismantling without damaging concrete.
- C. Reinforcement:
 - 1. Place reinforcing as indicated on Drawings.
 - 2. Interrupt reinforcing at expansion joints.
 - 3. Place dowels to achieve paving and curb alignment as detailed.
 - 4. Provide doweled joints as shown on the Drawings
 - 5. Repair damaged reinforcement finish to match shop finish.
- D. Placing Concrete:
 - 1. Place concrete according to Florida Department of Transportation Standard Specifications for Road and Bridge Construction.
 - 2. Ensure reinforcing, inserts, embedded parts, and formed joints are not disturbed during concrete placement.
 - 3. Place concrete continuously over the full width of the panel and between predetermined construction joints. Do not break or interrupt successive pours such that cold joints occur.
 - 4. Place concrete to pattern indicated.
- E. Joints:
 - 1. Place expansion joints at 20 foot intervals unless otherwise shown. Align curb, gutter, and sidewalk joints.
 - 2. Place joint filler between paving components and building or other appurtenances. Recess top of filler 1/4 inch for sealant installation.
 - 3. Provide scored joints at 3 feet intervals between sidewalks and curbs, and between curbs and paving.
 - 4. Provide keyed joints as indicated.
 - 5. Seal joints as indicated on Drawings.
- F. Exposed Aggregate:
 - 1. Apply surface retarder where exposed aggregate finish is required.
 - 2. Wash exposed aggregate surface with clean water and scrub with stiff bristle brush exposing aggregate.
- G. Finishing:
 - 1. Concrete finish shall be as shown on the Drawings.

- H. Curing and Protection:
 - 1. Immediately after placement, protect concrete from premature drying, excessively hot or cold temperatures, and mechanical injury.
 - 2. Maintain concrete with minimal moisture loss at relatively constant temperature for period necessary for hydration of cement and hardening of concrete.

3.4 TOLERANCES

- A. Section 01 40 00 - Quality Requirements: Tolerances.
- B. Maximum Variation of Surface Flatness: 1/4 inch in 10 ft.
- C. Maximum Variation from True Position: 1/4 inch.

3.5 FIELD QUALITY CONTROL

- A. Section 01 40 00 - Quality Requirements: Requirements for inspecting, testing.
- B. Perform field inspection and testing according to FDOT standards.
- C. Inspect reinforcing placement for size, spacing, location, support.
- D. Testing firm will take cylinders and perform slump and air entrainment tests according to ACI 301.
- E. Strength Test Samples:
 - 1. Sampling Procedures: ASTM C172.
 - 2. Cylinder Molding and Curing Procedures: ASTM C31/C31M, cylinder specimens, standard cured.
 - 3. Sample concrete and make one set of three cylinders for every 50 cu yds or less of each class of concrete placed each day and for every 2,000 sf of surface area paving.
 - 4. Make one additional cylinder during cold weather concreting, and field cure.
- F. Field Testing:
 - 1. Slump Test Method: ASTM C143.
 - 2. Air Content Test Method: ASTM C173/.
 - 3. Temperature Test Method: ASTM C1064.
 - 4. Measure slump and temperature for each compressive strength concrete sample.
 - 5. Measure air content in air entrained concrete for each compressive strength concrete sample.

- G. Cylinder Compressive Strength Testing:
 - 1. Test Method: ASTM C39.
 - 2. Test Acceptance: Florida Department of Transportation Standard Specifications for Road and Bridge Construction.
 - 3. Test one (1) cylinder at 7 days.
 - 4. Test three (3) cylinders at 28 days.
 - 5. Dispose remaining cylinders when testing is not required.
- H. Maintain records of placed concrete items. Record date, location of pour, quantity, air temperature, and test samples taken.

3.6 PROTECTION

- A. Section 01 70 00 - Execution and Closeout Requirements: Requirements for protecting finished Work.
- B. Immediately after placement, protect paving from premature drying, excessive hot or cold temperatures, and mechanical injury.
- C. Coordinate minimum requirements for concrete strength with expected traffic conditions.
- D. Do not permit traffic over paving until 75 percent design strength of concrete has been achieved.

END OF SECTION

SECTION 32 92 13

SODDING

PART 1 - GENERAL

1.1 SCOPE OF WORK

- A. The Contractor shall furnish all labor, materials, and equipment necessary to satisfactorily return all construction areas to their original conditions or better.
- B. Work shall include furnishing and placing seed or sod, fertilizing, planting, watering and maintenance until acceptance by City.

1.2 RELATED WORK NOT INCLUDED

- A. Excavation, filling and grading required to establish elevation shown on the Drawings are included under other sections of these Specifications.

1.3 QUALITY ASSURANCE

- A. It is the intent of this Specification that the Contractor is obliged to deliver a satisfactory stand of grass as specified. If necessary, the Contractor shall repeat any or all of the work, including grading, fertilizing, watering and seeding or sodding at no additional cost to the City until a satisfactory stand is obtained. For purposes of grassing, a satisfactory stand of grass is herein defined as a full lawn cover over areas to be sodded or seeded, with grass free of weeds, alive and growing, leaving no bare spots larger than 3/4 square yard within a radius of 8 feet.
- B. All previously grassed areas where pipelines are laid shall be sodded. All sodding and grassing shall be installed in accordance with these Specifications or as directed by the City.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Fertilizer: The fertilizer shall be of the slow-release type meeting the following minimum requirements: 12 percent nitrogen, 8 percent phosphorus, 8 percent potassium; 40 percent other available materials derived from organic sources. At least 50 percent of the phosphoric acid shall be from normal super phosphate or an equivalent source which will provide a minimum of two units of sulfur. The amount of sulfur shall be indicated on the analysis card attached to each bag or other container. Fertilizer shall be uniform in composition, dry and free flowing delivered to sites in original unopened containers bearing manufacturer's statement or guarantee.

- B. Sodding: Sod shall be provided as required on the construction drawings or at locations as directed by the City in accordance with Florida Department of Transportation, Specifications Section 575 and 981. The Contractor shall furnish Bahia grass sod or match existing sod. Placement and watering requirements shall be in accordance with FDOT Specifications Section 575, except that no additional payment will be made for placement and/or watering. This cost shall be included in the Contract price bid for sodding.
- C. Topsoil: Topsoil stockpiled during excavation may be used as necessary. If additional topsoil is required to replace topsoil removed during construction, it shall be obtained off site at no additional cost to the City. Topsoil shall be fertile, natural surface soil, capable of producing all trees, plants and grassing specified herein.
- D. Water: It is the Contractor's responsibility to supply all water to the site, as required during seeding and sodding operations and through the maintenance period and until the work is accepted. The Contractor shall make whatever arrangements that may be necessary to ensure an adequate supply of water to meet the needs for his work. He shall also furnish all necessary hose, equipment, attachments and accessories for the adequate irrigation of lawns and planted areas as may be required. Water shall be suitable for irrigation and free from ingredients harmful to plant life.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. When the trench backfill has stabilized sufficiently, the Contractor shall commence work on lawns and grassed areas, including fine grading as necessary and as directed by the City.
- B. Finish Grading: Areas to be seeded or sodded shall be finish graded, raked, and debris removed. Soft spots and uneven grades shall be eliminated. The City shall approve the finish grade of all areas to be seeded or sodded prior to seed or sod application.
- C. Protection: Seeded and sodded areas shall be protected against traffic or other use by placing warning signs or erecting barricades as necessary. Any areas damaged prior to acceptance by the City shall be repaired by the Contractor as directed by the City.

3.2 CLEANUP

- A. Soil or similar materials spilled onto paved areas shall be removed promptly, keeping those areas as clean as possible at all times. Upon completion of seeding and sodding operations, all excess soil, stones and debris remaining shall be removed from the construction areas.

3.3 LANDSCAPE MAINTENANCE

- A. Any existing landscape items damaged or altered during construction by the Contractor shall be restored or replaced as directed by the City.
- B. Maintain landscape work for a period of 90 days immediately following complete installation of work or until City accepts project. Watering, weeding, cultivating, restoration of grade, mowing and trimming, protection from insects and diseases, fertilizing and similar operations as needed to ensure normal growth and good health for live plant material shall be included at no additional cost to the City.

3.4 REPAIRS TO LAWN AREAS DISTURBED BY CONTRACTOR'S OPERATORS

- A. Lawn areas planted under this Contract and all lawn areas damaged by the Contractor's operation shall be repaired at once by proper soil preparation, fertilizing and sodding, in accordance with these Specifications.

END OF SECTION

SECTION 33 05 10
UTILITY TRENCH EXCAVATION, EMBEDMENT, AND BACKFILL

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Excavation, Embedment and Backfill for:
 - a. Pressure Applications
 - 1) Water Main
 - 2. Including:
 - a. Excavation of all material encountered, including rock and unsuitable materials
 - b. Disposal of excess unsuitable material
 - c. Site specific trench safety
 - d. Pumping and dewatering
 - e. Embedment
 - f. Concrete encasement for utility lines
 - g. Backfill
 - h. Compaction
- B. Related Specification Sections include, but are not necessarily limited to:
 - 1. Division 0 – Proposal Requirements, Contract Forms, and Conditions of the Contract
 - 2. Division 1 – General Requirements
 - 3. Section 31 10 00 – Site Clearing
- C. Definitions
 - 1. General – Definitions used in this section are in accordance with Terminologies ASTM F412 and ASTM D8 and Terminology ASTM D653, unless otherwise noted.
 - 2. Deleterious materials – Harmful materials such as clay lumps, silts and organic material.

1.2 REFERENCE STANDARDS

- A. Reference standards cited in this Specification refer to the current reference standard published at the time of the latest revision date logged at the end of this Specification, unless a date is specifically cited.
- B. American Society for Testing and Materials (ASTM) Standards:
 - 1. ASTM C33-08 Standard Specifications for Concrete Aggregates
 - 2. ASTM C88-05 Soundness of Aggregate by Use of Sodium Sulfate or Magnesium Sulfate
 - 3. ASTM C131 - Standard Test Method for Resistance to Degradation of Small-Size Coarse Aggregate by Abrasion and Impact in the Los Angeles Machine
 - 4. ASTM C136-01 Test Method for Sieve Analysis of Fine and Coarse Aggregate
 - 5. ASTM D448-08 Standard Classification for Sizes of Aggregate for Road and Bridge Construction.
 - 6. ASTM C535-09 Standard Test Method for Resistance to Degradation of Large-Size Coarse Aggregate by Abrasion and Impact in the Los Angeles Machine
 - 7. ASTM D588 – Standard Test method for Moisture-Density Relations of Soil-Cement Mixture
 - 8. ASTM D698-07 Test Method for Laboratory Compaction Characteristics of Soil Using Stand Efforts (12,400 ft-lb/ft³ 600 Kn-m/M³).

9. ASTM 1556 Standard Test Methods for Density and Unit Weight of Soils in Place by Sand Cone Method.
10. ASTM 2487 – 10 Standard Classification of Soils for Engineering Purposes (Unified Soil Classification System)
11. ASTM 2321-09 Underground Installation of Thermoplastic Pipe for Sewers and Other Gravity-Flow Applications
12. ASTM 3017 - Standard Test Method for Water Content of Soil and Rock in place by Nuclear Methods (Shallow Depth)
13. ASTM D4253 - Standard Test Methods for Maximum Index Density and Unit Weight of Soils Using a Vibratory Table
14. ASTM D4254 - Standard Test Method for Minimum Index Density and Unit Weight of Soils and Calculations of Relative Density
15. ASTM D6938 - Standard Test Methods for In-Place Density and Water Content of Soil and Soil-Aggregate by Nuclear Methods (Shallow Depth)
16. ASTM G57 - Standard Test Method for Field Measurement of Soil Resistivity Using the Wenner Four-Electrode Method

C. OSHA

1. Occupational Safety and Health Administration CFR 29, Part 1926-Safety Regulations for Construction, Subpart P - Excavations

1.3 ADMINISTRATIVE REQUIREMENTS

A. Coordination

1. Utility Company Notification
 - a. Contact Florida 811 no less than 48 hours prior to starting excavation.
 - b. Notify area utility companies at least 48 hours in advance, excluding weekends and holidays, before starting excavation.
 - c. Request the location of buried lines and cables in the vicinity of the Work.

B. Sequencing

1. Sequence Work for each section of the pipe installed to complete the embedment and backfill placement on the day the pipe foundation is complete.
2. Sequence Work such that proctor tests are complete in accordance with ASTM D698 prior to commencement of construction activities.

1.4 SUBMITTALS

- A. Submittals shall be in accordance with Section 01 33 00.
- B. All submittals shall be approved by the Engineer prior to construction.

1.5 ACTION SUBMITTALS / INFORMATIONAL SUBMITTALS

A. Action submittals/informational submittals

1. Shop Drawings
 - a. Provide detailed drawings and explanation for ground water and surface water control, if required.
 - b. Trench Safety Plan in accordance with Occupational Safety and Health Administration (OSHA) excavation standards, 29 Code of Federal Regulations (CFR) Part 1926, Subpart P. The Trench Safety Plan will be submitted for record purposes only and no approval will be provided by the Engineer.
 - c. Stockpiled excavation and/or backfill material

- 1) Provide a description of the storage of the excavated material only if the Contract Documents do not allow storage of materials in the right-of-way of the easement.
2. Product Data:
 - a. Materials Source: Submit name of imported materials suppliers.
 - b. Supplier's Certificate: Certify that products meet or exceed specified requirements.
 - c. Material properties:
 - 1) Sieve analysis
 - 2) Soil resistivity
 - 3) Certified test reports for compaction tests

1.6 CLOSEOUT SUBMITTALS [NOT USED]

1.7 MAINTENANCE MATERIAL SUBMITTALS [NOT USED]

1.8 QUALITY ASSURANCE [NOT USED]

1.9 DELIVERY, STORAGE, AND HANDLING

A. Storage

1. Spoil, imported embedment, and backfill materials may be stored within easements or temporary construction easements, unless specifically disallowed in the Contract Documents.
2. Do not block drainage ways, inlets or driveways.
3. Provide erosion control in accordance with contract documents and NPDES permit.
4. Materials shall not be stored in the Right-of-Way of any jurisdiction
5. In non-paved areas, do not store material on the root zone of any trees or in landscaped areas.
6. Designated Storage Areas
 - a. If the Contract Documents do not allow the storage of spoils, embedment, or backfill materials within easements or temporary construction easements, then secure and maintain an adequate storage location.
 - b. Provide an affidavit that rights have been secured to store the materials on private property.
 - c. Provide erosion control in accordance with contract documents and NPDES permit.
 - d. Do not block drainage ways.

B. Deliveries and haul-off - Coordinate all deliveries and haul-off.

1.10 SITE CONDITIONS

A. Existing Conditions

1. Any data which has been or may be provided on subsurface conditions is not intended as a representation or warranty of accuracy or continuity between soils. It is expressly understood that neither the Owner nor the Engineer will be responsible for interpretations or conclusions drawn therefrom by the Contractor.
2. Data are made available for the convenience of the Contractor.

1.11 WARRANTY

- ##### **A. Warranty shall be in accordance with the General Conditions and Supplemental Conditions.**

PART 2 - PRODUCTS

2.1 OWNER-FURNISHED PRODUCTS [NOT USED]

2.2 MATERIALS

A. Materials

1. Utility Sand:

- a. Granular and free flowing
- b. Meet or exceed the limits on deleterious substances per Table 1 for fine aggregate according to ASTM C 33
- c. Free of organic material
- d. Gradation: sand material consisting of durable particles, free of thin or elongated pieces, lumps of clay, loam or vegetable matter and meets the following gradation may be used for utility sand embedment/backfill, and graded with following limits when tested in accordance with ASTM C136.

Sieve Size	Percent Retained
1/2"	0
1/4"	0-5
#4	0-10
#16	0-20
#50	20-70
#100	60-90
#200	90-100

2. Crushed Rock:

- a. Durable crushed rock or recycled concrete.
- b. Meets the gradation of ASTM D448 size numbers 56, 57, or 67.
- c. May be unwashed.
- d. Free from silt clay or unsuitable materials.
- e. Percentage of wear not more than 40 percent per ASTM C131 or C535.
- f. Not more than a 12 percent maximum loss when subjective to 5 cycles of sodium sulfate soundness per ASTM C88.

3. Fine Crushed Rock:

- a. Durable crushed rock.
- b. Meets the gradation of ASTM D448 size numbers 8 or 89.
- c. May be unwashed.
- d. Free from silt, clay, or unsuitable materials.
- e. Have a percentage of wear not more than 40 percent per ASTM C131 or C535.
- f. Not more than a 12 percent maximum loss when subjected to 5 cycles of sodium sulfate soundness per ASTM C88.

4. Acceptable Backfill Material:

- a. In-situ or imported soils classified as CL, SC, or GC in accordance with ASTM D2487.
- b. Free from deleterious materials, boulders over 4 inches in size, and organics.
- c. Can be placed free from voids.
- d. Maximum 20 percent passing the number 200 sieve.

5. Unacceptable Backfill Material:

- a. In-situ soils classified as ML, MH, PT, OL, or OH in accordance with ASTM D2487.

6. Select Fill:

- a. Classified as SC or CL in accordance with ASTM D2487.
- b. Liquid limit less than 35.

- c. Plasticity index between 8 and 20.
- 7. Cement Stabilized Sand (CSS):
 - a. Sand:
 - 1) Shall be clean, durable sand meeting grading requirements for fine aggregates of ASTM C33 and the following requirements:
 - a) Classified as SW, SP, or SM by the United Soil Classification System of ASTM D2487
 - b) Deleterious materials:
 - (1) Clay lumps, ASTM C142, less than 0.5 percent
 - (2) Lightweight pieces, ASTM C123, less than 5.0 percent
 - (3) Organic impurities, ASTM C40, color no darker than standard color
 - (4) Plasticity index of 4 or less when tested in accordance with ASTM D4318.
 - b. Minimum of 4 percent cement content of Type I/II portland cement.
 - c. Water:
 - 1) Potable water, free of soils, acids, alkalis, organic matter or other deleterious substances, meeting requirements of ASTM C94.
 - d. Mix in a stationary pug mill, weigh-batch or continuous mixing plant.
 - e. Strength:
 - 1) 50 to 150 psi compressive strength at 2 days in accordance with ASTM D1633, Method A.
 - 2) 200 to 250 psi compressive strength at 28 days in accordance with ASTM D1633, Method A.
 - 3) The maximum compressive strength in 7 days shall be 400 psi. Backfill that exceeds the maximum compressive strength shall be removed by the Contractor for no additional compensation.
 - f. Random samples of delivered product will be taken in the field at point of delivery for each day of placement in the work area. Specimens will be prepared in accordance with ASTM D1632.
- 8. Trench Geotextile Fabric:
 - a. Soils other than ML or OH in accordance with ASTM D2487:
 - 1) Needle punch, nonwoven geotextile composed of polypropylene fibers.
 - 2) Fibers shall retain their relative position.
 - 3) Inert to biological degradation.
 - 4) Resist naturally occurring chemicals.
 - 5) UV Resistant.
 - 6) Mirafi 140N by Tencate, or approved equal.
- 9. Concrete Encasement:
 - a. Conform to Section 03 30 00.

2.3 ACCESSORIES [NOT USED]

2.4 SOURCE QUALITY CONTROL [NOT USED]

PART 3 - EXECUTION

3.1 INSTALLERS [NOT USED]

3.2 EXAMINATION

- A. Contact Florida 811 prior to beginning excavation.
- B. Verification of Conditions

1. Review all known, identified, or marked utilities, whether public or private, prior to excavation.
 2. Locate and protect all known, identified, and marked utilities or underground facilities as excavation progresses.
 3. The information and data shown in the Drawings with respect to utilities is approximate and based on record information or on physical appurtenances observed within the project limits.
 4. Coordinate with the owner(s) of underground facilities.
 5. Immediately notify any utility owner of damages to underground facilities resulting from construction activities.
 6. Repair any damages resulting from the construction activities.
- C. Notify the Engineer immediately of any changed condition that impacts excavation and installation of the proposed utility.

3.3 PREPARATION

A. Protection of In-Place Conditions

1. Pavement:
 - a. Conduct activities in such a way that does not damage existing pavement that is designated to remain.
 - 1) Where desired to move equipment not licensed for operation on public roads or across pavement, provide means to protect the pavement from all damage.
 - b. Repair or replace any pavement damaged resulting from performance of the Work outside the limits designated for pavement removal at no additional cost to the Owner.
2. Drainage:
 - a. Maintain positive drainage during construction and re-establish drainage for all swales and culverts affected by construction.
3. Trees:
 - a. When operating outside of existing ROW, stake permanent and temporary construction easements.
 - b. Restrict all construction activities to the designated easements.
 - c. Flag and protect all trees designated to remain in accordance with Section 31 10 00.
 - d. Conduct excavation, embedment, and backfill in a manner such that there is no damage to the tree canopy.
 - e. Prune or trim tree limbs as specifically allowed by the Drawings or as specifically allowed by the Engineer.
 - 1) Pruning or trimming may only be accomplished with equipment specifically designed for tree pruning or trimming.
 - f. Remove trees specifically designated to be removed in the Drawings in accordance with Section 31 10 00.
4. Above Ground Structures:
 - a. Protect all above ground structures adjacent to the construction.
5. Traffic:
 - a. Maintain traffic in accordance with the Traffic Control Plan(s).
 - b. Maintain safe sight distances around stockpiled materials.
 - c. Do not block access to driveways or alleys for extended periods of time unless:
 - 1) Alternative access has been provided.
 - 2) Proper notification has been provided to the property owner or resident.
 - 3) It is specifically allowed in the Traffic Control Plan.

- d. Use traffic rated plates to maintain access until access is restored.
- 6. Traffic Signal – Poles, Mast Arms, Pull boxes, Detector loops:
 - a. Notify the agency having jurisdiction a minimum of 48 hours prior to any excavation that could impact the operations of an existing traffic signal.
 - b. Protect all traffic signal poles, mast arms, pull boxes, traffic cabinets, conduit, and detector loops.
 - c. Immediately notify the agency having jurisdiction if any damage occurs to any component of the traffic signal due to the Contractor's activities.
 - d. Repair any damage to the traffic signal poles, mast arms, pull boxes, traffic cabinets, conduit, and detector loops as a result of the construction activities.
- 7. Fences:
 - a. Protect all fences designated to remain.
 - b. Fences shall be restored to preconstruction condition or better.

3.4 INSTALLATION

A. Excavation:

- 1. No blasting or burning of material will be allowed.
- 2. Excavate to a depth indicated on the Drawings.
- 3. Trench excavations are defined as unclassified. No additional payment shall be granted for rock or other in-situ materials encountered in the trench.
- 4. Excavate to a width sufficient for laying the pipe in accordance with the Drawings and brace in accordance with the Trench Safety Plan.
- 5. The bottom of the excavation shall be firm and free from standing water.
 - a. Notify the Engineer immediately if the water and/or the in-situ soils do not provide for a firm trench bottom.
 - b. The Engineer will determine if any changes are required in the pipe foundation or bedding.
- 6. Unless otherwise permitted by the Drawings or by the Engineer, the limits of the excavation shall not advance beyond the pipe placement so that the trench may be backfilled in the same day.
- 7. Over Excavation:
 - a. Fill over excavated areas with the specified bedding material for the specific pipe to be installed.
 - b. No additional payment will be made for over excavation or additional bedding material.
- 8. Unacceptable Backfill Materials:
 - a. In-situ soils classified as unacceptable backfill material shall be separated from acceptable backfill materials.
 - b. If the unacceptable backfill material is to be blended in accordance with this Specification, then store material in a suitable location until the material is blended.
- 9. Removal and Disposal of Excavated Materials:
 - a. Remove all unacceptable materials not intended to be blended or modified.
 - b. Remove all materials in excess of that required for backfill.
 - c. Removed excavated materials shall be disposed of in an approved solid waste disposal site in compliance with all applicable federal, state, and local regulations.

B. Shoring, Sheeting, and Bracing:

- 1. Engage a Licensed Professional Engineer in the State of Florida to design a site specific excavation safety system in accordance with Federal and State requirements.

2. Excavation protection systems shall be designed according to the space limitations as indicated in the Drawings.
3. Furnish, put in place, and maintain a trench safety system in accordance with the Excavation Safety Plan and required by Federal, State, or local safety requirements.
4. If soil or water conditions are encountered that are not addressed by the current Excavation Safety Plan, engage a Licensed Professional Engineer in the State of Florida to modify the Excavation Safety Plan and provide a revised submittal to the Engineer.
5. Do not allow soil, or water containing soil, to migrate through the Excavation Safety System in sufficient quantities to adversely affect the suitability of the Excavation Protection System. Movable bracing, shoring plates or trench boxes used to support the sides of the trench excavation shall not:
 - a. Disturb the embedment located in the pipe zone or lower.
 - b. Alter the pipe's line and grade after the Excavation Protection System is removed.
 - c. Compromise the compaction of the embedment located below the spring line of the pipe and in the haunching.

C. Water Control

1. Surface Water:
 - a. Furnish all materials and equipment and perform all incidental work required to direct surface water away from the excavation.
2. Ground Water:
 - a. Furnish all materials and equipment to dewater ground water by a method which preserves the undisturbed state of the subgrade soils.
 - b. Do not allow the pipe to be submerged within 24 hours after placement.
 - c. Do not allow water to flow over concrete until it has sufficiently cured.
 - d. Engage a Licensed Professional Engineer in the State of Florida to prepare a Ground Water Control Plan if any of the following conditions are encountered:
 - 1) A Ground Water Control Plan is specifically required by the Contract Documents
 - 2) If in the sole judgment of the Engineer, ground water is so severe that an Engineered Ground Water Control Plan is required to protect the trench or the installation of the pipe which may include:
 - a) Ground water levels in the trench are unable to be maintained below the top of the bedding.
 - b) A firm trench bottom cannot be maintained due to ground water.
 - c) Ground water entering the excavation undermines the stability of the excavation.
 - d) Ground water entering the excavation is transporting unacceptable quantities of soils through the Excavation Safety System.
 - e. In the event that there is no bid item for a Ground Water Control and the Engineer requires an Engineered Ground Water Control Plan due to conditions discovered at the Site, the Contractor will be eligible to submit a request for change order.
 - f. Control of ground water shall be considered subsidiary to the excavation when:
 - 1) No Ground Water Control Plan is specifically identified and required in the Contract Documents.
 - g. Ground Water Control Plan installation, operation, and maintenance:
 - 1) Furnish all materials and equipment necessary to implement, operate, and maintain the Ground Water Control Plan.
 - 2) Once the excavation is complete, remove all ground water control equipment not called to be incorporated into the work.
 - h. Water Disposal:

- 1) Dispose of ground water in accordance with all federal, state, and local regulations.
- 2) Do not discharge ground water onto or across private property without written permission.
- 3) Permission from the agency having jurisdiction is required prior to disposal into a sanitary sewer system.

D. Embedment and Pipe Placement:

1. Water Lines less than, or equal to, 16 inches in diameter:
 - a. The entire embedment zone shall be of uniform material.
 - b. Utility sand shall be generally used for embedment.
 - c. Crushed rock or fine crushed rock shall be used for embedment for excavated trench depths 15 feet, or greater.
 - d. If ground water is in sufficient quantity to cause sand to pump, then use crushed rock as embedment.
 - e. Place evenly spread bedding material on a firm trench bottom.
 - f. Provide firm, uniform bedding.
 - g. Place pipe on the bedding in accordance with the alignment of the Drawings.
 - h. In no case shall the top of the pipe be less than 42 inches from the surface of the proposed grade, unless specifically called for in the Drawings.
 - i. Place embedment, including initial backfill, to a minimum of 6 inches, but not more than 12 inches, above the pipe.
 - j. Where gate valves are present, the initial backfill shall extend to 6 inches above the elevation of the valve nut.
 - k. Form all blocking against undisturbed trench wall to the dimensions in the Drawings.
 - l. Compact embedment.
2. Water Lines 24-inches and greater in diameter
 - a. The entire embedment zone shall be of uniform material.
 - b. Crushed rock shall be used for embedment.
 - c. Provide trench geotextile fabric at any location where crushed rock or fine crushed rock come into contact with utility sand.
 - d. Place evenly spread bedding material on a firm trench bottom.
 - e. Provide firm, uniform bedding.
 - 1) Additional bedding may be required if ground water is present in the trench.
 - f. Place pipe on the bedding according to the alignment shown on the Drawings.
 - g. The pipe line shall be within:
 - 1) ± 1 inch of the elevation on the Drawings for 30-inch and larger water lines.
 - h. Place and compact embedment material to adequately support haunches in accordance with the pipe manufacturer's recommendations.
 - 1) Spade to full depth of lift to eliminate voids or bridging.
 - i. Crushed limestone shall be placed in maximum 12-inch compacted lift thickness in zone between 0.3 times the outside diameter of the pipe invert, and the top of the embedment zone.
 - j. For steel pipe greater than 30 inches in diameter, the initial embedment lift shall not exceed the spring line prior to compaction.
 - k. Where gate valves are present, the initial backfill shall extend to up to the valve nut.
 - l. Compact the embedment and initial backfill to 95 percent Standard Proctor Density per ASTM D 4253.
 - m. Density test may be performed by Owner to verify that the compaction of embedment meets requirements.
 - n. Place trench geotextile fabric on top of the initial backfill.

E. Trench Backfill:

1. At a minimum, place backfill in such a manner that the required in-place density and moisture content is obtained, and so that there will be no damage to the surface, pavement or structures due to any trench settlement or trench movement.
 - a. Meeting the requirement herein does not relieve the responsibility to damages associated with the Work.
2. Backfill Material:
 - a. Final backfill depth less than 15 feet:
 - 1) Backfill with:
 - a) Acceptable backfill material
 - b) Blended backfill material, or
 - c) Select backfill material, CSS, or CLSM when specifically required
 - b. Final backfill depth 15 feet or greater: (under pavement or future pavement)
 - 1) Backfill depth from 0 to 15 feet deep:
 - a) Backfill with:
 - (1) Acceptable backfill material
 - (2) Blended backfill material, or
 - (3) Select backfill material, CSS, or CLSM when specifically required
 - 2) Backfill depth from 15 feet and greater:
 - a) Backfill with:
 - (1) Select Fill
 - (2) CSS, or
 - (3) CLSM when specifically required
 - c. Final backfill depth 15 feet or greater: (not under pavement or future pavement)
 - 1) Backfill with:
 - a) Acceptable backfill material, or
 - b) Blended backfill material
 - d. Backfill for service lines:
 - 1) Backfill for water service lines shall be the same as the requirement of the main that the service is connected to.
3. Required Compaction and Density
 - a. Final backfill (depths less than 15 feet):
 - 1) Compact acceptable backfill material, blended backfill material or select backfill to a minimum of 95 percent Standard Proctor per ASTM D698 at moisture content within -2 to +5 percent of the optimum moisture.
 - 2) CSS or CLSM requires no compaction.
 - b. Final backfill (depths 15 feet and greater/under existing or future pavement):
 - 1) Compact select backfill to a minimum of 98 percent Standard Proctor density per ASTM D 698 at moisture content within -2 to +5 percent of the optimum moisture.
 - 2) CSS or CLSM requires no compaction.
 - c. Final backfill (depths 15 feet and greater/not under existing or future pavement):
 - 1) Compact acceptable backfill material blended backfill material, or select backfill to a minimum of 95 percent Standard Proctor density per ASTM D 698 at moisture content within -2 to +5 percent of the optimum moisture.
4. Saturated Soils:
 - a. If in-situ soils consistently demonstrate that they are greater than 5 percent over optimum moisture content, the soils are considered saturated.
 - b. Flooding the trench or water jetting is strictly prohibited.

- c. If saturated soils are identified in the Drawings or Geotechnical Report in the Appendix, Contractor shall proceed with Work following all backfill procedures outlined in the Drawings for areas of soil saturation greater than 5 percent.
 - d. If saturated soils are encountered during Work but not identified in Drawings or Geotechnical Report in the Appendix:
 - 1) The Contractor shall:
 - a) Immediately notify the Engineer.
 - b) Submit a Contract Claim for Extra Work associated with direction from Engineer.
 - 2) The Engineer shall:
 - a) Investigate soils and determine if Work can proceed in the identified location.
 - b) Direct the Contractor of changed backfill procedures associated with the saturated soils that may include:
 - (1) Imported backfill
 - (2) A site specific backfill design
5. Placement of Backfill:
- a. Use only compaction equipment specifically designed for compaction of a particular soil type and within the space and depth limitation experienced in the trench.
 - b. Flooding the trench or water jetting is strictly prohibited.
 - c. Place in loose lifts not to exceed 12 inches.
 - d. Compact to specified densities.
 - e. Remove any loose materials due to the movement of any trench box or shoring or due to sloughing of the trench wall.
6. Backfill Means and Methods Demonstration:
- a. Notify the Engineer in writing with sufficient time to obtain samples and perform standard proctor test in accordance with ASTM D698.
 - b. The results of the standard proctor test must be received prior to beginning excavation.
 - c. Upon commencing of backfill placement for the project the Contractor shall demonstrate means and methods to obtain the required densities.
 - d. Demonstrate Means and Methods for compaction including:
 - 1) Depth of lifts for backfill which shall not exceed 12 inches.
 - 2) Method of moisture control for excessively dry or wet backfill.
 - 3) Placement and moving trench box, if used.
 - 4) Compaction techniques in an open trench.
 - 5) Compaction techniques around structure.
 - e. Provide a testing trench box to provide access to the recently backfilled material.
 - f. The Owner will retain a qualified testing lab full time during this period to randomly test density and moisture content.
 - 1) The testing lab will provide results as available on the job site.
7. Varying Ground Conditions:
- a. Notify the Engineer of varying ground conditions and the need for additional proctors.
 - b. Request additional proctors when soil conditions change.
 - c. The Engineer may acquire additional proctors at its discretion.
 - d. Significant changes in soil conditions will require an additional Means and Methods demonstration.

3.5 REPAIR [NOT USED]

3.6 RE-INSTALLATION [NOT USED]

3.7 FIELD QUALITY CONTROL

A. Field Tests and Inspections

1. Proctors

- a. The Contractor will perform Proctors in accordance with ASTM D2453.
- b. Test results will generally be available to within 4 calendar days and distributed to:
 - 1) Contractor
 - 2) Owner's Representative
 - 3) Engineer
- c. Notify the Engineer if the characteristic of the soil changes.
- d. Perform new proctors for varying soils:
 - 1) When indicated in the geotechnical investigation in the Appendix
 - 2) If notified by the Contractor
 - 3) At the convenience of the Owner
- e. Trenches where different soil types are present at different depths, the proctors shall be based on the mixture of those soils.

2. Density Testing of Backfill:

- a. Density Tests shall be in conformance with ASTM D69
- b. Provide testing trench protection for trench depths in excess of 5 feet. Place, move and remove testing trench protection as necessary to facilitate all test conducted by the Owner's Representative.
- c. For final backfill depths less than 15 feet and trenches of any depth not under existing or future pavement:
 - 1) Perform density testing twice per working day when backfilling operations are being conducted.
 - 2) The testing lab shall take a minimum of 3 density tests of the current lift in the available trench.
- d. For final backfill depths 15 feet and greater deep and under existing or future pavement:
 - 1) Perform density testing twice per working day when backfilling operations are being conducted.
 - 2) The testing lab shall take a minimum of 3 density tests of the current lift in the available trench.
 - 3) The testing lab will remain onsite sufficient time to test 2 additional lifts.
- e. Make the excavation available for testing.
- f. The Owner's Representative will determine the location of the test.
- g. The Contractor's testing lab will provide results to Contractor and the Owner's Inspector upon completion of the testing.
- h. Test reports shall include:
 - 1) Location of test by station number
 - 2) Time and date of test
 - 3) Depth of testing
 - 4) Field moisture
 - 5) Dry density
 - 6) Proctor identifier
 - 7) Percent Proctor Density

3. Density of Embedment:
 - a. The Owner may test fine crushed rock or crushed rock embedment in accordance with ASTM D2922 or ASTM 1556.

B. Non-Conforming Work

1. All non-conforming work shall be removed, replaced, and retested.

3.8 SYSTEM STARTUP [NOT USED]

3.9 ADJUSTING [NOT USED]

3.10 CLEANING [NOT USED]

3.11 CLOSEOUT ACTIVITIES [NOT USED]

3.12 PROTECTION [NOT USED]

3.13 MAINTENANCE [NOT USED]

3.14 ATTACHMENTS [NOT USED]

END OF SECTION

SECTION 33 05 30
LOCATION OF EXISTING UTILITIES

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Locating and verifying the location and elevation of the existing underground utilities that may conflict with a facility proposed for construction by use of:
 - a. Exploratory Excavation
 - b. Vacuum Excavation
 - 2. The Contractor shall be responsible for all notification and locate procedures.
- B. Related Specification Sections include, but are not necessarily limited to:
 - 1. Division 0 – Proposal Requirements, Contract Forms, and Conditions of the Contract
 - 2. Division 1 – General Requirements
 - 3. Section 33 05 10 – Utility Trench Excavation, Embedment and Backfill

1.2 REFERENCES

- A. Definitions
 - 1. Exploratory Excavation: A method used to locate existing underground utility as shown on the plans through the use of standard excavation equipment.
 - 2. Vacuum Excavation: Method used to locate existing underground utility as shown on the plans through the use of geophysical prospecting equipment such as vacuum excavation.
- B. Reference Standards
 - 1. Reference standards cited in this Specification refer to the current reference standard published at the time of the latest revision date logged at the end of this Specification, unless a date is specifically cited.
 - 2. American Society of Civil Engineers (ASCE)
 - a. ASCE Publication CI/ASCE 38 (Standard Guideline for the Collection and Depiction of Existing Subsurface Utility Data)

1.3 ADMINISTRATIVE REQUIREMENTS

- A. Coordination
 - 1. In the absence of specific permit or easement requirements, the Contractor shall as a minimum:
 - a. Request utility locates through Florida 811.
 - b. Coordinate with Engineer and Agency having jurisdiction at least 48 hours prior to commencing Exploratory Excavation of Existing Utilities.
 - c. Coordinate location of all other existing utilities within vicinity of excavation prior to commencing Exploratory Excavation.
 - d. Coordinate staking of Exploratory Excavations with Engineer and Agency having jurisdiction at least 1 week prior to commencement.
- B. Sequencing

1. Exploratory Excavations shall be conducted in advance of construction activities and as required for compliance with the terms and conditions of permits and easements.

C. Scheduling

1. For critical utility locations, the Engineer and Agency having jurisdiction may choose to be present during excavation.
2. Alter schedule for Exploratory Excavation of Existing Utilities to accommodate Owner and Agency having jurisdiction.

1.4 SUBMITTALS [NOT USED]

1.5 ACTION SUBMITTALS/INFORMATIONAL SUBMITTALS [NOT USED]

1.6 CLOSEOUT SUBMITTALS [NOT USED]

1.7 MAINTENANCE MATERIAL SUBMITTALS [NOT USED]

1.8 QUALITY ASSURANCE [NOT USED]

1.9 DELIVERY, STORAGE, AND HANDLING [NOT USED]

1.10 FIELD CONDITIONS [NOT USED]

1.11 WARRANTY [NOT USED]

PART 2 - PRODUCTS [NOT USED]

PART 3 - EXECUTION

3.1 INSTALLERS [NOT USED]

3.2 EXAMINATION

A. Verification of Conditions

1. Verify location of existing utilities in accordance with the Contract Documents.

3.3 PREPARATION

A. Contact Florida 811 to request utility location.

B. Notify Engineer and Agency having jurisdiction prior to beginning any Work.

3.4 INSTALLATION

A. Exploratory Excavation

1. Designate the horizontal position of the existing underground utilities that are to be located using geophysical prospecting equipment.
 - a. Expose utility to spring line, as necessary.
 - b. Excavate and Backfill Trench for the Exploratory Excavation in accordance with Section 33 05 10.

B. Vacuum Excavation

1. Designate the horizontal position of the existing underground utilities that are to be located using geophysical prospecting equipment.
2. Perform excavation in general accordance with the recommended practices and procedures described in ASCE Publication CI/ASCE 38.

- C. Upon completion of the utility location activities, submit a report of the findings.
- D. If location of utility is in conflict with the Drawings, notify the Engineer for appropriate design modifications.

3.5 REPAIR / RESTORATION

- A. The Contractor shall be responsible for all repair and restoration required due to utility location activities.
- B. Once necessary data is obtained, immediately restore surface to existing conditions to:
 - 1. Obtain a safe and proper driving surface, if applicable.
 - 2. Ensure the safety of the general public.
 - 3. The satisfaction of the Engineer.
- C. Place embedment and backfill in accordance with Section 33 05 10.

3.6 RE-INSTALLATION [NOT USED]

3.7 FIELD QUALITY CONTROL [NOT USED]

3.8 SYSTEM STARTUP [NOT USED]

3.9 ADJUSTING [NOT USED]

3.10 CLEANING [NOT USED]

3.11 CLOSEOUT ACTIVITIES [NOT USED]

3.12 PROTECTION [NOT USED]

3.13 MAINTENANCE [NOT USED]

3.14 ATTACHMENTS [NOT USED]

END OF SECTION

SECTION 33 12 00
VALVES AND APPURTENANCES

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Contractor shall provide all labor, materials, equipment and incidentals required to furnish and install all valves and appurtenances.
2. The Work includes, but is not necessarily limited to, all types of valves required for buried, exposed, submerged and other types of piping except where otherwise specifically included in other Sections.

B. Coordination:

1. Review installation procedures under other sections and coordinate with the Work which is related to this Section including buried piping installation, exposed piping installation, site utilities, insulation, heating, ventilating and plumbing.
2. Contractor shall coordinate the mating of the valves and operators to provide a complete and functional system.

C. Related Specification Sections include, but are not necessarily limited to:

1. General Construction: Section 01 10 00
2. Polyvinyl Chloride (PVC) Gravity Sanitary Sewer Pipe: Section 33 31 20
3. Utility Piping: Section 33 34 16
4. Horizontal Directional Drill: Section 33 35 00

1.2 REFERENCES

A. Abbreviations and Acronyms

1. NRS – Non Rising Stem
2. OS&Y – Outside Screw and Yoke

B. Reference Standards

1. Reference standards cited in this Specification refer to the current reference standard published at the time of the latest revision date logged at the end of this Specification, unless a date is specifically cited.
2. American Association of State Highway and Transportation Officials (AASHTO).
3. American Society of Mechanical Engineers (ASME):
 - a. B16.1, Gray Iron Pipe Flanges and Flanged Fittings (Classes 25, 125, and 250).
4. American Iron and Steel Institute (AISI).
5. ASTM International (ASTM):
 - a. ASTM A 48, Standard Specification for Gray Iron Castings.
 - b. ASTM A 126, Standard Specification for Gray Iron Castings for Valves, Flanges and Pipe Fittings.
 - c. ASTM A 307, Standard Specification for Carbon Steel Bolts and Studs, 60,000 psi Tensile Strength.
 - d. ASTM A 354, Standard Specification for Quenched and Tempered Alloy Steel Bolts, Studs and Other Externally Threaded Fasteners.
 - e. ASTM A 436, Standard Specification for Austenitic Gray Iron Castings.
 - f. ASTM A 536, Standard Specification for Ductile Iron Castings.
 - g. ASTM B 62, Standard Specification for Composition Bronze or Ounce Metal Castings. American Water Works Association (AWWA):
 - h. ASTM C207, Steel Pipe Flanges for Waterworks Service, Sizes 4 In. Through 144 In.
 - i. ASTM C509, Resilient-Seated Gate Valves for Water Supply Service.
 - j. ASTM C515, Reduced-Wall, Resilient-Seated Gate Valves for Water Supply Service.
 - k. ASTM C550, Protective Interior Coatings for Valves and Hydrants.
 - l. ASTM C900, Polyvinyl Chloride (PVC) Pressure Pipe and Fabricated Fittings, 4 IN through 12 IN, for Water Transmission and Distribution.

6. American Water Works Association/American National Standards Institute (AWWA/ANSI):
 - a. AWWA C500, Gate Valves for Water and Sewerage Systems.
 - b. AWWA C506, Backflow Prevention Devices Reduced Pressure Principle and Double Check Valve Types.
 - c. AWWA C508, Swing Check Valves for Waterworks Service, 2 in. through 24 in. NPS.
 - d. AWWA C509, Resilient Seated Gate Valves, 3 through 12 NPS, for Water and Sewerage Systems.
7. NSF International (NSF):
 - a. 61, Drinking Water System Components - Health Effects.
 - b. 372, Drinking Water System Components – Lead Content.

1.3 ADMINISTRATIVE REQUIREMENTS [NOT USED]

1.4 SUBMITTALS

- A. Submittals shall be in accordance with contract documents.

1.5 ACTION SUBMITTALS/INFORMATIONAL SUBMITTALS

A. Product Data

1. Shop Drawings: Submit for approval the following:
 - a. Manufacturer's literature, illustrations, specifications, detailed drawings, data and descriptive literature on all valves and appurtenances.
 - b. Deviations from Drawings and Specifications.
 - c. Engineering data including dimensions, materials, size and weight.
 - d. Fabrication, assembly, installation and wiring diagrams.
2. Operation and Maintenance Data: Submit complete manuals including:
 - a. Copies of all Shop Drawings, test reports, maintenance data and schedules, description of operation, and spare parts information in accordance with Division 1.
3. Shop Tests:

- a. Hydrostatic tests shall be performed, when required by the valve specifications included herein.
4. Certificates: Where specified or otherwise required by ENGINEER submit test certificates.
5. Instructions for field repair of fusion bonded epoxy coating

B. Certificates

1. Furnish an affidavit certifying that all valves and appurtenances meet the provisions of this Section, each valve meets Specifications, all inspections have been made, and that all tests have been performed in accordance with applicable AWWA requirements.
2. Furnish affidavit that each valve manufacturer has five years of experience manufacturing valves of similar service and size with experience record.

1.6 CLOSEOUT SUBMITTALS [NOT USED]

1.7 MAINTENANCE MATERIAL SUBMITTALS

- A. Submit operations and maintenance manuals.

1.8 QUALITY ASSURANCE

A. Qualifications

1. Manufacturers
 - a. All valves shall be the product of one manufacturer for each project.
 - b. Manufacturer shall have a minimum of five (5) years of experience in the production of substantially similar equipment and shall show evidence of satisfactory service in at least five (5) installations.

1.9 DELIVERY, STORAGE, AND HANDLING

A. Storage and Handling Requirements

1. Protect all parts so that no damage or deterioration will occur during a prolonged delay from the time of shipment until installation is completed and the units and equipment are ready for operation.
2. Protect the finished surfaces of all exposed flanges by wooden blank flanges, strongly built and securely bolted thereto.

3. Protect finished iron or steel surfaces not painted to prevent rust and corrosion.
4. Prevent plastic and similar brittle items from being directly exposed to sunlight or extremes in temperature.
5. Secure and maintain a location to store the material in accordance with the City of Frostproof.

1.10 FIELD CONDITIONS [NOT USED]

1.11 WARRANTY

A. Manufacturer Warranty

1. Manufacturer's Warranty shall be in accordance with the City of Frostproof.

PART 2 - PRODUCTS

2.1 OWNER-FURNISHED PRODUCTS [NOT USED]

2.2 EQUIPMENT, PRODUCT TYPES AND MATERIALS

A. General:

1. Conform to the requirements of "Valve Schedule" attached at the end of this Specification Section.
2. Valves shall have manufacturer's name and working pressure cast in raised letters on valve body.
3. Manual valve operators shall turn clockwise to close unless otherwise specified.
4. Valves shall indicate the direction of operation.
5. All buried valves shall be provided with adjustable three-piece valve boxes and provided with extension stems, operating nuts and covers unless otherwise shown or specified.
6. Unless otherwise specified all flanged valves shall have ends conforming to ANSI B16.1, Class 125.
7. All other bolts, nuts and studs shall, unless otherwise approved, shall be of stainless steel.

8. Bolts and nuts shall have hexagon heads and nuts.
9. Gasket material and installation shall conform to manufacturer's recommendations.
10. Identification: Identify each valve 4 inches and larger with a brass or stainless-steel nameplate stamped with the approved designation. Nameplate shall be permanently fastened to valve body at the factory.
11. All valves shall include position indicators.

B. Check Valves:

1. General:
 - a. Check valves shall absolutely prevent the return of water back through the valve when the upstream pressure decreases below the downstream pressure. The valve shall be tight seating.
2. Type:
 - a. Counter-weighted swing check, capable of passing a 3" solid.
3. Materials:
 - a. Body: Ductile Iron, ASTM A536
 - b. Body Seat: Type 316 Stainless Steel
 - c. Disc Arm: Ductile Iron, ASTM A536, Grade 65-45-12
 - d. Disc Seat Ring: Nitrile Butadiene (NBR)
 - e. Shaft: Stainless Steel
 - f. Shaft Bearings: Bronze
 - g. Unless otherwise shown or specified valves shall have flanged ends conforming to ANSI B16.1, Class 125.
 - h. Shop Painting:
 - 1) Exposed ferrous interior surfaces shall be shop painted of an approved two component coal tar epoxy coating applied in accordance with the manufacturer's recommendations.
 - 2) Exterior surfaces of the valves shall be shop painted per manufacturers standard shop primer.

- i. Manufacturer: Provide check valves of one of the following:
 - 1) City of Frostproof or Polk County Preferred List
 - 2) Or approved equal.

C. Resilient-Seated Gate Valves

- 1. Manufacturers:
 - a. City of Frostproof or Polk County Preferred List
 - b. Or approved equal.
- 2. General:
 - a. Provide valves conforming to AWWA C515 and as specified herein.
 - b. Type:
 - 1) Provide non-rising stem (NRS) valves for buried service.
 - 2) Provide position indicators for NRS valves used for interior service.
 - c. Rated Working Pressure:
 - 1) Valves 12 inch and Smaller: 200 psig.
 - d. Maximum Fluid Temperature: 150 degrees F.
 - e. Provide valves with fully encapsulated resilient wedges, unless otherwise specified.
- 3. Materials of Construction: All materials of construction shall conform to AWWA C509 and shall be as follows for various valve components:
 - a. Body, Bonnet and Stuffing Box: Cast iron.
 - b. Wedge: Cast iron, symmetrically and fully encapsulated with molded rubber having minimum 1/8-inch thickness.
 - c. Stem: Manganese bronze.
 - d. All Rubber Items: Buna-N or other synthetic rubber suitable for the application.
 - e. All internal and external bolting and other hardware including pins, set screws, plug, studs, bolts, nuts and washers: Type 316 stainless steel.
- 4. Interior Coating:

- a. All valves shall be coated inside. The steel, cast-iron and ductile iron surfaces, except machined surfaces, shall be epoxy coated in accordance with AWWA C550.
5. Testing:
- a. Test all valves in conformance with AWWA C515.
6. Gear Actuators for Manually Operated Valves:
- a. Provide valves with gear actuators conforming AWWA C500.
 - b. Size gear actuators for the following maximum differential pressures:
 - 1) Maximum Differential Pressure Across Closed Valve: 75 psi.
- D. Brass Body Ball Valves (General Purpose) or Stainless Steel Ball Valve (Wastewater):
- 1. Reference: ASTM B 283
 - 2. Type: Two piece body with full port opening.
 - 3. Construction (water valve):
 - a. Body: Brass.
 - b. Ball: Brass with hard chrome plated finish.
 - c. Stem: Brass.
 - d. Stem Packing: PTFE.
 - e. O-Rings: Viton.
 - f. Seats: PTFE.

Ball valves for force mains shall be stainless steel.
 - 4. Nonblow out stem design.
 - 5. Pressure Rating: Class 125, 400 psi WOG.
 - 6. End Connections: Soldered or threaded.

E. Air Release Valves:

1. The air valve shall be designed to exhaust large amounts of air during filling, release small amounts of air during operation and open upon impending vacuum to admit air while draining.
2. Air release valves shall be suitable for use in wastewater service.
3. Valves shall be iron body with interior epoxy coating, exterior shop primer.
4. Float balls to be 304 stainless steel.
5. Valve vent plug and seat shall be 316 stainless steel.
6. Valves body test pressure shall be rated 300 psi.
7. Valve renewable seats shall be Buna-N.
8. orifice – Per approved manufacturer, suitable for 150 psi working pressure.
9. Inlets: 2” NPT; Outlet As shown.
10. Required accessories:
 - a. Backflushing attachments for flushing as recommended by manufacturer with valves at connection points.
 - b. Isolation valve and tapping saddle for connection to pressure sewer main. Tapping saddle shall be stainless steel band with brass saddle and Buna-N rubber gasket by Ford Meter Box or equal. Isolation valve shall be 2piece bronze full port ball valve with brass, chrome plated ball, and brass stem. Manual lever operator shall be stainless steel. All nipples shall be brass.
11. Manufacturer: Provide air release valves as manufactured by the following:
 - a. City of Frostproof or Polk County Preferred List,
 - b. or approved equal.

F. Sleeve, Tapping, Stainless Steel:

1. Body: 18-8 stainless steel
2. Lugs: 18-8 stainless steel
3. Bolts, washers, and nuts: NC rolled thread, 18-8 stainless steel
4. Gasket: Virgin SBR compounded for water service, full wrap around design.

5. Flange: 18-8 stainless steel with 3/4" NPT test plug.
6. All sleeves shall conform to applicable AWWA standards.
7. All sleeves to be NSF approved for potable water and shall have a minimum pressure rating of 200 psi.
8. Manufacturers:
 - a. Roamc, Style SST,
 - b. Ford, Fast,
 - c. JCM, 432,
 - d. Dresser, 630,
 - e. Mueller, H304SS,
 - f. or approved equal.

G. Tapping Valves:

9. Tapping Valves shall be resilient seat gate valves that conform to AWWA C509 or C515.
10. Valve shall be pressure rated for 175 psi.
11. Valve Body: Cast Iron or Ductile Iron.
12. Valve Wedge: Cast Iron or Ductile Iron and completely encapsulated in EPDM.
13. Valve stems shall be o-ring sealed and non-rising stem design.
14. Valve Stems shall be Type 304 or 431 stainless steel.
15. Gate valves shall be NSF 61 approved and bear the NSF logo.
16. Operating nut shall be 2" square and turn counter clockwise to open the valve.
17. Joints:
 - a. Tapping Valves shall be flanged joint by mechanical joint.
 - b. Mechanical Joint end connections shall fully conform with ANSI/AWWA C111/A21.11 for 4" diameter and larger.
 - c. Flanged end connections shall fully conform with ANSI B16.1 for 4" diameter and larger.
 - d. Threaded Joint: 2" diameter only.
18. Manufacturers:
 - a. American Flow Control, Series 2500,
 - b. Mueller, T2360-16-F,
 - c. Clow, F6114,
 - d. or approved equal.

2.3 ACCESSORIES

A. Valve Appurtenances

1. Extension Stems, Stem Guides, Wrenches and Keys:

- a. Provide operating key or wrench of suitable length and size for each valve that is not readily accessible to direct operation.
2. Valve Boxes: Provide each buried valve with a valve box as follows:
 - a. Fabricated of heavy pattern cast iron, two-piece adjustable telescoping type.
 - b. Lower section shall enclose operating nut and rest on bonnet.
 - c. Inside diameter shall be at least 4-1/2 inches.
 - d. Provide extension stem and operating nut attached with stainless steel pins or welded in place.
 - e. Cover shall be heavy duty cast-iron with direction to open arrow cast in.
 - f. Buried valve boxes shall include a valve position indicator.

B. Pressure Gauges for Miscellaneous Services:

1. Pressure gauges shall have a white face with black numerals, enclosed in a flangeless stainless-steel case. Gauges shall be accurate to 1 percent of scale.
2. Gauges shall be installed with an on-off valve.
3. Gauges on water lines shall have 2-inch diameter cases.
4. Gauges on other than potable City water, non-potable water supply, and air pipelines shall be provided with a diaphragm seal (with flush connection).
 - a. Seal housing shall be of Type 316 stainless steel, the diaphragm of Teflon or Kel-F, and the filling liquid of silicone oil.
 - b. Seal shall have a 1-inch diameter process connection, cleanout ring, and flush connection. Factory mount a stainless-steel cartridge snubber between the gauge and diaphragm seal.
5. Ranges shall be as shown, or if not shown, as selected by ENGINEER.
6. Manufacturer: Provide gauges of one of the following:
 - a. City of Frostproof preferred list,
 - b. or approved equal.

C. Painting

1. Clean and prime coat ferrous metal surfaces of equipment in the shop in accordance with the manufacturer's instructions.
2. Coat machined, polished and non-ferrous surfaces including gears, bearing surfaces and similar unpainted surfaces with corrosion prevention compound which shall be maintained during storage and until equipment begins operation.

2.4 SOURCE QUALITY CONTROL [NOT USED]

PART 3 - EXECUTION

3.1 INSTALLERS [NOT USED]

3.2 EXAMINATION [NOT USED]

3.3 PREPARATION [NOT USED]

3.4 INSTALLATION

A. General

1. Install all valves and appurtenances in accordance with manufacturer's instructions.
2. Install all valves so that operating handwheels or wrenches may be conveniently turned from operating floor but without interfering with access, and as approved by ENGINEER.
3. Unless otherwise approved install all valves plumb and level. Install valves free from distortion and strain caused by misaligned piping, equipment or other causes.

3.5 REPAIR/RESTORATION

- ##### **A. Damaged coatings shall be repaired per the manufacturer's recommendation.**

3.6 RE-INSTALLATION [NOT USED]

3.7 FIELD QUALITY CONTROL

- ##### **A. Field Testing and Adjustments**

1. Before acceptance of the installed valve, the Contractor shall demonstrate operation in the presence of the Engineer and the Owner shall have the opportunity to operate the valve.
2. Adjust components as required for proper operation.

3.8 SYSTEM STARTUP [NOT USED]

3.9 ADJUSTING [NOT USED]

3.10 CLEANING [NOT USED]

3.11 CLOSEOUT ACTIVITIES [NOT USED]

3.12 PROTECTION [NOT USED]

3.13 MAINTENANCE [NOT USED]

3.14 ATTACHMENTS [NOT USED]

END OF SECTION

SECTION 33 31 20

POLYVINYL CHLORIDE (PVC) GRAVITY SANITARY SEWER PIPE

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Polyvinyl Chloride (PVC) pipe 4-inch through 60-inch for gravity sanitary sewer applications.

B. Related Specification Sections include, but are not necessarily limited to:

1. General Construction: Section 01 10 00
2. Valve and Appurtenances: Section 33 12 00
3. Utility Piping: Section 33 34 16
4. Horizontal Directional Drill: Section 33 35 00

1.2 REFERENCES

A. Reference Standards

1. Reference standards cited in this Specification refer to the current reference standard published at the time of the latest revision date logged at the end of this Specification, unless a date is specifically cited.
2. American Association of State Highway and Transportation (AASHTO).
3. ASTM International (ASTM):
 - a. D1784, Standard Specification for Rigid Poly(Vinyl Chloride) (PVC) Compounds and Chlorinated Poly(Vinyl Chloride) (CPVC) Compounds.
 - b. D2412, Standard Test Method for Determination of External Loading Characteristics of Plastic Pipe by Parallel-Plate Loading.
 - c. D3034, Standard Specification for Type PSM Poly(Vinyl Chloride) (PVC) Sewer Pipe and Fittings.
 - d. D3212, Standard Specification for Joints for Drain and Sewer Plastic Pipes Using Flexible Elastomeric Seals.
 - e. F679, Standard Specification for Poly (Vinyl Chloride) (PVC) Large-Diameter Plastic Gravity Sewer Pipe and Fittings.
4. Underwriters Laboratories, Inc. (UL).

1.3 ADMINISTRATIVE REQUIREMENTS [NOT USED]

1.4 SUBMITTALS

A. Submittals shall be in accordance with the contract documents.

1.5 ACTION SUBMITTALS/INFORMATIONAL SUBMITTALS

A. Product Data

1. Product data sheet
2. Manufacturer
3. Nominal pipe diameter
4. Standard dimension ratio (SDR)
5. Cell classification
6. Laying lengths

B. Certificates

1. Furnish an affidavit certifying that all PVC Gravity Pipe meets the provisions of this Section and has been air and deflection tested and meets the requirements of ASTM D3034 and ASTM F679.

1.6 CLOSEOUT SUBMITTALS [NOT USED]

1.7 MAINTENANCE MATERIAL SUBMITTALS [NOT USED]

1.8 QUALITY ASSURANCE

A. Qualifications

1. Manufacturers
 - a. Finished pipe shall be the product of one manufacturer for each size per project, unless otherwise approved by the Engineer.
 - b. All pipe furnished shall be in conformance with ASTM D3034 (4-inch through 15-inch) and ASTM F679 (18-inch through 60-inch).

1.9 DELIVERY, STORAGE, AND HANDLING

A. Storage and Handling Requirements

1. Gravity pipe shall be stored and handled in accordance with the manufacturer's guidelines.
2. Secure and maintain a location to store the material in accordance with the City.

1.10 FIELD [SITE] CONDITIONS [NOT USED]

1.11 WARRANTY [NOT USED]

PART 2 - PRODUCTS

2.1 OWNER-FURNISHED PRODUCTS [NOT USED]

2.2 EQUIPMENT, PRODUCT TYPES AND MATERIALS

A. Manufacturers

1. Manufacturer shall be regularly engaged in production of the materials specified, with not less than five years of experience producing polyvinyl chloride (PVC) pipe similar to the specified requirements.

B. Performance / Design Criteria

1. Pipe:
 - a. Design:
 - 1) 4-inch through 15-inch: ASTM D3034, SDR26
 - 2) 18-inch and larger: ASTM F679, 115PS.
 - b. PVC Gravity Sanitary Sewer Pipe shall be approved by the UL.
 - c. Assume a standard lay length of 14 feet and 20 feet except for special fittings or closure pieces necessary to comply with the Drawings.
 - d. Use green coloring for ground identification as sanitary sewer pipe.
 - e. PVC shall meet the requirements of ASTM D1784, with a cell classification of 12454 or 12364.
 - f. In no case shall pipe be installed deeper than its design allows.
2. Minimum pipe stiffness of 46 psi at 5 percent deflection when test in accordance with ASTM D2412.
3. Pipe markings
 - a. Meet the minimum requirements of ASTM D3034 and ASTM F679.

- b. Minimum pipe markings shall be as follows:
 - 1) Manufacturer's Name or Trademark and production record
 - 2) Nominal pipe size
 - 3) PVC cell classification
 - 4) ASTM or Standard Dimension Ratio (SDR) designation
 - 5) Seal of testing agency that verified the suitability of the pipe

4. Joints

- a. Joints shall be gasket, bell and spigot, push-on type conforming to ASTM D3212.
- b. Since each pipe manufacturer has a different design for push-on joints; gaskets shall be part of a complete pipe section and purchased as such.

5. Connections

- a. Only use manufactured fittings.

2.3 ACCESSORIES [NOT USED]

2.4 SOURCE QUALITY CONTROL [NOT USED]

PART 3 - EXECUTION

3.1 INSTALLERS [NOT USED]

3.2 EXAMINATION [NOT USED]

3.3 PREPARATION [NOT USED]

3.4 INSTALLATION

A. General

- 1. Install pipe, specials and appurtenances as specified herein, and in accordance with the pipe manufacturer's recommendations.
- 2. Lay pipe to the lines and grades as indicated in the Drawings.
- 3. Excavate and backfill trenches in accordance with City of Frostproof Standards and Details

B. Pipe Handling

1. Haul and distribute pipe and fittings at the Site.
2. Handle piping with care to avoid damage.
 - a. Inspect each joint of pipe and reject or repair any damaged pipe prior to lowering into the trench.
 - b. Use only nylon ropes, slings or other lifting devices that will not damage the surface of the pipe for handling the pipe.
3. At the close of each operating day:
 - a. Keep the pipe clean and free of debris, dirt, animals, and trash – during and after the laying operation.
 - b. Effectively seal the open end of the pipe using a gasketed cap.

C. Pipe Joint Installation

- a. Clean dirt and foreign material from the gasketed socket and the spigot end.
- b. Assemble pipe joint by sliding the lubricated spigot end into the gasketed bell end to the reference mark.
- c. Install such that identification marking on each joint are oriented upward toward the trench opening.
- d. When making connection to manhole, use flexible boot to facilitate a seal.

D. Detectable Metallic Tape Installation

3.5 REPAIR / RESTORATION [NOT USED]

3.6 RE-INSTALLATION [NOT USED]

3.7 FIELD SITE QUALITY CONTROL

A. Field Tests and Inspections

1. Video Inspection
 - a. Provide a Post-CCTV inspection in accordance with City of Frostproof or Polk County Standards
2. Infiltration/Exfiltration Test and Deflection (Mandrel) Test
 - a. Perform in accordance with City of Frostproof or Polk County Standards.

3.8 SYSTEM STARTUP [NOT USED]

3.9 ADJUSTING [NOT USED]

3.10 CLEANING [NOT USED]

3.11 CLOSEOUT ACTIVITIES [NOT USED]

3.12 PROTECTION [NOT USED]

3.13 MAINTENANCE [NOT USED]

3.14 ATTACHMENTS [NOT USED]

END OF SECTION

SECTION 33 34 16

UTILITY PIPING

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes: The work specified in this Section consists of constructing the utility pipelines and appurtenances.
- B. Pipeline installation shall include, but not necessarily limited to, furnishing and installing force main and water main pipe, valves, fittings, and appurtenances of the size and type shown on the Plans, installed on a firm foundation true to line and grade in accordance with the Contract Documents.
- C. Related Sections:
 - 1. Summary: Section 01 10 00
 - 2. Valve and Appurtenances: Section 33 12 00
 - 3. Polyvinyl Chloride (PVC) Gravity Sanitary Sewer Pipe: Section 33 31 20
 - 4. Horizontal Directional Drill: Section 33 35 00

1.2 REFERENCES

- A. American Society for Testing and Materials.
 - 1. ASTM A 48, Specification for Gray Iron Castings.
 - 2. ASTM A 183, Specification for Carbon Steel Track Bolts and Nuts.
 - 3. ASTM A 320, Specification for Alloy Steel Bolting Materials for Low-Temperature Service.
 - 4. ASTM B 371, Specification for Copper-Zinc-Silicon Alloy Rod.
 - 5. ASTM C 923, Specification for Resilient Connectors between Reinforced Concrete Manhole Structures, Pipes and Laterals.
 - 6. ASTM D 1784, Specification for Rigid Poly (Vinyl Chloride)(PVC) Compounds and Chlorinated Poly (Vinyl Chloride)(CPVC) Compounds.

7. ASTM D 2000, Standard Classification System for Rubber Products.
8. ASTM D 2241, Specification for Poly (Vinyl Chloride)(PVC) Plastic Pipe (SDR-PR).
9. ASTM D 3139, Specification for Joints for Plastic Pressure Pipes Using Flexible Elastomeric Seals.
10. ASTM D 3450, Polyethylene Plastic Pipe and Fittings Materials, Spec. for.
11. ASTM F 714, Specification for Polyethylene (PE) Plastic Pipe (SDR-PR) Based on Outside Diameter.
12. ASTM F 477, Specification for Elastomeric Seals (Gaskets) for Joining Plastic Pipe.

B. American Force Works Association:

1. ANSI/AWWA C110/A21.10, American National Standard for Ductile-Iron and Gray-Iron Fittings, 3 in. Through 48 in., for Force and Other Liquids.
2. ANSI/AWWA C111/A21.11, American National Standard for Rubber Gasket Joints for Ductile Iron Pressure Pipe and Fittings.
3. ANSI/AWWA C116, Protective Fusion-Bonded Epoxy Coatings for the Interior and Exterior Surfaces of Ductile Iron and Gray Iron Fittings for Water Service.
4. ANSI/AWWA C151, Ductile Iron Pipe, Centrifugally Cast, for Water.
5. ANSI/AWWA C153/A21.53, American National Standard for Ductile-Iron Compact Fittings for Force Service.
6. ANSI/AWWA C500, Gate Valves – 3 In. through 48 In. for Force and Other Liquids.
7. ANSI/AWWA C550, Protective Interior Coatings for Valves and Hydrants.
8. ANSI/AWWA C900, Polyvinyl chloride (PVC) Pressure Pipe, 4-inch Through 12-inch, for Force Mains.
9. MSS-SP 60, Connecting Flange Joint Between Tapping Sleeves and Tapping Valves.

10. NACE RP0188, Discontinuity (Holiday) Testing of New Protective Coatings on Conductive Substrates.
 11. NAPF 500-03, Surface Preparation Standard for Ductile Iron Pipe and Fittings Receiving Special External Coatings and/or Special Internal Linings.
 12. NSF/ANSI 61, Drinking Water System Components - Health Effects.
 13. SSPC PA 2, Measurement of Dry Coating Thickness with Magnetic Gages.
- C. U.S. Commercial Standard Specification CS 226-59.
- D. City of Frostproof and Polk County Standards
1. City of Frostproof and Polk County Wastewater Collection and Transmission Standards
 2. City of Frostproof and Polk County Preferred List for Sanitary Sewer Materials

1.3 QUALITY ASSURANCE

- A. The City and/or a City authorized representative will inspect all materials before, during and after installation to ensure compliance with the Contract Documents.
- B. Regulatory Requirements:
1. Materials and methods of construction used on FDOT property are subject to approval of FDOT. Conduct work and operations fully within FDOT's rules, regulations and requirements. Ascertain from FDOT its rules, regulations and requirements, and what delays may be encountered. If required by FDOT, submit for approval specific details of construction methods intending to utilize including sketched or drawings.
- C. Provide piping and components of force main system conforming to ANSI/NSF Standard 61.
- D. Polyvinyl chloride (PVC) pipe and couplings shall be homogeneous throughout and free from visible cracks, bubbles, blisters, holes, foreign inclusions, cuts or scrapes on inside or outside surfaces, or other imperfections, which may impair the performance or life of the pipe. Each pipe shall be straight-to-within 1 ¼

inch per 20-foot length of pipe when uniformly supported along its entire length, and shall have a true circular cross-section to within +/- 1/64 inch.

- E. Ductile iron fittings shall be sound and without defects that might impair its service. Defective areas shall not exceed the maximum allowable minus wall thickness tolerance specified in AWWA C110.
- F. Ductile iron fittings for sanitary sewer force mains sewer pipe shall be epoxy lined. Epoxy lining shall be 40 mil minimum thickness (multi pass process) and shall be Protecto 401 Ceramic Epoxy, as manufactured by the Protecto Division of Vulcan Painters, Inc., or Permax-CTF or approved equal. For any lining method, to ensure a holiday-free lining, documentation must be provided, prior to shipment, showing each lined fitting has passed holiday testing at the time of production per ASTM G62. The lining shall have a minimum three (3) year warranty covering failure of the lining and bond failure between liner and pipe.

1.4 DELIVERY, STORAGE, AND HANDLING

A. Handling of Pipe and Fittings:

1. Unload, handle and store ductile iron fittings, valves and appurtenances as recommended by respective manufacturers to prevent damage and defects. If damage or coating abrasion occurs and is deemed repairable, repair as directed by City/Engineer, in accordance with manufacturer's recommendations. If damage is not repairable in opinion of City/Engineer, reject pipe, fittings, valves or appurtenances shall be removed from Project site and replaced at no addition expense.
2. Unload, handle and store Polyvinyl Chloride (PVC) Pressure Pipe as recommended by respective manufacturers to prevent damage and defects. If damage is not repairable in opinion of City/Engineer, reject pipe and remove from Project site and replace at no additional expense.

B. Acceptance at Site:

Engineer and the City reserves right to reject defective pipe, fittings, valves and appurtenances shipped to jobsite or stored on site. City or Engineer will examine pipe and determine if pipe is damaged prior to installation in trench. Failure of City or Engineer to detect damaged pipe does not relieve Contractor's total responsibility for pipe if it leaks or breaks after installation. Set defective pipe and fittings aside for final inspection by City or Engineer to determine if corrective repairs can be made, or material rejected.

1.5 PROJECT CONDITIONS

A. Inspection

1. Items of material furnished under this Section will be inspected prior to installation.

B. Environmental Requirements:

1. Keep trenches dewatered while installing pipe until required pipe joints are made and trench backfilled above water table.
2. Under no circumstances lay pipe in water.
3. Do not lay pipe when weather conditions are unsuitable, as determined by Engineer, for pipe laying work.

C. Operational Requirements:

1. An Owner's representative must be present for operating valves required to fill mains for pressure and leakage tests. Valves may only be operated by Owner's personnel.
2. Schedule pressure and leakage test at least 2 working days in advance of day that test is to be made with Owner.

PART 2 - PRODUCTS

2.1 GENERAL

- A. Material shall be furnished in accordance with the Contract Documents and the City of Frostproof or Polk County Preferred List for Water and Sanitary Sewer Materials.
- B. To minimize the number of joints, only standard manufacturers length of pipe shall be furnished and installed for all water mains unless otherwise indicated on the Plans, or as approved by the City.
- C. Piping systems shall be suitable for their intended use.

2.2 PIPE AND FITTINGS

A. Polyvinyl Chloride Pipe (PVC):

1. 4 inch through 12 inch: Manufactured to conform to ANSI/AWWA C900.
 - a. Wall Thickness: Wall thickness determined in accordance with ANSI/AWWA C900.
 - b. Pressure Class: 200 psi.
 - c. Dimension Ratio (DR): 18
2. Joints: Push on type, integral bell. Joint material including gaskets and lubricants to conform to ANSI/AWWA C900.

B. Ductile Iron Fittings:

1. Fittings: Ductile iron fittings conforming to ANSI/AWWA C110/A21.10 or ductile iron compact fittings conforming to ANSI/AWWA C153/A21.53. Fittings to be mechanical, conforming with applicable provisions of ANSI/AWWA C111/A21.11.
2. Lining for Wastewater Force Main: Epoxy lining shall be 40 mil minimum thickness (multi pass process) and shall be Protecto 401 Ceramic Epoxy, as manufactured by the Protecto Division of Vulcan Painters, Inc., or Permox-CTF or approved equal. For any lining method, to ensure a holiday-free lining, documentation must be provided, prior to shipment, showing each section of lined pipe has passed holiday testing at the time of production per ASTM G62. The lining shall have a minimum three (3) year warranty covering failure of the lining and bond failure between liner and pipe.

Water Main Coatings: All ductile iron pipe used in water and reclaimed water systems shall have a standard thickness cement lining on the inside in accordance with AWWA C104 and a standard 1-mil asphaltic exterior coating per AWWA C151. All ductile iron or gray iron fittings used in water and reclaimed water systems shall have standard thickness cement linings on the inside per AWWA C104 and an asphaltic exterior coating or they shall have factory-applied fusion bonded epoxy coatings both inside and outside in accordance with AWWA C550.

3. Joints for ductile iron fittings shall be mechanical and restrained.

4. All mechanical joint fittings shall be pressure rated for 350 psi for sizes 4-24 inches and 250 psi for sizes 30 inches and larger. All flanged fittings shall be pressure rated for 250 psi for all sizes. All fittings shall meet the requirements of AWWA C110 or AWWA C153.

C. Polyethylene Pressure Pipe

1. A. Polyethylene pipe 4" diameter and larger shall be high-density bimodal PE4710 polyethylene resin with a minimum cell classification of 445574 per ASTM D3350, Class 200, DR 11, meeting the requirements of AWWA C906. All pipe materials used in potable water systems shall comply with NSF Standard 61. Outside diameters of water, reclaimed water and pressure sewer HDPE pipes shall be ductile-iron pipe sizing system (DIPS).
2. Polyethylene tubing 2 inches in diameter and smaller for potable water and reclaimed water shall be high-density PE4710 polyethylene resin with a minimum cell classification of 445574 per ASTM D3350, Pressure Class 200, Copper Tube Size (CTS), SDR 9, meeting the requirements of AWWA C901 and ASTM D2737. Butt fusion or CTS brass connections shall be used. All pipe materials used in potable water systems shall comply with NSF Standard 61.
3. Alternatively, polyethylene tubing 2 inches in diameter and smaller for potable water and reclaimed water shall be crosslinked high-density polyethylene (PEXa) 3306 pipe, Pressure Class 200, Copper Tube Size (CTS), SDR 9, meeting the requirements of AWWA C904. Butt fusion or CTS brass connections shall be used. All pipe materials used in potable water systems shall comply with NSF Standard 61.
4. All HDPE MJ Adapters (DIPS) shall be a DIPS Bell MJ Adaptor with a retaining gland, stainless steel reinforcing collar, gland ring, standard MJ gasket, and extra-long Tee-head bolts. The gland ring shall be ductile iron, C110, heavy body gland ring. Twist-off nuts, sized same as tee-head bolts, and shall be used to insure proper actuating of restraining devices

D. Joint Restraints:

1. Ductile iron retainer glands for use with mechanical type joints shall be furnished with hardened setscrews and the completed restrained joint assembly shall have a rated minimum working pressure of 200 psi.
2. Rod for tie rod assemblies shall be 304 stainless steel rods and be threaded for at least 8 inches on both ends. Stainless steel rod shall be 3/4-inch diameter unless otherwise noted. Nuts, washers and appurtenances shall also be 304 stainless steel.

E. Joints:

Where PE pipe is joined to PE pipe, it shall be by thermal butt fusion. Thermal fusion shall be accomplished in accordance with the written instructions of the pipe manufacturer and fusion equipment supplier. The installer of the thermal butt fused PE pipe shall have received training in heat fusion pipe joining methods and shall have had experience in performing this type of work.

Where thermal butt fusion cannot be used, or when specifically called for on the Contract Drawings, electro-fused couplings may be used. Fusion shall be in accordance with the written instructions of the fitting manufacturer. However, Contractor must get prior approval from the City and Engineer before implementing a fusion coupling.

Flanged adapter, mechanical adapter and molded fittings for 4-inch and larger pipe shall be Pressure Class 200, PE4710, Ductile Iron Pipe Size (DIPS), DR 11, conforming to AWWA C906 with min. cell classification of 445474 per ASTM D3350. Mechanical joints and fittings for 2-inch and smaller tubing shall meet the requirements of: AWWA C901, ASTM D3350 and ASTM D3140.

F. Small Piping: Small piping is piping 2-1/2 inches and smaller and includes sensing lines.

1. Polyvinyl Chloride (PVC) Plastic, Schedule 40 ASTM D1785.
 - a. Joints: Solvent cemented ASTM D2564.
 - b. Nipples: Same as pipe.
 - c. Fittings: Polyvinyl chloride (PVC) plastic, Schedule 40 ASTM D2466.

2.3 VALVES

A. Sewage Combination Air Valves: Consisting of an air release valve and an air and vacuum valve factory piped into a compact assembly. The combination assembly shall automatically release air, gas or vapor under system operating pressure and shall also allow air to re-enter the system during draining or when vacuum occurs. Combination valve designs shall feature long bodies and float stem components so that the operating mechanisms are kept free from contact with sewage during operation. Valve construction as follows:

1. Please refer to specification section 33 12 00 and construction details

B. Gate Valve: Designed for working force pressure of 200 psi for valves 12-inch in diameter and smaller. Valve construction requirements as follows:

1. Please refer to specification section 33 12 00 and Construction Details

C. Valve Boxes: Cast iron extension roadway type, three-piece construction, and of screw adjustment design.

1. Please refer to specification section 33 12 00 and Construction Details.

2.4 TRACER WIRE

A. Locating Wire for Bored Mains:

1. Conductor: Magnetically detectable tracer wire shall be a #10 AWG (0.1019" diameter) fully annealed, high carbon 1055 grade steel, high strength solid copper clad steel conductor (HS-CCS).
2. Covering: Tracer wire shall be insulated with a 45 mil, high-density, high molecular weight polyethylene (HDPE) insulation, and rated for direct burial use at 30 volts.
3. Color: Color shall be blue for water, green for sewage force mains, and purple for reuse mains.
4. Testing: The contractor will be responsible to provide a tracer wire that test positive and negative for continuity for the entire length. The contractor shall perform a 12-volt DC electrical continuity test on each of the wires. Test each wire with both positive and negative charge. No more than one volt of loss per 1,000 feet of wire will be acceptable. The locator wire system shall pass the 12-volt DC electrical continuity test for at least one wire prior to final acceptance of the pipeline. Any cuts or breaks in the wire shall be repaired by the Contractor at his expense. Sections of wire shall be spliced together using Pro-Trace TW Connectors. Twisting the wires together is not acceptable.
5. Manufacturers:
 - a. Copperhead Industries, SoloShot, EHS-CCS PE45,
 - b. or approved equal.

B. Locating Wire for Open Cut Mains:

1. Conductor: Magnetically detectable tracer wire shall be a #10 AWG (0.1019" diameter) fully annealed, low carbon 1010 grade steel, solid copper-clad steel (CCS) conductor.
2. Covering: Tracer wire shall be insulated with a 30 mil, high-density, high molecular weight polyethylene (HDPE) insulation, and rated for direct burial use at 30 volts.
3. Color:
 - a. Color shall be blue for water, green for sewage force mains and gravity sewer, and purple for reuse mains.
4. Manufacturers:
 - a. Copperhead Industries, 10 Gauge UF Solid,
 - b. or approved equal.
5. Installation:

- a. Tracer wire shall be installed directly on top and bottom of all nonmetallic pipe.

2.5 MARKING TAPE

- A. Description:
 1. Underground Detectable Marking Tape shall be aluminum foil to mark the location of water mains, sewage force mains, reuse mains, and gravity sewers.
 2. Tape shall have a minimum 5 mil overall thickness with 0.35 mil solid aluminum foil core.
 3. Construction shall be 0.8 mil clear fiber, reverse print laminated to aluminum foil to 3.75 mil clear fiber, making a film permanently printed.
 4. Tape shall meet the thickness requirements of ASTM D2103, 5.0 mil, and tensile strength meeting requirements of ASTM D882, 15,000 psi.
 5. Color shall be blue for water, green for sewage force mains and gravity sewer, and purple for reuse mains, with "Potable Water", "Sewer Force Main", "Sewer", or "Reclaimed Water" written on the tape accordingly.
- B. Installation
 1. Contractor shall install marking tape 12inches to 18inches above the top of the pipe.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Carefully examine material for defects, and do not install material known to be defective.
- B. Replace material found defective in manufacture or damaged in transit or handling at no additional expense.
- C. Remove defective material from jobsite.

3.2 PREPARATION

- A. Perform earthwork for piping installation per City of Frostproof and Polk County Standards.
- B. Clean and removed foreign matter from pipe, fittings and valves before placing in trench and keep clean until acceptance of completed work. Remove pipe and fittings if interior has been contaminated with oil, gasoline, kerosene or other material damaging to bituminous seal coat or cement-mortar lining and replace at no cost to Owner. Should foreign material or contaminates be observed in

previously installed pipe, cease work until foreign material or contaminated pipe is decontaminated or removed.

- C. Prior to installation, inspect valves for direction of opening, freedom of operation, tightness of pressure containing bolting, cleanliness of valve ports and especially seating surfaces, handling damage and cracks. Correct defective valves or hold for inspection by Engineer.
- D. Use proper and suitable tools and appliances for proper and safe handling, lowering into trench and laying of pipes.
- E. Close open ends of pipe with a plug when pipe laying is not in progress.

3.3 GUIDELINES FOR CONTRACTORS AND SUBCONTRACTORS PERFORMING WORK FOR THE CITY OF FROSTPROOF

- A. Contractors and Subcontractors performing work for the City of Frostproof will conform to the following requirements. To the extent necessary, agreements and related statements of work will be amended to enforce the requirements.
- B. The use if cut-off and ring saws is prohibited in any trench, excavation, pit, vault or other below grade space.
- C. The use of diamond tipped blades is prohibited in any cut-off saw application. Only abrasive blades will be used with cut-off saws.
- D. The use of cut-off saws is only authorized for cutting pipe above ground and should be limited to applications where alternative cutting methods are unsafe or not feasible. This determination is the responsibility of the Contractor/Subcontractor. All manufacturer's recommendations, warnings and safeguards must be followed.
- E. Cut-off and Ring saws may be used for pavement cutting if the saw is properly mounted in a cart approved by the manufacturer and designed specifically for the saw model in use. Cut off saws used for pavement cutting must be equipped with abrasive blades. If operational conditions are such that a cart cannot be used, the cart requirement is waived for that portion of the work only. All manufacturer's recommendations, warnings and safeguards must be followed.
- F. It remains the Contractor/Subcontractor's responsibility to train their employees on the proper use and application of all equipment, to follow manufacturer

recommendations and to comply with all applicable Federal, State and local health and safety regulations.

3.4 INSTALLATION

A. Alignment and Grade

1. Lay and maintain pipe at required lines and grades as indicated on Drawings. Place fittings and valves at required locations with joints centered, spigots forced home, and valve stems plumb. Do not deviate from required line and grade, except with approval of Engineer.
2. Where underground conditions indicate a change of alignment or grade, make change only with written consent of Engineer. When a change in grade is indicated resulting in pipe having more cover than originally anticipated, carefully review class of pipe scheduled for installation at location to ensure it can withstand new loadings. If it cannot, replace with proper class of pipe, as directed by Engineer.
3. Except at points indicated on Drawings, exercise particular care that no high points are established where air can accumulate. In event field conditions necessitate a change in pipe profile and, in opinion of Engineer, resulting change requires installation of an air valve and manhole, install as additional and extra work in accordance with the contract documents. If Contractor requests a change in pipe profile to facilitate construction, and resulting change requires installation of an air valve and manhole at high points due to requested change, cost of furnishing and installing air valve and manhole is at Contractor's expense.

B. Laying of Pipe

1. General Requirements:

- a. Do not lay pipe in a wet trench or when trench conditions are unsuitable for pipe laying work. If efforts fail to obtain a stable dry trench bottom and Engineer determines trench bottom is unsuitable for trench foundation, he will order in writing type of stabilization to be constructed.
- b. Lay pipe with bell ends facing in direction of laying, unless otherwise indicated on Drawings, or directed by Engineer.

- c. Exercise care to ensure each length abuts next effecting no shoulder or unevenness occurs in pipeline.
- d. No wedging or blocking permitted in laying pipe unless written order of Engineer.
- e. Before joints are made, bed each section of pipe full length of barrel with recesses excavated so pipe invert forms continuous grade with invert of pipe previously laid. Do not bring succeeding pipe into position until preceding length is embedded and securely in place.
- f. Dig bell holes sufficiently large to permit proper joint making and to ensure pipe is firmly bedded full length of its barrel.
- g. Walking or working on completed pipeline, except as required in tamping and backfilling, not permitted until trench is backfilled one foot deep over top of pipes.
- h. Take up and relay pipe that is out of alignment or grade, or pipe having disturbed joints after laying.
- i. Take up and replace with new, at no additional expense, in-place pipe sections found to be defective.
- j. Take necessary precautions to prevent floating of pipeline by accumulation of force in trench, or collapse of pipeline. Should floating or collapse occur, restore at no additional expense.
- k. Take every precaution to prevent foreign material from entering pipe while it is being placed in line. During laying operations, do not place debris, tools, clothing, or other materials in pipe.
- l. Close openings in pipeline with plugs when pipe laying is stopped at close of day's work or for rest breaks, meal periods or other reasons.
- m. Place enough backfill over center sections of pipe to prevent floating.

- n. Use of chisels or hand saws not permitted. Grind smooth cut ends and rough edges and for push-on connections, cut end should be beveled slightly.
2. Joints: Exercise care when making each joint, and make in accordance with pipe manufacturer's specifications and in accordance with following instructions:
- a. Pipe:
 - 1) Push-On Joints: Join pipe in accordance with ANSI/AWWA C600, Section 3.4.1 or latest revision, and following.
 - a) Assemble push-on joint to provide tight, flexible joints that safely permit movement caused by expansion and contraction due to temperature changes and by ground movement.
 - b) Assure pipe has been kept clean before installing gasket. Flex circular rubber gasket inward and insert in gasket recess of bell socket. Apply a thin film of gasket lubricant to either inside surface of gasket or spigot end of pipe or both. Gasket lubricant to be supplied by pipe manufacturer and approved by Engineer prior to it's use.
 - 2) Mechanical Joint: Join in accordance with ANSI/AWWA C600, Section 3.4.2., latest revision, and following:
 - a) Centrally locate spigot in bell. Thoroughly brush contact surfaces of rubber gasket seal with a wire brush just prior to assembly. Remove foreign material and brush with soapy force prior to slipping gasket over spigot end and into bell. Normal range of bolt torques applied to standard cast iron bolts in joint are as follows:

Size Inches	Range of Torque Ft. – Lb.
5/8	40-60

3/4	60-90
1	70-100
1-1/4	90-120

- b) Above torque loads may be applied with torque measuring or indicating wrenches. Torque wrenches may be used to check application of approximate torque loads applied by men trained to give an average pull on a definite length of regular socket wrench.
 - c) When tightening bolts, it is essential that gland be brought up toward pipe flange evenly, maintaining equivalent distance between gland and face of flange at all points around socket. This may be done by partially tightening bottom bolt first, then top bolt, next bolts at either side, and last, remaining bolts. Repeat this cycle until bolts are within above range of torques. If effective sealing is not attained at maximum torque indicated above, disassemble and reassemble joint after thorough cleaning. Avoid overstressing of bolts to compensate for poor installation practice.
- 3) Retainer Glands: Install retainer glands as with mechanical joints, except after joint bolts are tightened, tighten restraining screws in retainer gland manufacturer.
 - 4) Restrained Joints: Install in accordance with manufacturer's recommendations.

C. Valve Installation

1. Installation: Set and join to pipe in manner specified previously. Provide valves with crushed stone support so that pipe does not support weight of valve. Set truly vertical.

2. Valve Protection: Provide valves with a valve box. Set top of valve box neatly to grade of surface of existing ground, unless directed otherwise by Engineer. Do not transfer shock or stress to valve, and center and plumb box over wrench nut of valve. Do not use valves to bring misaligned pipe into alignment during installation. Support pipe in manner to prevent stress on valve.

3.5 CONSTRUCTION

A. Connections to Existing Force Mains and Interruptions of Service

1. Notification: Notify Owner a minimum of 2 working days in advance of anticipated time for installing a connection to force system, or when necessary to close down a portion of existing systems to carry out work. Under no circumstances are valves to be manipulated on existing force system, except under direct supervision of a representative of Owner.
2. Owner's Restrictions: Owner reserves the right to designate day and time when existing force main may be removed from service. Owner may require that this work be done at night or on a weekend. In addition, Owner further reserves right to require that work installation of connections between existing and new force mains, or in other areas where service to customers will be interrupted, be carried out continuously and expeditiously until force is restored.
3. Notification of Customers: Give adequate and timely notice to affected customers that construction will require interruption of service.
4. Construction: In cases where connections to existing force system or other work require an interruption of force service, carefully plan work ahead in close coordination with Engineer and Owner. Obtain Engineer's approval of installation schedule and procedure before work is started, and procure necessary materials, tools and equipment before work is started. Make provision in prices bid for connections, and laying pipe adjacent to existing fittings, for adequate personnel to be available for continuous operations and payment of premium time. No additional or extra payment made for extra personnel and overtime for installation of connections, cutting and capping of existing force mains, or passing of existing fittings, whether or not Owner directs that work be continuous, without interruption, and that this work be at night or on a Sunday.

B. Separation of Force Mains with Water Mains and Storm Sewers

1. See FAC 62-555 for separation requirements.
 2. Proposed Crossings: Whenever force mains must cross proposed water mains, the force main should be installed prior to and below the proposed water main with minimum separation of 18-inches.
 3. Where force mains cross below existing building drains, storm drains or water mains, provide additional protection by all of the following:
 - a. A vertical separation of at least 18 inches between the bottom of the water main or storm drain and the top of the force main.
 - b. Adequate structural support for the existing pipes to prevent excessive deflection of the joints and the settling on and breaking of the water line.
 - c. Center a full length of the force main at the point of the crossing so that the pipe joints are equidistant and as far as possible from the water main.
 4. Exceptions: Where it is impossible to obtain the proper horizontal and vertical separation as stipulated above, deviations to these requirements may be made in accordance with DEP requirements and with Engineer's approval, and where deviations are indicated on the Drawings.
- C. Hydrostatic Testing: Conduct pressure and leakage tests specified ensuring each pipeline installed in Project is tested to Engineer's satisfaction.
1. Provide test pump, pipe connection to piping system, and all necessary tools, materials and equipment, and certified gauge, required for the pipe system.
 2. Hydrostatic testing equipment and testing procedures are subject to Engineer's approval. Conduct hydrostatic pressure and leakage tests in presence of, and to satisfaction of Engineer.
 3. Preparation:
 - a. For underground pipe, either completely backfill trench or partially backfill trench over center section of each pipe length prior to carrying out pressure test. Engineer reserves right, however, to

direct that entire trench be backfilled, if traffic or other local conditions require such action.

- b. Section of force main being tested must be filled with force a minimum of 24 hours before main is tested.
- c. Extreme care must be exercised to ensure that all air is expelled from pipeline during filling of pipe with force.
- d. After completion of tests, remove corporation stops and tightly plug taps, unless Owner elects to leave corporation stops in place.
- e. Installation of corporation stops for release of air or force from main will be at Contractor's expense, unless they are retained by Owner for other use.

4. Pressure Test:

- a. After pipeline has been filled with force for 24 hours, conduct a pressure test of 150 psi at least two (2) hours duration.
- b. Apply the specified test pressure by means of pump connected to the pipe in a manner satisfactory to the Engineer.
- c. Carefully examine all exposed pipes, joints, fittings, and valves during test and tighten all joints showing visible leakage. Remove all defective pipe, fittings, and valves from line and replace at no additional expense.
- d. Where trench has been completely backfilled, whether at Contractors option or as required by Engineer, and pressure gauge fails to hold required specified pressure, open the trench at no additional expense to repair any leaks.

5. Leakage Test:

- a. Conduct concurrently with pressure test.
- b. Provide suitable means to measure leakage during pressure test. Keep a record of force added to pipeline to maintain pressure of 150 psi for a period of at least 2 hours.

- c. Define leakage as quantity of force that must be supplied into newly laid pipe, or any valved section of it. To maintain pressure within 5 psi of specified test pressure after air in pipeline has been expelled and pipe filled with force.
 - d. No leakage is allowed for inside piping. No section of outside pipeline being tested will be accepted if leakage is greater than that determined by the formula $L = SD (P)^{1/2} / 148,000$ in which L is the allowable leakage, in gallons per hour; S is the length of the pipe tested in feet; D is the nominal diameter of the pipe, in inches; and P is the average test pressure during the leakage test, in pounds per square inch gauge.
 - e. No leakage is allowed for inside piping. No section of outside pipeline being tested will be accepted if leakage is greater than that determined by the formula $L = 0.25 [SD (P)^{1/2}] / 148,000$ in which L is the allowable leakage, in gallons per hour; S is the length of the pipe tested in feet; D is the nominal diameter of the pipe, in inches; and P is the average test pressure during the leakage test, in pounds per square inch gauge.
 - f. Should any test of a section of pipeline disclose leakage greater than that permitted, locate and repair the defective joints and/or pipe at no additional expense. Repair all visible leaks regardless of amount of leakage.
6. Repair and Retest: If a force main or section of force main fails to meet specified test requirements, and needs repaired, retest to demonstrate it meets specified test requirements.
7. Include costs for above stated tests in unit or lump sum price or prices bid for Work. No separate payment will be made for pressure or leakage testing.

END OF SECTION

SECTION 33 35 00
HORIZONTAL DIRECTIONAL DRILLING (HDD)

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes: Requirements for Horizontal Direction Drill (HDD) installation of water and sewer force main pipe.
- B. Horizontal Direction Drill (HDD) installation of water and sewer pipe shall include, but not necessarily limited to, furnishing and installing water and sewer pipe, fittings, and appurtenances of the size and type shown on the Plans and in accordance with the Contract Documents.
- C. Related Sections:
 - 1. General Construction: Section 01 10 00
 - 2. Valve and Appurtenances: Section 33 12 00
 - 3. Utility Piping: Section 33 34 16

1.2 REFERENCES

- A. American Water Works Association (AWWA) Standards:
 - 1. AWWA C906 Polyethylene (PE) Pressure Pipe and Fittings, 4 inch through 63 inch, for Water Distribution American Society for Testing and Materials (ASTM) Standards.
- B. ASTM Standards:
 - 1. ASTM D638 Standard Test Method for Tensile Properties of Plastics.
 - 2. ASTM D2122 Standard Method of Determining Dimensions of Thermoplastics Pipe and Fittings.
 - 3. ASTM D2683 Standard Specification for Socket-Type Polyethylene Fittings for Outside Diameter-Controlled Polyethylene Pipe and Tubing.
 - 4. ASTM D2837 Standard Test Method for Obtaining Hydrostatic Design Basis for Thermoplastic Pipe Materials.

5. ASTM D3035 Standard Specification for Polyethylene (PE) Plastic Pipe (SDR-PR) Based on Controlled Outside Diameter.
6. ASTM E3261 Standard Specification for Butt Heat Fusion Polyethylene Plastic Fittings for Polyethylene (PE) Pipe and Tubing.
7. ASTM D3350 Standard Specification for Polyethylene Plastic Pipe and Fittings Materials.
8. ASTM F412 Standard Terminology Relating to Plastic Piping Systems. ASTM F714 Standard Specification for Polyethylene (PE) Plastic Pipe (SDR-PR) Based on Outside Diameter.
9. ASTM F1962 Use of Maxi-Horizontal Directional Drilling for Placement of Polyethylene Pipe or Conduit Under Obstacles, Including River Crossings.
10. ASTM F2620 Standard Practice for Heat Fusion Joining of Polyethylene Pipe and Fittings.

C. City of Frostproof Standards latest editions, except as modified herein.

1. City of Frostproof Directional Bore Standards

1.3 QUALIFICATIONS

- A. The work specified in this Section requires significant previous experience and expertise in similar work to avoid negative impacts to public safety and the environment. Therefore, the Contractor performing the work shall be qualified, in the City's judgement, to complete the horizontal directional drilling work specified herein. In order to qualify to perform work specified in this Section the Contractor must provide evidence satisfactory to the City, including the following:
 - B. Contractor to have self-performed work comparable in nature to the scope of work required by this project for a minimum of two years.
 - C. Contractor to have successfully self-performed at least (5) horizontal directional drilling projects to install product pipe of a similar nominal diameter and length to the proposed project within the past two years. The City shall have sole authority to determine the adequacy of representative projects.
 - D. In order to qualify to perform work specified in this Section the Contractor must provide evidence satisfactory to the City of the following personnel qualifications:

1. The Contractor's project manager, superintendent, drill operator, and guidance system operator assigned to horizontal directional drilling shall be experienced in work of this nature and shall have successfully completed similar projects using horizontal directional drilling. The Contractor shall submit substantiating evidence of qualifications, in accordance with the provisions of this Section, with the bid submittal documents. Failure to submit the required documentation will cause the Contractor to be declared nonresponsive. If the Contractor elects to employ a specialist subcontractor(s) to perform horizontal directional drilling, the Contractor shall obtain and submit qualification documents for the subcontractor(s). Subcontractor(s) shall be held to the same requirements as those for the Contractor described herein.
2. All drilling, drill guidance, and pipe joining equipment operators shall be experienced in comparable horizontal directional drilling work and shall have been fully trained in the use of the proposed equipment by an authorized representative of the equipment manufacturer(s) or their authorized training agents.
3. All HDPE fusion equipment operators shall be qualified to perform pipe joining using the means, methods and equipment employed by the contractor. Fusion equipment operators shall have current, formal training on all fusion equipment employed the project. Training received more than two years prior to operation of the fusion equipment shall not be considered current. The Contractor shall submit written certification of training provided by the fusion equipment manufacturer.

1.4 QUALITY ASSURANCE

- A. The City and/or a City authorized representative will inspect all materials before, during and after installation to ensure compliance with the Contract Documents.
- B. The requirements set forth in this document specify a wide range of procedural precautions necessary to insure that the very basic, essential aspects of a proper directional bore installation are adequately controlled. Strict adherence shall be required under specifically covered conditions outlined in this specification or within any associated permit (i.e.: DEP, DOT, Etc.). Adherence to the specifications contained herein, or the City Representative's approval on any aspect of any directional bore operation covered by this specification, shall in no way relieve the Contractor of their ultimate responsibility for the satisfactory completion of the work authorized under the Contract. The HDD contractor shall be responsible for the repair of all damage to private and/or public property

(at no expense to the City). Repair work shall meet all local and state rules and requirements.

1.5 WARRANTY:

- A. The contractor shall supply to the City a two (2) year unconditional warranty. The warranty shall include materials and installation and shall constitute complete replacement and delivery to the site of materials and installation of same to replace defective materials or defective workmanship with new materials/workmanship conforming to the specifications.
- B. The pipe manufacturer shall provide a warranty to the contractor that the pipe conforms to these specifications and that the pipe shall be free from defects in materials and workmanship for a period of two (2) years from the date of substantial completion of the installation. The manufacturer's warranty to the contractor shall in no way relieve the contractor from its unconditional warranty to the City.
- C. The contractor shall warrant to the City that the methods used on the contract, where covered by patents or license agreements, are furnished in accordance with such agreements and that the prices included herein cover all applicable royalties and fees in accordance with such license agreements. The contractor shall defend, indemnify, and hold the City harmless from and against any and all costs, loss, damage or expense arising out of, or in any way connected with, any claim of infringement of patent, trademark, or violation of license agreement.

1.6 PROJECT SCHEDULE AND COOPERATION:

- A. The project schedule shall be established on the basis of working a normal work schedule including five days per week, single shift, and eight hours per day or four days per week, single shift, ten hours per day. Unless approved otherwise by the City normal or general items of work, such as bacteriological testing, leakage and pressure testing, density testing and final inspections, shall be scheduled during the normal work schedule. Due to operational and manpower limitations on the City systems, the City will require the contractor to perform work outside of the normal work schedule. These operational and manpower limitations, including but not limited to, line filling and flushing operation, tie-in work, (cut-in work or other work) and other phases of the work which may impact the continued (non-interruptible) service to existing City customers. The contractor shall plan and anticipate the cost impact of these systems limitations and provide such work or services at no additional cost to the City.

1.7 SUBMITTALS (HDD PROJECTS ONLY):

- A. Work Plan: Prior to beginning work, the Contractor must submit to the City Representative a work plan detailing the procedure and schedule to be used to execute the project. Horizontal directional drilling shall not commence until the contractor has received written approval of all work plan submittals from the City.
1. Methods: The Contractor shall provide complete descriptions of proposed plans, procedures, and personnel, as well as supporting calculations, for the following:
 - a. Drilling operations, addressing: Procedures for pilot hole drilling and reaming. Procedures for tracking and controlling the drilling head location. Procedures for preparing as-builts.
 - b. Drilling fluid management plan.
 - c. Spoils handling and disposal plan.
 - d. Pipe storage and handling, addressing: means and method for protecting pipe and ensuring temperature control in accordance with Contractor's installation calculations.
 - e. Pipeline assembly and installation, addressing: Procedures for pipe joining, pipeline pullback, and pullback monitoring.
 - f. Prevention of inadvertent fluid losses and spills, and contingencies for rapid containment and cleanup, addressing: Measures to mitigate risk of inadvertent fluid returns to surface. Procedures for monitoring and controlling drilling fluid flows and pressures. Equipment, resources, and procedures for identifying, containing, and cleaning up fluid losses and spills.
 - g. Quality control and testing procedures.
 - h. Safety plan.
 - i. Frac out plan.
 2. Schedule: The Contractor shall provide a schedule for all horizontal directional drilling activities commencing with the site preparation and terminating on completion of testing and final acceptance of the installed pipe. The schedule shall address anticipated subsurface conditions and overall project requirements.

3. Equipment

a. The contractor shall provide the make, model, and technical specifications for each of the following:

- 1) Horizontal directional drill rig.
- 2) Drilling system components.
- 3) Downhole drilling assembly and reaming equipment.
- 4) Downhole pressure sub.
- 5) Guidance and control system.
- 6) Pulling head.
 - a) Swivel.
 - b) Rollers.
- 7) Solids separation and drill fluid recirculation systems.
- 8) Pipe fusion equipment.
- 9) Pipe fusion data logger.
- 10) Pipe handling equipment.
- 11) Pigs and pigging equipment.

b. The Contractor shall provide the following specific equipment information:

- 1) Calibration certification for the pilot bore guidance and control system.
- 2) Calibration certification for the heat fusion datalogger.

4. Supplemental Work Plan Requirements: The Contractor shall provide the following additional work plan submittals within 30 days of receiving notice to proceed. The submission requirements for additional work plan submittals including number of copies and delivery of submittals shall follow the requirements outlined in the general requirements. Horizontal directional drilling shall not commence until the Contractor has received written approval of all supplemental work plan submittals.

- a. The Contractor shall submit traffic control plans for entry and exit pit sites.
- b. Plans for mitigating the potential for inadvertent drilling fluid losses to surface, and for rapidly identifying and cleaning up spills near the investigation borings located along the project alignment.
Investigation boreholes along the alignment have been backfilled as reported in the Geotechnical Report. The Contractor's work plans shall address the risk that all investigation boreholes may contribute to the risk of drill fluid loss.
- c. Contingency plan for rapidly identifying, locating, and containing any drilling fluid returns.
- d. The Contractor shall submit a contingency plan to address procedures to be employed in the event any of the listed items occur.
 - 1) Utility strike, obstruction, or inability to advance drill pipe.
 - 2) Excessive deviation from proposed line and grade, as described within this Section.
 - 3) Inability to move pipe through borehole during pullback.
 - 4) Settlement or heave of roadways and structures within 50 feet of the alignment.

B. Calculations:

- 1. The Contractor shall submit final design calculations for the City's review and approve within 90 days of receiving notice to proceed. Final design calculations shall support the Contractor's specific proposed means, methods, and products. The Contractor's final design calculations shall be prepared and sealed by a Licensed Professional Engineer registered to practice in the State of Florida, and retained by the Contractor.
- 2. Horizontal directional drilling shall not commence until the Contractor has received written approval of all design calculation submittals from the City.
- 3. At a minimum, design calculations shall demonstrate that the proposed pipe, equipment, and means and methods comply with the requirements of this Section and have been designed based on the design bore path, and installation means and methods, for anticipated installation and handling, hydrostatic, earth, and live loads, installation temperature and site

conditions. Design calculations shall address the considerations and guidelines presented in ASTM F1962.

4. The Contractor shall supply copies of all other calculations required to support the required submittals for horizontal directional drilling. At a minimum, the following calculations should be included:
 - a. Maximum allowable pipe loading limits.
 - b. Pullback load calculation based upon proposed drill path plan and profile.
 - c. Buoyancy effect calculations.
 - d. Effects of ballasting plan on pipe pullback forces.
 - e. Hydrofracture analysis. This should include a maximum annular pressure curve and the respective formation pressure versus depth based on the proposed drill plan and profile.
 - f. Confirmation that design parameters do not exceed predicted installation stresses including factors such as tensile load, buckling and deformation.

C. Shop Drawing Submittals:

1. Actual catalog data, brochures and descriptive literature will not be required for items of standard usage which meet the requirements of the City of Frostproof or Polk County Water and Wastewater Standards Manual. Any specialty item not shown in this manual will require a complete shop drawing submittal for any material which may, in the Engineer's opinion, not be in compliance with the City of Frostproof or Polk County Water and Wastewater Standards.

D. Construction Records:

1. Daily Reports:
 - a. The Contractor shall maintain daily activity reports throughout all horizontal directional drilling operations, including pipe installation. A sample daily report shall be submitted to the City for approval prior to the commencement of drilling operations. Daily reports shall be submitted within 24 hours of completion, and shall include, for each drill rod added or withdrawn, or every 30 feet during drilling, pre-reaming, and pullback:

- 1) Downhole tools and equipment in use.
- 2) Description of ground conditions encountered.
- 3) Description of drilling fluid.
- 4) Drilling and pumping rate.
- 5) Maximum and minimum downhole fluid pressures.
- 6) Drilling head location – at least every 10 feet along the bore path.
- 7) Drill stem torque.
- 8) Details and perceived reasons for delays greater than one hour other than normal breaks and shift changes.
- 9) Details of any unusual conditions or events.

2. Production and As-Built Drawings:

- a. The Contractor shall maintain at the construction site a complete set of field drawings for recording the as-built conditions. The Contractor shall plot as-built conditions on the field drawings, including the location in plan and elevation of the drill string, reaming head, and installed pipe, at the completion of each production shift. The Contractor shall compile and submit as-built data in accordance with the City and Polk County Standards. As-builts shall include all bores successful and failed.

3. Testing and Quality Control and Assurance Documentation:

- a. The Contractor shall maintain records for all testing and quality control and assurance procedures. The following records shall be provided to the City or the City's Representative on the day that information is acquired by the Contractor:
 - 1) Manufacturer's Field Reports.
 - 2) Test reports.

- 3) Fusion reports. For each weld, provide an electronic and printed report of the downloaded information for each weld.

E. Notification:

1. The City representative must be notified 48 hours (minimum) in advance of starting the drilling work. The Directional Bore shall not begin until the proper preparations (see work plan) for the operation have been completed.

1.8 DELIVERY, STORAGE, AND HANDLING

- A. Inspect materials delivered to the site for damage. All materials found during inspection or during the process of work to have cracks, flaws, cracked linings, or other defects shall be rejected and removed from the job site without delay.
- B. Unload and store near the place where the work will proceed within minimum handling. Store material (other than HDPE Pipe) under cover out of direct sun light. Do not store directly on the ground. Keep all materials free of dirt and debris.
- C. Contractor is responsible for obtaining approval from the City prior to storing any material onsite. All material stored at the site shall be outside of the FDOT clear zone and shall not create an above ground hazard as defined in FDOT Index 600.
- D. Contractor is responsible for obtaining, transportation and sorting any fluids, including water, to the work site.
- E. Disposal of fluids is the responsibility of the Contractor. Disposal of fluids shall be done in a manner that is in compliance with all permits and applicable federal, state, or local environmental regulations. The bentonite drilling slurry may be recycled for reuse in the hole opening operation, or shall be hauled by the Contractor to an approved location or landfill for proper disposal. Contractor shall thoroughly clean entire area of any fluid residue upon completion of installation, and replace any and all plants and sod damaged, discolored or stained by drilling fluids.

1.9 PROJECT CONDITIONS

- A. Inspection:

1. Items of material furnished under this Section will be inspected prior to installation.
2. The City representative must be notified 48 hours (minimum) in advance of starting the drilling work. The Directional Bore shall not begin until the proper preparations (see work plan) for the operation have been completed.

B. Environmental Requirements:

1. Contractor shall place silt fence between all drilling operations and any drainage, wetland, waterway or other designated for such protection by contract documents, state, federal and local regulations. Contractor shall place approved protection, to limit intrusion upon project area. Additional environmental protection necessary to contain any hydraulic or drilling fluid spills shall be put in place, including berms, liners, turbidity curtains and other measures. Contractor shall adhere to all applicable environmental regulations including environmental condition stated in local, state and federal permits.
2. Fuel may not be stored in bulk containers (greater than 25 gallons) within 200' of any water-body or wetland.

C. Site Preparation:

1. Prior to any alterations to work-site, Contractor shall video tape entire work area. One copy of which shall be given to the City Representative and one copy to remain with Contractor for a period of two (2) years following the completion of the project.
2. The Contractor shall coordinate utilities locates with Sunshine State One-Call of Florida, Inc., (811 or website www.callsunshine.com). Once the locate service has field marked all utilities, the Contractor shall verify each utility (including any service laterals, i.e. water, wastewater, cable, gas, electric, phone, etc.) and those within each paved area. Verification may be performed utilizing Ground Penetration Radar, hand dig, or vacuum excavation. Prior to initiating drilling, the Contractor shall record on the drawings both horizontal and vertical location of the utilities off of a predetermined baseline. The Contractor shall utilize the Ground Penetrating Radar over the projected bore path whether utilities are located in the horizontal drill pathway or not, in order to reduce the opportunity of conflicting with any unforeseen obstructions.

3. Work site shall be graded and filled to provide a level working area. No alterations beyond what is required for operations are to be made. Contractor shall confine all activities to designated work areas.
4. Following drilling operations, Contractor will de-mobilize equipment and restore the work-site to original condition. All excavations will be backfilled and compacted to 95% of original density (at a minimum).

D. Safety:

1. Contractor shall adhere to all applicable state, federal and local safety regulations and all operations shall be conducted in a safe manner.

E. Domestic Water

1. For the supply of domestic water during construction, the contractor shall utilize a City meter assembly (meter & backflow device) and pay for all water consumed except in the case where the new water main is connected directly into the active water system for line filling and flushing operation. Un-metered reclaimed water may be utilized for flushing and testing of new reclaimed water mains. Un-accountable domestic water quantities shall be minimized, where possible.

PART 2 - MATERIALS

2.1 GENERAL

- A. Materials shall be furnished in accordance with the Contract Documents and the City of Frostproof or Polk County Preferred List for Potable Water Materials and Wastewater Materials.
- B. To minimize the number of joints, only standard manufacturers length of pipe shall be furnished and installed for all water mains unless otherwise indicated on the Plans, or as approved by the City.

2.2 PIPE AND FITTINGS

- A. High Density Polyethylene (HDPE, PE) Pipe and Fittings:
 1. Materials used for the manufacturer of polyethylene pipe and fittings shall be PE3608 or PE4710 high density polyethylene meeting cell classification 345464C per ASTM D3350; and meeting Type II, Class B or Class C, Category 5, Grade P34 per ASTM D1248; and shall be listed

in the name of the pipe and fitting Manufacturer in PPI TR-4, Recommended Hydrostatic Strengths and Design Stresses for Thermoplastic Pipe and Fittings Compounds, with a standard grade rating of 1600 psi at 73 degrees F per ASTM D-2837. The Manufacturer shall certify that the materials used to manufacture pipe and fittings meet these requirements.

2. HDPE Pipe shall conform to AWWA C906, DR-11, Ductile Iron Pipe (DIP) size and NSF 61 Standard. Polyethylene pipe shall be manufactured in accordance with ASTM F714, Polyethylene (PE) Plastic Pipe (SDR-PR) Based on Controlled Outside Diameter and shall be so marked. Each production lot of pipe shall be tested for (from material or pipe) melt index, density, % carbon, dimensions and either quick burst or ring tensile strength (equipment permitting).
 3. Nominal pipe sizes only are indicated on the drawings bid form. Outside diameter of pipe is generally 1 to 2-inches greater than the nominal pipe diameter. The HDPE pipe size shall be selected (up-sized) to maintain the internal diameter. Relatively equal to ductile iron sizes.
 4. Service Identification: Permanent identification of piping service shall be provided by co-extruding multiple equally spaced color stripes into the pipe outside surface or by solid colored pipe shall. The striping material shall be the same material as the pipe material except for color. The following colors shall be used to identify piping service (pressure service):
 - a. Blue – potable water
 - b. Green – wastewater of force main
 - c. Purple – reclaimed water
 - d. Black – raw water
- B. Back-up Rings and Flange Bolts: Flange adapters shall be fitted with lap joint flanges pressure rated equal to or greater than the mating pipe. Convolute style backup rings preferred over the flat stock rings. The lap joint flange bore shall be chamfered to provide clearance to the flange adapter radius. Flange bolts and nuts shall be Grade 2 or higher.
- C. Manufacturer's Quality Control: The pipe and fitting manufacturer shall have an established quality control program responsible for inspecting incoming and

outgoing materials. Incoming polyethylene materials shall be inspected for density, melt flow rated, and contamination. The cell classification properties of the material shall be certified by the supplier, and verified by Manufacturer's Quality Control.

- D. Polyethylene Mechanical Joint (MJ) Adapters: Mechanical connections of HDPE pipe to Ductile Iron or PVC piping, mechanical joint fittings, or valves shall be through a self-restraining, fusible mechanical joint adapter with or without an integral, internal stainless steel insert. Mechanical joint adapter shall be of the same DR rating as the pipe. Note that PE flanged adapters may be utilized for pipe sizes 30 inches and larger.

2.3 DRILLING FLUIDS SHALL BE A BENTONITE SLURRY.

PART 3 - EQUIPMENT

3.1 GENERAL

- A. The directional drilling equipment shall consist of a directional drilling rig of sufficient capacity to perform the bore and pullback the pipe, a drilling fluid mixing delivery and recovery system of sufficient capacity to successfully complete the drill, a drilling fluid recycling system to remove solids from the drilling fluid so that the fluid can be re-used, a guidance system to accurately guide boring operation, a vacuum truck of sufficient capacity to handle the drilling fluid volume, trained and competent personnel to operate the system. All equipment shall be in good, safety operating condition with sufficient supplies, materials and spare parts on hand to maintain the system in good working order for the duration of this project.

3.2 DRILLING SYSTEM

- A. Drilling Rig: The directional drilling machine shall consist of a power system to rotate, push and pull hollow drill pipe into the ground at a variable angle while delivering a pressurized fluid mixture to a guidable drill (bore) head. The power system shall be self-contained with sufficient pressure and volume to power drilling operations. Hydraulic system shall be free of leaks. Rig shall have a system to monitor and record maximum pull-back pressure during pull-back operations. The rig shall be grounded during drilling and pull-back operations. There shall be a system to detect electrical current from the drilling string and an audible alarm which automatically sounds when an electrical current is detected.
- B. Drill Head: The drill head shall be steerable and shall provide the necessary cutting surfaces and drilling fluid jets.

- C. Mud Motors (if required): Mud motors shall be of adequate power to turn the required drilling tools.
- D. Drill Pipe: Shall be constructed of high quality 4130 seamless tubing, grade D or better.

3.3 GUIDANCE SYSTEM

- A. Magnetic Guidance System (MGS) wireline, wireless or gyroscopic shall provide real time electronic data to the inspector on request. All daily data and project data shall be displayed on the “As-Built”. If deemed necessary, the City shall at the contractor’s expense request a third party to verify the drill path profile and location of the installed line to the City satisfaction. The guidance system shall be capable of tracking at all depths up to forty feet (40’) below the maximum proposed depth and in any soil condition, including hard rock. It shall enable the driller to guide the drill head by providing immediate information on the tool face, azimuth (horizontal direction), and inclination (vertical direction). The guidance system shall be accurate to +/-2% of the vertical depth of the borehole at sensing position at depths up to one hundred feet and accurate within 1.5 meters horizontally.
- B. The Guidance System shall be of a proven type and shall be operated by personnel trained and experienced with this system. The operator shall be aware of any magnetic anomalies on the surface of the drill path and shall consider such influences in the operation of the guidance system if using a magnetic system.
 - 1. Bore Tracking and Monitoring: At all times during the pilot bore the Contractor shall provide and maintain a bore tracking system that is capable of accurately locating the position of the drill head in the x, y, and z axes. The Contractor shall record these data at least once per drill pipe length.
 - a. Downhole and Surface Grid Tracking System: Contractor shall monitor and record x, y, and z coordinates relative to an established surface survey benchmark. The data shall be continuously monitored and recorded at least once per drill pipe length.
 - b. Deviations between the recorded and design bore path shall be calculated and reported on the daily log. If the deviations exceed plus or minus 5 feet (horizontal or vertical deviation) from the design path, such occurrences shall be reported immediately to

the City. The Contractor shall undertake all necessary measures to correct deviations and return to design line and grade.

- c. Drilling Fluid Pressures and Flow Rates: Drilling fluid pressures including drilling fluid pressure in the borehole annular space and flow rates shall be continuously monitored and recorded by the Contractor. These measurements shall be made during pilot bore drilling, reaming, and pullback.

3.4 DRILLING FLUID (MUD) SYSTEM:

- A. Mixing System: A self-contained, closed, drilling fluid mixing system shall be of sufficient size to mix and deliver drilling fluid. Mixing system shall continually agitate the drilling fluid during operations.
- B. Drilling Fluids: Drilling fluid shall be composed of clean water, appropriate additives and clay. Water shall be from an authorized source with a minimum pH of 6.0. Water of a lower pH or with excessive calcium shall be treated with the appropriate amount of sodium carbonate or equal. The water and additives shall be mixed thoroughly and be absent of any clumps or clods. No potentially hazardous material may be used in drilling fluid.
- C. Delivery System: The delivery system shall have filters in-line to prevent solids from being pumped into the drill pipe. Connections between the pump and drill pipe shall be relatively leak-free. Used drilling fluid and drilling fluid spilled during drilling operations shall be contained and conveyed to the drilling fluid recycling system or disposed of properly. A berm, minimum of 12" high, shall be maintained around drill rigs, drilling fluid mixing system, entry and exit pits and drilling fluid cycling system to prevent spills into the surrounding environment. Pumps and or vacuum truck(s) of sufficient size shall be in place to convey excess drilling fluid from containment areas to storage, recycling, and disposal facilities.
- D. Drilling Fluid Viscosity In the event that inadvertent returns or returns loss of drilling fluid occurs during pilot hole drilling operations., Contractor shall cease drilling, wait at least 30 minutes, inject a quantity of drilling fluid with viscosity exceeding 120 seconds measured by a March funnel and then wait another 30 minutes. If mud fracture or returns loss continues, Contractor shall cease operations and notify the City Representative. The City Representative and Contractor shall discuss additional options and work will then proceed accordingly.
- E. Drilling Fluid Recycling System: The drilling fluid recycling system shall separate sand, dirt and other solids from the drilling fluid to render the drilling

fluid re-usable. Spoils separated from the drilling fluid will be stockpiled for later use or disposal.

- F. Control of Drilling Fluids: The Contractor shall follow all requirements of the Frac-Out and Surface Spill Contingency Plan as submitted and approved and shall control operational pressures, drilling mud weights, drilling speeds, and any other operational factors required to avoid hydrofracture fluid losses to formations, and control drilling fluid spillage. This includes any spillages or returns at entry and exit locations or at any intermediate point. All inadvertent returns or spills shall be promptly contained and cleaned up. The Contractor shall maintain on-site mobile spoil removal equipment during all drilling, pre-reaming, reaming and pullback operations and shall be capable of quickly removing spoils. The Contractor shall immediately notify the City of any inadvertent returns or spills and immediately contain and clean up the return or spill.

3.5 OTHER EQUIPMENT:

- A. Pipe Rollers: Pipe rollers, if utilized, shall be of sufficient size to fully support the weight of the pipe while being hydro-tested and during pull-back operations. Sufficient number of rollers shall be used to prevent excess sagging of pipe.
- B. Pipe Rammers: Hydraulic or pneumatic pipe rammers may only be used if necessary and with the authorization of the City Representative.
- C. Restrictions: Other devices or utility placement systems for providing horizontal thrust other than those defined above in the preceding sections shall not be used unless approved by the City Representative prior to commencement of the work. Consideration for approval will be made on an individual basis for each specified location. The proposed device or system will be evaluated prior to approval or rejection on its potential ability to complete the utility placement satisfactorily without undue stoppage and to maintain line and grade within the tolerances prescribed by the particular conditions of the projects.

3.6 DATA LOGGER:

- A. General:
 - 1. A data logger shall be used to record and document all butt weld fusion processes. A record shall be made of every fusion weld made. The data logger shall be of rugged, handheld computer as the recording device connected to a data collection device. The data collection device shall record the heater temperature and fusion pressure profile over time. All data shall be recorded and transmitted to the handheld computer where

the joint report will be stored, viewed, printed, or transferred to desk top computer for archiving. The operator associated with the fusion process shall utilize the data logger report as one means to confirm a complete and proper weld. This data shall be made immediately available to the City representative, upon request, unless approved otherwise by the City, a written or downloader report for each fusion weld process shall require and submitted to the City representative within ten working days after the fusion weld process for review and approval. If potential defect fusion weld is suspected by the City or the contractor, the work shall stop and a mutually acceptable (between the contractor and the City) corrective action plan shall be executed.

- B. Data Logger equipment shall be McElroy Datalogger Model no. DL6303 DL6304 or the City approved equal.

PART 4 - EXECUTION

4.1 DRILL PATH:

- A. Prior to drilling Contractor shall utilize all verified locate information to determine drill pathway. Marked up drawings (see Site Preparation paragraph) shall be on site at all times during operation.

4.2 GUIDANCE SYSTEM:

- A. Contractor shall provide and maintain instrumentation necessary to accurately locate the pilot hole (both horizontal and vertical displacements), measure pilot string torsional and axial forces and measure drilling fluid discharge rate and pressure. The City Representative shall have access to instrumentation and readings at all times during operation.

4.3 PILOT HOLE:

- A. The pilot hole shall be drilled along the path shown on the plans and profile drawings. Unless approved otherwise by the City, the pilot-hole tolerance shall be as follows:
- B. Elevation: As shown on the plans.
- C. Alignment: 5 feet inside the right-of-way or easement boundary.
- D. Curve Radius: The pilot hole radius shall be no less than 80% of the maximum bending radius as recommended by the pipe manufacturer of the pipe being

installed or the steel piping being used. In no case shall the bending radius be less than 30 pipe diameters, unless approved otherwise by the City.

- E. Entry Point Location: The exact pilot hole entry point shall be within +/- 5 feet of the location shown on the drawing without prior the City written permission for deviation.
- F. Exit Point Location: The exit point location shall be within +/- 5 feet of the location shown on the drawing without prior the City written permission for deviation.
- G. Limitations on Depth: HDPE pipe larger than bore hole path shall be specifically designed by the engineer and approved by the City. Where utilities cross under DOT roads, the depth of cover shall comply with applicable DOT permit.

4.4 PULL BACK:

- A. After successfully reaming bore hole to the required diameter, Contractor will pull the pipe through the bore hole. In front of the pipe will be swivel and appropriate tools per the contractor's approved work plan. Once pull-back operations have commenced, operations must continue without interruption until pipe is completely pulled into bore hole. During pull back operations Contractor will not apply more than the maximum safe pipe pull force at any time. Maximum allowable tensile force imposed on the pull section shall be equal to 80% of the pipe manufacturer's safety pull (or tensile) strength.
 - 1. Torsional stress shall be minimized by using a swivel to connect a pull section to reaming assembly.
 - 2. The pullback section of the pipeline shall be supported during pullback operations so that it moves freely and the pipe is not damaged.
 - 3. External pressure shall be minimized during installation of the pullback section in the reamed hole. Damaged pipe resulting from external pressure shall be replaced at no cost to the City.
 - 4. Buoyancy modification shall be at the discretion of the Contractor and shall be approved by the City Representative. The Contractor shall be responsible for any damage to the pull section resulting from such modifications.
 - 5. In the event that pipe becomes stuck, Contractor will cease pulling operations to allow any potential hydro-lock to subside and will commence pulling operations. If pipe remains stuck, Contractor will

notify the City Representative. The City Representative and Contractor will discuss options and then work will proceed accordingly.

4.5 PIPE ASSEMBLY

- A. Pipe shall be welded/fused together in one length, if space permits. Pipe may be placed on pipe rollers before pulling into bore hole to minimize damage to the pipe. It is critical that all original oxidized pipe surfaces be removed in order for fusion to take place. The scraping process requires that approximately 10” of the outer “skin” be removed in order to penetrate the oxidation and contamination barrier. Oxidized pipe surface simply will not bond.
- B. Acceptability of Damaged Pipe: Cuts or gouges that reduce the wall thickness by more than 10% is not acceptable and must be cut out and discarded.
- C. Butt Fusion Log: Each butt fusion shall be recorded and logged by an electronic monitoring device (McElroy Datalogger or the City approved equal is required) affixed to the fusion machine. Joint data shall be submitted as part of the As-Recorded information, in accordance with this specification.
- D. Butt Fusion Testing: When requested by a City Representative, butt fusion testing will be performed. The test fusion shall be allowed to cool completely, and then fusion test coupons shall be cut out. The test shall involve McElroy’ “In Field Tensile Tester” which utilizes test coupons (conducted in accordance with manufactures recommendations) or City pre-approved test methods.
- E. Mechanical Joining: Polyethylene pipe and fittings may be joined together or to the materials by means of flanged connections (flange adapters, eletrofused couplings, and back-up rings) or mechanical couplings designed for joining polyethylene pipe or for joining polyethylene pipe to another material. Mechanical couplings shall be fully pressure rated and fully thrust restrained such that when installed in accordance with manufacturer’s recommendations, a longitudinal load applied to the mechanical coupling will cause the pipe to yield before the mechanical coupling disjoins. External joint restraints shall not be used in lieu of fully restrained mechanical couplings.
- F. ARV: Provide air release valve for all water and force main installations (on HDPE pipe only) utilizing Robar Stainless Steel 6626 threaded Outlet Sleeve; or JCM 438 all stainless steel threaded outlet tapping sleeve.

4.6 SWABBING

- A. The purpose of swabbing a new pipeline is to conserve water while thoroughly cleaning the pipeline of all foreign material, sand, gravel, construction debris

and other items not found in a properly cleaned system. Prior to pressure testing of a new pipeline swabbing shall be utilized as directed by the City Representative.

- B. All New water, wastewater force, and reclaimed mains greater than 12" (with exceptions to smaller pipe lines as deemed necessary by the City) shall be hydraulically cleaned with a polypropylene swabbing device to remove dirt, sand and debris from main.
- C. If swabbing access and egress points are not provided in the design drawings, it will be the responsibility of the CONTRACTOR to provide temporary access and egress points for the cleaning, as required.
- D. Passage of cleaning poly swabs through the system shall be constantly monitored, controlled and all poly swabs entered into the system shall be individually marked and identified so that the existing of poly swabs from the system can be confirmed.
- E. Cleaning of the system shall be done in conjunction with, and prior to, the initial filling of the system for its hydrostatic test.
- F. The CONTRACTOR shall insert flexible polyurethane foam swabs (two pounds per cubic foot density) complete with rear polyurethane drive seal, into the first section of pipe. The swabs shall remain there until the pipeline construction is completed. A City representative shall be present for the swabbing process including swab insertion and retrieval.
- G. The line to be cleaned shall only be connected to the existing distribution system at a single connection point.
- H. Locate and open all new in-line valves beyond the point of connection on the pipeline to be cleared during the swabbing operation.
- I. At the receiver or exit point for the poly swab, the CONTRACTOR is responsible for creating a safe environment for collection of debris, water and the swab. Considerations shall be made for protecting surrounding personnel and property and safe retrieval of the swab.
- J. Only with the City personnel on-site shall the supply valve from the existing distribution system be operated. Cleaning and flushing shall be accomplished by propelling the swab down the pipeline to the exit point with potable water. Flushing shall continue until the water is completely clear and swab(s) is/are retrieved.

- K. Re-apply a series of individual swabs in varying diameters and/or densities as required, to attain proper cleanliness of pipeline.
- L. Swabbing speed shall range between two and five feet per second.
- M. After the swabbing process, pressure testing and disinfection of the pipe shall be completed in accordance with this section.

4.7 TESTING

A. Disinfection Tests:

1. All water pipe and fittings shall be thoroughly disinfected prior to being placed in service. Disinfection shall follow the applicable provisions of the procedure established for the disinfection of water mains as set forth in AWWA – Standard C651 entitled “AWWA Standard for Disinfecting Water Mains” and shall be in accordance with Chapter III. 1. – Section 350. Bacteriological testing on the water main shall be scheduled and completed by the City. The City will collect the water samples and be responsible for completing the water analysis (lab testing).
2. Temporary blow-offs shall be installed for the purpose of cleaning the water main. Blow-offs installed on water mains up to and including 12 inches shall be the same diameter as the water main. Blow-offs installed on 16 inch water mains and larger shall be the next smaller size, in diameter, than the water main being tested. Temporary blow-offs shall be removed and plugged after the main is cleared. The City Representative shall be present prior to and during the operation of blow-offs. The main shall be flushed prior to disinfection.
3. The new water main shall be connected to the existing water main at one point only for flushing purposes (no looping). The new main MUST have a blow off on the end as required previously. After the new main is thoroughly flushed, the open end shall be sealed and restrained and the main shall be thoroughly disinfected. Anytime the new line is reopened (to repair defective joints or pipe, defective fitting or valve) the complete disinfection process shall be repeated. Once bacteriological clearance has been received from the regulatory authority, the new main may be pressure tested.

B. Pressure and Leakage Tests:

1. Contractor shall test pipelines installed under this Contract in accordance with these specifications prior to acceptance of the pipeline by the City.

All field tests shall be made in the presence of the City Representative. Except as otherwise directed, all pipelines shall be tested. Unless approved otherwise by the City, all fusible or butt weld joints shall be tested, including MJ adapter fittings associated with the new construction. All piping to operate under liquid pressure shall be tested in sections of approved length. The pressure testing of an HDPE line section shall be tested separately from the PVC and DIP line sections. Where impractical, the HDPE test section shall include only a minimum amount of PVC and ductile iron pipe within the test section. If at all possible, the PVC and D.I.P. test sections shall be left exposed during the pressure test for visual leakage observation. If the Contractor chooses to pressure test against an existing the City water main/valve, the new water main must be disinfected prior to connection to the City line. The City will not be responsible for failure of the pressure test due to the existing valve leaking. All valved sections shall be hydrostatic tested to insure sealing (leak allowance) of all line valves.

2. All HDD over 100 LF shall be water pressure tested (above ground) prior to insertion. There shall be no pressure loss allowed.
3. Unless it has already been done, the section to pipe to be tested shall be filled with potable water and air shall be expelled from the pipe. Reclaimed water may be utilized for filling new reclaimed water or wastewater force main installations. If blow offs or other outlets are not available at high points for releasing air, the Contractor shall provide 1 inch minimum taps and blow-off valves and plugging them, after successful pressure test, shall be included in the unit price bid amount for the HDPE pipe.
4. Provide test pump, pipe connection to piping system, and all necessary tools, materials and equipment, and certified gauge, required for the pipe system.
 - a. Hydrostatic testing shall consist of a 150 psig test pressures, based on the elevation of the highest point of the line or section under tests. Pressure shall be applied by means of a pump connected to the pipe in a manner satisfactory to Water & Wastewater standards of the City of Frostproof. The pump, pipe connection and all necessary apparatus shall be furnished by the Contractor and shall be subject to the approval of the City of Frostproof Representative.

- b. Maximum duration for pressure test, including initial and final phase of the test, shall not exceed eight (8) hours. If the test is not completed due to leakage, equipment failure, etc., depressurized the test section, and then allow it to “relax” for at least eight (8) hours before bringing the test section up to test pressure again.

5. Pressure Testing:

- a. Initial Phase of Pressure Testing:

First, all air must be removed from the test section. The pressure test shall be completed after the line is backfilled. If possible, all flanged or mechanical joint valves and fittings shall be left exposed for visual leak inspection. If possible, all PVC and D.I.P. test sections shall be left exposed for visual leak inspection. Initially, the pressure within the test section should be raised to approximately 160 psi and then allowed to be idle (no additional make-up water/pressure to be injected), for approximately 3 hours. During this 3 hour period, the test section shall be allowed to stabilize and come to an equilibrium stage. No additional make-up water/pressure shall be applied to the test section during this 3 hour stabilization period unless the line pressure drops below 140 psi. In this case, make-up water/pressure shall only be applied to the test section to maintain a minimum of 140 psi (during the 3 hour stabilization period).

- b. Final Phase of Pressure Testing:

The final phase of the pressure test shall involve applying make-up water/pressure to achieve an “initial test pressure” of 150 psi (minimum)/155 psi (maximum). The test section is then allowed to be idle (no make-up water/pressure is added) for a period of 2 hours. After this 2 hour period, make-up water/pressure is applied to re-establish the “initial test pressure”. The quantity of water utilized to re-pump the line shall be measured and compared to the allowable quantities as determined by the table below. If the actual make-up water quantity is equal or less than the allowable amount, the pressure test passes. If the actual make-up water quantities are greater than the allowable amount, the pressure test fails.

Table 1: Allowable Make Up Amount	
Nominal Pipe Size (Inches)	Make-up Water Allowance

	Gallons/Linear feet of Pipe) 2-hour test
6	0.0030
8	0.0050
10	0.0065
12	0.0115
14	0.0140
16	0.0165
18	0.0215
20	0.0275
22	0.0350
24	0.0440
26	0.0500
28	0.0555
30	0.0635
32	0.0715
34	0.0810
36	0.0900
42	0.1155
48	0.1350

- c. In the event a section fails to pass the tests, the Contractor shall do everything necessary to locate, uncover (even to the extent of uncovering the entire section), and replace the defective pipe, valve, fitting or joint. Visible leaks shall be corrected regardless of total leakage. Lines which fail to meet these tests shall be retested as necessary until test requirements are met.

4.8 ENVIRONMENTAL CONTROLS AND RESTORATION

1. The Contractor shall meet the requirements of all specifications for all Work in this project and at all locations utilized by the Contractor during the progress of the Work.
2. Disposal Site: All costs for proper disposal of drilling mud and excess excavated materials shall be include in the lump sum price bid for the Work.
3. All operations involving drilling mud shall be controlled and monitored by the Contractor to ensure containment.
4. The Contractor shall establish bermed or sandbagged pits of sufficient size to accommodate the volume of drilling mud anticipated plus a two-foot freeboard. The bermed areas shall be maintained and designed by the Contractor to ensure containment and prevent loss of drilling mud.
5. Transportation of the disposal materials off site by public roads shall meet all Florida Department of Transportation requirements.

6. The Contractor shall restore any damage resulting from heaving, settlement, separation of pavement, and escaped drilling fluid from the boring operations at no additional costs to the Owner.

END OF SECTION

APPENDIX

PLAN SHEETS

Pictured By: Bidestine, Tyler. Sheet: Set:kha_Layout:C100_COVER_SHEET. August 23, 2024. 09:47:39pm. K:\NAK_Civil\046414319_Extension Fir Ave & 5th St West\CAD\PlanSheets\C100_COVER_SHEET.dwg
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PROJECT LOCATION

CONSTRUCTION PLANS FOR CITY OF FROSTPROOF EXTENSION ON FIR AVE & 5TH ST WEST

AUGUST 2024



**100% PLANS
NOT FOR CONSTRUCTION**



SHEET LIST TABLE	
SHEET NUMBER	SHEET TITLE
C100	COVER SHEET
C101	KEY MAP
C200	GENERAL NOTES
C400	FIR AVENUE PLAN AND PROFILE
C401	FIR AVENUE PLAN AND PROFILE
C402	5TH ST PLAN AND PROFILE
C500	UTILITY DETAILS
C501	UTILITY DETAILS
C502	UTILITY DETAILS
C503	LIFT STATION DETAILS
E101	POWER RISER SITE PLAN & GENERAL NOTES

PROJECT TEAM

OWNER
 CITY OF FROSTPROOF
 NICOLE MCDOWELL, CITY MANAGER
 P.O. BOX 308
 FROSTPROOF, FL 33843
 TEL: (863)-635-7854
 NMCADOWELL@CITYOFFROSTPROOF.COM

SURVEYOR & SUE
 CIVILSURV DESIGN GROUP, INC.
 CRAIG FULLER, P.E.
 2525 DRANE FIELD ROAD, SUITE 7
 LAKELAND, FL 33811
 TEL: (863)-646-4771
 CFULLER@CIVILSURV.COM

GEOTECHNICAL ENGINEER:
 ECS FLORIDA, LLC.
 2815 DIRECTORS ROW, SUITE 500
 ORLANDO, FL 32809
 TEL: (407) 859-8378

CIVIL ENGINEER
 KIMLEY-HORN AND ASSOCIATES, INC.
 JAMISON TONDREAU, P.E.
 109 SOUTH KENTUCKY AVENUE
 LAKELAND, FLORIDA 33801
 TEL: (863) 226-6877
 JAMISON.TONDREAU@KIMLEY-HORN.COM

ELECTRICAL ENGINEER
 NEW POWER CONSULTING, INC.
 DON NEWMAN, P.E.
 15520 HIGH BELL PLACE
 BRANDENTON, FL 34212
 TEL: (813)-294-2059
 DON.NEWMAN@NEW-PWR.COM

VICINITY MAP

N.T.S.

SECTION: 32

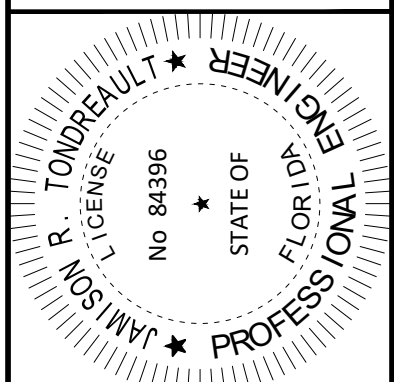
TOWNSHIP: 31S

RANGE: 28E

No.	REVISIONS	DATE	BY

Kimley-Horn

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 PHONE: 863-701-8702
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KHA PROJECT 046414319	DATE AUG 2024	SCALE AS SHOWN	DESIGNED BY CAG
		DRAWN BY CAG	CHECKED BY JRT

COVER SHEET

**EXTENSION ON FIR
 AVE AND 5TH ST WEST
 PREPARED FOR
 CITY OF FROSTPROOF**

FLORIDA
CITY OF FROSTPROOF

SHEET NUMBER
C100

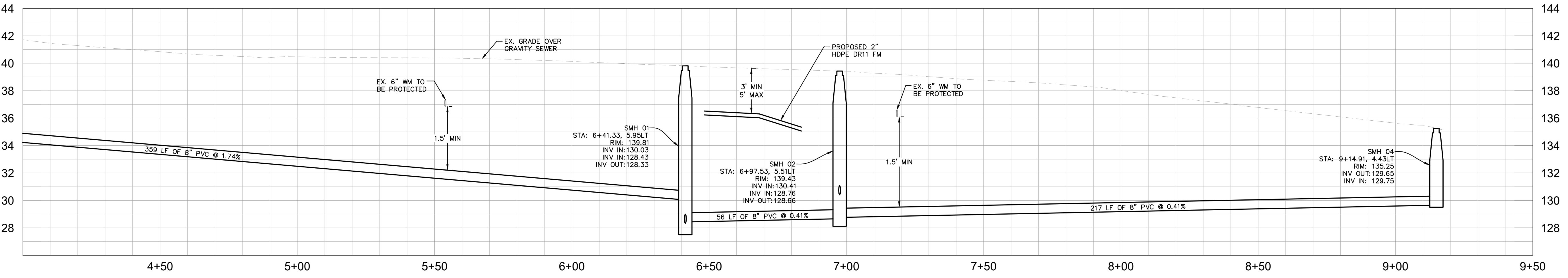
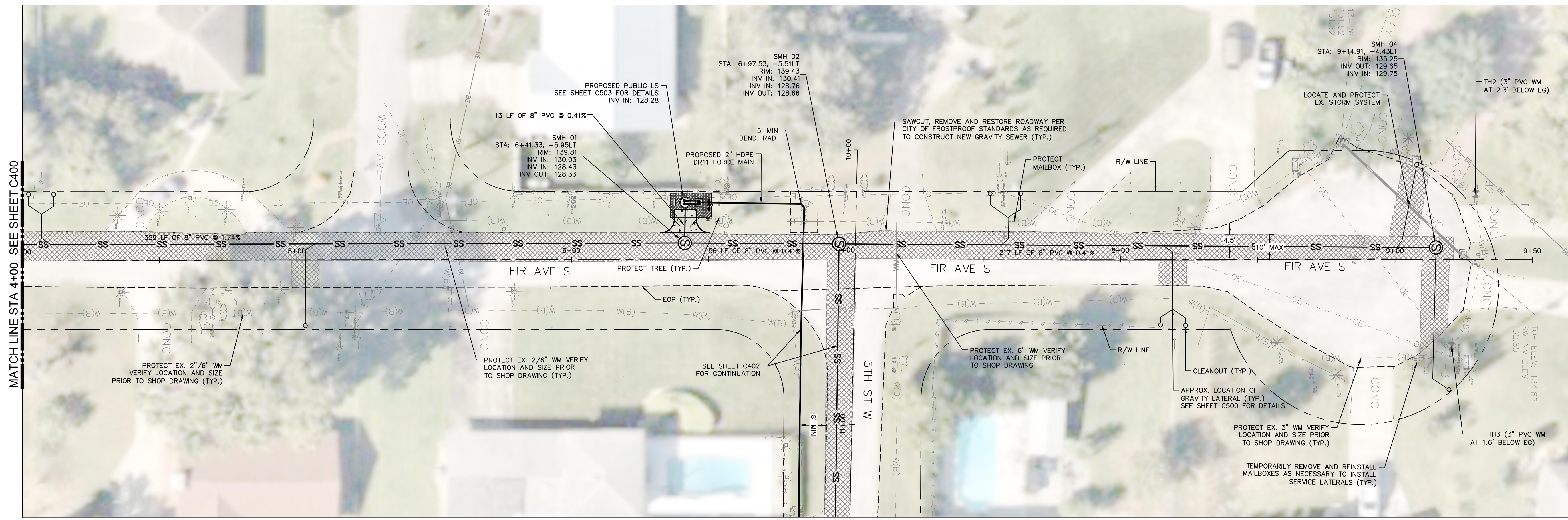
CALL 2 BUSINESS
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 YOU DIG

811
 Know what's below.
 Call before you dig.

SUNSHINE STATE ONE CALL OF FLORIDA, INC.

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Priced By: Bidestine, Tyler. Sheet: Set: Extension of Sewer Lateral on Fir Avenue. Project: Extension of Sewer Lateral on Fir Avenue. Date: 08/20/2024. Scale: As Shown. Drawn By: CAG. Checked By: JRT.



- NOTES:**
1. NEW SEWER LATERALS ARE SHOWN AT APPROXIMATE LOCATIONS. CONTRACTOR TO COORDINATE WITH EACH PROPERTY OWNER AND VERIFY LOCATION OF EXISTING SEPTIC TANK. NEW SEWER LATERALS SHALL BE IN A LOCATION FOR EASE OF FUTURE CONNECTIONS TO THE EXISTING DRAIN LINES. CONTRACTOR TO RECEIVE APPROVAL BY CITY PRIOR TO CONSTRUCTING NEW LATERALS.
 2. CONTRACTOR TO PROVIDE THE CITY AND ENGINEER OF RECORD (EOR) WITH A DETAILED CONSTRUCTION PHASING PLAN AND MAINTENANCE OF TRAFFIC PLAN FOR APPROVAL PRIOR TO BEGINNING CONSTRUCTION.
 3. ALL PROPOSED WORK SHALL BE COORDINATED WITH THE CITY AT LEAST TWO WEEKS IN ADVANCED OF PROPOSED CONSTRUCTION.
 4. CONTRACTOR TO USE CAUTION WHEN CONSTRUCTING NEAR EXISTING UTILITIES.
 5. CONTRACTOR TO VERIFY LOCATION AND DEPTH OF EXISTING UTILITIES PRIOR TO CONSTRUCTION AND PROTECT/SUPPORT.
 6. CONTRACTOR TO SUBMIT A FRAC OUT PLAN FOR APPROVAL BY EOR AND CITY.
 7. CONTRACTOR TO VERIFY EXACT LOT LINE LOCATIONS PRIOR TO CONSTRUCTION.
 8. PRIVATE SERVICE LATERALS: CONTRACTOR TO PROVIDE CONNECTION FROM EXISTING HOUSE DRAIN LINE TO THE NEW SERVICE LATERALS SHOWN.
 9. REMOVE AND REPLACE ASPHALT AND CONCRETE IN LIKE KIND AS REQUIRED TO CONSTRUCT NEW UTILITIES. REMOVE TO NEAREST JOINT
 10. ANY ITEMS DISTURBED SHALL BE RESTORED IN LIKE KIND TO GOOD OR BETTER CONDITION. GRASSED AREAS DISTURBED SHALL BE SODDED
 11. ALL SERVICE LOCATIONS SHOWN ON THE CONTRACT DRAWINGS ARE APPROXIMATE AND IT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR TO CONTACT ALL HOMEOWNERS FOR LOCATING THE OWNER'S EX. SERVICE LATERAL AND DETERMINE, SUBJECT TO APPROVAL BY THE CITY, THE BEST LOCATIONS AND DEPTH FOR EACH SERVICE LATERAL.
 12. ALL WORK ON CUSTOMERS SANITARY SEWER SERVICE LINES ON PRIVATE PROPERTY SHALL BE COMPLETED BY A PLUMBER LICENSED IN POLK COUNTY. THE CONTRACTOR SHALL NOT COMMENCE WORK ON PRIVATE PROPERTY UNTIL THE RIGHT-OF-ENTRY APPROVAL IS OBTAINED BY OWNER AND A COPY OF THE RIGHT-OF-ENTRY APPROVAL IS PROVIDED TO THE CONTRACTOR.
 13. ALL RESTORATION ON PRIVATE PROPERTY SHALL BE INCLUDED IN THIS BID ITEM INCLUDING FENCING, LANDSCAPING, IRRIGATION, WATER SERVICE, SHELL/ROCK, SOD, CONCRETE PAVERS, PAVEMENT, ETC. CONTRACTOR SHALL COORDINATE WITH THE HOMEOWNER PRIOR TO CONSTRUCTION OF THE PRIVATE LATERAL AND SHALL BE INCLUDED IN THE BID PRICE.

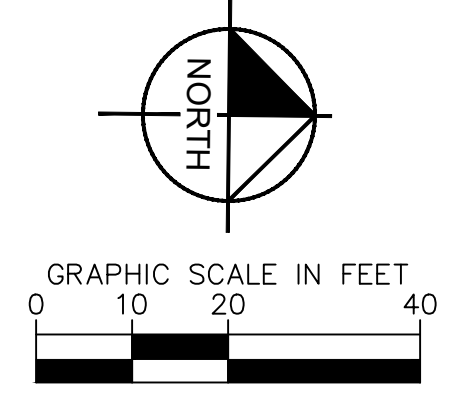
- SEPTIC TANK ABANDONMENT:**
1. ALL SEPTIC TANKS SHALL BE ABANDONED/DECOMMISSIONED IN ACCORDANCE WITH CHAPTER 64E - 6.011 (FLORIDA ADMINISTRATIVE CODE.)
 2. CONTRACTOR IS RESPONSIBLE FOR COORDINATING ANY NECESSARY FORMS AND/OR PERMITS WITH THE POLK COUNTY DEPARTMENT OF HEALTH.
 3. SEPTIC TANKS MUST BE PUMPED OUT BY LICENSED SEPTAGE HAULER.
 4. SEPTIC TANKS MUST BE CRUSHED/COLLAPSED IN A MANNER THAT PREVENTS HOLDING OF WATER. IN THE EVENT SEPTIC TANKS CANNOT BE CRUSHED OR COLLAPSED, THEY ARE TO BE FILLED ACCEPTABLE TO CITY AND HEALTH DEPARTMENT STANDARDS.
 5. REMAINING HOLE MUST BE FILLED WITH FILL MATERIAL ACCEPTABLE TO CITY AND HEALTH DEPARTMENT AND THE SITE GRADED. THE SITE MUST THEN BE STAKED.

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IT'S THE LAW! DIAL 811

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SUNSHINE STATE ONE CALL OF FLORIDA, INC.



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Professional Engineer

JAMISON R. TONDREAU

FLORIDA LICENSE No. 84396

STATE OF FLORIDA

KHA PROJECT 046414319
 DATE AUG 2024
 SCALE AS SHOWN
 DESIGNED BY CAG
 DRAWN BY CAG
 CHECKED BY JRT

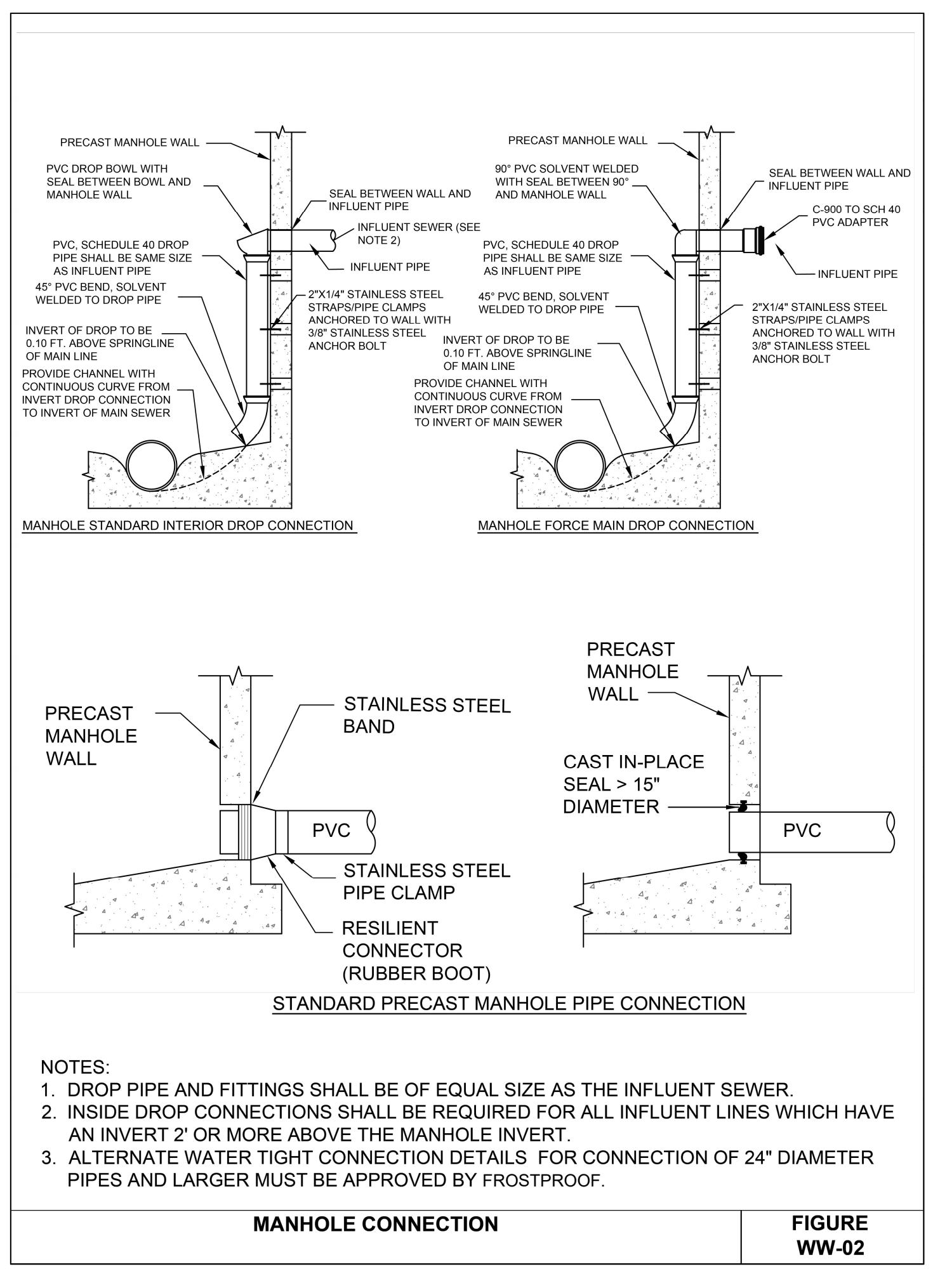
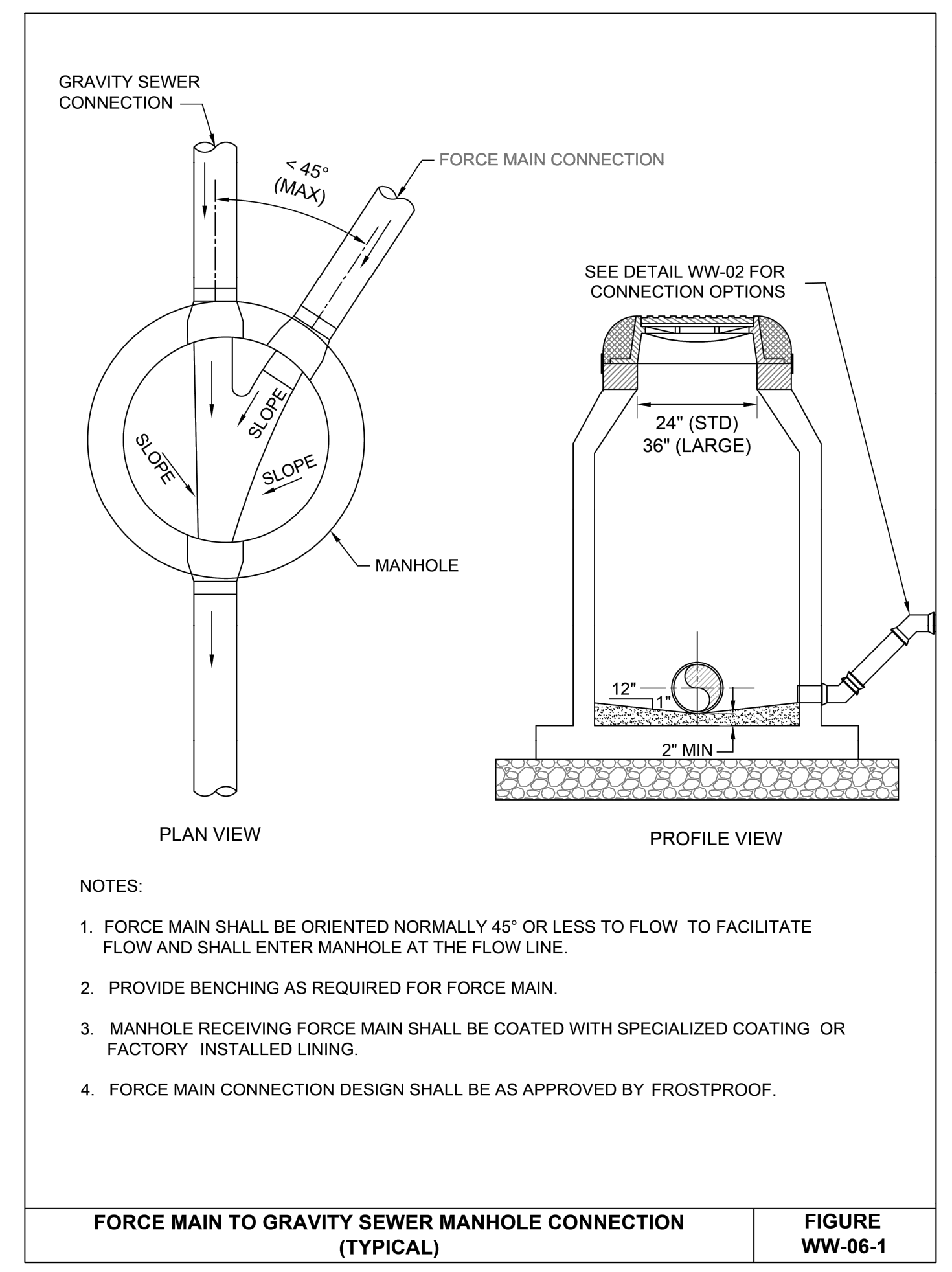
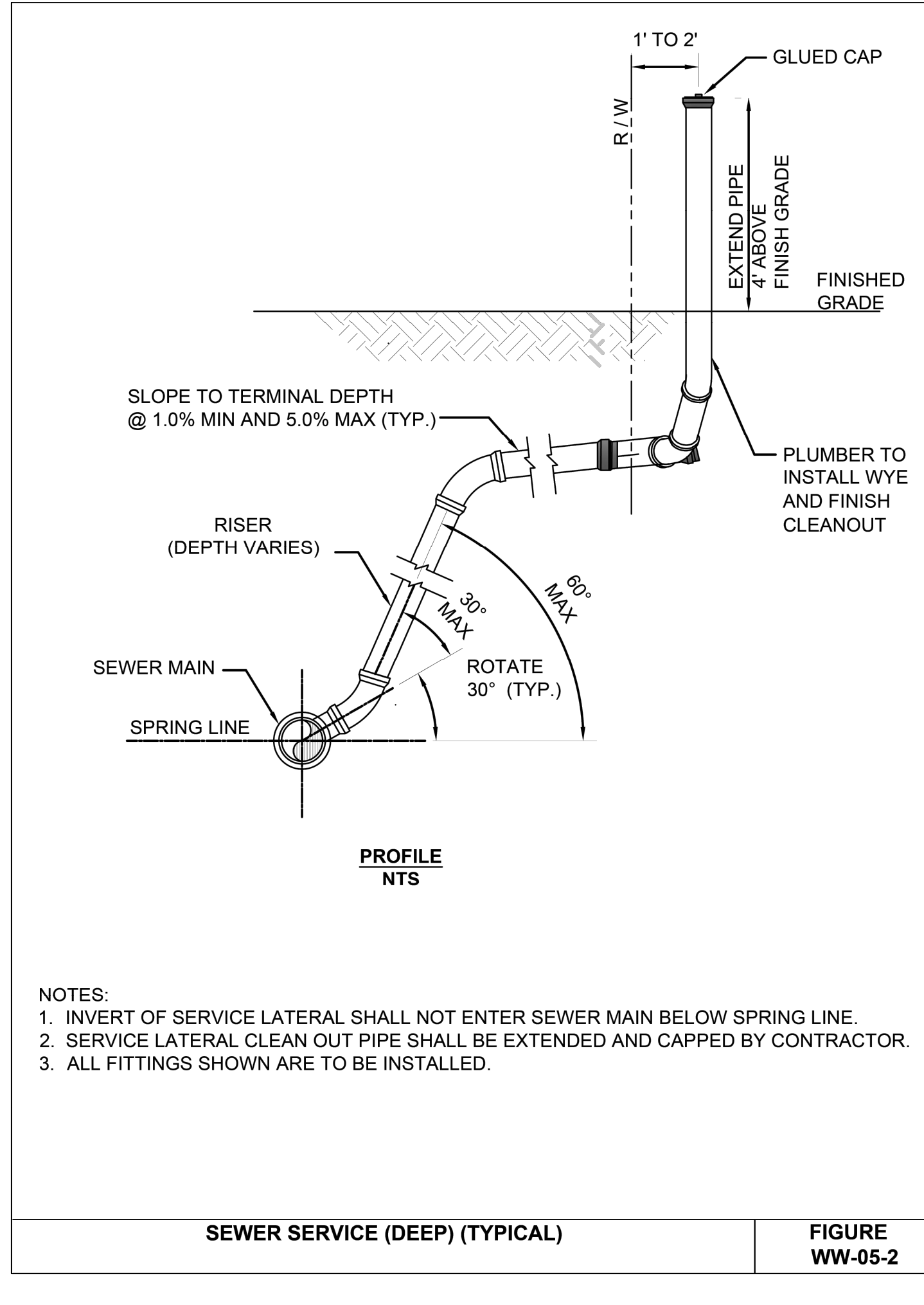
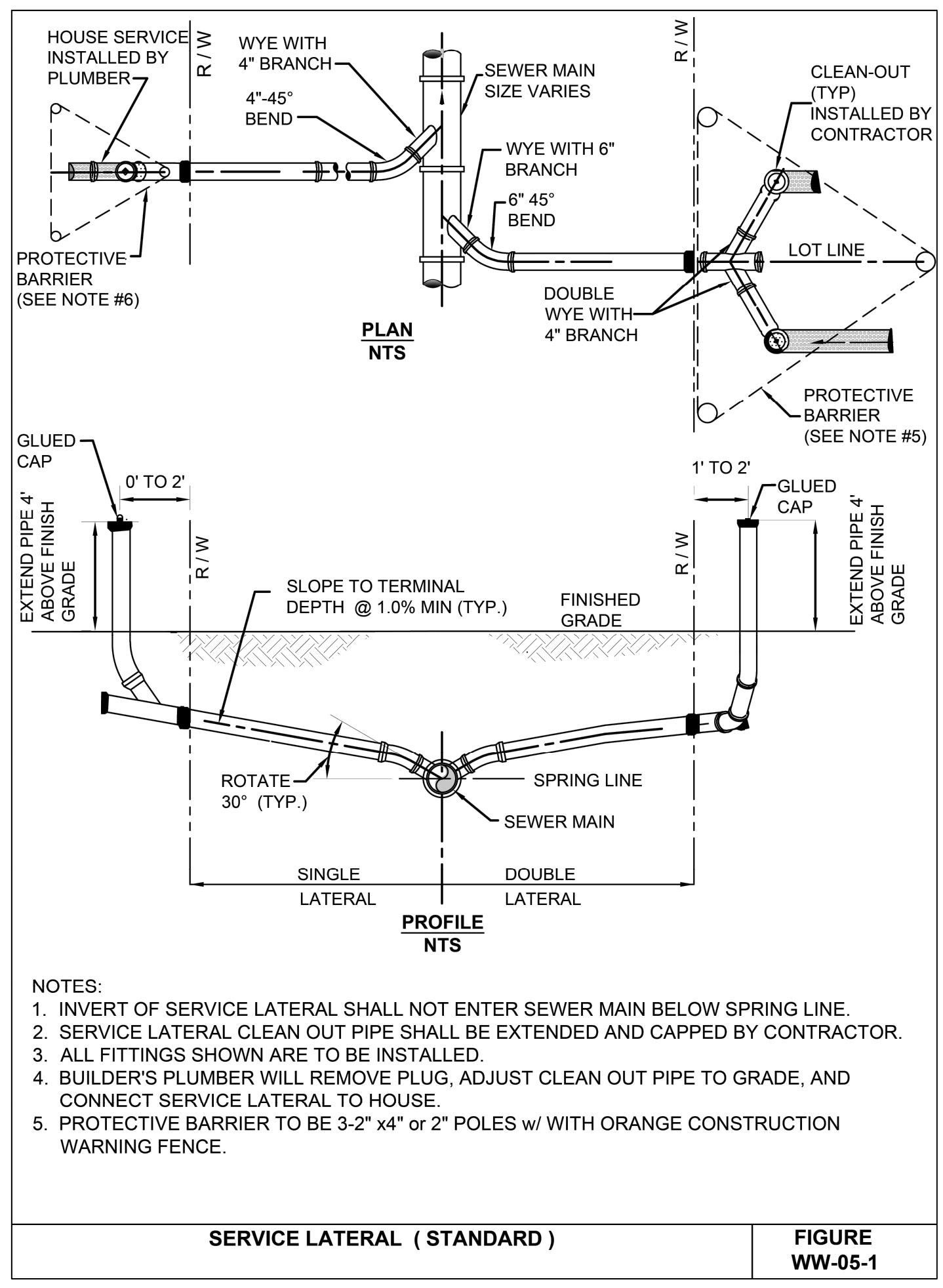
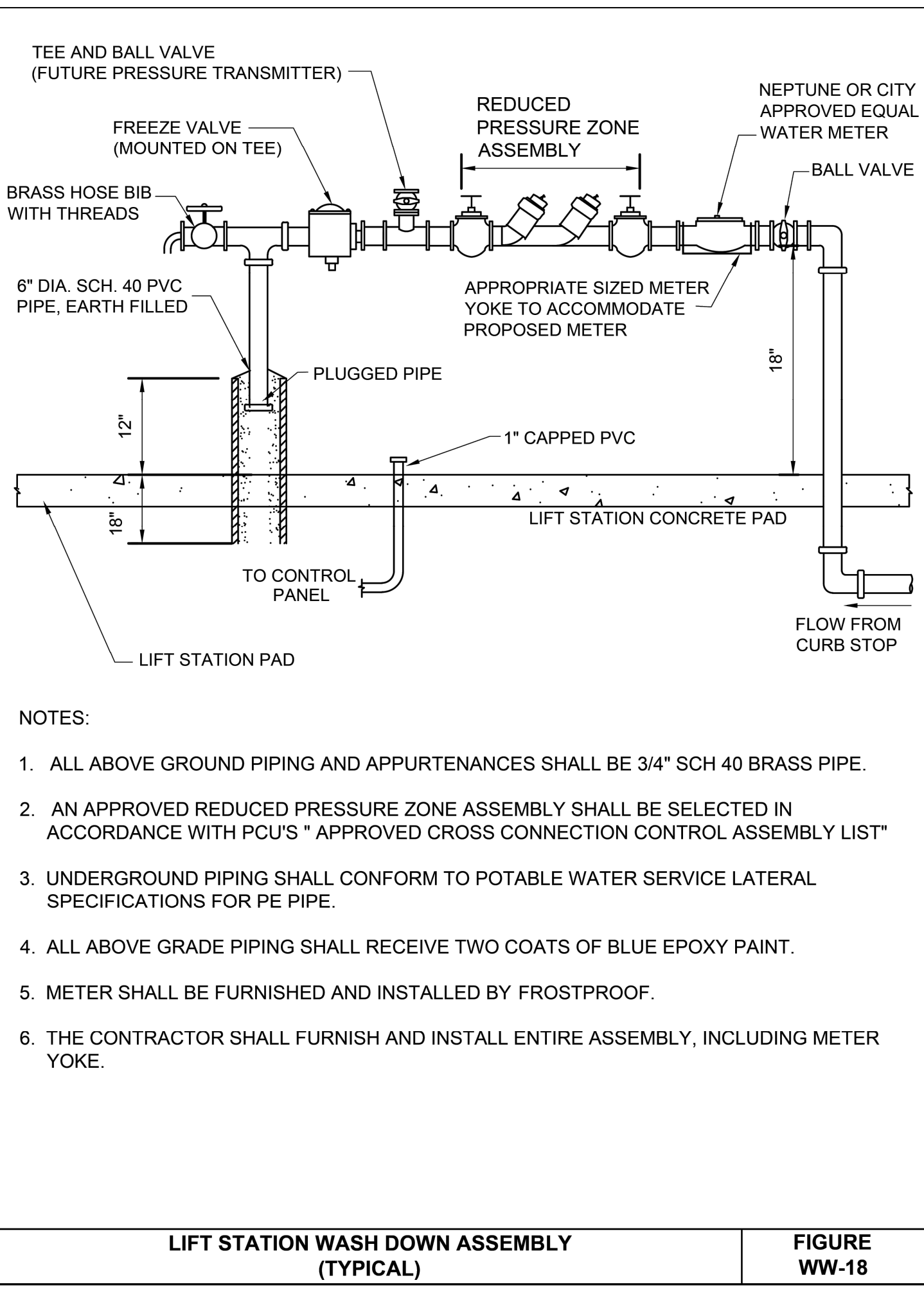
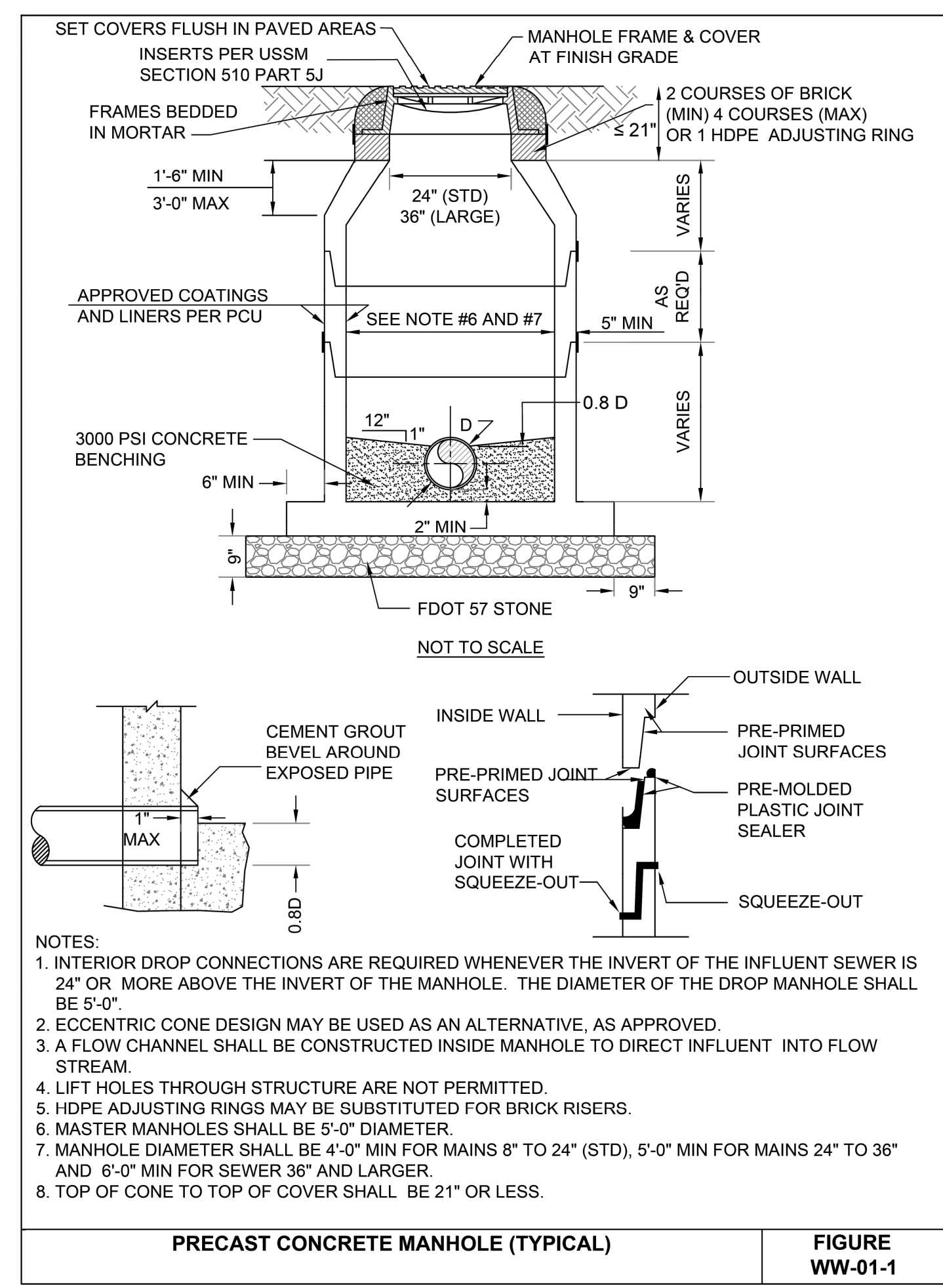
EXTENSION ON FIR AVE AND 5TH ST WEST PREPARED FOR CITY OF FROSTPROOF

FIR AVENUE PLAN AND PROFILE

SHEET NUMBER **C401**

No.	REVISIONS	DATE	BY

Priced By: Bidestine, Tyler Street, Setkha Layout: C500 UTILITY DETAILS - August 23, 2024 - 09:48:43am - K:\LAK Civil\046414319 - Extension Fir Ave & 5th St West\CAD\PlanSheet\C500 UTILITY DETAILS.dwg
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UTILITY DETAILS
 EXTENSION ON FIR AVE AND 5TH ST WEST PREPARED FOR CITY OF FROSTPROOF

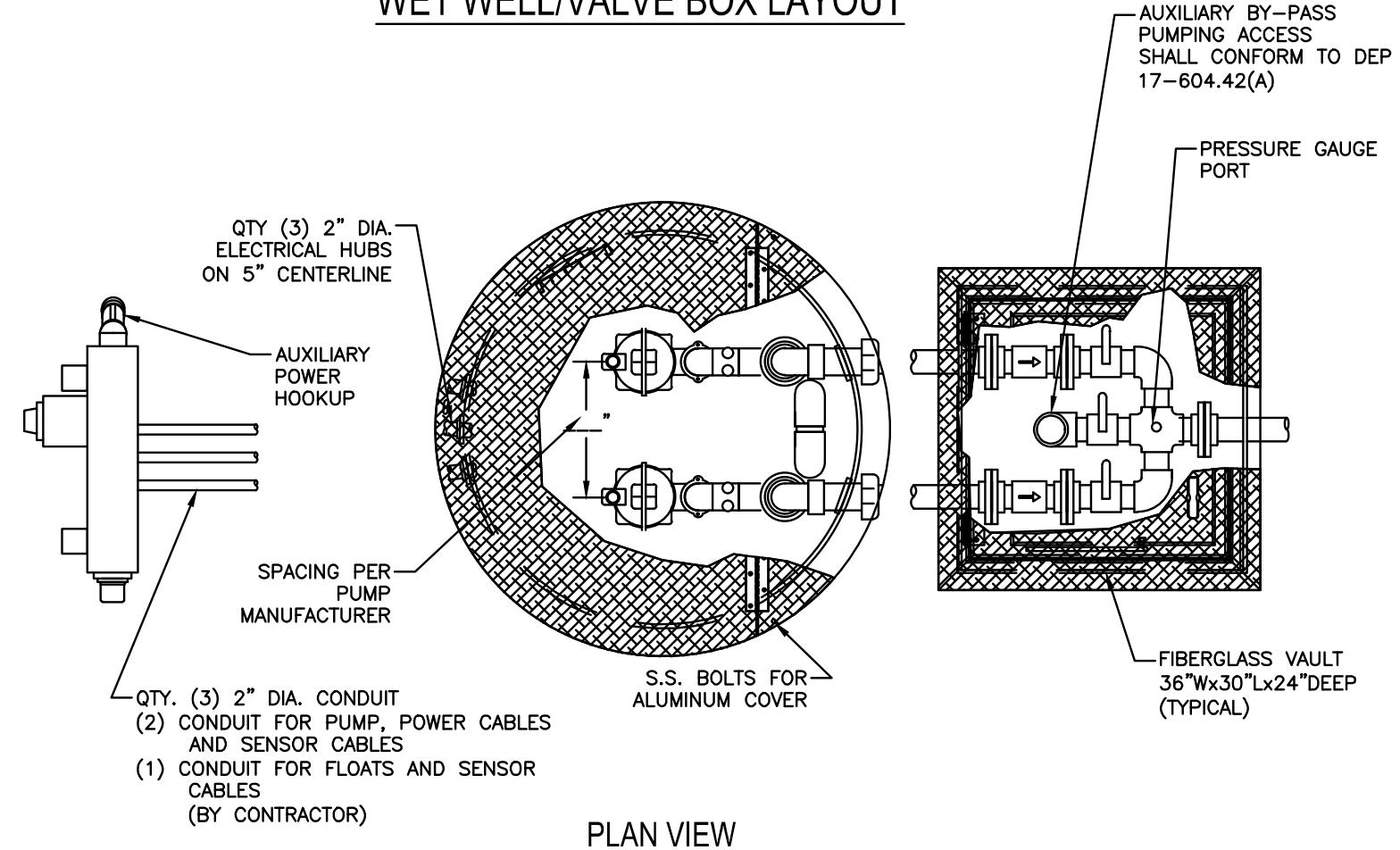
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NO.	REVISIONS	DATE	BY

KHA PROJECT 046414319
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Pictured By: Bidestine, Tyler, Sheet: Sattkha, Layout: C503 LIFT STATION DETAILS August 23, 2024, 10:10:46am, K:\LAK_Civil\046414319 - Extension Fir Ave & 5th St West\CAD\PlanSheets\C500 UTILITY DETAILS.dwg
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WET WELL/VALVE BOX LAYOUT



PLAN VIEW

PUMP DATA TABLE - LS-01

PUMP MODEL	WH/HVS200
IMPELLER DIAMETER	HVS200
PUMP DESIGN CAPACITY	31 GPM
PUMP DESIGN TDH	31.63 FT
HORSEPOWER	3 HP
VOLTAGE	120/240* V
PHASE	SINGLE* PH
DISCHARGE SIZE	1-1/4"
NOTES:	

GENERAL NOTES

PUMPS SHALL BE OF THE SUBMERSIBLE TYPE (MANUFACTURED BY HYDRAMATIC OR HOMA OR APPROVED EQUAL). EACH PUMP SHALL BE MOUNTED ON A #2 RAIL SYSTEM. THE RAIL SYSTEM SHALL BE SELF ENGAGING RESULTING IN A LEAKPROOF COUPLING. THE RAIL SYSTEM SHALL INCLUDE THE BASE ELBOW, DISCHARGE FLANGE ASSEMBLY, 304SS GUIDE RAILS, 316SS UPPER GUIDE BRACKET, 316SS LIFTING BAIL AND CABLE, AND A SIX-HOOK 316SS CABLE HOLDER. THE RAIL SYSTEM SHALL BE MOUNTED AND PRE-PIPED BY THE PUMP SUPPLIER.

PUMP CONSTRUCTION
 THE PUMP VOLUME, MOTOR AND SEAL HOUSING SHALL BE CONSTRUCTED OF CAST IRON. ALL EXTERNAL FASTENERS SHALL BE SERIES 300 STAINLESS STEEL. THE PUMP SHAFT SHALL BE CONSTRUCTED OF SERIES 416 STAINLESS STEEL.

IMPELLER
 THE IMPELLER SHALL BE OF MULTI-VANE, SEMI-OPEN CONSTRUCTION. THE IMPELLER SHALL BE STATICALLY AND HYDRAULICALLY BALANCED.

CUTTERS
 A CUTTER ASSEMBLY SHALL BE MOUNTED ON THE SUCTION SIDE OF THE PUMP WITH DIRECT DISCHARGE INTO THE PUMP IMPELLER. THE GRINDER SHALL BE CAPABLE OF GRINDING MATERIALS FOUND IN NORMAL, DOMESTIC SEWAGE. BOTH THE STATIONARY AND ROTATING CUTTERS SHALL BE CONSTRUCTED OF HARDENED STEEL.

MOTOR
 THE MOTOR SHALL BE MOUNTED IN A SEALED, SUBMERSIBLE TYPE HOUSING. THE STATOR SHALL BE SECURELY HELD IN PLACE WITH A REMOVABLE END RING AND THREADED FASTENERS FOR EASE OF REMOVAL WITHOUT THE USE OF HEAT OR A PRESS. THE MOTOR WILL HAVE TWO HEAVY-DUTY BALL BEARINGS; ONE UPPER (RADIAL) AND ONE LOWER (THRUST), TO SUPPORT THE SHAFT. THE MOTOR SHALL BE EQUIPPED WITH A WINDING THERMOSTAT THAT IS WIRED TO SHUT THE MOTOR OFF IN CASE OF MOTOR OVERHEATING.

SEAL CHAMBER
 THE PUMP SHALL HAVE TWO MECHANICAL SEALS, MOUNTED IN TANDEM WITH AN OIL CHAMBER BETWEEN THE SEALS. THE PUMP SHALL BE EQUIPPED WITH A SEAL LEAK DETECTION PROBE AND WARNING SYSTEM BY USING A SEAL FAILURE SENSOR INSTALLED IN THE SEAL CHAMBER.

WET WELL
 THE PUMP SUPPLIER SHALL PROVIDE THE WET WELL. THIS GLASS FIBER-REINFORCED POLYESTER BASIN SHALL BE CONSTRUCTED OF A COMMERCIAL GRADE OF GLASS FIBER AND SHALL BE PROVIDED WITH FILLET AND AN ANTI-FLOTATION RING WITH A MINIMUM DIAMETER OF THREE INCHES LARGER THAN THE BASIN DIAMETER. THE RAIL SYSTEM, INTERNAL PIPING AND DISCHARGE CONNECTIONS SHALL BE PRE-INSTALLED BY THE PUMP SUPPLIER.

HATCH COVER
 THE HATCH COVER SHALL BE 2/3 HINGED TO ALLOW FOR MAXIMUM ACCESS TO THE WET WELL. THE HATCH COVER SHALL BE ALUMINUM WITH STAINLESS STEEL FASTENERS, RATED FOR 300 PSF OR GREATER. THE HATCH COVER SHALL INCLUDE A SINGLE OR DUAL DOOR OF DIMENSIONS SPECIFIED BY THE PUMP MANUFACTURER FOR PROPER PUMP CLEARANCE. THE COVER SHALL BE MANUFACTURED BY US FABRICATION, OR EQUAL.

VALVE BOX
 THE VALVE BOX IS FIBERGLASS WITH ALUMINUM LOCKABLE COVER. STANDARD SIZE VALVE BOX IS 3' X 2 1/2' X 2'.

VALVES
 VALVES SHALL BE SEWAGE SWING CHECK WITH CLEAN-OUT PORTS AND BRASS BALL VALVES.

FLOATS
 FLOATS SHALL BE ANCHOR SCIENTIFIC ROTO-FLOATS OR EQUAL.

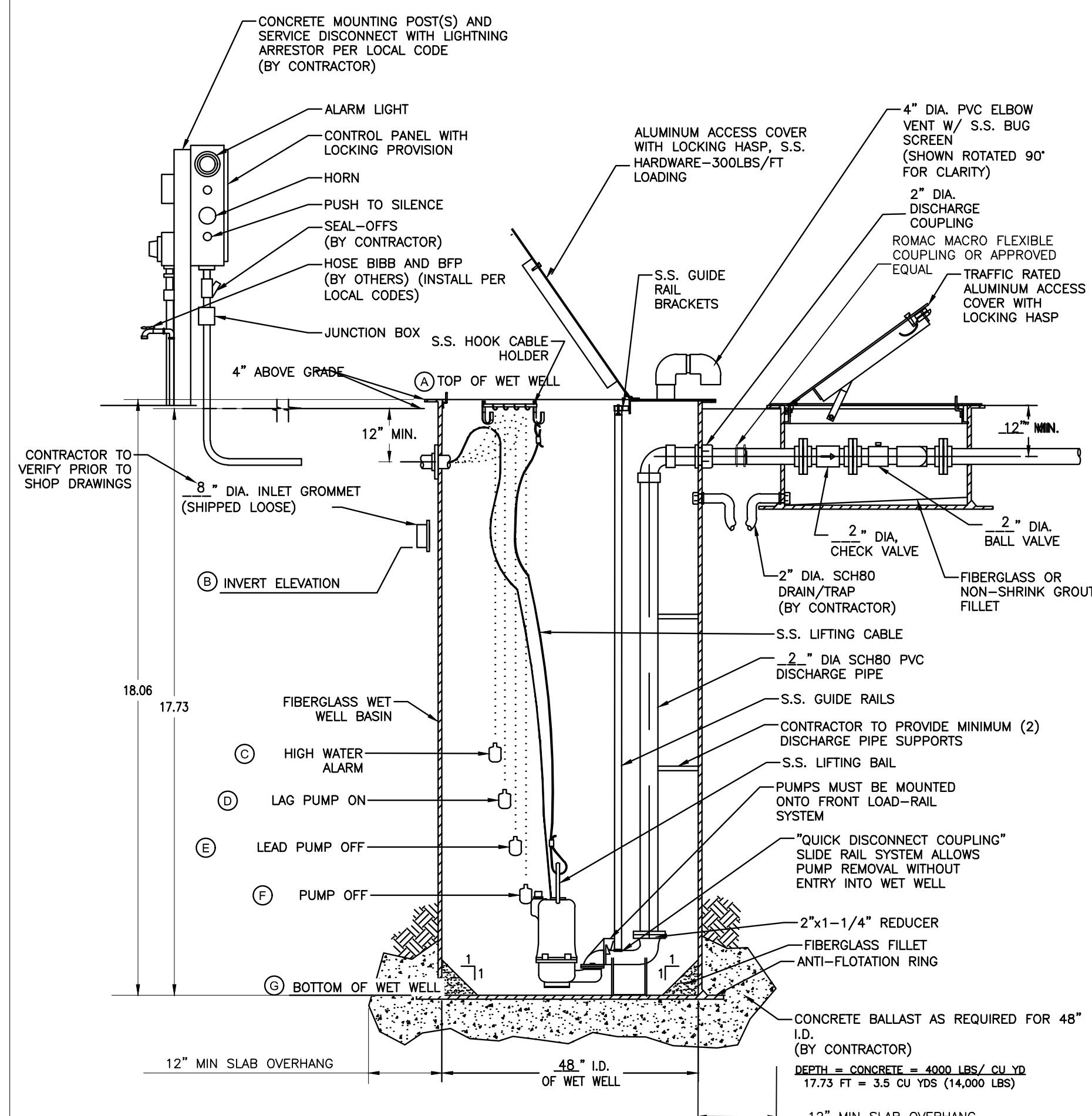
CONTROLS
 THE CONTROL PANEL SHALL BE UL508 LISTED. A NEMA 3R ENCLOSURE SHALL BE PROVIDED IN EITHER 4X FIBERGLASS OR 3R STAINLESS STEEL. THE PANEL SHALL INCLUDE AN ALTERNATING CONTROL SCHEME (DUPLEX AND ABOVE), MAIN CIRCUIT BREAKER, GENERATOR RECEPTACLE, HIGH LEVEL ALARM LIGHT AND HORN, ELAPSED TIME METERS, VOLTAGE OR PHASE MONITOR, SEAL FAILURE AND OVERLOAD SENSORS. THE LIGHTNING ARRESTOR SHALL BE PROVIDED BY CONTRACTOR.

ELECTRICAL
 ALL ELECTRICAL WORK SHALL BE IN ACCORDANCE WITH LOCAL CODES.

SUPPLIER
 PUMP SUPPLIER SHALL PROVIDE SUBMERSIBLE PUMPS, SLIDE RAIL ASSEMBLIES, FIBERGLASS BASIN AND VALVE BOX, CONTROL PANEL, FLOAT SWITCHES, ALUMINUM HATCHES AND ACCESSORIES TO INSURE PROPER OPERATIONS AND WARRANTY. THE COMPLETE PACKAGE PUMPING STATION SHALL HAVE PUMP BASES, RAIL ASSEMBLIES, AND DISCHARGE PIPING ASSEMBLED BY BARNEY'S PUMPS INC. READY FOR FIELD INSTALLATION.

PUMP PACKAGE SHALL BE SUPPLIED BY BARNEY'S PUMPS INC. IN LAKELAND (863-665-8500), CORAL SPRINGS (954-346-0669), OR JACKSONVILLE (904-260-0669), FL.

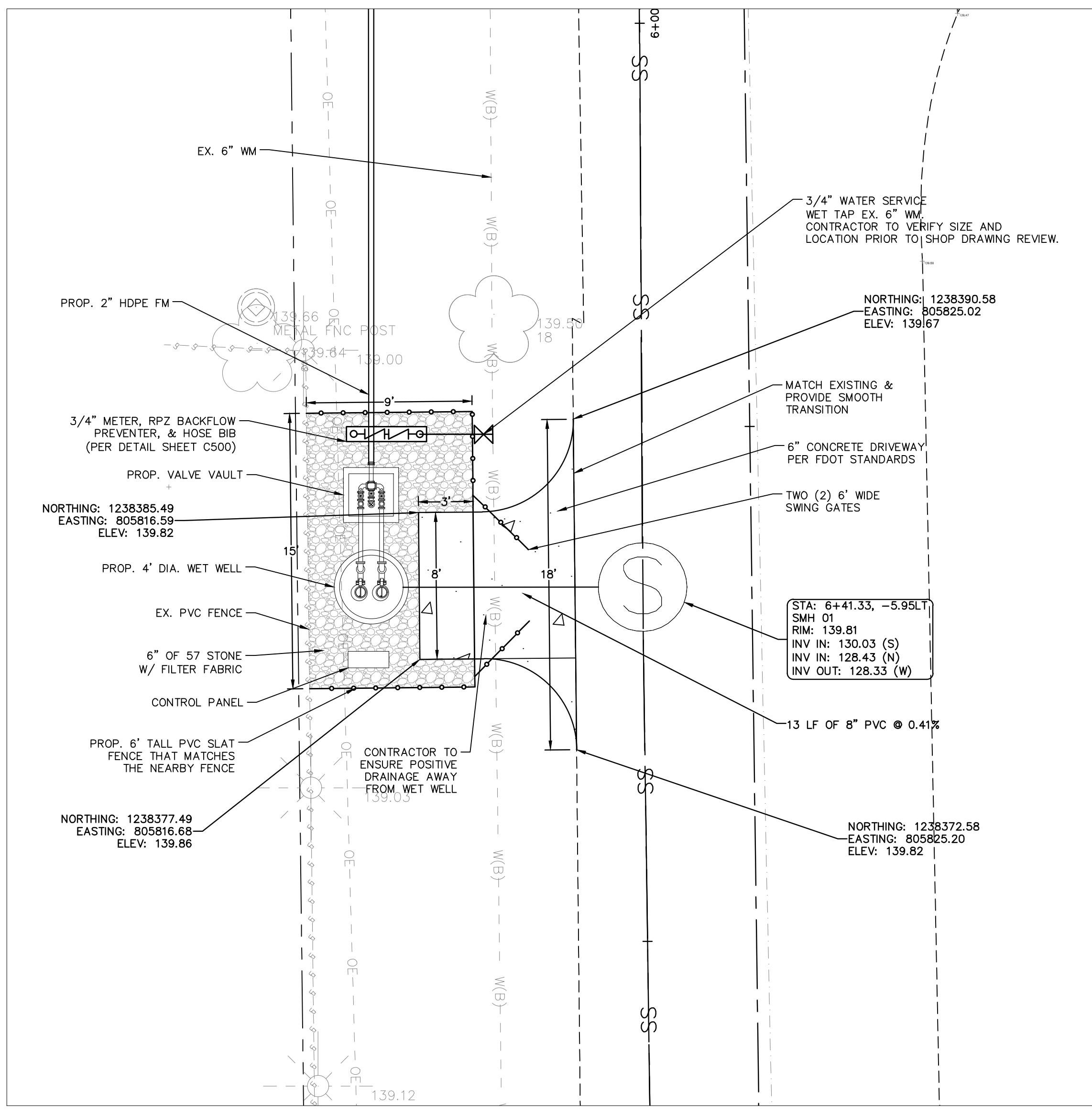
CONTRACTOR TO RECEIVE THE GEOTECH REPORT AND FOLLOW THE RECOMMENDATIONS FOR THE INSTALLATION AND COMPACTION.



SECTION VIEW

ELEVATIONS LS-01

(A) TOP OF WET WELL	139.94
(B) INLET INVERT	128.277
(C) HIGH WATER ALARM	127.28
(D) LAG PUMP ON	126.28
(E) LEAD PUMP ON	125.78
(F) PUMP OFF	124.88
(G) BOTTOM OF WET WELL	121.88



NO.	REVISIONS	DATE	BY

Kimley-Horn
 © 2024 KIMLEY-HORN AND ASSOCIATES, INC.
 109 SOUTH KENTUCKY AVENUE, LAKELAND, FL, 33801
 PHONE: 863-701-8702
 WWW.KIMLEY-HORN.COM REC. NO.: 35106

JAMISON R. TONDREAU
 LICENSED PROFESSIONAL ENGINEER
 No. 84396
 STATE OF FLORIDA
 DESIGNED BY CAG
 DRAWN BY CAG
 CHECKED BY JRT

**LIFT STATION
 DETAILS**

**EXTENSION ON FIR
 AVE AND 5TH ST WEST
 PREPARED FOR
 CITY OF FROSTPROOF**
 FLORIDA
 SHEET NUMBER
C503

CALL 2 BUSINESS DAYS BEFORE YOU DIG
 IT'S THE LAW! DIAL 811 Know what's below. Call before you dig.
 SUNSHINE STATE ONE CALL OF FLORIDA, INC.

THIS ITEM HAS BEEN DIGITALLY SIGNED AND SEALED BY JAMISON R. TONDREAU, P.E. #84396. PRINTED COPIES OF THIS DOCUMENT ARE NOT CONSIDERED SIGNED AND SEALED AND THE SIGNATURE MUST BE VERIFIED ON ANY ELECTRONIC COPIES.

This document, together with the concepts and designs presented herein, is intended only for the specific purpose and client for which it was prepared. Reuse of and improper reliance on this document without written authorization and adaptation by Kimley-Horn and Associates, Inc. shall be without liability to Kimley-Horn and Associates, Inc.

GENERAL NOTES:

- ALL WORK SHALL BE IN ACCORDANCE WITH THE 2023 FLORIDA BUILDING CODE AND THE 2020 NATIONAL ELECTRICAL CODE. WORK SHALL ALSO COMPLY WITH ALL APPLICABLE RULES AND REGULATIONS OF LOCAL LAWS AND ORDINANCES.
- CONTRACTOR SHALL MAKE A THOROUGH EXAMINATION OF THE SITE AND THE CONTRACT DOCUMENTS. NO CLAIM FOR EXTRA COMPENSATION WILL BE RECOGNIZED IF DIFFICULTIES ARE ENCOUNTERED WHICH AN EXAMINATION OF SITE CONDITIONS AND CONTRACT DOCUMENTS PRIOR TO EXECUTING CONTRACT WOULD HAVE REVEALED.
- ELECTRICAL CONTRACTOR SHALL ARRANGE FOR ALL NECESSARY PERMITS, LICENSES, UTILITY COORDINATION, AND INSPECTIONS AS REQUIRED BY THE CITY OR UTILITY COMPANY. CONTRACTOR IS RESPONSIBLE FOR ALL EQUIPMENT (METER CANS, CT CABINETS, PRIMARY CONDUITS, UTILITY POLE CONDUIT RISERS, METER DISCONNECT, ETC.) REQUIRED BY UTILITY COMPANY AND SHOULD INCLUDE NECESSARY COSTS IN BID. ANY ADDITIONAL INFRASTRUCTURE UPGRADE COSTS (NEW TRANSFORMER, NEW UNDERGROUND/OVERHEAD DISTRIBUTION, ETC.) REQUIRED BY THE UTILITY SHALL BE PRESENTED TO THE OWNER FOR REVIEW AND PAYMENT.
- CONTRACTOR SHALL LEGIBLY MARK-UP A SET OF 24"x36" DRAWINGS TO REFLECT AS-BUILT CONDITIONS, AND TURN OVER TO ARCHITECT, WITHIN 30 DAYS AFTER THE DATE OF PROJECT ACCEPTANCE, RECORD DRAWINGS OF THE ACTUAL INSTALLATION SHALL BE PROVIDED TO THE BUILDING OWNER PER FBC ENERGY CODE C405.5.4.1.
- AN OPERATING MANUAL AND MAINTENANCE MANUAL BE PROVIDED TO THE BUILDING OWNER PER FBC ENERGY CODE C405.5.4.2. THE MANUALS SHALL INCLUDE, AT A MINIMUM, THE FOLLOWING:
 - SUBMITTAL DATA STATING EQUIPMENT RATING AND SELECTED OPTIONS FOR EACH PIECE OF EQUIPMENT REQUIRING MAINTENANCE.
 - OPERATION MANUALS AND MAINTENANCE MANUALS FOR EACH PIECE OF EQUIPMENT REQUIRING MAINTENANCE. REQUIRED ROUTINE MAINTENANCE ACTIONS SHALL BE CLEARLY IDENTIFIED.
 - NAMES AND ADDRESSES OF AT LEAST ONE QUALIFIED SERVICE AGENCY.
- ALL EQUIPMENT INSTALLED SHALL BE LISTED AND LABELED BY A NATIONALLY RECOGNIZED TESTING LABORATORY (NRTL) AND/OR LISTED AND LABELED AS AN ASSEMBLY BY AN NRTL PER NEC ARTICLE 90.7.

WIRE/RACEWAY:

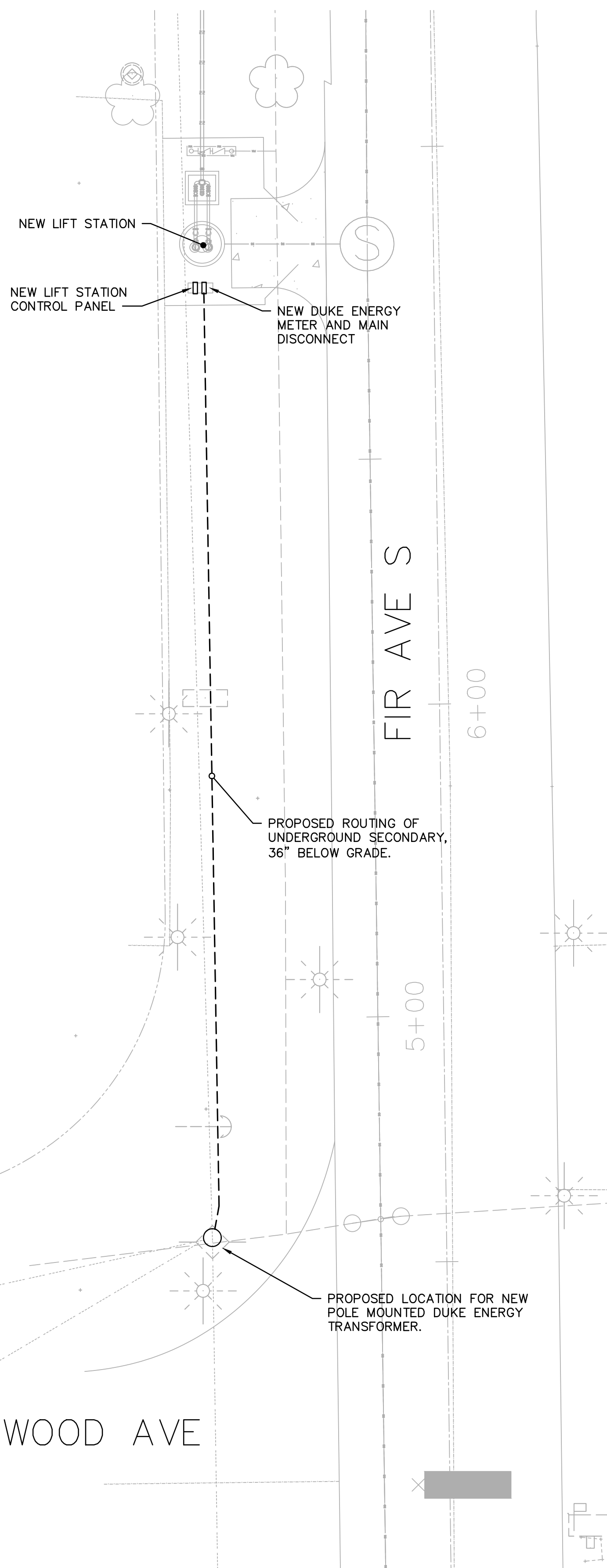
- ALL CONDUCTORS SHALL BE COPPER, CONDUCTOR INSULATION SHALL BE DUAL TYPE THHN/THWN 75°C (167°F) FOR DRY, DAMP, AND WET LOCATIONS. CONDUCTOR INSULATION WITH SINGLE TYPE MARKING THHN 90°C (194°F) MAY BE USED FOR DRY LOCATIONS ONLY. ALL CONDUCTORS SHALL BE COLOR CODED AS REQUIRED BY NEC AND FURTHER IDENTIFIED AND CODED AS SPECIFIED HEREINAFTER. COLOR CODING SHALL BE BY MEANS OF COLORED INSULATING MATERIAL, COLORED BRAID OR JACKET OVER THE INSULATION OR BY MEANS OF SUITABLE COLORED, PERMANENT, NON-AGING, INSULATING TAPE APPLIED TO CONDUCTORS AT EACH CABINET OR JUNCTION POINT. THE COLOR CODING SHALL BE ACCOMPLISHED AS THE CONDUCTORS ARE INSTALLED. THE FOLLOWING SYSTEMS OF COLOR CODING SHALL BE STRICTLY ADHERED TO:
 - A) GROUND LEADS: GREEN
 - B) 120/240 VOLT UNGROUNDED PHASE WIRES:
 - PHASE A: BLACK
 - PHASE B: RED
 - NEUTRAL: WHITE
 THE COLOR CODE ASSIGNED TO EACH PHASE WIRE SHALL BE CONSISTENTLY CONSISTENTLY FOLLOWED THROUGHOUT.
- THE CONDUCTORS FOR FEEDERS AND BRANCH CIRCUITS COMBINED SHALL BE SIZED FOR A MAXIMUM OF 5 PERCENT VOLTAGE DROP TOTAL PER FBC C405.5.3.
- ALL INTERIOR BUILDING CONDUCTORS SHALL BE RUN IN THIN WALL CONDUIT AND THIN WALL CONDUIT SHALL BE UNDERWRITERS' APPROVED GALVANIZED ELECTRICAL METALLIC TUBING. COUPLINGS AND CONNECTORS SHALL BE STEEL COMPRESSION TYPE, ZINC OR CADMIUM PLATED. BELOW GRADE CONDUITS SHALL BE SCHEDULE 40 PVC WITH RIGID METAL ELBOWS AND RISERS. RIGID METAL CONDUIT BELOW GRADE OR IN CONCRETE SHALL BE COATED WITH BITUMASTIC OR OR SLEEVED WITH 10 MIL POLYETHYLENE. SITE CONDUITS SHALL BE ROUTED AT 36" BELOW GRADE AND CONDUITS ROUTED BELOW BUILDINGS SHALL BE AT 36". EXTERIOR CONDUITS SHALL BE RIGID GALVANIZED STEEL.
- ALL RACEWAYS SHALL BE PROPERLY ALIGNED, GROUPED, AND SUPPORTED BY MECHANICAL TYPE "CADDY" CLIPS AT INTERVALS NOT EXCEEDING 8 FEET.
- ALL RACEWAYS WITH NO. 10 OR 12 AWG PHASE CONDUCTORS FOR RECEPTACLES, LIGHTING FIXTURES AND SIMILAR CIRCUITS SHALL BE PROVIDED WITH A PARTIY SIZED GREEN EQUIPMENT GROUND CONDUCTOR. GROUND CONDUCTOR SHALL BE INSTALLED IN ENTIRE RACEWAY SYSTEM INCLUDING WALL SWITCHES AND FLEXIBLE CONDUIT TO LIGHT FIXTURES. EQUIPMENT GROUND CONDUCTOR SIZES FOR CIRCUITS WITH PHASE CONDUCTORS LARGER THAN NO. 12 AWG ARE INDICATED ON DRAWINGS. GROUND CONDUCTORS SHALL BE CONNECTED TO GROUND BUSES IN PANELBOARDS.

GROUNDING:

- THE ENTIRE ELECTRICAL SYSTEM SHALL BE COMPLETELY AND EFFECTIVELY GROUNDED AS REQUIRED BY NATIONAL ELECTRICAL CODE. ALL METALLIC RACEWAYS SHALL BE MECHANICALLY AND ELECTRICALLY SECURE AT ALL JOINTS AND AT ALL BOXES, CABINETS, FITTINGS AND EQUIPMENT.
- THE GROUNDING SYSTEM SHALL BE TESTED BY THE CONTRACTOR. THE RESISTANCE TO GROUND SHALL BE NO MORE THAN (5) OHMS. SUBMIT TEST RESULTS TO ENGINEER. CONTRACTOR SHALL MAKE UPGRADES AND ADDITIONS TO GROUNDING SYSTEM AS REQUIRED TO ACHIEVE THE (5) OHM REQUIREMENT.

SWITCHGEAR:

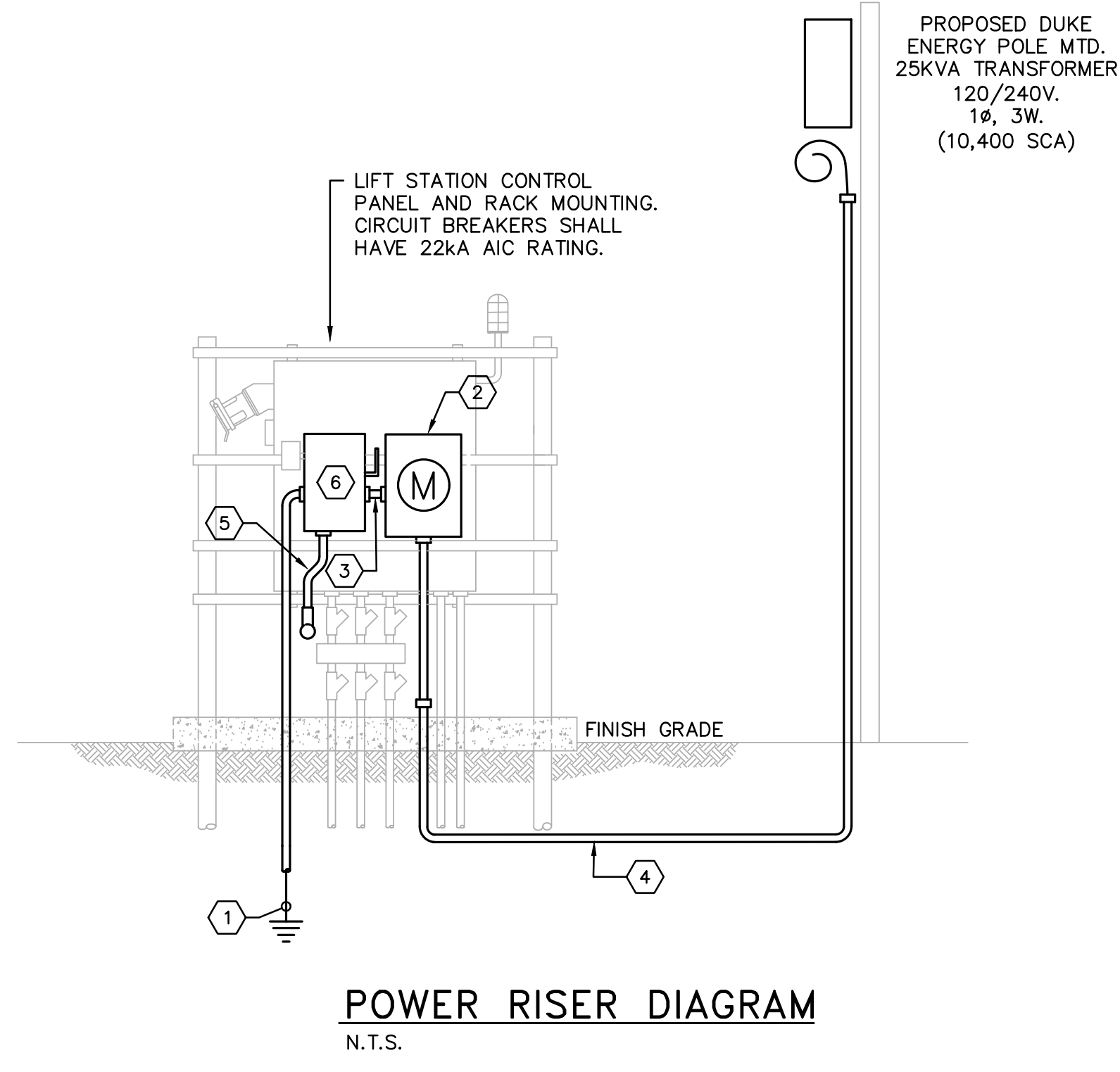
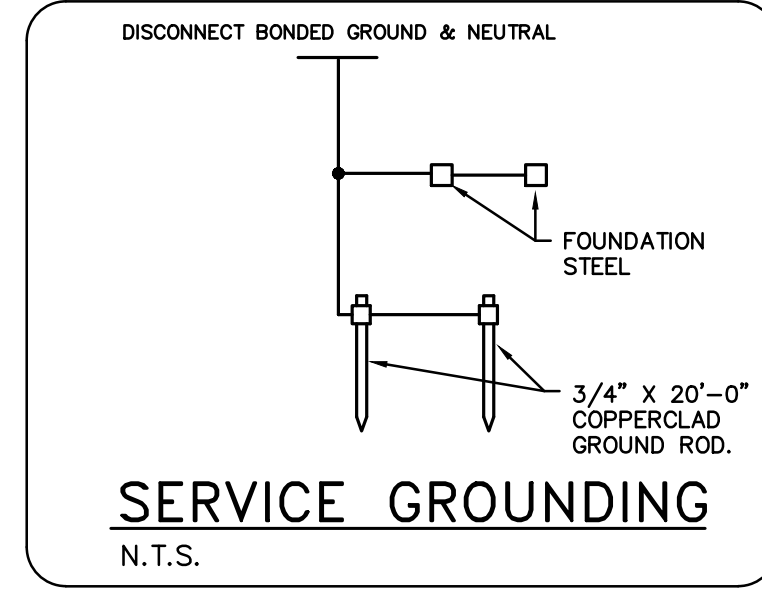
- PANELBOARDS SHALL BE MANUFACTURED BY SQUARE 'D' COMPANY, TYPE AS SHOWN ON DRAWINGS OR APPROVED EQUALS: EATON & SIEMENS. FURNISH WITH COPPER BUS BARS, COPPER EQUIPMENT GROUND BUS AND BOLT-ON CIRCUIT BREAKERS.
- DISCONNECT SWITCHES SHALL BE HEAVY-DUTY TYPE AND MANUFACTURED MANUFACTURED BY SQUARE 'D' COMPANY OR APPROVED EQUAL: EATON OR SIEMENS. FUSES SHALL BE DUAL ELEMENT, CARTRIDGE TYPE. FUSES SHALL BE BY ONE MANUFACTURER: BUSSMAN "FUSETRON" OR CHASE-SHAWMUT "TRIONIC".
- INSTALL ENGRAVED PLASTIC-LAMINATE LABELS ON EACH MAJOR UNIT OF ELECTRICAL EQUIPMENT IDENTIFYING PANELBOARD NAME OR EQUIPMENT SERVING. EXAMPLES ARE, PANELBOARDS, DISCONNECT SWITCHES, AND MOTOR STARTERS, I.E. LABELS SHALL BE 1/16" THICK BLACK PLASTIC LAMINATE WITH 3/8" WHITE CORE PLIE LETTERS.
- ALL MULTI-WIRE BRANCH CIRCUIT BREAKERS ARE TO BE TIED TOGETHER BY AN IDENTIFIED HANDLE-TIE OR BY A COMMON TRIP CIRCUIT BREAKER PER NEC SECTION 210.4(B).
- EACH MULTI-WIRE BRANCH CIRCUIT SHALL BE PROVIDED WITH A MEANS THAT WILL SIMULTANEOUSLY DISCONNECT ALL UNGROUNDED CONDUCTORS AT THE POINT WHERE THE BRANCH CIRCUIT ORIGINATES PER NEC ARTICLE 210.4(B).
- PROVIDE ARC FLASH WARNING LABELS ON ALL SWITCHBOARDS, PANELBOARDS, INDUSTRIAL CONTROL PANELS, METER SOCKET ENCLOSURES, AND MOTOR CONTROL CENTERS THAT REQUIRE EXAMINATION, ADJUSTMENT, SERVICING, OR MAINTENANCE WHILE ENERGIZED PER NEC ARTICLE 110.16(A). SERVICES SIZED 1200 AMPS AND LARGER SHALL REQUIRE A PERMANENT LABEL AND SHALL CONTAIN THE INFORMATION REQUIRED BY NEC ARTICLE 110.16(B).
- PROVIDE A PERMANENT LABEL TO BE AFFIXED TO THE FRONT OF ALL SWITCHBOARDS, SWITCHGEAR, AND PANELBOARDS STATING THE MAXIMUM AVAILABLE FAULT CURRENT IN AMPS, DATE CALCULATED, NOMINAL VOLTAGE AND FREQUENCY IN HERTZ, EQUIPMENT BUS RATING IN AMPS, AND SCOR OF SERVICE EQUIPMENT IN AMPS PER NEC ARTICLES 408.6, 110.21(B)(3) & 110.24. SIGNAGE SHALL BE ENGRAVED, LAMINATED ACRYLIC OR MELAMINE LABEL, PUNCHED OR DRILLED FOR MECHANICAL FASTENERS WITH WHITE LETTERS ON A BLACK BACKGROUND MINIMUM 1/16 INCH THICK. MINIMUM LETTER HEIGHT SHALL BE 1/2 INCH.



ELECTRICAL SITE PLAN
SCALE: 1/8" = 1'-0"

TABULATION	TOTAL LOAD	DEMAND FACTOR	DEMAND LOAD
CONTROLS	200	1.25	250
LIGHTING	465	1.25	581
RECEPTACLE	180		
3HP PUMP #1	4080	1.75	7140
3HP PUMP #2	4080	1.00	4080
TOTAL DEMAND LOAD			12051 VA
TOTAL DEMAND AMPS			50.2 A

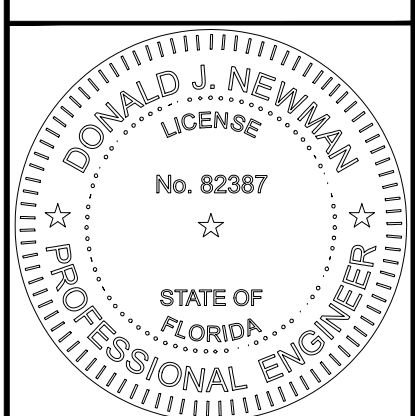
XFMR AFC VOLTAGE	10400	240
	MAIN DISCONNECT	CONTROL PANEL
IscA	10400	6057
length	50	3
wire size	2	2
C VALUE	6044	6044
sets	1	1
f	0.7170	0.0251
M	0.5824	0.9756
FAULT	6057	5909



- POWER RISER DIAGRAM NOTES:**
- NO. 6 COPPER GROUNDING ELECTRODE CONDUCTOR CONNECTED TO COPPER GROUND RODS AND FOOTER STEEL (2 LOCATIONS). SEE DETAIL THIS SHEET.
 - DUKE ENERGY APPROVED 100 AMP FEED-THRU METER CAN.
 - 4 NO. 2 AND 1 NO. 6 E.G. - 1 1/4".
 - 4 NO. 2 - 1 1/4".
 - 4 NO. 2 AND 1 NO. 6 E.G. - 1 1/4" CONDUIT TO LIFT STATION CONTROL PANEL MAIN CIRCUIT BREAKER.
 - NEMA 4X SS, 100A-3P, SQUARE 'D', SERVICE ENTRANCE RATED DISCONNECT FUSED AT 100 AMP.

No.	REVISIONS	DATE	BY

Kimley»Horn
109 SOUTH KENTUCKY AVENUE, LAKELAND, FL 33801
PHONE: 863-701-8702
WWW.KIMLEY-HORN.COM



KHA PROJECT	046414319
DATE	JULY 2024
SCALE	AS SHOWN
DESIGNED BY	DN
DRAWN BY	DN
CHECKED BY	DN

POWER RISER, SITE PLAN & GENERAL NOTES

EXTENSION ON FIR AVE AND 5TH ST WEST PREPARED FOR CITY OF FROSTPROOF FLORIDA

SHEET NUMBER
E101

SURVEY

Surveyor's Report

THE CITY OF FROSTPROOF
FIR AVENUE IMPROVEMENT PROJECT
City of Frostproof, Florida



Prepared for:

KIMLEY-HORN
109 South Kentucky Avenue
Lakeland, FL 33801



Prepared by:

CivilSurv Design Group, Inc.
2525 Drane Field Road, Suite 7
Lakeland, Florida 33811
Ph. (863) 646-4771

Professional Surveyor and Mapper Business License Number: LB 7805

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1- PROJECT INFORMATION

County: Polk

Survey Location: Within the right of way of Fir Avenue beginning 700 feet south of West 5th Street and north to the end of the cul-de-sac and along West 5th Street from the centerline of Fir Ave east for 500 feet.

Located within the City of Frostproof, Florida

2- TYPE OF SURVEY

Topographic and Subsurface Utility Locations

3- FIELD SURVEY DATE(S)

Field Survey efforts (performed by CivilSurv Design Group, Inc.) for this project began on September 07, 2023, and the last date of field survey was December 15, 2023.

4- PURPOSE OF SURVEY

This survey was performed to aid the design of improvements to Fir Avenue.

5- PROJECT DATUM AND UNITS OF MEASURE

The project is referenced to the following datum:

Horizontal Datum: North American Datum of 1983, Adjustment of 2011, State Plane Coordinate Zone 0902, Florida West referenced to the Florida Permanent Reference Network (FPRN). The horizontal datum was verified by utilizing National Geodetic Survey (NGS) control point K067.

Vertical Datum: North American Vertical Datum of 1988 (NAVD 88). Elevations shown were derived using redundant Global Navigation Satellite System (GNSS) observations and should be considered site specific. The vertical datum was verified by utilizing NGS control points 25339B & 25339A

Units of measure: The U.S. Survey Foot as adopted by the National Institute of Standards and Technology.

6- SURVEY METHODOLOGY

Topographic Survey: The survey data was collected using the Carlson SurvCE computer program running on a Carlson handheld computer. The instrument used was a Geomax Robotic (Serial Number 958317). The raw field data was then processed Carlson Export and imported into AutoCAD Civil 3D 2020.

7- FILES LIST (Final Deliverables)

The following items were delivered to Kimley Horn in electronic media with this report. Neither this report nor the items listed below are complete without the other.

AutoCAD Civil 3D Files:

SURVRD01_FIR_AVE_236-001-039.dwg Dated: 7/31/24 11:49 am

Subsurface Utility Files:

Test_Hole_Field_Data.XLSX Dated: 1/2/24 9:20 am

Test_Hole_Reports-236-001-039 Dated: 1/2/24 9:29 am

LEGEND

	=	ASPHALT CROWN		=	CLEAN OUT
	=	ASPHALT PAVEMENT		=	DELINEATOR POST
	=	TOP OR BOTTOM OF BANK		=	FIRE HYDRANT
	=	BRICK		=	GROUND SHOT
	=	CATCH BASIN		=	GUY ANCHOR
	=	CURB & GUTTER BACK		=	GUY POLE (WOOD)
	=	CURB & GUTTER FACE		=	LIGHT POLE (WOOD)
	=	CONCRETE SLAB		=	MAILBOX
	=	DRAIN PIPE		=	ELECTRIC METER
	=	DRIVEWAY		=	SEWER MANHOLE
	=	FENCE		=	POST
	=	BURIED GAS (LEVEL B)		=	POWER POLE (WOOD)
	=	GATE		=	SIGN
	=	HEDGE		=	SERVICE BOX
	=	MISCELLANEOUS		=	SHRUB
	=	PLANTER		=	TELEPHONE PEDESTAL
	=	OVERHEAD POWER		=	OAK TREE
	=	RIGHT OF WAY PER PLAT		=	PALM TREE
	=	SIDEWALK		=	TREE UNKNOWN
	=	BURIED WATER (LEVEL B)		=	ELECTRIC TRANSFORMER
				=	VALVE COVER SEWER
				=	VALVE COVER WATER
				=	WIRE PULL BOX


GENERAL NOTES

- 1) This survey report is not valid without the signature and original seal of a Florida licensed surveyor and mapper.
- 2) Neither the final deliverables listed above, nor this report are full and complete without the other.
- 3) This Survey Report includes accompanying digital files; only the complete combined document may be considered as the certified deliverable. Either part without the other is not certified herein. Per Chapter 5J-17, Florida Administrative Code, "additions or deletions to the survey data, maps or reports by other than the signing party or parties is prohibited without written consent of the signing party or parties".
- 4) The undersigned grants authorization to Kimley-Horn to use this electronic survey drawing as they see necessary, including additions, deletions, corrections or other revisions required in satisfying the City's work program.
- 5) All angles and distances shown hereon are direct measurements unless otherwise noted.
- 6) All distances are field measured unless otherwise noted.
- 7) The AutoCAD files are intended to plot or display at a scale of 1-inch equals 20 feet (1" = 20')

8- CERTIFICATION

The undersigned as representative of CivilSurv Design Group, Inc., hereby certifies that this survey and all files and appendices herein are a true and accurate representation of a field survey made under my responsible charge, and that to the best of my knowledge meets the Standards of Practice as set forth by the Board of Professional Surveyors and Mappers in Rule Chapter 5J-17 of the Florida Administrative Code, pursuant to Section 472.027 of the Florida Statutes subject to the qualifications noted hereon.

NOTE: THE SURVEYOR'S REPORT SUBMITTED FOR THIS PROJECT ACCOMPANIES THE ELECTRONIC FILES "236-001-039_FIR_Ave_7-31-24.zip Dated: 7/31/2024 11:54am" AND NEITHER IS FULL AND COMPLETE WITHOUT THE OTHER.

By:  _____

Timothy A. Morris, PSM
Florida Professional Surveyor and Mapper
License Number 7261

7/31/2024

Signature Date

Digital Seal: _____

GEOTECHNICAL REPORTS



ECS Florida, LLC

Subsurface Exploration and Geotechnical Engineering Report
Lift Station – Frostproof

Fir Avenue and West 5th Street
Frostproof, Polk County, Florida 33843

ECS Project No. 24:7584

February 28, 2024





February 28, 2024

Kimley-Horn and Associates, Inc.
116 South Kentucky Ave.
Lakeland, FL 33801

Attention: Mr. Jamison Tondreault

ECS Project No. 24:7584

Reference: Subsurface Exploration and Geotechnical Engineering Report
Lift Station - Frostproof
Fir Avenue and West 5th Street
Frostproof, Polk County, Florida 33843

Dear Mr. Tondreault:

ECS Florida, LLC (ECS) has completed the subsurface exploration, laboratory testing, and geotechnical engineering analyses for the above-referenced project. Our services were performed in general accordance with our agreed to scope of work. This report presents our understanding of the geotechnical aspects of the project along with the results of the field exploration and laboratory testing conducted, and our foundation design and earthwork construction recommendations.

It has been our pleasure to be of service to Kimley-Horn and Associates, Inc. during the design phase of this project. We would appreciate the opportunity to remain involved during the continuation of the design phase, and we would like to provide our services during construction phase operations as well to verify subsurface conditions estimated for this report. Should you have any questions concerning the information contained in this report, or if we can be of further assistance to you, please contact us.

Respectfully submitted,

ECS Florida, LLC

David Wilshaw, P.G.
Senior Principal
FL PG No. 2413
DWilshaw@ecslimited.com

Taylor McDade, P.E.
Geotechnical Project Manager
FL PE No. 92773
TMcDade@ecslimited.com

Taylor McDade, State of Florida, Professional Engineer, License No. 92773

This item has been digitally signed and sealed by Taylor McDade on the date indicated here.

Printed copies of this document are not considered signed and sealed and the signature must be verified on any electronic copies.

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APPENDICES

Appendix A – Diagrams

- Site Location Diagram
- Boring Location Diagram
- Soil Survey

Appendix B – Field Operations

- Reference Notes for Boring Logs
- Subsurface Exploration Procedure: Standard Penetration Testing (SPT)
- Boring Logs

Appendix C – Laboratory Testing

- Laboratory Test Results Summary

EXECUTIVE SUMMARY

The following paragraphs provide a brief discussion of our findings and recommendations. Please refer to the complete report for a more detailed discussion.

ECS Florida, LLC (ECS) has completed the subsurface exploration for the proposed lift station in the vicinity of the intersection of Fir Avenue and West 5th Street in Frostproof, Polk County, Florida. The project information summarized below is based exclusively on the information made available to us by Kimley-Horn and Associates, Inc. at the time of this report. Our findings, conclusions and recommendations are summarized below.

PROJECT INFORMATION:

- Site Locations: Fir Avenue and West 5th Street in Frostproof, Polk County, Florida
- Scope: One (1) lift station and horizontal drilled sewer pipes

SUBSURFACE CONDITIONS:

- Field Exploration: One (1) SPT boring drilled at the proposed location of the lift station to a depth of 25 feet below existing ground level
- Site Conditions: Grassed land
- Probable Fill: Not encountered within the depth of the boring.
- Natural Soils: SAND (SP), SAND WITH SILT (SP-SM), and CLAYEY SAND (SC)
- Refusal Materials: Not encountered within the depth of the boring
- Groundwater: Groundwater was not encountered prior to the introduction of drilling fluid at 10 feet below the existing ground surface; seasonal high groundwater table is anticipated to form at a depth greater than 10 feet below the existing ground surface.

This summary should not be considered apart from the entire text of the report with all the qualifications and considerations mentioned herein. Details of our conclusions and recommendations are discussed in the report text.

1.0 INTRODUCTION

The purpose of this study was to provide geotechnical information for the design and construction of the lift station. This report contains the results of our subsurface explorations and laboratory testing programs, site characterization, engineering analyses, and recommendations for the design and construction of the proposed lift station and infrastructure. The recommendations developed for this report are based on the location information provided by Kimley-Horn and Associates, Inc. on December 14, 2023.

Our services were provided in accordance with our Proposal No. 24:16279-GP dated September 11, 2023, and as authorized by Kimley-Horn and Associates, Inc. on September 11, 2023. Terms and Conditions of Service are in accordance with the Master Agreement for Continuing Professional Services between ECS Florida, LLC and Kimley-Horn and Associates, Inc. dated April 21, 2008.

The report includes the following items.

- A brief review and description of our field and laboratory test procedures and the results of testing conducted.
- A review of surface topographical features and site conditions.
- A review of area and site geologic conditions.
- A review of subsurface soil stratigraphy with pertinent available physical properties.
- Final copies of our soil test boring log.
- Evaluation and recommendations relative to temporary and permanent groundwater control.
- Geotechnical design recommendations for support of the lift station.
- Evaluation and recommendations regarding horizontal directional drilling.
- Evaluation and recommendations relative to groundwater control.
- Recommendations for site preparation and construction of compacted fills, including an evaluation of on-site soils for use as compacted fills.

2.0 PROJECT INFORMATION

2.1 PROJECT LOCATION/CURRENT SITE USE/PAST SITE USE

The subject site is located in the vicinity of the intersection of Fir Avenue and West 5th Street in Frostproof, Polk County, Florida. A Site Location Drawing is included as Figure 2.1.1 below and reproduced within Appendix A of this report.

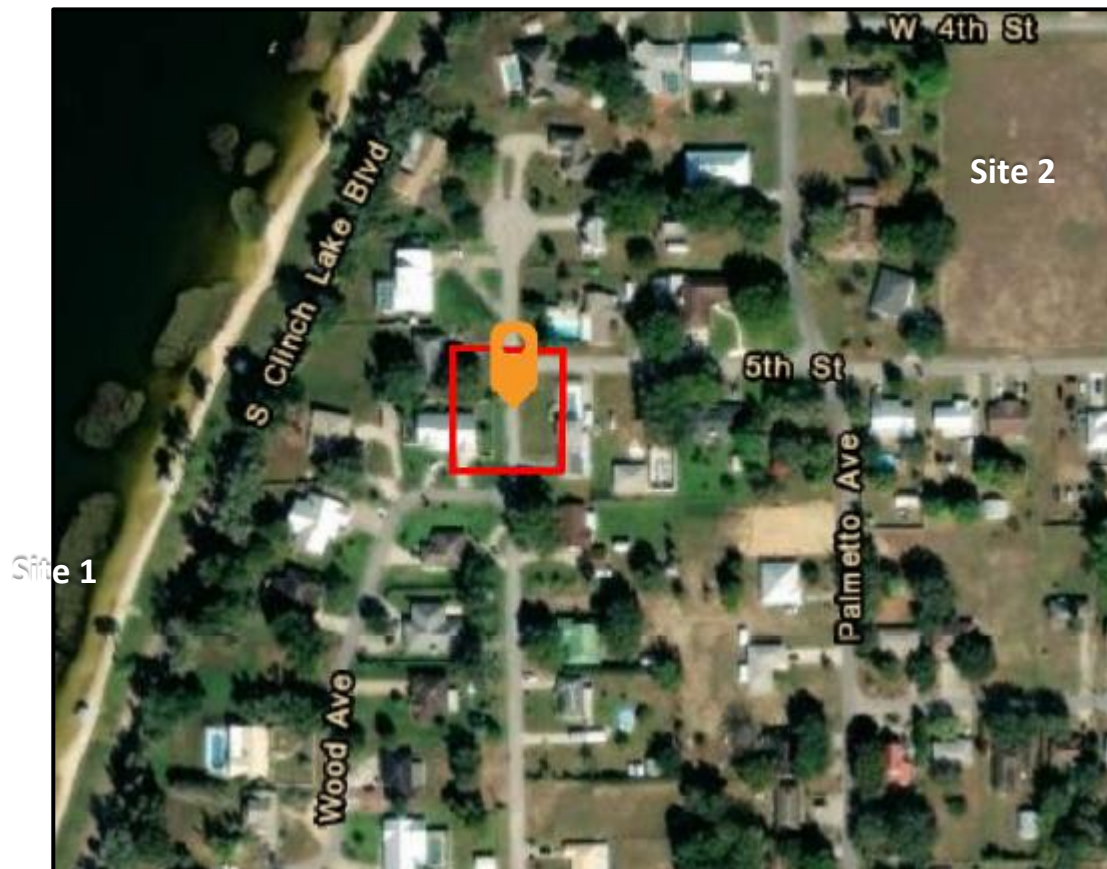


Figure 2.1.1. Site Location

The site is generally flat with existing grades varying between approximately EL. +144 feet to EL. +148 feet-datum. Our assumed surface elevations are based upon publicly available topographic information and should be considered approximate to the nearest foot. **Elevations used in this report, therefore, must not be used for design, since survey was not available at the time this report was written.**

Based upon our review of historical aerials that date back to 1957, the site was agricultural land prior to 1957. At some point between 1957 and 1984, Fir Avenue and West 5th Street were constructed, and the first residential structures were constructed. Between 1984 and 1999, the majority of the remaining land was developed with single family residential structures. The site remained in that condition to the present day.

2.2 PROPOSED CONSTRUCTION

Based on our understanding of the project based on information provided by Kimley-Horn and Associates, Inc. on December 14, 2023, ECS understands that one (1) lift station is planned in the vicinity of the intersection of Fir Avenue and West 5th Street in Frostproof, Polk County, Florida.

If actual project information varies from these conditions, then the recommendations in this report may need to be re-evaluated. We should be contacted if any of the above project information is incorrect so that we may reevaluate our recommendations.

3.0 FIELD EXPLORATION AND LABORATORY TESTING

Our exploration procedures are explained in greater detail in Appendix B including the insert entitled Subsurface Exploration Procedures. Our scope of work included drilling one (1) Standard Penetration Test (SPT) boring for this exploration. Our boring was located with a handheld GPS unit and the approximate location is shown on the Boring Location Diagram in Appendix A.

3.1 SUBSURFACE CHARACTERIZATION

The subsurface conditions encountered were generally consistent with published geological mapping. The following sections provide generalized characterizations of the soil. Please refer to the boring log in Appendix B.

Based on the Geologic Map of Florida, Central Florida geologic conditions can generally be described in terms of three basic sedimentary layers. The near-surface layer is primarily composed of sands containing varying amounts of silt and clay fines that are underlain by a layer of variably phosphatic clay and clayey fine sand, locally referred to as the “Hawthorn Group” which is in turn underlain by limestone. The thickness of these strata varies throughout Central Florida. In general, the surficial sands typically extend to depths of 40 feet to 70 feet below the ground surface, while the Hawthorn Group ranges from nearly absent in some locations to thicknesses greater than 100 feet. The limestone formation may be several thousand feet thick.

The groundwater hydrogeology of Central Florida can be described in terms of the nature and relationship of the three basic geologic strata. The near surface and upper strata are fairly permeable and include the surficial (water table) unconfined aquifer. The deep limestone formation of the Upper Floridan Aquifer is highly permeable due to the presence of large, interconnected channels and cavities throughout the rock. The Upper Floridan Aquifer is the primary source of drinking water in Central Florida. These two permeable strata are separated by the relatively low permeability clays in the Hawthorn Group. The amount of groundwater flow between the two aquifer systems is dependent on the thickness and consistency of the Hawthorn Group clay confining beds which, as previously stated, varies widely throughout Central Florida.

The United States Department of Agriculture Soil Survey for Polk County, Florida maps the land in the vicinity of the intersection of Fir Avenue and West 5th Street as Soil #3 – Candler sand, 0 to 5 percent slopes, excessively drained with the depth to water table of greater than 80 inches.

The soils encountered during this exploration are generally consistent with the Regional Geology and the published Soil Survey are described within the table below.

Approximate Depth (ft)	Stratum	Description	Ranges of SPT ⁽¹⁾ N-values (bpf)
0 – 25 ⁽²⁾	I	SAND (SP), SAND WITH SILT (SP-SM), and CLAYEY SAND (SC)	3 to 17

Notes:

- (1) Standard Penetration Testing using a Manual Hammer System
- (2) Termination depth of borings

3.2 GROUNDWATER OBSERVATIONS

Groundwater was not encountered prior to the introduction of drilling fluid to the boring at 10 feet below the existing ground surface. Variations in the long-term water table may occur as a result of changes in precipitation, evaporation, surface water runoff, construction activities, and other factors. Based upon our interpretation of the subsurface data, it appears that the seasonal high groundwater level will form at a depth greater than 10 feet below the existing ground surface.

3.3 KARST GEOLOGY

Areas within Central Florida are known to have karst geology. Karst terrain is characterized by voids, soil domes, soil raveling, interrupted drainage, disappearing streams, and topographical features such as sinkholes and closed depressions. These features are the result of the dissolution of soluble bedrock such as limestone by groundwater and/or the infiltration of surface water.

As water enters fractures, bedding planes, and other bedrock discontinuities within soluble bedrock, it slowly dissolves the rock and enlarges the discontinuities. Over geologic time, this results in the formation of solution channels or underground passages and ravines which may develop into surficial manifestations such as sinkholes and closed depressions. The dissolution of bedrock is generally a very slow process. However, soil may be eroded or raveled into the enlarged bedrock fractures, creating soil domes. Eventually, soil in these features can be lost through groundwater movement, resulting in surface depressions and potential sudden ground subsidence.

The soils derived from and overlying the carbonate bedrock are typically clayey and silty soils with varying amounts of sand and rock fragments. The bedrock within the general geographic region is characterized by jointed and faulted soluble carbonate lithologies interbedded with non-carbonate lithologies. These carbonate formations are generally moderately to highly solution prone.

The degree of weathering or solutioning is often controlled by lithological variations and structural orientations. Where structural discontinuities intersect or in areas which are highly fractured, solutioning is intensified creating low areas and seams that are typically filled with residual clayey soils. Conversely, more competent, high areas represent slightly- to non-fractured lithologies that are often coarser grained and only slightly solution prone.

The underlying carbonate formations of the project geographic area are susceptible to karst-related sinkhole development. Contributing characteristics and factors controlling the development include subsurface structural deformation, joint sets, and thick carbonate bedding within the area. A comprehensive assessment of sinkhole risk would require geophysical surveying and deeper SPT borings extended to the limestone bedrock. However, the risk of sinkhole damage to the proposed lift station in this area of Florida is low in our opinion, based upon available published data and the absence of any evidence of post-depositional weakening of the shallow soil profile within our SPT boring.

3.4 LABORATORY TESTING

Each sample was visually classified on the basis of texture and plasticity in accordance with ASTM D2488 Standard Practice for Description and Identification of Soils (Visual-Manual Procedures) and including USCS classification symbols, and ASTM D2487 Standard Practice for Classification for Engineering Purposes (Unified Soil Classification System (USCS)). After classification, the samples were grouped in the major zones noted on the boring log in Appendix B. The group symbols for each soil type are indicated in parentheses along with the soil descriptions. The stratification lines between strata on the log are approximate; in situ, the transitions may be gradual.

The laboratory testing consisted of selected tests performed on samples obtained during our field exploration operations. Classification and index property tests were performed on representative soil samples. The index testing program included natural moisture content tests (ASTM D 2216), and percent passing the No. 200 sieve (ASTM D 6913).

4.0 DESIGN RECOMMENDATIONS

4.1 LIFT STATION RECOMMENDATIONS

Based on the results of our exploration, we consider the subsurface conditions at the site adaptable for support of the proposed lift station wet well structure. The following sections present our recommendations for wet well construction.

4.1.1 General Construction Considerations

The water table should be maintained at least 2 feet below the required excavation depth. The dewatering system should not be decommissioned until sufficient deadweight exists on the structure to prevent uplift or the uplift protection system as described below, if necessary, is in place.

4.1.2 Uplift Pressure

We anticipate that the proposed structure will exert little or no net downward pressure on the soils; rather, the structure may be subject to hydrostatic uplift pressure prior to completion of construction and whenever the structure is empty. Below-ground structures should be designed to resist lateral earth pressures and hydrostatic uplift pressures appropriate for their depth below existing grade and wet season groundwater table.

The walls of the structure should be designed to resist at-rest lateral earth pressures, with equivalent fluid densities above and below the water table being as follows:

Above Water Table - Equivalent Fluid Density 58 lb/ft³

Below Water Table - Equivalent Fluid Density 88 lb/ft³

4.1.3 Uplift Protection

When the water within the below-ground structure is maintained at or above the surrounding groundwater level, no net buoyancy will occur to the structure. However, in other conditions, a positive means of uplift protection may be necessary. Hydrostatic uplift forces can be resisted in several ways including:

1. Addition of dead weight to the structure.
2. Mobilizing the dead weight of the soil surrounding the structure through extension of footings outside the perimeter of the structure.

We can assist you in evaluating uplift protection requirements, at your request.

4.1.4 Bearing Capacity and Settlement

Post-construction settlements of the wet well structure will be influenced by several interrelated factors, such as: (1) subsurface stratification and strength/compressibility characteristics; (2) bearing level, applied loads, and resulting bearing pressures beneath the foundation; and (3) site preparation and earthwork construction techniques used by the contractor.

Based on the results of the boring performed for the proposed structure at the site, provided the site preparation and earthwork construction recommendations presented in Section 5.0 are performed, and since the proposed structure will exert little downward pressure on the soils, it is our professional opinion that the proposed wet well installation is feasible. We recommend the foundation design use the following parameters.

Design Parameter	Thickened Slab
Net Allowable Bearing Pressure ⁽¹⁾	2,000 psf
Acceptable Bearing Soil Material	SAND (SP) and SAND WITH SILT (SP-SM) - Stratum I
Minimum Width	18 inches
Minimum Footing Embedment Depth (below top of slab grade for interior thickened slab footings or finished grade for exterior footings) ⁽²⁾	12 inches
Estimated Total Settlement ⁽³⁾	Less than 1-inch

Notes:

- (1) Net allowable bearing pressure is the applied pressure in excess of the surrounding overburden soils above the base of the foundation.
- (2) For bearing considerations.
- (3) Based on assumed structural loads. If final loads are different, ECS must be contacted to update foundation recommendations and settlement calculations.

Potential Undercuts: Most of the soils at the wet well foundation bearing elevation are anticipated to be suitable for support of the proposed structure. If soft or unsuitable soils are observed at the footing bearing elevations, the unsuitable soils should be undercut and removed. Any undercut should be backfilled with lean concrete ($f'_c \geq 1,000$ psi at 28 days) up to the original design bottom of footing elevation; the original footing shall be constructed on top of the hardened lean concrete.

4.2 HORIZONTAL DIRECTIONAL DRILLING

Based on the SPT borings performed, the subsurface materials generally consist of very loose to medium dense sands (SP and SP-SM). The encountered sandy soils have a potential for caving.

Drilling fluid should be used during drilling and back-reaming operations. Due to the sandy soils encountered during our investigation it is recommended that the drilling fluid consists of clean water and bentonite. Other appropriate additives should be added at the discretion of the specialty contractor. The drilling fluid should be mixed thoroughly and be absent of any clumps or clods. Further, the drilling fluid should not be recycled and should be hauled off the site.

The soils encountered in our investigation have a low heaving potential. However, heaving may occur when attempting to back-ream too large of a hole. To minimize heaving, the reaming process should be completed leaving the bored hole at full design diameter during pullback. The pullback barrel reamer should be no larger than the design bored diameter. The pullback rate should minimize overcutting of the borehole so that excessive voids are reduced, and post installation settlement may be minimized.

The drilling and installation operations should be monitored continuously by experienced personnel trained in all aspects of directional drilling process. These procedures include accurate monitoring and control systems to track the progress and exact location of the drilling head at all times. The drilling operator should maintain a record of drilling fluid pumping rates, pressures, viscosity, and density, etc., throughout the entire course of drilling activities. Horizontal and vertical adjustments should be made throughout the procedure so that the drilling profile matches the planned profile. The specific weight of the drilling fluid should be adjusted throughout the process to maintain hydrological stability. Jetting pressures should be limited to avoid drilling fluid release during drilling. However, should release of drilling fluid in the project area occur, operations should stop immediately, and measures should be taken to contain release.

Generic measures may include the following:

- If release is detected, the drilling crew should take immediate corrective action to contain the release and to prevent migration offsite.
- Pits and/or berms should be constructed around the borehole entry point to contain drilling fluid and return.
- Containment equipment, including earth moving equipment, portable pumps, hand tools, sandbags, hay bales, silt fencing, lumber, and vacuum trucks, should be stored and readily available at the drilling site.
- Any drilling seepage should be removed using a vacuum truck and then transported to an approved disposal site

5.0 SITE CONSTRUCTION RECOMMENDATIONS

5.1 SUBGRADE PREPARATION

5.1.1 Stripping and Grubbing

Prior to construction, the location of existing underground utilities within the construction area should be established. Provisions should then be made to relocate interfering utilities to appropriate locations.

Underground pipes that are not properly removed or plugged may serve as conduits for subsurface erosion, which may subsequently lead to excessive settlement of overlying structures.

The "footprint" of the proposed construction plus a minimum additional margin of 5 feet, should be stripped of all surface vegetation, stumps, debris, organic topsoil, or other deleterious materials. During grubbing operations, roots with a diameter greater than 0.5-inch, stumps, or small roots in a concentrated state, should be grubbed and completely removed.

5.1.2 Site Temporary Dewatering

There is a need for densification of the soils within the upper 2 feet below the stripped or excavated surface, temporary groundwater control measures may be required if the groundwater level is within 2 feet below the stripped or excavated surface at the time of construction. Should groundwater control measures become necessary, dewatering methods should be determined by the contractor. We recommend the groundwater control measures, if necessary, remain in place until compaction of the existing soils is completed. The dewatering method should be maintained until backfilling has reached a height of 2 feet above the ground water level at the time of construction. The site should be graded to direct surface water runoff from the construction area.

5.1.3 Excavation Protection

Excavation work for the project will be required to meet OSHA Excavation Standard Subpart P regulations, Type C Soils. A braced sheet pile structure is anticipated for excavation support. Use of an open cut for deeper excavations is not considered practical because it will require a large excavation to preclude slope sloughing. The support structure should be designed according to OSHA sheeting and bracing requirements. We recommend a Florida registered Professional Engineer design the sheeting/bracing system.

5.1.4 Preparation of Lift Station Foundation Soils

The excavation bottom should be densified using hand-operated compaction equipment prior to the placement of backfill soils. Typically, the material to be compacted should exhibit moisture contents within ± 2 percent of the Modified Proctor optimum moisture content (ASTM D 1557) during the compaction operations. Compaction should continue until densities of at least 95 percent of the Modified Proctor maximum dry density (ASTM D 1557) have been achieved within the upper one foot below the exposed surface within the lift-station structure excavation. If compaction of the excavation bottom soils can't be achieved, a one-foot-thick layer of FDOT 57 Stone can be placed at the structure's bearing level.

5.1.5 Compaction of Lift Station Structural Backfill

Structural backfill which will be required around each lift station structure should be placed in loose lifts not exceeding 6 inches in thickness and should be compacted with a light hand-operated compactor to a density of 95 percent of the Modified Proctor maximum dry density (ASTM D 1557). Heavy equipment should not be allowed within 5 feet of the structure to prevent overstressing of the structure walls.

5.2 EARTHWORK OPERATIONS

5.2.1 Engineered Fill

Prior to placement of engineered fill, representative bulk samples (about 50 pounds) of on-site and/or off-site borrow should be submitted to ECS for laboratory testing, which will typically include Atterberg limits, natural moisture content, grain-size distribution, and moisture-density relationships (i.e., Proctors) for compaction. Import materials should be tested prior to being hauled to the site to determine if they meet project specifications. Alternatively, Proctor data from other accredited laboratories can be submitted if the test results are within the preceding 90 days.

Satisfactory Engineered Fill Materials: Materials satisfactory for use as engineered fill should consist of inorganic soils with the following engineering properties and compaction requirements.

ENGINEERED FILL INDEX PROPERTIES	
Subject	Property
Structure Areas	LL < 40, PI < 20
Max. Particle Size	4 inches
Fines Content	Max. 25 % > #200 sieve
Max. organic content	5% by dry weight

ENGINEERED FILL COMPACTION REQUIREMENTS	
Subject	Requirement
Compaction Standard	Modified Proctor, ASTM D1557
Required Compaction	98% of Max. Dry Density
Moisture Content	-2 to +3 % points of the soil's optimum value
Loose Thickness	8 inches prior to compaction

On-Site Borrow Suitability: Deposits of soils (that meet the definition of satisfactory engineered fill) are present on the site.

Materials used as engineered fill for shallow fill areas should consist of approved material classified as SP, SP-SM, or more granular, which are free from debris, particles larger than 3 inches in diameter (4-inches for trench/utility backfill), organic inclusions, cinders, ash, or excess moisture. Higher fines soils such as SM and SC may be reused in deeper fill (2 feet and greater below proposed grades); however due to the higher fines, these soils are moisture sensitive and may be more challenging to place and compact as structural fill.

It is recommended that material to be used for engineered fill be analyzed and approved by the ECS Geotechnical Engineer prior to their use on site. Subgrade soils disturbed by contractor operations should be re-compacted to the specifications of this report. Subgrade soils which are excessively wet but otherwise suitable by virtue of soil classification (i.e., inorganic soil material meeting the specifications above) are not to be considered unsuitable by definition and can be moisture conditioned and re-compacted.

6.0 CLOSING

ECS has prepared this report to guide the geotechnical-related design and construction aspects of the project. We performed these services in accordance with the standard of care expected of professionals in the industry performing similar services on projects of like size and complexity at this time in the region. No other representation, expressed or implied, and no warranty or guarantee is included or intended in this report.

The description of the proposed project is based on information provided to ECS by Kimley-Horn and Associates, Inc. If any of this information is inaccurate or changes, either because of our interpretation of the documents provided or site or design changes that may occur later, ECS should be contacted so we can review our recommendations and provide additional or alternate recommendations that reflect the proposed construction.

We recommend that ECS review the project plans and specifications so we can confirm that those plans/specifications are in accordance with the recommendations of this geotechnical report.

Field observations, and quality assurance testing during earthwork and foundation installation are an extension of, and integral to, the geotechnical design. We recommend that ECS be retained to apply our expertise throughout the geotechnical phases of construction, and to provide consultation and recommendation should issues arise.

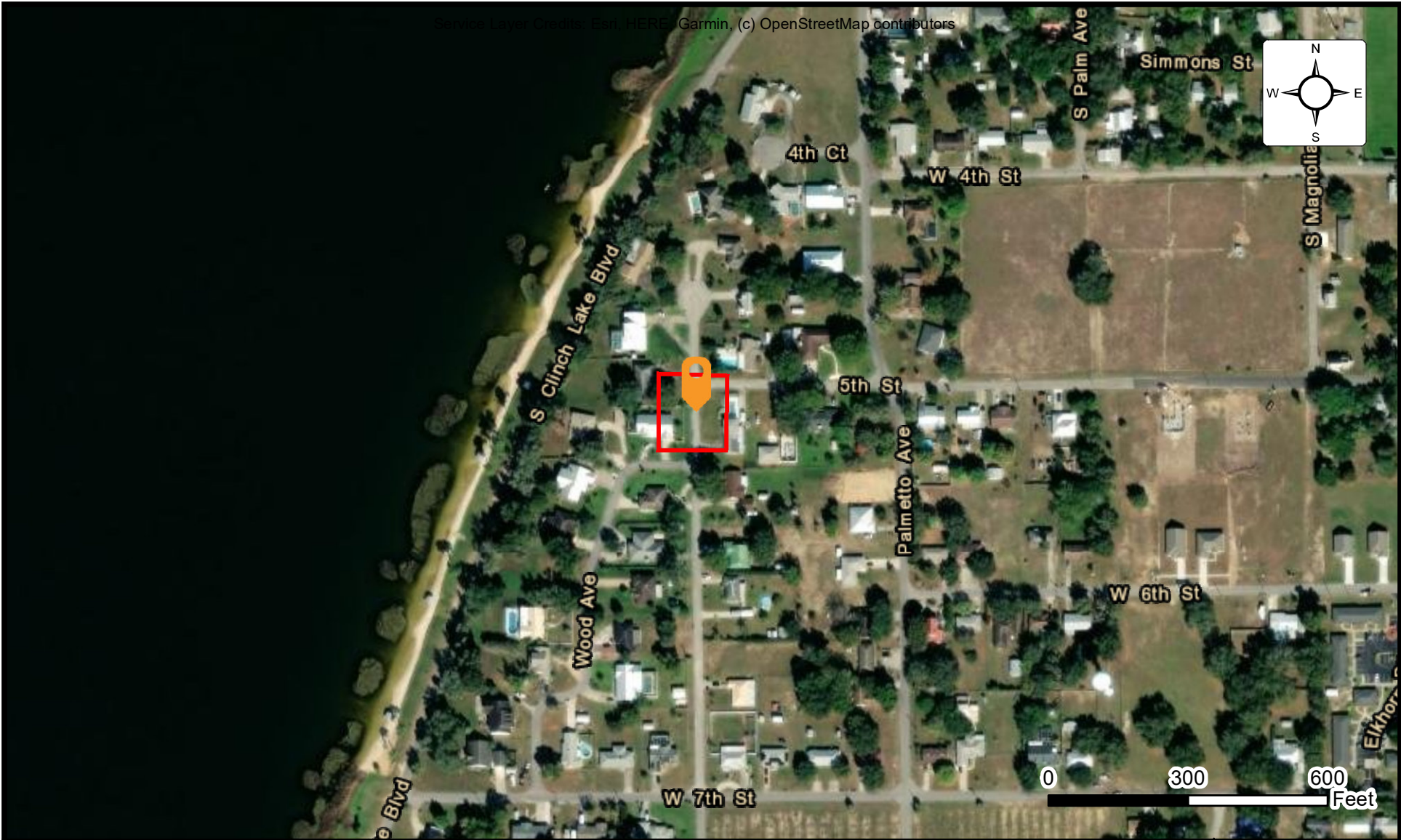
ECS is not responsible for the conclusions, opinions, or recommendations of others based on the data in this report.

Appendix A - Drawings and Reports

Site Location Diagram

Boring Location Diagram(s)

Soil Survey Map



SITE LOCATION DIAGRAM LIFT STATION - FROSTPROOF

FIR AVENUE AND WEST 5TH STREET, FROSTPROOF, FLORIDA
KIMLEY-HORN



ENGINEER TM13
SCALE AS NOTED
PROJECT NO. 24:7584
FIGURE 1 OF 1
DATE 2/26/2024

Service Layer Credits: Esri, HERE, Garmin, (c) OpenStreetMap contributors



Legend

⊕ Approximate SPT Boring Locations

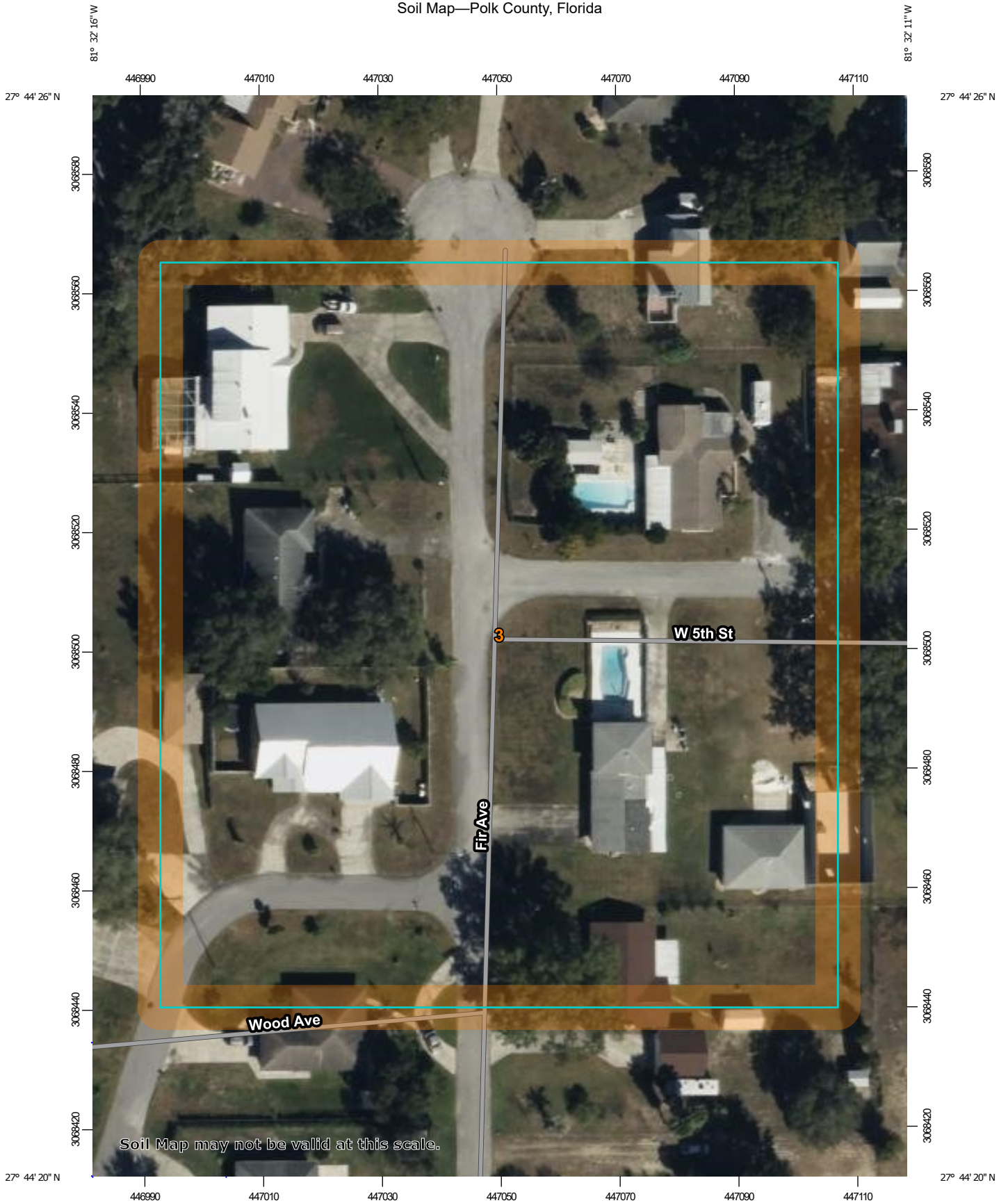


BORING LOCATION DIAGRAM LIFT STATION - FROSTPROOF

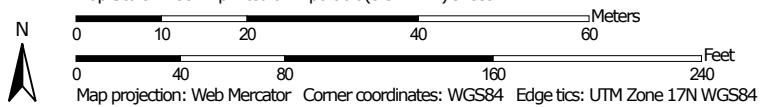
FIR AVENUE AND WEST 5TH STREET, FROSTPROOF, FLORIDA
KIMLEY-HORN

ENGINEER TM13
SCALE AS NOTED
PROJECT NO. 24:7584
FIGURE 1 OF 1
DATE 2/26/2024

Soil Map—Polk County, Florida




Map Scale: 1:884 if printed on A portrait (8.5" x 11") sheet.




MAP LEGEND

Area of Interest (AOI)

 Area of Interest (AOI)

Soils

 Soil Map Unit Polygons

 Soil Map Unit Lines

 Soil Map Unit Points

Special Point Features



Blowout



Borrow Pit



Clay Spot



Closed Depression



Gravel Pit



Gravelly Spot



Landfill



Lava Flow



Marsh or swamp



Mine or Quarry



Miscellaneous Water



Perennial Water



Rock Outcrop



Saline Spot



Sandy Spot



Severely Eroded Spot



Sinkhole



Slide or Slip



Sodic Spot



Spoil Area



Stony Spot



Very Stony Spot



Wet Spot



Other



Special Line Features

Water Features



Streams and Canals

Transportation



Rails



Interstate Highways



US Routes



Major Roads



Local Roads

Background



Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:20,000.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service

Web Soil Survey URL:

Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Polk County, Florida

Survey Area Data: Version 21, Sep 6, 2023

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Jan 30, 2022—Mar 2, 2022

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
3	Candler sand, 0 to 5 percent slopes	3.5	100.0%
Totals for Area of Interest		3.5	100.0%

Appendix B – Field Operations

Reference Notes

Exploration Procedures

Boring Logs

REFERENCE NOTES FOR BORING LOGS

MATERIAL ^{1,2}	
	ASPHALT
	CONCRETE
	GRAVEL
	TOPSOIL
	VOID
	BRICK
	AGGREGATE BASE COURSE
	GW WELL-GRADED GRAVEL gravel-sand mixtures, little or no fines
	GP POORLY-GRADED GRAVEL gravel-sand mixtures, little or no fines
	GM SILTY GRAVEL gravel-sand-silt mixtures
	GC CLAYEY GRAVEL gravel-sand-clay mixtures
	SW WELL-GRADED SAND gravelly sand, little or no fines
	SP POORLY-GRADED SAND gravelly sand, little or no fines
	SM SILTY SAND sand-silt mixtures
	SC CLAYEY SAND sand-clay mixtures
	ML SILT non-plastic to medium plasticity
	MH ELASTIC SILT high plasticity
	CL LEAN CLAY low to medium plasticity
	CH FAT CLAY high plasticity
	OL ORGANIC SILT or CLAY non-plastic to low plasticity
	OH ORGANIC SILT or CLAY high plasticity
	PT PEAT highly organic soils

DRILLING SAMPLING SYMBOLS & ABBREVIATIONS			
SS	Split Spoon Sampler	PM	Pressuremeter Test
ST	Shelby Tube Sampler	RD	Rock Bit Drilling
WS	Wash Sample	RC	Rock Core, NX, BX, AX
BS	Bulk Sample of Cuttings	REC	Rock Sample Recovery %
PA	Power Auger (no sample)	RQD	Rock Quality Designation %
HSA	Hollow Stem Auger		

PARTICLE SIZE IDENTIFICATION		
DESIGNATION	PARTICLE SIZES	
Boulders	12 inches (300 mm) or larger	
Cobbles	3 inches to 12 inches (75 mm to 300 mm)	
Gravel:	Coarse	¾ inch to 3 inches (19 mm to 75 mm)
	Fine	4.75 mm to 19 mm (No. 4 sieve to ¾ inch)
Sand:	Coarse	2.00 mm to 4.75 mm (No. 10 to No. 4 sieve)
	Medium	0.425 mm to 2.00 mm (No. 40 to No. 10 sieve)
	Fine	0.074 mm to 0.425 mm (No. 200 to No. 40 sieve)
Silt & Clay ("Fines")	<0.074 mm (smaller than a No. 200 sieve)	

COHESIVE SILTS & CLAYS		
UNCONFINED COMPRESSIVE STRENGTH, QP ⁴	SPT ⁵ (BPF)	CONSISTENCY ⁷ (COHESIVE)
<0.25	<2	Very Soft
0.25 - <0.50	2 - 4	Soft
0.50 - <1.00	5 - 8	Firm
1.00 - <2.00	9 - 15	Stiff
2.00 - <4.00	16 - 30	Very Stiff
4.00 - 8.00	31 - 50	Hard
>8.00	>50	Very Hard

RELATIVE AMOUNT ⁷	COARSE GRAINED (%) ⁸	FINE GRAINED (%) ⁸
Trace	≤5	≤5
With	10 - 20	10 - 25
Adjective (ex: "Silty")	25 - 45	30 - 45

GRAVELS, SANDS & NON-COHESIVE SILTS	
SPT ⁵	DENSITY
<5	Very Loose
5 - 10	Loose
11 - 30	Medium Dense
31 - 50	Dense
>50	Very Dense

WATER LEVELS ⁶	
	WL (First Encountered)
	WL (Completion)
	WL (Seasonal High Water)
	WL (Stabilized)

FILL AND ROCK			
FILL	POSSIBLE FILL	PROBABLE FILL	ROCK

¹Classifications and symbols per ASTM D 2488-17 (Visual-Manual Procedure) unless noted otherwise.

²To be consistent with general practice, "POORLY GRADED" has been removed from GP, GP-GM, GP-GC, SP, SP-SM, SP-SC soil types on the boring logs.

³Non-ASTM designations are included in soil descriptions and symbols along with ASTM symbol [Ex: (SM-FILL)].

⁴Typically estimated via pocket penetrometer or Torvane shear test and expressed in tons per square foot (tsf).

⁵Standard Penetration Test (SPT) refers to the number of hammer blows (blow count) of a 140 lb. hammer falling 30 inches on a 2 inch OD split spoon sampler required to drive the sampler 12 inches (ASTM D 1586). "N-value" is another term for "blow count" and is expressed in blows per foot (bpf). SPT correlations per 7.4.2 Method B and need to be corrected if using an auto hammer.

⁶The water levels are those levels actually measured in the borehole at the times indicated by the symbol. The measurements are relatively reliable when augering, without adding fluids, in granular soils. In clay and cohesive silts, the determination of water levels may require several days for the water level to stabilize. In such cases, additional methods of measurement are generally employed.

⁷Minor deviation from ASTM D 2488-17 Note 14.

⁸Percentages are estimated to the nearest 5% per ASTM D 2488-17.



SUBSURFACE EXPLORATION PROCEDURE: STANDARD PENETRATION TESTING (SPT) ASTM D 1586 Split-Barrel Sampling

Standard Penetration Testing, or **SPT**, is the most frequently used subsurface exploration test performed worldwide. This test provides samples for identification purposes, as well as a measure of penetration resistance, or N-value. The N-Value, or blow counts, when corrected and correlated, can approximate engineering properties of soils used for geotechnical design and engineering purposes.

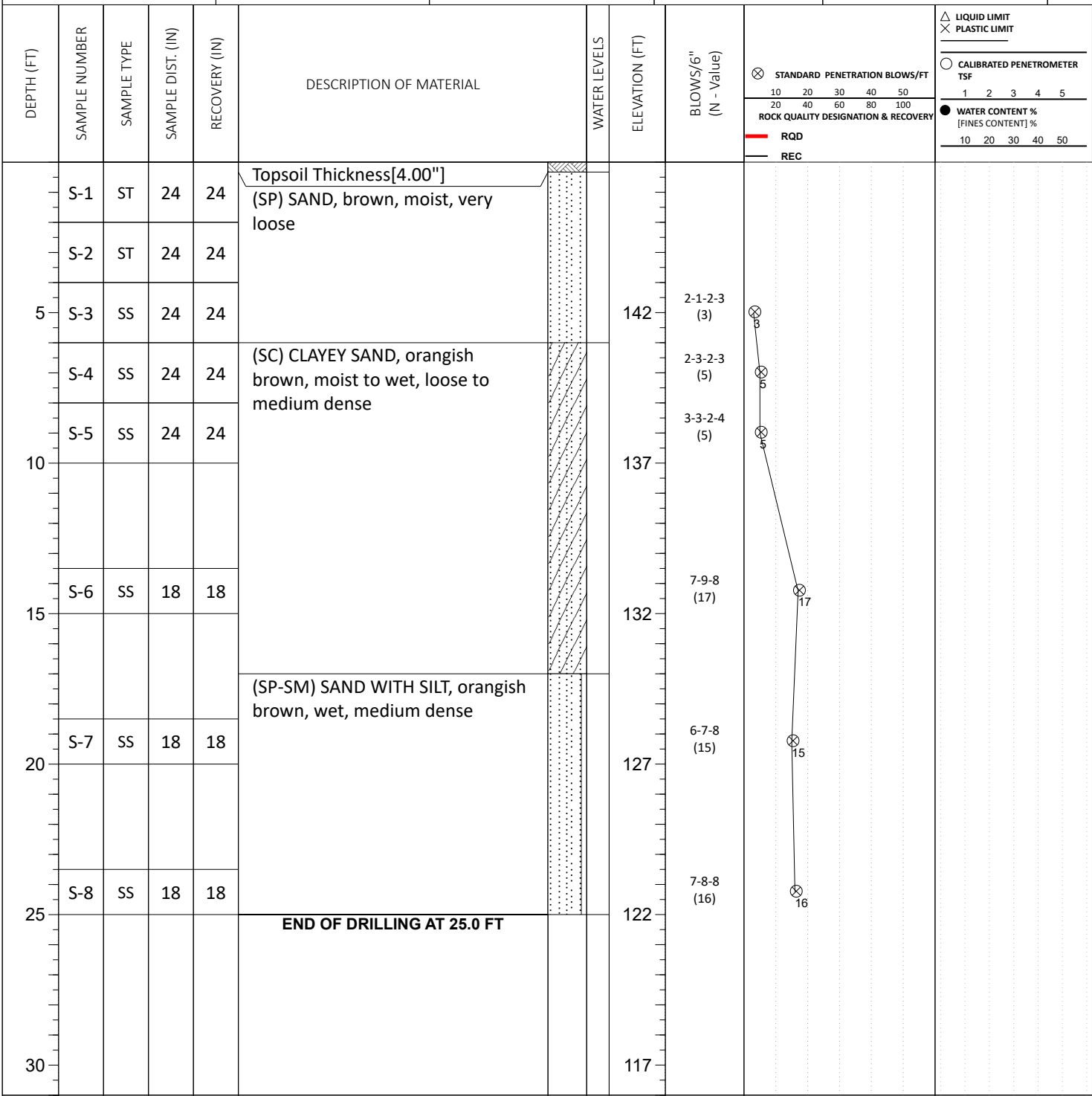
SPT Procedure:

- Involves driving a hollow tube (split-spoon) into the ground by dropping a 140-lb hammer a height of 30-inches at desired depth
- Recording the number of hammer blows required to drive split-spoon a distance of 18-24 inches (in 3 or 4 Increments of 6 inches each)
- Auger is advanced* and an additional SPT is performed
- One SPT typically performed for every two to five feet. An approximate 1.5 inch diameter soil sample is recovered.



**Drilling Methods May Vary*— The predominant drilling methods used for SPT are open hole fluid rotary drilling and hollow-stem auger drilling.

SITE LOCATION: Fir Avenue and West 5th Street, Frostproof, Florida, 33843			LOSS OF CIRCULATION
LATITUDE:	LONGITUDE:	STATION:	BOTTOM OF CASING



THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL TYPES. IN-SITU THE TRANSITION MAY BE GRADUAL

▽ WL (First Encountered) >10'	BORING STARTED: Jan 22 2024	CAVE IN DEPTH:
▼ WL (Completion)	BORING COMPLETED: Jan 22 2024	HAMMER TYPE: Manual
▽ WL (Seasonal High Water) >10'	EQUIPMENT: Track	LOGGED BY:
▽ WL (Stabilized)		DRILLING METHOD: Mud rotary

GEOTECHNICAL BOREHOLE LOG

Appendix C – Laboratory Testing

Laboratory Testing Summary


Laboratory Testing Summary

Sample Source	Sample Number	Depth (feet)	MC (%)	Soil Type	Atterberg Limits			Percent Passing No. 200 Sieve	Moisture - Density		Organic Content	Permeability (feet/day)
					LL	PL	PI		Maximum Density (pcf)	Optimum Moisture (%)		
ECS-01	S-4	6-8	13.4	SC				21.8				
ECS-01	S-7	18.5-20	17.7	SP-SM				7.1				

Notes: See test reports for test method, *ASTM D2488

Definitions: MC: Moisture Content, Soil Type: USCS (Unified Soil Classification System), LL: Liquid Limit, PL: Plastic Limit, PI: Plasticity Index, CBR: California Bearing Ratio, OC: Organic Content

Project:	Lift Station - Frostproof	Project No.:	24:7584
Client:	Kimley-Horn and Associates, Inc.	Date Reported:	2/26/2024

	Office / Lab	Address	Office Number / Fax
	ECS Florida LLC - Orlando	2815 Directors Row Suite 500 Orlando, FL 32809	(407)859-8378 (407)859-9599

TEST HOLE REPORTS

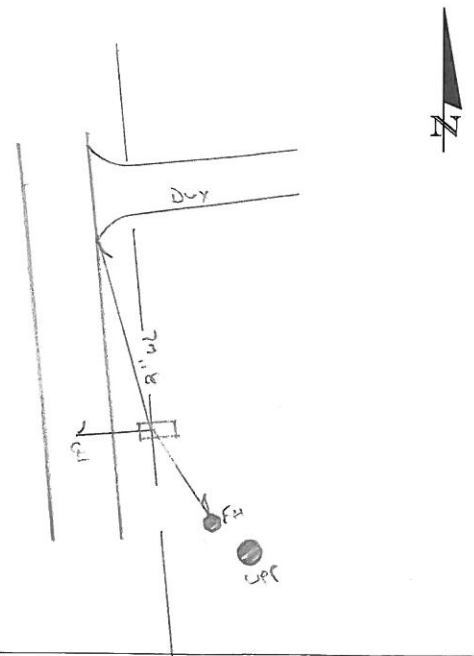
2525 DRANE FIELD ROAD SUITE 7
LAKELAND, FL 33811
TELEPHONE: 863.646.4771
FAX: 863.646.3378

CIVILSURV JOB #: 236-001-039
TEST HOLE #: 1
CIVILSURV PM:

PROJECT NAME: EXTENSION FIRE AL	F.D.O.T. JOB#:	WORK ORDER #:
LOCATE REQUESTED BY:	PAVEMENT TYPE: NONE ASPHALT CONCRETE ASPHALT OVER CONCRETE BRICK COBBLES PAVERS OTHER: GRASS SIDEWALK DIRT N/A	
REQUESTED LOCATE: GAS WATER ELEC. TEL. SAN F.M. STORM OTHER:	PAVEMENT CONDITIONS: GOOD FAIR POOR N/A	
LOCATED UTILITY: GAS WATER ELEC. TEL. SAN F.M. STORM OTHER:	SOIL CONDITIONS: HARD SOFT WET MOIST DRY DIRT SAND CLAY ROCKY SOLID-ROCK N/A	
MATERIAL AS FOUND: DI CI STL W/STL VCPX RCP TILE DUCT PLA T.COTTA ACP GALV. ROUGH POUR SMOOTH POUR PVC UNK DB CABLE N/A	SHEET 1 OF 1	PROPOSED:
OTHER:	COVER ESTABLISHED BY:	FORM CHECKED BY:
SIZE AS FOUND: 2"	FORM BY: D. PORTER	ASSISTED BY: R. REZA
UTILITY CONDITION: GOOD FAIR POOR N/A	NUMBER OF HOLES: 1	TODAY'S DATE: 12-14-23
RIBBON INSTALLED: RED BLUE YELLOW ORANGE N/A PINK WHITE PURPLE GREEN	INSTALLED: NAIL HUB&TACK CHISX IRON ROD & CAP AT: CROWN EDGE OF UTILITY N S E W	
	SURVEY PIN LOCATED BY: D. PORTER	
	NOTES: DUG 1' X 2' E/W TRENCH DOWN 4' FOUND 2" PVC WL AT 2'40"	
	SURVEY INFORMATION:	
	GIVEN ELEVATION:	
	TIME:	
	STATION:	OFFSET:

SKETCH

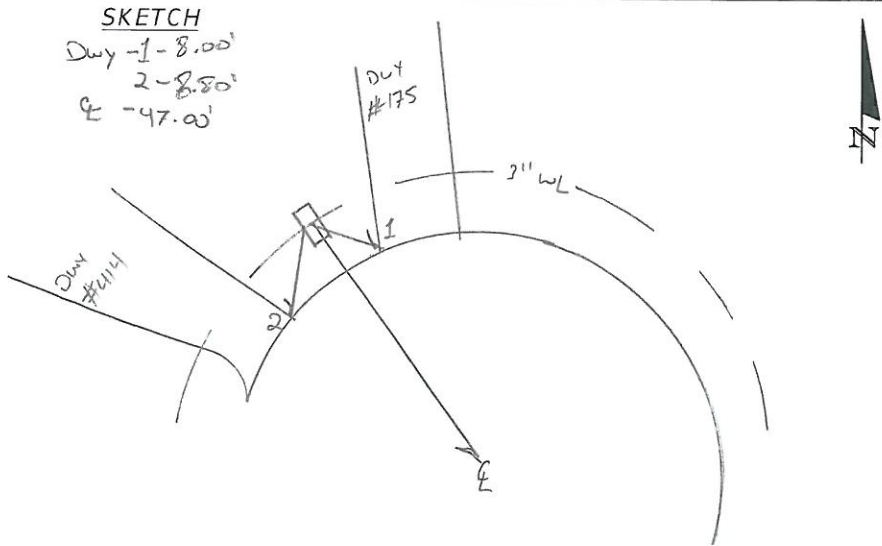
E - 15.10'
Dwy - 28.30'
FH - 10.0'



2525 DRANE FIELD ROAD SUITE 7
LAKELAND, FL 33811
TELEPHONE: 863.646.4771
FAX: 863.646.3378

CIVILSURV JOB #: 236-001-039
TEST HOLE #: 2
CIVILSURV PM:

PROJECT NAME: <u>EXTENSION FDR AVE</u>	F.D.O.T. JOB#:	WORK ORDER #:
LOCATE REQUESTED BY:	PAVEMENT TYPE: NONE ASPHALT CONCRETE ASPHALT OVER CONCRETE BRICK COBBLES PAVERS OTHER: <u>GRASS</u> SIDEWALK DIRT N/A	
REQUESTED LOCATE: GAS <u>WATER</u> ELEC. TEL. SAN F.M. STORM OTHER:	PAVEMENT CONDITIONS: GOOD FAIR POOR N/A	
LOCATED UTILITY: GAS <u>WATER</u> ELEC. TEL. SAN F.M. STORM OTHER:	SOIL CONDITIONS: <u>HARD</u> <u>SOFT</u> WET MOIST <u>DRY</u> DIRT <u>SAND</u> CLAY ROCKY SOLID-ROCK N/A	
MATERIAL AS FOUND: DI CI STL W/STL VCPX RCP TILE DUCT PLA T.COTTA ACP GALV. ROUGH POUR SMOOTH POUR <u>PVC</u> UNK DB CABLE N/A	SHEET <u>1</u> OF <u>1</u> PROPOSED:	
OTHER:	COVER ESTABLISHED BY: FORM CHECKED BY:	
SIZE AS FOUND: <u>3"</u>	FORM BY: <u>D. PORTER</u> ASSISTED BY: <u>R. REZA</u>	
UTILITY CONDITION: <u>GOOD</u> FAIR POOR N/A	NUMBER OF HOLES: <u>1</u> TODAY'S DATE: <u>12-14-23</u>	
RIBBON INSTALLED: RED <u>BLUE</u> YELLOW ORANGE N/A PINK WHITE PURPLE GREEN	INSTALLED: NAIL <u>HUB&TACK</u> CHISX IRON ROD & CAP AT: <u>CROWN</u> EDGE OF UTILITY: N S E W	
	SURVEY PIN LOCATED BY: <u>D. PORTER</u>	
	NOTES: DUG 1'x2' TRENCH DOWN 4' FOUND 3" PVC WL AT 2.30'	
SURVEY INFORMATION: _____		_____
GIVEN ELEVATION: _____		_____
TIME: _____		_____
STATION: _____		OFFSET: _____



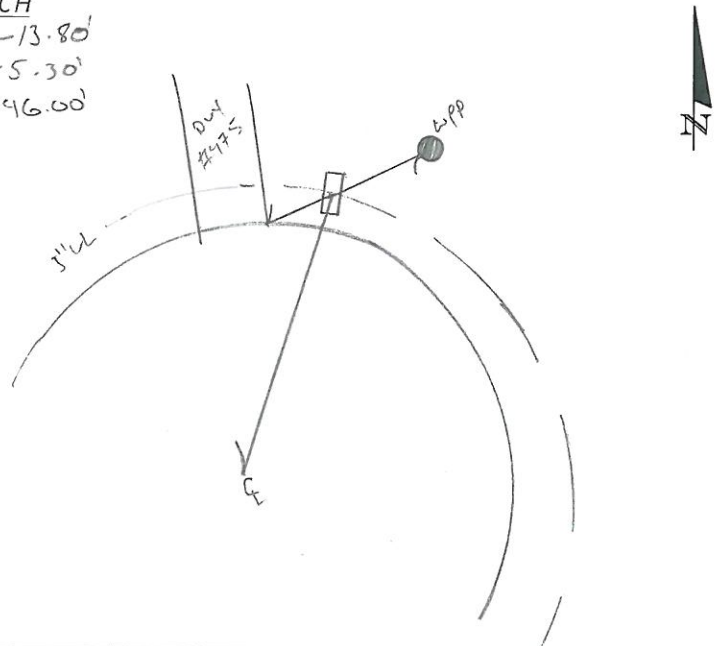
2525 DRANE FIELD ROAD SUITE 7
LAKELAND, FL 33811
TELEPHONE: 863.646.4771
FAX: 863.646.3378

CIVILSURV JOB #:
276-001-039
TEST HOLE #: 3
CIVILSURV PM:

PROJECT NAME: <u>EXTENSION FIRE AVE.</u>	F.D.O.T. JOB#:	WORK ORDER #:
LOCATE REQUESTED BY:	PAVEMENT TYPE: NONE ASPHALT CONCRETE ASPHALT OVER CONCRETE BRICK COBBLES PAVERS OTHER: <u>GRASS SIDEWALK</u> <u>DIRT</u> N/A	
REQUESTED LOCATE: GAS <u>WATER</u> ELEC. TEL. SAN F.M. STORM OTHER:	PAVEMENT CONDITIONS: GOOD FAIR POOR N/A	
LOCATED UTILITY: GAS <u>WATER</u> ELEC. TEL. SAN F.M. STORM OTHER:	SOIL CONDITIONS: <u>HARD</u> <u>SOFT</u> <u>WET</u> <u>MOIST</u> <u>DRY</u> <u>DIRT</u> <u>SAND</u> <u>CLAY</u> <u>ROCKY</u> <u>SOLID-ROCK</u> N/A	
MATERIAL AS FOUND: DI CI STL W/STL VCPX RCP TILE DUCT PLA T.COTTA ACP GALV. ROUGH POUR SMOOTH POUR <u>PVC</u> UNK DB CABLE N/A	SHEET <u>1</u> OF <u>1</u>	PROPOSED:
OTHER:	COVER ESTABLISHED BY:	FORM CHECKED BY:
SIZE AS FOUND: <u>3"</u>	FORM BY: <u>D. POCTEE</u>	ASSISTED BY: <u>R. REZA</u>
UTILITY CONDITION: GOOD FAIR POOR N/A	NUMBER OF HOLES: <u>1</u>	TODAY'S DATE: <u>12-14-23</u>
RIBBON INSTALLED: RED <u>BLUE</u> YELLOW ORANGE N/A PINK WHITE PURPLE GREEN	INSTALLED: NAIL <u>HUB&TACK</u> CHISX IRON ROD & CAP AT: <u>CROWN EDGE OF UTILITY</u> : N S E W	
	SURVEY PIN LOCATED BY: <u>D. POCTEE</u>	
	NOTES: <u>DUG 1'x4' TRENCH DOWN 4'</u> <u>FOUND 3" WL PVC AT 1.60'</u>	
	SURVEY INFORMATION: _____	
	GIVEN ELEVATION: _____	
	TIME: _____	
	STATION: _____	OFFSET: _____

SKETCH

Dwy-13.80'
Opp-5.30'
E = 96.00'



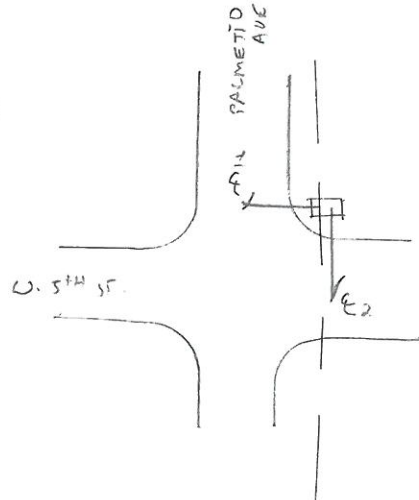
2525 DRANE FIELD ROAD SUITE 7
LAKELAND, FL 33811
TELEPHONE: 863.646.4771
FAX: 863.646.3378

CIVILSURV JOB #: 236-001-039
TEST HOLE #: 5
CIVILSURV PM:

PROJECT NAME: <u>EXTENSION</u>	F.D.O.T. JOB#:	WORK ORDER #:
LOCATE REQUESTED BY:	PAVEMENT TYPE: NONE ASPHALT CONCRETE ASPHALT OVER CONCRETE BRICK COBBLES PAVERS OTHER: <u>GRASS</u> <u>SIDEWALK</u> <u>DIRT</u> N/A	
REQUESTED LOCATE: GAS <u>WATER</u> ELEC. TEL. SAN F.M. STORM OTHER:	PAVEMENT CONDITIONS: GOOD FAIR POOR N/A	
LOCATED UTILITY: GAS <u>WATER</u> ELEC. TEL. SAN F.M. STORM OTHER:	SOIL CONDITIONS: <u>HARD</u> <u>SOFT</u> <u>WET</u> <u>MOIST</u> <u>DRY</u> <u>DIRT</u> <u>SAND</u> <u>CLAY</u> <u>ROCKY</u> <u>SOLID-ROCK</u> N/A	
MATERIAL AS FOUND: DI CI STL W/STL VCPX RCP TILE DUCT PLA T.COTTA ACP GALV. ROUGH POUR SMOOTH POUR <u>PVC</u> UNK DB CABLE N/A	SHEET <u>1</u> OF <u>1</u> PROPOSED:	
OTHER:	COVER ESTABLISHED BY: FORM CHECKED BY:	
SIZE AS FOUND: <u>6"</u>	FORM BY: <u>D. PORTER</u> ASSISTED BY: <u>D. REZA</u>	
UTILITY CONDITION: GOOD FAIR POOR N/A	NUMBER OF HOLES: <u>1</u> TODAY'S DATE: <u>12-14-23</u>	
RIBBON INSTALLED: RED <u>BLUE</u> YELLOW ORANGE N/A PINK WHITE PURPLE GREEN	INSTALLED: NAIL <u>HUB&TACK</u> CHISX IRON ROD & CAP AT: <u>CROWN</u> <u>EDGE OF UTILITY</u> N S E W	
	SURVEY PIN LOCATED BY: <u>D. PORTER</u>	
	NOTES: <u>DUG 1' x 3' E/W TRENCH DOWN 3'</u> <u>3.40' DOWN FORMED 6" DOWN PVC</u>	
SURVEY INFORMATION:		OFFSET:
GIVEN ELEVATION:		
TIME:		
STATION:		

SKETCH

E2 - 16.00'
E2 - 25.90'



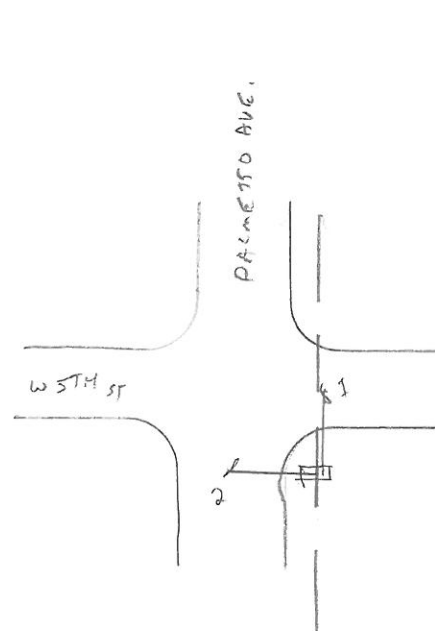
2525 DRANE FIELD ROAD SUITE 7
LAKELAND, FL 33811
TELEPHONE: 863.646.4771
FAX: 863.646.3378

CIVILSURV JOB #: 236-001-039
TEST HOLE #: SA
CIVILSURV PM:

PROJECT NAME:	F.D.O.T. JOB#:	WORK ORDER #:
LOCATE REQUESTED BY:	PAVEMENT TYPE: NONE ASPHALT CONCRETE ASPHALT OVER CONCRETE BRICK COBBLES PAVERS OTHER: GRASS SIDEWALK <u>DIRT</u> N/A	
REQUESTED LOCATE: GAS <u>WATER</u> ELEC. TEL. SAN F.M. STORM OTHER:	PAVEMENT CONDITIONS: GOOD FAIR POOR N/A	
LOCATED UTILITY: GAS <u>WATER</u> ELEC. TEL. SAN F.M. STORM OTHER:	SOIL CONDITIONS: <u>HARD</u> <u>SOFT</u> WET MOIST <u>DRY</u> <u>DIRT</u> <u>SAND</u> <u>CLAY</u> ROCKY SOLID-ROCK N/A	
MATERIAL AS FOUND: DI CI STL W/STL VCPX RCP TILE DUCT PLA T.COTTA ACP GALV. ROUGH POUR SMOOTH POUR <u>PVC</u> UNK DB CABLE N/A	SHEET 1 OF 1	PROPOSED:
OTHER:	COVER ESTABLISHED BY:	FORM CHECKED BY:
SIZE AS FOUND: 6"	FORM BY: D. Porter	ASSISTED BY: R. REZA
UTILITY CONDITION: GOOD FAIR POOR N/A	NUMBER OF HOLES: 1	TODAY'S DATE: 12-13-28
RIBBON INSTALLED: RED <u>BLUE</u> YELLOW ORANGE N/A PINK WHITE PURPLE GREEN	INSTALLED: NAIL <u>HUB&TACK</u> CHISX IRON ROD & CAP AT: <u>CROWN</u> <u>EDGE OF UTILITY</u> : N S E W	
<p>ELEV. SURVEY PIN: 146.10'</p> <p>COVER (TOP): 3.50'</p> <p>ELEV. (TOP): 142.60'</p> <p>COVER (BOTTOM): 4.00'</p> <p>ELEV. (BOTTOM): 142.10'</p> <p>WIDTH: 6"</p> <p>FACING: W/S</p>		
SURVEY PIN LOCATED BY: D. Porter		
NOTES: Dug 1/2" hole down 4' Found 6" unkn at 3.50'		
SURVEY INFORMATION: _____		
GIVEN ELEVATION: _____		
TIME: _____		
STATION: _____		OFFSET: _____

SKETCH

Q 1 - 29.00'
2 - 13.70'



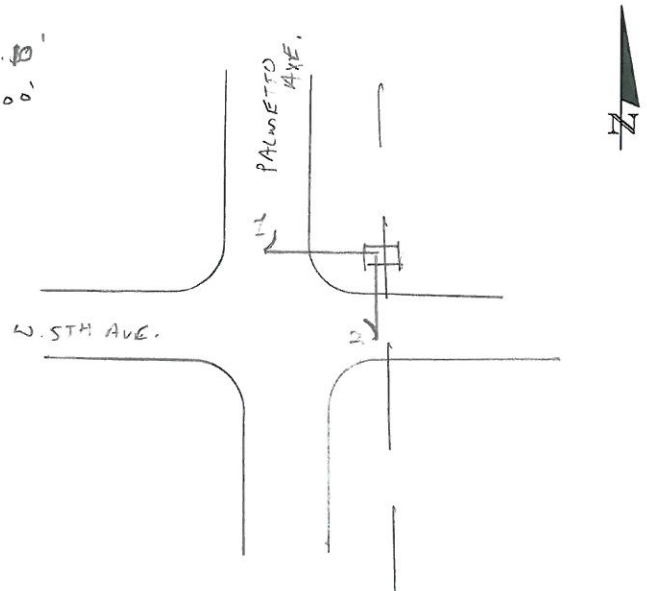
2525 DRANE FIELD ROAD SUITE 7
LAKELAND, FL 33811
TELEPHONE: 863.646.4771
FAX: 863.646.3378

CIVILSURV JOB #: 236-001-029
TEST HOLE #: 6
CIVILSURV PM:

PROJECT NAME:	F.D.O.T. JOB#:	WORK ORDER #:
LOCATE REQUESTED BY:	PAVEMENT TYPE: NONE ASPHALT CONCRETE ASPHALT OVER CONCRETE BRICK COBBLES PAVERS OTHER: GRASS SIDEWALK DIRT N/A	
REQUESTED LOCATE: GAS WATER ELEC. TEL. SAN F.M. STORM OTHER:	PAVEMENT CONDITIONS: GOOD FAIR POOR N/A	
LOCATED UTILITY: GAS WATER ELEC. TEL. SAN F.M. STORM OTHER:	SOIL CONDITIONS: HARD SOFT WET MOIST DRY DIRT SAND CLAY ROCKY SOLID-ROCK N/A	
MATERIAL AS FOUND: DI CI STL W/STL VCPX RCP TILE DUCT PLA T.COTTA ACP GALV. ROUGH POUR SMOOTH POUR PVS UNK DB CABLE N/A	SHEET 1 OF 1	PROPOSED:
OTHER:	COVER ESTABLISHED BY:	FORM CHECKED BY:
SIZE AS FOUND: 6"	FORM BY: D. PORTER	ASSISTED BY: K. REZA
UTILITY CONDITION: GOOD FAIR POOR N/A	NUMBER OF HOLES: 1	TODAY'S DATE: 12-14-23
RIBBON INSTALLED: RED BLUE YELLOW ORANGE N/A PINK WHITE PURPLE GREEN	INSTALLED: NAIL HUB&TACK CHISX IRON ROD & CAP AT: CROWN EDGE OF UTILITY: N S E W	
<p>ELEV. SURVEY PIN: 147.07'</p> <p>COVER (TOP): 2.60'</p> <p>ELEV. (TOP): 144.47'</p> <p>COVER (BOTTOM): 3.10'</p> <p>ELEV. (BOTTOM): 143.97'</p> <p>WIDTH: 6"</p> <p>FACING: 1/3</p>	SURVEY PIN LOCATED BY: D. PORTER	
	<p>NOTES: Dug 1' x 3' E/W TRENCH DOWN 5' FOUND 6" PVC GAS AT 2.60'</p>	
<p>SURVEY INFORMATION: _____</p> <p>GIVEN ELEVATION: _____</p> <p>TIME: _____</p> <p>STATION: _____</p> <p>OFFSET: _____</p>		

SKETCH

± 1 - 18.00'
± 2 - 24.00'



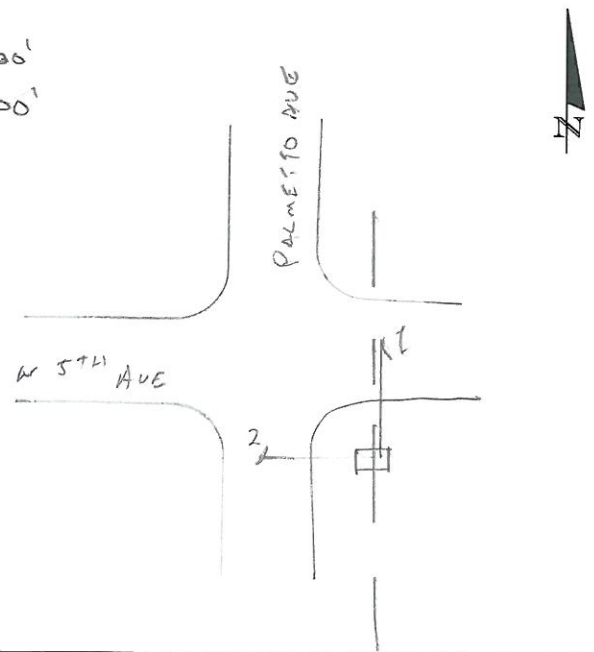
2525 DRANE FIELD ROAD SUITE 7
LAKELAND, FL 33811
TELEPHONE: 863.646.4771
FAX: 863.646.3378

TEST HOLE #: 236-001-079 / GA
CIVILSURV PM: ~~GA~~

PROJECT NAME:	F.D.O.T. JOB#:	WORK ORDER #:
LOCATE REQUESTED BY:	PAVEMENT TYPE: NONE ASPHALT CONCRETE ASPHALT OVER CONCRETE BRICK COBBLES PAVERS OTHER: GRASS SIDEWALK DIRT N/A	
REQUESTED LOCATE: GAS WATER ELEC. TEL. SAN F.M. STORM OTHER:	PAVEMENT CONDITIONS: GOOD FAIR POOR N/A	
LOCATED UTILITY: GAS WATER ELEC. TEL. SAN F.M. STORM OTHER:	SOIL CONDITIONS: HARD SOFT WET MOIST DRY DIRT SAND CLAY ROCKY SOLID-ROCK N/A	
MATERIAL AS FOUND: DI CI STL W/STL VCPX RCP TILE DUCT PLA T.COTTA ACP GALV. ROUGH POUR SMOOTH POUR PVC UNK DB CABLE N/A	SHEET 1 OF : 1 PROPOSED:	
OTHER:	COVER ESTABLISHED BY: FORM CHECKED BY:	
SIZE AS FOUND: 6"	FORM BY: D. PUEJER ASSISTED BY: R. REZA	
UTILITY CONDITION: GOOD FAIR POOR N/A	NUMBER OF HOLES: 1 TODAY'S DATE: 12-15-23	
RIBBON INSTALLED: RED BLUE YELLOW ORANGE N/A PINK WHITE PURPLE GREEN	INSTALLED: NAIL HUB&TACK CHISX IRON ROD & CAP AT: CROWN EDGE OF UTILITY: N S E W	
<p>ELEV. SURVEY PIN: 146.23</p> <p>COVER (TOP): 2.55'</p> <p>ELEV. (TOP): 143.68'</p> <p>COVER (BOTTOM): 3.05'</p> <p>ELEV. (BOTTOM): 143.18'</p> <p>WIDTH: 6"</p> <p>FACING: N/S</p>	SURVEY PIN LOCATED BY: D. PUEJER	
	<p>NOTES: Dug 1'x1' Hole Down 5'</p> <p>Found 6" GAS AT 2.55'</p>	
SURVEY INFORMATION:		
GIVEN ELEVATION:		
TIME:		
STATION:		OFFSET:

SKETCH

EI - 36.00'
2 - 17.00'



FORMS

NOTICE OF AWARD

Date of Issuance:	
Owner:	Owner's Contract No.:
Engineer:	Engineer's Project No.:
Project:	Contract Name:
Bidder:	
Bidder's Address: (send Certified Mail, Return Receipt Requested)	

TO BIDDER:

You are notified that Owner has accepted your Bid dated ____ for the above Contract, and that you are the Successful Bidder and are awarded a Contract for: ____

____ [describe Work, alternates, or sections of Work awarded]

The Contract Price of the awarded Contract is \$ _____ [note if subject to unit prices, or cost-plus]

____ unexecuted counterparts of the Agreement accompany this Notice of Award, and one copy of the Contract Documents accompanies this Notice of Award, or has been transmitted or made available to Bidder electronically [revise if multiple copies accompany the Notice of Award]

____ sets of the Drawings and __ copies of the Project Manual will be delivered separately from the other Contract Documents.

You must comply with the following conditions precedent within 15 days of the date of receipt of this Notice of Award.

1. Deliver to the Owner [____] counterparts of the Agreement, fully executed by Bidder.
2. Deliver with the executed Agreement(s) the Contract security and insurance documentation as specified in the Instructions to Bidders and General Conditions
3. Other conditions precedent (if any):

Failure to comply with these conditions within the time specified will entitle Owner to consider you in default, annul this Notice of Award, and declare your Bid security forfeited.

Within ten days after you comply with the above conditions, Owner will return to you one fully executed counterpart of the Agreement, together with any additional copies of the Contract Documents

Owner
By: _____
Authorized Signature

Title

Copy: Engineer

NOTICE TO PROCEED

Owner:	Owner's Contract No.:
Contractor:	Contractor's Project No.:
Engineer:	Engineer's Project No.:
Project:	Contract Name:
	Effective Date of Contract:

TO CONTRACTOR:

Owner hereby notifies Contractor that the Contract Times under the above Contract will commence to run on [_____, 20__].

On that date, Contractor shall start performing its obligations under the Contract Documents. No Work shall be done at the Site prior to such date. In accordance with the Agreement, [the date of Substantial Completion is _____, and the date of readiness for final payment is _____] *or* [the number of days to achieve Substantial Completion is _____, and the number of days to achieve readiness for final payment is _____].

Before starting any Work at the Site, Contractor must comply with the following:

[Note any access limitations, security procedures, or other restrictions]

_____ Contractor	_____ Owner
_____ Received by:	_____ Given by: Authorized Signature
_____ Title	_____ Title
_____ Date	_____ Date

CHANGE ORDER

DATE OF ISSUANCE:

No.

PROJECT:

OWNER:

CONTRACTOR: _____

ENGINEER:

CONTRACT FOR: _____

YOU ARE DIRECTED TO MAKE THE FOLLOWING CHANGES IN THE CONTRACT DOCUMENTS.

Description:

CHANGE IN CONTRACT PRICE: Original Bid Price As bid SRF Eligible	CHANGE IN CONTRACT TIME: Original Contract Time _____ Days
Previous Change Orders	Net change from previous Change Orders __ _ days
Contract Price prior to this Change Order	Contract Time prior to this Change Order ___ _ Days

Change Order

Net Increase/decrease of this Change Order	Net Increase/decrease of this Change Order NA
Contract Price with all approved Change Orders	Contract Time with all approved Change Orders ___ Days

RECOMMENDED:

By _____
Engineer

ACCEPTED:

By _____
CONTRACTOR

APPROVED:

By _____

END OF SECTION

Contractor's Application For Payment No. _____

	Application Period:	Application Date:
To (Owner):	From (Contractor):	Via (Engineer)
Project:	Contract:	
Owner's Contract No.:	Contractor's Project No.:	Engineer's Project No.:

APPLICATION FOR PAYMENT

Change Order Summary

Approved Change Orders				
Number	Additions	Deductions		
TOTALS				
NET CHANGE BY CHANGE ORDERS				

1. ORIGINAL CONTRACT PRICE.....	\$	
2. Net change by Change Orders	\$	
3. CURRENT CONTRACT PRICE (Line 1 ± 2).....	\$	
4. TOTAL COMPLETED AND STORED TO DATE (Column F on Progress Estimate)	\$	
5. RETAINAGE:		
a. ____ % x \$ _____ Work Completed	\$	
b. ____ % x \$ _____ Stored Material.....	\$	
c. Total Retainage (Line 5a + Line 5b)	\$	
6. AMOUNT ELIGIBLE TO DATE (Line 4 - Line 5c)	\$	
7. LESS PREVIOUS PAYMENTS (Line 6 from prior Application).....	\$	
8. AMOUNT DUE THIS APPLICATION.....	\$	
9. BALANCE TO FINISH, PLUS RETAINAGE (Column G on Progress Estimate + Line 5 above).....	\$	

CONTRACTOR'S CERTIFICATION

The undersigned Contractor certifies, to the best of its knowledge, the following:

(1) All previous progress payments received from Owner on account of Work done under the Contract have been applied on account to discharge Contractor's legitimate obligations incurred in connection with Work covered by prior Applications for Payment;

(2) Title of all Work, materials and equipment incorporated in said Work, or otherwise listed in or covered by this Application for Payment, will pass to Owner at time of payment free and clear of all Liens, security interests, and encumbrances (except such as are covered by a bond acceptable to Owner indemnifying Owner against any such Liens, security interest, or encumbrances); and

(3) All the Work covered by this Application for Payment is in accordance with the Contract Documents and is not defective.

Contractor Signature

By:	Date:
-----	-------

Payment of:	\$ _____	(Line 8 or other - attach explanation of other amount)
is recommended by:	_____	_____ (Date)
	(Engineer)	
Payment of:	\$ _____	(Line 8 or other - attach explanation of other amount)
is approved by:	_____	_____ (Date)
	(Owner)	
Approved by:	_____	_____ (Date)
	Funding Agency (if applicable)	

Item #		Unit										
138		LS										
139		LS										
140		LS										
141		LS										
142		LS										
143		LS										
144		LS										
145		LS										
146		LS										
147		LS										
148		LS										
149		LS										
Totals						\$		\$		\$	\$	% \$

Stored Material Summary

Contractor's Application

Application Number:

Application Date:

A Supplier Invoice No.	B Submittal No. (with Specification Section No.)	Storage Location	C Description of Materials or Equipment Stored	D		E Amount Stored this Month (\$)	Subtotal Amount Completed & Stored to Date (D + E)	F		G Materials Remaining in Storage (\$) (D + E - F)
				Stored Previously				Incorporated in Work		
				Date Placed into storage (Month/Year)	Amount (\$)			Date (Month/Year)	Amount (\$)	
			Totals							

CERTIFICATE OF SUBSTANTIAL COMPLETION

Owner:	Owner's Contract No.:
Contractor:	Contractor's Project No.:
Engineer:	Engineer's Project No.:
Project:	Contract Name:

This [preliminary] [final] Certificate of Substantial Completion applies to:

All Work The following specified portions of the Work:

Date of Substantial Completion

The Work to which this Certificate applies has been inspected by authorized representatives of Owner, Contractor, and Engineer, and found to be substantially complete. The Date of Substantial Completion of the Work or portion thereof designated above is hereby established, subject to the provisions of the Contract pertaining to Substantial Completion. The date of Substantial Completion in the final Certificate of Substantial Completion marks the commencement of the contractual correction period and applicable warranties required by the Contract.

A punch list of items to be completed or corrected is attached to this Certificate. This list may not be all-inclusive, and the failure to include any items on such list does not alter the responsibility of the Contractor to complete all Work in accordance with the Contract.

The responsibilities between Owner and Contractor for security, operation, safety, maintenance, heat, utilities, insurance, and warranties upon Owner's use or occupancy of the Work shall be as provided in the Contract.

Amendments to Owner's responsibilities: None
 As follows

Amendments to Contractor's responsibilities: None
 As follows:

The following documents are attached to and made a part of this Certificate: *[punch list; others]*

This Certificate does not constitute an acceptance of Work not in accordance with the Contract Documents, nor is it a release of Contractor's obligation to complete the Work in accordance with the Contract.

EXECUTED BY ENGINEER:	RECEIVED:	RECEIVED:
By: _____ (Authorized signature)	By: _____ Owner (Authorized Signature)	By: _____ Contractor(Authorized Signature)
Title: _____	Title: _____	Title: _____
Date: _____	Date: _____	Date: _____