

PROJECT SPECIFICATIONS
FOR
LOXAHATCHEE RIVER DISTRICT



ITB #22-002-00112
ROLLING HILLS SUBDIVISION
GRAVITY SEWER, LIFT STATION, &
FORCEMAIN

October 2021

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TABLE OF CONTENTS

<u>BIDDING AND CONTRACT REQUIREMENTS</u>	<u>FRONT-END PAGE NO.</u>
NOTICE TO CONTRACTORS	1
ARTICLE 1 - INSTRUCTION TO BIDDERS	3
ARTICLE 2 – PROPOSAL, QUESTIONNAIRE & BID	15
ARTICLE 3 – BID SECURITY	40
ARTICLE 4 – CONTRACT	42
ARTICLE 5 – PUBLIC CONSTRUCTION BOND	52
ARTICLE 6 – CONSTRUCTION FORMS	55
ARTICLE 7 – CERTIFICATE OF DISTRICT’S ATTORNEY	67
ARTICLE 8 – RESERVED	68
ARTICLE 9 – SPECIAL CONDITIONS	69
ARTICLE 10 – GENERAL CONDITIONS.....	97
 <u>TECHNICAL SPECIFICATIONS</u>	 <u>SECTION NO.</u>
MISCELLANEOUS REQUIREMENTS	30
EXCAVATION, BACKFILL, FILL AND GRADING	100
HORIZONTAL DIRECTIONAL DRILL	101
PIPE FITTINGS AND ACCESSORIES	110
CAST IN PLACE CONCRETE	120
PRECAST MANHOLES AND STRUCTURES	121
VALVES AND APPURTENANCES	130
PIPELINE INTEGRITY TESTS	140
SUBMERSIBLE LIFT STATIONS	150
INSTRUMENTATION	180
PROGRAMMABLE LOGIC CONTROLLER	181

DIVISION 1 – GENERAL REQUIREMENTS

SUMMARY OF WORK.....	01000
COORDINATION AND MEETINGS	01039
MEASUREMENT AND PAYMENT	01200
SUBMITTALS	01300
PRE-CONSTRUCTION AUDIO-VIDEO DOCUMENTATION	01360
QUALITY CONTROL	01400
CONSTRUCTION FACILITIES AND TEMPORARY CONTROLS	01500
MATERIAL AND EQUIPMENT	01600
CONTRACT CLOSEOUT	01700
PROJECT RECORD DRAWINGS	01720
OPERATION AND MAINTENANCE MANUALS	01730
GENERAL REQUIREMENTS	01750
CLOSEOUT SUBMITTALS.....	01780

DIVISION 2 – SITE WORK

UTILITY CONSTRUCTION.....	02000
DEWATERING	02140
GRADING	02210
EROSION, SEDIMENTATION, AND DUST CONTROL	02270
REHABILITATION OF SEWER UTILITIES	02731
RELINING GRAVITY MAINS, CIPP	02733
SEWER SERVICE LATERAL LINING	02734
MANHOLE REHABILITATION	02764
SODDING.....	02936

DIVISION 16 – ELECTRICAL

ELECTRICAL GENERAL REQUIREMENTS.....	16000
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BASIC MATERIALS AND METHODS	16050
RTU CELL BASE SYSTEM.....	16912

APPENDICES

LOXAHATCHEE RIVER DISTRICT MINIMUM CONSTRUCTION STANDARDS AND TECHNICAL SPECIFICATIONS	APPENDIX A
CONTRACTOR PERFORMANCE EVALUATION REPORT.....	APPENDIX B
GRAVITY SEWER EVALATION REPORT.....	APPENDIX C

NOTICE TO CONTRACTORS

Bids will be received by the Loxahatchee River Environmental Control District (the "District,") via DemandStar until **2:00 p.m.** local time on **November 9, 2021**. Any Bids received after 2:00 p.m. local time on **November 9, 2021**, will not be accepted under any circumstances. Any uncertainty regarding the time a Bid is received will be resolved against the Bidder. The Bids will be publicly opened and read aloud on **November 11, 2021** at **2:00 p.m.** local time in the Governing Board room of the District, at the above address. The Work to be performed is located in unincorporated Martin County, and consists of furnishing all labor, tools, materials, and equipment necessary for the rehabilitation of an existing wastewater pump station as shown on the Contract Plans and Specifications and as specified herein to include:

ITB #22-002-00112:

ROLLING HILLS SUBDIVISION GRAVITY SEWER, LIFT STATION, & FORCEMAIN

Furnishing all labor, materials, equipment and all incidentals and appurtenances necessary for wastewater collection improvements in the Rolling Hills Subdivision including the rehabilitation of seventeen manholes, the cured in place pipe (CIPP) lining of approximately 3,000 linear feet of existing 8" gravity sewer, the replacement of approximately 120 linear feet of existing 8" gravity sewer, 33 new service laterals with cleanouts, the rehabilitation and lining of 13 existing services, one new lift station utilizing an existing wet well, including all site work, mechanical work, dewatering, electrical work, instrumentation work, and related piping, valves, fittings, and appurtenances, approximately 850 linear feet of 4" force main to be installed via both open-cut and horizontal directional methods, force main valves and fittings, and restoration of all areas affected by construction to existing conditions or better.

The District reserves the right to determine material elements of the Bid and to award the Contract, if at all, to the lowest, qualified, responsive, and responsible Bidder. The District further reserves the right to reject any and all Bids; to not proceed with the Project; and/or to waive any irregularities contained in a Bid.

A pre-bid conference will be held at 2:00 p.m., local time on November 2, 2021 via Microsoft Teams. A meeting invite will be distributed to all plan holders prior to the scheduled date and time. If a bidder downloads Bid Documents from the District's website the bidder must send a request to be included in the pre-bid conference meeting invite to purchasing@lrecd.org. All contractors planning to submit Bids on this Project are encouraged to attend.

Bid Documents may be downloaded at the District's website, <https://loxahatcheeriver.org/governance/purchasing-bids/> or from DemandStar. Bid Documents will be available on **October 11, 2021** after **8:00 a.m.** local time. The Bid Documents are made available on the above terms solely for the purpose of obtaining Bids and do not confer a license or grant for any other use.

Character and amount of security to be furnished by each Bidder are stated in the Instruction to Bidders. The Bidder shall hold its Bid open for acceptance by the District for a period of not less than ninety (90) calendar days following the date of the Bid opening.

This solicitation has been issued as an Electronic Bid with the same title on DemandStar. To submit a response for this bid electronically follow the instructions on DemandStar. Electronic responses are the only method allowed for Bidders to respond to this solicitation. Bids shall be submitted on or before the date and time specified.

LOXAHATCHEE RIVER ENVIRONMENTAL CONTROL DISTRICT

Gordon M. Boggie, Chairman

INSTRUCTIONS TO BIDDERS

ARTICLE 1

1. The following defined terms shall govern this Section and all other Contract Documents unless otherwise noted in the Contract Documents:

- a. “Bid” shall mean the documents that comprise the submission for the Work of this Project.
- b. “Bid Period” shall mean the time period from when the Bid Documents will become available to the deadline for submitting Bids.
- c. “Bidder” shall mean one who submits a Bid directly to the District, as distinct from a sub-bidder, who submits a Bid to the Bidder.
- d. “Bid Documents” include the Advertisement for Bids, Instructions to Bidders, Proposal, Questionnaire, the Bid Form, and the proposed Contract Documents (including all Addenda issued prior to receipts of Bids).
- e. “Change Order” shall mean a written change, addition, or deletion to the Contract Documents signed by both Contractor and the District.
- f. “Contract” shall mean the agreement between the Successful Bidder and the District for performance of the Work.
- g. “Contract Documents” shall mean all documents that comprise the agreement of the parties related to the Project. The Contract Documents include the Notice to Contractors, Instructions to Bidders, Proposal, Questionnaire, Bid Security, Contract, Public Construction Bond, Sworn Statement of Public Entity Crimes, Opinion of District’s Attorney, Releases of Liens, Special Conditions, General Conditions, Technical Specifications, Standard Details and Plans, Plans and Specifications including all modifications, addenda, and Change Orders contained in any documents before or after execution of the Contract.
- h. “Contract Sum” shall mean the total amount due to Contractor as a result of the Work performed on the Project, including any amounts due as a result of Change Orders.
- i. “Contract Time” shall mean the time to complete the Project as set forth in the Contract Documents. Reference to “days” shall mean calendar days unless otherwise noted.
- j. “Contractor” shall mean the Successful Bidder with whom the District executes a contract for the Work or its duly authorized agents.
- k. “County” shall mean Palm Beach County, as may be applicable.
- l. “Defective” shall mean the Work does not conform to the Contract Documents or does not meet the requirements of any applicable inspection, reference standard, test, or approval.

- m. "District" shall mean the Loxahatchee River Environmental Control District, acting through its properly authorized representatives.
- n. "Engineer" shall mean the engineer designated by the District as its engineering representative during the course of construction to make appropriate inspection and computation of payments, whether acting directly or through properly authorized agents, inspectors or representatives of the Engineer, acting within the scope of duties entrusted to them. The Engineer is not an employee of the District.
- o. "Final Completion" shall mean the time when Engineer determines that all of the Work and associated punch list items have been completed in accordance with the Contract Documents.
- p. "Notice of Award" shall mean the District's notification of award of the Contract to the Successful Bidder.
- q. "Plans" shall mean any and all drawings, plans, sketches, diagrams, designs, lists, or other graphic and pictorial portions of the Contract Documents showing the design, location, and dimensions of the Work for the Project.
- r. "Project" shall mean the entire construction to be performed as provided in the Contract Documents.
- s. "Specifications" shall mean the written requirements for materials, equipment, systems, standards, and workmanship for the Work, and performance of related services.
- t. "Substantial Completion" shall mean the date as certified by Engineer when the construction of the Project is sufficiently completed, in accordance with the Contract Documents, so that the Project can be utilized for the purposes for which it was intended; or if there be no such certification, the date when final payment is due in accordance with the Contract.
- u. "Successful Bidder" shall mean the lowest, qualified, responsible, and responsive Bidder to whom the District, based on the District's evaluation hereinafter provided, makes an award.
- v. "Work" shall mean any and all obligations, duties and responsibilities necessary to the successful completion of the Project assigned to or undertaken by Contractor under the Contract Documents, including all labor, materials, equipment, services, and other incidentals and the furnishing, installation, and delivery thereof and all Work reasonably inferable therefrom.

2. **Bids:** Bids will be received by the Loxahatchee River Environmental Control District (the "District,") via DemandStar until **2:00 p.m.** local time on **November 9, 2021**. Any Bids received after **2:00 p.m.** local time on **November 9, 2021**, will not be accepted under any circumstances. Any uncertainty regarding the time a Bid is received will be resolved against the Bidder. The Bids will be publicly opened and read aloud on **November 11, 2021** at **2:00 p.m.** local time in the Governing

Board room of the District, at the above address. The Bidder shall hold its Bid open for acceptance by the District for a period not less than ninety (90) calendar days following the date of the Bid opening.

Bid Documents may be downloaded at the District's website, <https://loxahatcheeriver.org/governance/purchasing-bids/> or via DemandStar. Bid Documents will be available on **October 11, 2021** after **8:00 a.m.** local time. The Bid Documents are made available on the above terms solely for the purpose of obtaining Bids and do not confer a license or grant for any other use.

A pre-bid conference will be held at 2:00 p.m., local time on November 2, 2021, via Microsoft Teams. A meeting invite will be distributed to all plan holders prior to the scheduled date and time. If a bidder downloads Bid Documents from the District's website the bidder must send a request to be included in the pre-bid conference meeting invite to purchasing@lrecd.org. All contractors planning to submit Bids on this Project are encouraged to attend. All contractors planning to submit Bids on this Project are encouraged to attend.

All Bids shall be made on the blank form of proposal attached hereto. All blanks on the Bid Forms must be printed in blue or black ink or typed. Completed Bid Forms shall be scanned to PDF format and uploaded to DemandStar. The Bid shall contain an acknowledgment of receipt of all Addenda. A single Bid shall be submitted for all portions of the Work. Bids by corporations must be executed in the corporate name by the president or a vice president (or other corporate officer accompanied by evidence of authority to sign) and the corporate seal must be affixed and attested by the secretary or an assistant secretary. The corporate address and state of incorporation must be shown below the signature. Bids by partnerships must be executed in the partnership name and signed by a general partner, whose title must appear under the signature. The official address of the partnership must also be shown below the signature. If requested, the person signing a Bid for a corporation or partnership must produce evidence satisfactory to the District of the person's authority to bind the corporation or partnership. All names must be typed or printed below the signature. The address and telephone number for communications regarding the Bid must be shown.

After commencement of the Bid Period, no Bidder, or its agents, representatives, or persons acting at the request of such Bidder shall contact, communicate with or discuss any matter relating to the Bid with any District officer, agent, Board member, or employee other than Engineer or their designee. This prohibition ends upon execution of the final contract for the Work or when the Bid has been cancelled. A Bidder who violates this provision will be subject to discipline, including at a minimum a written reprimand and up to and including rejection of its Bid and/or cancellation of the Contract.

3. **Bid Security:** Each Bid must be accompanied by bid security in the form of a certified check or Bidder's Guaranty Bond ("Bid Bond") issued by a surety meeting the requirements of this Instruction to Bidders Section 3 and payable to the District for ten percent (10%) of the total amount of the Bid ("Bid Security"). Bidders will send the ORIGINAL Bid Bond to the District immediately after the Bid Due Date. The District will hold all bids unopened for 48 hours from the Bid Due Date. The original Bid Bond is to be received within 48 hours of the Bid Due Date or the bid will be deemed non-responsive. The Bid Security of the Successful Bidder will be retained until the Bidder has executed the Contract and furnished the required payment and performance bonds in the form of a Public Construction Bond, whereupon the Bid Security will be returned. If the Successful Bidder

fails to execute and deliver the Contract and furnish the required Bonds within fourteen (14) calendar days after the Notice of Award, the District may annul the Notice of Award and the Bid Security of that Bidder will be forfeited to the District. The Bid Security of any Bidder whom the District believes to have a reasonable chance of receiving the award may be retained by the District for ninety (90) calendar days after the date of the opening of the Bid. The Bid Security of other Bidders will be returned seven (7) calendar days after the opening of the Bids. The Bid Bond shall be issued by a company having a registered agent in the State of Florida.

4. **Bonds and Qualification of Security Companies:** Upon award of the Contract, Contractor shall execute a Public Construction Bond, in the amount of the total Contract Sum with a qualified surety company, covering performance of the Project and payment of subcontractors, substantially similar in form to that provided in Article 5 of the Contract Documents and in compliance with the requirements of Section 255.05, Florida Statutes.

In order to be acceptable to the District, Bid Bonds, Public Construction Bonds, or Maintenance Bonds shall, at a minimum be written by a surety company that:

- a. is admitted/authorized to do business in the State of Florida and complies with the provisions of Section 255.05, Florida Statutes;
- b. has been in business and has a record of successful continuous operations for at least five (5) years;
- c. files a certified copy of a power of attorney with the signed Bid, Public Construction, or Maintenance bonds;
- d. lists the surety's agency name, address, and telephone number on all bonds; and
- e. has at least the following minimum ratings based on the following contract amounts:

<u>CONTRACT AMOUNT</u>	<u>BEST'S RATINGS</u>
\$ 25,000.00 to \$100,000.00	B+ Class V or better
\$100,000.01 to \$500,000.00	A Class VI or better
\$500,000.01 and over	A Class VII or better

The life of the Construction Bonds or Maintenance Bonds shall extend twelve (12) months beyond the date of Final Completion and shall contain a waiver of alteration to the terms of the Contract, extensions of time, and/or forbearance on the part of the District.

Surety companies executing bonds must appear on the Treasury Department's most current list (Circular 570 as amended).

5. **Subject of Bids:** All Work for the Project shall be constructed in accordance with the Plans and Specifications prepared by Holtz Consulting Engineers. Bids shall be submitted for furnishing, delivering, and installing all materials, equipment, incidentals and services, including labor for the

Work as specified in the Contract Documents and all items reasonably inferable therefrom. Engineer will compute the quantities that will be the basis for payment applications, both progress and final.

All Work shall be done as set forth in the Contract Documents and substantially completed, tested, cleaned, and ready for operation within the periods stated in Article 4 of the Contract, Section 2.

6. **Modification and Withdrawal of Bids:** Bids may be withdrawn or modified by an appropriate document duly executed (in the manner that a Bid must be executed) and delivered to the place where Bids are to be submitted during the Bid Period. A request for withdrawal or a modification must be in writing and signed by a person duly authorized to withdraw or modify the Bid. If signed by a deputy or subordinate, the principal's written authorization to such deputy or subordinate granting the power to act on the principal's behalf must accompany the request for withdrawal or modifications. Withdrawal of a Bid will not prejudice the rights of a Bidder to submit a new Bid within the Bid Period. After expiration of the Bid Period, no Bid may be withdrawn or modified, except as provided below.

If, within twenty-four (24) hours after Bids are opened, any Bidder files a duly signed, written notice with the District and within five (5) calendar days thereafter demonstrates to the reasonable satisfaction of the District that there was a material and substantial mistake in the preparation of its Bid, that Bidder may withdraw its Bid and the Bid Security will be returned. Thereafter, the Bidder will be disqualified from further bidding on the Project.

7. **Award, Waiver, and Rejection of Bids:** The Contract will be awarded pursuant to the requirements of applicable federal, state, and local laws and regulations. The Contract award will be made to the lowest cost, qualified, responsive, and responsible Bidder whose proposal materially complies with all the requirements. The District reserves the option to award or rebid the Project at any time if deemed to be in the best interest of the District.

It is the intention of the District to award the Contract to a Bidder competent to perform and complete the Work in a timely and satisfactory manner. Additionally, the District may conduct such investigations as the District deems necessary to assist in the evaluation of any Bid and to establish the responsibility, qualifications, and financial ability of Bidders, proposed subcontractors, suppliers, and other persons and organizations to perform and furnish the Work in accordance with the Contract Documents to the District's satisfaction and within the prescribed time.

To the extent permitted by applicable federal, state, and local laws and regulations, the District reserves the right to: determine materiality of Bid components; determine qualifications of the Bidder; determine responsibility of Bidder; determine responsiveness of Bidder; reject any and all Bids; waive any informality or irregularities in any Bid received; or accept the Bid deemed by the District to be in its best interest. Bids may be rejected at the option of the District if the District determines in its sole discretion the Bid is materially incomplete, unbalanced, conditional, or obscure; the Bid contains additions not called for, erasures, alterations, irregularities of any kind; the Bid does not comply materially with the Notice to Contractors and/or Instruction to Bidders; or the Bid is from a Bidder that does not meet pre-bid conference attendance requirements.

Documented poor performance of contractors on previous contracts with the District or other governmental entity will be considered during evaluation and may be sufficient cause not to award.

8. **Construction Schedule:** Prior to signing the Contract, the Successful Bidder shall submit on a form acceptable to the District and Engineer, the overall proposed construction schedule for the Project. The schedule shall conform to the requirements of Special Conditions Section 9.36. This construction schedule shall specify the Project completion date as set forth in the Contract.

9. **Execution of the Contract:** When the District gives a Notice of Award to the Successful Bidder, it shall be accompanied by the required number of unsigned counterparts of the Contract and all other written Contract Documents. Within fifteen (15) days thereafter, Contractor shall sign and deliver the counterparts of the Contract and other written Contract Documents to the District with the required bonds and insurance certificates. Within fifteen (15) days thereafter, the District shall deliver one fully signed counterpart to Contractor. Each counterpart is to be accompanied by a complete set of the appropriately identified Plans and Specifications. Following execution of the Contract by the District, the construction schedule shall be modified to begin upon the execution of the Contract by both Parties of the Contract.

10. **Examination of Contract Documents and Site:** It is the responsibility of each Bidder, prior to submitting a Bid to (a) examine the Bid and Contract Documents thoroughly, (b) visit the site of the Work and become familiar with local conditions that may in any manner affect cost, progress, performance or furnishing of the Work, (c) consider federal, state, and local laws, ordinances, rules, and regulations that may affect cost, progress, performance or furnishing of the Work in any manner, (d) examine the Plans and Specifications, requirements of the Work, and the accuracy of the quantities of the Work to be completed, and (e) notify Engineer of all conflicts, errors, or discrepancies in the Contract Documents.

Bidder may rely upon the accuracy of the technical data contained in the reports of exploration and tests of subsurface conditions at the site of the Work which have been utilized by Engineer in preparation of the Contract Documents. Bidder may not rely upon the completeness of the documents, non-technical data, interpretations or opinions of the reports of exploration and tests of subsurface conditions, for the purposes of bidding and/or construction. Further, information and data reflected in the Contract Documents with respect to underground facilities at or contiguous to the site are based upon information and data furnished to the District and Engineer by the owners of such underground facilities or others. The District does not assume responsibility for the accuracy or completeness thereof unless it is expressly provided otherwise in the Supplementary Conditions. Elevations of the ground are shown on the Plans and Specifications and are believed to be reasonably correct. However, such elevations are not guaranteed and are presented only as an approximation. Bidders shall satisfy themselves as to the correctness of all elevations.

The lands upon which the Work is to be performed, right-of-ways and easements for access thereto, and other lands designated for use by Contractor in performing Work are identified in the Contract Documents. All additional lands and access thereto required for temporary construction facilities or storage materials and equipment shall be provided by Contractor.

Before submitting a Bid, each Bidder shall, at Bidder's own expense, make or obtain any additional examinations, investigations, explorations, tests, studies and any additional information and/or data which pertain to the physical conditions (subsurface, surface and underground facilities) at or contiguous to the site or otherwise which may affect cost, progress, performance, or furnishing of the Work in accordance with the time, price, and other terms and conditions of the Contract Documents. In advance, the District will provide each Bidder access to the site of the Work at reasonable times to conduct such explorations and tests as each Bidder deems necessary for the submission of the Bid, provided Bidder provides two (2) business days written notice prior to the date access is requested.

The submission of a Bid will constitute an incontrovertible representation by Bidder that Bidder has complied with the requirements as set for in the Instructions to Bidders and all other Contract Documents; the Bid is premised upon performing and furnishing the Work required by the Bid and Contract Documents; the means, methods, techniques, sequences, or procedures of construction as may be indicated in or required by the Bid and Contract Documents will be followed; and that the Bid and Contract Documents are sufficient in scope and detail to indicate and convey an understanding of all terms and conditions of performance and furnishing of the Work.

The Contract Documents contain the detailed provisions required for the construction of the Project. No information, verbal or written, obtained from any officer, agent or employee of the District on any such matter shall in any way affect the risk or obligation assumed by Contractor, or relieve Contractor from fulfilling any of the conditions of the Contract Documents.

11. Interpretations and Addenda: All questions about the meaning or intent of the Contract Documents are to be directed to Engineer. All questions must be submitted to Engineer in writing as early as possible during the Bid Period. No oral answers or interpretations will be provided. Interpretations or clarifications considered necessary by Engineer in response to such questions will be issued by addenda mailed to all persons recorded by Engineer as having received the Bid Documents. Questions received less than ten (10) calendar days prior to the deadline to submit Bids will not be answered. Only questions answered by formal written addenda will be binding. Oral responses and other interpretations or clarifications will be without legal effect, and shall not be relied upon by a Bidder.

Addenda may also be issued to modify the Bid Documents as deemed necessary by the District and/or Engineer. Contractor agrees to use the products and methods designated or described in the Plans and Specifications and as amended by any addenda. Addenda shall control in the event of conflict with Contractor's Bid.

12. Substitute Material and Equipment: The Contract will be based on material and equipment described in the Plans and Specifications without consideration of possible "substitute" or "equal" items. Whenever it is indicated in the Plans and Specifications that a Contractor may furnish or use a "substitute" or "equal" item of material or equipment, written application for such acceptance will not be considered by Engineer until after the effective date of the Contract. The written application for acceptance of a substitute item of material or equipment will be handled in accordance with the field order procedure.

13. **Subcontractors:** Each Bid must identify the names and addresses of the subcontractors. If requested by the District or Engineer, the Successful Bidder, and any other Bidder so requested, shall, within seven (7) days after the date of the request, submit to the District an experience statement with pertinent information as to similar projects and other evidence of qualification for each such subcontractor, person, and organization. The amount of subcontract work shall not exceed sixty percent (60%) of the Work. If the District or Engineer, after due investigation, has reasonable objection to any proposed subcontractor, supplier, other person, or organization, either party may, before issuing the Notice of Award, request the Successful Bidder to submit an acceptable substitute without an increase in Contract sum or Contract Time. If the apparent Successful Bidder declines to make any such substitution, the District may award the Contract to the next lowest qualified, responsive, and responsible Bidder that proposes to use acceptable subcontractors, suppliers, and other persons and organizations. Declining to make requested substitutions will not constitute grounds for sacrificing the Bid Security of any Bidder. Any subcontractor, supplier, other person or organization listed and not objected to in writing by the District or Engineer prior to giving of the Notice of Award, will be deemed acceptable to the District and Engineer, subject to revocation of such acceptance after the Effective Date of the Contract. The Successful Bidder shall be solely responsible for all payment to its subcontractors. No Contractor shall be required to employ any subcontractor, manufacturer, other person or organization against whom it has reasonable objection.

14. **Taxes:** Contractor shall pay all applicable sales, consumer, use, and other similar taxes required by law.

15. **Compliance with Laws:** Bidders must comply with all applicable federal, state, or local laws and regulations, including, but not limited to, the Department of Labor Safety and Health Regulations for construction promulgated under the Occupations Safety and Health Act of 1970 (PL 91-956) and under Section 107 of the Contract Work Hours and Safety Standards Act (PL 91-54).

Any chemicals used in the performance of this Project by the Bidder must have prior approval of the Environmental Protection Agency (EPA) and/or United States Department of Agriculture (USDA).

Bidders shall comply with the requirements of Sections 553.60-553.64, Florida Statutes (the “Trench Safety Act”) and 29 CFR Section 1926.650 Subpart P (the “Occupational Safety and Health Administration’s Excavation Safety Standards”). If the Project provides for trench excavation in excess of five (5) feet deep, the Bidder shall include in its Bid a reference to the Trench Safety Act and the standards that will be in effect during the period of construction of the Project; written assurance by the Bidder, that if selected, the Bidder will comply with applicable trench safety standards; and a separate item identifying the cost of compliance with the Trench Safety Act, in accordance with Section 553.64, Florida Statutes.

16. **Liquidated Damages and Additional Delay Damages:** Bidder and the District recognize the Work is of a critical nature, that time is of the essence, and the difficulty associated with ascertaining the extent of delay damages the District will suffer as a result of delay in the Work. As a result, if awarded the Contract, Bidder agrees to pay the District as liquidated damages, and not as a penalty, the amount of Liquidated Damages and Additional Delay Damages as outlined in Article 4- Contract Section 2.

17. **Insurance:** Contractor shall provide and maintain throughout the terms of this Contract, liability insurance with all the subject features in accordance with the instruction given in the Special Conditions Section 9.08.

18. **Required Disclosures:** With its Bid submission, Bidder shall disclose all material facts pertaining to any felony conviction or any pending felony charges in the last three (3) years in this state, any other state, or the United States against (i) Bidder, (ii) any business entity related to or affiliated with Bidder, or (iii) any present or former executive employee, officer, director, stockholder, partner or owner of Bidder or of any such related or affiliated entity. This disclosure shall not apply to any person or entity which is only a stockholder, owning twenty percent (20%) or less of the outstanding shares of a Bidder and whose stock is publicly owned and traded.

At its sole discretion the District may reject the Bid of any Bidder whose present or former executive employees, officers, directors, stockholders, partners, or owners are currently accused of or have ever been convicted of bidding violations. The discretion of the District may be exercised based on the disclosure required herein. By submitting a Bid, Bidder recognizes and accepts that the District may reject the Bid based upon the exercise of its sole discretion, and Bidder waives any claim it might have for damages or other relief resulting from the rejection of its Bid based on these grounds.

19. **Public Entity Crime/ Convicted Vendor List:** A person or affiliate who has been placed on the convicted 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 the 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 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, Florida Statutes, Category Two, for a period of thirty-six (36) months from the date of being placed on the convicted vendor list.

20. **License and Permits:** Contractor shall obtain and pay for all permits and licenses required for the Work as defined in Section 01000 of the Technical Specifications, including the cost of all Work performed in compliance with the terms and conditions of such permits, whether by itself or others.

No construction Work shall commence until all applicable licenses and permits have been obtained and copies delivered to Engineer.

21. **Protest:** The District is responsible for resolution of protests of contract awards, claims, disputes, alleged patent infringements, alleged license fee(s) and other related procurement matters in accordance with sound business judgment and good administrative practice. By submitting a Bid to the District, Bidders agree to the procedures outlined in the District's Procurement Policy which can be found on the District's website, www.loxahatcheeriver.org/purchasing.php, to resolve all protests.

22. The Contract Documents include various divisions, sections, and conditions which are essential parts of the Work to be provided by the Contractor. A requirement occurring in one is

binding as though occurring in all. The Contract Documents are intended to be complementary and to describe and provide for complete Work. In case of discrepancy, the following precedence will govern the interpretation of the Contract Documents prior to award of the Contract:

1. Addenda
2. Bid Documents, including the Contract
3. Special Conditions
4. Technical Specifications / Plans and Specifications
5. General Conditions
6. Bidder's Response

After award, in the event of a conflict, Change Orders, supplemental agreements, and revisions to Plans and Specifications will take precedence over any of the above. Detailed plans shall have precedence over general plans. In the event that any conflicts cannot be resolved by reference to this governing order of Contract Documents provision, then the District shall resolve the conflict in any manner which is acceptable to the District and which comports with the overall intent of the Contract Documents.

23. To render a Bid responsive, the Bidder's Proposal must be accompanied by the Bid Form provided in Article 2 of the Contract Documents. Acceptable references and projects to be included shall be those related to installation of low pressure force main systems. References provided shall be from the "owner" of the Project, not the project engineer or Contractor. The District will not award a Bid to any Bidder who cannot prove to the satisfaction of the District that the corporation/partnership/individual identified on the signature of Bidder form has satisfactory written references for similar work. References that are from a parent corporation or affiliated subsidiary will not be considered by the District.

24. **Notice to Proceed:** The Notice to Proceed for this project will be issued within 180 days of the Award of Contract at a time mutually agreed to by the Owner and lowest responsive bidder.

25. **Health, Safety and Environmental Performance:** The District shall evaluate Bidder's health, safety and environmental performance based on the following performance metrics and documentation reviews. The selected Bidder is solely responsible for all applicable health, safety, and environmental requirements, and the health, safety, and environmental evaluation conducted by the District is not an assumption of any responsibility for health, safety, and environmental requirements by the District. Bidders which fail to submit with their Bid information demonstrating compliance with the following criteria shall be considered non-responsive/non-responsible:

U.S. Department of Labor Occupational Safety and Health Administration (OSHA) Incident Rates and Recordable Injuries:

Total Days Away, Restricted, Transferred (DART) **Benchmark 4.4**
(U.S. Bureau of Labor Statistics, Table 1). Incidence rates of nonfatal occupational injuries and illnesses by industry and case types, **2018, 25th percentile or better for size 11-49, NAICS 237110, Water and sewer line and related structures construction**). **Bidder's DART must be less than or equal to benchmark.**

Total Recordable Incident Rate (TRIR) **Benchmark 6.8**
(U.S. Bureau of Labor Statistics, Table 1. Incidence rates of nonfatal occupational injuries and illnesses by industry and case types, **2018, 25th percentile or better for size 11-49, NAICS 237110, Water and sewer line and related structures construction**). **Bidder's TRIR must be less than or equal to benchmark.**

Fatalities: **0** Work related fatalities resulting in OSHA citations within the last three years, OR if 1 or more work related fatalities resulting in an OSHA citation exist within the last three years, the contractor must have mitigated risk of recurrence by implementing adequate industry standard safety procedures and training as determined by OSHA by providing such OSHA determination to the District.

Bidder shall submit a health, safety and environmental plan for Construction and General Industry. The health, safety and environmental plan must address the following minimum requirements:

Lockout/Tagout
Excavation Trenching and Shoring
Permit Required Confined Space
Injury Reporting/Investigation
Operator Qualifications
Hot Work
Personal Protective Equipment
Electrical Safety
Near Miss, Behavioral Based Safety
Qualified, Certified and Competent Employees

OSHA Inspection Detail review must show no Serious or Willful violations in the previous 36 months and no unresolved Failure to Abate Prior Violation in the previous 36 months and no active Failure to Abate Prior Violation.

Bidder shall submit with their Bid OSHA Form 300A completed for the previous year, an Experience Modification Rating letter from its insurance carrier for the current period and a copy of its written health, safety and environmental program with training records for the previous 36 months.

26. **Previous Performance on District Projects:** The District has implemented a Contractor Evaluation Report in an effort to document contractor performance on District projects. Bidders who have received Unsatisfactory ratings on previous District projects must submit with their Bid a mitigation plan detailing previous unsatisfactory ratings and measures implemented to address the unsatisfactory performance. Bidders with unsatisfactory ratings not submitting a mitigation plan with their bid shall be deemed Non-Responsive/Non-Responsible.

27. **Experience:** The District shall evaluate the Bidder's experience relative to the work to be performed based on the following requirements:

Have successfully performed as Prime Contractor on a minimum of 5 similar projects in the past 5 years. Similar projects shall include electrical installations with a minimum construction contract value of \$25,000. Qualifying projects shall be complete and shall not have been assessed Liquidated Damages, terminated, suspended or defaulted.

Bidder shall submit Project Resumes for all qualifying projects. Resumes shall include project name, description, construction cost, completion date, Owner's project manager contact information (name, phone number and email), Engineer of Record's contact information (name, phone number and email). See Proposal, Article 2A, Questionnaire.

LOXAHATCHEE RIVER
ENVIRONMENTAL CONTROL DISTRICT

By: _____
Gordon M. Boggie
Chairman

I hereby acknowledge receipt of the Notice to Contractors and Instruction to Bidders and have familiarized myself with the contents therein and all other Contract Documents

By: _____
Bidder

_____ Date

PROPOSAL

ARTICLE 2

**LOXAHATCHEE RIVER DISTRICT
ROLLING HILLS SUBDIVISION GRAVITY SEWER, LIFT STATION,
& FORCEMAIN**

To the LOXAHATCHEE RIVER DISTRICT of Jupiter, Florida, as the party of the first part:

Proposal made by: _____
as Bidder,

whose business address is: _____

State whether Bidder is an individual,
a partnership or a corporation: _____

Accompanying this Proposal is a Bid Security for \$ _____ (Numbers)
_____. (Amount Written)

From: _____
(Name of Surety)

1. The undersigned Bidder hereby declares that the Bidder has carefully examined the Contract Documents relating to the above entitled matter and the Work, and has personally inspected the location of the Work. The undersigned Bidder has correlated the results of all observations, examinations, investigations, tests, reports, and studies with the terms and conditions of the Contract Documents.
2. The undersigned Bidder hereby declares that the Bidder is the only person or persons interested in its Bid; that it is made without any connection with any person submitting another bid for the same Contract; that the Bid is in all respects fair and without collusion, fraud, or mental reservations; that no official of the District or any person in the employ of the aforesaid is directly or indirectly interested in said Bid or in the supplies of Work to which it relates, or in any portion of the profits thereof.
3. The undersigned Bidder does hereby offer and agree to furnish all materials, to fully and faithfully construct, perform and execute all Work in the above entitled matter in accordance with the Plans and Specifications relating thereto, and to furnish all labor, tools, implements, machinery, forms transportation, and materials necessary and proper for the said purpose at the prices named below for the various items of Work.
4. The undersigned Bidder does hereby declare that the prices so stated cover all expenses of every kind incidental to the completion of said Work and the Contract, including all claims that may arise through damages or other cause whatsoever. The undersigned Bidder agrees to complete the Work for the price(s) indicated in the Bid Form.
5. The undersigned Bidder does hereby declare that the Bidder shall make no claim on an account of any variation of the approximate estimate in the quantities of Work to be done, nor on account of any misunderstanding or misconceptions of the nature of the Work to be done or the grounds or place where it is to be done.
6. The undersigned Bidder does hereby agree that it will execute the Contract which will contain the material terms, conditions, provisions, and covenants necessary to complete the Work according to the Plans and Specifications, within fifteen (15) calendar days after receipt of written Notice of Award of this proposal by the District; and if the Bidder fails to execute said Contract within said period of time, that the District shall have the power to rescind said award and also retain for the District the Bid Security accompanying Bidder's proposal which shall become forfeited as liquidated damages.
7. The undersigned Bidder also declares and agrees that the Bidder will commence the Work within ten (10) calendar days after receipt of written Notice to Proceed and will complete the Work fully and in every respect on or before the time specified in the Contract Documents, and so authorize the party of the District in case of failure to complete the Work within such specified time to employ such persons, equipment, and materials as may be necessary for the proper completion of said Work and to deduct the cost therefore from the amount due under the Contract.
8. The undersigned Bidder accepts all of the terms and conditions of the Bid Documents, including without limitation those dealing with the disposition of the Bid Security. The undersigned Bidder also makes all representations required by the Instructions to Bidders.

9. The undersigned Bidder agrees to provide Unit Prices of major construction elements of the Work in order to better determine the value of progress payment, in a format as provided in Article 6 Forms for Use During Construction.

10. The undersigned Bidder hereby agrees that the Bidder will, at Bidder's expense, insure all persons employed by it in prosecuting the Work hereunder against accident as provided by the Workers' Compensation Law of the State of Florida.

11. The price for the Work shall be stated in both words and figures in the appropriate place in the proposal form. Discrepancies in the multiplication of units of Work and unit prices will be resolved in the favor of the unit prices. Discrepancies between the indicated sum of any column of figures and the correct sum thereof will be resolved in the favor of the correct sum. In the event that there is a discrepancy between the price in written words and the price written in figures, the former shall govern.

12. The undersigned Bidder acknowledges receipt of the addenda, if any, as listed herein and agrees that Bidder will be bound by all addenda whether or not listed herein.

Receipt of Addendum	No. _____	Date _____
	No. _____	Date _____
	No. _____	Date _____
	No. _____	Date _____

13. The following documents are attached to and made a condition of this Bid (initial each item in the space provided):

- a. Initial_____. Instructions to Bidders, Proposal, Questionnaire, Sworn Statement Under Section 287.133(3)(a), Florida Statutes, on Public Entity Crimes, Schedule of Bid Prices
- b. Initial_____. Bid Security
- c. Initial_____. Power of Attorney (for Surety Bond only)
- d. Initial_____. Corporate Authority to execute Bid (any corporate employee other than president or vice president)
- e. Initial_____. Copies of current valid license(s) issued in accordance with Florida Statutes and/or appropriate local ordinances is hereby acknowledged.
- f. Initial_____. OSHA's Form 300A completed for the previous year
- g. Initial_____. Experience Modification Rating letter (issued by insurance carrier) for the current period.

- h. Initial_____. Written health, safety and environmental program with training records for the previous 36 months.
- i. Initial_____. Contractor's Unsatisfactory Rating Mitigation Plan (if required, see ITB 26)
- j. Initial_____. Project Resume's for qualifying experience (see ITB 27).

Contractor: _____

By: _____

Title: _____

Address: _____

(Corporation Seal)

Attest: _____

Title: _____

Contractor's License No: _____

BID FORM — BASE BID
LOXAHATCHEE RIVER ENVIRONMENTAL CONTROL DISTRICT
ROLLING HILLS SUBDIVISION GRAVITY SEWER, LIFT STATION, & FORCEMAIN

UNIT PRICES

No.	Description	Unit	Qty	Unit Cost	Total
General Conditions and Restoration					
1	Mobilization/Demobilization, Bonds and Insurance	1	LS		
2	Maintenance Of Traffic	1	LS		
3	As- Built Record Drawings	1	LS		
4	Audio Video Documentation	1	LS		
5	NPDES Permit/Erosion Measures	1	LS		
6	Dewatering	1	LS		
Manhole Rehabilitation					
7	Pressure Clean Manhole	17	EA		
8	Miscellaneous Manhole Repairs (Including Mortar, Pipe Connections, Reinforcement Steel, Holes, Cracks, Joints, and Leaks)	17	EA		
9	Pressure/Xypex Grouting	5	EA		
10	Reform Bench and Channel	17	EA		
11	Chimney Adjustment	4	EA		
12	Install New Manhole Cover	7	EA		
13	Install New Adjustment Ring	13	EA		
14	Install New Frame	5	EA		
Gravity Sewer Pipe Rehabilitation					
15	Cured in Place Pipe Lining, 8" Pipe	3,000	LF		
16	8" PVC SDR 26 PVC Replacement (0-6' Depth)	40	LF		
17	8" PVC SDR 26 PVC Replacement (6-8' Depth)	20	LF		
18	8" PVC SDR 26 PVC Replacement 8-10' Depth)	20	LF		
19	8" PVC SDR 26 PVC Replacement (10-12' Depth)	40	LF		
Sewer Service Laterals					
20	Install New 4" PVC Lateral – Single Service with Cleanout on Existing Gravity Main or into Existing Manhole	32	EA		

21	Install New 6" PVC Lateral – Double Service with Cleanouts on Existing Gravity Main or into Existing Manhole	1	EA		
22	Clean and Televiser Existing 4" Lateral, Make Point Repairs, Install Cured In Place Pipe Lining, and Install New Cleanout & Associated Piping required for 4" Single Service	4	EA		
23	Clean and Televiser Existing 6" Lateral, Make Point Repairs, Install Cured In Place Pipe Lining, and Install New Cleanout, and Associated Piping required for 6" Single Service	6	EA		
24	Clean and Televiser Existing 6" Lateral, Make Point Repairs, Install Cured In Place Pipe Lining, and Install New Cleanouts, and Associated Piping required for 6" Double Service	3	EA		
Lift Station and Force Main					
25	Proposed Lift Station, Including all Mechanical, Structural, Site, Electrical, and Instrumentation Work (Owner furnished pumps, to be installed by Contractor)	1	LS		
26	4" C900 PVC Force Main installed via Open-Cut	100	LF		
27	4" HDPE DIPS SDR-11 installed via Horizontal Directional Drill	750	LF		
28	4" Plug Valve with Valve Box	2	EA		
29	4" DI MJ 90 Degree Bend	1	EA		
30	4" DI MJ 45 Degree Bend	2			
31	4" DI MJ 11.25 Degree Bend	4	EA		
32	4" HDPE x MJ Adapter	4	EA		
33	Air Release Valve	2	EA		
34	Connect to Existing Force Main	1	EA		
TOTAL BID					

TOTAL BID ITEMS 1-34, (in words) _____ Dollars

_____ Cents

THE CONTRACT AWARD SHALL BE EVALUATED BASED ON THE TOTAL BID PRICE FOR ITEMS 1 THROUGH 34 AS SUBMITTED BY THE LOWEST, QUALIFIED, RESPONSIBLE, RESPONSIVE BIDDER.

(Name of Bidder)

Bidders Name: _____

By: _____
Signature of Authorized Officer, Partner, Member, Manager

Print Name of Person signing: _____

Title: _____

Business Address: _____

Incorporated or formed under the laws of the State of _____.

PROPOSAL
ARTICLE 2a

QUESTIONNAIRE
For

ROLLING HILLS SUBDIVISION GRAVITY SEWER, LIFT STATION, & FORCEMAIN

INSTRUCTIONS

1. The following information must be filled out by **all Bidders**.
2. Please print legibly, type, or word process. Sign in ink. When attaching sheets, please place the question number to which you are responding in the upper right hand corner of each sheet and number the sheets.
3. Note that the person signing this Application must swear that the information provided below is true, accurate, and complete.

1. Basic Information

1.1 Name of Contractor:

[Same as on Cover Page of The Proposal]

1.2 Contact Person(s):

1.3 Telephone No: _____ Fax No: _____ E-mail: _____

1.4 Address:

1.5 Federal Tax ID No: _____

1.6 CONTRACTOR'S license: Primary classification: _____

State License Number _____

Supplemental classifications held, if any: _____

Name of Licensee, if different from (1) above: _____

1.7 Name of person and title who inspected site of proposed WORK for your firm: _____

Name: _____ Date of Inspection: _____
Title: _____

2. Organizational Structure & History

2.1 The Contractor is duly organized under the laws of the State of _____.

2.2 The Contractor has the following organizational structure.

() individual () corporation () partnership
() limited liability company () joint venture () other: _____

2.3 Provide the year the Contractor (and not any Predecessor Entities or Related Entities) was first organized. _____

2.4 List all Predecessor Entities below (or on attached sheets if necessary).

2.5 Please list all Related Entities below (or on attached sheets if necessary).

2.6 If organized in any state other than Florida or in a foreign country, are you in compliance with all laws and regulations necessary to legally do business in the State of Florida?

YES _____ NO _____

3. Officers and Owners

3.1 Officers: List the name, title, and address of current Officers, Directors, Partners, Members, and any other persons with similar positions, in descending order of degree of control.

Name	Title	Address
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____

[Attach additional sheets as necessary.]

3.2 Owners. Please list the name, address, and percentage of ownership of all persons or entities owning 10 percent or more of the Contractor, in descending order of percentage of ownership.

Owner	Address	%
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____

[Attach additional sheets as necessary.]

3.3 Employees. Please list total quantity of employees, # of crews, and discipline of each crew.

Crew Discipline	Number of employees in crew	% of total firm
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____

[Attach additional sheets as necessary.]

4. Experience

4.1 Summary of Contractor Experience With respect to this specific project, list the approximate number of years of experience that the Contractor has as a prime contractor or as a subcontractor with primary responsibility.

<u>Project Type</u>	<u>Years</u>
CIPP Lining & Sewer Construction (primary)	_____
CIPP Lining & Sewer Construction (subcontractor)	_____

4.2 Most Recently Completed Contracts Please provide the following information regarding the last ten contracts completed by the Contractor. Please list in reverse chronological order (most recently completed project first, next most recently completed project, etc.). [Please feel free to provide this information on attached sheets in another format as long as it contains all the information requested.]

Contract Amount	Project Type & Location	Month / Year Completed	Name, Address, Contact Person & Tel. # of Owner

4.3 What is the last project similar in nature that you have completed as Prime Contractor for a government entity in Florida? (This must be filled out below or Bid may be considered non-responsive.)

Project: _____

Project Cost: _____
Year Complete: _____
Government: _____

4.4 ATTACH TO THIS BID the experience resume of the person who will be designated chief construction superintendent or on site construction manager.

4.5 List 5 projects completed as Prime Contractor in last 5 years in Florida involving work of similar type and complexity that you have completed as Prime Contractor for a government entity in Florida? See Instructions to Bidders, Paragraph 27, Experience. If 5 projects have not been completed, Contractor must so state (this must be filled out below or Bid may be considered non-responsive).:

a. Project Name: _____

Contract Price: \$ _____

Detailed Description of Work: _____

Name, Address and Telephone Number of Government/Contact Person: _____

b. Project Name: _____

Contract Price: \$ _____

Detailed Description of Work: _____

Name, Address and Telephone Number of Government/Contact Person: _____

c. Project Name: _____

Contract Price: \$ _____

Detailed Description of Work: _____

Name, Address and Telephone Number of Government/Contact Person: _____

d. Project Name: _____

Contract Price: \$ _____

Detailed Description of Work: _____

Name, Address and Telephone Number of Government/Contact Person: _____

e. Project Name: _____

Contract Price: \$_____

Detailed Description of Work: _____

Name, Address and Telephone Number of Government/Contact Person: _____

4.6 Contracts In Progress Please provide the following information regarding all contracts currently in progress, in descending order of contract amount. [Please feel free to provide this information on attached sheets in another format as long as it contains all the information requested.]

Contract Amount	Project Type & Location	% Completed	Name, Address, Contact Person & Tel. # of Owner

4.7 Provide an alphabetical listing of all state or local government agencies, including telephone number and contact person, that have awarded the Contractor (or any Predecessor Entities and Related Entities) a contract during the last five years. Attach additional sheets as necessary.

- | | |
|----------|----------|
| 1. _____ | 2. _____ |
| 3. _____ | 4. _____ |
| 5. _____ | 6. _____ |

- 4.8 Subcontractors. This proposal is being submitted by the CONTRACTOR who proposes to perform the Work as required by the Contract Documents. If the CONTRACTOR will be utilizing a Subcontractor for a category of Work set forth below then the CONTRACTOR **must** identify the Subcontractor by name and provide the Subcontractor's address and telephone number. Only **one** Subcontractor may be identified for each category set forth below. If the CONTRACTOR does not identify a Subcontractor for a category of Work specified, this shall constitute a representation and warranty by the CONTRACTOR that the CONTRACTOR is not utilizing a Subcontractor for such Work and will perform such Work with CONTRACTOR's own employees. After submitting this bid the contractor may not add to, subtract from, modify or make substitutions regarding the Supplier/Subcontractor identification and listing without the express written request and consent of the District. Any substitutions must be for legitimate and proper reasons. All Subcontractors listed are subject to the approval of the District.

CONTRACTOR represents and warrants to the District that all of said Subcontractors and their authorized vendors have been made aware of all the appropriate portions of the Contract Documents and agree that their portion of the Work and materials furnished in connection therewith will meet all of the requirements of the Contract Documents and that deliveries will be scheduled so as not to impede the progress of the Work.

Subcontractors:

Electrical Systems

Name:

Address & Telephone No.

Other

Name:

Address & Telephone No.

- 4.10 Liquidated Damages Within the last five years, has the Contractor (or any Predecessor Entities or Related Entities) had liquidated damages assessed against it?

YES _____ NO _____

If YES, please provide full details on attached sheets including the per diem amount of liquidated damages, the original contract time, and the number of days for which liquidated damages were assessed. Please feel free to include a written summary of your position on the matter.

4.11 Terminations / Suspensions / Defaults

(a) Within the last five years, has a contract of the Contractor (or any Predecessor Entities or Related Entities) been terminated or suspended for cause?

YES _____ NO _____

(b) Within the last five years, has another party (e.g. surety) completed Work which the Contractor (or any Predecessor Entities or Related Entities) was originally responsible to perform?

YES _____ NO _____

(c) Within the last five years, has the Contractor (or any Predecessor Entities or Related Entities) been considered in default of a contract that was not cured within the time frame allowed by the contract?

YES _____ NO _____

If the answer to any of questions 4.6(a) -(c) is YES, please provide full details on attached sheets. Please feel free to include a written summary of your position on the matter.

4.12 Denial of Qualification or Award

(a) Within the last 5 years, has any federal, state, or local government or procurement agency denied the Contractor (or any Predecessor Entities or Related Entities) qualification?

YES _____ NO _____

(b) Within the last 5 years, has any federal, state, or local government or procurement agency, after the Contractor (or any Predecessor Entities or Related Entities) submitted the apparent low bid, refused to award a contract for reasons related to the Contractor's qualifications, experience, competence, or financial situation?

YES _____ NO _____

If the answer to either of questions 4.7(a) or (b) is YES, please provide full details on attached sheets. Please feel free to include a written summary of your position on the matter.

4.13 Debarments, Etc.

(a) Within the last 5 years, has the Contractor (or any Predecessor Entities or Related Entities) been debarred for any reason by any federal, state, or local government or procurement agencies?

YES _____ NO _____

(b) Within the last 5 years, has the Contractor (or any Predecessor Entities or Related Entities) refrained from bidding for any reason, such as suspension or agreement not to bid, or as part of the

settlement of a Dispute of any type with any federal, state, or local government or procurement agencies?

YES _____ NO _____

If the answer to either of questions 4.8(a) or (b) is YES, please provide full details on attached sheets. Please feel free to include a written summary of your position on the matter.

4.14 Claims History Within the last 5 years, has the Contractor (or any Predecessor Entities or Related Entities) been a party to a Claim with an originally claimed amount in excess of \$50,000?

YES _____ NO _____

If YES, please provide full details for each Claim on attached sheets including (a) whether the Claim was brought by or against the Contractor (or any Predecessor Entities or Related Entities), (b) the nature of the Dispute underlying the Claim, (c) originally claimed amounts, (d) the resolution of such Claims (including the amount) or if unresolved, the current status of such Claims, and (e) the name, address and phone number of the primary adverse party who is to be contacted for additional information, and (f) a written summary of your position on the matter (if desired).

4.15 Bid or Other Crimes Within the last 10 years, has the Contractor (or any Predecessor Entities or Related Entities), or any officers, owners, or Key Personnel of the same ever been indicted on, convicted of, or plead or consented to a violation of a bid crime including bid collusion or any other crime involving fraud or knowing misrepresentation?

YES _____ NO _____

If YES, please provide full details on attached sheets. Please feel free to include a written summary of your position on the matter.

4.16 Quality Control Does the Contractor have a written organizational-level quality control plan (as opposed to project-level plans)?

YES _____ NO _____

If YES, please answer the following two questions.

- (a) What year was it first adopted? _____
- (b) In what year was its substance last revised? _____

4.17 Contractor Evaluation Report Has the Contractor performed work with the District where a Contractor Evaluation Report was completed as part of the work?

YES _____ NO _____

If YES, did the Contractor receive any UNSATISFACTORY ratings?

YES _____ NO _____

If YES, include with the Bid Contractor's UNSATISFACTORY RATING MITIGATION PLAN.

5. Key Personnel

5.1 Please provide the following information for all Key Personnel whose duties consist primarily of one or more the following functions: (a) project management, (b) quality control and (c) safety oversight. [Please feel free to provide this information on attached sheets in another format as long as it contains all the information requested.]

Name	Job Duties (a-c above)	Relevant Licenses or Certifications	Experience (# of Yrs.)	Education (Degree or # Yrs.)
1 _____	_____	_____	_____	_____
2 _____	_____	_____	_____	_____
3 _____	_____	_____	_____	_____
4 _____	_____	_____	_____	_____
5 _____	_____	_____	_____	_____
6 _____	_____	_____	_____	_____

[Attach additional sheets as necessary.]

6. Bonding

6.1 Is the Contractor capable of obtaining from a Qualifying Bonding Company a performance bond and a payment bond each in the amount of the bid prices that the Contractor will be submitting to the OWNER. A Qualifying Bonding Company is an insurance, bonding, and/or surety company rated in accordance with contract requirements.

YES _____ NO _____

If NO, please explain why you cannot meet the bonding standards set forth in question 6.1 above on attached sheets.

7. Environmental

7.1 Environmental Record. Within the last 5 years, has the Contractor (or any Predecessor Entities or Related Entities) been found to be in violation of any federal, state or local environmental law or regulation in an administrative, civil or criminal proceeding in which the fact finder found that the Contractor committed the violation and/or failed to comply after having been notified of the violation?

YES _____ NO _____

If YES, please provide full details, including a summary of your position, on attached sheets.

8. Financial

8.1 ATTACH TO THIS BID an abbreviated financial statement on the attached form, references, and other information, sufficiently comprehensive to permit an evaluation of CONTRACTOR'S current financial condition.

9. Certifications Under Oath

By signing below, the person signing below hereby certifies and swears, **ON OATH**, as follows.

1. I have personal knowledge of all the information contained in this Questionnaire OR I am responsible for the accuracy of all such information.
2. The information contained in this Application is true and complete.
3. I hereby authorize the Loxahatchee River District to contact any person or entity necessary to verify or supplement any of the information requested by or provided in this Application without liability, and I hereby further authorize any person or entity contacted to provide any and all information requested without liability.
4. The Contractor has read, understands, and agrees to all terms of the Qualification Questionnaire.
5. I am duly authorized by law and by the Contractor to sign this Qualification on behalf of the Contractor.

Date

CONTRACTOR

Witness

[Signature]

By: _____
[Name and Title Printed]

State of _____

County of _____

Date: _____

The foregoing instrument was acknowledged before me this ____ day of _____, 20__ by _____, who is personally known to me or who has produced a valid _____ Driver's License as identification and who did take an oath.

[Signature of Notary Public]

Name Printed: _____

My Commission Expires: _____

SWORN STATEMENT UNDER SECTION 287.133(3)(a),
FLORIDA STATUTES, ON PUBLIC ENTITY CRIMES

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

1. This sworn statement is submitted with Bid, Proposal or Contract No. _____
for [INSERT PROJECT NAME HERE].
2. This sworn statement is submitted by

(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: _____.)
3. My name is _____ and my relationship to the entity
named (please print name of individual signing)
above is _____.
4. 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 with 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 of any other state or of the United states and involving antitrust, fraud, theft, bribery, collusion, racketeering, conspiracy, or material misrepresentation.
5. 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, nonjury trial, or entry of a plea of guilty or nolo contendere.
6. 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" includes those officers, 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 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 thirty-six (36) months shall be considered an affiliate.

7. 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 officers, directors, executives, partners, shareholders, employees, members, and agents who are active in management of an entity.
8. 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 officers, directors, executives, partners, shareholders, employees, members, or agents who are active in management of the entity, nor any affiliate of the entity have been charged with and convicted of a public entity crime subsequent to July 1, 1989.

___ The entity submitting this sworn statement, or one of more of the officers, directors, executives, partners, shareholders, employees, members, or agents who are active in 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 officers, 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 vendor list. [attach a copy of the final order].

___ There has been a proceeding concerning the conviction before a hearing officer of the State of Florida, Division of Administrative Hearings. The final order entered by the hearing officer did not place the person or affiliate on the convicted vendor list. [Please attach a copy of the final order].

___ The person or affiliate was placed on the convicted vendor list. There has been a subsequent proceeding before a hearing officer of the State of Florida, Division of Administrative Hearings. The final order entered by the hearing officer determined that it was in the public interest to remove the person or affiliate from the convicted vendor list. [Please attach a copy of the final order].

___ The person or affiliate has not been placed on the convicted vendor list. [Please describe any action taken by or pending with the Department of General Services].

(Signature)

(Date)

STATE OF _____

COUNTY OF _____

The foregoing instrument was acknowledged before me this _____ day of _____,
20__ by _____, who is personally known to me or who has produced a valid
_____ Driver's License as identification and who did take an oath.

Notary Public

Printed/Typed Name

My Commission Expires:

Condensed current financial statement for (Name of Contractor)

**ROLLING HILLS SUBDIVISION GRAVITY SEWER, LIFT STATION, &
FORCEMAIN**

Condition at close of business _____, 20_____

ASSETS

1. Cash: (a) On Hand \$_____, (b) In bank \$_____, (c) Elsewhere _____
\$_____
2. Notes receivable (a) Due within 90 days
\$_____
(b) Due after 90 days
\$_____
(c) Past Due
\$_____
3. Accounts receivable from completed contracts, exclusive of claims not approved for payment
\$_____
4. Sums earned on uncompleted contracts as shown by Engineer's or Architect's estimate
\$_____
(a) Amount receivable after deducting retainage
\$_____
(b) Retainage to date, due upon completion of contracts
\$_____
5. Accounts receivable from sources other than construction contracts
\$_____
6. Deposits for bids or other guarantees
\$_____
(a) Recoverable within 90 days
\$_____
(b) Recoverable after 90 days
\$_____
7. Interest accrued on loans, securities, etc.
\$_____

8. Real Estate (a) Used for business purposes
\$ _____
(b) Not used for business purposes
\$ _____
9. Stocks and Bonds (a) Listed – present market value
\$ _____
(b) Unlisted – present value
\$ _____
10. Materials in stock not included in Item 4:
(a) For uncompleted contracts (present value)
\$ _____
(b) Other materials (present value)
\$ _____
11. Equipment, book value
\$ _____
12. Furniture and fixtures, book value
\$ _____
13. Other assets
\$ _____
- TOTAL ASSETS
- \$ _____

LIABILITIES

1. Notes payable (a) To banks regular
\$ _____
(b) To banks for certified checks
\$ _____
(c) To others for equipment obligations
\$ _____
(d) To others exclusive of equipment obligation
\$ _____
2. Accounts Payable * (a) Not past due
\$ _____
(b) Past due
\$ _____
3. Real Estate encumbrances
\$ _____
4. Other liabilities
\$ _____
5. Reserves
\$ _____

6. Capital stock paid up:

(a) Common

\$ _____

(b) Common

\$ _____

(c) Preferred

\$ _____

(d) Preferred

\$ _____

7. Surplus (net worth) Earned \$ _____ Unearned \$ _____

\$ _____

TOTAL LIABILITIES

\$ _____

CONTINGENT LIABILITIES

1. Liability on notes receivable, discounted or sold

\$ _____

2. Liability on accounts receivable, pledged, assigned or sold

\$ _____

3. Liability as bondsman

\$ _____

4. Liability as guarantor on contracts or on accounts of others.

\$ _____

5. Other contingent liabilities

\$ _____

TOTAL CONTINGENT LIABILITIES

\$ _____

*Include all amounts owing subcontractors for all work in place and accepted on completed and uncompleted contracts, including retainage

Certified and Signed By:

Certified Public Accountant

AUTHORITY TO EXECUTE BID AND CONTRACT

If the Bidder is a Corporation, attach to this page a certified copy of corporate resolutions of the Board of Directors of the Corporation authorizing an officer of the Corporation to execute the Contract contained within this document on behalf of the Corporation.

(End of Article.)

BID SECURITY

ARTICLE 3

1. The undersigned Bidder does hereby declare and stipulate that this proposal is made in good faith, without collusion or connection with any other person or persons bidding for the same Work, and that it is made pursuant to and subject to all the terms and conditions of the Notice to Contractors, Instructions to Bidders, the Contract Documents, the Technical Specifications, and the Plans and Specifications pertaining to the Work, all of which have been examined by the undersigned.

2. Accompanying this proposal is a certified check or standard bid bond in the sum of \$_____.00, in accordance with the Notice to Contractors and Instruction to Bidders. Such amount shall be equal to ten percent (10%) of the Bid amount.

3. The undersigned Bidder agrees to execute the Contract, and the Public Construction Bond for the total amount of the Bid within fifteen (15) calendar days from the date when written Notice of Award of the Contract is delivered at the address given on this proposal. The name and address of the corporate surety with which the Bidder proposes to furnish the specified Public Construction Bond is as follows:

Bond Company's most recent "Best's Key Rating": _____

4. The undersigned Bidder agrees to begin the Work with an adequate work force and equipment within ten (10) calendar days from the date of receipt of official Notice to Proceed, and to complete all of the Work within the number of calendar days specified in the Special Conditions from the date of official Notice to Proceed.

5. The Bid Security will be returned to all, except the three (3) lowest qualified responsive, responsible Bidders, within seven (7) business days after the opening of the Bids and the remaining securities will be returned to the three (3) lowest Bidders within forty-eight (48) hours, after the District and Contractor have executed the Contract, or, if no Contract has been so executed, within one hundred twenty (120) calendar days after the date of the opening of Bids upon demand of the Bidder at any time thereafter so long as it had not been notified of the acceptance of the Bid.

6. All the phases of Work enumerated in the Contract Documents Technical Specifications with their individual jobs and overhead, whether specifically mentioned, included by implication or appurtenant thereto, are to be performed by Contractor under the applicable Bid item irrespective of whether it is named in said list.

7. This Bid is also based on addenda:

No. _____	Date _____
No. _____	Date _____
No. _____	Date _____
No. _____	Date _____

Date _____

Date _____

Date _____

Date _____

Contractor: _____

By: _____

Address: _____

(SEAL) Contractor's License No. _____

Contractor's License No. _____

Attest: _____

Title: _____

CONTRACT

ARTICLE 4

THIS CONTRACT, is made and entered into this _____ day of _____, Two Thousand and _____ (20____), by and between _____ (the “Contractor”), and the **LOXAHATCHEE RIVER ENVIRONMENTAL CONTROL DISTRICT**, (the “District.”)

WITNESSETH: That whereas the District has awarded to Contractor the Work of performing certain construction:

SECTION 1. Scope of Work: Contractor shall furnish, install and deliver all of the labor, including engineering design, materials, tools, equipment, services, and everything necessary to perform the Work; and shall construct in accordance with the Contract Documents and the terms of this Contract, the Project known and identified as ROLLING HILLS SUBDIVISION GRAVITY SEWER, LIFT STATION, & FORCEMAIN and shall do everything required by or reasonably inferable from the Contract Documents. The Work is generally described as follows:

ROLLING HILLS SUBDIVISION GRAVITY SEWER, LIFT STATION, & FORCEMAIN

Furnishing all labor, materials, equipment and all incidentals and appurtenances necessary for wastewater collection improvements in the Rolling Hills Subdivision including the rehabilitation of seventeen manholes, the cured in place pipe (CIPP) lining of approximately 3,000 linear feet of existing 8” gravity sewer, the replacement of approximately 120 linear feet of existing 8” gravity sewer, 33 new service laterals with cleanouts, the rehabilitation and lining of 13 existing services, one new lift station utilizing an existing wet well, including all site work, mechanical work, dewatering, electrical work, instrumentation work, and related piping, valves, fittings, and appurtenances, approximately 850 linear feet of 4” force main to be installed via both open-cut and horizontal directional methods, force main valves and fittings, and restoration of all areas affected by construction to existing conditions or better.

SECTION 2. Time of Completion: Construction of the Work must begin within ten (10) calendar days from the date of receipt of official Notice to Proceed. Substantial Completion shall be achieved within **180 days** consecutive calendar days from the date of Notice to Proceed. For projects with a value of less than ten million dollars (\$10,000,000.00), Final Completion shall be achieved within **sixty-five (65)** consecutive calendar days from the date of actual Substantial Completion. For projects with a value of more than ten million dollars (\$10,000,000.00), Final Completion shall be achieved within **ninety-five (95)** consecutive calendar days from the date of actual Substantial Completion. The rate of progress and the time of completion are essential conditions of this Contract.

Deduction for Not Completing on Time: The District and Contractor recognize that because the Work is of a critical nature, time is of the essence. Therefore, the District will suffer direct financial loss and damage if the Work is not completed within the times specified above. The District and Contractor also recognize that it is difficult to ascertain the extent of those damages in advance and it will be difficult and expensive to determine those damages in a legal proceeding. Accordingly, Contractor shall pay to the District as liquidated damages, and not as a penalty, the amounts set out in (a) and (b) (“Liquidated Damages”) below for each and every calendar day the above deadlines are delayed, as said date may be adjusted as provided in the Special Conditions. Delay shall not include delays caused by factors beyond Contractor’s reasonable control, including but not limited to delays because of strikes, lockouts, work slowdowns or stoppages, accidents, acts of God, failure of any

governmental or other regulatory authority to act in a timely manner, failure of the District to furnish timely information or to obtain the cooperation of the District's design professionals and/or Engineer, or delays caused by faulty performance by the District or by Engineer.

- a. **Substantial Completion Delay.** Contractor shall pay to the District as Liquidated Damages, and not as a penalty, **\$100** per day for each and every calendar day Substantial Completion is delayed.
- b. **Final Completion Delay.** If Final Completion is not reached within **65 days** of actual Substantial Completion, Contractor shall pay to the District as Liquidated Damages, and not as a penalty, **\$75** per day for each and every calendar day Final Completion is delayed.

In addition Contractor shall be responsible for the costs for engineering and other professional fees, delay damage settlements or awards owed by the District to others, fines or penalties imposed by regulatory agencies, and professional fees, including attorneys' fees, incurred in connection with such settlements, awards, penalties or fines (collectively "Additional Delay Damages"). Engineering and inspection fees shall include direct labor costs, indirect costs, and overhead and profit. The District and Contractor agree that the amounts set out in (2)(a) and (2)(b), above are to be paid by Contractor as Liquidated Damages and represent a reasonable estimate of the District's anticipated expenses for delays, inspection, and administrative costs associated with such delays. However, such amounts do not represent additional District costs for Additional Delay Damages. Therefore, in addition to these Liquidated Damages amounts, there shall be other amounts for Additional Delay Damages incurred by the District caused by avoidable delays by Contractor.

Where Liquidated Damages and Additional Delay Damages in connection with the Work of this Contract are duly and properly imposed against Contractor in accordance with the terms of this Contract, Federal law, State law, and/or governing ordinances or regulations, the total amount that Contractor owes to the District may be withheld and reduced from any monies due or to become due Contractor under the Contract, and when deducted, shall be deemed and taken as payment for such Liquidated Damages and Additional Delay Damages. If monies due from the District are not sufficient to cover such Liquidated Damages, Contractor agrees to immediately pay to the District any balance due.

SECTION 3. General: Contractor hereby certifies that it has read each and every clause of the Contract Documents and that it has made such examination of the location of the proposed Work as is necessary to understand fully the nature of the obligation herein made; and will complete the same in the time limits specified herein, in accordance with the Contract Documents. Contractor shall work with and report to Engineer to complete the Work set forth in the Contract Documents. Contractor has given Engineer written notice of all conflicts, errors, and discrepancies in the Contract Documents and the written resolution thereof by Engineer is acceptable to Contractor.

All Work under this Contract shall be done to the satisfaction of Engineer, who shall, in all cases, determine the amount, quality, fitness, and acceptability of the Work and materials, which may arise, as to the fulfillment of the Contract on the part of Contractor, Engineer's decision thereon shall be final and conclusive, and such determination shall be a condition precedent to the right of Contractor to receive any payment hereunder.

At any time during the performance of the Contract, Contractor shall allow and provide the District access to all of the documents, papers, letters or other materials made or received by Contractor in conjunction with the Contract and Work. Should Contractor fail to provide access to these documents in response to the District's request, the District may unilaterally cancel the Contract. At the conclusion of the Contract, Contractor shall provide the District all public records related to the Project or the Work.

Any clause or section of this Contract or the Contract Documents which may, for any reason, be declared invalid, may be eliminated therefrom; and the intent of this Contract or the Contract Documents and the remaining portion thereof will remain in full force and effect as completely as though such invalid clause or section has not been incorporated herein.

No assignment by a party hereto of any rights, responsibilities, or interests in the Contract Documents will be binding on another party hereto without the written consent of both parties. Unless specifically stated to the contrary in a written consent to an assignment, no assignment will release or discharge the assignor from any duty or responsibility under the Contract Documents. Notwithstanding the foregoing, the District may assign this Contract to the State of Florida or any political subdivision, municipality, special district or authority thereof without Contractor's consent and without recourse.

The District and Contractor each binds itself, its partners, successors, assigns and legal representatives to the other party hereto, its partners, successors, assigns and legal representatives in respect to all covenants, agreements, and obligations contained in the Contract Documents.

SECTION 4. Contract Sum: The District shall pay Contractor as just compensation for the performance of this Contract, subject to any additions or deductions as provided in the Contract Documents, based on unit prices, the amounts set forth in the Pricing Schedule attached hereto ("Contract Sum"). The District and Contractor agree that all payments will be processed in accordance with the Local Government Prompt Payment Act, Sections 218.70-218.80, Florida Statutes.

SECTION 5. Progress Payments: On or before the tenth (10th) day of every month, except as provided for in the Special Conditions, Contractor shall prepare and submit on a form approved by Engineer a detailed estimate and invoice to Engineer setting forth the schedule of values of the total amount of the Work which has been completed from the start of the job up to and including the last day of the preceding month and the value thereof, less any percentage retained in accordance with the Special Conditions, and the aggregate of any previous payment ("Progress Payment Application"). Contractor shall provide such supporting evidence as may be required by the District and/or Engineer.

As a strict condition precedent to payment, each Progress Payment Application must be accompanied by: a Contractor's Progress Payment Affidavit submitted by Contractor to Engineer indicating that all lienors under Contractor's direct contract have been paid in full; and a waiver and release of lien upon progress payment ("Partial Release of Lien") from all persons with a potential lien interest in the Project, including but not limited to subcontractors, sub-subcontractors, suppliers, and materialmen.

Upon receipt of the Progress Payment Application, Engineer shall either provide the District with its written approval of the Progress Payment Application, or notify the District in writing that it rejects the Progress Payment Application, the reason(s) for such rejection, and its recommendation as to the amount Contractor is owed, if any, within ten (10) days of receipt of the Progress Payment Application.

The District shall review Engineer's recommendation as set forth above. If the District agrees that the Progress Payment Application is complete and accurately reflects the amount Contractor is owed, the District shall pay Contractor the amount set forth on the Progress Payment Application within twenty-five (25) days of Engineer's receipt of the Progress Payment Application.

In the event the District finds the Progress Payment Application is incomplete or does not accurately reflect the amount Contractor is owed, the District shall reject the Progress Payment Application in writing within twenty (20) days of Engineer's receipt of the Progress Payment Application. The rejection shall state with specificity the reason for the rejection and any action necessary to make the Progress Payment Application acceptable to the

District. If Contractor submits a corrected Progress Payment Application within ten (10) days of the rejection, acceptable to the District, the District shall pay the corrected Progress Payment Application within ten (10) business days after the corrected Progress Payment Application is received.

In the event the District disputes the corrected Progress Payment Application, the District shall notify Contractor in writing of such dispute and pay to Contractor the amount not in dispute, if any, within twenty-five (25) days of the District's receipt of the corrected Progress Payment Application. In exchange for such payment, Contractor shall submit to Engineer a Progress Payment Affidavit indicating that all lienors under Contractor's direct contract have been paid in full for the Work related to the non-disputed amount.

Contractor and the District agree that prior to instituting any litigation for damages under this Section 5, the parties shall conduct a non-binding mediation to attempt to resolve their dispute. In the event the parties cannot agree upon a mediator, each party shall select a mediator and such mediators shall select a third mediator who shall serve as the mediator for the dispute. In the event such mediation does not occur within thirty (30) days of a written request of either party, the parties shall be free to pursue litigation without first conducting mediation.

Contractor shall promptly pay each subcontractor and supplier within ten (10) days of receipt of payment from the District. The amount shall be determined in accordance with the terms of the applicable subcontracts and purchase orders. The District shall not have responsibility for payments to a subcontractor.

Contractor warrants that title to all Work covered by the Progress Payment Application will pass to the District no later than the time payment. Contractor further warrants that upon submittal of a progress payment application, all Work previously paid for by the District shall, to the best of Contractor's knowledge, information and belief, be free and clear of liens, claims, security interests or other encumbrances adverse to the District's interests.

A progress payment by the District shall not constitute acceptance of Work not in accordance with the requirements of the Contract Documents.

SECTION 6. Acceptance and Final Payment: When the Work has been fully completed, including all punch list items as provided for in the Special Conditions, in accordance with the terms of the Contract Documents, a Final Payment Application shall be prepared by Contractor and provided to Engineer within thirty (30) calendar days after the date of Final Completion stating the final Work performed to complete the Project plus or minus any Change Orders, and less the aggregate of any previous payment.

As a strict condition precedent to final payment, Contractor shall submit to Engineer with the Final Payment Application:

1. a Final Payment Affidavit stating that all subcontractors, suppliers, and other materialmen have been paid;
2. Waiver and Release of Lien upon Final Payment ("Final Release of Lien") from Contractor and all persons or entities that have, or potentially have, a lien on the Project, including but not limited to all subcontractors and vendors;
3. all close-out documents including, but not limited to the Maintenance Bond, warranties, guarantees, owner's manuals, and start-up certificates by the designer or manufacturer demonstrating that the equipment meets design intent;
4. data establishing payment or satisfaction of obligations, such as receipts, claims, security interests or encumbrances arising out of the Contract.

Upon receipt of the Final Payment Application, Engineer will inspect the Work, the Final Payment Application, and supporting documentation. If Engineer finds the Work acceptable, Engineer will issue a certificate of acceptance stating that the quality Work has been fully completed to Engineer's satisfaction in substantial compliance with the Contract Documents. The Certificate of Final Completion shall constitute Engineer's determination as to the quality of the Work only; it shall not include an opinion as to the timeliness of completion of the Work. If the Engineer finds the Contract fully and timely performed, and the Final Payment Application accurately reflects the final amount Contractor is owed, the Engineer shall issue its written approval to the District of the Final Payment Application within ten (10) calendar days of receipt the Final Payment Application.

If Engineer disputes the Final Payment Application, finds the Work unsatisfactory, or determines that amounts should be deducted as Liquidated Damages and Additional Delay Damages, Engineer shall notify the District in writing of its findings, the support for such findings, and its recommendation as to the amount Contractor is owed, if any, within ten (10) calendar days of receipt of the Final Payment Application.

The District shall review Engineer's recommendation as set forth above. If the District finds that the Work is acceptable, the Contract has been fully and timely performed, and the Final Payment Application is complete and accurately reflects the amount Contractor is owed, the District shall pay Contractor the amount of the Final Payment Application within twenty-five (25) calendar days of Engineer's receipt of the Final Payment Application.

In the event the District finds the Work is not acceptable, the Contract has not been fully and timely performed, or the Final Payment Application is incomplete or does not accurately reflect the amount Contractor is owed, the District shall reject the Final Payment Application in writing within twenty (20) calendar days of Engineer's receipt of the Final Payment Application. The rejection shall state with specificity the reason for the rejection and any action necessary to make the Final Payment Application acceptable to the District. If Contractor submits a corrected Final Payment Application acceptable to the District, the District shall pay the corrected Final Payment Application within ten (10) calendar days after the corrected Final Payment Application is received.

In the event the District disputes the corrected Final Payment Application, the District shall notify Contractor in writing of such dispute and pay to Contractor the amount not in dispute, if any, within twenty-five (25) calendar days of the District's receipt of the corrected Final Payment Application. This payment shall constitute a progress payment and shall not be deemed final payment. In exchange for such payment, Contractor shall submit to Engineer a Progress Payment Affidavit indicating that all lienors under Contractor's direct contract have been paid in full for the Work related to the non-disputed amount.

The District and Contractor agree that prior to instituting any litigation for damages under this Section, the parties shall conduct a non-binding mediation to attempt to resolve their dispute. In the event the parties cannot agree upon a mediator, each party shall select a mediator and such mediators shall select a third mediator who shall serve as the mediator for the dispute. Such mediation shall occur within forty-five (45) calendar days of the District's rejection of the corrected Final Payment Application. In the event such mediation does not occur within thirty (30) calendar days of a written request of either party, the parties shall be free to pursue litigation without first conducting mediation.

Acceptance of final payment by Contractor, a subcontractor, or material supplier shall constitute a waiver of claims by the payee.

In the event that a lien is filed or claimed against the Work by any subcontractor, supplier, or laborer, Contractor agrees to immediately (i) pay such subcontractor, supplier, or laborer for work which Contractor has been paid by the District and deliver to the District a Final Release of Lien signed by such subcontractor, supplier, or laborer; or (ii) cause the immediate removal of such lien by providing a bond in accordance with Florida law. If Contractor

fails to do the above, the District may, at its option, and at the sole expense and liability of Contractor, bond such lien or cause the lien to be discharged and deduct the cost of said bond from the amount owed Contractor under any pending invoice or the next invoice. This Section shall survive the termination or expiration of this Contract.

SECTION 7. WARRANTY: Contractor warrants to the District and Engineer that (1) materials and equipment furnished under the Contract will be new and of good quality unless otherwise required or permitted by the Contract Documents; (2) the Work will be free from defects not inherent in the quality required or permitted; and (3) the Work will conform to the requirements of the Contract Documents.

SECTION 8. CORRECTION OF THE WORK: In addition to the warranties provided for in Article 4 – Contract Section 7, Contractor shall promptly correct Work rejected by Engineer and/or District as failing to conform to the requirements of the Contract Documents. Contractor shall bear the cost of correcting such rejected Work, including the costs of uncovering, replacement, and additional testing.

In addition to Contractor's other obligations including warranties under the Contract, Contractor shall, for a period of one (1) year after Substantial Completion, correct Work not conforming to the requirements of the Contract Documents.

If Contractor fails to correct nonconforming Work within a reasonable time, the District may correct it in accordance with the Contract Documents.

This period of one (1) year shall be extended with respect to portions of Work first performed after Substantial Completion by the period of time between Substantial Completion and the actual performance of the Work. This Section 8 shall survive acceptance of the Work under the Contract Documents and termination of the Contract Documents.

(Remainder of this page left blank intentionally)

IN WITNESS WHEREOF, the parties hereto have executed this Contract this _____ day of _____, 20____. All portions of the Contract Documents have been signed or identified by the District and Contractor or by Engineer on their behalf.

ATTEST:

OWNER: LOXAHATCHEE RIVER
ENVIRONMENTAL CONTROL DISTRICT

Witness

Witness

Gordon M. Boggie
Chairman
Address for notice: 2500 Jupiter Park Dr.
Jupiter, Florida 33458

CONTRACTOR:

Witness

Witness

As its: _____

Address for notice: _____

(Affix Corporate Seal)

**STATE OF FLORIDA
COUNTY OF PALM BEACH**

I HEREBY CERTIFY that on this day, before me, personally appeared _____, as _____, to me well known and known to be the person described in or who produced as identification a _____(Form of ID) and who executed and acknowledged to and before on behalf of the District, the foregoing Contract, and that he acknowledged in the presence of two subscribing witnesses freely and voluntarily for the purposes therein expressed.

WITNESS my hand and official seal in the County and State last aforesaid this ____ day of _____, 20 ____.

Notary Public, State of Florida
Print Name:
Commission No.:
My Commission Expires:

(Notary Ink Stamp)

**STATE OF FLORIDA
COUNTY OF _____**

I HEREBY CERTIFY that on this day, before me, personally appeared _____ as _____ (Title) of the _____ (Name of Company), to me well known and known to be the person described in or who produced as identification a _____(Form of ID) and who executed and acknowledged to and before on behalf of _____ (Company Name), Contractor, the foregoing Contract, and that he acknowledged in the presence of two subscribing witnesses freely and voluntarily for the purposes therein expressed.

WITNESS my hand and official seal in _____ County and State last aforesaid this ____ day of _____, 20 ____.

Notary Public, State of Florida
Print Name:
Commission No.:
My Commission Expires:

(Notary Ink Stamp)

BID FORM — BASE BID
LOXAHATCHEE RIVER ENVIRONMENTAL CONTROL DISTRICT
ROLLING HILLS SUBDIVISION GRAVITY SEWER, LIFT STATION, & FORCEMAIN

UNIT PRICES

No.	Description	Unit	Qty	Unit Cost	Total
General Conditions and Restoration					
1	Mobilization/Demobilization, Bonds and Insurance	1	LS		
2	Maintenance Of Traffic	1	LS		
3	As- Built Record Drawings	1	LS		
4	Audio Video Documentation	1	LS		
5	NPDES Permit/Erosion Measures	1	LS		
6	Dewatering	1	LS		
Manhole Rehabilitation					
7	Pressure Clean Manhole	17	EA		
8	Miscellaneous Manhole Repairs (Including Mortar, Pipe Connections, Reinforcement Steel, Holes, Cracks, Joints, and Leaks)	17	EA		
9	Pressure/Xypex Grouting	5	EA		
10	Reform Bench and Channel	17	EA		
11	Chimney Adjustment	4	EA		
12	Install New Manhole Cover	7	EA		
13	Install New Adjustment Ring	13	EA		
14	Install New Frame	5	EA		
Gravity Sewer Pipe Rehabilitation					
15	Cured in Place Pipe Lining, 8" Pipe	3,000	LF		
16	8" PVC SDR 26 PVC Replacement (0-6' Depth)	40	LF		
17	8" PVC SDR 26 PVC Replacement (6-8' Depth)	20	LF		
18	8" PVC SDR 26 PVC Replacement 8-10' Depth)	20	LF		
19	8" PVC SDR 26 PVC Replacement (10-12' Depth)	40	LF		
Sewer Service Laterals					
20	Install New 4" PVC Lateral – Single Service with Cleanout on Existing Gravity Main or into Existing Manhole	32	EA		

21	Install New 6" PVC Lateral – Double Service with Cleanouts on Existing Gravity Main or into Existing Manhole	1	EA		
22	Clean and Televiser Existing 4" Lateral, Make Point Repairs, Install Cured In Place Pipe Lining, and Install New Cleanout & Associated Piping required for 4" Single Service	4	EA		
23	Clean and Televiser Existing 6" Lateral, Make Point Repairs, Install Cured In Place Pipe Lining, and Install New Cleanout, and Associated Piping required for 6" Single Service	6	EA		
24	Clean and Televiser Existing 6" Lateral, Make Point Repairs, Install Cured In Place Pipe Lining, and Install New Cleanouts, and Associated Piping required for 6" Double Service	3	EA		
Lift Station and Force Main					
25	Proposed Lift Station, Including all Mechanical, Structural, Site, Electrical, and Instrumentation Work (Owner furnished pumps, to be installed by Contractor)	1	LS		
26	4" C900 PVC Force Main installed via Open-Cut	100	LF		
27	4" HDPE DIPS SDR-11 installed via Horizontal Directional Drill	750	LF		
28	4" Plug Valve with Valve Box	2	EA		
29	4" DI MJ 90 Degree Bend	1	EA		
30	4" DI MJ 45 Degree Bend	2			
31	4" DI MJ 11.25 Degree Bend	4	EA		
32	4" HDPE x MJ Adapter	4	EA		
33	Air Release Valve	2	EA		
34	Connect to Existing Force Main	1	EA		
TOTAL BID					

TOTAL BID ITEMS 1-34, (in words) _____ Dollars

_____ Cents

THE CONTRACT AWARD SHALL BE EVALUATED BASED ON THE TOTAL BID PRICE FOR ITEMS 1 THROUGH 34 AS SUBMITTED BY THE LOWEST, QUALIFIED, RESPONSIBLE, RESPONSIVE BIDDER.

(Name of Bidder)

Bidders Name: _____

By: _____
Signature of Authorized Officer, Partner, Member, Manager

Print Name of Person signing: _____

Title: _____

Business Address: _____

Incorporated or formed under the laws of the State of _____.

PUBLIC CONSTRUCTION BOND

ARTICLE 5

Bond No. _____

KNOW ALL PERSONS BY THESE PRESENTS: That we, _____
(Name of Contractor) as “Principal” at the address of _____
and _____ as “Surety” at the address of _____
are bound to the LOXAHATCHEE
RIVER ENVIRONMENTAL CONTROL DISTRICT (the “District”), at the address of 2500 Jupiter
Park Drive, Florida 33458, in the sum of _____
(Written Amount) (\$ _____ -_) (the “Bond”) for the payment of which we bind
ourselves, our heirs, personal representatives, successors, and assigns, jointly and severally.

WHEREAS, Principal has entered into a contract (the “Contract”) with LOXAHATCHEE
RIVER ENVIRONMENTAL CONTROL DISTRICT dated _____, 2020, in the amount of
\$ _____) for the
ROLLING HILLS SUBDIVISION GRAVITY SEWER, LIFT STATION, & FORCEMAIN which
Contract, is by reference made a part hereof.

THE CONDITION of this Bond is that if Principal:

1. Performs the Contract with the District at the times and in the manner prescribed in the Contract; and
2. Promptly makes payments to all claimants, as defined in Section 255.05(1), Florida Statute, supplying Principal with labor, materials, or supplies, used directly or indirectly by Principal in the prosecution of the Work provided for in the Contract; and
3. Pays the District all losses, damages, expenses, costs, and attorney’s fees, including appellate proceedings, that the District sustains because of a default by Principal under the Contract; and
4. Performs the guarantee of all Work and materials furnished under the Contract for the time specified in the Contract, then this Bond is void; otherwise, it remains in full force.
5. Any changes in or under the Contract Documents and compliance or noncompliance with any formalities connected with the Contract or the changes does not affect Surety’s obligation under this Bond.
6. To a claimant who is not in privity with the Principal and who has not received payment for labor, materials, or supplies, that written notice must be delivered to the Principal. This Bond is furnished pursuant to the statutory requirements for bonds on public works projects, Section 255.05, Florida Statutes. A claimant, except a laborer, who is not in privity with the Principal and who has not received payment for labor, materials, or supplies, is hereby notified that Section 255.05(2), Florida Statutes specifically requires that written notice be given to Principal within forty-five (45) days after beginning to furnish labor, materials, or supplies for the prosecution of the Work that

claimant intends to look to the Bond for protection. Further notice is hereby given to a claimant who is not in privity with the Principal and who has not received payment for labor, materials, or supplies, that written notice must be delivered to the Principal and to the Surety, of the performance of the labor or delivery of the materials or supplies and of the non-payment, within ninety (90) days after performance of the labor or after complete delivery of the materials or supplies (but not before 45 days after the first furnishing of labor, services, or materials), or with respect to rental equipment, within ninety (90) days after the date that rental equipment was last on the job site available for use. No action for the labor, material, or supplies may be instituted against Principal of the Surety unless both notices have been given. Further notice is hereby given that no action for labor, materials, or supplies may be instituted against the Principal or the Surety on the Bond after one (1) year from the performance of the labor or completion of delivery of the materials or supplies.

7. Without modifying the foregoing, this Bond shall require no more and no less of the Principal and Surety than is specified in Section 255.05, Florida Statutes. The notice and time limitation provisions of Section 255.05, Florida Statutes are incorporated herein by reference.

Surety and Contractor, intending to be legally bound hereby, subject to the terms printed above, do cause this Performance Bond to be duly executed on its behalf by its authorized officer, agent or representative.

The provisions and limitations of Section 255.05, Florida Statutes including but not limited to the notice and time limitations in Sections 255.05(2) and 255.05(10), Florida Statutes are incorporated in this bond by reference.

(Remainder of Page Intentionally Left Blank)

SIGNED AND SEALED ON _____, 20__.

Name of Principal

Name of Surety

By: _____
Signature of Principal

By: _____
As Attorney-in-Fact (Attach Power of Attorney)

STATE OF FLORIDA
COUNTY OF _____

Sworn to and acknowledged before me this ____ day of _____, 202__, by
_____ to me who produced as identification a
_____.

Notary Public, State of Florida

Print Name: _____

(Notary Ink Seal)

Commission Expires: _____

My Commission Expires: _____

COUNTERSIGNATURE

BY: _____

ARTICLE 6
FORMS FOR USE DURING CONSTRUCTION

6-1 Notice of Award of Contract

6-2 Notice to Proceed

6-3 Progress Payment Affidavit

6-4 Final Payment Affidavit

6-5 Certificate of Substantial Completion

6-6 Certificate of Final Completion

6-7 Partial Release of Lien

6-8 Final Release of Lien

6-9 Change Order

6-10 Application and Certificate of Payment – Contractor shall utilize American Institute of Architect Form G702 and G703

Loxahatchee River District



Water Reclamation | Environmental Education | River Restoration
2500 Jupiter Park Drive, Jupiter, Florida 33458-8964
Telephone (561) 747-5700 • Fax (561) 747-9929 • www.loxahatcheeriver.org
D. Albrey Arrington, Ph.D., Executive Director

[Date]

[Contractor Name]

[Contractor Address]

SUBJECT: Loxahatchee River Environmental Control District
ROLLING HILLS SUBDIVISION GRAVITY SEWER, LIFT STATION, &
FORCEMAIN
Notice of Award of Contract

Dear _____:

I am pleased to advise you that the District Governing Board has elected to Award the Contract for the subject project to your firm. You are the apparent successful Bidder and have been awarded a contract for:

ROLLING HILLS SUBDIVISION GRAVITY SEWER, LIFT STATION, & FORCEMAIN

The Contract Price of your Contract is \$_____

In accordance with the contract specifications you will have 14 calendar days from the date of this Notice of Award, that is by (Day), (Date), to provide the following:

- a.) 4 executed sets of the attached Contract Documents, and
- b.) A Public Construction Bond with power of attorney in the amount of 100% of the contract (\$_____) and
- c.) An insurance certificate for this project in accordance with requirements set forth in Section 9.08, (please make sure coverages and additional insureds are as stated); and
- d.) A schedule of activities (received), and
- e.) Any other paperwork as required by the Contract.

Failure to comply with these conditions within the time specified will entitle Owner to consider your Bid abandoned, to annul this Notice of Award and to declare your Bid Security forfeited.

Within 20 calendar days after you comply with the above conditions, the District will return 1 fully

executed contract after execution.

Should you have any questions in regard to this correspondence, please feel free to contact me or [ENGINEER]

Regards,

Kris Dean, P.E.
Deputy Executive Director/Director of Engineering Services

Enclosures: 4 sets of Contract Documents

Loxahatchee River District



Water Reclamation | Environmental Education | River Restoration
2500 Jupiter Park Drive, Jupiter, Florida 33458-8964
Telephone (561) 747-5700 • Fax (561) 747-9929 • www.loxahatcheeriver.org

D. Albrey Arrington, Ph.D., Executive Director

[Date]

[Contractor Name]

[Contractor Address]

SUBJECT: ROLLING HILLS SUBDIVISION GRAVITY SEWER, LIFT STATION, &
FORCEMAIN
Notice to Proceed

Dear _____:

You have already received one (1) copy of the fully executed contract for the subject project. With the execution of this document completed by both parties and a Planning Meeting held [DATE], you are hereby provided with **NOTICE TO PROCEED as of [Day], [Date]**.

In accordance with the contract documents, you will have _____ consecutive calendar days from _____ to Substantial Completion, and _____ calendar days from actual Substantial Completion to Final Contract Completion, therefore:

Substantial Completion Date is: _____
Contract Completion Date is: _____

We look forward to working with you toward the successful completion of another project.

Should you have any questions in regard to this matter please feel free to contact me or [ENGINEER].

Kris Dean, P.E.
Deputy Executive Director/Director of Engineering Services

[ENGINEER]

PROGRESS PAYMENT AFFIDAVIT

STATE OF FLORIDA

COUNTY OF _____

BEFORE ME, the undersigned authority, personally appeared _____
 who, after being by me first duly sworn, deposes and says of his personal knowledge that:

1. He/She is the _____ of _____, which
 does business in the State of Florida, hereinafter referred to as "Contractor".

2. Pursuant to a contract with Loxahatchee River District, Contractor has furnished and will furnish
 services for the purpose of improving real property, more particularly described as:

ROLLING HILLS SUBDIVISION GRAVITY SEWER, LIFT STATION, & FORCEMAIN

3. This affidavit is executed in accordance with Section 713.06(3)(c), Florida Statutes, for the purpose
 of obtaining a progress payment in the amount of _____
 _____ Dollars (\$ _____).

4. All lienors under Contractor's direct Contract have been paid in full, except for the following listed
 lienors:

NAME OF LIENOR
 (Use blank sheet if necessary)

AMOUNT DUE OR TO BECOME DUE FOR
 LABOR, SERVICES OR MATERIAL

SIGNED, SEALED, AND DELIVERED this ____ day of _____, 20____.

By _____
 Contractor

SUBSCRIBED AND SWORN TO before me this ____ day _____ of 20____, by
 _____, personally known to me or who produced as identification a
 _____.

(Notary Ink Stamp)

 NOTARY PUBLIC, State of _____
 Print Name: _____
 Commission No.: _____
 My Commission Expires: _____

* THIS FORM SHALL BE SUBMITTED WITH EACH PAYMENT REQUEST.

FINAL PAYMENT AFFIDAVIT

STATE OF FLORIDA

COUNTY OF _____

BEFORE ME, the undersigned authority, personally appeared _____
 who, after being by me first duly sworn, deposes and says of his personal knowledge that:

1. He/She is the _____ of _____, which
 does business in the State of Florida, hereinafter referred to as "Contractor".
2. Pursuant to a contract with Loxahatchee River District, Contractor has furnished and will furnish
 services for the purpose of improving real property, more particularly described as:

ROLLING HILLS SUBDIVISION GRAVITY SEWER, LIFT STATION, & FORCEMAIN

3. This affidavit is executed in accordance with Section 713.06(3)(c), Florida Statutes, for the purpose
 of obtaining final payment in the amount of _____
 _____ Dollars (\$ _____).

4. All lienors under Contractor's direct Contract have been paid in full, except for the following listed
 lienors:

NAME OF LIENOR

(Use blank sheet if necessary)

AMOUNT DUE OR TO BECOME DUE FOR
 LABOR, SERVICES OR MATERIAL

SIGNED, SEALED, AND DELIVERED this ____ day of _____, 20____.

By _____
 Contractor

SUBSCRIBED AND SWORN TO before me this ____ day _____ of 20____, by
 _____, personally known to me or who produced as identification a
 _____.

(Notary Ink Stamp)

 NOTARY PUBLIC, State of _____
 Print Name: _____
 Commission No.: _____
 My Commission Expires: _____

Certificate of Substantial Completion

[Date]
[NAME]
[ADDRESS]

Loxahatchee River Environmental Control District
ROLLING HILLS SUBDIVISION GRAVITY SEWER, LIFT STATION, & FORCEMAIN
Substantial Completion

Dear [Name]:

On _____ the District, [PARTY NAMES] conducted a Substantial Completion Inspection for the above referenced project. The Substantial Completion inspection resulted in the attached [#] page Punchlist, containing [#] items for completion or correction. Please note per Spec Section 01780, all punch list items are to be corrected prior to Final Payment and before Final Completion is granted.

Based on the above referenced inspection, [name] has **deemed the project Substantially Complete as of [date]**.

Once all of the attached punch list items have been completed or corrected, please contact our office in writing so that we can schedule a time for final inspection.

If you have any questions regarding these items, please call me at _____.

Sincerely,

[Name]
[Title]

Enclosure: Substantial Completion Punchlist

cc: Kris Dean, LRECD
Lenny Giacobelli, LRECD

Certificate of Final Completion

[DATE]
[NAME]
[ADDRESS]

Loxahatchee River Environmental Control District
ROLLING HILLS SUBDIVISION GRAVITY SEWER, LIFT STATION, & FORCEMAIN
Final Completion

Dear [Name]:

On _____ the Loxahatchee River Environmental Control District, Palm Beach County,
_____, and _____ conducted a Final Completion
Inspection for the above referenced project. Per our inspection, the below listed items were
determined to be incomplete:

We have now verified that all of the Punch List Items have been completed. Please accept this
letter for your records, that as of _____ has deemed the above
referenced project to be fully complete and in compliance with the Contract Documents.

We are currently preparing the Final Balancing Change Order to complete the processing of your
Final Payment Application.

If you have any questions regarding these items, please call me at _____.

Sincerely,

[Name]
[Title]

Enclosure

cc: Kris Dean, LRECD
Lenny Giacobelli, LRECD

WAIVER AND RELEASE OF LIEN UPON PROGRESS PAYMENT:

The undersigned lienor, in consideration of the sum of \$ _____, hereby waives and releases its lien and right to claim a lien for labor, services, or materials furnished through (insert date) to (insert the name of your customer) on the job of (insert the name of the owner) to the following property:

ROLLING HILLS SUBDIVISION GRAVITY SEWER, LIFT STATION, & FORCEMAIN

This waiver and release does not cover any retention or labor, services, or materials furnished after the date specified.

DATED on , (year) . (Lienor)

WITNESS:

By: _____
Contractor (SEAL)

Attest: _____

SWORN AND SUBSCRIBED TO BEFORE ME, THIS ____ day _____ of 20____, by _____, personally known to me or who produced as identification a _____.

NOTARY PUBLIC, State of Florida

WAIVER AND RELEASE OF LIEN UPON FINAL PAYMENT

The undersigned lienor, in consideration of the final payment in the amount of \$_____, receipt of which is hereby acknowledged, hereby waives and releases its lien and right to claim a lien for labor, services, or materials furnished to _____ on the job of the Loxahatchee River Environmental Control District hereinafter referred to as the "District," to the following property: ROLLING HILLS SUBDIVISION GRAVITY SEWER, LIFT STATION, & FORCEMAIN

WITNESS:

By: _____
Contractor (SEAL)

_____ Attest: _____

SWORN AND SUBSCRIBED TO BEFORE ME, THIS ____ day _____ of 20____, by _____, personally known to me or who produced as identification a _____.

(Notary Ink Stamp)

NOTARY PUBLIC, State of Florida
Print Name: _____
Commission No.: _____
My Commission Expires: _____

LOXAHATCHEE RIVER ENVIRONMENTAL CONTROL DISTRICT

2500 JUPITER PARK DRIVE, JUPITER, FLORIDA 33458
 (561) 747-5700 FAX (561) 747-9929

CHANGE ORDER #1

DATE: _____

PROJECT NAME: ROLLING HILLS SUBDIVISION GRAVITY SEWER, LIFT STATION, &
 FORCEMAIN

OWNER: Loxahatchee River Environmental Control District

CONTRACTOR:

THE FOLLOWING CHANGES:

JUSTIFICATION:

CHANGE TO CONTRACT PRICE:

Original CONTRACT PRICE: \$

Current CONTRACT PRICE \$

CONTRACT PRICE due to this Change Order
 will be *INCREASED/DECREASED* by: \$

The New CONTRACT PRICE including
 this Change Order will be: \$

CHANGE TO CONTRACT TIME:

The DATE OF COMPLETION of all work will be: UNCHANGED

APPROVED BY CONTRACTOR: _____
 DATE

APPROVED BY ENGINEER: _____
 DATE

APPROVED BY OWNER: _____
 LOXAHATCHEE RIVER ENVIRONMENTAL CONTROL DISTRICT DATE

ARTICLE 7

CERTIFICATE OF DISTRICT'S ATTORNEY

ROLLING HILLS SUBDIVISION GRAVITY SEWER, LIFT STATION, & FORCEMAIN

THIS IS TO CERTIFY that on this ____ day of _____, 20__, I have examined the attached Contract Documents, Surety Bonds, and the execution thereof by the parties thereto, and I am of the opinion that each of the aforesaid agreements has been duly executed by the proper parties thereto acting through their duly authorized representatives; that said representative have full power and authority to execute said agreements on behalf of the respective parties named therein; and that the foregoing agreements as being legally sufficient in form constitute a binding agreement between the parties.

By: _____

Patrick J. McNamara, Esq.
de la Parte & Gilbert, P.A.
Attorney for the
LOXAHATCHEE RIVER
ENVIRONMENTAL CONTROL DISTRICT

ARTICLE 8
RESERVED

SPECIAL CONDITIONS

ARTICLE 9

TITLE

- 9.01 Governing Order of Contract Documents
- 9.02 Time of Completion and Amount of Liquidated Damages
- 9.03 Reimbursement of Additional Delay Damages
- 9.04 Percentage of Progress Payments to be Retained
- 9.05 Amount of Minimum Progress Payment
- 9.06 Surety Bonds
- 9.07 Subcontractors
- 9.08 Contractor's Insurance
- 9.09 Water Supply
- 9.10 Pipeline and Manhole Locations
- 9.11 Elevation Datum
- 9.12 Easements
- 9.13 Occupying Private Land
- 9.14 Work in State, County and Town Rights-of-Way
- 9.15 Interference with and Protection of Streets
- 9.16 Traffic Control
- 9.17 Work Adjacent to Telephone, Power, Cable TV
and Gas Company Structures
- 9.18 Storage of Materials
- 9.19 Salvaged Materials and Excavated Materials
- 9.20 Planning Meeting
- 9.21 Alterations
- 9.22 Extra and Deleted Work
- 9.23 Extension of Time on Account of Extra Work
- 9.24 Changes Not to Affect Bonds
- 9.25 Non-Assignable
- 9.26 District Remedies
- 9.27 Contractor's Remedies

9.28	Discontinuance of Construction
9.29	Contractor's Responsibility
9.30	District's Right to Terminate
9.31	Venue, Disputes and Attorney's Fee
9.32	Coordination with District's Existing Facilities
9.33	Permits
9.34	Coordination of Construction
9.35	Field Layout of Work
9.36	Submittals
9.37	Inspection and Testing
9.38	Utilities and Services
9.39	Security
9.40	Special Controls
9.41	Field Offices, Storage and Construction Areas
9.42	Equipment and Materials
9.43	Project Closeout
9.44	Open Specifications
9.45	Spare Parts List
9.46	Applicable Standards and Codes
9.47	Copies of Plans and Specifications
9.48	Restoration – Special
9.49	Contractor Performance Reviews and Ratings

9.01 Governing Order of Contract Documents

In the event of discrepancy, the interpretation of Contract Documents shall follow the order of precedence as identified in Article 1 Instruction to Bidders Section 22.

9.02 Time of Completion and Amount of Liquidated Damages

Contractor agrees to commence Work on or before a date to be specified in a written Notice to Proceed. In the event Contractor does not reach Substantial Completion or Final Completion of the Work within the time specified in the Notice to Proceed, Contractor shall pay to the District as liquidated damages, and not as a penalty the amounts set forth in Article 4- Contract Section 2.

9.03 Reimbursement of Additional Delay Damages

In the event Substantial Completion and Final Completion of the Work set forth in the Contract Documents and any subsequent modifications, is delayed beyond the time set forth in Article 4- Contract Section 2, Contractor shall also be responsible for Additional Delay Damages as set forth in the Article 4 - Contract Section 2.

9.04 Percentage of Progress Payments to be Retained

The percentage of estimated value to be retained under that heading of the Contract, entitled Progress Payments shall conform to the following schedule:

- a. Retention of up to 10% of payments claimed.
- b. For Projects over \$200,000, when the Project is fifty percent (50%) complete, the retainage amount shall be reduced to 5% from each subsequent progress payment made to the Contractor.
- c. After fifty percent (50%) completion of the Work, Contractor may present a payment application for up to one-half of the retainage held by the District for the first fifty percent (50%) of the Work.
- d. A cash bond or irrevocable letter of credit will be accepted if offered in lieu of cash retainage.

The above retainage reductions shall not require the District to release any amount that is the subject of a good faith dispute or a claim pursuant to Section 255.05, Florida Statutes.

The above retainage reductions shall not apply if the Project is funded, in whole or in part, with federal funds that are subject to federal grantor laws and regulations that are contrary to any provision of the Florida Local Government Prompt Payment Act, or if the retainage reduction is otherwise not required by the Florida Local Government Prompt Payment Act.

9.05 Left Blank Intentionally

9.06 Surety Bonds

Contractor, at the time of execution of the Contract, must deposit with the District a Public Construction Bond providing for the satisfactory performance and completion of the Work and providing security for payment of all persons performing labor and/or providing materials or supplies

in connection with this Contract. The bond shall be furnished in an amount equal to the amount of the contract award. The form and conditions of the bond and the surety shall be in accordance with the statutory requirements of Section 255.05(2), Florida Statutes, and are subject to the District's approval.

A maintenance bond in the amount of 50% of the contract price guaranteeing the repair of all damages due to improper materials or workmanship for a period of one (1) year after Final Completion will also be required. The maintenance bond shall be submitted with the final payment request.

The bonds shall be written by a surety company that has the following ratings based upon amount of the Contract:

<u>CONTRACT AMOUNT</u>	<u>BEST'S RATINGS</u>
\$ 25,000.00 to \$100,000.00	B+ Class V or better
\$100,000.01 to \$500,000.00	A Class VI or better
\$500,000.01 and over	A Class VII or better

The surety must be licensed to do business in the State of Florida, and the bonds must be executed by an Attorney-in-Fact for the surety company with a certified copy of its Power of Attorney attached to the bonds.

The Maintenance Bond shall remain in effect for one (1) year beyond the date of Final Completion and acceptance of the entire Work to repair any Defective Work done under the Contract Documents. The Public Construction Bond shall remain in effect to pay valid claims for payment of labor, supplies, and/or materials submitted after completion of the Work and for items covered under the performance aspect of said bond.

9.07 Subcontractors

Prior to award of the Contract, Engineer shall notify Contractor of any objection to the subcontractors proposed for the Work, and Contractor shall not employ any subcontractor with whom Engineer or District has an objection.

Contractor shall be responsible to the District for the acts and omissions of any subcontractor and any person directly or indirectly employed by a subcontractor, to the extent Contractor is responsible for the acts and omissions of persons directly employed by Contractor. Nothing contained in the Contract Documents shall create any contractual relation between any subcontractor and the District.

9.08 Contractor's Insurance

Contractor shall maintain and pay for, as applicable, through an insurance company or insurance companies acceptable to the District at Contractor's sole expense: Fire, Extended Coverage, Vandalism and Malicious Mischief coverage on buildings and structures in the course of construction. Such coverage shall include foundations, additions, attachments, and all permanent fixtures belonging to and constituting a part of said buildings or structures. The policy or policies shall also cover machinery, if the cost of machinery is included in the Contract. The amount of insurance must at all times be at least equal to the actual cash value of the insured property.

Contractor shall provide the District, prior to the execution of the Contract, with a satisfactory Certificate of Insurance certifying that the required insurance is in force.

During the life of the Project, Contractor shall provide, pay for and maintain insurance of the types and in the amounts described herein. All such insurance shall be provided by responsible companies with A.M. Best ratings of at least A-, authorized to transact business in the State of Florida, and which are satisfactory to the District. Promptly after the District's issuance of the Notice of Award of this Contract, and prior to commencing the Work, Contractor shall provide evidence of insurance coverages of the types and in the amount required by submitting executed Certificates of Insurance, in the form preferred by the District. Each Certificate of Insurance shall set forth the original manual signature of the authorized representative of the insurance company/companies identified therein and shall have attached thereto proof that said representative is authorized to execute the same. In addition, certified true and exact copies of all required policies shall be provided to the District upon request.

Contractor shall obtain and maintain in full force and effect during the life of this Contract, Worker's Compensation Insurance covering all employees in performance of Work under this Contract. Contractor shall make this same requirement of any of its subcontractors. Contractor shall indemnify and save the District and Engineer harmless from any damages resulting from either Contractor or any subcontractor's failure to secure and/or maintain such insurance.

All policies of insurance required shall require that the insurer give the District thirty (30) days written notice of any cancellation, intent not to renew, or reduction in coverage; and ten (10) days written notice of any non-payment of premium. Such notice shall be delivered by U.S. Registered Mail to: Loxahatchee River District, 2500 Jupiter Park Drive, Jupiter, Florida 33458, Attn: Kris Dean, P.E. In the event of any reduction in the aggregate limit of any policy, Contractor shall immediately restore such limit to the amount required herein.

Receipt by the District of any Certificate of Insurance or copy of any policy evidencing the insurance coverages and limits required by the Contract Documents does not constitute approval or agreement by the District that the insurance requirements have been satisfied or that the insurance policies shown on the Certificates of Insurance are in compliance with the requirements of the Contract Documents.

The insurance coverages and limits required of Contractor under the Contract Documents are designed to meet the minimum requirements of the District. They are not designed as a recommended insurance program for Contractor. Contractor shall be responsible for the sufficiency of its own insurance program. Should Contractor have any questions concerning its exposures to loss under the Contract Documents or the insurance coverages needed therefore, it should seek professional assistance.

If the insurance coverage initially provided by Contractor is to expire prior to the completion of the Work, renewal Certificates of Insurance shall be furnished to the District thirty (30) days prior to the expiration of current coverages.

All liability insurance policies obtained by Contractor to meet the requirements of the Contract Documents, other than the Worker's Compensation and Employer's Liability Policy, shall provide that the District, its officers, employees, and agents, and Engineer and its shareholders, officers, and directors, and any other person or entity designated by the District, shall be named "additional

insureds” under the Policy and shall also incorporate a Severability of Interest and Cross Liability provision. All insurance coverages provided under this Special Conditions Section 9.08 shall apply to all of Contractor’s activities under the Contract Documents without regard for the location of such activity. The policy shall include a waiver of subrogation provision in favor of the additional insured. This policy shall include, but not be limited to, all of the following coverage in the following minimum amounts:

- a. Vehicle – Owner, Hired, Non-owner – Any Automobile Coverage

Injury or death of any one person:	\$1,000,000
Injury or death of more than one person in any one occurrence:	\$1,000,000
Property Damage- any one occurrence:	\$ 300,000

- b. Comprehensive General Liability, other than vehicle, including:

Comprehensive Premises Operations Explosions and Collapse Hazard Underground Hazard Products/Completed Operations Hazard Broad Form Property Damage Independent Contractors Personal Injury	
Per Occurrence	\$1,000,000
Aggregate	\$1,000,000
Injury or death of any one person:	\$1,000,000
Injury of death of more than one person in any one occurrence:	\$1,000,000

- c. Property Damage:

Each occurrence:	\$ 300,000
Aggregate operations:	\$ 500,000
Aggregate protective:	\$ 500,000
Aggregate contractual:	\$ 500,000

Neither Contractor nor any subcontractor shall commence Work under this Contract until they have obtained all insurance required under this Special Conditions Section 9.08, and have supplied the District with evidence of such coverage in the form of the Certificate of Insurance, and such Certificate has been approved by the District in writing. All such insurance policies shall provide for at least thirty (30) calendar days written notice to the District prior to cancellation. Contractor’s and subcontractor’s insurance shall be primary to any other insurance carried by the District, its

consultants, or Engineer. The District's, its consultants', or Engineer's coverage shall be excess insurance only, and Contractor's insurance policies shall so state.

Contractor shall be responsible for and shall obtain and file insurance certificates on behalf of all its subcontractors within ten (10) calendar day of the subcontractor's start of Work. All Certificates of insurance shall be filed with the District in the office designated in the Contract Documents.

Should Contractor fail to maintain the insurance coverages required by the Contract Documents, the District may, at its option, either terminate this Contract for default or procure and pay for such coverage, charge Contractor, and deduct the costs from payments due Contractor. A decision by the District to procure and pay for such insurance coverages shall not operate as a waiver of any of its rights under the Contract Documents.

Failure of Contractor to submit the required Certificates of Insurance within the times required by this Special Conditions Section 9.08 may result in a delay in issuing the Notice to Proceed. The parties specifically agree that such a delay is neither excusable nor compensable and will not entitle Contractor to a change in the Contract Sum or time.

9.09 Water Supply

Contractor shall, at its own expense, provide all water needed for construction purposes and for testing.

9.10 Pipeline and Manhole Locations

Pipelines and manholes will be located substantially as indicated on the Plans and Specifications, but Engineer may make such modifications in locations as may be found desirable to avoid interferences with existing structures or for other reasons.

9.11 Elevation Datum

The datum adopted by Engineer is based on National Geodetic Vertical Datum of 1929. All elevations on the Plans and Specifications refer to this datum.

9.12 Easements

The District has obtained, or will obtain, permanent easements and temporary construction easements through private property, where required. The temporary construction easements entitle Contractor to the occupancy and use of the designated area near or adjacent to the Work for purposes related to the Work.

Easements are shown on the Plans and Specifications.

Contractor will not encroach on any property unless it has been established that easements have been obtained or that the property owner has given the District permission in writing. On all other land, Contractor has no rights unless he obtains written consent from the proper parties.

9.13 Occupying Private Land

Contractor shall not (except after written consent from the proper parties) enter or occupy with persons, tools, equipment or materials, any land outside the rights-of-way or property of the District. A copy of the written consent shall be given to Engineer.

9.14 Work in State, County, and Town Rights-of-Way

Attention is directed to the fact that Work will be going on in County rights-of-way. The District has obtained written consent for Contractor to encroach on these rights-of-way for the Work.

Any damage to the areas within these rights-of-way shall be repaired or restored in accordance with their respective standards, specifications, latest revisions and permit requirements.

9.15 Interference with and Protection of Streets

Contractor shall not close or obstruct any portion of the street, road, or private way without obtaining permits therefor from the proper authorities. During the course of the Work, if any street or private way shall be rendered unsafe by Contractor's operations, Contractor shall make such repairs or provide such temporary ways or guards as shall be acceptable to Engineer.

Streets, roads, private ways, and walks not closed, shall be maintained passable by Contractor at Contractor's expense, and Contractor shall assume full responsibility for the adequacy and safety of provisions made.

Contractor shall, at least forty-eight (48) hours in advance, notify the proper authorities including, but not limited to, the police, ambulance squad, fire departments, and school district, and any other public authority with jurisdiction in writing, with a copy to Engineer, if a closure of a street is necessary. Contractor shall cooperate with the proper authorities in the establishment of alternate routes. Contractor shall provide adequate detour signs, plainly marked and well lit, in order to minimize confusion. All expenses of street closure shall be the responsibility of Contractor.

Contractor shall, when required by Engineer, schedule its Work so as to interfere as little as possible with the operations of adjacent users and to minimize loss of access by public or private agencies to their place of business.

9.16 Traffic Control

For control of traffic, Contractor shall provide an adequate number of flagmen in accordance with the latest revisions of the Florida Department of Transportation specifications. Contractor shall bear the costs of employing such flagmen.

9.17 Work Adjacent to Telephone, Power, Cable TV and Gas Company Structures

In all cases where Work is to be performed near telephone, power, water, cable TV, or gas company facilities, Contractor shall provide written notification to the respective companies of the areas in which Work is to be performed, within a minimum of forty-eight (48) hours prior to any Work in these areas. Contractor shall comply with all applicable regulations of the State of Florida regarding

the location of underground facilities prior to excavating any area (Sunshine State-One Call of Florida).

9.18 Storage of Materials

Suitable storage facilities shall be furnished by Contractor. All materials, supplies and equipment intended for use in the Work shall be stored by Contractor to prevent damage from exposure, contamination by foreign substances, or vandalism. Engineer shall not accept, or sample for testing, materials, supplies or equipment that have been improperly stored. Materials found unfit for use shall not be incorporated in the Work and shall immediately be removed from the construction or storage site.

9.19 Salvaged Materials and Excavated Materials

In the absence of special provisions to the Contract, salvage materials, equipment or supplies excavated during the course of the Work are the property of the District and shall be cleaned and stored as directed by Engineer.

All excavated materials needed for backfilling operation shall be stored on site. Contractor shall take the appropriate steps to secure any necessary additional area for stockpiling. Contractor shall include in its bid price the removal of such material from site to an area designated by Engineer. The haul distance shall not exceed six (6) miles each way. All excess materials not wanted by the District shall be hauled and disposed of at an approved site, at Contractor's expense.

9.20 Pre-Construction Meeting

Within ten (10) calendar days after the execution of the Contract and prior to start of construction, a planning meeting will be scheduled by Engineer which must be attended by Contractor. This conference will include representatives of Contractor, Engineer, the District, local utilities, regulatory agencies, other contractors performing Work in the area for the District, and any other party that the District may deem as necessary for the orderly performance of the Contract. However, this does not relieve Contractor of the responsibility of contacting local utilities and any other necessary agencies as the circumstances may require. At this meeting the parties shall coordinate the sequence of construction.

9.21 Alterations

Engineer may make alterations in the line, grade, plan, form, dimensions, or materials of the Work or any part thereof, either before or after the commencement of construction of the Work. If such alterations increase or diminish the quantity of Work to be done, compensation for increased Work shall be made at the Contract Unit Prices or under the item for extra Work. For decreased Work, Contractor shall allow the District a credit based on the Contract Unit Prices or by such other means as determined by Engineer. If such alterations diminish the quantity of Work to be done, they shall not warrant any claim for damages or for anticipated profits on the Work that is eliminated.

9.22 Extra and Deleted Work

Contractor shall perform any unforeseen additional Work necessary to the proper completion of the Contract and not otherwise provided for herein, when and as ordered in writing by Engineer and approved by the District ("Extra Work"). For Extra Work, Contractor shall be compensated either:

- a. At the price agreed upon before the Extra Work is commenced and named in the order for the Work, or
- b. If Engineer so elects, for the reasonable cost of said Work, as determined by Contractor and approved by Engineer, plus a percentage of such cost, as set forth below, or
- c. At the unit price indicated in the Contract.

Contractor must submit written notification to Engineer within fifteen (15) days of any event Contractor claims to result in a change in the Scope of the Work or in Extra Work, and Contractor shall quantify such change within thirty (30) days of the event. The District shall provide a response to the Contractor within thirty (30) days from receipt of Contractor's quantification of the change. The cost of Extra Work performed shall include the cost to Contractor of materials used, equipment installed, common and skilled labor and foremen, and the fair rental price of all machinery used on the Extra Work for the period of such use.

At the request of Engineer, Contractor shall furnish itemized statements of the cost of the Work ordered and give Engineer access to all accounts, bills, and vouchers relating thereto.

Contractor may include in the cost for Extra Work the amounts of additional premiums paid to obtain and maintain the required insurance on account of such Extra Work, including but not limited to: Social Security or other direct assessments upon Contractor's payroll by Federal or other properly authorized public agencies; and other approved assessments made by Contractor directly to Contractor's employees, which are recognized to be part of the cost of doing Work.

Compensation for the rental of machinery used for Extra Work shall be based upon an appropriate fraction of the approved monthly rate schedule. The cost of transportation, not exceeding a distance of one hundred (100) miles, of such machinery to and from the Work shall be added to the compensation for rental property provided; however, compensation for rental property shall only apply to machinery or equipment used for Extra Work and not already required to be furnished under the terms of the Contract.

Contractor shall not include in the cost of Extra Work, any cost or rental of small tools, buildings, or any portion of the time of Contractor, its superintendent, or its office and engineering staff.

Contractor may add up to fifteen percent (15%) to the cost of Extra Work done by Contractor's own forces to cover its overhead allowance for use of capital the premium on the Bond as assessed upon the amount of this extra Work, and profit.

Where Extra Work done is performed by a subcontractor, the subcontractor shall compute the cost for the Extra Work, as stated above plus fifteen percent (15%). Contractor shall be allowed an additional five percent (5%) of the subcontractor's charge for the Extra Work to cover the cost of Contractor's overhead, use of capital, the premium on the Bonds as assessed upon the amount of this Extra Work, and profit.

If Extra Work is done, Contractor and/or subcontractor shall keep daily records of such Extra Work. The daily record shall include the names of persons employed, hours worked, materials and equipment incorporated, and machinery used, if any, in the execution of such Extra Work. This daily record shall be signed by Contractor's authorized representative and approved by Engineer, verifying that such Work has been done. A separate daily record shall be submitted for each Extra Work order.

Notwithstanding anything contained herein the markup to Contractor and/or subcontractor, for overhead, profit, use of capital, and the premium on the Bonds as the same relates to Extra Work within the scope of Section 01020 of the Technical Specifications, shall not exceed twenty percent (20%).

9.23 Extension of Time on Account of Extra Work

When Extra Work is ordered at any time during the progress of the Work which requires, in the opinion of Engineer, an unavoidable increase of time for the completion of the Contract, additional time shall be certified in writing by Engineer.

9.24 Changes Not To Affect Bonds

It is distinctly agreed and understood that any changes made in the Plans and Specifications for this Work (whether such changes increase or decrease the amount thereof) of any change in the manner of time of payments made by the District to Contractor shall in no way annul, release, or affect the liability and surety on the bonds given by Contractor.

9.25 Non-Assignable

Neither the Contract Documents, nor any monies due hereunder, or any part thereof, shall be assigned, transferred, or sublet by Contractor; nor shall the District be liable to any assignee or transferee, or sub-lessee, without the written consent of the District. Any assignment, transfer, or sublease, shall not release or discharge Contractor from any obligation hereunder.

9.26 District Remedies

If Contractor defaults or neglects to carry out any of its obligations under this Contract, or should liens be filed, bills of sale, conditional bills of sale, chattel mortgages, assignments of this Contract without the consent of Contractor, or orders for the payment of money for materials or labor or either, or should Contractor become insolvent or file Bankruptcy, the District shall have the right, in addition to any other rights and remedies provided by law, to (a) perform and furnish through itself or through others any such labor or materials for the Work and to deduct the cost thereof from any money due or to become due to Contractor for all or any portion of the Work; (b) enter upon the premises and take possession for the purpose of completing the Work of all equipment, scaffolds, tools, appliances, and any other items thereon; and (c) to employ any person or persons to complete the Work and provide all labor services, materials, equipment, and other items required therefor. In case of such termination of the employment of Contractor, Contractor shall not be entitled to receive any further payment under this Contract. However, if the unpaid balance of the amount to be paid under this Contract shall exceed the cost and expense incurred by the District in completing the Work, such excess shall be paid by the District to Contractor; but if such cost and expenses shall exceed the unpaid

balance, Contractor shall promptly pay the difference to the District on demand. Said cost and expense shall include not only the cost of completing the Work to the satisfaction of the District and of performing and furnishing all labor, services, materials, equipment, and other items required therefor, but all losses, damages, costs and expenses including attorney's fees sustained, incurred, or suffered by reason of or resulting from Contractor default, or by reason for litigation over this Contract.

9.27 Contractor's Remedies

If the District fails to make a payment as provided for in the Contract Documents for a period of thirty (30) days after the date the payment is due, through no fault of Contractor, Contractor may, upon seven (7) additional days' written notice to the District terminate the Contract and recover from the District payment for Work executed including reasonable overhead and profit and costs incurred by reasons of such termination.

9.28 Discontinuance of Construction

Contractor agrees and guarantees to perform the above mentioned Work in accordance with the terms herein, irrespective of any strikes, lockouts, or stoppages and Contractor shall not employ persons, means, materials, or equipment which may cause strikes, Work stoppages, or any disturbances by workmen employed by Contractors.

In the event the District is prevented from proceeding with any or all of this Work as stated in this Contract, due to a declaration of war, or national emergency, by the United States government, whereas the construction of the type contracted for herein is specifically prohibited by statute or governmental edict, or due to the stoppages of construction caused by any governmental agency, State, City, Town, or County regulations, orders, restrictions, or due to circumstances beyond the District's control, or for any reasons whatsoever, then the District herein reserves the right to either suspend the Work to be done for an indefinite period of time or to cancel this Contract outright by giving notice by registered mail for such intention to Contractor herein. In the event of any conditions above mentioned occurring after the Work herein has already been commenced, then the District herein shall be liable only for the Work completed up to the cancellation or suspension without the addition of prospective profits or other charges whatsoever.

9.29 Contractor's Responsibility

It is specifically agreed, that all materials shall be supplied and Work shall be done in accordance with the rules, requirements, regulations and directives of various Building Departments, other State, County, or Town departments having jurisdiction over the same; mortgagees, if any; and the Federal Housing Administration or the Veteran's Administration, or their Bureaus, Agencies, Subdivisions, or Agencies or any other governmental bureau, agency, or department interested in this job directly or indirectly.

Contractor shall, at its own cost, obtain all necessary permits, licenses, inspections and certificates pertaining to the Work and shall comply with all Federal, State, Municipal and local laws, ordinances, rules, regulations, orders, notices and requirements, whether or not provided by the Plans, Specifications, General Conditions or other Contract Documents without additional expense to the District. Contractor shall also be responsible for and correct at its own cost and expense, any violations thereof resulting from and in connection with its performance of its Work. Engineer shall not be responsible for the means, methods, techniques, sequences or procedures of construction

selected by Contractor or the safety precautions and programs incident to the Work of Contractor. Engineer's efforts will be directed toward providing assurance for the District that the completed Project will conform to the Contract Documents, but Engineer shall not be responsible for the failure of Contractor to perform the construction Work in accordance with the Contract Documents.

Engineer shall have the authority to reject Work which does not conform to the Contract Documents, and shall have authority, but not the obligation, to stop the Work in the event of any unsafe conditions or unsafe practices on the part of Contractor, any subcontractor or any of their employees. Engineer's ability to stop the Work shall not affect Contractor's liability for the existence of unsafe conditions or practice.

9.30 The District's Right to Terminate

The District may terminate this Contract and take possession of all or some of Contractor's materials, tools, equipment and appliances and complete the Work by any means the District deems fit if any of the following occur: if at any time there shall be filed by or against Contractor in any court a petition in bankruptcy, insolvency, for reorganization, or for the appointment of a receiver or trustee of all or a portion of Contractor's property, where Contractor fails to secure a discharge within thirty (30) days of any such petition; if Contractor makes an assignment for the benefit of creditors or petitions for or enters into an agreement or arrangement with its creditors; if Contractor fails to prosecute the Work properly, fails to complete the Work entirely on or before any date established for partial or final completion; fails to make prompt payment to subcontractors, for materials or labor; or without limitation, fails to perform any provisions of this Contract. The District may terminate this Contract by giving Contractor seven (7) calendar days prior written notice of any such default to Contractor. Such termination shall be without prejudice to any other remedy that the District may have. In case of termination, Contractor shall not be entitled to receive any further payment until the Work is finished. If the unpaid balance of the Contract Sum shall exceed (1) the expense of completing the Work including compensation for additional managerial and administrative services, plus (2) the District's losses and damages because of Contractor's default, such excess shall be paid to Contractor. If such expense, plus the District's losses and damages shall exceed such unpaid balance, Contractor shall pay the difference to the District promptly on demand.

The District may terminate this Contract without cause by giving seven (7) calendar days prior written notice to Contractor, and in such event, the District will pay Contractor for that portion of the Contract Sum, less the aggregate of previous payments, allocable to the Work completed as of the date of termination. The District also will reimburse Contractor for all costs necessarily incurred for organizing and carrying out the stoppage of the Work and paid directly by Contractor, not including overhead, general expenses or profit. The District will not be responsible to reimburse Contractor for any continuing contractual commitments to subcontractors or materialmen or penalties or damages for canceling such contractual commitments inasmuch as Contractor shall make all subcontracts and other commitments subject to this provision.

In the event of termination by the District, the District may require Contractor promptly to assign to it all or some subcontracts, construction, plant, materials, tools, equipment, appliances, rental agreements, and any other commitments which the District may in its sole discretion, choose to take by assignment, and in such event Contractor shall promptly execute and deliver to the District written assignments of the same.

The District may, at any time, terminate the Contract for the District's convenience and without cause. Contractor shall be entitled to receive payment for Work executed and costs incurred by reason of such termination

9.31 Venue, Disputes and Attorney's Fees

This Contract shall be governed by the laws of the State of Florida as now and hereafter in force. The venue for actions arising out of this Contract is fixed in Palm Beach County, Florida.

Contractor and the District agree that prior to instituting any litigation for damages under this Special Conditions Section 9.31, the parties shall conduct a non-binding mediation to attempt to resolve their dispute. In the event the parties cannot agree upon a mediator, each party shall select a mediator and such mediators shall select a third mediator who shall serve as the mediator for the dispute. In the event such mediation does not occur within thirty (30) days of a written request of either party, the parties shall be free to pursue litigation without first conducting mediation.

In any dispute arising out of the Contract Documents and/or relating to the Work, the Prevailing Party shall be entitled to recover all costs and expenses incurred, including, without limitation, attorneys' and paralegals' fees and costs whether before suit is filed, after suit is filed, on any appeal, and in any bankruptcy proceedings.

9.32 Coordination with District's Existing Facilities

Contractor shall cooperate and coordinate its activities with those of the District when connecting to the existing District facilities, while working on the District plant site, and as specified in the Contract Documents.

The District has adopted a Standard Operating Procedure (SOP) for System Shutdowns and Bypass included in the Appendix and made part of this Contract. The Contractor is responsible for compliance with the SOP including planning all work requiring system shutdowns and/or bypasses to be completed within the Low Risk Holding Time and the Contractors Wastewater Management/Spill Response Plan. Details required for this compliance are included in the Appendix including the allowable duration of the shutdown or bypass (low risk holding time), the location of the isolation facilities, required facility information to determine residual wastewater volume disposal requirements and disposal locations, anticipated continuous flow the Contractor may expect and other pertinent information.

The Contractor is also responsible for all costs associated with the Emergency Operation Measures should these be implemented due to negligence on the Contractor's part or failure of the Contractor to perform the work within the allowed time frame.

9.33 Permits

Unless otherwise identified in Section 01000 of the Technical Specifications, Contractor shall be responsible for obtaining any and all permits (i.e. building permits) necessary for the Work under this Contract and pay the costs thereof, said permits may be included as part of the Contract Documents. If differences between the specifications and conditions of the permits exist, the permits shall govern.

9.34 Coordination of Construction

A. General

Contractor shall be responsible for the maintenance of utility operations during construction as specified in the Section 01500 of the Technical Specifications.

B. Temporary Facilities

District personnel must have ready access at all times to all existing structures. Temporary facilities shall include any equipment, materials, controls, services and accessories temporarily needed for access to, and for protection of all existing structures and equipment, and to maintain an operating system, in accordance with the provisions of these Specifications.

The size or capacity of the temporary facility shall generally be equal to the size or capacity of the facility replaced, unless otherwise indicated on the Contract Plans and Specifications or otherwise directed and approved by the District. All temporary facilities shall be removed when they are no longer required unless otherwise agreed upon in writing. To substitute an unscheduled temporary facility for an existing or new facility, Contractor shall prepare and submit a plan and description of the proposed temporary facility to the District. Upon receipt of the written approval of the District, Contractor shall then submit the notification of intent to commence Work.

C. Coordination with District Personnel

Before commencing Work involving removing or placing in operation existing or new facilities, Contractor shall notify the District in writing at least thirty (30) calendar days in advance in writing. The District shall be responsible for removing facilities from operation. Only the District can authorize the shutdown of any portions of the sanitary system. Contractor shall, under no circumstances, interfere with any existing lift station or collection system.

9.35 Field Layout Work

All Work under this Contract shall be constructed in accordance with the lines and grades shown on the Contract Plans and Specifications or as directed by Engineer. Elevation of existing ground, structures and appurtenances are believed to be reasonably correct but are not guaranteed to be absolute and therefore are presented only as an approximation. Any error or apparent discrepancy in the data shown or omissions of data required for accurately accomplishing the stake-out survey shall be referred immediately to Engineer for interpretation or correction.

All survey Work for construction control purposes shall be made by Contractor at its expense as set forth in General Conditions Section 10.11.

Contractor shall establish all base lines for the location of the principal component parts of the Work together with benchmarks and batter boards adjacent to the Work. Based upon the information provided by the Contract Plans and Specifications, Contractor shall have the responsibility to carefully preserve the benchmarks, reference points and stakes. In case of destruction thereof by

Contractor or resulting from its negligence, Contractor shall be held liable for any expense and damage resulting therefrom and shall be responsible for any mistakes that may be caused by the unnecessary loss or disturbance of such marks, reference points, and stakes.

Existing or new control points, property markers, and monuments that will be established or are destroyed during the normal causes of construction shall be reestablished by Contractor; and all reference ties recorded therefore shall be furnished to Engineer. All computations necessary to establish the exact position of the Work shall be made and preserved by Contractor.

9.36 Submittals

A. Progress Schedule

Prior to executing the Contract, but after the award of the Contract to the Successful Bidder, the Successful Bidder shall prepare and submit the proposed progress schedule to Engineer for review and comments. The schedule shall be prepared using Oracle - Primavera P6. The contractor shall supply the electronic Primavera P6 schedule and a PDF copy of the Primavera P6 gantt chart.

The schedule shall be prepared using the Critical Path Method ("CPM") and shall depict in detail the proposed sequence of the Work and identifying construction activities for each structure, collection, transmission, or treatment facility. The schedule shall be time scaled, identifying the first day of each week, with the estimated date of starting and completion of each stage of the Work in order to complete the Project within the Contract time.

Contractor shall revise the progress schedule to reflect Engineer's comments prior to approval.

An updated schedule shall be submitted monthly with each Progress Payment Application depicting progress to the last day of the month. Subsequent changes to the schedule shall be accompanied by a letter of explanation with appropriate references and revision dates on the schedule.

B. Operation and Maintenance Instruction for all Valves and Mechanical Devices

1. Individual Instructions

When required by Engineer, Contractor, through manufacturer's representatives, shall provide instruction to the District's designated employees regarding the operation and care of all equipment furnished by Contractor and installed hereunder.

2. Written Instructions

When required by Engineer, Contractor shall furnish and deliver to Engineer, prior to final payment, six (6) complete sets of instructions, technical bulletins, and any other printed matter such as diagrams, prints or drawings, containing full information required for the proper operation, maintenance, and repair of all Contractor furnished equipment. Included in this submission shall be a spare parts diagram and complete spare parts list. The information provided shall include a source of replacement parts and names of service representatives,

including addresses and telephone numbers. Extensive pictorial cuts of equipment are required for operator reference in servicing. These requirements are a prerequisite to the operation and acceptance of equipment. Each set of instructions shall be bound together in appropriate three-ring binders. A detailed table of contents shall be provided for each set. Written operation and maintenance instructions shall be required for all equipment items supplied for this Project. The amount of detail required shall be commensurate with the complexity of the equipment item.

Information not applicable to the specific piece of equipment installed on this Project shall be removed from the submission.

When written instructions include shop drawings and other information previously reviewed by Engineer, only those editions thereof which were accepted by Engineer, and which accurately depict the equipment installed, shall be incorporated in the instructions.

C. Maintenance and Lubrication Schedules

When required by Engineer, Contractor shall furnish complete Equipment Maintenance and Lubrication Schedules for each piece of mechanical equipment such as valves, gates, etc. The complete forms (six copies), as provided in Section 01300 entitled "Submittals" of the Technical Specifications shall be submitted along with the shop drawings and included with the furnished O&M Manuals.

D. Schedule of Values

Contractor shall submit as a shop drawing a Schedule of Values for Engineer's review at the Pre-Construction Meeting. The Schedule of values shall contain the installed value of the component parts of the Work for the purpose of making progress payments during the construction period. The Schedule shall provide sufficient detail for the proper identification of Work accomplished. Each item shall include its proportional share of all costs, including Contractor's overhead contingencies and profit. The sum of all scheduled items shall equal the total value of the Contract. For payments on acceptable stored material items, Contractor shall also submit a separate list covering the cost of materials, delivered, and unloaded at the project site along with delivery invoices with taxes paid. Stored materials will be paid for items to be used within thirty (30) days of delivery. In addition, the listing shall also include the installed value of the item with coded reference to the Work items in the Schedule of Values.

Contractor shall expand or modify the above schedule and materials listing as required by Engineer's initial and subsequent reviews.

E. Schedule of Payments

Contractor shall submit a Schedule of Payments at the Pre-Construction meeting to be approved by the District. The Schedule of Payments shall contain Contractor's expected Progress Payment values throughout the construction period, for the purpose of assuring that the District will have sufficient monies available to make payments in the expected amounts

for each payment period. Contractor shall provide an updated Schedule of Payments with each Progress Payment Application.

F. Contractor's Shop and Working Drawings

Contractor shall submit shop and Work drawings in accordance with General Conditions Section 10.07.

9.37 Inspection and Testing

The Contractor shall employ and pay for the services of an independent test laboratory for specified testing.

The Work or actions of the testing laboratory shall in no way relieve Contractor of its obligations under the Contract. The laboratory testing Work shall include such inspections and testing required by the Contract Document, existing laws, codes, ordinances, etc. The testing laboratory will have no authority to change the requirements of the Contract Documents, nor perform or approve any of Contractor's Work.

Contractor shall allow Engineer ample time and opportunity for testing materials and equipment to be used in the Work. Contractor shall advise Engineer promptly upon placing orders for materials and equipment so that arrangements may be made, if desired, for inspection before shipment from place of manufacture. Contractor shall at all times furnish Engineer and Engineer's representatives, facilities including labor, and allow proper time for inspecting and testing materials, equipment, and workmanship. Contractor must anticipate that possible delays may be caused in the execution of the Work due to the necessity of materials and equipment being inspected and accepted for use. Contractor shall furnish, at Contractor's own expense, all samples of materials required by Engineer for testing. Contractor shall make its own arrangements for providing water, electric power, or fuel for the various inspections and tests of structures and equipment.

Contractor shall furnish the services of representatives of the manufacturers of certain equipment, as prescribed in other sections of the Specifications. Contractor shall also place orders for such equipment on the basis that, after the equipment has been tested prior to Final Completion of the Work; the manufacturer will furnish the District with certified statements that the equipment has been installed properly and is ready to be placed in functional operation. Tests and analyses required of equipment shall be paid for by Contractor, unless otherwise specified in writing.

The Contractor will pay the cost of all tests, inspections, or investigations undertaken by the order of Engineer for the purpose of determining conformance with the Contract Documents if such tests, inspections, or investigations are not specifically required by the Contract Documents, and if conformance is ascertained thereby. Whenever nonconformance is determined by Engineer as a result of such tests, inspections, or investigations, Contractor shall bear the full cost thereof or shall reimburse the District for said cost. The cost of any additional tests and investigations, which are ordered by Engineer to ascertain subsequent conformance with the Contract Documents, shall be borne by Contractor.

9.38 Utilities and Services

A. General

Contractor shall provide for utilities and services for its own operations, as well as field offices. These shall include electrical power, water, ventilation, sanitary facilities and telephone service. Contractor shall furnish, install and maintain all temporary utilities during the Contract period including removal upon completion of the Work. Such facilities shall comply with regulations and requirements of the National Electrical Code, OSHA, Florida Power and Light, and applicable Federal, State, and local codes, etc.

B. Temporary Power

Contractor shall arrange with Florida Power and Light for construction period service and pay all costs for the work and power. In addition to providing for a safe construction period distribution system, Contractor shall provide a safe and adequate artificial lighting system for work areas which do not have sufficient natural light. Temporary lighting shall be maintained during non-working periods if the area is subject to access by the public or plant personnel. Contractor shall furnish all electrical or other power required for construction, testing and trial operation prior to final acceptance by the District or at the time of Beneficial Occupancy.

C. Permanent Power

Utility charges for power consumed by permanent electrical facilities used for normal operations and maintenance of the treatment plant will be paid by the District.

D. Temporary Water

Contractor shall pay for all water used for construction, flushing, testing and temporary sanitary facilities. Contractor shall provide and maintain all piping, fittings, adapters, and valves required.

E. Temporary Ventilation

Contractor shall provide and maintain adequate ventilation for a safe working environment. In addition, forced air ventilation shall be provided for the curing of installed materials, humidity control and the prevention of hazardous accumulations of dust, gases or vapors.

F. Temporary Sanitary Facilities

Contractor shall provide and maintain adequate and clean sanitary facilities for the construction work force and visitors. The facilities shall comply with local codes and regulations and be situated at approved locations.

9.39 Security

Contractor shall employ watchmen and security guards in its sole discretion, as it deems necessary to

protect the job site against vandalism, burglary, theft, trespassing, etc. Contractor shall care for and protect against loss or damage all material to be incorporated in the construction, including but not limited to, the existing plant structures, equipment and materials for the duration of the Contract, shall repair or replace damaged or lost materials and damaged structures at no additional cost to the District.

Contractor shall be responsible for providing, maintaining and securing gates used for construction purposes for the duration of the Project.

9.40 Special Controls

A. Chemicals

All chemicals used during Project construction or furnished for testing or Project operation, whether herbicide, pesticide, disinfectant, polymer, reactant of other classification, must be approved by either EPA or HUD. The handling, use, storage and disposal of such materials, containers or residues shall be in strict conformance to the manufacturer and/or supplier's instructions. Unless otherwise authorized, such materials shall be kept in secured storage. Copies of antidote literature shall be kept at the storage site and at Contractor's job site office. A supply of antidotes shall be kept at Contractor's office.

B. Dust

During construction Contractor shall, by the application of water and/or calcium chloride or other means, approved by Engineer, eliminate dust annoyance to adjacent property owners, business establishments, and all vehicular traffic. Contractor shall take all protective measures, to the satisfaction of Engineer, necessary to ensure that dust and debris do not enter any adjacent property or roadway. Contractor shall be responsible for the cleanup of existing property and roadways which have become soiled due to lack of proper dust control as determined by Engineer.

C. Noise

Noise resulting from Contractor's Work shall not exceed the noise levels and other requirements stated in local ordinances. Contractor shall be responsible for curtailing noise resulting from its operation. Contractor, upon written notification from Engineer or the noise control officers, shall make any repairs, replacements, adjustments, additions to and/or furnish mufflers when necessary to fulfill noise level requirements.

D. Erosion Abatement and Water Pollution

It is imperative that any Contractor dewatering operation does not contaminate or disturb the environment of the properties adjacent to the plant. Contractor shall, therefore, schedule and control its operations to confine all runoff water from disturbed surfaces, and water from dewatering operations that becomes contaminated with lime, silt, muck, and other deleterious matter, fuels, oils, bitumens, calcium chloride, chemicals and other polluting materials.

Contractor shall construct temporary stilling basin(s) of adequate size and provide all

necessary temporary materials, operations, and controls including, but not limited to, filters, coagulants, screens, and other means necessary to attain the required discharge water quality.

Contractor shall be responsible for providing, operating, and maintaining materials and equipment used for conveying clear water to the point of discharge. All pollution prevention procedures, materials, equipment and related items shall be operated and maintained until such time as the dewatering operation is discontinued. Upon the removal of the materials, equipment and related items, Contractor shall restore the area to the existing condition prior to commencing the Work.

E. Pests and Rodents

Contractor shall be responsible for maintaining the job site free from litter, rubbish and garbage. Contractor shall provide containers for the disposal of garbage and other materials that attract and are breeding places for pests and rodents. Contractor shall, at its expense, provide the services of an exterminator on a periodic basis to inspect the job site and to provide services as required to control pests and rodents.

F. Periodic Clean-Up; Basic Site Restoration

During construction, Contractor shall regularly remove from the site all accumulated debris and surplus materials of any kind which result from the construction. Unused equipment and tools shall be stored at Contractor's yard or base of operations for the Project.

Contractor shall perform the clean-up Work on a regular basis and/or as frequently as ordered by Engineer. Basic site restoration in a particular area shall be accomplished immediately following the installation or completion of the required facilities in that area. Furthermore, such site restoration shall also be accomplished, when ordered by Engineer, if partially completed facilities must remain incomplete for some time period due to unforeseen circumstances.

Upon failure of Contractor to perform periodic clean-up and basic restoration of the site to Engineer's satisfaction, Engineer may, upon five (5) calendar days prior written notice to Contractor, employ such labor and equipment as he deems necessary for the purpose, and all costs resulting therefrom shall be charged to Contractor and deducted from any amounts of money that may be due it.

9.41 Storage and Construction Areas

A. Storage and Construction Areas

Contractor shall confine its construction operations within the Contract limits shown on the Plans and Specifications and/or property lines and/or fence lines. All on-site Contractor Staging Areas shall be confined to designated areas as shown on the Plans and Specifications. Any additional staging and storage areas required by Contractor shall be provided by Contractor.

Contractor shall be solely responsible for the protection and safekeeping of equipment and

materials at or near the sites. No claim shall be made against the District for any act of an employee or trespasser. Should an occasion arise necessitating access to an area occupied by stored equipment and/or materials, Contractor shall immediately move such equipment or materials. No equipment or materials shall be placed upon the District's property until written approval has been received from the District.

Upon completion of the Contract, Contractor shall remove from the staging areas all equipment, fencing, surplus materials, rubbish, etc., from the construction, storage, and staging areas, and restore the areas to their original condition.

9.42 Equipment and Materials

A. General

All equipment, materials, instruments or devices incorporated in this Project shall be new and unused, unless indicated otherwise in the Contract Documents or in writing signed by the District and Contractor. All equipment, materials, instruments or devices shall be the products of reliable manufacturers who, unless otherwise specified, have been regularly engaged in the manufacture of such material and equipment for the use as identified for this Project for, at least five (5) years.

Equipment and materials to be incorporated in the Work shall be delivered sufficiently in advance of their installation and use to prevent delay in the execution of the Work, and they shall be delivered as nearly as feasible in the order required for executing the Work.

Contractor shall protect all equipment and materials from deterioration and damage. The equipment and materials shall be handled and stored by the manufacturer, fabricator supplier and Contractor before, during, and after shipment in a manner to prevent warping, twisting, bending, breaking, chipping, rusting, and any injury, damage or theft of any kind whatsoever. Any equipment exhibiting any of the above, shall be removed and replaced at Contractor's expense; such expense shall include both labor and materials.

B. Storage

Contractor shall store its equipment and materials in accordance with Special Conditions Section 9.18, Storage of Materials, at the job site in accordance with the manufacturer's recommendations and as directed by Engineer. Contractor shall not store unnecessary materials or equipment on the job site and shall prevent any structure from being overloaded or kept in a condition that would endanger the safety of others. Contractor shall enforce the instructions of the District and Engineer regarding the posting of regulatory signs for loading structures, fire safety, and smoking areas.

C. Handling and Maintenance

The manufacturer's storage instructions shall be carefully followed and any deviations shall be approved by the manufacturer in writing with a copy to Engineer. Equipment with moving parts, such as gears, electric motors, etc., and/or instruments, control panels, and switch gears, shall be stored in a temperature and humidity controlled building until the equipment is to be

installed, and such equipment shall be rotated per the manufacturer's recommendations while in storage and during the period between installation and acceptance of the Work.

The equipment shall be stored fully lubricated unless otherwise instructed by the manufacturer. Lubricants shall be changed upon completion of installation and as frequently as required thereafter during the period between installation and acceptance of the Work. New lubricants shall be put into the equipment at the time of acceptance of the Work.

Equipment with electric motors having space heaters shall have the space heaters energized unless stored in a temperature and humidity controlled building. Space heaters shall be energized at the time of installation and maintained until acceptance of the equipment.

9.43 Project Closeout

A. General

As construction of the Project enters the final stages of completion, Contractor shall, in accordance with the requirements set forth in the Contract Documents, attend to or have already completed the following items:

1. Schedule equipment manufacturer's visits to site.
2. Calibrate instruments and controls.
3. Required testing of Project components.
4. Schedule facilities start-up and initial operation.
5. Schedule and furnish skilled personnel during initial facilities operation.
6. Correct and/or replace Defective Work, including completion of items previously overlooked or Work which remains incomplete, all as evidenced by Engineer's "Punch List".
7. Attend to any other items listed herein or brought to Contractor's attention by Engineer.

A. Substantial Completion

Items to be completed and provided prior to issuance of Substantial Completion shall include but not be limited to the following:

1. All equipment mfg. visits to the site
2. Startup tests completed and documentation provided to the Engineer
3. All instruments and controls calibrated and tested
4. All components of the Project successfully tested
5. Instruction provided to personnel on operation of equipment as required by the Technical Specification.
6. Project and its constituent pieces must be fully operational in accordance with Contract requirements and permits.
7. Restore areas disturbed by construction activities.

B. Cleaning and Restoration

Before the Final Completion of the Project, Contractor shall accomplish the cleaning and final adjustments of the various facility components as specified in the Specifications, including:

1. Clean and lubricate all finish hardware after adjustment for proper operation.
2. Touch up marks or defects in painted surfaces and touch up any similar defects in factory finished surfaces.
3. Remove all stains, marks, fingerprints, soil, spots, and blemishes from all finish surfaces.
4. Restore all areas disturbed by construction operations to conditions equal to or better than that which existed prior to the Work.

D. Project Record Drawings and Documents

Contractor shall keep a set of drawings at the jobsite. As-built plans shall be submitted for Work completed at the end of each pay period. The payment application will not be processed until the as-built plans are approved by Engineer. Contractor shall be held responsible for the accuracy of such data, and shall bear any costs incurred in finding utilities as a result of incorrect data furnished by Contractor.

Before the Final Completion of the Project, Contractor shall submit to Engineer (or to the District if indicated) certain records, certifications, etc., which are specified elsewhere in the Contract Documents. Missing, incomplete, or unacceptable items, as determined by Engineer or the District, shall constitute grounds for withholding Final Payment to Contractor. A partial list of such items appears below, but it shall be Contractor's responsibility to submit any other items which are required in the Contract Documents:

1. Test results of Project components.
2. Performance affidavits for equipment.
3. Operation and maintenance instructions or manuals for equipment.
4. Month-to-month records containing all deviations from the Plans and Specifications, Addenda, and Modifications of Shop drawings. Such records shall be prepared from record drawings showing correct and accurate changes and deviations from the Work made during construction so as to reflect the Work as it was actually constructed. These drawings shall conform to recognized standards of drafting, be neat, legible and be on Mylar or other approved reproducible material. Contractor shall secure and pay for the services of a registered land surveyor for a final survey at every 100 feet of the location of the pipeline upon completion of construction. Signed and sealed "As Built" record drawings showing pipe location, slopes, depths of cover, offsets, and location of all fittings, valves, manholes, and all related appurtenances shall be submitted to Engineer. Missing, incomplete or inaccurate drawings as specified herein and as determined by Engineer, shall constitute grounds for withholding final payment to Contractor.
5. In addition to items specified under Article 4 Section 6 of the Contract, all technical documentation as specified elsewhere in the Contract Documents and particularly in the Technical Specifications.

E. Grease, Oil and Fuel

All grease, oil, and fuel required for testing of equipment shall be furnished by Contractor. Contractor shall also furnish a one (1) year's supply of lubricants including grease and oil in the type recommended by the manufacturer for each item of equipment supplied.

F. Touch-Up and Repair

Contractor shall touch-up and repair damage to all field painted and factory finished equipment. Touch-up of equipment, panels, etc. shall match as nearly as possible to the original finish. If in the opinion of Engineer the touch-up Work is not satisfactory, Contractor shall repaint the item.

G. Chemicals

All chemicals required for testing of equipment or the process shall be furnished by Contractor. Contractor shall also furnish chemicals for the District's use where specified.

H. Closeout and Punch Lists

Contractor shall notify Engineer and the District in writing when the Work has reached Substantial Completion. Engineer will make an inspection of the Project for the purposes of determining the Work has reached Substantial Completion and for discovering and developing a list of Work not found acceptable and requiring cleaning, repair or replacement ("Punch List"). If Engineer determines the Project to be substantially complete, Engineer shall issue the Certificate of Substantial Completion. If the Project has an estimated cost of less than \$10 million, the Punch List shall be developed within thirty (30) days following actual Substantial Completion of the Project. If the Project has an estimated cost of more than \$10 million, the Punch List shall be developed within sixty (60) days following actual Substantial Completion of the Project. The Punch list shall be delivered to Contractor within five (5) days of the development of the Punch List. The Final Completion date shall not be less than thirty (30) days following delivery of the Punch List.

Upon receipt of the Punch List, Contractor shall perform all work necessary to complete the Punch List. Work that has been inspected and accepted by Engineer shall be maintained by Contractor, until Final Completion of the entire Project. Upon completion of the items on the Punch List, Contractor shall notify Engineer in writing that the Project is ready for inspection. This procedure will continue until the entire Project is accepted by Engineer. "Final Payment" will not be processed until the entire Project has been accepted by Engineer in writing by issuance of the Certificate of Final Completion and all of the requirements in Special Conditions Section 9.43 D. - Project Record Drawings and Documents have been satisfied. Contractor's acceptance of final payment from the District shall constitute a full waiver and release by Contractor of all claims against the District arising out of or relating to the Project or Work.

Final cleaning and repairing shall be scheduled upon completion of the Project.

I. Partial Utilization

Prior to the completion of the Project, it may be necessary to place into service various facilities, structures, equipment and processes in accordance with the Sequence of Operation and Construction. Whenever a structure, equipment, or process has been completed and tested, Contractor shall notify Engineer that it is ready for inspection. Any Work not found acceptable will be noted on the "Punch List." Whenever Contractor has completed the Work and it has been accepted by Engineer, the District shall take possession, operate and maintain the facility, and equipment warranties begin ("Partial Utilization"). Partial Utilization shall not constitute Substantial Completion.

J. Tools and Spare Parts

1. Tools

Any special tools (including grease guns or other lubricating devices) which may be necessary for the adjustment, operation, and maintenance of any equipment shall be furnished with the respective equipment. Contractor shall furnish a complete list of tools and instructions for their use, recommended by the manufacturer or supplier with the Shop Drawing Submittal.

2. Spare Parts

Spare parts for equipment shall be furnished where indicated in the equipment specifications and/or as recommended by the equipment manufacturer. Spare parts shall be identical and interchangeable with original parts. Parts shall be supplied, prepared for storage, in clearly identified containers, except large or bulky items which may be wrapped in polyethylene.

The parts shall be stored separately in a locked area, maintained by Contractor, and shall be delivered to the District at a location designated by the District. Contractor shall furnish an inventory listing all spare parts in the form included herein for each piece of equipment.

K. Start-Up and Field Instructions

The bid prices for the equipment furnished by Contractor shall include the cost of competent manufacture representatives of all equipment to supervise the installation, adjustment and testing of the equipment and to instruct the District's operating personnel in their operation and maintenance of all equipment. The supervision may be divided into two or more time periods as required by the installation program or as directed by Engineer.

The manufacturer's representatives shall certify in writing that the installation and testing of the equipment has satisfactorily been completed and that the equipment is ready for operation and the District's operating personnel have been instructed in the operation, maintenance, and lubrication of the equipment.

Contractor shall provide the services of the manufacturer's representative(s) for additional time as required should difficulties arise in the operation of the equipment due to the manufacturer's design or fabrication of the equipment or faulty installation by Contractor.

This additional service shall be provided at no cost to the District for the duration of the Contract and one (1) year maintenance period.

L. Final Clean-Up and Site Restoration

Before finally leaving the site, Contractor shall wash and clean all exposed surfaces which have become soiled or marked. Contractor shall remove from the site of the Work all accumulated debris and surplus materials of any kind which result from its operation, including construction equipment, tools, sheds, sanitary enclosures, etc. Contractor shall leave all equipment, fixtures, and Work, which he had installed, in a clean condition. The completed Project shall be turned over to the District in a neat and orderly condition.

All damage, as a result of Work under this Contract, to existing structures, pavement, driveways, curb and gutters, sidewalks, utility poles, utility pipelines, conduits, drains, catch basins, fences, and other obstructions not specifically mentioned herein shall be repaired.

9.44 Open Specifications

Where materials or equipment are specified by a trade or brand name, it shall not be the intention of the District to discriminate against an equal product of another manufacturer but rather to set a definite standard of quality or performance and to establish an equal basis for the evaluation of bids. Unless otherwise specified, all materials shall be the best of their respective kinds and shall be in all cases, fully equal to approved samples. Where a trade or brand name is specified with the words “or equal” or “equivalent,” this is understood to mean that other trade or brand names may be substituted that are, in the opinion and judgment of Engineer, equal in quality and performance. Even though the words “or equal” or “equivalent” are used in the Specifications, unless a substitute is approved in writing by Engineer, Engineer shall have the right to require the use of the material or equipment specified by trade or brand name.

9.45 Spare Parts List

The equipment supplier shall prepare a recommended spare parts list. Six (6) copies of the recommended spare parts list shall be submitted with the shop drawings.

9.46 Applicable Standards and Codes

Whenever reference is made to any published standards, codes, or standard specifications, such reference shall mean the latest issue of that standard, code, specifications, or tentative specification of the technical society, organization, or body referred to which is in effect at the date of invitation for bids.

9.47 Copies of Plans and Specifications

Contractor shall be provided with three (3) complete sets of Plans and Specifications for its use at no charge. Signed and sealed drawings which are necessary to obtain Building Permits will also be provided to Contractor by Engineer at no charge.

9.48 Restoration – Special

Existing areas of special landscaping materials, irrigation systems, ground cover and any other improvements that are damaged shall be restored with new materials to equal or better than existing conditions. Technical Specifications may contain additional requirements.

9.49 Contractor Performance Reviews and Ratings

The District shall develop a Contractor performance evaluation report. This report shall be used to periodically review and rate the Contractor's performance under the contract with performance rating as follows:

Satisfactory	Performance meets contractual requirements. The contractual performance of the element being assessed may contain some minor problems for which corrective actions taken by the Contractor were satisfactory
Unsatisfactory	Performance does not meet most contractual requirements and recovery is not likely in a timely manner. The contractual performance contains a serious problem(s) for which the contractor's corrective actions appear or were ineffective.

The report shall also list discrepancies found during the review period. The Contractor shall be provided with a copy of the report and may respond in writing if he takes exception to the report or wishes to comment on the report. Contractor performance reviews and subsequent reports will be used in determining the Contractor's satisfactory performance record on future Contracts.

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GENERAL CONDITIONS

ARTICLE 10

TITLE

10.01	General
10.02	Definitions
10.03	Plans and Specifications are Supplementary
10.04	Handling and Distribution
10.05	Materials, Samples, Inspection, Approval
10.06	Inspection of Work Away from the Site
10.07	Contractor's Shop and Working Drawings
10.08	Safety and Accident Prevention
10.09	Insufficiency of Safety Precautions
10.10	Sanitary Regulations
10.11	Lines, Grades and Measurements
10.12	Dimensions of Existing Structures
10.13	Work to Conform
10.14	Pipe Location
10.15	Planning and Progress Schedules
10.16	Precautions During Adverse Weather
10.17	Electrical Energy
10.18	Bolts, Anchor Bolts and Nuts
10.19	Concrete Inserts
10.20	Operating Instructions and Parts Lists
10.21	Lubricants
10.22	Special Tools
10.23	Protection Against Electrolysis
10.24	Indemnification and Confidentiality
10.25	Work by Others
10.26	Record Drawings
10.27	Non-Waiver

10.28	Mutuality of Provisions
10.29	Restoration of Property
10.30	Notice
10.31	Legally Binding

10.01 General

Contractor shall furnish all labor, materials, tools and equipment necessary to do all Work required for the completion of each item of this Contract as specified herein. The Work to be done and paid for under any item shall not be limited to the exact extent mentioned or described, but shall include all incidental Work necessary or customarily done for the completion of that item.

10.02 Definitions

Wherever the words or terms defined in this Section or pronouns used in their stead occur in the Specifications or other Contract Documents, they shall have the meanings herein given.

- a. "AASHTO" shall mean the American Association of State Highway and Transportation Officials.
- b. "ACI" shall mean the American Concrete Institute.
- c. "Addendum" shall mean modification of the Contract Documents issued in writing by Engineer prior to opening the bids.
- d. "ANS" shall mean American National Standard, as approved by the American National Standards Institute, Inc.
- e. "ASTM" shall mean the American Society for Testing and Materials.
- f. "AWWA" shall mean the American Water Works Association.
- g. "Bid" shall mean the documents that comprise the submission for the Work of this Project.
- h. "Bid Period" shall mean the time period from when the Bid Documents will be available to the deadline for submitting Bids.
- i. "Bidder" shall mean one who submits a Bid directly to District, as distinct from a sub-bidder, who submits a Bid to the Bidder.
- j. "Bid Documents" include the Advertisement for Bids, Instructions to Bidders, Proposal, Questionnaire, the Bid Form, and the proposed Contract Documents (including all Addenda issued prior to receipts of Bids).
- k. "Change Order" shall mean a written change, addition, or deletion to the Contract Documents signed by both Contractor and the District.
- l. "Contract" shall mean the agreement between the Successful Bidder and the District for performance of the Work.
- m. "Contract Documents" shall mean all documents that comprise the agreement of the parties related to this Project. The Contract Documents include the Notice to Contractors, Instructions to Bidders, Proposal, Questionnaire, Bid Security, Contract, Public Construction

Bond, Sworn Statement of Public Entity Crimes, Opinion of District's Attorney, Final Release of Lien, Special Conditions, General Conditions, Technical Specifications, Standard Details and Plans, including all modifications, addenda, and Change Orders contained in any documents before or after execution of the Contract

- n. "Contract Sum" shall mean the total amount due to Contractor as a result of Work on the Project, including any amounts as a result of Change Orders.
- o. "Contract Time" shall mean the time to complete the Project as set forth in the Contract Documents. Reference to "days" shall mean calendar days unless otherwise noted.
- p. "Contractor" shall mean the Successful Bidder with whom the District signs the Contract for the Work or its duly authorized agents.
- q. "County" shall mean Palm Beach County, as may be applicable.
- r. "Defective" shall mean the Work does not conform to the Contract Documents or does not meet the requirements of any applicable inspection, reference standard, test, or approval.
- s. "District" shall mean the Loxahatchee River Environmental Control District, acting through its properly authorized representatives.
- t. "Engineer" shall mean the engineer designated by the District as its engineering representative during the course of construction to make appropriate inspection and computation of payments, whether acting directly or through properly authorized agents, inspectors or representatives of Engineer, acting within the scope of duties entrusted to them.
- u. "Final Completion" shall mean the time when Engineer determines that all Contract Document requirements have been completed.
- v. "IEEE" shall mean the Institute of Electrical and Electronic Engineers, Inc.
- w. "Notice of Award" shall mean the District's notification of the Contract to the Successful Bidder.
- x. "Notice to Proceed" shall mean the written notice from the District to the Contractor to proceed with the Work.
- y. "Plans" shall mean any and all drawings, plans, sketches, diagrams, designs, lists, exhibits, or other graphic and pictorial portions of the Contract Documents showing the design, location, and dimensions of the Work for the Project.
- z. "Pricing Schedule" shall be based upon the Bid item(s) and shall establish the value of the Contract Award. .
- aa. "Project" shall mean the entire construction to be performed as provided in the Contract Documents.

- bb. "Schedule of Values" is established between Contractor and Engineer to determine the appropriate cost of component items that were used to establish the "Pricing Schedule," and the value to be paid as Work is completed. The Schedule of Values shall be determined during the Pre-Construction Meeting.
- cc. "Specifications" shall mean the written requirements for materials, equipment, systems, standards, and workmanship for the Work, and performance of related services.
- dd. "Substantial Completion" shall mean the date as certified by Engineer when the construction of the Project or a specified part thereof is completed, in accordance with the Contract Documents and applicable permits, so that the Project or specified part can be utilized for the purposes for which it was intended; or if there be no such certification, the date when final payment is due in accordance with the Contract.
- ee. "Successful Bidder" shall mean the lowest cost, qualified, responsive, responsible Bidder to whom the District, based on the District's evaluation hereinafter provided, makes an award.
- ff. "Work" shall mean any and all obligations, duties and responsibilities necessary to the successful completion of the Project assigned to or undertaken by Contractor under the Contract Documents, including all labor, materials, equipment, services, and other incidentals and the furnishing, installation, and delivery thereof and all Work reasonably inferable therefrom.

10.03 Plans and Specifications are Supplementary

The Plans and Specifications are intended to supplement each other, and together constitute one complete set of Contract Documents, so that any Work exhibited in the one and not the other shall be executed just as if it has been set forth in both, in order that the Work shall be completed in every respect according to the complete design or designs as decided and determined by Engineer. In the event of a conflict in the Plans and Specifications, the Specifications shall be considered prevailing. Should Contractor find that anything is omitted from the Plans and Specifications which is necessary for a clear understanding of the Work, or that there is an error in either Plans or Specifications, Contractor shall promptly notify Engineer. From time to time during the progress of the Work, Engineer may furnish supplementary or working drawings necessary to show changes or define the Work in more detail, and these also shall be part of the Contract Documents.

10.04 Handling and Distribution

Contractor shall, at its own expense, handle, haul, deliver, and distribute all materials and all surplus materials on the different portions of the Work, as necessary. Contractor shall provide suitable and adequate storage room for materials and equipment, until the Final Completion of the Work.

Storage charges and demurrage charges by transportation companies and vendors, which result from delays in handling, shall be borne by Contractor.

10.05 Materials, Samples, Inspection, Approval

Unless otherwise indicated on the Plans and Specifications or specified, only new materials and equipment shall be incorporated in the Work. All materials and equipment furnished by Contractor to be incorporated in the Work shall be subject to the inspection and approval of Engineer.

No material shall be processed for, fabricated for, or delivered to the Work without prior approval of Engineer.

Within thirty (30) calendar days after the award of the Contract, Contractor shall submit to Engineer the names and addresses of the manufacturers and suppliers of all materials and equipment proposed to be incorporated into the Work. When shop and working drawings are required as specified below, such information shall be submitted prior to the submission of the drawings so that Engineer may consider and approve or disapprove the manufacturer and/or the supplier as to its ability to furnish a product meeting the Specifications, subject to final approval of the particular material or equipment. As requested, Contractor shall also submit data relating to the material and equipment proposed to be incorporated into the Work, in sufficient detail to enable Engineer to identify the particular product in question and to form an opinion as to its conformity to the Contract requirements.

Such data shall be submitted in a manner similar to that specified for shop and working drawings.

Facilities and labor for the handling and inspection of all materials and equipment shall be furnished by Contractor. Defective materials and equipment shall be removed immediately from the site of the Work. The Contractor will make arrangements for, and pay for soil density tests wherever and whenever the District desires, but at no less than every 1 foot lift and 400 LF of trench backfill, 1 foot lift and 100 SF of roadway subgrade and base and 1 foot lift and 100SF of fill beneath concrete on grade. If the results of a soil density test indicate that compaction is less than that specified, Contractor shall recompact and retest soil density with no additional cost to the District.

If Engineer so requires, either prior to beginning or during the progress of the Work, Contractor shall submit samples of materials for such special tests as may be necessary to demonstrate that they conform to the Specifications. Such samples, including concrete test cylinders, shall be furnished, taken, stored, packed and shipped as directed, at the expense of Contractor. Contractor shall, at its expense, furnish approved molds for making concrete test cylinders. Except as otherwise specified, the District shall make arrangements for, and pay for, the tests. All samples shall be packed so as to reach their destination in good condition, and shall be labeled to indicate the material represented, the name of the building or Work and location of which the material is intended, and the name of Contractor submitting the sample. To ensure consideration of samples, Contractor shall notify Engineer by letter that the samples have been shipped and shall properly describe the samples in the letter. In no case shall the letter of notification be enclosed with the samples.

Contractor shall submit data and samples to Engineer, or place its orders, sufficiently early to permit Engineer to consider, inspect, test, and approve the materials and equipment before they are incorporated in the Work. Delay resulting from Contractor's failure to do so shall not be used as a basis of a claim against the District or Engineer. When required, Contractor shall furnish to Engineer three (3) sworn copies of manufacturer's shop or mill tests (or reports from independent testing laboratories) relative to materials, concrete and equipment data.

After Engineer approval of the samples, data, etc., the materials and equipment used in the course of the Work shall correspond therewith.

10.06 Inspection of Work Away from the Site

If Work done off the construction site is to be inspected on behalf of the District during its fabrication, manufacture, or testing, or before shipment, Contractor shall give notice to Engineer of the place and time where such fabrication, manufacture, testing or shipping is to be done. Such notice shall be in writing and delivered to Engineer in ample time so that the necessary arrangements for the inspection can be made.

10.07 Contractor's Shop and Working Drawings

Contractor shall submit for approval six (6) copies (unless otherwise specified in writing) of shop and working drawings of concrete reinforcement, structural details, piping layout, wiring, materials fabricated especially for this Contract, and materials and equipment for which such drawings are specifically requested. All shop and working drawing submittals shall be prepared and submitted in accordance with Section 01300 of the Technical Specifications.

10.08 Health, Safety and Environmental Program

The Contractor shall adhere to all applicable federal and state occupational safety and health laws as they apply to this Contract.

The Contractor will enforce the Loxahatchee River Environmental Control District's safety rules and practices as they apply to the Contractor's employee's, in addition to the Contractor's own safety rules and procedures.

The Contractor shall provide all of its subcontractors with copies of all safe working procedures and shall ensure their enforcement.

10.09 Insufficiency of Safety Precautions

Failure of Contractor to provide these required conditions shall be a material breach of this Contract and the District shall be entitled to stop the Work until such time as Contractor corrects these conditions, without payment to Contractor of extension of time to complete the Work.

10.10 Sanitary Regulations

Contractor shall provide adequate sanitary conveniences for the use of those employed on the worksite. Such conveniences shall be made available when the first employees arrive on the worksite, shall be properly secluded from public observation, and shall be constructed and maintained in suitable numbers and at such points and in such manner as may be required or approved.

Contractor shall maintain the sanitary facilities in a satisfactory and sanitary condition at all times and shall enforce their use. Contractor shall rigorously prohibit the committing of nuisances on the

worksite, on the lands of the District, or any adjacent property. Contractor is solely responsible for the use and maintenance of the sanitary facilities.

The District and Engineer shall have the right to inspect any building or other facility erected, maintained, or used by Contractor, to determine whether or not the sanitary regulations have been complied with.

10.11 Lines, Grades and Measurements

Contractor shall employ, at its own expense, a land surveyor who shall be registered in the State of Florida and who shall be thoroughly experienced in field layout work. Said surveyor shall establish all lines, elevations, reference marks, etc., needed by Contractor during the progress of the Work, and from time to time Contractor shall verify such marks by instrument or by other appropriate means.

Alignment and grade of all pipe, tunnels and borings shall be controlled by use of lasers, levels or other equipment as required to assure proper alignment and grade. Contractor shall furnish all lasers and accessories as required and approved by Engineer. Contractor's engineer will set and check each laser each day that Work is in progress or more often as required to assure continuous accurate control. Contractor's engineer responsible for lines and grades shall certify to the District in writing that the Work has been constructed to lines and grades as shown on the Plans and Specifications. This certification shall accompany each request for payment.

Engineer shall be permitted at any time to review the lines, elevations, reference marks, lasers, etc., set by Engineer employed by Contractor, and Contractor shall correct any errors in lines, elevations, reference marks, lasers, etc., disclosed by engineer. Such a review shall not be construed to be an approval of Contractor's Work and shall not relieve Contractor of the responsibility for the accurate construction of the entire Work.

Contractor shall make all measurements and review all dimensions necessary for the proper construction of the Work called for by the Plans and Specifications. During the prosecution of the Work, Contractor shall make all necessary measurements to prevent misfitting in said Work, for the accurate construction of the entire Work.

10.12 Dimensions of Existing Structures

Where the dimensions and locations of existing structures are of critical importance in the installation or connection of new Work, Contractor shall verify such dimensions and locations in the field before the fabrication of any materials or equipment which is dependent on the correctness of such information.

10.13 Work to Conform

During its progress and on its completion, all Work shall conform to the lines, levels, and grades indicated on the Plans and Specifications or given by Engineer and shall be built in a thoroughly substantial and workmanlike manner, in accordance with the Plans and Specifications and the directions given from time to time by Engineer. In no case shall any Work in excess of the requirements of the Plans and Specifications be paid for unless ordered in writing by Engineer.

All Work done without instructions having been given therefore by Engineer, done without proper lines or levels, or done during the absence of Engineer, or its agent, will not be estimated or paid for except when such Work is authorized by Engineer in writing. Work so done may be ordered uncovered or taken down, removed, and replaced at Contractor's expense.

10.14 Pipe Location

Pipelines will be located substantially as indicated on the Plans and Specifications, but the right is reserved by the District, acting through Engineer, to make such modifications in location as may be found desirable to avoid interference with existing structures or for other reasons. Where fittings, etc., are noted on the Plans and Specifications, such notation is for Contractor's convenience and does not relieve Contractor from laying and joining different or additional items where required without additional compensation.

10.15 Planning and Progress Schedules

Contractor shall prepare and submit all schedule submittals in accordance with Section 01300 of the Technical Specifications.

10.16 Precautions During Adverse Weather

In the event of, or the possibility thereof, adverse weather, including high tides, and against the possibility thereof, Contractor shall take all necessary precautions so that the Work may be properly done and satisfactory in all respects. When required, protection shall be provided by use of tarpaulins, wood, building paper shelters, and other approved means. Contractor shall be responsible for all changes caused by adverse weather, including tidal fluctuations and Contractor shall take such precautions and procure insurance as Contractor deems prudent.

Engineer may suspend construction operations at any time when, in its sole discretion, the conditions are unsuitable or the proper precautions are not being taken, whatever the weather or tidal conditions may be, in any season.

Contractor shall provide a written tropical storm/hurricane plan consistent with District requirements to Engineer prior to commencement of construction.

10.17 Electrical Energy

Contractor shall make all necessary applications and arrangements and pay all fees and charges for power and light and other electrical energy as necessary for the proper completion of this Contract during its entire progress. Contractor shall provide and pay for all temporary wiring, switches, connections, and meters.

There shall be sufficient electrical lighting so that all Work may be done in a workmanlike manner when there is not sufficient daylight.

10.18 Bolts, Anchor Bolts and Nuts

All necessary bolts, anchor bolts, nuts, washers, plates and bolt sleeves shall be furnished by Contractor in accordance herewith.

10.19 Concrete Inserts

Concrete inserts shall be designed to safely support, in the concrete that is used, the maximum load that can be imposed by the bolts used in the inserts. Inserts shall be of a type which will permit locking of the bolt head or nut. All inserts shall be 316 stainless steel.

10.20 Operating Instructions and Parts Lists

Operations and Maintenance (O&M) Manuals for each item of equipment shall be submitted in accordance with Section 01300 of the Technical Specifications entitled "Submittals."

10.21 Lubricants

During testing and prior to acceptance, Contractor shall furnish all lubricants necessary for the proper lubrication of all equipment furnished under this Contract and as specified in the Contract Documents.

10.22 Special Tools

For each type of equipment furnished by Contractor, Contractor shall provide a complete set of all special tools (including calibration and test equipment) which may be necessary for the adjustment, operation, maintenance, and disassembly of such equipment.

Special tools are considered to be those which, because of their limited use, are not normally available, but which are necessary for the particular equipment.

Special tools shall be delivered at the same time as the equipment to which they pertain. Contractor shall properly store and safeguard such special tools to ensure they are in a proper functioning condition, as determined by Engineer. At the completion of the Work the special tools shall be delivered to the District.

10.23 Protection Against Electrolysis

Where dissimilar metals are used in conjunction with each other, suitable insulation shall be provided between adjoining surfaces so as to eliminate direct contact and any resultant electrolysis. The insulation shall be bituminous impregnated felt, heavy bituminous coatings, nonmetallic separators or washers, or other materials approved by Engineer.

10.24 Indemnification and Confidentiality

For specific consideration received by Contractor, included in the Contract sum beyond the cost of the Work, Contractor shall indemnify and hold harmless the District, its officers and employees, from liabilities, damages, losses and costs, including, but not limited to, reasonable attorney's fees, to the extent caused by the negligence, recklessness, or intentional wrongful misconduct of Contractor and persons employed or utilized by Contractor in the performance of the Contract. The monetary limitation on the extent of the indemnification that bears a reasonable commercial relationship to the

Contract and is part of the Project specifications or Bid Documents, is up to three (3) times the monetary value of the Contract. Notwithstanding the foregoing, the monetary limitation on the extent of the indemnification provided shall not be less than one million dollars (\$1,000,000.00) per occurrence. The District and the insurance carrier shall have the right to “mutually approve” the choice of attorney(s) to provide the defense, with such approval not to be unreasonably withheld. If no agreement on the choice of attorney(s) can be reached in a reasonable length of time, the final authority to choose an attorney will rest with the claims manager in the office where the claim originated.

In any and all claims against the District or any of their officers or employees by an employee of Contractor, any subcontractor, anyone directly or indirectly employed by any of them or anyone else for whose acts any of them may be liable, the indemnification obligation under this General Conditions Section 10.24 shall not be limited in any way on the amount or type of damages, compensation or benefits payable by or for Contractor or any subcontractor under worker’s compensation acts, disability benefits or other employee benefit acts. The intention of these two clauses above is to provide for the legal indemnification allowed for under Section 725.06, Florida Statutes, no more and no less, so as to be completely legal and not void as against public policy. If any provision of this indemnification is determined by a court of law to be void, it shall be severed from this provision and the remainder of this provision shall be given full force and effect under Section 725.06, Florida Statutes.

In the performance of the Work, Contractor may be exposed to the confidential information of the District and other. Contractor shall not disclose to anyone not employed by the District nor use, except on behalf of the District, any such confidential information acquired in the performance of the Work except as authorized by the District in writing and, regardless of the term of this Contract, Contractor shall be bound by this obligation until such time as said confidential information shall become part of the public domain. Information regarding all aspects of the District’s business and information concerning the Work (either directly or indirectly disclosed to it or developed by it in the performance of the Work) shall be presumed to be confidential except to the extent that same shall have been published or otherwise made freely available to the general public without restriction. Contractor also agrees that it will not disclose to the District any information it holds subject to any obligation or confidence to any third persons.

10.25 Work by Others

The District may perform additional Work related to the Project itself, or the District may engage others to perform Work on the Project which such engagement shall be governed by similar General Conditions. Contractor shall afford the other contractors who are parties to such direct contracts (or the District, if it is performing the additional Work), reasonable opportunity for the introduction and storage of materials and equipment and the execution of the Work, and shall properly connect and coordinate Contractor’s Work with the Work of others. If any part of Contractor’s Work depends for proper execution or results upon the Work of any such other contractor (or the District), Contractor shall inspect and promptly report to Engineer, in writing, any defects or deficiencies in such Work that render it unsuitable for such proper execution and results. Contractor’s failure so to report shall constitute an acceptance of the other Work as fit and proper for the relationship of its Work except as to defects and deficiencies which may appear in the other Work after the execution of Contractor’s Work.

Contractor shall do all cutting, fitting and patching of its Work that may be required to make its several parts come together properly and fit it to receive or be received by such other Work. Contractor shall not endanger any Work of others by cutting, excavating or otherwise altering their Work and will only cut or alter their Work with the written consent of Engineer and of the other contractors whose Work will be affected.

If the performance of additional Work by other contractors or the District is not noted in the Contract Documents prior to the execution of the Contract, written notice thereof shall be given to Contractor prior to the state of any such additional Work.

10.26 Record Drawings

Contractor shall keep and maintain one record copy of all Specifications, Plans and Specifications, Addenda, Change Orders, Modifications and Shop drawings at the site in good order and annotated to show all changes made during the construction process as specified in the Contract Documents. All record drawings shall be kept maintained and updated by Contractor in accordance with Section 01720 of the Technical Specifications entitled "Project Record Drawings."

10.27 Non-Waiver

Progress or final payments shall not be acceptance of improper, faulty, or defective work or material, and shall not release Contractor of any of its obligations under the Contract Documents, and shall not constitute a waiver of any rights or provisions of the Contract Documents by the District.

10.28 Mutuality of Provisions

If any provision of the Contract Documents shall for any reason be held to be invalid, illegal, or unenforceable in any respect under the laws of the State of Florida, any such invalidity, illegality or unenforceability shall not affect any other provision of the Contract Documents and the Contract Documents shall be construed as if such invalid, illegal, or unenforceable provision had never been incorporated herein and the rights of the parties hereto shall be construed and enforced accordingly.

10.29 Restoration of Property

Existing structures and facilities, including but not limited to buildings, utilities, topography, streets, curbs, walks landscape materials and other improvements that are damaged or removed due to the Work, shall be patched, repaired, or replaced by Contractor to the satisfaction of the owner of such structure and facility, and authorities having jurisdiction. In the event that authorities having jurisdiction require that such repairing and patching be done with their own labor and materials, Contractor shall abide by such regulations and pay for such work.

10.30 Notice

Any notice or writing given hereunder shall be delivered by depositing the notice contained in a sealed envelope, postage prepaid in the United States Postal System as registered or certified mail, with return receipt requested, or by overnight express carrier. Any such notice so deposited shall be conclusively deemed delivered to and received by the addressee forty-eight (48) hours after the deposit if all of the foregoing conditions of notice have been satisfied and addressed as follows:

DISTRICT:

CONTRACTOR:

10.31 Legally Binding

Contractor agrees that the Contract Documents are legally binding documents and has had the opportunity to permit its attorney to review them. The Contract Documents are the joint work product of the Parties hereto and, accordingly, no term or provision shall be more strictly construed against any party.

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TECHNICAL

SPECIFICATIONS

SECTION 30

MISCELLANEOUS REQUIREMENTS

3.01 Lines, Grades and Measurements

Alignment and grade of all pipe, tunnels and borings shall be continuously controlled by use of lasers or other acceptable method. Laser alignment and grade through the pipeline is the preferred method. The District Engineer shall be permitted at any time to check the lines, elevations, reference marks, laser, etc., set by the Contractor or the Design Engineer.

3.02 Work to Conform

The maximum allowed vertical deviation of any single gravity pipe, tunnel or boring from plan grade shall be three percent (3%) of inside diameter. No single gravity pipe shall vary in horizontal alignment right or left, from the pipe centerline by more than five percent (5%) of inside diameter. Force main joint deflections shall be limited by AWWA Standards and manufacturer's recommendation.

3.03 Pipeline location

Pipelines shall not be located closer to an existing or proposed structure than the horizontal distance obtained when drawing a 45-degree angle from the proposed invert of the pipeline to bottom outside face of the footing. In no case shall this distance be less than ten (10) feet. Pipelines shall be located as indicated on the drawings, but the Design Engineer is responsible to make such modifications in location as may be found desirable to avoid interference with existing structures or for other reasons, which are not material to the interest of the District and which do not otherwise conflict with any other statement or criteria set forth in this manual. The District should be notified of such changes in a timely fashion and such changes shall be recorded on Record Drawings.

3.04 Pipe Adapters

When joining pipes of different types, District approved transition sleeves, adapters, and couplings shall be used.

3.05 Fittings and Stoppers

Branches, stub-outs and fittings shall be laid as indicated in the Standard Details and shown on the approved drawings. Open ends of pipe and branches shall be closed with nonmetallic "wing nut" expansion stoppers secured in place in an acceptable manner. Stoppers shall be designed to remain in place and watertight during infiltration tests.

Service Lines

a. General

Service lines shall be as shown on the Standard Details. Service lines for a single lot shall be a minimum of 4 inches in diameter; for two lots, a minimum of 6-inches in diameter. Where three or more lots are connected to a single service line, the service line shall be considered a gravity sewer, shall be a minimum of 8-inches in diameter, and shall be in accordance with the criteria covering District maintained gravity sewers. Exceptions to these requirements may be made in specific instances where constructability, environmental impacts or excessive costs require an alternate to these criteria. These exceptions shall be considered non-conforming connections and subject to correction to District Standards if and when criteria used in determining constructability, environmental impacts or excessive costs are no longer valid.

b. Easements, Implied Grant of Way of Necessity and Statutory Way of Necessity

If a residential property requires an easement across another residential property to gain access to District sewers the easement shall be conveyed to the District using the District's Standard Easement Agreement. Easements shall only be allowed when no District maintained sanitary sewer is available for connection in public right of way or existing easements adjacent to the property and constructability, environmental impacts or excessive costs render construction of new sewer facilities in public right of way or existing easements adjacent to the property non-viable.

The District recognizes Florida Statutes 704.01, (1) Implied grant of way of necessity, and (2) Statutory way of necessity, may be applicable in providing sanitary sewer service to a property.

In the case of Implied Grant of Way of Necessity there may be instances where a sanitary sewer service existed to a property and that property was then divided into multiple properties each using the existing sanitary sewer service. In these instances the District recognizes the Implied Grant of Way of Necessity for each property's use of the sanitary sewer service under a "grandfather" clause but considers the connection/s non-conforming in that properties may be served by facilities not owned and maintained by the District and/or properties may be served by facilities that may be inadequately sized and/or one property may be served by facilities that cross another property and are not in a District Standard Easement. In these instances, the District shall require the sanitary sewer connections using an Implied Grant of Way of Necessity for sewer service be corrected to current District Standards when renovation or redevelopment of any of the affected properties occurs.

In the case of Statutory Way of Necessity there may be instances where a property is shut off or hemmed in from access to sanitary sewer service by lands, fencing or other improvements. In these instances the District, with agreement from the shut off or hemmed in property, may act on behalf of the shut off or hemmed in property and use and maintain an easement over, under, through and upon the lands which lie between the said shut-off or hemmed-in lands and public right of way or existing easements to supply sanitary sewer service to the shut-off or hemmed-in land granted the shut-off or hemmed-in land is using the lands that lie between for personal ingress and egress. The District considers sanitary sewer connections using Statutory Way of Necessity to be non-conforming in that properties are served by facilities that cross another property and are not in a District Standard Easement. In these instances the District shall require the sanitary sewer connections using a Statutory Way of Necessity for sewer service be corrected to current District Standards when renovation or redevelopment of the property over which a Statutory Way of Necessity is used occurs, or when a public right of way or utility easement becomes accessible to the shut-off or hemmed in property.

c. **Maintenance Responsibility**

The service line (lateral) cleanout will usually delineate the point of responsibility between the District and the property owner; however, the following variations do exist:

1. Multi-family Units - Public right-of-way - Owner's responsibility to the right-of-way line.
2. Multi-family Units - Non-Public right-of-way - Owner's responsibility to the main line connection.
3. Commercial Buildings - Owner's responsibility to the main line.
4. Condominium with Common Areas - Non-Public right-of-way Owner's responsibility to the main line connection.
5. Condominium with Common Areas Adjacent to Public right-of-way - District assumes responsibility within the public right-of-way.

3.07 **Service Line Markers**

A service line marker shall be installed 12-inches {minimum} above the service wye adjacent to the cleanout of each service line. The service line markers shall be Electronic System, Sanitary Marker 1258, as manufactured by 3M.

3.08 **Bolts, Anchor Bolts, and Nuts**

Anchor bolts shall have suitable washers and, where so required, their nuts shall be hexagonal. All anchor bolts, nuts, washers, plates, and bolt sleeves shall be galvanized unless otherwise indicated or specified.

Expansion bolts shall have malleable iron and lead composition elements or the required number of units and sizes.

Bolts, anchor bolts, nuts and washers specified to be stainless steel shall be type 316 stainless steel.

Anchor bolts and expansion bolts shall be set accurately. If anchor bolts are set before the concrete has been placed, they shall be carefully held in suitable templates of approved design. If anchor or expansion bolts are set after the concrete has been placed, all necessary drilling and grouting or caulking shall be done, and care shall be taken not to damage the structure or finish by cracking, chipping, spalling, or otherwise during the drilling and caulking.

3.09 Concrete Inserts

Concrete inserts shall be designed to safely support the maximum load that can be imposed by the bolts used in the inserts. Inserts shall be of a type which will permit locking of the bolt head or nut. All inserts shall be galvanized.

3.10 Protection against Electrolysis

Where dissimilar metals are used in conjunction with each other, suitable insulation shall be provided between adjoining surfaces so as to eliminate direct contact with any resultant electrolysis. The insulation shall be bituminous impregnated felt, heavy bituminous coatings, nonmetallic separators or washers, or other approved materials.

END OF SECTION 30

SECTION 100

EXCAVATION, PIPE EMBEDMENT, FILL AND GRADING

100.01 Description

All excavations shall be made in such manner and to such widths as will provide suitable room for building the structures or laying and jointing the piping. All sheeting, bracing, supports, coffer dams, pumping and draining shall be performed to render the bottom of the excavations firm, dry and acceptable in all respects.

100.02 Sheeting and Bracing

Sheeting and bracing shall be furnished as may be necessary to support the sides of the excavation and to prevent any movement of earth which could in any way diminish the width of the excavation to less than that necessary for proper construction, or could otherwise injure or delay the work, or endanger adjacent structures.

All timber sheeting and bracing shall be left in place unless otherwise directed by the Design Engineer to remove same or cut off at a specified elevation.

All sheeting and bracing, including trench boxes not to be left in place, shall be carefully removed in such manner as not to endanger the construction or other structures. All voids left or caused by the withdrawal of sheeting shall be backfilled immediately with approved material and compacted by ramming with tools especially adapted to that purpose, by watering, or by other means as may be directed by the Design Engineer.

100.03 Drainage

100.03.01 General

To ensure proper conditions at all times during construction, all means shall be used to intercept and/or remove promptly and dispose properly of all water entering trenches and other excavations. Such excavations shall be kept dry until the structures, pipes and appurtenances to be built therein have been completed to such extent that they will not be floated or otherwise damaged.

All water pumped or drained from the work shall be disposed of in a suitable manner without undue interference with other work, damage to pavements, other surfaces, or property. Suitable temporary pipes, flumes, or channels shall be provided for water that may flow along or across the site of the work. All requirements of all regulatory agencies regarding dewatering and the discharge of water from the project shall be complied with.

All labor, materials, tools, and equipment shall be provided, as necessary, to properly control the quality of the discharge from the dewatering operations as described herein. All applicable laws, rules and regulations governing the discharge of water from dewatering operations shall be

complied with. All dewatering shall be accomplished by the use of sanded well points and other techniques deemed necessary by the Contractor to properly dewater the trench excavations.

The water discharged from the Contractor's dewatering operation shall not exceed the turbidity limits promulgated by the State of Florida Department of Environmental Protection discharge standards for the Loxahatchee River or its tributaries.

Unless otherwise directed by the Design Engineer, an approved siltation tank shall be installed ahead of dewatering discharge points. In addition, silt screens and other devices and techniques may be required to maintain the discharge quality at turbidity levels below the required limits.

Any and all methods approved by the Design Engineer to control the bacteriological quality of well point discharge into existing drainage ditches and/or canals shall be utilized. Levels for fecal coliform in a discharge which ultimately leads to the Loxahatchee River, shall not exceed those promulgated by the State of Florida Department of Environmental Protection discharge standards.

100.03.02 Drainage Well-point System

If it is necessary to drain the soil and prevent saturated soil from flowing into the excavation, an efficient drain well-point system will be utilized. The well points shall be designed especially for this service. The pumping unit shall be designed for use with the well-points and shall be capable of maintaining a high vacuum and of handling large volumes of air and water at the same time.

100.04 Trench Excavation

Where pipe is to be laid in rock bedding or concrete cradle, the trench may be excavated by machinery to, or to just below, the designated subgrade, provided that the material remaining at the bottom of the trench is not disturbed.

If the trench is excavated below the designated subgrade, the undercut shall be backfilled with compacted bedding rock, uniformly graded from 1/4-inch size.

100.05 Depth of Trench

Trenches shall be excavated to such points as will permit the pipe to be laid at the elevations, slopes, or depths of cover indicated and at uniform slopes between indicated elevations.

100.06 Width of Trench

Pipe trenches shall be made as narrow as practicable and shall not be widened by scraping or loosening materials from the sides. Every effort shall be made to keep the sides of the trenches firm and undisturbed until backfilling has been completed and consolidated.

Trenches shall be excavated with approximately vertical sides between the elevation of the center of the pipe and an elevation one (1) foot above the top of the pipe.

100.07 Trench Excavation in Fill

If pipe is to be laid in embankments or other recently filled material, the material shall first be placed to the top of the fill or to go to a height of at least three (3) feet above the top of the pipe, whichever is the lesser, Particular care shall be taken to ensure maximum consolidation of material under the pipe location, The pipe trench shall be excavated as though in undisturbed material.

100.08 Unauthorized Excavation

If bottom of any excavation is taken out or disturbed beyond the limits indicated or prescribed, the resulting void shall be backfilled with embedment material compacted to a minimum of 90% of AASHTO T-180 or to the standards of the applicable agency having jurisdiction.

100.09 Elimination of Unsuitable Material

Pipe bedding shall extend a minimum of 4 inches below the pipe. The pipe shall be supported on suitable material ascertained by the Design Engineer following good engineering practices.

100.10 Backfilling

As soon as practicable after the pipes have been laid, or the structures have been built and are structurally adequate to support the loads, including construction loads to which they will be subjected, the backfilling shall be started and thereafter it shall proceed until its completion.

100.10.1 Backfill Materials

The nature of the materials will govern both their acceptability for backfill and the methods best suited for their placement and compaction in the backfill. The materials and the methods shall both be subject to the approval and direction of the Design Engineer. No stone or rock fragment larger than 3 inches in greatest dimension shall be placed in the backfill nor shall large masses of backfill material be dropped into the trench in such a manner as to endanger the pipeline. If necessary, a timber grillage shall be used to break the fall of material dropped from a height of more than 5 feet. Pieces of bituminous pavement shall be excluded from the backfill unless their use is expressly permitted, in which case they shall be broken up as directed.

100.10.2 Embedment Materials

Three broad classes of material shall be used for bedding, haunching, and pipe side support.

CLASS 1 - Angular, ¼-inch to ¾-inch graded stone,
of which 100% passes a 1-inch sieve such as coral,
slag, cinders, crushed stone, crushed shells, or

bedding rock.

CLASS 2 - Coarse sands and gravels with maximum particle size 3/4 inch including variously graded sands and gravels containing small percentages of fines, generally granular and non-cohesive, either wet or dry. Soil Types GW, GP, SW. and SP are included in this class.

CLASS 3 - Fine sand and clayey gravels, including fine sands, sand-clay mixtures, and gravel-clay mixtures. Soil Types GM, GC, SM, and SC are included in this class. Included in Class 3 are existing soil types classified as select backfill.

Class 1, Class 2, or Class 3 material shall be used for bedding material to the top of the pipe. Special care must be taken to insure Class 1, 2, or 3 material is worked under the pipe haunch. Class 2 or 3 material shall be compacted to a minimum of 98% density per AASHTO T -180. The District has the option, at any time, to take density tests to confirm the 98% compaction. Precautions shall be taken to prevent movement of the pipe when placing and compacting material under the pipe haunches.

If Class 2 or 3 material is used for bedding and haunching, a dry trench shall be maintained.

Under certain conditions, the Engineer may be faced with an unusual amount of water running in the trench which he may find necessary to remove in order to properly install and compact the embedment material. The Engineer may elect to remove the water with trench side pumps through the use of Class 1 material for bedding. The depth of Class 1 material will depend upon the amount of water but take care to ensure that the trench wall soil material is such that it will not be removed from the area adjacent to the bedding as a result of the running water. The Engineer may also elect to utilize well points or under drain to control excessive ground water. If Class 1 material is used as bedding and under drain, it must be utilized at least up to the top of the pipe.

100.10.3 Zone Around Pipe

The zone around the pipe shall be backfilled with the materials and to the densities and limits indicated on the details.

100.10.4 Compaction

Compaction shall be accomplished by tamping, or under appropriate construction techniques to achieve the required densities.

100.10.5 Maximum Density

Unless specified otherwise, the percent of maximum density referred to in these specifications refers to the maximum density obtained when the material is laboratory tested in accordance with the procedures outlined in Designation AASHTO T-180, Latest Revision or as otherwise required by the governmental agency having jurisdiction over the finished roadway. Field densities shall be determined by a testing laboratory using accepted methods.

100.10.6 Miscellaneous Requirements

Whatever method of compacting backfill is used, care shall be taken that stones and lumps shall not become nested and that all voids between stones shall be completely filled with fine materials. Only approved quantities of stones and rock fragments shall be used in the backfill.

All voids left by the removal of sheeting shall be completely backfilled with suitable material, thoroughly compacted.

END OF SECTION 100

SECTION 101

HORIZONTAL DIRECTIONAL DRILL

107.01 General

This specification covers installation of 4" and larger diameter HDPE pipe using horizontal directional drill methods. Installations shall comply with FDOT Standard Specification (Latest Edition) Section 555, ASTM F1962 and this specification.

107.02 Material and Equipment

The drilling fluid shall be a bentonite drilling fluid with or without polymer additives. All materials shall be NSF/ANSI 60 certified.

Pipe and fittings shall comply with Section 114.

Tracking/Steering equipment shall require a walk-over tracking system. The tracking/steering equipment shall place the pilot bore with a maximum horizontal tolerance of +/- 5% of directional bore pipe depth below grade.

After placement the contractor shall utilize a magnetic locating system utilizing a DC or AC current and a surveyed surface loop coil to as-built the final directional bore installation location in place. The surface loop shall be surveyed in by a Florida Licensed Professional Land Surveyor and georeferenced to State Plane Coordinates in NAD83, Florida East Zone and vertical datum NGVD29.

All directional drills shall be installed with a minimum 2" HDPE conduit and two minimum 10 gauge tracer wires installed for the full length of the bore. The conduit shall be terminated in a CDR box installed at each end of the bore. The 10-gauge tracer wires shall be terminated in the valve box for the isolation valves on each end. The conduit diameter and wall thickness shall be sized to withstand anticipated pull back forces of the installation. Tracer wire shall be high strength copper clad steel, Copperhead Soloshot EHS or approved equal.

107.03 Submittals

Submit technical data, cut sheets and shop drawings for equipment and materials including but not limited to drilling fluid (including MSDS Sheet), additives, pipe, fittings, adapters, pipe stiffeners, bore plan, locating and tracking equipment, locating tracking equipment calibration, locating and tracking equipment certification, heat fusion technician certification and proposed sequence of construction for approval by the Engineer.

Horizontal and vertical alignment of the pilot bore based on location information from the locating/tracking/steering equipment outlined in paragraph 107.02 and surveyed points on the DC surface looped coil. The horizontal and vertical alignment shall be referenced to horizontal and

vertical datum requirements as specified in the Record Drawing Submittal Guide, Standard Detail SD-29. **The horizontal and vertical alignment shall be as-built and certified by the steering contractor as complying with the locating/tracking/steering equipment manufacturers recommended procedures.**

A log of directional drilling machine pressures during pulling operations converted to tensile stress seen in the pipe. Hydraulic pressure produced by the machine alone is not acceptable.

Experience and project resumes.

107.04 Experience

The directional drill contractor and locating/tracking/steering/contractor shall demonstrate experience in similar horizontal directional drills. Experience shall be a minimum of 5 successful installations of same or larger diameter of same or longer length in the previous 5 years. The directional drill contractor shall submit a list of references.

107.05 Placement and Testing

Perform all locates and pothole all potential conflicts prior to submitting the bore plan. The bore plan shall not be approved until all known conflicts have been resolved.

HDPE pipe shall be handled with care to include only the use of nylon slings for lifting and the use of appropriate sized pipeline rollers for supporting and maneuvering the pipe during fusion and pull back operations.

All HDPE pipe shall be pressure tested per Section 140.

All pipe installed below the water table shall be flooded with water prior to pulling operations.

Installations shall not exceed the pipe manufacturer's recommended radius of curvature.

The reamed hole shall not exceed 1.5 times the nominal diameter of the installed pipe.

All directional bores shall include one isolation valve on each end.

Upon completion bore pits shall be cleaned of excess drilling fluid and backfilled with clean fill.

END OF SECTION 101

SECTION 110

PIPE, FITTINGS AND ACCESSORIES

110.01 General

This section provides standards for all pipe and fittings used in the construction of District wastewater facilities. Approved piping systems include SCH40 and SCH 80 PVC, High Density Polyethylene (HDPE), SDR26 PVC, C900 PVC, C905 PVC and Ductile Iron.

110.02 Schedule 40 and 80 PVC Pipe (1/2" – 3")

Small diameter PVC (3" diameter or less) pipe and fittings shall be pressure rated ASTM D1784/D1785 schedule 40 for buried applications and schedule 80 for non-buried applications. Small diameter PVC pipe shall be marked with schedule, diameter, pressure rating at 140 F and applicable ASTM standards for dimensions and materials and be white or gray in color.

Small diameter PVC joints shall be solvent weld socket type.

110.03 AWWA C901 High Density Polyethylene (1/2" – 3")

Small diameter HDPE (3" diameter or less) pipe shall manufactured from PE4710 resin and comply with AWWA C901 and ASTM F714. Small diameter HDPE pipe shall be iron pipe size (IPS) with a standard dimension ratio (SDR) 11. Small diameter HDPE pipe shall be marked with diameter, SDR, AWWA C901, ASTM F714 and PE4710 and shall be black in color with extruded stripes in applicable color; sewer = green, IQ = purple.

Small diameter HDPE pipe shall come in reels sufficient for continuous lay lengths from service latera to service lateral.

Small diameter HDPE pipe shall use brass pack joint style couplings and stainless steel pipe stiffeners.

110.04 AWWA C906 High Density Polyethylene (4" – 63")

Large diameter HDPE (4" – 63") pipe shall manufactured from PE4710 resin and comply with AWWA C906, ASTM F714 and be listed with the Plastic Pipe Institute's (PPI) TR4. Large diameter pipe shall be ductile iron pipe size (DIPS) with a standard dimension ratio (SDR) 11. Large diameter HDPE pipe shall be marked with diameter, SDR, AWWA C906, ASTM F714 and PE4710 and be black in color with extruded stripes in applicable color; sewer = green, IQ = purple, potable = blue.

Single joints of pipe shall be a minimum of 40 feet in length. Damaged pipe may have the damaged area cut out and the remaining portion reused as long as the remaining portion is a minimum of 20 feet in length.

Large diameter HDPE pipe shall utilize HDPE butt fused fittings of the same SDR.

110.05 SDR 26 PVC Gravity Mains

Gravity main installations whose invert is greater than 4'-0" and less than 14'-0" shall be integral bell and spigot gasketed pipe and comply with ASTM D3034 for SDR 26 up to 15" in diameter. SDR 26 gravity main pipe shall meet the following ASTM Standards: D3212 (Joint), F477 (Gasket), D1784 (PVC Compound), D2412 (Stiffness) and D2321 (installation). SDR 26 gravity main pipe shall be green in color and marked with diameter, SDR and applicable ASTM standards.

Joints of SDR 26 gravity main pipe shall be either 14'-0" or 20'-0" in length

110.06 AWWA C900 Force Mains

Force main installations 4" – 48" shall be integral bell and spigot gasketed pipe and comply with AWWA C900 DR18, Pressure Class 235. C900 Force main pipe shall comply with ASTM Standards D1784 (PVC Compound), D3139 (Joint), and F477 (Gasket). C900 force main pipe shall be marked with diameter, DR and AWWA C900. C900 force main pipe shall be green for sewer and purple for IQ.

Joints of C900 force main pipe shall be either 14'-0" or 20'-0" in length.

C900 force main pipe shall use ductile iron fittings with restrained mechanical joints

110.07 Ductile Iron Pipe

All ductile iron pipe shall be manufactured in accordance with ANSI/AWWA C151/A21.51. Ductile iron pipe shall be pressure class 350 up to 20" and pressure class 250 for larger diameters. Ductile iron pipe shall be epoxy coated on the interior with Protecto 401, Permite 9043 Type II or Linerguard. Coatings shall conform to ANSI/AWWA C104/A21.4

Joints shall be conform to ANSI/AWWA C111/A21.11. Restrained push on joints shall use Field Lok 350 Gaskets by US Pipe and Foundry Co., or approved equal.

Ductile Iron Pipe shall be minimum Pressure Class 350 up to 20-inches in diameter and Pressure Class 250 for larger diameters.

Where ductile iron pipe is used, fittings shall be ductile iron and conform to the requirements of ANSI/AWWA C153/A21.53 and shall be of a pressure classification at least equal to that of the pipe with which they are used. Fittings may be flanged or mechanical as applicable.

110.08 SDR 26 PVC Fittings

PVC Gravity main fittings shall conform to the requirements of ASTM D2241 SDR26. Gaskets shall conform to ASTM F477. Fittings in sizes not available in injection molded form shall be fabricated from SDR26 pipe in accordance with ASTM D2241.

110.09 Schedule 40 and 80 PVC Fittings

Fittings used in small diameter PVC piping systems shall match the schedule of the piping system, either Schedule 40 or 80. Fittings shall be socket weld and conform ASTM D1785 for physical dimensions and ASTM D1784 for materials.

110.010 HDPE Butt Fused Fittings

Molded butt fusion fittings and adapters shall conform to ASTM D 3261, utilize HDPE conforming to the pipe to which it will be fused and have the same dimension ratio as the pipe to which it will be fused. All fittings shall be pressure rated to provide a working pressure rating no less than that of the pipe.

110.011 Large Diameter HDPE to PVC/DI Adapters

Transition from HDPE to other piping systems shall require MJ or flanged HDPE adapters. Instances where these adapters are not practical will require pipe stiffeners in conjunction with ductile iron fittings. The pipe stiffeners shall be stainless steel as manufactured by JCM Industries or pre-approved equal. Pipe stiffeners in conjunction with ductile iron fittings shall only be used with the written approval of the District Engineer for HDPE pipe 12" diameter and smaller. When approved, MEGALUG Series 2000PV mechanical joint restraints or approved equal shall be used.

110.012 Small Diameter HDPE Fittings and Adapters

Small diameter HDPE pipe (1/2" – 3") HDPE to HDPE and HDPE to PVC connections shall use pack joint style fittings as manufactured by Ford Meter Box Co. Stainless steel pipe stiffeners shall also be required.

110.013 Ductile Iron Fittings

Ductile iron fittings shall conform to ANSI/AWWA C153/A21.53 (compact fittings) with a minimum pressure rating of 350 psi. Fittings shall be mechanical joint or flanged as required.

Flanged fittings shall comply with ANSI B16.5, Class 150.

All mechanical joints shall be restrained. Restrained mechanical joints shall use 1100 Series Megalug by EBAA Iron Sales, Inc. or approved equal.

Ductile iron fittings shall be epoxy coated on the interior with Protecto 401, Permite 9043 Type II or Linerguard. Coatings shall conform to ANSI/AWWA C104/A21.4

110.014 Ductile Iron Pipe and Fittings Linings and Coatings

Ductile iron pipe fittings shall be epoxy coated on the interior with Protecto 401, Permite 9043 Type II or Linerguard. Coatings shall conform to ANSI/AWWA C104/A21.4

Buried ductile iron pipe and fittings shall receive an external bituminous coating in accordance with ANSI 21.10. and be striped with green for sewer and purple for IQ water.

Above grade ductile iron pipe and fittings shall receive a three coat system; Prime Coat: TNEMEC-Aluminum Mastic #135 (3 to 5 mils DFT), Intermediate Coat Series 66 Epoxoline Hi-Build Epoxy (4 to 6 mils DFT) and Finish Coat Series 73 Endura-Shield III Urethane (2 to 3 mils DFT). Coatings shall be green for sewer and purple for reclaimed water.

110.015 Marking Tape

All buried piping shall include marking tape. Marking tape shall be minimum 2" wide, magnetic and detectable. Marking tape shall be green and marked "SEWER".

110.016 Buried Markers

Buried markers shall be installed at all fittings, valves, service connections, change of direction and every 300' of pipe lay length. Buried markers are not required on gravity main piping but are required on service lateral piping and cleanouts. Buried markers shall be EMS Mini-Markers for Wastewater Model 1258 as by 3M.

110.017 Tracer Wire

When specifically required pressure rated piping shall be installed with tracer wire. Tracer wire shall be attached to the pipe using a half-hitch every 10' for direct bury applications and shall be pulled with the pipe (without attaching) in directional drill installations. Tracer wire in directional drill applications shall be minimum 10 gauge, Copperhead Soloshot EHS or approved equal. Tracer wire in direct bury applications shall be minimum 14 gauge, PVC coated, solid copper wire.

110.018 Handling and Cutting Pipe

The pipe manufacturer's recommendation for handling, storing, unloading and cutting pipe shall be followed. Individual pipes shall not be allowed to drop from the truck when unloading. Pipe units shall not be handled with chains or single cables. Pipe shall not be stored more than two units high. Every care shall be taken in handling and laying pipe and fittings to avoid damaging the pipe or scratching or marring machined or finished surfaces.

Any fitting showing a crack shall be marked as rejected and removed at once from the work.

In any pipe showing a distinct crack and in which it is believed there is not incipient fracture beyond the limits of the visible crack, the cracked portions, if so approved by the Design Engineer, may be cut off before the pipe is laid so that the pipe used is perfectly sound. The cut shall be made in the sound barrel at a point at least 12-inches from the visible limits of the crack.

Except as otherwise approved, all cutting shall be done with knives or saws adapted to the purpose. All cut ends shall be examined for possible cracks caused by cutting.

Cut ends to be used with push on joints shall be carefully chamfered and the reference mark located in accordance with the manufacturer's recommendation to prevent cutting the gasket when the pipe is laid or installed.

110.019 Installing Pipe and Fittings

No defective pipe or fittings shall be laid or placed in the piping, and any piece discovered to be defective after having been laid or placed shall be removed and replaced by a sound and satisfactory piece.

Each pipe and fitting shall be cleared of all debris, dirt, etc., before being laid and shall be kept clean until accepted in the complete work. Pipe and fittings shall be laid accurately to the lines and grades indicated on the drawings or required. Care shall be taken to ensure a good alignment both horizontally and vertically.

Each length of pipe shall have a firm bearing along its entire length. Embedment requirements are shown on the Standard Details and in this specification.

The bell of the pipe shall be cleaned of dirt or other obstruction and wiped out before the cleaned and prepared spigot of the next pipe is inserted into it. Only lubricants made by the pipe manufacturer may be used on the spigot. The new pipe shall be shoved firmly into place until properly seated and held securely until the joint has been completed.

110.020 Temporary Plugs

At all times when pipe laying is not actually in progress, the open ends of pipe shall be closed by temporary watertight plugs. If water is in the trench when work is resumed, the plug shall not be removed until all danger of water entering the pipe has passed.

110.021 Preparation of Trench Bottom

The trench bottom shall be constructed to provide a firm, stable and uniform support for the full length of the pipe. Unsuitable foundation material shall be removed as required by the Engineer and refilled with Class 1, 2, or 3 material. Class 2 or 3 material shall be compacted to a minimum of 90% standard proctor density.

110.022 Manhole Connections

Where PVC gravity or force main pipe enters the manhole, approved sealing adapters as manufactured by Harco, Fernco or equal, shall be used. Any coupling used shall be coated with an epoxy coated sand finish approved by the District.

110.023 Bell Holes for Elastomeric Seal Joints

When the pipe being installed is provided with elastomeric seal joints, bell holes shall be excavated in the bedding material to allow for unobstructed assembly of the joint. Care should be taken that the bell hole is not larger than necessary to accomplish proper joint assembly. When the joint has been made, the bell hole should be carefully filled with bedding or haunching material to provide for adequate support of the pipe throughout the entire length.

SECTION 120

CAST IN PLACE CONCRETE

120.01 Materials

120.01.1 Concrete

Ready-mixed concrete shall be used. It shall comply with the Standard Specifications for Ready-Mixed Concrete, ASTM Designation C94 for the strengths specified herein. Alternate No.2, under Paragraph 4 - Quality of Concrete ASTM C94 shall govern for the design of the concrete mixture.

120.01.2 Cement

Type I cement shall be used in concrete for general purposes. Type II cement shall be used for sewer manholes, wet wells, and all other applications where the concrete may be exposed to a wastewater atmosphere.

120.02 Concrete

120.02.1 Mix

Concrete shall be composed of Portland cement, coarse aggregate, fine aggregate and water. The concrete mix shall be designed to produce the quality specified, proportioned and mixed in accordance with the requirements set forth herein and shall in all cases meet the following requirements:

<u>Class</u>	<u>Location</u>	28 Day Compressive <u>Strength</u>
A.	Specifically Required on Plans	4,000 psi
B.	General Structural Concrete	3,000 psi
C.	Non-structural Applications	2,500 psi

120.02.2 Slump

The concrete, when placed, shall show slumps within the following limits when tested in accordance with the Method of Test for Slump of Portland Cement Concrete, ASTM Standard Specification C-143.

Min.	Max.
------	------

<u>Type of Concrete</u>	<u>Slump</u>	<u>Slump</u>
Mass Concrete	1 Inch	3 Inches
Reinforced Concrete:		
Thin vertical sections and thin columns, 7 inches or less in thickness	3 Inches	6 Inches
Heavy vertical sections more than 7 inches in thickness	3 Inches	5 Inches
Structural Slabs	1 Inch	4 Inches

120.02.3 Air Entraining

Air entrained concrete shall conform with the following requirements:

	<u>Maximum Aggregate Size(Inches):</u>				
	<u>3/8:</u>	<u>1-2:</u>	<u>3/4:</u>	<u>1:</u>	<u>1-1/2:</u>
Average total air content, percent (Plus or minus 1%):	5	5	4	4	3

120.03 Placing Concrete

Concrete shall be placed within 1 hour of the load ticket time stamp and before the initial set has occurred.

The concrete shall be compacted and worked in an approved manner into all corners and angles of the forms and around reinforcement and embedded fixtures in such a manner to prevent segregation of the coarse aggregate.

All concrete shall be placed with an aid of mechanical vibrating equipment supplemented by hand forking or spading. Vibration shall be transmitted directly to the concrete and not through the forms. The duration of vibration at any location in the forms shall be held to a minimum necessary to produce thorough compaction. The concrete shall be placed by suitable equipment as nearly as possible to its final location and without any segregation of the aggregate. Any free vertical drop shall not exceed 4-1/2 feet.

Expansion joints shall be placed as indicated on the plans. Joint material shall be installed as indicated and as approved by the Design Engineer. Construction joints shall be made only at locations indicated on the plans or approved by the Design Engineer, and in such manner as not to impair the strength, water-tightness or appearance of the structure.

120.04 Finishing

All top surfaces which are not covered by forms and which are not to be covered by additional concrete or backfill, shall be carried slightly above grade and struck off by board finish. All edges shall be provided with a 3/4 inch chamfer. All exposed surfaces which show board marks, joint marks or other irregularities after the forms are removed shall, at the discretion of the Design Engineer, be rubbed with carborundum brick, filled or otherwise dressed to produce a smooth true surface.

No special concrete or cement mortar topping course shall be used for slab finish unless shown on the drawings. The slab shall be brought to a true and even finish by power or hand floating. Unless otherwise specified, the surface shall be steel troweled to a smooth finish. Troweling shall be the minimum to obtain a smooth, dense surface and shall not be done until the mortar has hardened sufficiently to prevent excess fine material from being worked to the surface.

120.05 Curing

All concrete shall be kept wet by covering with water and approved water saturated covering, or other approved method which will keep all surfaces continuously wet for a period of seven (7) days, unless otherwise specified by the Design Engineer. All concrete shall be adequately protected from injurious action by the sun. Fresh concrete shall be protected from heavy rains, flowing water and mechanical injury. All concrete shall be kept damp for at least seven (7) days by covering with an approved saturated covering, by a system of perforated pipes or mechanical sprinklers, or by any other approved method which will keep all surfaces continuously damp.

Where wood forms are left in place during curing, they shall be kept wet at all times to prevent opening at the joints and drying out of the concrete. Water for curing shall be clean and entirely free from any elements which might cause staining or discoloration of the concrete.

120.06 Forms

Forms shall be of wood, metal, or other approved material shall be built true to line and grade, mortar tight, adequately braced and supported, and sufficiently rigid to prevent displacement or sagging.

Forms, except those lined with absorptive form lining, shall be coated with a non-staining mineral oil applied shortly before placing the concrete. In lieu of oiling, forms for unexposed surfaces may be thoroughly wetted immediately before placing the concrete.

Forms ties shall be of a design such that when forms are removed no metal shall be within 1 inch of the finished surface. Holes remaining from withdrawn tie rods or bolts shall be filled solid with cement mortar.

Under normal conditions, the minimum waiting period after placing concrete for stripping forms shall be as follows:

<u>Where Used</u>	<u>Time</u>
1. Bottom forms of girders and beams, floor slabs, and other concrete.	5 Days
2. Walls, piers, columns, sides of beams, and other vertical surfaces.	24-48 hours

The use of this schedule shall not operate to relieve the Contractor or the Design Engineer of responsibility for the safety of the structure.

120.07 Embedded Items

In addition to steel reinforcement, pipes, and other metal objects, as shown on the plans or ordered to be built into, or set in, or attached to the concrete, all necessary precautions shall be taken to prevent these objects being displaced, broken, or deformed. Before concrete is placed, care shall be taken to determine that any embedded or wood parts are firmly and securely fastened in place as indicated. They shall be thoroughly cleaned and free of paint or other coating, rust, scale, oil, or any foreign matter. The concrete shall be packed tightly around the pipes and other metal work to prevent leakage and to secure perfect adhesion. Drains shall be adequately protected from intrusion of concrete.

Concrete placing operations shall not begin until the reinforcing steel, utilities, anchor bolts, etc., to be embedded in concrete have been inspected and approved by the Design Engineer.

120.08 Reinforcing Steel

Reinforcing bars and mesh shall be sizes and shapes as indicated on the drawings. Bars shall be deformed bars of intermediate grade, new billet steel conforming with ASTM Designation A-615, Grade 60. Wire mesh shall conform with ASTM Designation A-I85.

120.09 Water Stops

Water stops shall be molded PVC, hollow center bulb, multiple ribbed as manufactured by W.R. Meadows, Inc., Electrovert, Inc. or Serviced Products Corporation, or approved equal.

120.10 Testing Services

Testing shall be performed by an independent commercial testing laboratory approved by the District. The Design Engineer shall furnish the District with copies of compression and slump test reports for every thirty (30) cubic yards or portion thereof of concrete placed. It shall be the responsibility of the Design Engineer to produce concrete of the strength, durability, workability and finish specified, furnish representative material for specimens in quantities required by the testing laboratory, and cooperate and assist in taking samples of materials for testing. The District reserves the right to take and test additional concrete samples.

END OF SECTION 120

SECTION 121

PRECAST MANHOLES AND STRUCTURES

121.01 General

Manholes and structures shall conform in shape, size, dimensions, materials and other respects to the Standard Details or as directed by the District's Engineer.

All manholes and structures shall be precast concrete with monolithic base sections. Invert channels may be formed in the concrete of the base or may be formed of brick and mortar upon the base.

All manholes which will receive direct force main discharges, or are at least 14-feet deep (rim to lowest invert) and the last collection manhole just upstream of any lift station shall receive a minimum 0.5-inch thick calcium aluminate corrosion barrier such as Sewper Coat, Strong Seal, Refratta HAC 100 or approved equal, and installed per the manufacturers recommendations.

The inverts shall conform accurately to the size of the adjoining pipes. Sides inverts shall be curved and main inverts (where direction changes) shall be laid out in smooth curves of the longest possible radius which is tangent to the centerlines of adjoining sewers.

Connections to existing structures shall be made only by mechanically coring a hole through the structure. Jackhammer and other methods of cutting a hole through an existing structure are not acceptable.

Rubber "boots" subject to District approval, will be allowed for making pipe connections to structures provided that a layer of non-shrink grout be applied to seal the annular space on the inside of the manhole for the full wall thickness. The boots shall be cast in the precast structure and shall utilize stainless steel bands and screws.

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121.02 Precast Concrete Sections

Precast concrete sections shall conform to the ASTM Specifications for Precast Reinforced Concrete Manhole Risers and Tops, Designation C-478 or ASTM C858 Standard Specification for Underground Precast Concrete Utility Structures with the following exceptions and additional requirements:

Type II cement shall be used in structures directly exposed to wastewater (i.e. manholes and wetwells).

Sections shall be steam cured and shall not be shipped until at least five (5) days after having been

cast.

Acceptance of the sections will be on the basis of material tests, finished quality, and inspection of the completed product.

Cones shall be 30" - concentric type

Joint material in riser sections shall be of the bitumastic type as manufactured by RAM-NEK or equal.

No more than two (2) lift holes may be cast or drilled in each section.

121.03 Shallow Manhole

When the depth from the deepest invert to the top of the cone section is 4'-0" or less, an approved shallow cone section with a 30" opening shall be used. In no case shall a flat slab top section be used.

121.04 Setting Precast Sections

Precast reinforced concrete sections shall be set so as to be vertical with sections in true alignment.

All holes in sections, used for their handling, shall be thoroughly plugged with mortar. The mortar shall be one part cement and 1-1/2 parts sand; mixed slightly damp to the touch (just short of "balling"); hammered into the holes until it is dense and an excess of paste appears on the surface; and then finished smooth and flush with the adjoining surfaces.

Anti-hydro grout shall be used to fill all voids around sanitary sewer pipe and manhole sections.

121.05 Mortar for Brick and Concrete Block Work

The mortar shall be composed of Portland cement, hydrated lime, and sand, in which the volume of sand shall not exceed three (3) times the sum of the volumes of cement and lime. The proportions of cement and lime shall be as directed and may vary from 1:1/4 for dense, hard burned brick to 1:3/4 for softer brick. In general, mortar for Grade SA brick shall be mixed in the proportions of 1:1/2:4-1/2.

Cement shall be Type II Portland cement as specified for under Concrete Masonry.

Hydrated lime shall be Type "S" conforming to the ASTM Standard Specification for Hydrated Lime for Masonry Purposes, Designation C207 - Latest Revision.

The sand shall be well graded clean, durable particles all of which shall pass a No. 8 sieve.

121.06 Laying Brick

Only clean, red, fire cured brick shall be used. The brick or block shall be moistened by suitable means, as directed, until they are neither so dry as to absorb water from the mortar, nor so wet as to be slippery when laid.

Each brick or block shall be laid in a full bed and joint of mortar without repairing subsequent grouting, flushing, or filling, and shall be thoroughly bonded as directed.

Brick shall only be used in chimney construction for final adjustment of frame and covers to required grade. Brick chimneys shall not exceed 18 inches in height for manholes 4-6 feet deep and 24 inches for manholes greater than 6 feet deep.

121.07 Plastering and Curing Brick

Outside faces of brick shall be plastered with mortar from 1/4 inch to 3/8 inch thick. If required, the brick shall be properly moistened prior to application of the mortar. The plaster shall be carefully spread and troweled so that all cracks are thoroughly worked out. After hardening, the plaster shall be carefully checked by being tapped for bond and soundness. Unbonded or unsound plaster shall be removed and replaced.

Brick and plaster shall be protected from too rapid drying by the use of burlaps kept moist, or by other approved means and shall be protected from the weather, all as required.

121.08 Frames and Covers

The castings for the frames and covers shall be of good quality, strong, tough, even grained cast iron, smooth, free from scale, lumps, blisters, sandholes and defects of every nature which render them unfit for the service for which they are intended.

All castings shall be thoroughly cleaned and subject to a careful hammer inspection.

Casting shall be at least Class 30 conforming to the ASTM Standard Specification for Gray Iron Castings, Designation A48- Latest Revision, and conform to the standard details.

The contact surface of the frame and cover seat shall be a machine fit and the cover surface shall be "knobbed".

Frame and covers shall be US Foundry Model 230 AB-M

121.09 Setting Frames and Covers

Frames shall be set with the tops conforming accurately to the grade of the pavement or finished

roadway surface, in unsurfaced areas the frames and covers shall be set 3 inches higher than the surrounding ground. Frames shall be set concentric with the top of the masonry and in a full bed of mortar so that the space between the top of the manhole masonry and the bottom flange of the frame shall be completely filled and made watertight. A thick ring of mortar extending to the outer edge of the masonry shall be placed around the bottom flange. The mortar shall be smoothly finished to be flush with the top of the flange and have a slight slope to shed water away from the frame.

Cover shall be left in place in the frames on completion of other work at the manholes.

121.10 Adjustment of Existing Manhole Frames

When it is necessary to raise existing manhole frames due to repaving of roads or other reasons, the frames shall be shimmed with masonry, brick and Type II cement mortar to the new finished grade, or in the case of sodded areas, 2" above finished grade. In cases where raising the existing frame and cover result in chimneys greater than 12" in height the District may require the conical section be raised installation of additional barrel section below the conical section.

When new paving operations cause the manhole frame to be adjusted upwards, manholes will be raised using conventional shimming methods under the frame. The use of adapter rings in the existing frame will not be permitted unless specifically authorized by the District.

END OF SECTION 121

SECTION 130

VALVES AND APPURTENANCES

130.01 General

All buried valves and appurtenances including exposed nuts, bolts, and retainer glands shall be given an exterior approved bitumastic or epoxy coating. All valves shall open counterclockwise. All valves shall have extension stems pinned to the operating nut with a stainless steel pin extension. Stems will not be required where the valve operation nut is less than 30" from finished grade.

Contractors must supply LRD with shop drawings clearly indicating that the criterion for each type of valve or appurtenance listed in this section is satisfied.

130.02 Plug Valves

All mechanical joint and flanged plug valves shall be of the nonlubricated eccentric type. Valves shall be rated for not less than 125 psi pressure differential acting in either direction (bi-directional). At this differential, the valve shall provide drip tight shutoff. All components shall be of corrosion resistant construction. Valve flanges shall be ANSI B16.1, class 125 pound with a full round or other acceptable type port to assure minimum turbulence and minimum pressure drop. Valve bodies shall be of ductile iron and seats shall be of nickel-alloy. Valves are to have a balance plug, coated with a resilient material solidly bonded to a cast iron or semi-steel core, as required, to assure low torque and bubble-tight shutoff. The valve plug shall touch on the seat when in the closed position.

Plug valve port areas shall be at least 100% through 24 inches in diameter. For plug valves 30" and larger, a port area of at least 75% is required.

Buried plug valves shall be installed vertically with non-rising stems and shall open by turning a two inch square operating nut counterclockwise. An arrow shall be cast into the nut skirt to indicate the open direction.

Plug valves shall be as manufactured by DeZurik Corporation, Milliken, Keystone Valve Manufacturing Company (Ballcentric Type), or approved equal.

130.03 Resilient Seat Gate Valves

Gate valves shall be resilient seated, manufactured to meet or exceed the requirements of AWWA C509 or C515, Latest Revision, and in accordance with the following specifications. Valves shall have an unobstructed waterway canal equal to or greater than the full nominal diameter of the valve.

The valves are to be non-rising stem with the stem made of cast, forged, or rolled bronze as shown in AWWA C509. Two stem seals shall be provided and shall be of the O-ring type, one above and one below the thrust collar. A 2-inch square operating nut shall be provided for operating the valve. The stem nut, also made of bronze, may be independent of the gate or cast integrally with the gate. If the stem nut is cast integrally, the threads shall be straight and true with the axis of the stem to avoid binding during the opening or closing cycle.

The valve body, bonnet, and bonnet cover shall be ductile iron. All ferrous surfaces inside the valve body shall have a fusion bonded epoxy coating applied at the valve manufacturer's facilities. The coating shall meet or exceed all requirements of AWWA C550. All bolts, nuts and washers shall be stainless steel to limit exterior corrosion and maintain fastener strength.

The sealing mechanism shall consist of a cast iron or ductile iron gate having a vulcanized Buna-N or SBR synthetic rubber coating or a Buna-N rubber seat mechanically retained on the gate. The resilient sealing mechanism shall provide zero leakage at 250-psi working pressure. All valves shall have pressure tests performed to the requirements of AWWA C509 or C515 specifications, as applicable, prior to shipment from the manufacturer. Valve shall seat and be drip-tight at the working pressure when installed with the line flow in either direction.

All valves are to be tested in strict accordance with AWWA C509. Resilient seat gate valves shall be as manufactured by Mueller, Metro-Series, American Darling or approved equal.

Valves shall be covered by a Manufacturer's 10 year limited warranty from date of purchase by end user and delivered within 30 days from receipt of purchase order. The supplier will also provide laminated maintenance manuals.

130.04 Swing Check Valves

Swing check valves for sewage, sludge, and general service shall be in accordance with AWWA C 508, unless otherwise specified below, full-opening; designed for a working pressure of 150 psi unless otherwise shown, and shall have a flanged cover piece to provide access to the disc. Corrosive ferrous surface of valves, 4-inch and larger, which will be in contact with water, shall receive a fusion-bonded epoxy coating conforming to AWWA C550. The valve body and cover shall be of cast iron to ASTM A126, with flanged ends to ANSI B16.1, or mechanical joint ends, as shown.

The valve disc shall be of cast iron, ductile iron, or bronze to ASTM B 62. The valve seat and rings shall be of bronze to ASTM B 92 or B 148, or stainless steel. The hinge pin shall be of bronze or stainless steel.

Suppliers or Equal:

American-Darling Valve Co.

APCO (Valve and Primer Corp.)

Crane Company

Mueller Co.

The valves shall have a lever and counterweight and shall be suitable for horizontal or vertical mounting.

130.05 Air Release, Air Vacuum Valves, and Combination Type Valves

The air release and air vacuum valves shall be of the type especially designed for forced sewer systems. The valve shall be of the short body type and capable of releasing air, gas, or vapor under pressure during system operation or allow air to enter the system when the system is draining, as applicable. The valve shall be as shown on the Standard Details with a two inch inlet. The venting orifice shall be sized by the Design Engineer based on a working pressure of 75 psi.

It shall be the responsibility of the design engineer to determine which valve is necessary for the pipeline conditions encountered.

Air release and air vacuum valves shall be ARI D-025 (See Standard Details).

130.06 Ball Valves

Ball valves shall be limited to 3/4" through 2-1/2" in size and shall have cast brass, bronze or stainless steel body, bronze tee head, stem with check, full round way opening and provision for locking in a closed position.

Ball valves can be used for force main and low pressure sewer applications up to 2-1/2" in diameter. The primary use in force main applications is for ARV isolation valve use (See Standard Details).

Valves shall be designed to be fully opened with a 90-degree turn of the operating handle and shall be full port design with bi-directional sealing rated for a minimum 150 psi working pressure.

Brass ball valves in the low pressure system valve shall be as manufactured by Ford, with NPT or pack joint ends as needed.

Where these valves are direct buried, a 2" square gate valve operating nut shall be included with a valve box.

130.07 Brass Check Valves

Brass check valves shall be Proflo PFX31 size 1-1/2" to 2".

130.08 Valve Boxes and Vaults

All buried valves shall be equipped with a valve box. Valve boxes shall be heavy duty construction for traffic loading type, cast iron, three piece, slide type, or screw type with drop covers. The valve boxes shall be adjustable to six inches up or down from the nominal required cover of the pipe.

A number six base section shall be provided. Minimum shaft diameter shall be 5-1/4 inches and minimum metal thickness shall be 3/16 inch. Boxes shall be coated with an approved bitumastic or epoxy coating. Valve box covers shall have the word "SEWER" or "REUSE" cast thereon depending on the application. Swing check valves shall be installed in an approved suitable vault for easy access by the District maintenance staff.

Valve boxes shall be installed on firmly compacted material at a level approximately equal to the elevation of the valve packing plate. No contact between the valve and the box shall be permitted. On plug valves, the positioner on the operating mechanism shall be kept free of rocks, debris, etc.

Where valves are installed with over six feet of cover, or where the ground water table is within three feet of the ground level, an extension stem shall be provided to bring an operating nut within two feet of the finished grade. This extension, stem shall be satisfactorily pinned to the valve operation nut to prevent dislodging during operation of the valve.

END OF SECTION 130

SECTION 140

PIPELINE INTEGRITY TESTS

140.01 General

The District shall inspect all sewer facilities prior to acceptance and again just prior to the expiration of the 1-year guarantee.

When a section of pipe of a length deemed adequate by the Design Engineer is ready for testing, the pipe shall be flushed and then tested in accordance with the applicable testing method as described herein. Suitable temporary testing plugs or caps shall be installed. All necessary pressure pumps, pipe connections, meters, gauges, water, weirs, bulkheads, and other necessary equipment and all labor required for carrying out these tests shall be furnished. The Design Engineer shall notify the District at least 48 hours prior to any testing so that it may, at its option, have a representative present during the testing.

Gravity sewers shall be tested in accordance with the Hydraulic Infiltration/Exfiltration Test as described herein. Additionally, PVC Gravity sewers shall be tested for deflection as described herein. Force mains shall be tested in accordance with the Pressure and Leakage Test for Force Mains as described herein.

If the District Engineer so desires, the first section of any line between two manholes shall be tested as soon as possible after backfilling has been completed. If such tests appear to be satisfactory and acceptable, progressive testing of completed sections of the lines may be deferred at the option of the District's Engineer, and at the request of the Contractor, until all pipe has been laid and before final acceptance. However, if permitted, this will not constitute a waiver of any of the tests or the leakage requirements.

Sections of pipe tested for infiltration and exfiltration prior to completion of the project shall be subject to a final inspection at completion of the project, and also subject to additional leakage tests, if warranted in the opinion of the District Engineer.

If the section fails to pass the applicable tests, the Contractor shall locate, uncover and repair or replace the defective pipe, fitting or joint, at his own expense. Additional testing will be required after the deficiency is corrected.

140.02 Hydraulic Infiltration/Exfiltration Tests

Upon completion of a section of the sewer, the pipe shall be dewatered and tested to measure the infiltration for at least three (3) consecutive days. Test section shall be from manhole to manhole. Longer test sections may be used with the approval of the District Engineer.

For making the infiltration tests, underdrains, if used, shall be plugged, well points and other groundwater drainage shall be stopped to permit the groundwater to return to its normal level. Infiltration shall be measured by the use of weirs designed specifically for this purpose or other acceptable means approved by the District Engineer.

As required, suitable bulkheads shall be installed to permit the test of the sewer.

Where the crown of the pipe is below the natural groundwater table at the time and place of testing, the pipe shall be tested for infiltration. Suitable watertight plugs shall be installed and section of pipe to be tested shall be pumped dry before start of test. Where the crown of the pipe is above the natural water table, the pipe shall be tested for exfiltration by installing necessary plugs and filling pipes and manholes with water and maintaining a static head of water of a minimum of two feet above the crown of the pipe during the test. Exfiltration tests shall be conducted on main lines and lateral lines, unless waived by the District Engineer. The water level of internal pressure to be used for exfiltration test shall be determined by the Design Engineer.

The sewers shall pass the applicable test before any connections are made to buildings or to active sewers.

The maximum allowed infiltration/exfiltration shall not exceed 25 gallons per inch of diameter per mile per 24 hours for pipe lines and 4 gallons per 24 hours for manholes. Once systems are stabilized a 2 hour test shall be performed and the appropriate fraction of maximum allowed infiltration/exfiltration applied.

140.03 Pressure and Leakage Test for Force Mains (HDPE)

After fusing, prior to placement, the HDPE piping shall be filled with potable water and pressure tested at 100 psi or 1.5 times design operating pressure for 2 hours, whichever is greater. Each joint shall be visibly inspected for leakage at the end of 2 hours. Any sections showing visible leakage shall be cut out and the remaining pipe fused together and retested. After placement the HDPE pipe shall be pressurized to a minimum 1.65 times pipeline design pressure for 4 hours, with make up water added as necessary to maintain 1.65 times pipeline design pressure. At the end of 4 hours, pressure is reduced to 1.5 times design pressure and pressure monitored for 1 hour. Deviation in pressure > 5% during the 1 hour test indicate a failed test. All testing shall be in compliance with ASTM F2164.

140.04 Pressure and Leakage Test for Force Mains (PVC and DI)

Except as otherwise directed by the District, all pipelines shall be given combined pressure and leakage tests in sections of length approved by the District's Engineer. The Contractor shall furnish and install suitable temporary plugs or caps; all necessary pressure pumps, pipe connections, meters, gauges, and other necessary equipment; and all labor required. The Design Engineer shall witness all tests.

Subject to approval of the Design Engineer and provided that the tests are made within a reasonable time considering the progress of the project as a whole, and the need to put the section into service, the Contractor may make the tests when he desires.

The section of pipe to be tested shall be filled with water of approved quality and all air shall be expelled from the pipe.

The section under test shall be maintained full of water for a period of 24 hours prior to the combined pressure and leakage test being applied.

Two pressure and leakage tests shall be conducted for each pipeline segment. The first test shall be conducted at the average working pressure of the pipeline segment. The second test shall be conducted at a test pressure of 100 pounds per square inch or 1.5 times the pipeline design operating pressure, whichever is greater.

The pressure and leakage test shall consist of first raising the water pressure (based on the elevation of the lowest point of the section under test and corrected to the gauge location) to the specified pressure. If the Contractor cannot achieve the specified pressure and maintain it for a period of one hour with no loss of pressure and no additional pumping, the section shall be considered as having failed to pass the pressure test. The District may require that the pressure and leakage test be run in accordance with AWWA C-600 Standards, latest revision (Four Hour Test).

Allowable leakage shall not exceed the following where L = allowable leakage (gallons), N = number of joints, D = nominal diameter of pipe (inches), P = average test pressure (psi).

$$L = \frac{ND\sqrt{P}}{7400}$$

140.05 Pressure and Leakage Test for Low Pressure Force Mains

Low pressure force mains shall be filled with potable water, bled of air and pressurized to 70 psi. Pressure shall be maintained constant for 1 hour without adding water. Any loss of pressure indicates a failed test.

140.06 Deflection Testing

Pipe deflection shall not exceed 5% measured by a go/no-go gauge or mandrel. The District may confirm the pipe deflection at the end of the job prior to acceptance. Additionally, the District may confirm the pipe deflection just prior to end of the one year guarantee period. Pipe sections exceeding 5% long term deflection will be relaid by the Contractor or the Developer at his own cost and expense and retested until the District's go/no-go gauge passes through the pipe section.

The District's mandrel will be considered the "official" gauge used for deflection testing. The standard District gauge is manufactured by "HURCO" Technologies, Inc., Harrisburg, S.D. The outside diameter of the District's mandrel is as follows:

Pipe Diameter (Inches)	Mandrel Diameter (Inches)
8	7.28
10	9.08
12	10.79

END OF SECTION 140

SECTION 150

SUBMERSIBLE LIFT STATIONS

150.01 Scope

It is the intent of this standard is to provide component requirements and general design guidelines for submersible wastewater lift stations. This standard shall be used in conjunction with Standard Details SD-31 through 35 and referenced standards for complete submersible wastewater lift station requirements.

This specification typically defines requirements for 20HP and smaller lift stations. Lift stations greater than 20 HP, serving critical infrastructure or performing as a repump station may require alternate design criteria including variable speed, tri-plex configuration, permanent standby emergency power and PLC control. These additional design criteria will be defined by Engineering Services during the design.

150.02 Site

Lift station sites shall be provided with a minimum 40' x 40 lift station easement. Variations on the easement shall be considered on a case by case basis where access, maintenance and bypass operations can be accommodated with alternate configurations acceptable to the District and approved by Engineering Services.

The lift station site and access shall be set at proper elevations and configurations such that access and maintenance to the station will not be impaired by flooding, excessive road grades, swales, walls or landscaping. A lift station site plan indicating all topographical features, rights-of-way, easements and adjoining contiguous areas shall be submitted to the District for approval.

All above or at grade facilities shall be above the 1% Annual Chance Flood (100-year flood) zone, as shown on Flood Insurance Rate Maps (FIRMs). Site and lift station plans shall include the 100-year flood elevation.

150.03 Power

The Contractor shall coordinate with and pay all fees, deposits, and service costs to Florida Power and Light Corp. to provide a three phase, 480V or 240V underground power service to the new lift station site. The transformer for the station shall be located not further than 25 feet from the nearest station easement line.

The power meter for the lift station shall be located on the lift station site, installed on the District's standard control panel rack.

150.04 Lift Station Standard Equipment

A list of standard lift station equipment is given below. This list is not all inclusive and the Contractor shall supply all other equipment necessary for complete working installations. The lift station shall include:

Two (2) explosion proof submersible type sewage pumps with 316 stainless steel guide rails, base plates and all accessories.

Two (2) discharge lines with swing check valves and plug valves and emergency tap connection

Instrumentation/control system, (requirements vary on station size)..

One (1) electrical control panel, NEMA 4X, to house electrical equipment, pump controls, alarms and protection.

One (1) wet well.

One (1) valve vault.

Concrete covers with aluminum access hatches and safety grates

Influent drop assemblies

Permanent standby generator and ATS, (requirements vary on station size).

Radio or Cellular Telemetry System

Coatings

Concrete pads

Landscaping/site screening

The wet well structure shall receive a minimum 1.0-inch thick calcium aluminate corrosion barrier such as Sewper Coat, Strong Seal, Refratta HAC 100 or approved equal, and installed per the manufacturers recommendations.

One (1) influent (collection) manhole structure with piping connecting to the wet well structure. The distance between the collection manhole and the wet well shall be no more than 50 feet.

The pumps shall be capable of handling grit and raw unscreened sewage. The design shall be such that the pump unit will be automatically and firmly connected to the discharge piping when lowered into place on its mating discharge connection, permanently installed in the wet well. The pump shall be easily removable for inspection or service requiring no bolts, nuts, or other fastenings to be disconnected.

All major parts, such as the stator casing, oil casing, sliding bracket, volute, and impeller shall be of gray iron. All surfaces coming into contact with sewage shall be protected by a coating resistant to sewage. All exposed bolts and nuts shall be of stainless steel.

Pump faces shall be machined to accept a sacrificial plate between the pump face and seat. The sacrificial plate shall be manufactured from 1/4" brass plate, bolted to the pump face and removable/replaceable.

A wear ring system shall be installed to provide efficient sealing between the volute and impeller.

The impeller shall be hard alloy gray cast iron of non-clogging design capable of handling solids, fibrous material, heavy sludge, and other matter found in normal sewage applications. The impeller shall be constructed with a long throughout without acute turns. The impeller shall be dynamically balanced. The impeller shall be a slip fit to the shaft and key driven. Non-corroding fasteners shall be used.

Each pump shall be provided with a mechanical rotating shaft seal system running in an oil reservoir having separate, constantly hydro-dynamically lubricated and lapped seal faces.

The lower seal unit between the pump and oil chamber shall contain one stationary and one positively driven rotating tungsten-carbide ring.

The upper seal unit between the oil pump and motor housing shall contain one stationary tungsten-carbide ring and one positively driven rotating carbon ring. Each interface shall be held in contact by its own spring system supplemented by external liquid pressures. The seals shall be easily inspected and replaceable.

The shaft sealing system shall be capable of operating submerged to depths of, or pressure equivalent to, 65 feet. No seal damage shall result from operating the pumping unit out of its liquid environment. The seal system shall not rely upon the pumped media for lubrication.

A sliding guide bracket shall be an integral part of the pump unit. The volute casing shall have a machined discharge flange to automatically and firmly connect with the cast iron discharge connection, which when bolted to the floor of the sump and discharge line, will receive the pump discharge connection flange without the need of adjustment, fasteners, clamps or similar devices.

Installation of the pump unit to the discharge connection shall be the result of a simple linear downward motion of the pump unit guided by no less than two guide bars. No other motion of the pump unit, such as tilting or rotating, shall be acceptable. Sealing of the discharge interface by means of a diaphragm, O-ring, or other device will not be considered acceptable or equal to a metal to metal contact of the pump discharge flange and mating discharge connection specified and required. No portion of the pump unit shall bear directly on the floor of the wet well. There shall be no more than a 90-degree bend allowed between the volute discharge flanges and station piping.

The pump motor shall be housed in an air or oil filled watertight casing and shall have moisture resistant Class "F" 155-degree C insulation. Oil filled casing shall be filled with transformer oil, quality BP Energol JSO, or Shell Diala D or DX. The motor shall be a minimum of 5 BHP, rated for operation at 1700 or 1750 rpm, on a 230V, 3-phase, 60 hertz power supply. The cable entry water seal design shall be such that precludes specific torque requirements to insure a watertight and submersible seal. Epoxies, silicones or other secondary sealing systems shall not be required or used. The cable entry junction box and motor shall be separated by a stator lead sealing gland or terminal board which shall isolate the motor interior from foreign materials gaining access through the pump top.

Pump motor cable installed shall be suitable for submersible pump applications and this shall be indicated by a code or legend permanently marked on the cable. Cable sizing shall conform to NEC specifications for pump motors and shall be of adequate size for the motor rating. Pump motor cable shall be ample length to reach the rack mounted panel. Cable length to be determined by the site plans.

The pump cable shall have 90 degree C rated insulated material based on 40 degree ambient and shall have anti-ropeing and anti-wicking design. All mating surfaces of major parts shall be machined and fitted with nitrile O-rings where watertight sealing is required. Machining and fittings shall be such that sealing is accomplished by automatic compression in two planes and O-ring contact made on four surfaces, without the requirement of specific torque to affect this. Rectangular cross sectioned gaskets requiring specific torque limits to achieve compression shall not be considered adequate.

Tolerances of all parts shall be such that allows replacement of any parts without additional machining required to insure sealing as described above. No secondary sealing compounds, greases, or other devices shall be used.

Each unit shall be provided with an adequately designed cooling system. Thermal radiators integral to the stator housing, cast in on unit, are acceptable. Where water jackets along or in conjunction with radiators are used, separate circulation shall be provided. Cooling media channels and ports shall be no-clogging by virtue of their dimensions. Provisions for external cooling and flushing shall be provided.

Pump and motor assemblies shall meet NEC and NFPA requirements for explosion proof installations in Class 1, Division 1, Group D environments.

The pumps and motors shall be manufactured by FLYGT Corporation.

150.06 Control Panel

This section is specific to single speed, duplex lift stations with float control, for variable speed, PLC controlled stations see Section 161.

The Contractor shall furnish and install a heavy duty type District Standard control panel as shown on the plans and specified here, as manufactured by Sta-Con Incorporated, QCI, or approved equal, and in accordance with the detail sheets SD-31 through 35.

The control panel shall contain all the remote electrical equipment necessary to provide for the operation of the pumps. The panel shall start and stop the pumps in the wet well.

The control panel shall start the “lead” pump when the liquid level rises to a preselected elevation “D”. If the influent rate exceeds the capacity of the “lead” pump, the lag pump shall be started when the liquid level rises to a preselected elevation “C” (higher than “D”). If the liquid level rises to a preselected elevation “B” (higher than “C”), the high level alarm shall be activated. When the liquid level falls to a persecuted elevation “E” (lower than “D”), both pumps shall be stopped.

The control panel shall be contained in a single enclosure, fabricated of not less than 14-gauge 316 stainless steel, NEMA 4X construction. The door shall be formed with minimum lip of 3/4” and full height hinged. Closure mechanisms shall be No. 3 S.S. fasteners with No. 3 keepers as manufactured by Simmons Fasteners, or approved equal.

The interior door shall be constructed of .080-inch thick 6061-T6 aluminum. The interior and exterior doors shall be provided with a stop mechanism to hold the doors open which working in the panel. A rain shield shall be provided.

The control panel shall include the following items plus any other items shown on the plans or required for a complete, operational installation.

Circuit breakers with combination full voltage motor Starters for each pump.

“Hand-Off-Auto” selector switch for each pump, heavy duty oil tight type (toggle switches will not be acceptable).

Automatic pump alternator with test switch.

Duplex receptacle with 15-amp circuit breaker 115V GFI.

Control power circuit breaker.

Main circuit breaker.

Emergency power minimum 100-amp circuit breaker and 100-amp, 4 wire, 3 pole, reverse service generator receptacle. Emergency power to match main breaker size.

Lightning arrestor, 3-phase.

Surge capacitor.

Phase monitor, to prevent energization of pump motors in the event of phase failure or reversal or low voltage.

Indicating light for each level regulator (float switch).

“Running” indicating light for each pump.

Elapsed time meter for each pump, 2-1/2”, 6-digit non-reset.

Emergency/High level alarm light and horn, 12 VDC with battery back-up.

The panel shall include back-up circuitry to permit one pump to operate with a normal drawdown in the event of failure (open circuit) of the “stop” level regulator.

Spare parts to be furnished with the panel include:

- 2 - 120V Relays
- 1 - Alternator
- 1 - Phase Monitor
- 12 - Lamps
- 12 - Fuse Links
- 1 – Intrinsically Safe Barrier
- 1 – Alarm Controller

A copy of the panel wiring diagram shall be attached to the inside of the outer panel door. An extra copy shall be given to the District.

The basic components and layout of the control panel are shown on Standard Details 31, 32, 33 and 34.

Substitutions of these components will be permitted for approved equal, interchangeable products upon obtaining specific written approval from the District.

150.07 Telemetry

Lift stations shall be provided with a District standard radio telemetry system by Data Flow Systems. Telemetry systems shall provide monitoring and control for the following signals:

1. Digital
 - a. Power Fail
 - b. High Level
 - c. Pump # 1 Fail
 - d. Pump # 2 Fail
 - e. Pump Run # 1
 - f. Pump Run # 2
 - g. Spare
 - h. Spare
 - i. Generator General Alarm (Permanent Standby Generator Stations Only)
 - j. Generator Low Coolant (Permanent Standby Generator Stations Only)
 - k. Generator Low Fuel (Permanent Standby Generator Stations Only)
 - l. Generator Fail to Start (Permanent Standby Generator Stations Only)
2. Analog
 - a. Wet Well Level
 - b. Spare
 - c. Spare

An alternative cellular telemetry system may be available. Coordinate with the District's Director of Engineering Services for specifics.

150.08 Access Hatches & Fall Through Safety Prevention Systems

The wetwell and valve vault access hatch shall be single leaf design with a minimum clear opening at 36" x 48", but must also meet the minimum clear opening as required by the pump manufacturer. The frame shall be a minimum: 3" x 3" x 1/4" aluminum angles and the cover shall be 1/4" aluminum angles and the cover shall be 1/4" aluminum diamond pattern. The hatch shall be completed with anchor straps, automatic hold open arm and cover release, forged brass or stainless steel hinges with stainless steel pins, hasp and staple lock, flush type handles, upper guide holders and sensor cable holder. The cover shall be reinforced to withstand a live load of 300 lbs./sq. ft. unless in areas that may experience traffic. Hatches in traffic areas shall meet H-20 design loading criteria, at a minimum. Hinges shall be of the interior type.

All stations 6' in diameter or larger, shall be provided with fall through safety prevention systems. All systems will be of the grate type as manufactured by U.S.F. Fabrication, Inc., or approved equal able to withstand a pedestrian load of 300 lbs/sq. ft.. The safety grate shall be constructed of aluminum. All hardware must be of 316 stainless steel.

The configuration of the hatch and safety grate shall be such that opposing sides of the wetwell opening are protected when the safety grate is in the upright position. Safety chains shall be provided from the safety grate to the hatch to protect adjacent sides.

10' diameter and larger wetwells and tri-plex stations will require custom hatch and safety grate designs to be determined in coordination with the District's Engineering Services.

150.09 Floats

Float switches with internal single pole mercury switch shall be installed in the wet well to control the operation of the pumps with variations of liquid level in the wet well. The float switches shall be sealed in a polypropylene casing with a firmly bonded electrical cable protruding. Floats shall be Roto-Float type S as manufactured by Anchor Scientific Inc..

150.10 Wetwell Level Sensor

See Section 180

150.11 Valves

See Section 130



150.12 Pipe and Fittings

See Section 110 for pipe and fittings.

150.13 Wetwell and Valve Vault

See Section 121 and standard details SD-31

150.14 Wet Well via Caisson Construction

Wet wells installed via the caisson method are allowed only with prior approval by the Loxahatchee River District. Final acceptance of the wet well by caisson method will only occur when it is determined that:

- Wet well has no structural damage, deep gouges and and/or cracks.
- Wet well has been installed at the design depths indicated.
- Wet well is plumb. The maximum deviation shall be 1/8" per foot of each precast section.
- Wet well tremie seal is leak free and there are no continually damp areas prior to the installation of the secondary pour.
- Wet well sections show no evidence of separation and that the structure has not settled.
- Wet well walls, specifically at the joints, are flush and without overhang.

- Wet well was installed in proper sequence.

If any of the above items are not met to the satisfaction of the District, the wet well will be rejected and it will be the contractor's responsibility to remedy the problem at his own expense. The contractor shall also provide a warrantee that the wet well will meet the above requirements for a 1-year period from the date of District acceptance.

150.15 Submittals

The following submittals are required for approval prior to construction of the project.

1. Lift Station Calculations to include
 - a. Average Daily Flow
 - b. Peak Hour Flow
 - c. System Head Curves
 - d. Wetwell Cycle Time
 - e. Anti-Flotation
2. Lift Station Site Plan
3. Pump and Motor
4. Pipe and Fittings
5. Valves
6. Concrete Structures
7. Control Panel – complete detailed design including electrical schematic, panel layout, bill of materials
8. Panel Rack
9. Base Plates
10. Rails, Brackets and Adapters
11. Conduit and Cable
12. Aluminum Hatches and Safety Grates

Detailed wiring diagrams of the entire installation including main power supply, pump motors, control circuits, alarm circuits, and metering circuits shall be submitted. The diagrams shall include schematic and connection wiring diagrams.

Four (4) copies of detailed installation drawings including wiring diagrams, pump curves and maintenance and operating manuals shall be submitted to the District at the time of initial start-up.

150.16 Services to be Furnished by Manufacturer of Equipment

The services of a factory-trained representative shall be furnished for the lift station start-up. The representative shall check all electrical components, wiring, and pump operations.

150.17 Operation and Maintenance

Upon completion and successful startup of the lift station the District will be provided with two copies of the lift station operation and maintenance manual. The manual shall include operation and maintenance detail including service intervals for all equipment provided with the lift station. Operation and maintenance manuals shall also include AS-BUILT drawings for the lift station, control panel, wiring schematics and appurtenances.

150.18 Warranty

The pump manufacturer shall warrant the pumps for a period of five (5) years from the date of pump manufacturer's start-up. The warranty shall include a minimum 100% coverage of the manufacturer's shop labor and parts for the first eighteen months, then 50% coverage through the third year, and then 25% coverage through the fifth year.

END OF SECTION 150

SECTION 180

INSTRUMENTATION

180.01 General

Instrumentation as described in this specification and shown in the drawings shall be provided.

Instrumentation shall be incorporated into the design requirements of the Contractor utilizing the equipment and materials included in this specification.

All electrical components of the system shall operate on 120 volt, single-phase, 60 hertz or 24 VDC power, except as otherwise noted in the specifications.

All electrical components located within the wetwell and the wetwell side of any sealed conduit fitting shall be Intrinsically Safe.

All necessary fuses or switches required by the instrumentation manufacturer for his equipment shall be provided with the equipment.

180.02 Submittals

Detailed design drawings including product specification sheets, mounting hardware, location, conduit, cable and tag numbers shall be provided.

180.03 Cable

All electronic (4-20MADC) signal wire shall be two conductors, copper, twisted pair with tape foil shield and drain wire. The shield is to be grounded at the PLC I/O panel only for single point grounding, in accordance with manufacturer's instructions. Single triad shielded cables for potentiometer signal cables shall be three conductors, copper, twisted triad with tape foil shield and drain wire. The cables must be UL listed for wet locations as defined by the NEC.

180.04 Instrument Mounts

All instruments shall be mounted in readily accessible positions that do not require entry into the wetwell for removal or maintenance. Brackets shall be fabricated to hold instruments. All brackets shall be 304 or 316 stainless steel. All mounting hardware, screws, machine bolts with washers and nuts shall be 316 stainless steel.

180.05 Conduits

All low voltage signals shall be isolated from high level control or power signals in separate conduits. All instrumentation signal conduits below grade shall be SCH80 PVC or 304 stainless steel. All underground conduits shall have grounding bushings and a No. 8 AWG copper minimum cable run to a ground lug at the termination points.

180.06 Lightning/Surge Protection

All transmitters with 4-20 MADC outputs shall have a transmitter mounted surge protection unit. The surge protection unit shall be a EDCO SS65 or approved equal.

180.07 Intrinsically Safe Pressure Transducer/Wetwell Level Sensor

Pressure transducers/wetwell level sensors shall be intrinsically safe and encased in a 316 stainless steel housing.

1. Range: 0 – 15 PSI
2. Cable: Minimum 50'
3. Output: 4 – 20 mA
4. Accuracy: +/-5%

Probes shall be Wika Instruments, LP Model LS10 with LevelGuard Anti-clog attachment or equal.

Level sensing submersible probes shall be installed in a stilling well. The stilling well shall be minimum 6" SCH 40 PVC secured to the wetwell every 7 feet with stainless steel brackets and hardware. The stilling well and probe shall be accessible from the wetwell hatch, not requiring an entry into the wetwell for maintenance or replacement of the probe.

180.08 Intrinsically Safe Pressure Transmitter

Pressure transmitters shall be intrinsically safe, backlit and mounted in the power and control panel dead-front.

1. Display: 5 Digit
2. Input: 24 VDC
3. Output: 4 – 20 mA
4. Accuracy: +/- 0.03%

Pressure transmitters shall be Precision Digital model 688 or approved equal.

180.09 Power Supplies

All instruments shall be looped powered with an appropriately rated power supply. Each instrument shall have a dedicated power supply.

180.10 Field Calibration and Testing

All instruments shall be set up, calibrated and tested in the field. The Contractor shall provide calibration sheets and testing equipment for each instrument. When installation is complete all components shall be tested to confirm operation and compliance with the contract.

180.11 Installation

All equipment shall be installed per the manufacturers requirements.

END OF SECTION 180

SECTION 181

PROGRAMMABLE LOGIC CONTROLLERS

169.01 General

This section describes the hardware and software requirements for a new Programmable Logic Controller (PLC) for a duplex or tri-plex lift submersible wastewater lift station with adjustable frequency drives, level control, emergency standby power, DFS radio telemetry unit (or) Cellular telemetry unit and appurtenances.

This section provides all labor and material required for the PLC system including the panels, equipment, software, screen development, programming, conduit, cable, tie-ins, checkout and start-up of the complete integrated system. This section shall be used in conjunction with the approved drawings and Section 161, Variable Speed/PLC Control Panels.

The latest version available at the time of installation of all PLC development software and communication driver software shall be provided.

All software and programming shall be required to perform the following functions in addition to the interlocking, monitoring and control functions indicated on the loop diagram drawings and developed in the PLC logic and OWS screen development meetings.

All enclosures shall be UL listed and NEMA rated to house the PLC, remote I/O, power supplies, and terminal blocks as shown in the drawings.

All panels shall be UL listed and labeled as a completed assembly. The panel fabricator shall furnish and install all items not specifically detailed in the drawings required to have the panels UL listed and labeled. All inspections, approvals and modifications required to have the completed panel labeled and listed by UL shall be furnished by, and the responsibility of the panel fabricator.

169.02 Applicable Standards

NEC
NEMA
UL
IEC

Temperature	IEC60068:
Relative Humidity	IEC60068:
Vibration	IEC 60068
Shock	IEC 60068
Emissions	IEC61000
ESD Immunity	IEC 61000
Radiated RF Immunity	IEC61000

EFT/B Immunity	IEC61000
Surge Immunity	IEC61000
Conducted RF Immunity	IEC61000

169.03 Operation and Maintenance Manuals

All products shall be provided with operation and maintenance manuals complete with installation, troubleshooting and technical information on the equipment provided under this contract. Manuals shall be published by the equipment manufacturer.

169.04 Training

Training and instruction shall be given by the manufacturer or representative. Training shall be 4-hours for personnel selected by the Owner in the operation and general maintenance of the PLC. This training is independent of operator training for lift station observation and operation associated with automated controls.

169.05 Submittals

Submittals shall include installation drawings and manufacturer cutsheets clearly defining the products to be provided, their accessories/options and interconnectivity with all systems. Drawings shall also include single line system diagrams and detailed line diagrams for power, input/output and tag numbers.

169.06 Spare Parts

- A. One CPU
- B. One of each Network Module
- C. One of each type of input/output and data link module
- D. One of each type of power supply

169.07 Programmable Logic Controller

1. Approved Manufacturer

The PLC system shall be a Rockwell Automation 1756 ControlLogix L7**** .

2. General

The PLC system (memory, communications, input/output modules, processor, power supplies, software) shall be a modular chassis mounted system and come complete from one manufacturer to provide a complete functioning control system as depicted in the Control Block Diagram and described in the operating protocol and of sufficient capacity for future expansion as allowed for in this specification.

Products shall be provided with conformal coatings, factory applied, to extend product life in harsh, corrosive environments.

The PLC shall be programmable and configurable from a Windows 7 and Windows 10

3. Communication

The PLC system shall be Ethernet compatible or have an Ethernet module accessible by a laptop computer. Programming functions associated with the PLC system shall be accessible through the Ethernet connection.

The PLC shall have a compatible communication modules or ports for communicating with the emergency standby generator controller exclusive of input/output modules and dry contacts. This communication port shall allow for sharing of all monitoring and alarm data associated with the emergency generator controller.

4. Input/Output Modules

The PLC shall have analog and discrete input/output modules sufficient for all proposed and future nodes identified in the control block diagram associated with the DFS Radio Telemetry System.

The PLC shall have analog and discrete input/output modules sufficient for all proposed generator status and generator fail signals.

The PLC shall have analog and discrete input/output modules sufficient for all proposed ATS, commercial, generator power signals.

The PLC shall have analog and discrete input/output modules sufficient for variable speed pump control based on level. PLC control and monitoring of variable speed drives shall be through analog and discrete input/output modules. The use of proprietary communication protocols for variable speed drive control shall be allowed.

The PLC shall have the ability to accommodate 50% additional I/O modules.

5. Central Processing Unit

The PLC configuration shall be maintained through a power loss. The PLC shall continue with operations when power is reinstated without additional programming, uploads or resets.

The PLC system shall utilize a Secure Digital (SD) card for non-volatile memory to store a user program and tag data on the PLC. The PLC system shall be

configurable to trigger the controller to save to or load from the SD card and to load to the controller from the SD card on power up.

The minimum size CPU shall be an A-B Rockwell Automation ControlLogix Series 1756-L71 with 128 MBs of optional nonvolatile memory storage.

6. Power Supplies

Power supplies shall be surge and transient protected, and shall accept input voltages of 90 to 130 VAC. The power supplies shall be fused.

All PLC systems power supplies shall be modular, allowing the power supply to be removed for replacement without affecting input/output modules or wiring.

The PLC systems shall come with redundant power supply.

7. Wire and Cabling

All PLC specific cables shall be furnished by the PLC system manufacturer and be designed for the intended use.

All other wire shall be stranded copper type TFF or MTW, 18 GA for I/O and minimum 14 GA for power.

8. Programming

The CPU shall be capable of being programmed by an external IBM compatible host device via either a serial communication port or Ethernet port on the CPU, or a parallel communication port on an input/output chassis. Serial programming shall be possible without the use of a workstation interface board.

Software shall be Rockwell Automation RSLogix 5000 Professional Edition.

All software shall be registered to the Owner.

9. Terminal Blocks

Input/output modules shall utilize removable terminal blocks to connect all field side wiring.

10. Signal Isolators, Converters and Conditioners

Instrument signals shall be 4 – 20 mA DC. Signal isolators and converters shall be provided as necessary to comply with this requirement. The devices shall be mounted in the panel and such that field wiring may be changed/maintained without affecting the devices.

All communication circuitry shall include protection against lightning, spikes and other transient surges.

11. Grounding

The grounding system of the PLC system shall be tied into the main ground system. The tie-in shall be made from the panel frames to the main ground system.

169.08 Execution

Start-up and testing services for the PLC system shall be provided. The PLC system shall be fully tested against the requirements outlined in this section and Section 161 and the operating protocol and equipment manufacturer requirements. Test procedures and checklists for approval shall be submitted prior to testing. Completed test checklists shall be submitted as part of the project record documentation.

END OF SECTION 181

DIVISION 1

GENERAL REQUIREMENTS

SECTION 01000

SUMMARY OF WORK

PART I - GENERAL

1.01 WORK COVERED BY CONTRACT DOCUMENTS

- A. Furnishing all labor, materials, equipment and all incidentals and appurtenances necessary for wastewater collection improvements in the Rolling Hills Subdivision including the rehabilitation of seventeen manholes, the cured in place pipe (CIPP) lining of approximately 3,000 linear feet of existing 8" gravity sewer, the replacement of approximately 120 linear feet of existing 8" gravity sewer, 33 new service laterals with cleanouts, the rehabilitation and lining of 13 existing services, one new lift station utilizing an existing wet well, including all site work, mechanical work, dewatering, electrical work, instrumentation work, and related piping, valves, fittings, and appurtenances, approximately 850 linear feet of 4" force main to be installed via both open-cut and horizontal directional methods, force main valves and fittings, and restoration of all areas affected by construction to existing conditions or better.
- B. All Work shall be in accordance with the General Conditions.

1.02 WORK BY OTHERS

- A. The CONTRACTOR will diligently perform the scope of work independently of all others who may perform concurrent tasks during execution of the scope of work.
- B. The OWNER reserves the right to add to the work in accordance with the General Conditions.
- C. The ENGINEER or OWNER's representative reserves the right, throughout the construction process, to perform onsite inspections of the CONTRACTOR and construction process. Documentation of work may include, but not be limited to, detailed documentation of daily work performed by the CONTRACTOR, and photographs and/or videos of critical phases of construction.

1.03 WORK SEQUENCE

- A. The CONTRACTOR shall submit the sequence of work for review and approval by the OWNER and ENGINEER prior to commencement of work.
- B. CONTRACTOR must apply for and obtain all required permits for construction, including but not limited to building permits and dewatering permits, prior to commencement of construction activities.

- C. The CONTRACTOR is responsible to complete the work in the time as set forth by the General Conditions, which is 180 calendar days for substantial completion and 245 calendar days for final completion.

PART 2 – PRODUCTS

NOT USED

PART 3 – EXECUTION

NOT USED

END OF SECTION

SECTION 01039

COORDINATION AND MEETINGS

PART 1 – GENERAL

1.01 PERFORMANCE

- A. Section generally defines CONTRACTOR's responsibilities, unless otherwise indicated, for the following:
 - 1. Coordination.
 - 2. Field engineering.
 - 3. Cutting and patching.
 - 4. Preconstruction conference.
 - 5. Progress meetings.

1.02 COORDINATION

- A. Coordinate scheduling, submittals, and work to assure efficient and orderly sequence of installation of interdependent construction elements, with provisions for accommodating items to be installed later.
- B. Coordinate completion and clean up of Work of separate sections in preparation for Substantial and Final Completions.
- C. Coordinate any tie-ins to existing piping with Loxahatchee River District (LRD). Obtain written authorization prior to disconnecting or shutting down any pumps, equipment, meters, water mains, reclaimed mains, force mains, opening or closing valves, or performing tie-ins.
- D. Procure approval from LRD prior to operating any existing valve.

1.03 FIELD ENGINEERING

- A. Employ a Land Surveyor registered in the State of Florida and acceptable to the ENGINEER and OWNER to perform all field surveys.

- B. CONTRACTOR shall locate and protect survey control and reference points.
- C. Control datum for survey is Vertical Control NAVD 1988.
- D. Provide field engineering services. Utilize land surveyor to establish elevations, lines, and levels, utilizing recognized survey practices.
- E. Submit signed and sealed certification prepared by the Land Surveyor that the elevations and locations of the Work are in conformance with the Contract Documents.

1.04 CUTTING AND PATCHING

- A. Employ skilled and experienced installer to perform cutting and patching.
- B. Submit written request in advance of cutting or altering elements which affects:
 - 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 of the Work together, to integrate with other Work.
 - 2. Uncover Work for exploration and identification of existing utilities or for installation of subsequent Work.
 - 3. Remove and replace defective and non-conforming Work.
 - 4. Remove samples of installed Work for testing.
 - 5. Provide openings in elements of Work for penetrations by mechanical and electrical Work.

- D. Execute Work by methods, which will avoid damage to other Work, and provide proper surfaces to receive patching and finishing.
- E. Cut rigid materials using masonry saw or core drill, as required.
- F. Restore Work with new Products in accordance with requirements of the Task Order.
- G. Construct a tight fit between the Work and pipes, sleeves, ducts, conduit, and other penetrations through surfaces.
- H. Refinish surfaces to match adjacent finishes. For continuous surfaces, refinish to nearest intersection; for an assembly, refinish entire unit.
- I. Identify any hazardous substance or condition exposed during the Work to the ENGINEER.

1.05 PRECONSTRUCTION CONFERENCE

- A. ENGINEER will schedule a conference after Notice to Proceed.
- B. Attendance Required: OWNER, ENGINEER, and GENERAL CONTRACTOR
- C. Agenda:
 - 1. Designation of personnel representing the parties as defined in the General and Supplemental Conditions, and the ENGINEER.
 - 2. Procedures and processing of field decisions, submittals, substitutions, applications for payments, proposal request, Change Orders and Contract closeout procedures.
 - 3. Scheduling.

1.06 PROGRESS MEETINGS

- A. Schedule and administer meetings throughout progress of the Work as required.
- B. Attendance Required: Job superintendent, major Subcontractors and suppliers, OWNER, ENGINEER, as appropriate to agenda topics for each meeting.
- C. Agenda:

1. Review minutes of previous meetings.
2. Review of Work progress and updated schedule.
3. Field observations, problems, and decisions.
4. Identification of problems, which impede planned progress.

PART 2 – PRODUCTS

NOT USED

PART 3 – EXECUTION

NOT USED

END OF SECTION

SECTION 01200

MEASUREMENT AND PAYMENT

PART 1 - GENERAL

1.01 GENERAL REQUIREMENTS

- A. The Unit prices stated in the Contract shall be considered payment in full for the completion of all work. Payment shall be made under each item only for work as it is not specifically included under other items.
- B. Furnishing all labor, materials, equipment and all incidentals and appurtenances necessary for wastewater collection improvements in the Rolling Hills Subdivision including the rehabilitation of seventeen manholes, the cured in place pipe (CIPP) lining of approximately 3,000 linear feet of existing 8" gravity sewer, the replacement of approximately 120 linear feet of existing 8" gravity sewer, 33 new service laterals with cleanouts, the rehabilitation and lining of 13 existing services, one new lift station utilizing an existing wet well, including all site work, mechanical work, dewatering, electrical work, instrumentation work, and related piping, valves, fittings, and appurtenances, approximately 850 linear feet of 4" force main to be installed via both open-cut and horizontal directional methods, force main valves and fittings, and restoration of all areas affected by construction to existing conditions or better.

1.02 PERFORMANCE

- A. Section generally defines unless otherwise indicated, the following:
 - 1. Payment item descriptions.
 - 2. Payment application descriptions.
- B. The cost of temporary facilities, bonds, insurance, attending project meetings, administration, record drawings, policing, and other general duties shall be considered incidental to all items.
- C. The OWNER may direct the CONTRACTOR to install certain portions of the work in advance of other portions without extra payment to the CONTRACTOR.

1.03 RELATED SECTIONS

- A. Notice to Contractors

- B. Article 1 - Instructions to Bidders.
- C. Article 2 - Bid Form.
- D. Article 4 – Contract.
- E. Article 10 - General Conditions.

1.04 LUMP SUM ITEMS

- A. The lump sum price shall be full compensation for all labor, materials and equipment to satisfactorily complete the installation of the items as shown on the plans and indicated in the details for lump sum bid items.

1.05 UNIT PRICE ITEMS

- A. The ENGINEER or his representative shall determine the number of units of each work item installed.

1.06 SATISFACTORY COMPLETION

- A. Satisfactory completion shall include dewatering, if any, and repair or replacement of damaged landscaping, irrigation systems, pavement or other existing improvements.

1.07 PAYMENT ITEMS

- A. Unit Price Bid
 - 1. Payment shall constitute summation of measured quantities multiplied by the respective unit price for items constructed as specified herein and shown on the engineering drawings; including installation and removal of all temporary facilities, piping; and supply of all incidental materials, equipment and labor necessary to complete the contemplated Work whether specifically identified herein or not.
 - 2. Partial progress payments will be made at monthly intervals and will be based upon the value of the Work completed on the date that a partial payment application is submitted less deductions for retainage as defined elsewhere. Signed and Sealed Record Drawings shall be submitted and approved with each partial and final pay request.

1.08 PAYMENT APPLICATION DESCRIPTION

- A. Preparation of Applications:
 - 1. Present required information in type written form, or equivalent.

2. Execute certification by signature of authorized officer.
3. Use data from approved Schedule of Values. Provide dollar value in each column for each line item for portion of work performed.
4. List each authorized Change Order as an extension on the Application for Payment, listing Change Order number and dollar amount as for an original item of Work.

B. Submittal Procedures

1. Submit three (3) copies of each Application for Payment.

Payment Period: Submit monthly as directed by the OWNER.

Submit signed and sealed record drawings covering work for which payment is being requested.

Submit revised progress schedule accurately reflecting the work completed and the schedule of future work items.

C. Substantiating Data

1. When OWNER requires substantiating information, submit data justifying dollar amounts in question.
2. Provide one (1) copy of data with cover letter of each copy of application. Show Application number and date, and line item by number and description on each piece of data.

PART 2 – PRODUCTS

NOT USED

PART 3 - EXECUTION

3.01 BID ITEM DESCRIPTIONS

A. PAY ITEM NO. 1 – MOBILIZATION/DEMobilIZATION, BONDS AND INSURANCE

The Contract Lump Sum for this item shall constitute full compensation for mobilization, demobilization, general conditions, insurances, monthly photos, shop

drawings, permits, temporary facilities, and bonding in accordance with the contract documents. The first payment shall not include mobilization / demobilization if the CONTRACTOR has not started work at the project site. Payment for this item shall be by Lump Sum (LS). Total cost of this item shall not exceed 10% of the total contract value.

B. PAY ITEM NO. 2 – MAINTENANCE OF TRAFFIC

The Contract Lump Sum for this item shall constitute full compensation for providing all necessary permits and traffic devices to maintain traffic during construction and restoration. Traffic devices may be in the form of barricades, personnel, lights, signs, temporary rock roadways, etc. All work shall be in accordance with all applicable Florida Department of Transportation specifications, and in accordance with the governing municipalities and other governing agencies. Payment for this item shall be by Lump Sum (LS).

C. PAY ITEM NO. 3 – AS- BUILT RECORD DRAWINGS

The Contract Lump Sum for this item shall constitute full compensation for providing a Professional Surveyor licensed in the State of Florida to perform as-built surveying including: signed and sealed record drawings; AUTOCAD record drawings and other items described in Section 01720, Record Documents. Payment for record drawing information will be made upon completion of all required items in accordance with the requirements of the Contract Documents. Payment for record drawings will be processed after drawings are approved. No partial payments shall be made for record drawings. Payment for this item shall be by Lump Sum (LS).

D. PAY ITEM NO. 4 – AUDIO VIDEO DOCUMENTATION

The Contract Unit Price for this item shall constitute full compensation for providing, prior to start of construction, a video of the project by a professional video-taping service acceptable to the OWNER. The video may include all driveways, landscaping area, etc. for each side of the streets. The video should extend from right-of-way to right-of-way and 10' beyond. A copy of the video shall be turned over to the OWNER and ENGINEER for their use. Payment for this item shall be by Lump Sum (LS).

E. PAY ITEM NO. 5 – NPDES PERMIT/EROSION MEASURES

The Contract Lump Sum for this item shall constitute full compensation for establishing, constructing and maintaining erosion and sediment control measures. The erosion control programs shall be maintained during the entire period of construction, including any extensions in Contract time. Temporary erosion and pollution control shall include construction work off-site where such work is necessary as a result of borrow pit operations, haul roads or equipment storage sites, etc. This work shall also include the preparation of any required Stormwater

Pollution Prevention Plan (SWPPP), including modifications and updates. The CONTRACTOR shall obtain and comply with all provisions of the State of Florida Department of Environmental Protection Permit for Stormwater Discharge from Large and Small Construction Activities (NPDES Construction Site Permit Program). Payment for this item shall be by Lump Sum (LS).

F. PAY ITEM NO. 6 – DEWATERING

The Contract Unit Price for this item shall constitute full compensation for furnishing all labor, material, and equipment and cleanup necessary for providing dewatering and disposal operation for the installation of the gravity sewer system. This item includes, well points, stilling basin, piping, pumps, pump noise mitigation and all other required dewatering appurtenances. Dewatering pumps shall have mitigation measures to reduce the noise level to less than 60 dBA measured at the base of residential structures. Discharge water exiting the CONTRACTOR's dewatering system shall not exceed background turbidity of the receiving water body as referenced by the background sampling location as determined by the ENGINEER. Discharge shall comply with SFWMD permit conditions and FDEP requirements for a Generic Permit for the discharge of Produced Groundwater from a non-contaminated site activity (62-621.300(2) FAC) and any other applicable regulations governing discharge of dewatering water. Water discharge activities shall be adjusted accordingly and corrective actions taken if the water exiting the dewatering system exceeds these requirements to be complaint with all applicable regulations. CONTRACTOR shall implement best management practices (BMPs) and install pollution control devices including but not limited to settling tanks, silt barriers, and hay bales as needed to comply with discharge water quality requirements. The CONTRACTOR will be required to apply for and follow all permit constraints and the dewatering plan. All dewatering work associated with the SFWMD Dewatering Permit shall be included in this bid item. If the CONTRACTOR uses the existing drainage system for dewatering activities then the CONTRACTOR will be required to desilt the existing drainage system. Payment of this item shall be Lump Sum (LS).

G. PAY ITEM NO. 7 – PRESSURE CLEAN MANHOLE

The Contract Unit Price for this item shall constitute full compensation for furnishing all materials, labor, equipment and tools necessary to pressure clean 4' manholes as shown on the contract drawings, as specified herein and as directed by the ENGINEER, including but not limited to: supplying water for pressure cleaning, excavation for the manhole, disposal of all excess materials, maintaining uninterrupted flow of existing utilities, providing access to driveways and roadways at all times, maintaining traffic control, cleaning the site of the work location and protection of utilities, structures, trees, shrubs and lawns, and all other work required for the complete cleaning of the manhole. Payment for this item shall be the actual

number of Each (EA) manholes pressure cleaned.

H. PAY ITEM NO. 8 - MISCELLANEOUS MANHOLE REPAIRS (INCLUDING MORTAR, PIPE CONNECTIONS, REINFORCEMENT STEEL, HOLES, CRACKS, JOINTS, AND LEAKS)

This item of work will be measured and paid for at the unit price per each manhole, regardless of depth or size (or number and flow rate of visible leaks encountered, pipe connections, manhole type or condition). Payment shall be made per unit price per each manhole for repairing mortar, pipe connections, reinforcing steel, holes, cracks, joints, or other repairs as necessary. Payment for this item shall be per each (EA) manhole.

I. PAY ITEM NO. 9 – PRESSURE/XYPEX GROUTING

This item of work will be measured and paid for at the unit price per each manhole, regardless of depth or size (or number and flow rate of visible leaks encountered, pipe connections, manhole type or condition). Payment shall be made per unit price per each manhole for sealing or patching all visible leaks by injecting chemical grout; to relieve hydrostatic pressure outside the manhole. Payment for this item shall be per each (EA) manhole.

J. PAY TEM NO. 10 – REFORM BENCH AND CHANNEL

This item of work will be measured and paid at the unit price of each manhole repaired. Payment of the unit price will provide compensation for cleaning and patching and reforming the manhole bench and flow channels;; testing labor, tools, and equipment; maintenance of traffic; and all incidentals and materials needed to reform the manhole bench and invert. Payment for this item shall be per each (EA) manhole.

K. PAY ITEM NO. 11 – CHIMNEY ADJUSTMENT

This item of work will be measured and paid at the unit price of each manhole repaired. Payment of the unit price will provide compensation for furnishing and installing all materials, labor, equipment and tools necessary to adjust the manhole chimney as shown on the contract drawings, as specified herein and as directed by the ENGINEER. This item also includes any required restoration of areas affected by construction to equal or better condition, including roadway replacement, sodding, curb and gutter, landscaping, and any other miscellaneous restoration required. Payment for this item shall be per each (EA) manhole.

L. PAY ITEM NO. 12 – NEW MANHOLE COVER

This item of work will be measured and paid for at the unit price per each, regardless of size. Payment of the unit price for each will provide compensation for furnishing

and installing the new cover; salvaging and transporting to the location designated by the OWNER of all replaced cast iron materials; cleanup; labor, tools, and equipment; maintenance of traffic; and all incidentals necessary to obtain a new watertight cover, complete in place. This item also includes any required restoration of areas affected by construction to equal or better condition, including roadway replacement, sodding, curb and gutter, landscaping, and any other miscellaneous restoration required. Payment for this item shall be per each (EA) manhole.

M. PAY ITEM NO. 13- NEW ADJUSTMENT RING

This item of work will be measured and paid for at the unit price per each, regardless of size. Payment of the unit price for each will provide compensation for furnishing and installing the new adjustment ring; salvaging and transporting to the location designated by the OWNER of all replaced cast iron materials; cleanup; labor, tools, and equipment; maintenance of traffic; and all incidentals necessary to obtain a new adjustment ring, complete in place. This item also includes any required restoration of areas affected by construction to equal or better condition, including roadway replacement, sodding, curb and gutter, landscaping, and any other miscellaneous restoration required. Payment for this item shall be per each (EA) manhole.

N. PAY ITEM NO. 14 – NEW FRAME

This item of work will be measured and paid for at the unit price per each, regardless of size. Payment of the unit price for each will provide compensation for furnishing and installing the new frame; salvaging and transporting to the location designated by the OWNER of all replaced cast iron materials; cleanup; labor, tools, and equipment; maintenance of traffic; and all incidentals necessary to obtain a new watertight frame, complete in place. This item also includes any required restoration of areas affected by construction to equal or better condition, including roadway replacement, sodding, curb and gutter, landscaping, and any other miscellaneous restoration required. Payment for this item shall be per each (EA) manhole.

O. PAY ITEM NO. 15 – CURED IN PLACE PIPE LINING – 8”

This work will be measured and paid at the unit price per linear foot (LF) of liner as delineated by the pipe size. Measurement shall be made based on the horizontal projection of the centerline of the permanently installed liner between manholes, measured to the nearest foot from the inside wall of manhole to inside wall of manhole for each section lined. Each unit price bid shall include, but not be limited to, all necessary or required resident notification, sewer pipe cleaning, including mechanical root removal for the areas as noted as having root intrusion, and preparation of the existing sewer, maintenance of traffic, including blocking or plugging incoming lines; post-lining television surveys; chemical joint sealing if necessary; pipe lining; the cost of obtaining a water meter, cleaning; sample collection; by pass pumping; grouting to prevent infiltration at service connections and liner ends; cleanup; documentation and reporting; and all labor, materials and

equipment required to provide a complete and acceptable liner installation.

P. PAY ITEMS 16 – 19 – 8” PVC SDR 26 PVC REPLACEMENT

This work, of whatever nature, will be measured and paid for at the unit price per foot (LF) as delineated by pipe size and depth brackets as named in the Bid Proposal. Payment of the unit price shall provide full compensation for all necessary and required work including, but not limited to post-construction television inspection; maintenance of traffic; excavation; removal, transportation and disposal of existing pipe regardless of type; removal, transportation and disposal of material generated by cleaning and preparation; transportation and handling costs; furnishing and installing all materials including pipe, pipe joint material including lubricant, pipe bedding, flexible banded couplings and adapters, rigid sleeves with compression joints, embedment materials; flow isolation by pass pumping; backfill; compaction; complying with the State of Florida Trench Safety Act; supporting and protecting existing utilities as required; dewatering; sheeting and shoring, if necessary; cutting pipe; making all connections within the lines to existing sewers; testing; cleanup; final cleanup; all labor, materials and equipment required to provide a complete and acceptable pipe installation, including all appurtenances, in accordance with the Contract Documents, the manufacturer's specifications and compliance with all applicable regulatory requirement; and all incidentals related to achieve a repaired segment of sewer gravity main complete in place, tested, and ready for use. Costs associated with providing suitable bedding and backfill materials, as well as removing and disposing of unsuitable materials, connecting to any existing manholes, are included under these pay items and will not be separately compensated. Cleaning and television inspection (post construction) of the entire segment of main (manhole to manhole) is included in this bid item, regardless of the length of pipe constructed. This item also includes any required restoration of areas affected by construction to equal or better condition, including roadway replacement, sodding, curb and gutter, landscaping, and any other miscellaneous restoration required

Q. PAY ITEM NO. 20 – 4” PVC LATERAL – SINGLE SERVICE W/ CLEANOUT ON EXISTING GRAVITY MAIN OR INTO EXISTING MANHOLE

The Contract Unit Price for this item shall constitute full compensation for providing all labor, materials, equipment, and incidentals necessary to furnish and install PVC service piping, fittings, adapters, EMS markers, cleanouts, and any other appurtenances necessary to connect the single short service to the sanitary sewer shown on the contract drawings, as specified herein and as directed by the ENGINEER, including but not limited to: the excavation and backfill thereof, together with the disposal of all excess materials, bracing and sheeting, the furnishing and compaction, hydrostatic testing, maintaining uninterrupted flow of existing utilities, providing access to driveways at all times, cleaning the site of the work location and protection of utilities, structures, trees, shrubs and lawns, and all other

work required for the complete installation of sewer service lines, cleanout, and appurtenances. This item also includes any required restoration of areas affected by construction to equal or better condition, including roadway replacement, sodding, curb and gutter, landscaping, and any other miscellaneous restoration required. Payment for this item shall be the actual number of Each (EA) single short service installed.

R. PAY ITEM NO. 21 – 6” PVC LATERAL –DOUBLE SERVICE W/ CLEANOUTS ON EXISTING GRAVITY MAIN OR INTO EXISTING MANHOLE

The Contract Unit Price for this item shall constitute full compensation for providing all labor, materials, equipment, and incidentals necessary to furnish and install PVC service piping, fittings, adapters, EMS markers, cleanouts, and any other appurtenances necessary to connect the double service to the sanitary sewer shown on the contract drawings, as specified herein and as directed by the ENGINEER, including but not limited to: the excavation and backfill thereof, together with the disposal of all excess materials, bracing and sheeting, the furnishing and compaction, hydrostatic testing, maintaining uninterrupted flow of existing utilities, providing access to driveways at all times, cleaning the site of the work location and protection of utilities, structures, trees, shrubs and lawns, and all other work required for the complete installation of sewer service lines, cleanout, and appurtenances. This item also includes any required restoration of areas affected by construction to equal or better condition, including roadway replacement, sodding, curb and gutter, landscaping, and any other miscellaneous restoration required. Payment for this item shall be the actual number of Each (EA) single service installed.

S. PAY ITEMS NO. 22-24 – CLEAN AND TELEWISE EXISTING LATERAL, MAKE POINT REPAIRS, INSTALL CURED IN PLACE PIPE LINING, AND INSTALL NEW CLEANOUTS, AND ASSOCIATED PIPING REQUIRED

This work will be measured and paid at the unit price per each (EA) as delineated in the Bid Forms. The unit price bid shall include, but not be limited to, all necessary or required resident notification, sewer pipe cleaning and preparation of the existing sewer, including blocking or plugging incoming lines, maintenance of traffic, removal; transportation and disposal of material generated by cleaning and preparation; pre and post-lining television surveys; chemical joint sealing if necessary; pipe lining; the cost of obtaining a water meter, cleaning; sample collection; by pass pumping; grouting to prevent infiltration at liner ends; cleanup; documentation and reporting; and all labor, materials and equipment required to provide a complete and acceptable liner installation. This item includes furnishing and installing all cleanouts, piping, fittings, and appurtenances required to meet the service lateral standard details as shown in the Contract Drawings. This item also includes any required restoration of areas affected by construction to equal or better condition, including roadway replacement, sodding, curb and gutter, landscaping,

and any other miscellaneous restoration required. Payment for this item shall be per each service (EA).

T. PAY ITEM NO. 25 – PROPOSED LIFT STATION, INCLUDING ALL MECHANICAL, STRUCTURAL, SITE, ELECTRICAL, AND INSTRUMENTATION WORK (OWNER FURNISHED PUMPS, TO BE INSTALLED BY CONTRACTOR)

Under this Item, Contractor shall provide all labor, material, and equipment required to satisfactorily furnish and install a new lift station as shown on the drawings. The work shall include the installation of the pumps to be furnished by the Owner, furnishing and installing the extension of the wet well, ,rails, floats, hatches, safety devices, valve vault, discharge piping, coatings, piping, valves, appurtenances, testing, control panels, site work, concrete work, structural work, electrical work and instrumentation work for a fully functioning system as depicted on the Drawings and as specified in the Contract Documents. This item also includes any required restoration of areas affected by construction to equal or better condition, including roadway replacement, sodding, curb and gutter, landscaping, and any other miscellaneous restoration required. Payment of this item shall be by Lump Sum (LS).

U. PAY ITEM NO. 26 – 4” 900 PVC FORCE MAIN INSTALLED OPEN-CUT

The Contract Unit Price for this item shall constitute full compensation for furnishing all materials, labor, equipment and tools necessary to furnish and install the 4-inch C-900 PVC force main as shown on the contract drawings, as specified herein and as directed by the ENGINEER, including but not limited to: the excavation for the pipe trench, together with the disposal of all excess materials, bracing, sheeting, and dewatering, the installation of the PVC pipe, pipe restraints, and trace wire, the backfilling and compaction of the pipe trenches, density testing, hydrostatic testing, maintaining uninterrupted flow of existing utilities, providing access to driveways and roadways at all time, maintaining traffic control, cleaning the site of the work location and protection of utilities, structures, trees, shrubs and lawns, and all other work required for the complete installation of the water main. This work also includes repairs to irrigation systems damaged or removed during the construction activities and shall include piping, valves, heads, controls, conduit, boxes, wires, panels, etc. All irrigation systems shall be restored to the pre-existing condition or better. This item shall also include removal and proper restoration of miscellaneous items such as mailboxes, decorative landscaping, driveway and drainage culverts, irrigation piping, etc. All mailboxes and irrigation piping removed during the course of construction are to be properly restored to the pre-existing condition or better, as directed by the ENGINEER. Where so directed by the OWNER, decorative landscaping shall be replaced. Restoration of all landscaped areas shall be equal or better than the original condition. If the CONTRACTOR elects to remove landscape material and reinstall the material at a later date, they shall be responsible for properly maintaining and watering the material while it is under their care for thirty

(30) days. This item also includes any required restoration of areas affected by construction to equal or better condition, including roadway replacement, sodding, curb and gutter, landscaping, and any other miscellaneous restoration required. Payment of this item shall be per Linear Foot (LF) installed.

V. PAY ITEM NO. 27 – 4” HDPE DIPS SDR-11 INSTALLED VIA HDD

The Contract Unit Price for this item shall constitute full compensation for furnishing all materials, labor, equipment and tools for the complete construction of a 4-inch HDPE force main via horizontal directional drill methods as shown on the construction drawings, specified herein and as directed by the ENGINEER. This item includes, but is not limited to, surveying, erosion control, excavation, backfill, and compaction for entry and exit pits, maintenance of traffic, supporting and protecting existing utilities, dewatering, all pipe, fusing, drilling, reaming, slurry, pulling of pipe through the borehole, disposal of excess materials, frac-out control, pipe marking tape, tracer wire, tracer wire termination boxes, adapters, temporary restoration of irrigation systems (irrigation piping, sprinkler heads, etc.), providing temporary sidewalks and walkways interrupted during construction activities, temporary restoration of mailboxes, temporary restoration of fences, temporary restoration of driveways, temporary restoration of roads, temporary restoration of structures, etc., and removal and disposal of sidewalks, driveways, asphaltic concrete, rock base and subgrade (including necessary sawcutting). Payment for this item is per Linear Foot (LF) of horizontal distance transversed of the 4-inch HDPE pipe as measured along the ground surface and not actual quantity of piping installed. Payment for this item will be from the end of the 4-inch pipe with the pulling head connected to it to the end of the last section of 4-inch pipe pulled as part of the HDD. This item also includes any required restoration of areas affected by construction to equal or better condition, including roadway replacement, sodding, curb and gutter, landscaping, and any other miscellaneous restoration required.

W. PAY ITEM NO. 28 – 4” PLUG VALVE WITH VALVE BOX

The Contract Unit Price for this item shall constitute full compensation for furnishing all materials, labor, equipment and tools for the complete installation of 4-INCH plug valves as shown on the construction drawings, specified herein and as directed by the Engineer. This item includes, but is not limited to, all excavation, disposal of excess materials, bracing, sheeting, rock removal, dewatering, the furnishing and installation of the butterfly valves, restrained flanged coupling adapters, valve boxes, valve key extensions, bolts, nuts, gaskets, restraints, backfilling, compaction, concrete thrust blocks, mechanical joint restraints, concrete collars, Operation and Maintenance Manuals, and concrete supports, and protection of utilities, structures, trees, and shrubs. This item also includes any required restoration of areas affected by construction to equal or better condition, including roadway replacement, sodding, curb and gutter, landscaping, and any other miscellaneous restoration required. Payment for this item shall be the actual number of Each (EA) valve installed.

X. PAY ITEMS NO. 29 - 31 – 4” DI MJ FITTINGS

The Contract Unit Price for this item shall constitute full compensation for furnishing all materials, labor, equipment and tools for the complete installation of Protecto 401 Ceramic Epoxy lined compact ductile iron fittings, including plugs, as shown on the construction drawings, specified herein and as directed by the Engineer. This item includes, but is not limited to, all excavation, disposal of excess materials, bracing, sheeting, rock removal, dewatering, the furnishing and installation of the ductile iron fittings, bolts, nuts, gaskets, flanges, restraints, glands, markers, backfilling, compaction, concrete thrust blocks, location and protection of utilities. This item also includes any required restoration of areas affected by construction to equal or better condition, including roadway replacement, sodding, curb and gutter, landscaping, and any other miscellaneous restoration required. Payment for this item shall be each (EA) fitting installed.

Y. PAY ITEM NO. 32 – 4” HDPE X MJ ADAPTER

The Contract Unit Price for this item shall constitute full compensation for furnishing all materials, labor, equipment and tools for the complete installation of a HDPE/PVC Transition Adapter as shown on the construction drawings, specified herein and as directed by the Engineer. This item includes, but is not limited to, all excavation, disposal of excess materials, bracing, sheeting, rock removal, dewatering, the furnishing and installation of the blow-off assembly, bolts, nuts, gaskets, restraints, glands, backfilling, compaction, concrete thrust blocks concrete collars, Operation and Maintenance Manuals, and concrete supports, and protection of utilities, structures, trees, and shrubs. This item also includes any required restoration of areas affected by construction to equal or better condition, including roadway replacement, sodding, curb and gutter, landscaping, and any other miscellaneous restoration required. Payment for this item shall be the actual number of Each (EA) HDPE/PVC Transition Adapter.

Z. PAY ITEM NO. 33 – AIR RELEASE VALVE

The Contract Unit Price for this item shall constitute full compensation for furnishing all materials, labor, equipment and tools necessary to install air release valves as shown on the contract drawings, as specified herein and as directed by the ENGINEER, including but not limited to: the excavation for the manhole, disposal of all excess materials, bracing, sheeting and dewatering, the installation of the air release valve, coated manhole with frame and cover or box as required on the drawings, rock base, corporation stop, check valve, fittings, bolts, nuts, gaskets, flanges, restraints, backfill and compaction, testing, supports, concrete slab, maintaining uninterrupted flow of existing utilities, providing access to driveways and roadways at all times, maintaining traffic control, cleaning the site of the work location and protection of utilities, structures, trees, shrubs and lawns, and all other work required for the complete installation of the air release valves. This item also includes any required restoration of areas affected by construction to equal or better

condition, including roadway replacement, sodding, curb and gutter, landscaping, and any other miscellaneous restoration required. Payment for this item shall be the actual number of Each (EA) air release valve installed.

AA. PAY ITEM NO. 34 – CONNECT TO EXISTING FORCE MAIN

The Contract Unit Price for this item shall constitute full compensation for furnishing all materials, labor, equipment and tools necessary to connect the proposed 4-inch force main to the existing force main where shown on the contract drawings, as specified herein and as directed by the ENGINEER, including but not limited to: removing existing pipe and fittings, excavation and backfill thereof, sheeting and bracing, dewatering, protection and support of existing utilities, proper handling and disposal of pipe at an approved facility, installing adapters for new the new pipe and fittings, providing access to roadway, driveways, and sidewalks at all times, backfilling and compaction, maintaining traffic control, cleaning the site of the work location and protection of utilities, structures, trees, shrubs, and lawns, and all other work required for connecting to the existing force main. This item also includes any required restoration of areas affected by construction to equal or better condition, including roadway replacement, sodding, curb and gutter, landscaping, and any other miscellaneous restoration required. Payment for this item shall be the actual number of Each (EA) connection installed.

END OF SECTION

SECTION 01300

SUBMITTALS

PART 1 - GENERAL

1.01 PERFORMANCE

- A. Section generally defines CONTRACTOR's responsibilities, unless otherwise indicated, for the following:
 - 1. Submittal procedures.
 - 2. Construction progress schedules.
 - 3. Dewatering plans.
 - 4. Temporary Trenching, Sheeting, and Shoring Plan.
 - 5. Proposed products list.
 - 6. Shop drawings.
 - 7. Product data.
 - 8. Manufacturers' instructions.
 - 9. Manufacturers' certificates.

1.02 RELATED SECTIONS

- A. **Section 01400** - Quality Control: Manufacturers' field services and reports.
- B. **Section 01780** - Contract Closeout: Contract warranty and manufacturer's certificates, closeout submittals.

1.03 SUBMITTAL PROCEDURES

- A. Transmit each submittal with ENGINEER accepted form. All submittals shall be submitted electronically. Responses to submittals will also be performed electronically.
- B. Sequentially number the transmittal forms. Resubmittals to have original number with an alphabetic suffix.
- C. Identify Project, CONTRACTOR, Subcontractor or supplier; pertinent Drawing sheet and detail number(s), and specification Section number, as appropriate.
- D. Apply CONTRACTOR's stamp, signed or initialed certifying that review, verification of Products required, field dimensions, adjacent construction Work, and coordination of information, is in accordance with the requirements of the Work and Contract Documents.
- E. Schedule submittals to expedite the Project, and deliver to ENGINEER at their business address. Coordinate submission of related items.
- F. Identify variations from Contract Documents and Product or system limitations which may be detrimental to successful performance of the completed Work.
- G. Provide space for CONTRACTOR and ENGINEER review stamps on each submittal.
- H. Only complete submittals will be reviewed. Partial or incomplete submittals for a product will be returned to the CONTRACTOR without review.
- I. Revise and resubmit submittals as required, identify all changes made since previous submittal.
- J. Distribute copies of reviewed submittals to concerned parties. Instruct parties to promptly report any inability to comply with provisions.

1.04 CONSTRUCTION PROGRESS SCHEDULES

- A. Submit initial progress schedule as required in the “Special & General Conditions”.
- B. Revise and resubmit as required in the “Special & General Conditions”.

- C. Submit revised schedules with each Application for Payment, identifying changes since previous version.
- D. Submit a horizontal bar chart with separate line for each major section of Work or operation, identifying first work day of each week.
- E. Show complete sequence of construction by activity, identifying Work of separate stages and other logically grouped activities. Indicate the early and late start, early and late finish, float dates, and duration.
- F. Indicate estimated percentage of completion for each item of Work at submission of each Application for Payment.
- G. At the end of each week, CONTRACTOR shall submit a written 2-week look ahead describing the construction activities that will take place to allow for coordination with Engineer, OWNER, and other parties.

1.05 PROPOSED PRODUCTS LIST AND INFORMATION

- A. Submit complete list of major products proposed for use, with name of manufacturer, trade name, and model number or each product.
- B. For products specified only by reference standards, give manufacturer, trade name, model or catalog designation, and reference standards.

1.06 SHOP DRAWINGS

- A. After review, distribute in accordance with Article on Procedures above and for Record Documents described in **Section 01780** - Contract Closeout.

1.07 PRODUCT DATA

- A. Submit the number of copies which the CONTRACTOR requires, plus one (1) electronic (pdf) copy, which will be retained by the ENGINEER.
- B. Mark each copy to identify applicable products, models, options, and other data. Supplement manufacturers' standard data to provide information unique to this Project.
- C. After review, distribute in accordance with Article on Procedures above and provide copies for Record Documents described in **Section 01780** - Contract Closeout.

1.08 MANUFACTURER'S INSTRUCTIONS

- A. When specified in individual specification Sections, submit manufacturers' printed instructions for delivery, storage, assembly, installation, start-up, adjusting, and finishing, in quantities specified for Product Data.
- B. Identify conflicts between manufacturers' instructions and Contract Documents.

1.09 MANUFACTURER'S CERTIFICATES

- A. When specified in individual specification Sections, submit manufacturers' certificate to ENGINEER for review, 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.
- B. Certificates may be recent or previous test results on material or Product, but must be acceptable to ENGINEER.

PART 2 – PRODUCTS

NOT USED

PART 3 – EXECUTION

NOT USED

END OF SECTION

SECTION 01360

PRE-CONSTRUCTION AUDIO-VIDEO DOCUMENTATION

PART 1 - GENERAL

1.01 PERFORMANCE

- A. Section generally defines CONTRACTOR's responsibilities, unless otherwise rated, for the following:
 - 1. Audio-Video Documentation.
 - 2. Equipment.
 - 3. Submittals.
 - 4. Technique.
 - 5. Quality Assurance.

1.02 QUALITY ASSURANCE

- A. Documentation shall be performed by a responsible commercial firm known to be skilled and regularly engaged in the preparation of pre-construction color audio-video documentation. **Any Preconstruction video produced by the CONTRACTOR will be immediately rejected.** All preconstruction videos are to be completed by a firm with extensive amount of previous experience in producing preconstruction documentation.
- B. Completed documentation shall reproduce bright, sharp pictures with accurate colors and shall be free from distortion, tearing, rolling, or any other significant picture imperfection. The audio portion of the recording shall reproduce the commentary of the camera operator with proper volume, clarity, and be free of distortion.
- C. Construction shall not proceed until the OWNER and ENGINEER have reviewed the documentation and notified the CONTRACTOR of its acceptability.

1.03 MEASUREMENT AND PAYMENT

- A. No separate payment item is provided for this work. The cost of performing this work shall be incorporated into the bid items or lump sum amount identified on the bid form.

PART 2 - PRODUCTS

2.01 RECORDING EQUIPMENT

- A. Utilize color video camera having:
 - 1. Horizontal Resolution of 350 lines at center.
 - 2. 8:1 Zoom, minimum.
- B. Utilize digital format recorder having:
 - 1. Minimum horizontal resolution of 540 lines, 60 fields.

2.02 RECORDING MEDIA

- A. Utilize new, Digital Video Disc (DVD) having:
 - 1. DVD shall be DVD-R. DVD-RAM shall not be accepted.
 - 2. 4³/₄-inch diameter discs.
 - 2. High resolution.
 - 3. 4.7 gigabyte storage per layer with two (2) layers (minimum).

PART 3 - EXECUTION

3.01 COVERAGE

- A. Record coverage of all surface features located in the construction's zone of influence (including the proposed storage area(s)) including, but not limited to:
 - 1. Roadways, driveways, sidewalks.
 - 2. Treatment facilities, surrounding structures, sanitary facilities.
 - 3. Drainage structures, abovegrade utilities, drainage swales, canals.

4. Landscaping, trees, shrubbery, fences, irrigation heads, meters.
- B. Record the individual features of each item with particular attention being focused upon the existence of any faults, fractures, or defects.
- C. Control pan rate, rate of travel, camera height and zoom rate to maintain a steady clear view at all times.
- D. Limit recorded coverage to one side of any street at any one time.
- E. Create a single, continuous, unedited recording that begins and ends within each portion of a particular construction area. The recording shall proceed in the direction of ascending baseline stationing.

3.02 AUDIO CONTENT

- A. Simultaneously record audio content during videotaping.
- B. Audio recording shall assist in viewer orientation and in any needed identification, clarification, or description of features being recorded.
- C. Audio recording will only consist of camera operator commentary.

3.03 INDEXING

- A. Permanently label each tape with a sequential tape number and the project name.
- B. Index each DVD with a digital record of the time and date of the recording that is continuously displayed as the DVD is played.
- C. Prepare a written log which describes the contents of each DVD including:
 1. Structure/location names.
 2. Coverage begin/end, station and location.
 3. Recording date.

3.04 CONDITIONS

- A. Record coverage during dry, clear weather and during daylight hours only.
- B. Record coverage when the area to be covered is free of debris or obstructions.

- C. Record coverage no more than 15 days prior to the start of construction.

END OF SECTION

SECTION 01400

QUALITY CONTROL

PART 1 - GENERAL

1.01 PERFORMANCE

- A. Section generally defines CONTRACTOR's responsibilities, unless otherwise indicated, for the following:
 - 1. Quality assurance and control of installation.
 - 2. References.
 - 3. Inspection and testing laboratory services.

1.02 QUALITY ASSURANCE/CONTROL OF INSTALLATION

- A. Monitor quality control over suppliers, manufacturers, products, services, site conditions, and workmanship, to produce Work of specified quality.
- B. Comply fully with manufacturers' instructions, including each step in sequence.
- C. Should manufacturers' instructions conflict with Contract Documents, request clarification from ENGINEER before proceeding.
- D. Comply with specified standards as a minimum quality for the Work except when more stringent tolerances, codes, or specified requirements indicate higher standards or more precise workmanship.
- E. Perform work by persons qualified to produce workmanship of specified quality.
- F. Secure products in place with positive anchorage devices designed and sized to withstand stresses, vibration, physical distortion or disfigurement.
- G. Provide devices or utilize methods necessary for compliance with the "Trench Safety Act".

1.03 REFERENCES

- A. Conform to reference standard as identified in each individual technical specification section.

- B. Should specified reference standards conflict with Contract Documents, request clarification from ENGINEER before proceeding.
- C. The contractual relationship of the parties to the Contract shall not be altered from the Contract Documents by any reference standard or document.

1.04 INSPECTION AND TESTING LABORATORY SERVICES

- A. CONTRACTOR will appoint, employ, and pay for services of an independent firm to perform inspection and testing.
- B. The independent firm will perform inspections, tests, and other services specified in individual specification Sections and as required by the ENGINEER.
- C. Reports will be submitted by the independent firm to the ENGINEER, in duplicate, indicating observations and results of tests and indicating compliance or non-compliance with Contract Documents.
- D. Cooperate with independent firm; furnish samples of materials, design mix, equipment, tools, storage and assistance as requested.
 - 1. Notify ENGINEER and independent firm 24 hours prior to expected time for operations requiring services.
 - 2. Make arrangements with independent firm and pay for additional samples and tests required for CONTRACTOR's use.
- E. Retesting required because of non-conformance to specified requirements shall be performed by the same independent firm on instructions by the ENGINEER. The cost for retesting shall be the CONTRACTOR's responsibility.
- F. Testing to be provided by the CONTRACTOR shall include, at a minimum:
 - 1. Density testing.
 - 2. Testing of the new force main and discharge piping.
 - 3. Testing of new pumps.

PART 2 PRODUCTS

NOT USED

PART 3 EXECUTION

NOT USED

END OF SECTION

SECTION 01500

CONSTRUCTION FACILITIES AND TEMPORARY CONTROLS

PART 1- GENERAL

1.01 PERFORMANCE

- A. Section generally defines CONTRACTOR's responsibilities, unless otherwise indicated, for the following:
 - 1. Temporary Utilities: Electricity, water, and sanitary facilities.
 - 2. Temporary Controls: Barriers, enclosures and fencing, protection of the Work.
 - 3. Construction Facilities: Parking, progress cleaning, and project signage.

1.02 RELATED SECTIONS

- A. **Section 01700** – Contract Closeout.

1.03 TEMPORARY WATER SERVICE

- A. CONTRACTOR shall be responsible for obtaining construction water and construction meter and for all hauling or conveyance of water to the site.

1.04 TEMPORARY SANITARY FACILITIES

- A. CONTRACTOR shall provide and maintain required facilities.

1.05 BARRIERS AND TRAFFIC CONTROL

- A. Provide barriers to prevent unauthorized entry to construction areas and to protect existing facilities and adjacent properties from damage due to construction operations and demolition.
- B. Provide protection for natural vegetation designated to remain. Replace protected vegetation, if damaged.
- C. Protect all landscaping and decorative vegetation. Restore damaged landscaping and vegetation to its original condition.
- D. Protect non-owned vehicular traffic, stored materials, site and structures from damage.

- E. Provide signs, signals, cones, barricades and trained flagmen to direct traffic in and around the construction site in accordance with Florida Department of Transportation Work Zone Traffic Control Standards.
 - 1. Prepare a WORK ZONE TRAFFIC CONTROL PLAN and submit that plan to the appropriate officials in all municipalities and jurisdictions where the Work will impact the flow of traffic.
 - 2. Obtain written approval of that plan from all municipalities and jurisdictions, and then provide copies of the plan and all approvals to the OWNER and ENGINEER prior to the start of construction. All approvals must be obtained prior to construction.
 - 3. Keep specified areas open and accessible at all times.

1.06 PROTECTION OF INSTALLED WORK

- A. Protect installed Work and provide special protection where specified in individual specification Sections.
- B. Provide temporary and removable protection for existing and installed Products. Control activity in immediate work area to minimize damage.
- C. Provide protective coverings as needed.
- D. Protect finished floors, stairs, roadways, and other surfaces from traffic, dirt, wear, damage, or movement of heavy objects, by protecting with durable sheet materials.

1.07 SECURITY

- A. Provide security and facilities to protect Work from unauthorized entry, vandalism, or theft.

1.08 ACCESS ROADS

- A. Construct and maintain temporary roads accessing public thoroughfares to serve construction area.
- B. Extend and relocate as Work progress requires. Provide detours necessary for unimpeded traffic flow. Coordinate interruptions in normal public vehicular traffic flow with those governmental agencies having authority over each roadway.

1.09 PARKING

- A. Provide temporary parking areas to accommodate construction personnel.

- B. Temporary parking areas must not interfere with normal traffic flow or designated parking for others.
- C. Temporary parking areas must be approved by the ENGINEER and OWNER.

1.10 PROGRESS CLEANING

- A. Maintain all construction areas free of waste materials, debris, and rubbish. Maintain all sites in a clean and orderly condition.
- B. Broom and vacuum clean areas prior to start of surface finishing, and continue cleaning to eliminate dust.
- C. Remove waste materials, debris, and rubbish from site daily and dispose of at approved location.
- D. Always keep roadways, sidewalks and bicycle paths clear of construction debris and trash.
- E. Provide positive methods and apply dust control materials to minimize raising dust from construction operations, and provide positive means to prevent airborne dust from dispersing into the atmosphere. CONTRACTOR shall immediately mitigate dust upon complaint.

1.11 REMOVAL OF UTILITIES, FACILITIES, AND CONTROLS

- A. Remove temporary above grade or buried utilities, equipment, facilities, materials, prior to Final Application for Payment inspection.
- B. Remove underground installations to a minimum depth of three (3) feet. Existing dry can shall be removed to a minimum depth of six (6) feet.
- C. Clean and repair damage caused by installation or use of temporary work.
- D. 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 01600

MATERIAL AND EQUIPMENT

PART 1 - GENERAL

1.01 PERFORMANCE

- A. Section generally defines CONTRACTOR's responsibilities, unless otherwise indicated, for the following:
 - 1. Products.
 - 2. Transportation and handling.
 - 3. Storage and protection.
 - 4. Product options.
 - 5. Substitutions.

1.02 RELATED SECTIONS

- A. Instructions to Bidders: Product options and substitution procedures.
- B. **Section 01400** - Quality Control.

1.03 PRODUCTS

- A. Products: Means new material, machinery, components, equipment, fixtures, and systems forming the Work. Does not include machinery and equipment used for preparation, fabrication, conveying and erection of the Work. Products may also include existing materials or components required for reuse.
- B. Do not use materials and equipment removed from existing premises, except as specifically permitted by the Contract Documents.

1.04 TRANSPORTATION AND HANDLING

- A. Transport and handle Products in accordance with manufacturer's instructions.

- B. Promptly inspect shipments to assure that Products comply with requirements, quantities are correct, and Products are undamaged.
- C. Provide equipment and personnel to handle Products by methods which prevent soiling, disfigurement, or damage.

1.05 STORAGE AND PROTECTION

- A. Store and protect Products in accordance with manufacturer's instructions, with seals and labels intact and legible. Store sensitive Products in weather-tight, climate controlled enclosures.
- B. For exterior storage of fabricated Products, place on secure supports, above ground.
- C. Provide off-site storage and protection when site does not permit on-site storage or protection. On-site storage of products must be approved by the OWNER and ENGINEER prior to delivery.
- D. Cover Products subject to deterioration with impervious sheet covering. Provide ventilation to avoid condensation.
- E. Store loose granular materials on solid flat surfaces in a well-drained area. Prevent mixing with foreign matter.
- F. Arrange storage of Products to permit access for inspection. Periodically inspect to assure Products are undamaged and are maintained under specified conditions.

1.06 PRODUCT OPTIONS

- A. Products Specified by Reference Standards or by Description Only: Any Product meeting those standards or description.
- B. Products Specified by Naming One or More Manufacturers: Products of manufacturers named and meeting specifications, no options or substitutions allowed.
- C. Products Specified by Naming One or More Manufacturers with a Provision for Substitutions: Submit a request for substitution for any manufacturer not named.

1.07 SUBSTITUTIONS

- A. Substitutions may be considered when a Product becomes unavailable through no fault of the CONTRACTOR.
- B. Document each request with complete data substantiating compliance of proposed Substitution with Contract Documents.
- C. A request constitutes a representation that the Bidder:
 - 1. Has investigated proposed Product and determined that it meets or exceeds the quality level of the specified Product.
 - 2. Will provide the same warranty for the Substitution as for the 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 reimburse OWNER for review or redesign services associated with re-approval by the ENGINEER or governing authorities.
- D. 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 the Contract Documents.
- E. Substitution Submittal Procedure:
 - 1. Submit three copies of request for Substitution for consideration. Limit each request to one (1) proposed Substitution.
 - 2. Submit shop drawings, Product data, and certified test results attesting to the proposed Product equivalence.
- F. The 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 01700

CONTRACT CLOSEOUT

PART 1 - GENERAL

1.01 PERFORMANCE

- A. Section generally defines CONTRACTOR's responsibilities, unless otherwise indicated, for the following:
 - 1. Closeout Procedures.
 - 2. Final Cleaning.
 - 3. Adjusting.
 - 4. Warranties.

1.02 RELATED SECTIONS

- A. **Section 01500** - Construction Facilities and Temporary Controls.
- B. **Section 01720** – Record Documents.
- C. **Section 01780** – Closeout Submittals.
- D. **Section 01810** – Equipment Testing and Facility Startup.

1.03 CLOSEOUT PROCEDURES

- A. Submit written certification that the Contract Documents have been reviewed, Work has been inspected, and that Work is complete in accordance with the Contract Documents and ready for ENGINEER's inspection.
- B. Provide submittals to ENGINEER that are required by governing or other authorities.
- C. Submit final Application for Payment identifying total adjusted Purchase Order Sum, previous payments, and sum remaining due. Submit final releases of liens

from all suppliers and subcontractors as required in **Section 01780** – Closeout Submittals.

- E. Submit final record drawings in accordance with **Section 01720** – Record Documents and LRD requirements. In addition, the CONTRACTOR is to provide the required number of sets of signed and sealed Record Drawings in order to assist the ENGINEER in closing out all necessary permits.

1.04 FINAL CLEANING

- A. At completion of the Work or of a part thereof and immediately prior to CONTRACTOR's request for certificate of Substantial Completion or immediately prior to CONTRACTOR's notice of completion, clean entire site or parts thereof, as applicable.
 - 1. Leave the Work and adjacent areas affected in a cleaned condition satisfactory to OWNER.
 - 2. Remove grease, dirt, dust, paint or plaster splatter, stains, labels, fingerprints, and other foreign materials from exposed surfaces.
 - 3. Repair, patch, and touch up marred surfaces to specified finish and match adjacent surfaces.
 - 4. Broom clean exterior paved driveways and parking areas.
 - 5. Hose clean sidewalks, loading areas, and other areas contiguous with principal structures.
 - 6. Rake clean all other surfaces.
 - 7. Leave water courses, gutters, and ditches open and clean.
- B. Use only cleaning materials recommended by manufacturer of surfaces to be cleaned.

1.05 ADJUSTING

- A. Adjust operating Products and equipment to ensure smooth and unhindered operation.

1.06 WARRANTIES

- A. Provide duplicate copies.
- B. Execute and assemble documents from Subcontractors, suppliers, and Manufacturers.
- C. Provide Table of Contents and assemble in binder with durable plastic cover.
- D. Submit prior to final Application for Payment.
- E. For items of Work delayed beyond date of Substantial Completion, provide updated submittal within ten (10) days after acceptance, listing date of acceptance as start of warranty period.
- F. Provide operation and maintenance documentation.

PART 2 - PRODUCTS

NOT USED

PART 3 - EXECUTION

NOT USED

END OF SECTION

SECTION 01720

RECORD DOCUMENTS

PART 1 - GENERAL

1.1 REQUIREMENTS

- A. The CONTRACTOR shall keep and maintain, at the job site, one record copy of all Drawings, Technical Specifications, addenda, change orders, and other modifications to the Contract, approved shop drawings, and field test records.
- B. The CONTRACTOR shall provide record drawings to indicate all project conditions, locations, configurations, and any other changes or deviations which may vary from the details represented in the Drawings, including buried or concealed construction and utility features which are revealed during the course of construction. Special attention shall be given to recording the horizontal and vertical location of all buried utilities that differ from the locations indicated, or which were not indicated on the Drawings. Said record drawings shall be supplemented by any detailed sketches as necessary or directed to indicate, fully, the work as actually constructed. These master record drawings of the CONTRACTOR's representation of as-built conditions, including all revisions made necessary by addenda and change orders shall be maintained up-to-date during the progress of the work.
- C. Record drawings shall be accessible to the ENGINEER at all times during the construction period.
- D. Periodic payments must be accompanied by an updated copy of the record drawings. Pay Applications submitted without record drawings will not be processed by the ENGINEER until the drawings are received. The CONTRACTOR shall provide the following:
 - 1. One (1) set of hard copy record drawings (11"x17" drawings, to scale) and an electronic CAD file on CD.
 - 2. The record drawings for the lift stations shall show accurate locations of fence and gate(s), access driveway(s), wet well, valve vault, terminal manhole, valve/pipe fittings, emergency pump out, RPZ backflow preventer and water service back to existing water main, electrical panel, discharge force main length to furthest isolation valve or to fence or connection point to existing main, and gravity pipes connecting to existing wet well.

3. Record drawings for the gravity collection system shall show the pipe material type, size, length of pipe and slope between pipe manholes, and invert and rim elevations.
 4. Record drawings for the force main shall show the pipe material type, size, and top of pipe elevation.
 5. Provide GPS coordinates of the corners of pump station fences and center of wet well, the locations of manholes, valves, clean-outs, fire hydrants, meters, etc.
- E. Final payment will not be processed until the CONTRACTOR has prepared and delivered record as-built drawings, signed and sealed by a licensed surveyor, to the ENGINEER.
- F. Upon substantial completion of the work and prior to final acceptance, the CONTRACTOR shall finalize and deliver a complete set of signed and sealed record drawings to the ENGINEER for transmittal to the OWNER, conforming to the construction records of the CONTRACTOR. This set of drawings shall consist of corrected drawings showing the reported location of the work. The information submitted by the CONTRACTOR and incorporated by the ENGINEER into the Record Drawings will be assumed to be correct, and the CONTRACTOR shall be responsible for the accuracy of such information, and shall bear the costs resulting from the correction of incorrect data furnished to the ENGINEER and the OWNER.

1.2 RELATED REQUIREMENTS

- A. **Section 01300:** Submittals.
- B. **Section 01700:** Project Close Out.

1.3 RECORDING

- A. Label each document "PROJECT RECORD" in neat large printed letters.
- B. Record information concurrently with the progress of construction.
- C. Legibly mark drawings to record actual construction.
1. For pipelines, provide horizontal location of pipes any time the pipe passes a permanent surface reference point. Permanent reference points are as defined herein. Any deviations from the alignment shown on the Drawings must be noted.

2. For pressure pipelines, provide vertical locations at 100-foot intervals. Vertical location will be depth of cover or pipe elevation, whichever is called for on the Drawings.
 3. All fittings, including sleeves, valves, and services are to be located by two measurements to permanent surface reference points and by GPS.
 4. Permanent surface reference points are manholes, catch basins, power poles, concrete sidewalk, or concrete curbs. Edge of pavement and road intersections may not be used without the ENGINEER's approval. GPS coordinates shall also be provided.
 5. Field changes of dimension and detail.
 6. Changes made by Field Order, Change Order, or Construction Change Directive.
 7. Details not shown on the original Drawings (i.e. fire hydrants, water meters, water main, etc.).
- D. Legibly mark each Section of the Technical Specifications and Addenda to record:
1. Manufacturer, trade name, catalog number, and supplier of each item actually installed.
 2. Changes made by Field Order, Change Order, or Work Directive.

1.4 SUBMITTAL

- A. Prior to Substantial Completion, submit Record Documents to the ENGINEER for delivery to the OWNER.
- B. Accompany submittal with a transmittal letter in duplicate, containing:
1. Date.
 2. Project title and number.
 3. CONTRACTOR's name and address.
 4. Title and number of each record document.
 5. Signature of CONTRACTOR or its authorized representative.

- C. Computer generated as-built drawings shall be submitted. Data in tabular form will not be accepted. Following review by the ENGINEER and OWNER, any comments are to be addressed. On final submission, the following items shall be provided.
1. Two (2) signed and sealed sets of prints (24" x 36").
 2. The electronic drawing files must be AutoCAD and PDF format or compatible (DWG file or DXF file) submitted on compact disc (CD or DVD). All fonts and line types shall be from the standard AutoCAD library or be AutoCAD compatible. Reference files and blocks are to be bound to drawings prior to submittal. Layers and drawings created by turning on and off layers are to be documented and submitted in MS Word. As a minimum requirement, electronic files must include all features that were shown on the Drawings.
- D. Record drawings for pump stations provided by the CONTRACTOR shall address the following information:
1. Manufacturer, model number, serial numbers for each piece of equipment.
 2. For each new pump: pump type, design capacity and TDH, shutoff head, impeller size, manufacturer's pump curve reference number, horsepower, efficiency, motor speed, discharge pipe size, and discharge flange pressure rating.

PART 2 – PRODUCTS

Not Used

PART 3 – EXECUTION

Not Used

END OF SECTION

SECTION 01730

OPERATION & MAINTENANCE MANUALS

PART 1 - GENERAL

1.01 SECTION INCLUDES

- A. Detailed information for the preparation, submission, and ENGINEER's review of Operation and Maintenance (O&M) Data, as required by individual specification sections. The O&M information shall be prepared specifically for this project, and shall include all sections and organization as specified herein.

1.02 DEFINITIONS

- A. Preliminary Data: Initial and subsequent submissions for ENGINEER's review.
- B. Final Data: ENGINEER-accepted data, submitted as specified herein.
- C. Maintenance Operation: As used on Maintenance Summary Form is defined to mean any routine operation required to ensure satisfactory performance and longevity of equipment. Examples of typical maintenance operations are lubrication, belt tensioning, adjustment of pump packing glands, and routine adjustments.

1.03 SEQUENCING AND SCHEDULING

- A. Equipment and System Data.
 - 1. Preliminary Data:
 - a. Do not submit until Shop Drawing for equipment or system has been reviewed and approved by ENGINEER and OWNER.
 - b. Submit prior to shipment date.
 - 2. Materials and Finished Data
 - a. Preliminary Data: Submit at least fifteen (15) days prior to request for start-up.

- b. Final Data: Submit within ten (10) days after final inspection.

1.04 DATA FORMAT

- A. Prepare preliminary data in the form of an instructional manual. Prepare final data in data compilation format in electronic media.

- B. Instructional Manual Format:

- 1. Binder: Commercial quality, permanent, three-ring or three-post binders with durable plastic cover.
- 2. Size: 8½ inches by 11 inches, minimum.
- 3. Cover: Identify manual with typed or printed title “OPERATION AND MAINTENANCE MANUAL” and list:
 - a. Project title.
 - b. Designate Applicable system, equipment, material, or finish.
 - c. Identity of separate structure as applicable.
 - d. Identity of general subject matter covered in the manual.
- 4. Title Page
 - a. CONTRACTOR name, address, and telephone number.
 - b. Subcontractor, supplier, installer, or maintenance CONTRACTOR’s name address, and telephone number, as appropriate.
 - i. Identify area of responsibility of each.
 - ii. Provide name and telephone number of local source of supply for parts and replacement.
- 5. Table of Contents:
 - a. Neatly typewritten and arranged in systematic order with consecutive page numbers.
 - b. Identify each product by product name and other identifying numbers or symbols set forth in the Contract Documents.

6. Paper: 20 pound minimum, white for typed pages.
7. Text: manufacturer's printed data, or neatly typewritten.
8. Three-hole punch data for binding and composition; arrange printing so that punched holes do not obliterate data.
9. Material shall be suitable for reproduction, with quality equal to original. Photocopying of materials will be acceptable, except for material containing photographs.

C. Data Compilation Format:

1. Compile all ENGINEER-accepted preliminary O&M data into a hard-copy, hard-bound set.
2. Each set shall consist of the following:
 - a. Binder: Commercial quality, permanent, three-ring or three-post binders with durable plastic cover.
 - b. Cover: Identify each volume with typed or printed title "OPERATION AND MAINTENANCE MANUAL, VOLUME NO. ____ OF ____", and list:
 - i. Project title
 - ii. CONTRACTOR's name, address, and telephone number.
 - iii. If entire volume covers equipment or system provided by one supplier include the following:
 - a) Identity of general subject matter covered in the manual.
 - b) Identity of equipment number and specification section.
 - c. Provide each volume with title page and typed table of contents with consecutive page numbers. Place content of entire set, identified by volume number in each binder.
 - d. Table of contents neatly typewritten, arranged in systematic order:
 - i. Include list of each product, indexed to content of each volume.
 - ii. Designate system or equipment for which it is intended.

- iii. Identify each product by product name and other identifying numbers or symbols set forth in the Contract Documents.
- e. Section Dividers:
 - i. Heavy, 80 pound cover weight, tabbed with numbered plastic index tabs.
 - ii. Fly-leaf:
 - a) For each separate product, or each piece of operating equipment, with typed description of product and major component parts of equipment.
 - b) List with each product:
 - 1) Name address, and telephone of subcontractor, suppliers, installer and maintenance CONTRACTOR as applicable.
 - 2) Identity area of responsibility of each.
 - 3) Provide local source of supply for parts and replacement.
 - iii. Identity of separate structure as applicable.
- f. Assemble and bind material, as much as possible, in the same order as specified in the Contract Documents.
- g. Include a data sheet listing specific information for each piece of equipment including:
 - i. Capacity and/or rating (flow and head ratings, speed, etc.)
 - ii. Serial number and/or model number(s)

D. Electronic Media Format:

- 1. Portable Document Format (PDF):
 - a. After all preliminary data has been found to be acceptable to the ENGINEER, submit O&M data in PDF format on CD or DVD.
 - b. Files to be exact duplicates of ENGINEER-accepted preliminary data. Arrange by specification number and name.

- c. Files to be fully functional and viewable in the most recent version of Adobe Acrobat.

1.05 SUBMITTALS

A. Informational

1. Data outline: submit two (2) copies of a detailed outline of the proposed organization and content of the Final Manuals prior to preparation of the preliminary manuals.
2. Preliminary Data:
 - a. Submit two (2) copies for ENGINEER's review.
 - b. If data meets conditions of the Contract:
 - i. One (1) copy will be returned to the CONTRACTOR.
 - ii. One (1) copy will be forwarded to the project representative.
 - c. If data does not meet conditions of the Contract:
 - i. All copies will be returned to the CONTRACTOR with the ENGINEER's comments for revision.
 - ii. ENGINEER's comments will be retained in ENGINEER's file.
 - iii. Resubmit two (2) copies revised in accordance with the ENGINEER's comments.
3. Final Data: Submit two (2) copies in format specified herein.

1.06 DATA FOR EQUIPMENT AND SYSTEMS

A. Content for each unit (or common Units) and system:

1. Product Data:
 - a. Include only those sheets that are pertinent to specific product.
 - b. Clearly annotate each sheet to:
 - i. Identify specific product or part installed.
 - ii. Identify data applicable to installation.
 - iii. Delete references to inapplicable information.

- iv. For data listed in tables, highlight the appropriate data with pointer marking “USE -->”.
 - c. Function, normal operating characteristics, and limiting conditions.
 - d. Performance curves, engineering data, nameplate data, and tests.
 - e. Complete nomenclature and commercial number of replaceable parts.
 - f. Original manufacturer’s part list, illustrations, detailed assembly drawings showing each part with part numbers and sequentially numbered part list, and diagrams required for maintenance.
 - g. Spare parts ordering instructions.
 - h. Where applicable, identify installed spares and other provisions for future work (e.g. reserved panel space, unused components, wiring, terminals)
2. As-installed, color coded piping diagrams.
 3. Charts of valve tag numbers, with the location and function of each valve.
 4. Drawings: Supplement product data with Drawings as necessary to clearly illustrate:
 - a. Format:
 - i. Provide reinforced, punched, binder tab: bind in with text.
 - ii. Reduced to 8½ inches by 11 inches, or 11 inches by 17 inches folded to 8½ inches by 11 inches.
 - iii. Where reduction is impractical, fold and place in 8½ inches by 11 inches envelopes bound in text.
 - iv. Identify specification section and product on drawings and envelopes.
 - b. Relations of component parts of equipment and systems.
 - c. Control and flow diagrams.

- d. Coordinate drawings with Project record documents to assure correct illustration of completed installation.
- 5. Instructions and procedures: Within text, as required to supplement product data.
 - a. Format:
 - i. Organize in consistent format under separate heading for each different procedure.
 - ii. Provide logical sequence of instructions for each procedure.
 - iii. Provide information sheet for OWNER's personnel, including:
 - a) Proper procedures in the event of failure.
 - b) Instances that might affect validity of guarantee or bond.
 - b. Installation instructions: Including alignment, adjusting, calibrating, and checking.
 - c. Operating procedures:
 - i. Startup, break-in, routine, and normal operating instructions.
 - ii. Test procedures and results of factory tests where required.
 - iii. Regulation, control, stopping, and emergency instructions.
 - iv. Description of operating sequence by control manufacturer.
 - v. Shutdown instructions for both short and extended duration.
 - vi. Summer and winter operating instructions, as applicable.
 - vii. Safety precautions.
 - viii. Special operating instructions.
 - d. Maintenance and Overhaul procedures:
 - i. Routine maintenance.
 - ii. Guide to troubleshooting.
 - iii. Disassembly, removal, repair, reinstallation, and reassembly.
- 6. Start-up information and test reports.
- 7. Guarantee, bond, and service agreement: in accordance with **Section 01780 - Closeout Submittals.**

- B. Content for each electronic item or system:
1. Description of unit and component parts:
 - a. Function, normal operating characteristics, and limiting conditions.
 - b. Performance curves, engineering data, nameplate data, and tests.
 - c. Complete nomenclature and commercial number of replaceable parts.
 - d. Interconnection wiring diagrams, including control and lighting systems.
 2. Circuit directories of panelboard:
 - a. Electrical service.
 - b. Controls.
 - c. Communication.
 3. List of electrical relay settings, and control and alarm contact settings.
 4. Electrical interconnection wiring diagram, including control and lighting systems.
 5. As-installed control diagrams by control manufacturer.
 6. Operating procedures:
 - a. Routine and normal operating instructions.
 - b. Sequences required.
 - c. Safety precautions.
 - d. Special operating instructions.
 7. Maintenance procedures:
 - a. Routine maintenance.

- b. Guide to troubleshooting.
 - c. Adjustment and checking.
 - d. List of relay settings, control, and alarm contact settings.
- 8. Manufacturer's printed operating and maintenance instructions
 - 9. List of original manufacturer's spare parts, manufacturer's current prices, and recommended quantities to be maintained in storage.
 - 10. Start-up information and test reports.

C. Maintenance summary

- 1. Compile individual maintenance summary for each applicable equipment item, respective unit or system, and for components of subunits.
- 2. Format:
 - a. Use maintenance summary form bound with this section.
 - b. Each maintenance summary may take as many pages as needed.
 - c. Use only 8½ inch by 11 inch paper.
 - d. Complete using typewriter or electronic printing.
- 3. Include detailed lubrication instructions and diagrams showing points to be greased or oiled; recommended type, grade, and temperature range of lubricants and frequency of lubrication.
- 4. Recommended spare parts:
 - a. Data to be consistent with manufacturer's bill of materials / parts list furnished in the O&M Manuals.
 - b. "Unit" is the unit of measure for ordering the part
 - c. "Quantity" is the number of units recommended.
 - d. "Unit Cost" is the current purchase price.

1.07 DATA FOR MATERIALS AND FINISHES

- A. Content for architectural products, applied materials and finishes:
 - 1. Manufacturer's data, giving full information on products:
 - a. Catalog number, size, and composition.
 - b. Color and texture designations.
 - c. Information required for reordering special manufactured products
 - 2. Instructions for care and maintenance
 - a. Manufacturer's recommendation for types of cleaning agents and methods.
 - b. Cautions against cleaning agents and methods that are detrimental to product.
 - c. Recommended schedule for cleaning and maintenance.
- B. Content for moisture protection and weather exposed products.
 - 1. Manufacturer's data, giving full information on products:
 - a. Applicable standards.
 - b. Chemical composition.
 - c. Details of installation.
 - 2. Instructions for inspection, maintenance and repair.

1.08 SUPPLEMENTS

- A. The supplement listed below, following "END OF SECTION," are part of this specification.
 - 1. Form: Maintenance Summary Form.

PART 2 - PRODUCTS **NOT USED**

PART 3 - EXECUTION
NOT USED

END OF SECTION

MAINTENANCE SUMMARY FORM

PROJECT: _____ CONTRACT NO.: _____

1. EQUIPMENT ITEM _____

2. MANUFACTURER _____

3. EQUIPMENT/TAG NUMBER _____

4. WEIGHT OF INDIVIDUAL COMPONENTS (OVER 100 POUNDS) _____

5. NAMEPLATE DATA (hp, voltage, speed, etc.) _____

6. MANUFACTURER'S LOCAL REPRESENTATIVE _____

a. Name _____ Telephone No. _____

b. Address _____

7. MAINTENANCE REQUIREMENTS

Maintenance Operation Comments	Frequency	Lubricant (If Applicable)
List briefly each maintenance operation required and refer to specific information in manufacturer's standard maintenance manual, if applicable. (Reference to manufacturer's catalog or sales literature is not acceptable.	List required frequency of each maintenance operation.	Refer by symbol to lubricant required.

8. LUBRICANT LIST

Reference Symbol	Shell	Exxon Mobil	Chevron Texaco	BP Amoco	Or Equal
List Symbols used in No. 7 above	List equivalent lubricants as distributed by each manufacture for the specific use recommended.				

9. RECOMMENDED SPARE PARTS FOR OWNER'S INVENTORY

Part No.	Description	Unit	Quantity	Unit Cost
Note: Identify parts provided by this Contract with two asterisks.				

SECTION 01750

GENERAL REQUIREMENTS

PART 1 - GENERAL

1.01 PERFORMANCE

A. Section generally defines CONTRACTOR's responsibilities, unless otherwise indicated, for the following:

1. Preservation of Property.
2. Siltation and Bank Erosion.
3. Utility Construction and Adjustment.
4. CONTRACTOR's Responsibility.
5. Use of Chemicals.
6. Progress of Work.
7. OSHA.
8. Utilities and Structures Shown on the Plans.
9. Drainage.
10. Restoration of Surface Improvements.
11. Hours of Operation.

1.02 PRESERVATION OF PROPERTY

- A. Preserve from damage all property along the line of the work, or which is in the vicinity of or is in any way affected by the work, the removal or destruction of which is not called for by the plans.
- B. Wherever such property is damaged due to the activities of the CONTRACTOR, it shall be immediately restored to its original condition by the CONTRACTOR at no cost to the OWNER.

- C. In case of failure on the part of the CONTRACTOR to restore such property, or make good such damage or injury, the OWNER may, after 48 hours notice to the CONTRACTOR, proceed to repair, rebuild or otherwise restore such property as may be deemed necessary and the cost thereof will be deducted from any monies due or which may become due the CONTRACTOR under this contract.

1.03 SILTATION AND BANK EROSION

- A. Take adequate precautions to minimize siltation and bank erosion in the vicinity of canals or ditches, in discharging well point systems or during other construction activities.
- B. If well pointing, the CONTRACTOR shall notify the South Florida Water Management District and procure and necessary permits.

1.04 UTILITY CONSTRUCTION AND ADJUSTMENT

- A. Bid items for pipe, pump stations, drainage structures, electrical, instrumentation, and appurtenances are for new work only.
- B. Bids for these items shall include all work incidental thereto, such as pavement repair, existing pond lining repair, sodding, landscape and irrigation repair, sidewalk, and all other required restoration work unless otherwise called for.
- C. Where it is necessary to relocate, lower or otherwise adjust existing mains and appurtenances as may be required to accomplish the new pipeline construction, the cost of work shall be included in the unit prices or lump sum price for such new pipeline.

1.05 CONTRACTOR'S RESPONSIBILITY

- A. The CONTRACTOR shall be held strictly responsible for all parts of the work.
- B. If failures in the Work develop within one (1) year from the date of final acceptance, the CONTRACTOR shall be required to replace all faulty material at his full expense. A one (1) year warranty walkthrough shall be attended by the CONTRACTOR with the ENGINEER and South Martin Regional Utility.
- C. The CONTRACTOR is advised to purchase material under a guarantee from the Manufacturer, guaranteeing proper service under conditions that are established by the drawings, specifications and local conditions.

D. The CONTRACTOR shall also be responsible for the following:

1. Charges by others for assistance to the CONTRACTOR for such work as supporting, replacing, moving or providing protection for their facilities as necessitated by the CONTRACTOR's operation.
2. All costs of restoration of the work site to condition equal or better than prior to construction, including landscaping and irrigation systems.
3. All costs of restoration of pavements and structures damaged by the CONTRACTOR's operation. Likewise the CONTRACTOR shall pay all costs of restoring all work areas and all areas where construction materials are stored, whether new materials to be installed or materials removed from the work area incidental to the work solely to the satisfaction of the OWNER.
4. All public liability, property damage and contractual liability insurance required by others to permit the CONTRACTOR's operation.

1.06 USE OF CHEMICALS

- A. Any chemical used by the CONTRACTOR during the course of construction shall meet the regulatory requirements of either the Environmental Protection Agency (EPA) or the United States Department of Agriculture (USDA), and shall be approved by the ENGINEER prior to use.

1.07 PROGRESS OF WORK

- A. If at any time, the materials and appliances to be used appear to the ENGINEER as insufficient or improper for securing the quality of work or rate of progress required for the project, he may order the CONTRACTOR to increase his efficiency or improve the character of work.
- B. The failure of the ENGINEER to demand any increase of such efficiency or improvement shall not release the CONTRACTOR from his obligation to secure the quality of work or the rate of progress necessary to complete the work within the limits imposed by the Contract.

1.08 OSHA

- A. CONTRACTOR must comply with the Department of Labor, Safety and Health Regulations for construction promulgated under the Occupational Safety and

Health Act of 1970 (PL 91-956) and under Section 107 of the Contract Work Hours and Safety Standards Act (PL 91-54).

1.09 UTILITIES AND STRUCTURES SHOWN ON THE PLANS

- A. Existing utilities and facilities are shown on the contract drawings only for the convenience of all parties concerned and were established without guarantee as to their accuracy or completeness of location.
- B. Because of conflicting and sometimes erroneous information, certain facilities may not be located precisely as shown, or may be omitted entirely.
- C. Prior to performing any work, the CONTRACTOR shall determine, by site inspection including soft digs by hand excavation or vacuum-assisted excavation, or otherwise, all pertinent data concerning the existing utilities, structures, and facilities, including the request of each utility agency to advise him of the location of their facilities in the work vicinity.
- D. The CONTRACTOR shall be completely responsible for the relocation, as required, of existing utilities and structures with such work accomplished at no additional cost to the OWNER.
- E. The OWNER and ENGINEER will assume no liability for damages sustained or costs incurred because of the CONTRACTOR's operations in the vicinity of the existing utilities or structures.
- F. The CONTRACTOR shall schedule his work in such a manner that he is not delayed by the utility companies relocating or supporting their utilities. No compensation shall be made for such loss of time.
- G. The position of certain structures and utilities directly affects the proposed construction. Therefore, in order to insure that the proposed work can actually be positioned as planned, the CONTRACTOR shall make any excavation necessary for location of structures and utilities prior to construction of that particular portion of the job.
- H. All overhead, surface or underground structures encountered in trenching, whether shown on the Plans or not shown on the Plans, are to be carefully protected from injury or displacement, and all damage to such structures is to be completely repaired within a reasonable time; otherwise, the ENGINEER may give twenty-four (24) hour notice to the CONTRACTOR, then repair the damage at the CONTRACTOR's expense.

- I. All such repairs made by the CONTRACTOR are to be made to the satisfaction of the ENGINEER; all damaged pipes must be replaced or prevented from leaking. Also, all such repairs are to be inspected by the ENGINEER prior to backfilling. The CONTRACTOR must carefully protect from disturbance or injury, all monuments, stakes and bench marks, and shall not excavate nearer than five feet (5') to any of them until they have been removed, witnessed or otherwise disposed of by the ENGINEER.

1.10 DRAINAGE

- A. Grading shall be controlled in the vicinity of excavations so that the surface of the ground will be properly sloped to prevent water from running into trenches or other excavated areas.
- B. Any water that accumulates in the excavations shall be removed promptly by well point or by other means satisfactory to the ENGINEER in such a manner as to not create a nuisance to adjacent property or public thoroughfare.
- C. Trenches shall be kept dry while pipe is being laid. Bridging of dewatering pipe shall be provided where necessary.
- D. Pumps and engines for well point systems shall be operated with mufflers, at a minimum noise level suitable to a residential area.
- E. The CONTRACTOR will not be allowed to discharge water into any storm drainage system without the written approval of the OWNER of that system.
- F. Approval will be subject to the conditions that the storm sewer be returned to its original conditions.
- G. The CONTRACTOR is responsible for carrying the water to the OWNER's onsite storm water management system or nearby body of water and for obtaining the necessary permission to use same.
- H. The CONTRACTOR shall be financially responsible for any nuisance or damage created due to carrying off water from his drainage system.

1.11 RESTORATION OF SURFACE IMPROVEMENTS

- A. Roadways, including shoulders, alleys and driveways of shell, limerock, asphalt, concrete, stabilized soil or gravel, grade plots, sod, shrubbery, ornamental trees, signs, mailboxes, fences, irrigation systems, or other surface improvements on public or private property which have been damaged or removed in excavating or

other construction operations, shall be restored to conditions equal to or better than conditions existing prior to beginning work.

- B. Turf restoration shall consist of sodding and not seed and mulching.
- C. CONTRACTOR is urged to investigate existing irrigation systems in order to minimize repair work necessary. No extra costs will be paid as a result of damage to existing irrigation systems.
- D. The cost of doing this work shall be included in the cost of the various applicable items or the lump sum priced proposal items unless a separate payment item has been established for specific restoration Work.
- E. Pre-Construction Audio Video DVDs - as specified will be used as an aid in determining conditions prior to construction.

1.12 HOURS OF OPERATION

- A. The CONTRACTOR is hereby informed and understands that certain noise between the hours of 6:00 PM and 8:00 AM is restricted. Therefore, the work is restricted during these hours, unless emergency conditions exist that are endangering life or property, as may be determined by the ENGINEER.
- B. If the CONTRACTOR is authorized to operate equipment twenty-four (24) hours per day, the engines shall be provided with residential type silencers approved by the ENGINEER.
- C. The CONTRACTOR will not be authorized to work Saturdays, Sundays or holidays unless the CONTRACTOR agrees to reimburse the OWNER for all expenses incurred and provided that such work is prior to the commencement of work.

PART 2 - PRODUCTS

NOT USED

PART 3 - EXECUTION

NOT USED

END OF SECTION

SECTION 01780

CLOSEOUT SUBMITTALS

PART 1 - GENERAL

1.01 SUBMITTALS

A. Informational Submittals:

1. Submit prior to application for final payment.
 - a. Record Documents: As required in **Section 01720** – Record Documents.
 - b. Operation and Maintenance Manuals: As required in **Section 1730** – O&M Manuals.
 - c. Approved Shop Drawings and Samples: As required in **Section 01300** – Submittals.
 - d. Special Bonds, Special Guarantees, and Service Agreements.
 - e. Consent of Surety to Final Payment: As required in General Conditions.
 - f. Releases of Waivers of Liens and Claims: As required in General Conditions.
 - g. Releases from Agreements.
 - h. Final Application for Payment: Submit in accordance with procedures and requirements stated in **Section 01200** - Measurement and Payment.
 - i. Extra Materials: As required by individual Specification Sections.

1.02 RECORD DOCUMENTS

A. Quality Assurance.

1. Furnish qualified and experienced person, whose duty and responsibility shall be to maintain record documents.

2. Accuracy of Records:
 - a. Coordinate changes within record documents, making legible and accurate entries on each sheet of Drawings and other documents where such entry is required to show change.
 - b. Purpose of Project record documents is to document factual information regarding aspects of the Work. Both concealed and visible, to enable future modification of the Work to proceed without lengthy and expensive site measurement, investigation, and examination.
3. Make entries within twenty-four (24) hours after receipt of information that a change in the Work has occurred.
4. CONTRACTOR shall maintain a red-lined set or record drawings throughout the duration of the project. ENGINEER may review and approval of current status of record documents along with each pay request. Failure to properly maintain and update record documents may result in a deferral by ENGINEER to recommend whole or any part of CONTRACTOR's Application for Payment, either partial or final.

PART 2 – PRODUCTS
NOT USED

PART 3 - EXECUTION

3.01 MAINTENANCE OF RECORD DOCUMENTS

- A. General:
 1. Promptly following commencement of Contract Times, secure from ENGINEER at no cost to CONTRACTOR, one complete set of Contract Documents. Drawings will include a full-size and digital set.
 2. Delete ENGINEER title block and seal all documents.
 3. Label or stamp record document with title, "RECORD DOCUMENTS," in neat large printed letters.
 4. Record information concurrently with construction progress and within twenty-four (24) hours after receipt of information that change has occurred. Do not cover or conceal Work until required information is recorded.

B. Preservation:

1. Maintain documents in a clean, dry, legible condition and in good order. Do not use record documents for construction purposes.
2. Make documents and Samples available at all times for observation by ENGINEER.

C. Making Entries on Drawings:

1. Using an erasable colored pencil (not ink or indelible pencil), clearly describe change by graphic line and note as required.
 - a. Color Coding:
 - i. Green when showing information deleted from Drawings.
 - ii. Red when showing information added to Drawings.
 - iii. Blue and circled in blue to show notes.
2. Date entries.
3. Call attention to entry by “cloud” drawn around area or areas affected.
4. Legibly mark to record actual changes made during construction, including but not limited to:
 - a. Depths of various elements of foundation in relation to finished first floor data if not shown or where depth differs from that shown.
 - b. Horizontal and vertical locations of existing and new Underground Facilities and appurtenances, and other underground structures, equipment, or Work. Reference to at least two measurements to permanent surface improvements.
 - c. Location of internal utilities and appurtenances concealed in the construction referenced to visible and accessible features of the structure.
 - d. Locate existing facilities, piping, equipment, and items critical to the interface between existing physical conditions or construction and new construction.
 - e. Changes made by Addenda and Field Orders, Work Change Directive, Change Order, Written Amendment, and ENGINEER’s written interpretation and clarification using consistent symbols for each and showing appropriate document tracking number.

5. Dimensions on Schematic Layouts: Show on record drawings, by dimension, the centerline of each run of items such as are described in previous subparagraph above.
 - a. Clearly identify the item by accurate note such as “cast iron drain,” “galv. water,” and the like.
 - b. Show by symbol or note, vertical location of item (“under slab,” “in ceiling plenum,” “exposed,” and the like).
 - c. Make identifications so descriptive that it may be related reliably to Specifications.

END OF SECTION

DIVISION 2

SITEWORK

SECTION 02000

UTILITY CONSTRUCTION

PART 1 - GENERAL

1.01 WORK INCLUDED

- A. This specification governs the construction of all Loxahatchee River District gravity sewers, sewer services, force mains, low pressure sewer services, low pressure force mains, lift stations, reclaimed water mains, and all appurtenant devices associated therewith.

1.02 LOXAHATCHEE RIVER DISTRICT MINIMUM CONSTRUCTION STANDARDS

- A. Construction of the facilities identified herein shall be in accordance with the latest edition of the "Loxahatchee River Environmental Control District Manual of Minimum Construction Standards and Technical Specifications" (LRDMCS), which are presented within this document as Appendix A.
- B. Construction of the facilities identified herein will also be in accordance with the applicable portions of the Florida Department of Transportation Standard Specifications for Road and Bridge Construction, Latest Edition, all referenced specifications, and the ENGINEER's project manual.
- C. In the event of a conflict between any governing specifications, the more stringent requirement shall govern construction of this project.

1.03 RESTORATION

- A. Full and complete restoration of all existing facilities will be accomplished to the sole satisfaction of the OWNER without additional compensation to the CONTRACTOR. The cost of all restoration will be included in the lump sum or unit bid price and no separate payment item for restoration will be established in the schedule of values developed subsequent to bidding.

PART 2 - MATERIALS

2.01 GENERAL

- A. All construction materials shall comply with the requirements of the LRDMCS as outlined therein. All parts of the LRDMCS that are applicable shall govern unless a more stringent standard is listed in the Contract Documents or required by other permitting agencies.

PART 3 - EXECUTION

3.01 CONSTRUCTION

- A. All phases of construction, including but not limited to, trenching, pipe laying, backfilling, pipeline flushing, and surface restoration shall comply with the requirements of Part 1.02 as noted in this section.
- B. Pipeline backfill not beneath paved surfaces shall be compacted to a minimum density of 98 percent of AASHTO T-180 or as required by governmental agencies having jurisdiction over the Work.

3.02 TESTING

- A. All testing, including but not limited to, trench earthwork density testing, and pipeline pressure testing shall comply with the requirements of this specification, the LRDMCS, "Florida Department of Transportation Standard Specifications for Road and Bridge Construction", Latest Edition, and the Palm Beach County Health Department.
- B. Backfill density test locations will be examined in accordance with the requirements listed on the trenching details shown on the engineering drawings.
- C. The CONTRACTOR will use the OWNER's testing laboratory (GFA International) for all testing.
- D. The OWNER will pay for all passing tests and the CONTRACTOR will pay for any failed tests and wait time for any retesting made necessary by failure to perform in accordance with the project specifications.
- E. Retesting locations around all failing tests will be located at the original test location.
- F. Retest only after re-compaction of a failing test area.
- G. Hydrostatic Testing
 - 1. Hydrostatic testing shall be performed in accordance with **Section 140 – Pipeline Integrity Tests**.

3.03 WARRANTY/PROJECT DOCUMENTATION

- A. All warranties and project documentation, including but not limited to record drawings and payment applications, shall comply with the requirements of this specification.

3.04 COORDINATION

- A. All coordination of construction shall primarily occur between the CONTRACTOR and the ENGINEER. The Engineer of Record for design of this construction project is Holtz Consulting Engineers, Inc. The ENGINEER will aid the OWNER in evaluation of technical questions, coordination of the work, resolution of technical and payment disputes, and regulatory certification of the project. The ENGINEER's direct representative on this project will be:

Christine Miranda, PE, (561) 575-2005

- B. The OWNER's direct representative who will perform the coordination activities is:

Mr. Kris Dean, PE, Director of Engineering, (561) 747-5700

- C. The Utilities to coordinate with are, at a minimum:

1. Martin County.
2. Village of Tequesta.
3. Florida Power and Light.
4. AT&T.
5. Bellsouth.
6. Comcast Cable.
7. Florida Public Utilities.
8. Other applicable utilities.

3.05 PERMITS

- A. The OWNER and ENGINEER will obtain construction permits from the FDEP, where applicable. If applicable, license agreements and easements for construction on public and private property will also be obtained by the OWNER and ENGINEER.
- B. The CONTRACTOR will obtain and pay for any dewatering, Martin County U-2 permits, building or other permits necessary to perform the Work, except as identified above.

END OF SECTION

SECTION 02140

DEWATERING

PART 1 - GENERAL

1.01 SECTION INCLUDES

- A. Dewatering methods for utility and structural installation.

1.02 RELATED SECTIONS

- A. All of Division 1.
- B. Division 2 - Pipe and Structures (As Applicable).

1.03 PAYMENT

- A. Unless noted otherwise on the Bid Form, no separate payment will be made for Work covered under this Section. All costs in connection therewith or incidental thereto are to be included in the respective Contract price for the item or structure to which the Work pertains.

PART 2 - PRODUCTS

NOT USED

PART 3 - EXECUTION

3.01 PUMPING AND DRAINAGE

- A. The CONTRACTOR shall be responsible for determining all dewatering requirements and governmental regulations prior to commencement of work including, but not limited to, methods of drainage, removal of water, disposal of water and permitting.
- B. The CONTRACTOR shall bear all costs associated with dewatering including costs of damage to property caused by dewatering.
- C. The CONTRACTOR shall provide and maintain all necessary facilities and equipment to remove all water entering excavations and shall keep such excavations dry so as to obtain a satisfactory undisturbed subgrade foundation condition until the fills, structures or pipes to be built thereon have been completed to such extent that

they will not float or otherwise be damaged by allowing water levels to return to natural levels.

- D. Dewatering shall be conducted by a well point type system and in such a manner as to preserve the undisturbed bearing capacity of the subgrade soils at proposed bottom of excavation and to preserve the integrity of adjacent structures. Well point system installation shall be constructed with proper sand filters to prevent drawing of finer grained soil from the surrounding ground. Sump installation, over excavation of trenches, and rocking shall not be allowed as a method of dewatering.
- E. Water entering the excavation from surface runoff shall be collected in shallow ditches around the perimeter of the excavation, drained to sumps, and pumped from the excavation to maintain a bottom free from standing water.
- F. The CONTRACTOR shall take all additional precautions to prevent uplift of any structure during construction.
- G. The conveying of water in open ditches or trenches will not be allowed. Permission to use any storm sewers, or drains, for water disposal purposes shall be obtained from the authority having jurisdiction. Any requirements and costs for such use shall be the responsibility of the CONTRACTOR. However, the CONTRACTOR shall not cause flooding by overloading or blocking up the flow in the drainage facilities, and shall leave the facilities unrestricted and as clean as originally found. Any damage to facilities shall be repaired or restored as directed by the OWNER or the authority having jurisdiction, at no cost to the OWNER.
- H. Flotation shall be prevented by the CONTRACTOR by maintaining a positive and continuous operation of the dewatering system. The CONTRACTOR shall be fully responsible and liable for all damages, which may result from failure of this system.
- I. Removal of dewatering equipment shall be accomplished after the system is no longer required; the material and equipment constituting the system shall be removed by the CONTRACTOR. Well point holes shall be filled with a suitable material.
- J. The CONTRACTOR shall take all necessary precautions to preclude the accidental discharge of fuel, oil, etc., in order to prevent adverse effects on groundwater quality.
- K. CONTRACTOR shall provide for and be responsible for the prevention, control and abatement of erosion and water pollution until completion of the Project. CONTRACTOR shall provide all temporary erosion control features necessary to prevent, control and abate erosion and water pollution. During the construction of the project, the CONTRACTOR shall comply with the Water Quality Standards of the State of Florida and applicable provisions of any NPDES permits in effect.

3.02 DEWATERING PERMITS

- A. The CONTRACTOR shall be responsible for obtaining all necessary dewatering permits and for paying all associated application and permit fees. The District will reimburse the Contractor for any permitting fees associated with obtaining the dewatering permit.

END OF SECTION

SECTION 02210

GRADING

PART 1 - GENERAL

1.01 PERFORMANCE

- A. Section generally defines CONTRACTOR's responsibilities unless otherwise indicated, for the following:
 - 1. Finish grading of subsoil.
 - 2. Placing, leveling and compacting topsoil.

1.02 RELATED SECTIONS

- A. All of Division 1.
- B. **Section 02936** – Sodding.

1.03 PROTECTION

- A. Protect landscaping and other features remaining as final work.
- B. Protect existing structures, utility poles, fences, roads, paving, curbs, sidewalks, etc.

PART 2 - PRODUCTS

2.01 MATERIALS

- A. Reused top soil or subsoil organically enhanced with appropriate compost material shall be used to perform all final grading operations in preparation for establishment of a live and healthy grass cover.

PART 3 - EXECUTION

3.01 INSPECTION

- A. Verify site conditions and note irregularities affecting work of this Section.

3.02 SUBSOIL PREPARATION AND COMPACTION

- A. Eliminate uneven areas and low spots.
- B. Remove debris, roots, branches, stones, in excess of ½-inch in size and dispose of at an approved site.
- C. Place and compact needed fill in lifts having a maximum unconsolidated thickness of twelve (12) inches.
- D. Compact fill to 98 percent of maximum density as determined by AASHTO Method T-180 using mechanical tamping equipment. Use a minimum amount of water to adjust fill moisture content if necessary.
- E. Restore the surface to the original grade wherever settlement occurs.

3.03 PLACING TOPSOIL

- A. Place topsoil in areas where seeding, sodding, planting is scheduled.
- B. Use topsoil in relatively dry state. Place during dry weather.
- C. Fine grade topsoil eliminating rough or low areas. Maintain levels, profiles, and contours of subgrade.
- D. Remove stone, roots, grass, weeds, debris, and foreign material while spreading.
- E. Manually spread topsoil around trees and plants to prevent damage.
- F. Lightly compact roll placed topsoil.
- G. Remove surplus subsoil and topsoil from site.
- H. Leave stockpile area and site clean and ready to receive landscaping.
- I. Top soil to match existing depth, or two inches, whichever is greater.

3.04 TOLERANCES

- A. Top of topsoil: Plus or minus ½-inch.

3.05 SCHEDULE OF LOCATION

- A. The following identifies compacted topsoil thicknesses for various locations.
1. Sod: Two (2) inches.

END OF SECTION

SECTION 02270

EROSION, SEDIMENTATION AND DUST CONTROL

PART 1 - GENERAL

1.01 DESCRIPTION OF WORK

- A. Work consists of control measures as required during the life of the Contract to control erosion, sedimentation and dust.
- B. The CONTRACTOR shall establish, construct and maintain erosion and sediment control measures. The erosion control programs shall be maintained during the entire period of construction, including any extensions in Contract time.
- C. Temporary erosion and pollution control shall include construction work off-site where such work is necessary as a result of borrow pit operations, haul roads or equipment storage sites, etc.
- D. Preparation of the Stormwater Pollution Prevention Plan (SWPPP), including modifications and updates.
- E. Obtain and comply with all provisions of the State of Florida, Department of Environmental Protection, Permit for Stormwater Discharge from Large and Small Construction Activities (NPDES Construction Site Permit Program)

1.02 REFERENCES

- A. Rule 62-40.432, F.A.C.
- B. The Florida Development Manual: A Guide to Sound Land and Water Management (DEP, 1988) and any subsequent amendments.
- C. 40 CFR Part 122.
- D. Chapter 403.0885, F.S.
- E. FDOT Standard Specifications for Road and Bridge Construction, Section 104, Latest Edition.
- F. State of Florida Department of Environmental Protection Generic permit for Stormwater Discharge from Large and Small Construction Activities – Notice of Termination of Generic Permit Coverage immediately following this section.

PART 2 - PRODUCTS

NOT USED

PART 3 - EXECUTION

3.01 PREVENTION, CONTROL AND ABATEMENT OF EROSION AND WATER POLLUTION

- A. All work shall be in accordance with the requirements of the State of Florida Department of Environmental Protection under Chapter 62-621, F.A.C. or Chapter 62-620, F.A.C.
- B. The CONTRACTOR shall provide for and be responsible for the prevention, control and abatement of erosion and water pollution until completion and acceptance of the Project. The CONTRACTOR shall provide all temporary erosion control features necessary to prevent, control and abate erosion and water pollution, and shall prepare and submit as the operator and permittee, along with the applicable application fee, the "Notice of Intent to Use Generic Permit for Stormwater Discharge from Large and Small Construction Activities" (NOI) prior to commencing construction and the "Notice of Termination" (NOT) upon final completion of construction. The CONTRACTOR, as required by the NPDES permit program, shall prepare a stormwater pollution prevention plan (SWPPP). This SWPPP shall be modified and updated by the CONTRACTOR as necessary, to meet the requirements of the NPDES permit issued, at no additional cost to the OWNER. The CONTRACTOR shall also comply with the inspections, maintenance, reporting and all other provisions of the NPDES permitting program, and the cost for the compliance with this program is to be included in the CONTRACTOR bid price for the work.
- C. During the construction of the Project, the CONTRACTOR shall comply with the Water Quality Standards of the EPA and the State of Florida.
- D. The CONTRACTOR shall meet and be responsible for the requirements of all applicable governing agencies regarding prevention, control and abatement of erosion and water pollution.

3.02 DAMAGE TO WATER DETENTION AND DRAINAGE AREAS

- A. The CONTRACTOR shall be responsible for the prevention of damage to detention ponds, holding areas, drainage canals or natural waterways, and wetlands (both on and off site).
- B. The CONTRACTOR shall act as directed to correct said damage as quickly as

possible and take necessary steps to prevent future damage. The CONTRACTOR shall notify the ENGINEER of said damage.

- C. The cost of correction of damage shall be at no cost to the OWNER or his agents.

3.03 DUST CONTROL

- A. The CONTRACTOR shall exercise precautionary measures to minimize dust emissions as necessary, which may include, but shall not be limited to, periodic sprinkling or wetting of the site, and shall modify measures to be implemented, as necessary, to satisfy jurisdictional agency requirements including but not limited to Palm Beach County and the Palm Beach County Health Department (Air Pollution Division) at no additional expense to the OWNER.

END OF SECTION

SECTION 02731

REHABILITATION OF SEWER UTILITIES

PART 1 -- GENERAL

1.1 THE REQUIREMENT

- A. Furnish all labor, materials, equipment, and incidentals required to install open cut point repairs to rehabilitate existing sewers with limited defects as shown on the Drawings or as directed by the Construction Manager. These repairs are intended to address specific, local defects such as fractures, separated/open joints, holes, voids, sheared pipe, infiltration sources, etc., identified by closed circuit television (CCTV) inspection generally of a singular structural nature and not requiring rehabilitation for the entire manhole-to- manhole length.
- B. Furnish all labor, materials, equipment, and incidentals required to conduct post-rehabilitation CCTV inspections and other requirements described herein for final point repair acceptance.

1.2 SUMMARY

- A. Methods, procedures and requirements are similar when sections of existing pipe have been crushed, cracked, or settled, or have holes in them and are to be replaced with new pipe. Generally, point repairs are made at specific locations and involve relatively short lengths of sewer or fittings (up to 15 feet) which are to be repaired or replaced.
- B. Locations where point repairs are to be made will be made available to the CONTRACTOR through Work Orders and will be based on previously performed smoke tests and television surveys. It is understood that the exact location of pipe leaks and failures cannot always be determined before the pipe is exposed because the smoke injected into the existing pipe to detect their presence can migrate through passages in the earth, and overburden, and may not emerge directly over the leak or failure.
- C. It is also understood that the smoke testing and closed circuit television surveys performed by others prior to the commencement of this project cannot always determine the precise cause of leakage or failure. The pipe shall be exposed and the source located, examined and evaluated before repairs are made. Additional smoke shall be introduced into the pipe by the CONTRACTOR to aid in the final evaluation and determination of required work if necessary to locate the area to be repaired.
- D. After each designated Point Repair has been made, the Contractor will perform a CCTV inspection. The CCTV video and inspection report will be submitted to the OWNER for review. The cost of the CCTV inspection shall be included in the unit price for the Point Repair. If a repaired joint or section should prove to be defective,

the Contractor shall re-perform the work at no additional cost to the OWNER and shall also be responsible for the costs of any re-inspection required by the OWNER to document the success of the re-work. Where work is to be performed on private property, the CONTRACTOR shall consult with the OWNER who will make arrangements and schedules with the property owners before the CONTRACTOR performs the work.

- E. Excavation, backfill, exploratory excavation, sheeting and shoring, dewatering, conflicts with other utilities, and miscellaneous work shall conform to the requirements of Section 100 Excavation, Backfill, Fill and Grading

1.3 CONTRACTOR SUBMITTALS

- A. The CONTRACTOR shall submit shop drawings in accordance with Section 01300 Submittals.

1.4 QUALIFICATIONS

- A. The Qualifications of the CONTRACTOR shall be submitted prior to contract award. These Qualifications shall include detailed descriptions of the following:
 - 1. Name, business address and telephone number of the CONTRACTOR.
 - 2. Name(s) of all supervisory personnel to be directly involved with this project.
 - 3. The CONTRACTOR shall sign and date the information provided and certify that to the extent of his knowledge, the information is true and accurate, and that the supervisory personnel will be directly involved with and used on this project. Substitutions of personnel and/or methods will not be allowed without written authorization of the OWNER.
 - 4. The CONTRACTOR shall provide his references of previous project lists going back five years including his customers' names, addresses, and telephone numbers.
 - 5. To be qualified, the CONTRACTOR shall have a minimum of five years previous experience in the work required in this section.

1.5 TELEVISION SURVEY

- A. Television survey, including Preconstruction Survey and Post Construction Survey is required for all point repairs of sanitary sewers.

1.6 WARRANTY

- A. All point repair work shall be fully guaranteed by the Contractor and manufacturer for 3 years from the acceptance date. A written warranty shall be submitted. During this period, all serious defects including seal failure between the point repair and the main sewer shall be removed and replaced by the Contractor in a satisfactory manner at no additional cost to OWNER. At its own expense, OWNER may conduct an independent television inspection of the point repair work prior to the guarantee period's completion. Any defects repaired at that time shall be fully guaranteed by the Contractor and manufacturer for 1 year from the date the defect was repaired. Wrinkles, blisters, dry spots in resin, unexpanded tabs or other defects in the finished point repair, which in the Construction Manager's opinion negatively affect the pipe's integrity, strength, flow capacity, or solids passage performance are unacceptable. The Contractor will be responsible for removing and repairing, at the Contractor's expense, all such defects in a manner satisfactory to the Construction Manager. Defects also include but are not limited to the following:
 - 1. Leakage through the point repair or between point repair and pipe
 - 2. Point repair separating from the pipe
 - 3. Collapsed mechanical type sleeves or liners
 - 4. Non-expanded sleeves or liners with poor end transitions
 - 5. Excessive wrinkles or other obstructions inhibiting flow through the sewer

PART 2 -- PRODUCTS

2.1 GENERAL

- A. Pipe-to-pipe connections shall be made by using flexible banded couplings or adapters, couplings with compression joints in compliance with ASTM C 425.
- B. When a sound pipe stub-out exists from a manhole to which connection is to be made, a pipe-to-pipe connection shall be made as described above. If one is not present or is faulty, an opening shall be cut in the manhole wall and the connection, consisting of a pipe stub-out with an EPDM rubber boot assembly grouted into the opening with non-shrink grout shall be made to form a corrosion resistant, watertight seal. The invert, benches and floor inside the manhole shall be cut and reshaped as necessary.

PART 3 -- EXECUTION

3.1 PRE-INSTALLATION

- A. A digital CCTV video inspection must be performed by the CONTRACTOR on sections of the mainline pipe to be rehabilitated using a pan and tilt camera to confirm the proposed repair falls within the limitation parameters set by the manufacturer, including, but not limited to, the following:
 - 1. Any offsets or intrusions into the main
 - 2. Potential flows going through the main pipe
 - 3. Main pipe's size at the point repair location
 - 4. Condition including the presence of debris, changes in diameter, or other observations
 - 5. Active infiltration present within the work area vicinity
 - 6. Any defects noted in the mainline pipe should be documented using NASSCOPACP/LACP Standards.

3.2 PREPARATION

- A. Site preparation shall be performed as described in Division 31. When the repairs are to be made on sewers or facilities lying under paved surfaces, those surfaces shall be removed to the limits specified for point repairs of the particular size pipe involved (trench width plus two feet for concrete surfaces) unless otherwise acceptable to the OWNER.
- B. The CONTRACTOR shall excavate and backfill in accordance with Section 100 Excavation, Backfill, Fill and Grading. Under no circumstances shall the CONTRACTOR be allowed to remove concrete or asphalt without prior saw cutting. The saw cutting shall be deep enough to produce an even, straight cut.
- C. Dewater, sheet and or brace all excavations in accordance with Section 100 Excavation, Backfill, Fill and Grading. Well points, pumps, sheeting, bracing and/or sock drain shall be used to provide a safe, dry, open hole for all repairs or replacements specified herein.
- D. Excavate down to the pipe, completely exposing the pipe up to the next undamaged section of pipe on each side.
- E. Locate the leak to be repaired.

3.3 FLOW CONTROL

- A. The Contractor shall be responsible for controlling sewer flows while installing the point repair product. The Contractor shall be solely responsible for cleanup, repair, property damage costs, and claims resulting from its operations.

3.4 INSTALLATION - POINT REPAIR OF SANITARY SEWER

- A. After the leak or failure is located and exposed, the CONTRACTOR shall complete the spot repair as follows:
 - 1. Remove and replace section(s) of pipe or fitting. Remove section(s) of defective pipe or fitting by cutting on each side along lines perpendicular to longitudinal axis of pipe so as to leave "spigot ends" to be connected to replacement pipe. Cut or fabricate replacement section. Make connections using stainless steel shear rings. Bedding or embedment shall be placed and compacted. Reconnect to service line if required. As a minimum, a total of six (6) feet of piping shall be replaced by the CONTRACTOR.

3.5 INSTALLATION - POINT REPAIR OF SERVICE LATERAL

- A. In the case of point repairs performed on service laterals, the CONTRACTOR shall determine the exact location of the repair by means of television inspection with an electronic locating device (sonde).
- B. Cement-stabilized sand shall be used to supplement the embedment or backfill when accepted by the OWNER. This shall consist of two sacks of cement per cubic yard of sand thoroughly mixed. Only a sufficient amount of water shall be added to assure setting-up of the cement. These mixes shall be made before placing in the trench and only enough shall be prepared to allow placing, shaping and tamping before an initial set has taken place. Cement-stabilized sand shall be used for repairs in FDOT paved right of ways.

3.6 POST INSTALLATION

- A. Following the point repair installation, the Contractor shall televise the rehabilitated main beginning 10 feet upstream from the start of the point repair location and extending to the downstream manhole. CCTV inspection shall be completed according to NASSCO PACP guidelines. When complete, the Contractor shall submit the CCTV inspection data in a Granite NET-compatible database on DVDs or an external USB hard drive.

3.7 FIELD TESTING AND ACCEPTANCE

- A. The adequacy of point repairs in sewer mains shall be demonstrated by the CONTRACTOR by testing. For service lines, visual review and acceptance by the OWNER will be deemed sufficient. Testing of mains may be accomplished by one of two alternate methods, depending on the depth of the line and the difference in elevation of the pipe at the ends of the reach. Smoke testing shall be used if the pipe slope exceeds one percent. Testing shall be performed while dewatering is continued and before backfilling.
- B. Smoke-Testing. The reach of sewer in which the repair (or repairs) has been made shall be isolated by plugging the upstream and downstream manholes as necessary not only to temporarily eliminate the flow of sewage through it but also to prohibit the smoke from entering other reaches of sewer. Smoke shall then be introduced into one of the manholes and into the reach using smoke bombs and a blower especially designed or adapted for smoke testing sanitary sewers and acceptable to the OWNER. The repaired area shall then be observed for the emergence of smoke for a period of 15 minutes. If none can be seen, the repair will be deemed to have 'passed the test.
- C. Exfiltration-Testing: This method may be used only on sewers laid on grades less than 1.00 percent. Water, colored with a bright-colored dye acceptable for usage in testing, is introduced into the pipe so as to impose a 2-foot static head over the top of the pipe at the point of repair when the pipe in the lower manhole is plugged. Observations shall then be made by the OWNER to determine if leakage of the colored water occurs at the repair point. Care shall be taken, when this method is used, that:
 - 1. Not more than 4-feet of static head are induced on the main at the lower end of the reach, and
 - 2. No back-up problems are caused in service lines.

3.8 CLEANUP

- A. Complete placement and compaction of backfill.
- B. Restore surface features to at least as good condition as existed before construction began, including roadways, driveways and walks.

END OF SECTION

SECTION 02733

RELINING GRAVITY MAINS, CIPP

PART 1 -- GENERAL

1.1 THE REQUIREMENT

- A. The work specified in this section includes all labor, materials, accessories, equipment and tools necessary to install and test cured-in-place pipe lining. The finished pipe liner shall be fabricated from materials which when cured will, be chemically resistant to withstand internal exposure to domestic sewage.
- B. CIPP installation will take place prior to all manhole coating work. Lined-through manholes shall be opened prior to manhole coating work.
- C. Steam cure methods will not be allowed for rehabilitation of pipelines with a diameter greater than 24 inches.

1.2 REFERENCE SPECIFICATIONS, CODES AND STANDARDS

- A. The following standards are referenced in this specification:
 - 1. ASTM D 543: Standard Practices for Evaluating the Resistance of Plastics to Chemical Reagents.
 - 2. ASTM D 638: Standard Test Method for Tensile Properties of Plastics.
 - 3. ASTM D 696: Standard Test Method for Coefficient of Linear Thermal Expansion of Plastics Between -30°C and 30°C with a Vitreous Silica Dilatometer
 - 4. ASTM D 790: Standard Test Methods for Flexural Properties of Unreinforced and Reinforced Plastics and Electrical Insulating Materials.
 - 5. ASTM D 1044: Standard Test Method for Resistance of Transparent Plastics to Surface Abrasion
 - 6. ASTM D 2990: Standard Test Method for Tensile, Compressive, and Flexural Creep and Creep-Rupture of Plastics.
 - 7. ASTM D 5813: Standard Specification for Cured-In-Place Thermosetting Resin Sewer Piping Systems.
 - 8. ASTM F 1216: Standard Practice for Rehabilitation of Existing Pipelines and Conduits by the Inversion and Curing of a Resin-Impregnated Tube.
 - 9. ASTM F 1743: Standard Practice for Rehabilitation of Existing Pipelines and

Conduits by Pull-in-Place Installation of Cured-in-Place
Thermosetting Resin Pipe (CIPP).

- B. Where reference is made to one of the above standards, the revision in effect at the time of the bid opening shall apply.
- C. The following sections are referenced in this specification:
 - 1. 01 33 00 – Submittal Procedures
 - 2. 33 01 12 – Sewer Flow Control
 - 3. 33 01 30.16 – TV Inspection of Gravity Pipelines
 - 4. 33 01 30.41 – Cleaning of Sewers
 - 5. 33 01 30.71 – Rehabilitation of Sewer Utilities

1.3 CONTRACTOR SUBMITTALS

- A. Furnish Submittals in accordance with Section 01300 – Submittals and the following supplemental requirements:
 - 1. Certifications:
 - a. Certification showing the CONTRACTOR or lining SUBCONTRACTOR is currently licensed by the appropriate licensor to perform CIPP installation. All certifications shall be submitted to the ENGINEER before any materials are ordered.
 - 2. Shop drawings, plans, equipment catalog data, and written descriptions detailing short and long-term properties (providing all supporting test data) of all component materials and composite materials, and recommendations for material storage and temperature control, CIPP handling, insertion, curing, trimming and finishing, and QA/QC procedures. The CONTRACTOR shall submit design calculations to the ENGINEER for review after field verification of sizes and prior to ordering any material from the manufacturer the required minimum thickness for the CIPP to be installed in each pipe reach based on the internal inspection data and the CIPP manufacturer's specifications:
 - a. CIPP lining supplier's name and a list of material manufacturers.
 - b. CIPP lining schedules including field-verified lengths and diameters for all CIPP linings and appurtenances required. Plans should include map(s) showing insertion points, equipment and storage locations, and field wet-out locations for all CIPP installations.
 - c. Detailed installation procedures including CIPP lining production schedule, acceptable inversion heads and pressures, inversion procedures, curing and cool-down procedures and temperatures, and times for each process stage.

- d. If a field wet-out procedure will be used for liner impregnation, submit a complete description of the proposed wet-out procedure with detailed information on equipment and material storage locations, resin volumes and/or weights, liner length, start times, finish times, resin injection locations, and any other pertinent data documenting the wet-out procedure.
 - e. Design data and specification data sheets listing all parameters used in the CIPP liner design and thickness calculations based on ASTM F1216.
 - f. Certification stating CIPP tube has been manufactured in accordance with ASTM F 1216 and resin is suitable for its intended use.
 - g. Procedure and materials to reinstate connecting sewers and laterals.
 - h. Detailed method for addressing CIPP sampling requirements including location and size of each sample, method of removal, and method of liner repair and procedure for testing CIPP Liner.
 - i. Pre-installation and post-installation CCTV Inspection reports.
 - j. A complete list of service laterals, including relevant footage and diameter shall be submitted to the OWNER and ENGINEER prior to initiating CIPP lining.
 - k. Test report of CIPP sample(s).
 - l. Manufacturers' shipping, storage, and handling recommendations for all CIPP system components.
 - m. A safety plan and MSDS sheets (Safety Data Sheets) for all hazardous chemicals used or expected to be on-site including resin, catalyst, cleaners and repair agents.
 - n. Technical procedure or information regarding the control and mitigation of shrinkage and wrinkling during installation and cure of CIPP liner.
 - o. Copies of previous physical properties tests as well as chemical resistance tests.
3. All sewer lining design calculations shall be sealed and signed by a Florida registered professional engineer.
 4. Customer Notifications. Submit a copy of the initial customer notification as described in Section 1.8.
 5. Post-lining inspection data. Submit the final television inspection in a Granite NET compatible database that shows the rehabilitated lateral per Section 02731 Rehabilitation of Sewer Utilities.

1.4 QUALITY ASSURANCE

- A. The CONTRACTOR shall have a minimum of five (5) years of continuous experience installing the CIPP liners in pipe of a similar size, length and configuration as contained in this contract. A minimum of 250,000 linear feet of liner installation experience in Florida is required including past completed project references. The lead personnel including the superintendent, the foreman and the lead crew personnel for the CCTV inspection, resin wet-out, the CIPP liner installation, liner curing and the robotic service reconnections must have a minimum of five (5) years of total experience with the CIPP technology proposed for this contract and must have demonstrated competency and experience to perform the scope of work contained in this contract.
- B. The CIPP liner manufacturer shall have a minimum installation history of two (2) years and 100,000 linear feet of furnished product in the sizes applicable for this Project. Verifiable experience shall be submitted to the OWNER upon request.
- C. All CIPP linings shall be from a single manufacturer. The ENGINEER and/or OWNER may inspect the CIPP lining after delivery and reject any or all of the lining products if they fail to meet the requirements specified herein.

1.5 WARRANTY

- A. The liner shall be certified by the manufacturer for specified material properties for a particular job. The manufacturer shall warrant the liner to be free from defects in raw materials for five (5) years from the date of acceptance. At the Owner's discretion, a one-year warranty TV inspection shall be conducted by the Contractor to up to 10% of the work completed. During the warranty period, any defects that affect the integrity or strength of the pipe shall be repaired at the Contractor's expense in a manner mutually agreed by the Owner and the Contractor. The Contractor shall be responsible for conducting a warranty TV inspection within 60 days prior to warranty expiration or as directed by the Owner within the warranty period. Any defects replaced at that time shall be fully warranted by the Contractor and manufacturer for one year from the date the defect was repaired. During the non-prorated warranty period, any defects which affect the integrity, strength or water tightness of the installed pipe shall be repaired at the contractor's expense.
- B. Wrinkles, blisters, dry spots in resin, or other defects in the finished sewer main, which in the OWNER's opinion, negatively affect the sewer main's integrity or strength or the pipe's flow capacity or performance of solids passage are unacceptable. Contractor will be responsible to remove and repair, at Contractor's expense, all such defects in a manner satisfactory to the OWNER. Defects also include but are not limited to the following:
 - a. Leakage through the lining or between lining and pipe
 - b. More than 10 percent reduction in the lining thickness
 - c. Lining separating from the pipe
 - d. Excessive wrinkles inhibiting flow

- C. The lining shall be as free as commercially practicable from visual defects such as foreign inclusions, dry spots, pinholes, and delamination. The lining shall have a smooth surface free from leaks, cracks, and crazing. Some minor waviness that, in the OWNER's opinion, will not appreciably decrease the flow cross-section or affect the flow characteristics shall be permissible.

1.6 DELIVERY, STORAGE AND HANDLING

- A. If the flexible tube is impregnated with resin at the factory, it shall be transported, installed, and cured before expiration of the shelf life.
- B. The certified CIPP CONTRACTOR or SUBCONTRACTOR shall be responsible for the delivery, storage and handling of all materials for CIPP lining in accordance with the written requirements of the manufacturer.
- C. The CONTRACTOR shall exercise adequate care during transportation, handling and installation to ensure the CIPP material is not torn, cut, or otherwise damaged. If any part or parts of the CIPP material becomes torn, cut or otherwise damaged before or during insertion, it shall be repaired or replaced in accordance with the manufacturer's recommendations and approval by the ENGINEER before proceeding.
- D. The CIPP lining shall be maintained at a proper temperature in refrigerated facilities and protected from ultraviolet light at all times prior to installation to prevent premature curing. Any CIPP lining showing evidence of premature curing shall be rejected for use and immediately removed from the site.

1.7 TEMPORARY WATER

- A. If available, the Owner will provide all water for construction purposes for use by the Contractor at no expense. Temporary water supply and connections to hydrants shall meet all Owner requirements.

PART 2 -- PRODUCTS

2.1 MATERIALS

- A. General:
 - 1. The CONTRACTOR shall be responsible for control of all materials and process variables to provide a finish CIPP possessing the minimum properties specified in ASTM F 1216, and as required herein.
 - 2. The outside reach of CIPP liner tube shall be labeled by the liner manufacturer with the location of the liner manufacturer, the name of the project, the liner thickness, the liner diameter, the liner length, and the location where it is to be installed.
- B. Design Criteria:

1. The liner shall be designed in accordance with the procedures of ASTM F1216. All material properties used in design calculations shall be long-term (time-corrected) values.
2. The following parameters shall be assumed for the liner design for bidding purposes:
 - a. Modulus of soil reaction, $E' = 1,000$ psi
 - b. Groundwater depth equal to 10 feet above top of pipe or to grade, whichever is less
 - c. Unit weight of soil = 120 pcf
 - d. Live load using an AASHTO HS-20 vehicle loading
 - e. The CIPP shall be designed for fully deteriorated conditions
 - f. Assume that the CIPP liner does not bond to the pipe.
 - g. Safety factor of 2.0
 - h. Long-term reduction factor – 50%
 - i. Minimum ovality factor of 2 percent
 - j. Maximum long-term deflection shall be 5 percent
 - k. Minimum structural standards:

Property	Test Method	Initial (psi)
Flexural Strength	ASTM D790	4,500
Flexural Modulus of Elasticity	ASTM D790	250,000

1. 50-year service life
3. The design for the CIPP shall recognize any non-uniform cross section and the liner bifurcation present at the spring line of the pipe. Accounting for this condition by the use of an ovality reduction factor alone is unacceptable.

C. Component CIPP Properties:

1. Flexible Tube:
 - a. The flexible tube shall be one or more layers of needled felt or equivalent non-woven material manufactured under quality controlled conditions set by the manufacturer, and be capable of holding resin and withstanding installation pressures and curing temperatures. The tube shall be compatible with the resin system used, and shall contain no intermediate layers that delaminate after resin curing.

- b. The outside layer of the tube shall be coated with an impermeable material compatible with the resin and fabric.
 - c. Tube material shall be able to stretch to fit irregular pipe sections and negotiate bends. The tube shall be fabricated to a size so that, when installed, it will fit snugly inside the circumference and length of the existing sewer and produce the required thickness after the resin is cured.
 - d. The minimum length of the flexible tube shall be as necessary to effectively and fully span the distance between manholes, with allowance for proper stretching or shrinkage due to pressure or expansion.
 - e. The tube shall contain no intermediate layers that may delaminate after resin curing. It shall not be possible to separate any layers with a probe or knife blade such that the layers separate cleanly or the probe or knife blade moves freely between the layers.
 - f. Allowance should be made for circumferential stretching during the installation and shrinkage of resin during curing and aging so that the final cured product is snug against the wall of the host pipe and free of fins and buckles.
 - g. The wall color of the interior pipe surface of the liner shall be of a light color with reflective nature to allow proper CCTV inspection.
2. Resin:
- a. The felt tubing shall be vacuum impregnated with a thermosetting resin system. The resin used shall be compatible with CIPP system used, and designated for use in sewers.
 - b. The resin shall be a general purpose thermosetting polyester, vinyl ester, or epoxy resin and catalyst system that provides the cured physical strengths and properties specified herein. The resin shall not contain fillers, except those required for viscosity control or fire retarding.
 - c. The resin used to impregnate the tube shall produce a cured tube which shall be resistant to abrasion from solids, grit, and sand in wastewater. The resin shall have proven resistance to the municipal wastewater environment.
3. Wall Thickness:
- a. Wall thickness of the CIPP liners shall be the thickness calculated by the manufacturer in accordance with ASTM F1216 or the thicknesses indicated in the following table, whichever is greater:

CIPP Minimum Nominal Thickness

Pipe Diameter (in)	Depth of Sewer to Top of Pipe (ft)	Liner Thickness (mm)
8-inch	3 to 20	6
8-inch	More than 20 feet	7.5
10-inch	3 to 20	6
10-inch	More than 20 feet	9.0
12-inch	3 to 10	6
12-inch	10 to 17	7.5
12-inch	17 to 20	9
12-inch	More than 20 feet	10.5
15-inch	3 to 10	7.5
15-inch	10 to 20	9
18-inch	3 to 10	9
18-inch	10 to 20	10.5

4. Chemical Resistance:

- a. The liner shall be fabricated from materials which, when complete, are chemically resistant to and will withstand internal exposure to domestic sewage having a pH range of 5 to 11 and temperatures up to 125-degrees Fahrenheit.
- b. CIPP liners shall meet the minimum chemical resistance requirements in accordance with ASTM D 543.

5. Hydrophilic Rubber End Seal

- a. Rubber end seals complying with ASTM F2561 shall be utilized at manholes and at lateral connections as noted below.
- b. The rubber end seal shall be an extended hydrophilic rubber compounded from chloroprene (Neoprene) rubber and hydrophilic resin that expands on contact with water.
- c. The end seals must be in a tubular form which when installed will form 360 degree seal between the host pipe and the newly installed liner and must be a minimum 3-inches wide. The use of caulking, rope, or band type of an end seal will not be allowed.
- d. On contact with water, the rubber shall swell and mold itself to completely fill any gaps and exert pressure evenly to ensure the seal.

6. CIPP Liner system and lateral connection sealing system manufacturers are those specified

D. Type Testing

1. Type testing shall be carried out prior to the commencement of the Work to confirm that the materials used comply with the specification. Tests shall be carried out by an independent body approved by the Engineer.
2. The following tests shall be carried out and corresponding progress reports and results provided to the Engineer, on samples of cured resin/felt composite conforming to this specification:
 - a. Tensile Strength
 - b. Tensile modulus of elasticity
 - c. Flexural strength
 - d. Flexural modulus of elasticity
 - e. Density
 - f. Hardness (Barcol)
 - g. Impact resistance
 - h. Shear strength
 - i. Abrasion resistance
 - j. Coefficient of thermal expansion
 - k. Compressive strength
 - l. 100 day acid test
 - m. Long term flexural creep test
3. Details of standard test procedures shall conform to the relevant ASTM standard.
4. Additional requirements are detailed below:
 - a. Tensile Strength Testing: Samples shall be without end pieces. The rate of grip separation shall be 1 mm/minute. The tensile modulus of elasticity shall be measured over the linear portion of the load extension curve. If the load extension curve contains no straight portion, the modulus shall be taken as the slope of the tangent to the curve over the first 0.2% strain ignoring the initial strain required to straighten the sample. Samples of single layer felt/resin composite and multi-layer (2 or 3 layers of felt) composite shall be tested. The test report

shall contain full particulars concerning the test and shall also include load extension curves for each samples.

- b. Flexural Testing: Samples of single layer felt/resin composite and multi-layer (2 or 3 layers of felt) composite shall be tested. The modulus of elasticity shall be measured in accordance with Tensile Strength Testing above. The test report shall be measured in accordance with Tensile Strength Testing above. The test report shall contain all particulars in accordance with the relevant standard.
- c. Density: Determine the hardness of single layer and multi-layer samples of cured resin/felt composite in accordance with the relevant standard.
- d. Hardness: Determine the hardness of single layer and multi-layer samples of cured resin/felt composite in accordance with the relevant standard.
- e. Impact Resistance: The impact resistance of samples of multi-layer resin/felt composite shall be determined. A minimum of ten specimens shall be tested. The test report shall include all relevant particulars required by the relevant standard.
- f. Shear Strength: Determine the shear strength of a cured single layer sample of resin/felt composite. The samples shall be tested with the axis of the punch perpendicular to the sheet from which the samples were machined. The test report shall contain all relevant particulars the relevant standard.
- g. Abrasion Resistance: The abrasion resistance of the resin/felt composite shall be measured in accordance with ASTM D-1044 using a Tabor abrader with H- 18 Calibrase wheels and 1 kilogram weights. The material shall be tested with the surface dry, and again with the surface wet. After 2000 cycles the depth of wear shall be measured and recorded.
- h. Coefficient of Thermal Expansion: The coefficient of the thermal expansion of the resin/felt composite shall be measured in accordance with ASTM D-696 or VDE 0304. The method adopted shall be maintained for all tests performed throughout the Contract.
- i. Compression Testing: Samples shall be Type 1, and the speed of testing shall be 1 mm/minute. The test report shall contain all particulars required by the relevant standard.
- j. 100 Day Acid Test: Samples of single layer and multi-layer or resin/felt composite shall also be subjected to a 100 day acid test. Samples shall be prepared to tensile and flexural testing as heretofore specified, and shall be immersed in 10% V/V sulfuric acid at 40°C for 100 days. After removal from the acid samples shall be washed, dried and tested for tensile and flexural properties. The values of the tensile and flexural strengths obtained from such tests shall not be less than 75.1% of the minimum values specified by the tests.
- k. Long Term Flexural Creep Test: Where directed by the Engineer, the Contractor will be required to initiate, with an approved testing laboratory, tests to

substantiate the value of the long term flexural modulus of the structural layer used in the design of the lining. The tests shall be continued for the duration of the contract, and results provided at maximum intervals of three months. Long Term Flexural Modulus shall be 125,000 psi.

- a. All the above tests shall be carried out at $35^{\circ}\text{C} \pm 2^{\circ}\text{C}$ (ambient sewer temperature).
- b. In addition Tests (1) to (4), above, i.e. tensile and short term creep tests, shall be carried out in parallel from the same samples at $25^{\circ}\text{C} + 2^{\circ}$ (ambient laboratory temperature) for correlation purposes. A report on the form of correlation shall be submitted to the Engineer's along with other test progress reports and results.
- c. Properties of the cured composite Soft (Cured-in-Place) lining shall have the following minimum, values unless otherwise agreed by the Engineer:

1) Tensile Strength
2,250 psi (25
N/mm²)

2) Flexural Strength
4,500 psi (50
N/mm²)

3) Compressive Strength
5,400 psi (60 N/mm²)

4) Tensile Modulus of
Elasticity 230,000 psi (1700
N/mm²)

5) Flexural Modulus of Elasticity (short
term) 250,000 psi (2200 N/mm²)

PART 3 -- EXECUTION

3.1 EXISTING FLOW BYPASS PUMPING – NOT REQUIRED

- A. The CONTRACTOR shall provide continuous sewer flow bypass pumping during the CIPP liner installation process.
- B. The CONTRACTOR shall be responsible for maintaining continuous sanitary sewer service and a diversion system to each and every property connected to the segment of sewer subject to CIPP liner installation.
- C. The CONTRACTOR shall be solely responsible for clean-up, repair, property damage

costs and claims resulting from failure of the diversion system.

3.2 PRE-INSTALLATION INSPECTION AND CLEANING

- A. The CONTRACTOR shall carry out his/her operations in a safe manner and in accordance with all applicable state and federal requirements and regulations. .
- B. The CONTRACTOR shall take field measurements to verify the existing pipe diameter, ovality and length prior to manufacturing liners. If the pipe is more than 3 percent out of round, immediately notify the ENGINEER.
- C. The manufacturer shall incorporate these measurements (3.4.B) into the manufacturing process of the liner. The outside of the flexible tube shall be marked along its full length at regular intervals not to exceed five (5) feet.
 - 1. The CONTRACTOR shall remove all internal debris such as solids and roots and clean the existing sewer line prior to installation of the liner. All debris removed from the sewer during cleaning shall be transported in watertight containers to the OWNER's treatment plant (or to other approved disposal sites) and be discharged as directed by the OWNER.
- D. The interior of the existing sewer shall be carefully inspected by CCTV to determine the location of any conditions which may prevent proper installation of the CIPP liner into the main lines or service lateral lines, and such conditions shall be noted so they can be corrected.
- E. If the invert of a sewer is eroded more than 2 inches, it shall be filled with grout to match the surrounding pipe surface.
- F. Location and distance from the upstream and downstream manholes of all internal and external point repairs shall be determined before rehabilitation commences. All point repairs must be completed prior to CIPP lining.

3.3 TRIMMING INTRUDING LATERALS

- A. The CONTRACTOR shall trim intruding laterals so the when completed, the service connection is flush to within ¼ inch of the internal pipe wall. Lateral cutting shall be documented by internal inspection methods.
- B. The CONTRACTOR shall ensure that the host pipe is not damaged during lateral trimming operations and document each location of subjected to lateral trimming in the (CCTV) inspection.

3.4 INSTALLATION PROCEDURES

- A. Installation shall be accomplished by inversion or pulled-in-place methods and cured in place by circulating hot water or steam to produce a hard, joint less, impermeable pipe repair. UV cured CIPP will not be permitted without prior written approval from the

OWNER.

- B. Installation procedures shall be in accordance with the latest versions of ASTM F1216 or ASTM F1743 and the manufacturer's recommendations.
- C. If a field "wet out" procedure is used for resin impregnation, the CONTRACTOR shall designate a location where the liner tube will be vacuum impregnated prior to installation subject to approval of the OWNER. The CONTRACTOR shall allow the ENGINEER to inspect the materials and "wet out" procedure. Sufficient excess resin shall be used in accordance with the latest version ASTM F1216. A roller system shall be used to uniformly distribute the resin throughout the tube.
- D. Before installation begins, the tube manufacturer shall provide the minimum pressure required to hold the tube tight against the existing conduit, and the maximum allowable pressure so as not to damage the tube. Once the installation has started, the pressure shall be maintained between the minimum and maximum pressures until the installation has been completed.
- E. The curing of the CIPP must take into account the existing pipe material, the resin system, and ground conditions (temperature, moisture level, and thermal conductivity of soil). The post-cure temperature should be held for a period as recommended by the resin manufacturer, during which time the recirculation of the water and cycling of the head source to maintain the temperature continues.
- F. The bond between all CIPP layers shall be uniform. All layers, after cure, shall be completely saturated with resin.
- G. The CIPP shall be cooled to a temperature below 100-degrees F before relieving the hydrostatic head. Care should be taken in release of the static head so that a vacuum will not be developed that could damage the newly installed liner. Provide piping, valves and other equipment to discharge curing water.
- H. Where practicable, liners can be installed in continuous runs through manholes where there are two or more continuous sewer segments requiring lining, especially to connect several short segments with continuous lining.
- I. The temperature of water discharged to the sewer system from processing liners shall not exceed 125-degrees F maximum, or the level allowed by State or local standards if less than 125-degrees F.
- J. Cut and trim the new lining at each manhole wall. Seal the lining to the manhole wall with hydrophilic sealant material.
- K. The CONTRACTOR shall furnish on-site on a continuous basis one (1) additional operational robotic cutter assembly train and key spare components as a "stand-by" unit in the event of primary equipment breakdowns.

3.5 POST INSTALLATION

- A. After installation of the liner in a full segment pipe, a minimum of one (1) inch of the liner material shall be left to protrude from the wall of the entrance and the exit manholes.
- B. The upstream and downstream manholes shall be inspected and any holes or voids in the manhole wall immediately surrounding the new liner shall be sealed with a hydrophilic rubber joint seal and chemical grout. The Engineer shall approve the seal.
- C. The lining's field acceptance shall be based on the OWNER's evaluation of the installation including post-lined digital CCTV inspection and reviewing certified test data for the installed pipe samples. A post-liner inspection of the rehabilitated line shall be completed.
- D. Where liners of any type are installed in two or more continuous manhole segments, the liner invert through the trough of intermediate manholes shall be left intact. Final finishing of the installation in those intermediate manholes shall require removal of the top of the exposed liner and neat trimming of the liner edge where it touches the lip of the manhole bench.
- E. Portions of any piece of liner material removed during installation shall be available for inspection and retention by the ENGINEER.
- F. The CONTRACTOR shall take photographs of Hydrophilic Rubber End Seals at each manhole connection.
- G. The CONTRACTOR shall reinstate openings for all drop assemblies after relining the mainline sewer.
- H. Service connections shall be reinstated without excavation as specified herein.

3.6 FINISHED CIPP LINER PRODUCT

- A. The finished CIPP shall be continuous over the entire length of a manhole to manhole section of pipe and be free from visual defects such as foreign inclusions, dry spots, pinholes, delamination, fins and wrinkles larger than 2 percent of the pipe diameter.
- B. The liner shall conform to the shape of the pipe existing prior to liner insertion and not be out of round by more than 3 percent.
- C. Defects beyond the specification allowances, determined by the ENGINEER as affecting the integrity or strength of the CIPP, or as adversely affecting the hydraulic capacity of the pipe, shall be repaired or replaced at the CONTRACTOR's expense. Method of repair shall be proposed by the CONTRACTOR and submitted to the ENGINEER for review and approval. The repairs shall be smooth and sealed with an epoxy resin compatible with the CIPP liner system.
- D. Fins and wrinkles in the finished CIPP beyond the specification allowances are unacceptable and shall be ground, removed or otherwise repaired and sealed by the CONTRACTOR at no additional cost to the OWNER.
 - 1. Methods of repair shall be proposed by the CONTRACTOR and submitted to the

ENGINEER for review and approval.

- E. Separations of liner seams in the finished liner pipe are unacceptable and shall be removed or repaired by the CONTRACTOR at no additional cost to the OWNER.
 - 1. If a separation of a liner seam exists, the CONTRACTOR shall repair or replace that section of the pipe at no additional cost to the OWNER.
 - 2. Methods of repair shall be proposed by the CONTRACTOR and submitted to the ENGINEER for approval.
- F. There shall be no visible infiltration through the liner at the service connection, or around the liner at manhole connections. The CONTRACTOR shall repair all visible leaks in a manner approved by **the ENGINEER**.

3.7 REINSTATEMENT OF EXISTING SERVICE LATERALS

- A. After curing is complete, existing service connections shall be reinstated.
- B. Reinstate service laterals using only remote internal methods (prior to CIPP liner acceptance).
- C. Where the CIPP liner does not create dimples at the service connections or in other ways indicate the locations, the exact location shall be determined from the internal inspection data. It is the CONTRACTOR's responsibility to accurately locate and reinstate all service connections after the CIPP installation and curing has been completed. All service connections shall be reinstated to a minimum of 95% of the original opening, matching invert of the lateral.
- D. The CONTRACTOR shall seal all laterals after reinstatements are 100% cut and brushed. The sealing is to be in compliance with ASTM F2454. The lateral sealing area is to include the first joint or 18" into the lateral pipe whichever is more. A test is necessary after the annular space is sealed in keeping with the ASTM Standard. If the test fails any resealing will be done at the expense of the contractor. All grout sealing required (lateral connections and manholes penetrations) are to be 100% complete before the final video is done to document that the completed section is ready to be submitted for payment.
- E. In addition, during the sealing and testing of the lateral connections the Contractor is to have an inspector present to document the procedure. The contractor is also directed to video tape the seal and complete testing as follows: To be paid for lateral reinstatement the video must show 1) a 5 second video prior to sealing, 2) a 15 second video of the test pressure showing the lateral passed the pressure test. The screen must have the lift station number, manhole to manhole numbers and the station footage of the lateral on the main. The video must not run the entire time, just as described above.
- F. The CONTRACTOR shall submit list of reinstated service connections to ENGINEER for approval.
- G. The ENGINEER will compare list of reinstated service connections with approved submittal of lateral locations made prior to installation of CIPP. Any omitted service

reinstatements must be thoroughly investigated by the CONTRACTOR and if needed, additional reinstatements shall be made at no additional cost to OWNER.

3.8 MANHOLES CONNECTIONS

- A. The CIPP shall make a tight seal at the manhole opening with no annular gaps and no infiltration.
- B. Use Class 5 concrete according to FDOT to form a smooth transition with a reshaped invert and a raised manhole bench to eliminate sharp edges of CIPP, concrete bench, and channel invert. Build up and smooth invert of manhole to match flow line of new CIPP.

3.9 FIELD SAMPLING AND TESTING

- A. The CONTRACTOR shall prepare a sample of the installed CIPP liner for subsequent testing of its physical properties.
- B. Sampling shall be performed for each separate installation of CIPP on one (1) test per batch-order of liner. As an example – one sample from each pipeline reach where the liner is installed shall be provided.
- C. The OWNER reserves the right to take five (5) random core samples of the installed CIPP liner at no additional cost in accordance with the procedures in ASTM D5813, as is applicable. The method of repair will be as recommended by the Manufacturer.
- D. The cured liner thickness shall be accurately measured as described in ASTM F1743 and shall not be less than 95 percent of the thickness specified.
- E. The liner shall be visually inspected in accordance with ASTM F1743 to ensure number of layers of felt conforms to the specified number of layers and thickness. The CONTRACTOR shall calculate the resin-to-felt ratio by weight and the ratio shall fall in the range of 1.10:1 to 1.15:1.
- F. The sample shall be prepared using the flat plate sampling method in accordance with the procedures in ASTM F1216.
- G. The flat plate sample shall be large enough to provide five sample specimens each for short term flexural (bending) properties, as per ASTM D790. The sample will be clamped in a mold and placed in the downtube during the curing of the CIPP tube.
- H. The sample shall be removed after all the water is removed from the cured pipe tube. The samples shall be identified by: Date, Project Name, Size, Thickness, Location, Resin and Catalyst. The cured sample shall be tested by an independent testing laboratory as recommended by the CIPP liner manufacturer and approved by the ENGINEER for the short term flexural (bending) properties and tensile properties, per ASTM D790 and ASTM D638, respectively. The sample shall be double bagged and sealed.
- I. The CONTRACTOR shall provide liner test results for long-term properties in accordance with ASTM D2990.

- J. The CONTRACTOR shall be responsible for any deviation from the specified physical properties and those evaluated through testing. Failure to meet the specified physical properties shall result in the CIPP liner being considered defective work and shall be rejected.
- K. The CONTRACTOR shall be responsible for all costs associated with the testing of the liner physical properties.

3.10 POST-INSTALLATION INSPECTION AND ACCEPTANCE OF WORK

- A. The CONTRACTOR shall refrain from removing the sewer flow bypass pumping system until both the ENGINEER and OWNER have formally notified the CONTRACTOR that the work and finished product is accepted.
- B. Correction of failed CIPP or CIPP deemed defective from post-installation inspection or test reports for structural values, thickness, etc., shall be repaired at no extra cost to the OWNER. Method of repair, which may require field or workshop demonstration, shall be approved by the OWNER.

3.11 CLEANUP

- A. After the liner installation has been completed and accepted, the Contractor shall cleanup the entire project area. The Contractor shall dispose of all excess material and debris not incorporated into the permanent installation.

END OF SECTION

SECTION 02734

SEWER SERVICE LATERAL LINING

PART 1 -- GENERAL

1.1 THE REQUIREMENT

- A. Furnish all labor, materials, equipment, and incidentals required to install cured-in-place pipe (CIPP) lining to rehabilitate existing active service laterals as shown on the Drawings or as directed by the OWNER. Service laterals shall be lined from the connection with the main sewer to the property line or easement edge, unless otherwise noted or approved by the OWNER. A brim seal connection style, or full-wrap style lining shall be used to address the connection between the main sewer and the service lateral.
- B. Furnish all labor, materials, equipment, and incidentals required to conduct air testing, pre and post-rehabilitation CCTV inspections, and other requirements described herein for final service lateral lining acceptance.
- C. This specification shall also apply to installing CIPP lining for laterals discharging directly into manholes, if the pipe diameter is 6-inch or less.
- D. Service laterals may be a combination of tees, wyes, or break-in taps of varying sizes (4-inch to 8-inch) with angles generally ranging up to 90 degrees. The Contractor shall install a cleanout at the property line or easement edge in accordance with details provided.
- E. If any active service laterals are identified as defective and the Contractor is unable to line the lateral from the main sewer to the property line or easement edge, the Contractor shall inform the OWNER about the lateral's condition and shall propose a rehabilitation method that maximizes the lateral's rehabilitated length while minimizing the extent of surface disruption. The OWNER will direct the Contractor as to the acceptable approach for rehabilitating or replacing the service lateral in question.

1.2 REFERENCE SPECIFICATIONS, CODES AND STANDARDS

- A. The following standards are referenced in this specification:
 - 1. ASTM D 790: Standard Test Methods for Flexural Properties of Unreinforced and Reinforced Plastics and Electrical Insulating Materials
 - 2. ASTM F 1216: Standard Practice for Rehabilitation of Existing Pipelines and Conduits by the Inversion and Curing of a Resin-Impregnated Tube
 - 3. ASTM F 2561: Standard Practice for Rehabilitation of a Sewer Service Lateral and its Connection to the Main Using a One Piece Main and Lateral Cured-in-Place Liner
 - 4. ASTM F 1743: Standard Practice for Rehabilitation of Existing Pipelines and

Conduits by Pulled-in-Place Installation of Cured-in-Place
Thermosetting Resin Pipe (CIPP)

5. ASTM D 2990: Standard Test Methods for Tensile, Compressive, and Flexural Creep and Creep-Rupture of Plastics
6. ASTM D 5813: Standard Specification for Cured-in Place Thermosetting Resin Sewer Pipe
- B. Where reference is made to one of the above standards, the revision in effect at the time of the bid opening shall apply.

1.3 CONTRACTOR SUBMITTALS

- A. Submit the following in accordance with Section 01300 Submittals:
 1. Shop drawings and schedules for all service lateral lining and appurtenances required.
 2. Design data and specification data sheets listing all parameters used in the lining design.
 3. Thickness calculations based on ASTM F1216-16, Appendix XI.1.2 for fully deteriorated pipe.
 4. All service lateral lining design calculations shall be sealed and signed by a Florida registered professional engineer.
 5. Detailed procedure for installing the service lateral lining.
 6. The service lateral lining manufacturer's name and the facility location where the service lateral lining will be manufactured.
 7. A licensed and certified trainer and representative from the lining system manufacturer shall be on-site to assist in the work for a minimum of 2 weeks.
 8. The Contractor shall be an approved installer as certified and/or licensed by the lining manufacturer.
 9. Material Certifications. Written certification is required from the manufacturer stating all materials used in the work were manufactured and tested in accordance with ASTM F1216 and is being used or installed in conformance with the manufacturer's recommendations.
 10. Customer Notifications. Submit a copy of the initial customer notification as described in Section 1.8.
 11. Storage and Delivery Procedures. Provide the lining manufacturer's recommended storage and delivery procedures. This shall include storage and delivery temperatures, maximum time from wet-out to installation, and other pertinent information.

12. Material Safety Data Sheets. Submit Material Safety Data Sheets (MSDS) for each component of the service lateral lining system.
13. Test Results. Prior to using any materials, furnish the proposed material's test results from an independent laboratory in conformance with these specifications. All submitted test data shall have been performed on field installed samples within the last 12 months. Testing by an independent laboratory shall verify the products to be used meet all minimum strength standards as set forth in ASTM F1216, Table 1. Testing shall also verify any product to be used on the project meets the minimum chemical resistance requirements as established in ASTM F1743, Table 2, where the testing is in accordance with Section 7.2.1 of ASTM F1743.
14. Pipe Cleaning Narrative. Submit a narrative describing in sufficient detail the proposed methods for root cutting and cleaning the existing laterals. Prepare such narrative to include the degree of cleaning as recommended by the lining manufacturer. Such narrative shall indicate the lining manufacturer's technical representative's approval for the proposed cleaning methods.
15. Lining Thickness Calculations. Perform lining thickness calculations for each set of laterals for each manhole-to-manhole section and furnish them to the OWNER with supporting assumptions. Calculations shall be done after cleaning, televising, and other field inspections have been accomplished. Design parameters shall be used in calculations.
16. Curing Cycle and Cooling Rate. If the lateral lining is heat-cured, submit the resin manufacturer's recommended curing cycle and the recommended cooling rate. Submit a copy of the cure logs for each lateral installation.
17. Post-lining inspection data. Submit the final television inspection in a latest version of Granite NET compatible database that shows the rehabilitated lateral per Section 02731 Rehabilitation of Sewer Utilities.

1.4 QUALITY ASSURANCE

- A. For the work to be acceptable by the Owner, the Contractor performing the service lateral lining work must have at least two (2) years active experience in the commercial installation of the products and must have documented the following minimum criteria to be deemed commercially acceptable:

Product	Minimum Standard	Unit	Florida Minimum Requirement	U.S. Minimum Requirement
Lateral Liner	ASTM F 1216	LF	15,000	50,000
	ASTM F 1216			

Main/Lateral Connections	ASTM F 2561	EA	200	1,000
Stack Single or Double Wye	ASTM F 1216	EA	25	25
	ASTM F 2561			
Lateral Transitions	ASTM F 1216	EA	50	100
Siamese Lateral Connections	ASTM F 1216	EA	25	25
	ASTM F 2561			

- B. The service lateral lining shall be provided by a single manufacturer. The supplier shall be responsible for providing all test requirements specified herein as applicable.
- C. The OWNER may inspect the service lateral lining after delivery. The service lateral lining shall be subject to rejection at any time if it fails to meet any requirements specified, even though sample lining may have been accepted as satisfactory at the manufacturer. Lining rejected after delivery shall be marked for identification and removed from the job site at once.
- D. Final Installed Lining Thickness. The final installed lining thickness shall not be less than or more than 10 percent greater than the required thickness. The final installed lining thickness measurement shall be determined from lining sample coupons retrieved from the sewer, plate samples or as deemed necessary by the Engineer. It shall be the Contractor's responsibility to consider site conditions and their installation process to determine the proper lining thickness to install.
- E. Non-Compliance. If the flat plate samples do not meet the required 4,500 psi flexural strength and 250,000 psi flexural elasticity modulus as outlined, actual installed samples must be taken. The installed samples shall be taken as directed by the OWNER and in accordance with all applicable ASTM requirements. From these samples, the installed thickness shall be determined by taking an average of at least 10 thickness measurements. Installed samples shall then be prepared for re-testing in accordance with these specifications.

1.5 WARRANTY

- A. The liner shall be certified by the manufacturer for specified material properties for a particular job. The manufacturer shall warrant the liner to be free from defects in raw materials for ten (10) years from the date of acceptance. The contractor guarantees the work to be free from defects caused by faulty workmanship for a period of five (5) years from the date of acceptance. At the Owner's discretion, a one (1) year warranty TV inspection shall be conducted by the contractor to up to 10% of the work completed. During the non-prorated warranty period, any defects that affect the integrity or strength of the pipe shall be repaired at the Contractor's expense in a manner mutually agreed by the Owner and the Contractor. Any defects replaced at that time shall be fully guaranteed by the Contractor and manufacturer for one (1) year from the date the defect was repaired. The Contractor shall be responsible for conducting a warranty TV inspection.
- B. Wrinkles, blisters, dry spots in resin, or other defects in the finished service lateral, which in the OWNER's opinion, negatively affect the service lateral's integrity or strength or the pipe's flow capacity or performance of solids passage are unacceptable. Contractor will be responsible to remove and repair, at Contractor's expense, all such defects in a manner satisfactory to the OWNER. Defects also include but are not limited to the following:
 - a. Leakage through the lining or between lining and pipe

- b. More than 10 percent reduction in the lining thickness
 - c. Lining separating from the pipe
 - d. Excessive wrinkles inhibiting flow
- C. The lining shall be as free as commercially practicable from visual defects such as foreign inclusions, dry spots, pinholes, and delamination. The lining shall have a smooth surface free from leaks, cracks, and crazing. Some minor waviness that, in the OWNER's opinion, will not appreciably decrease the flow cross-section or affect the flow characteristics shall be permissible.

1.6 DELIVERY, STORAGE AND HANDLING

- A. Care shall be taken in shipping, handling, and storing to avoid damaging the service lateral lining. Extra care shall be taken during cold weather construction. Any lining damaged in shipment shall be replaced as directed by the OWNER.
- B. Any lining showing a split or tear, or which has received a blow that may have caused damage, even though damage may not be visible, shall be marked as rejected and removed at once from the job site.
- C. At all times, the lining materials, including the wet-out lining, shall be maintained at a proper temperature, such as in refrigerated facilities, to prevent premature curing prior to installation. The lining shall be protected from UV light prior to installation. Any lining showing evidence of premature curing will be rejected for use and will be removed from the site immediately.

1.7 TEMPORARY WATER

- A. If available, the Owner will provide all water for construction purposes for use by the Contractor at no expense. Temporary water supply and connections to hydrants shall meet all Owner requirements.

PART 2 -- PRODUCTS

2.1 MATERIALS

- A. The service lateral lining shall be a seamless, corrosion-resistant, cured-in-place pipe lining product that seals the service lateral pipe and the junction between the service lateral pipe and main sewer. The portion of the lateral lining system that connects to the main/lateral interface shall be either a full-wrap or brim-seal connection type.
- B. The service lateral lining shall be a resin-impregnated, flexible polyester felt, non-woven textile tube, needle punched felt, circular knit or circular braid, glass fiber reinforced plastic

or equivalent material tube which is cured -in-place by an acceptable curing method. The tube shall be able to conform to bends, offset joints, bells, and disfigured pipe sections.

- C. The service lateral shall provide a 50-year service life and shall have the minimum structural properties listed below:

Minimum Structural Properties	
Physical Properties	Minimum Standard
Flexural Strength (ASTM D790)	4,500 psi
Flexural Modulus of Elasticity (ASTM D790)	250,000 psi

- D. The service lateral shall be designed, fabricated, and installed for the actual conditions encountered for this application including the host pipe material, in accordance with the applicable ASTM F1216, ASTM F 2561, ASTM D2990 provisions, and shall meet the following minimum design conditions:

- a. Modulus of soil reaction, $E' = 1,000$ psi
- b. Groundwater depth equal to 10 feet above top of pipe or to grade, whichever is less
- c. Unit weight of soil = 120 pcf
- d. Live load using an AASHTO HS-20 vehicle loading
- e. The CIPP shall be designed for fully deteriorated conditions
- f. Assume that the CIPP liner does not bond to the pipe.
- g. Safety factor of 2.0
- h. Long-term reduction factor – 50%
- i. Minimum ovality factor of 2 percent
- j. Maximum long-term deflection shall be 5 percent
- k. 50-year service life
- l. Friction coefficient $Ku' = 0.130$
- m. Estimated maximum groundwater level at ground surface
- n. Soil Depth: The cover depth will be determined by field measurements.

- E. The finished lining shall have a 3 mm minimum thickness for 4-inch laterals and 4.5 mm

for 6-inch laterals. Any main that is greater than 20 feet deep shall have minimum service liner thickness of 6 mm (0.236 inches).

- F. The service lateral lining shall have sufficient wall thickness to withstand all anticipated external pressures and loads that may be imposed after installation. The design shall be performed and certified by a Florida registered professional engineer.
- G. When cured, the service lateral lining shall extend from the mainline into the lateral connection in a continuous tight fitting, watertight pipe-within-a-pipe to eliminate any visible groundwater leakage and future root growth at the lateral to mainline connection and along the lateral. The service lateral product system shall be compatible with the mainline and/or lateral pipe or lining. The lining portion within the mainline pipe may be a full-wrap or brim-seal connection or style.
- H. When cured, the finished service lateral product shall be chemically resistant to domestic sewage over the rehabilitated pipe's expected lifetime. The lining material and resin shall be completely compatible.
- I. The connection between the service lateral and the main sewer shall be lined so a continuous overlap between the service lateral lining and the main sewer extends 3-inches minimum from the lateral along the entire circumference.
- J. A leak-free seal must be created to form a sealing bond between the service lateral product and the host lateral and mainline pipe walls. The Contractor should use a hydrophilic material component at each lining tube end to provide a leak-free seal.
- K. When cured, the lining shall form a hard, impermeable lining which is chemically resistant to chemicals found in domestic sewage.
- L. Component CIPP Properties:
 - 1. Resin:
 - a. The resin system shall meet the requirements of ASTM F1216, Section 5.2 and shall conform to ASTM D5813, Section 8.2.2. The resin installed service lateral lining system shall produce a service lateral that will comply with the structural requirements specified herein and shall provide chemical resistance for the flow media in the gravity pipe. The resin shall be compatible with the rehabilitation process, shall be able to cure in water's presence or absence and shall have an initiation temperature for cure as recommended by the resin manufacturer. Unless otherwise specified, provide a general purpose or enhanced strength unsaturated, thermosetting, polyester, vinyl ester, epoxy or silicate resin and a catalyst system compatible with the installation process. The resin shall be vacuum impregnated into the lining.
 - b. Submit documentation from the resin manufacturer specifically describing the resin system's chemical characteristics including allowable mixing,

impregnation, and handling time, transportation, and storage time, and recommended curing cycle including temperatures, pressures, and times. The resin manufacturer's documentation must also include maximum allowable time for handling the impregnated tube prior to insertion and the maximum allowable elapsed time from insertion to exotherm. If remedial measures are available to extend either of the maximum allowable times indicated above, without affecting the resin's physical properties, the resin manufacturer should describe these measures and the time limits beyond which even these measures will not prevent altering the resin's physical properties.

2. Wall Thickness:

- a. Wall thickness of the CIPP liners shall be the thickness calculated by the manufacturer in accordance with ASTM F1216.

3. Chemical Resistance:

- a. The liner shall be fabricated from materials which, when complete, are chemically resistant to and will withstand internal exposure to domestic sewage having a pH range of 5 to 11 and temperatures up to 125-degrees Fahrenheit.
- b. CIPP liners shall meet the minimum chemical resistance requirements in accordance with ASTM F1216.

4. Hydrophilic Rubber End Seal

- a. The rubber end seal shall be an extended hydrophilic rubber compounded from chloroprene (Neoprene) rubber and hydrophilic resin that expands on contact with water.
- b. The end seals must be in a tubular form which when installed will form 360 degree seal between the host pipe and the newly installed liner and must be a minimum 3-inches wide. The use of caulking, rope or band type of an end seal will not be allowed.
- c. On contact with water, the rubber shall swell and mold itself to completely fill any gaps and exert pressure evenly to ensure the seal.

- 5. CIPP Liner system and lateral connection sealing system manufacturers are Miller Pipeline, Reynolds, Lanzo, Insituform LLC, or approved equal.

PART 3 -- EXECUTION

3.1 EXISTING FLOW BYPASS PUMPING – NOT REQUIRED

- A. The CONTRACTOR shall provide continuous sewer flow bypass pumping during the

CIPP liner installation process.

- B. The CONTRACTOR shall be responsible for maintaining continuous sanitary sewer service and a diversion system to the property connected to the service lateral subject to CIPP liner installation.
- C. The CONTRACTOR shall be solely responsible for clean-up, repair, property damage costs and claims resulting from failure of the diversion system.

3.2 PRE-INSTALLATION INSPECTION AND CLEANING

- A. The CONTRACTOR shall carry out his/her operations in a safe manner and in accordance with all applicable state and federal requirements and regulations.
- B. A Digital CCTV video inspection must be done on the mainline pipe with a pan and tilt camera and the service lateral to confirm the proposed repair falls within the limitation parameters set by the manufacturer on the following aspects:
 - 1. The location and clock reference of the lateral junctions to be lined
 - 2. Any offsets, any intrusions from the lateral into the main
 - 3. Angle at which the connection comes in
 - 4. Any changes in the lateral's approach angle for the repair length
 - 5. Potential flows coming throughout the lateral pipe
 - 6. Potential flows going through the main pipe
 - 7. Diametric connection size for the lining length
 - 8. Main pipe's size at the service lateral point
 - 9. Service lateral's condition including the presence of debris, turns, bends, changes in diameter, or other observations
 - 10. Active infiltration present within the work area vicinity
 - 11. Any defects noted in the mainline pipe or lateral should be documented using NASSCO PACP/LACP Standards.
 - 12. Inform the OWNER about service laterals in which a service lateral lining cannot be installed from the main sewer to the cleanout established at the property line or easement line. The Contractor shall identify these service laterals and provide the

OWNER with documentation about the conditions encountered including the CCTV inspection. If a full-length lateral lining cannot be installed or a point repair on the service cannot be performed, the OWNER may direct the Contractor to install a short lateral lining with no cleanout required extending up the lateral from the main. The length is to be field determined to the maximum length possible, but should extend 3 feet minimum up the lateral from the main.

13. Inform the OWNER about service laterals in which a short length service lateral product cannot be installed. The Contractor shall identify, document, and video record these services and inform the OWNER about the conditions encountered. If a short length lateral lining cannot be installed, the service connection will be “cut and buffed” to restore a 95% minimum service opening.
14. The CONTRACTOR shall remove all internal debris such as solids and roots and clean the existing sewer line prior to installation of the liner. All debris removed from the sewer during cleanings shall be transported in watertight containers to the OWNER's treatment plant (or to other approved disposal sites) and be discharged as directed by the OWNER.

3.3 LINE PREPARATION

- A. Prior to installing the service lateral product, the area around the lateral sealing surface in the main and lateral shall be inspected. Waste product build-up, hard scale, roots, lateral cutting debris, or resin slugs must be removed using high-pressure water jetting or in-line cutters. All laterals to be lined shall be cleaned as required prior to lining. The term “cleaned” shall mean removing all sand, dirt, roots, grease, and other solids or semisolid materials from the interior face of the sewer mainlines and the service laterals.
- B. Built-up deposits on the main and lateral pipe walls shall be removed. The removal shall reach at least 1 foot beyond the scheduled service lateral installation length to allow the bladder to inflate tightly against the pipe walls ensuring a smooth transition from service lateral product to the existing pipe wall.
- C. Televiser the lateral to provide a detailed record of existing conditions and lateral connections. Have a copy of the pre-lining inspections in the field. Immediately prior to lining insertion, the camera shall traverse the lateral to inspect for debris which may have entered the line after the existing condition inspection.
- D. Where active infiltration is present and when it is recommended by the service lateral lining manufacturer, the infiltration must be stopped in advance by grouting.
- E. Additional precautions need to be taken when applying the sleeve to a main pipe lined with a CIPP lining with a polyolefin coating. The coating is to be lightly scarified, scraping off the coating in the main CIPP in the service lateral lining's vicinity, and verified by the OWNER. This scuffing is mandated for service lateral linings required to adhere to the

pipe wall.

- F. The Contractor shall be responsible, if needed, for bypassing sewage while installing the service lateral lining product. In cases where the temporary sewage backup is accepted as a replacement for bypassing, the Contractor shall be responsible for all damage caused by sewage backing up into properties or sanitary sewer overflows.

3.4 INSTALLATION

- A. The service lateral lining shall be vacuum-impregnated with resin (wet-out) under controlled conditions. The resin volume used shall be sufficient to fill all voids in the textile lining material at nominal thickness and diameter. The volume shall be adjusted by adding 5% to 10% excess resin for the change in resin volume due to polymerization and to allow for any resin migration into the cracks and joints in the original pipe. All resin shall be contained within the translucent bladder during vacuum impregnations. No dry or unsaturated area in the lateral tube shall be acceptable upon visual inspection.
- B. The pressure apparatus shall include a bladder with sufficient length in the main and lateral lines so the inflated bladder extends beyond the ends of the service lateral product's lateral tube and main line tube, pressing the end edges flat against the internal pipe wall, thus forming a smooth transition from service lateral product to pipe diameters without a step, ridge, or gap between the service lateral product and the lateral and mainline pipes' inner diameters.
- C. For service lateral linings with hydrophilic materials, the main bladder shall be inflated causing the main sheet to unwrap and expand, embedding the hydrophilic material between the main lining and the main pipe as the main lining is pressed tight against the main pipe.
- D. After insertion is completed, recommended pressure must be maintained on the impregnated service lateral product according to ASTM F1216-16, Sections 7.4.2 and 7.4.3, pressing the lining firmly against the inner pipe wall during the entire curing process. The lining shall be cured at ambient temperatures or by a suitable heat source. In no instance will sewage be used to invert or cure linings or calibration tubes.
- E. The finished service lateral lining shall be free from dry spots, lifts, and delamination. The installed service lateral lining should not inhibit the CCTV post installation video inspection for the mainline and service lateral pipes or future pipe cleaning operations. For service lateral linings with compression gaskets, the CIPP shall taper at each end providing a smooth transition to accommodate video equipment and maintain proper flow in the mainline. In all cases, the finished product must provide an airtight/watertight verifiable non-leaking connection between the main sewer and sewer service lateral. During the warranty period, any defects with the service lateral that affect the lateral connection's performance, cleaning, or water tightness shall be repaired at the Contractor's expense in a manner acceptable to Owner.

- F. Following the lining installation, provide the OWNER with an electronic picture and recorded data identifying the location and showing the completed work and restored condition for all the rehabilitated service laterals from the sewer main to the service reconnection point. The Contractor shall televise the rehabilitated lateral to provide a detailed record of finished conditions using NASCCO PACP/LACP guidelines. When complete, the Contractor shall submit the rehabilitated lateral inspections in a Granite NET-compatible database and the accompanying logs on DVDs or an external USB harddrive.

3.5 POST INSTALLATION INSPECTION

- A. Perform post-installation television inspection to confirm completion of lateral lining work. Verify that lining work conforms to the requirements of the Drawings and Specifications.

3.6 FIELD TESTING AND ACCEPTANCE

- A. The lining's field acceptance shall be based on the OWNER's evaluation of the installation including post-lined digital CCTV inspection and reviewing certified test data for the installed pipe samples. The CCTV inspection for each lateral shall extend 10 feet minimum past the end of the rehabilitation work on the service lateral. For laterals where a cleanout was installed, the CCTV inspection shall include the cleanout and the connection to the existing, undisturbed service lateral.
- B. A flat plate sample shall be collected for every 50 lateral installations, and the sample shall be submitted to a third party testing laboratory to confirm strength properties (flexural strength and flexural modulus) in accordance with ASTM F1216. The test results must meet or exceed the strengths in the design, or the Contractor must provide a 10% credit for up to 50 laterals the sample represents.
- C. All service connections shall be open, clear, and watertight.
- D. The lining shall have no evidence of splits, cracks, breaks, lifts, kinks, delaminations, or crazing.
- E. If any defective lining is discovered after it has been installed, it shall be removed and replaced by the Contractor with a new lining, a new pipe, or other measures with the OWNER's approval at no additional cost to Owner. Any lining installation not meeting specified strengths or thickness shall provide other acceptable remediation measures or credit as approved by the OWNER. The re-inspection requirements as listed above shall apply to this re-installed section of line.

3.7 FINISHED CIPP LINER PRODUCT

- A. The finished CIPP shall be continuous over the entire length of service pipe and be free from visual defects such as foreign inclusions, dry spots, pinholes, delamination, fins and wrinkles larger than 2 percent of the pipe diameter.

- B. The liner shall conform to the shape of the pipe existing prior to liner insertion and not be out of round by more than 3 percent.
- C. Defects beyond the specification allowances, determined by the ENGINEER as affecting the integrity or strength of the CIPP, or as adversely affecting the hydraulic capacity of the pipe, shall be repaired or replaced at the CONTRACTOR's expense. Method of repair shall be proposed by the CONTRACTOR and submitted to the ENGINEER for review and approval. The repairs shall be smooth and sealed with an epoxy resin compatible with the CIPP liner system.
- D. Fins and wrinkles in the finished CIPP beyond the specification allowances are unacceptable and shall be ground, removed or otherwise repaired and sealed by the CONTRACTOR at no additional cost to the OWNER.
 - 1. Methods of repair shall be proposed by the CONTRACTOR and submitted to the ENGINEER for review and approval.
- E. Separations of liner seams in the finished liner pipe are unacceptable and shall be removed or repaired by the CONTRACTOR at no additional cost to the OWNER.
 - 1. If a separation of a liner seam exists, the CONTRACTOR shall repair or replace that section of the pipe at no additional cost to the OWNER.
 - 2. Methods of repair shall be proposed by the CONTRACTOR and submitted to the ENGINEER for approval.
- F. There shall be no visible infiltration through the liner, or from behind the liner at the mainline connection and within the service lateral. The CONTRACTOR shall repair all visible leaks in a manner approved by the ENGINEER.
- G. Cleanout installation on each lateral in accordance with details provided.

3.8 CLEANUP

- A. After the installation work and testing have been accepted, restore the project area affected by the operations to a condition at least equal to what existed prior to the work.

END OF SECTION

SECTION 02764
MANHOLE REHABILITATION

PART 1 -- GENERAL

1.1 SCOPE

- A. Work orders will include the various manhole repairs specified in this Section. Manhole rehabilitation shall be accomplished by the application of materials that will improve the overall structural condition of the manhole. The intent of this portion of the work is to provide for aspects of sewer manhole rehabilitation and sealing using various procedures either singularly or in combination, including type of repair, methods of repair, materials and equipment as required for each manhole scheduled for rehabilitation.
1. Manhole Preparation: These work items include cleaning the manhole, sealing walls and patching the interior surfaces.
 2. Manhole Repairs - Critical Leak Areas: These work items include repairing leaks in the wall to base areas, pipe penetrations and manhole joints.
 3. Manhole Coating: These work items include installation of calcium aluminate corrosion barrier coatings.
 4. Frame and Cover Repairs: These work items include the repair of frame and cover leaks, realigning and grouting frame, and frame and cover replacement.

1.2 SUBMITTALS

- A. The CONTRACTOR shall submit shop drawings and other information as specified in accordance with Section 01 33 00 "Submittals".
- B. With the bid, the following submittals are required.
1. Name, business address and telephone number of the Manhole Rehabilitation CONTRACTOR.
 2. The name of the manhole lining product suppliers and a list of materials to be furnished, as well as CONTRACTOR's experience with the specified manhole lining products (number of years installing the products, number of manholes lined with the products, and list of references going back three years including customer names, addresses, telephone numbers, and number of manholes). Where the CONTRACTOR proposes to utilize a sub-contractor to apply a manhole lining product, submit all required information for the sub-contractor as well.
 3. Three years of previous related experience, as documented by verifiable

references, shall be required to be qualified in bidding this project. The CONTRACTOR performing the work shall be fully qualified, experienced and equipped to complete this work expeditiously and in a satisfactory manner and shall be an approved installer of the manhole lining systems as certified and licensed by the manufacturers.

4. The OWNER reserves the right to approve or disapprove the CONTRACTOR, based on the submitted qualifications.

C. Prior to contract award, the following submittals are required.

1. Name(s) of all supervisory personnel to be directly involved with Manhole Rehabilitation for this project. The CONTRACTOR shall sign and date the information provided and certify that to the extent of his knowledge, the information is true and accurate, and that the supervisory personnel will be directly involved with and used on this project. Substitutions of personnel and/or methods will not be allowed without written authorization of the OWNER
2. A certified statement from the manufacturer that the CONTRACTOR is a certified and/or licensed installer of the manhole lining products. CONTRACTOR shall initiate and enforce quality control procedures consistent with the manufacturer's recommendations. Applicators shall be completely trained and specialized in all aspects of manhole rehabilitation including grouting/sealing for active leak repair, surface preparation and wastewater corrosion materials applications.
3. Written descriptions of the manufacturer-recommended procedures for surface preparation, installation, curing, and testing of the specified manhole repair and lining products; construction method(s) and equipment to be used; and locations required for equipment and material access.
4. Where CONTRACTOR is proposing use of an alternate product to those specified, such use shall be subject to OWNER review and approval.

1.3 GUARANTEE

- A. All manhole lining installed shall be guaranteed by the CONTRACTOR for a period of two years from the date of final acceptance. During this period, all defects discovered in the lining, as determined by the OWNER, shall be repaired or replaced in a satisfactory manner by the CONTRACTOR at no cost to the OWNER

1.4 DELIVERY, STORAGE AND HANDLING

- A. Care shall be taken in shipping, handling and placing to avoid damaging the lining products. Any lining product or material damaged in shipment shall be replaced as directed by the OWNER

- B. Any lining product showing deterioration, or which has been exposed to any other adverse storage condition that may have caused damage, even though no such damage can be seen, shall be marked as rejected and removed at once from the work site.
- C. While stored, the lining products shall be adequately packaged and protected. The lining products shall be stored in a manner as recommended by the manufacturer.

1.5 SITE CONDITIONS

- A. Applicator shall conform to all local, state, and federal regulations including those set forth by OSHA, the EPA, and other applicable authorities.
- B. Confined space entry, flow bypass, or maintenance of traffic plans shall be prepared by the CONTRACTOR as required to perform the specified work.

PART 2 -- PRODUCTS

2.1 MANHOLE FRAMES AND COVERS

- A. All manhole frame and cover material and installation requirements shall be as indicated in these documents.
- B. Replacement of manhole frames and covers shall be pursuant to requirements outlined in these documents.

2.2 RUBBER SEALS

- A. The manhole frame-chimney joint area of manholes and the precast manhole barrel joints shall be sealed with internal flexible rubber frame seal as manufactured by Cretex Specialty Products, or equal.
- B. Internal rubber seals used for sealing the joints between the manhole frame and chimney or corbel/cone section, shall consist of the following components:
 - 1. Rubber Sleeve and Extension: The flexible rubber sleeve extensions and wedge strips shall be extruded from a high-grade rubber compound conforming to the applicable requirements of ASTM C 923, with a hardness (durometer) of 48.±.5.
 - a. The sleeve shall be double pleated with a minimum unexpanded vertical height of 8 inches, a minimum thickness of 3/16 inches and shall be capable of a vertical expansion when installed of not less than 2 inches. The top and bottom section of the sleeve shall contain an integrally formed expansion band recess and multiple sealing fins.
 - b. The extension, if required, shall have a minimum thickness of 3/16

inches. The top section of the extension shall be shaped to fit into the bottom band recess of the sleeve under the bottom chimney seal band. The bottom section of the extension shall contain an integrally formed expansion band recess and multiple sealing fins matching that of the rubber sleeve.

- c. Any splice used to fabricate the sleeve and extension shall be hot vulcanized and have a strength such that the sleeve shall withstand a 180 degrees bend with no visible separation.
 - d. The continuous wedge strip used to adapt the rubber sleeve to sloping surfaces shall have the slope differential needed to provide a vertical band recess surface, be shaped to fit into the band recess and have an integral band restraint. The length of the wedge strip shall be such that, when its ends are butted together, it will cover the entire inside circumference of that band recess needing slope adjustment.
2. Expansion Bands: The expansion bands used to compress the sleeve against the manhole shall be 16-gauge stainless steel conforming to ASTM A 240, Type 316, with a minimum width of 1 3/4 inches. The expansion mechanism shall have the capacity to develop the pressures necessary to make a watertight seal and shall have a minimum adjustment range of 2 diameter inches. Studs and nuts used for this mechanism shall be stainless steel conforming to ASTM F 593 and 594, Type 316.

2.3 PREPATORY INFILTRATION CONTROL PRODUCTS

A. Infiltration Control/Plugging Material

1. Prior to installing the manhole lining system, active infiltration shall be controlled according to the specifications of the lining manufacturer. Infiltration control materials shall be rapid-setting, high early strength, hand applied cementitious material for stopping infiltrating water and making repairs to concrete, brick or other masonry constructed manholes. The material shall be non-shrinking, non-metallic and non-corrosive. It shall be formulated at the factory and supplied in factory sealed and labeled pre-measured containers. The material shall be compatible with the lining material to be used.
2. The product shall be Mainstay ML-10 or approved equal.

B. Chemical Grouting Material

1. Chemical Grouts may be used for stopping very active infiltration and shall be mixed per manufacturer's recommendations. The chemical grout shall be an extremely low viscosity acrylamide resin with gel times from 5 seconds

to several hours. Product shall be AV-100 Chemical Grout as manufactured by Avanti International, or equal. The chemical grout shall be compatible with the lining material to be used.

C. Patching Material

1. Voids in the existing manhole walls or damaged inverts shall be repaired prior to installing the manhole lining system. The patching material shall be a rapid setting, high early strength, corrosion resistant hand mixed and hand applied cementitious material intended for filling voids and repairing inverts in concrete, brick or other masonry constructed manholes. It shall be formulated in the factory and supplied in factory sealed and labeled pre-measured containers. The material shall be compatible with the lining material to be used.
2. The product shall be in accordance with the approved materials list.

2.4 MANHOLE COATINGS

- A. Manholes shall be given a minimum 0.5-inch coat of Sewper Coat, Strong Seal, Refratta HAC 100 or other approved calcium aluminate corrosion barrier.

2.5 AROMATIC URETHANE SEALANT

- A. The flexible sealant shall be a two component, aliphatic, chemically curing, urethane sealant. The sealant shall be designed for flexibility from ground movement and extended water immersion when applied to the inside wall of the adjustment ring area. Manhole seal shall be designed to prevent leakage of water into the manhole through the frame joint area and the area above the manhole cone, including all extensions to the chimney area. Extension shall include, but is not limited to, lifting rings, brick and/or block material that may have been used to achieve grade. The material shall not corrode in municipal sewer environments.
- B. The sealant shall be Ring Seal as manufactured by The Rain Stopper, Flex-Seal Utility Sealant as manufactured by Sealing Systems, Inc., or approved equal.
- C. A primer coat of 2-3 mils thickness shall be applied to the prepared surface.
- D. The flexible sealant shall be applied on primed surfaces at a thickness of 100 mils or as specified by the OWNER. The overlap of the bottom portion of casting and the top of the lowest adjustment ring should be 3 inches or greater.

PART 3 -- EXECUTION

3.1 GENERAL

- A. The CONTRACTOR shall perform all work in strict accordance with all applicable OSHA Standards. Particular attention is drawn to those safety requirements involving man entry in confined spaces.
- B. Flow Control: Flow control, shall be exercised as required to ensure that no flowing sewage comes into contact with sections of the manhole under repair.
- C. Prior to beginning work, the OWNER will visually review the manhole and confirm the repair procedure indicated on the Work Order.
- D. The CONTRACTOR shall notify all property owners who discharge sewage directly to the manhole being repaired that their service will be discontinued while the lining is being placed, cured and active pipe and service connections reopened. The CONTRACTOR shall notify individual property owners at least 72 hours in advance, giving the date, start time and estimated completion time for the work being conducted. This notification shall be coordinated with the distribution of the door hangers. The CONTRACTOR shall reopen all of the existing active pipe connections in each sewer manhole following the repair.

3.2 PREPARATION

- A. General:
 - 1. The CONTRACTOR is responsible for properly preparing the existing manhole for lining prior to the installation of the lining system, including stopping all leaks, patching voids, removing steps/rungs, cleaning, and removing debris.
 - 2. The casting and adjusting area of the manhole shall be sandblasted to remove any loose material and rust.
 - 3. Prior to cleaning the manhole, a $\frac{1}{2}$ -inch mesh screen shall be installed at the manhole outlet to catch debris. The CONTRACTOR shall clean all accumulations of debris, such as dirt and grease, loose mortar, bricks and concrete, and dispose of properly.
 - 4. The manhole surface shall be clean, structurally sound and free from oil, grease, loose mortar, paints, protective coatings, efflorescence, laitance and airing compounds. The condition of the manhole may require the use of an environmentally safe degreasing compound; if so, the surface shall be thoroughly rinsed to eliminate any residue.
 - 5. All existing manhole rungs/steps shall be removed and the void patched or cut off and ground smooth.
 - 6. When a coating is called for in the Work Order, manhole interior shall be high-

pressure (4,000 psi) water cleaned and blasted to remove all deteriorated concrete and other loose material. As a minimum, 4 inches of the manhole cover frame area shall also be cleaned by blasting. After the cleaning process, the concrete structure shall be washed with a 5-10 percent solution of muriatic acid. The structure shall be cleaned again with high pressure water to remove acid residual and any loose material. The CONTRACTOR shall make provisions during blasting operations to contain all blasting abrasive material. No blasting abrasive shall be allowed into the sanitary sewer lines.

B. Sealing of Manhole Walls:

1. After the completion of the cleaning operation, manhole wall leaks shall be sealed by the following methods:
 - a. Plugging using the infiltration control material specified in Article 2.03; and/or
 - b. Patching using the material specified in Article 2.03; and/or
 - c. Chemical Grout Sealing using material specified in Article 2.03.
 - i. Equipment: The basic equipment shall consist of chemical pumps, chemical containers, injection fittings, hoses, valves, and all necessary equipment and tools required to seal manholes. The chemical injection pumps shall be equipped with pressure meters that will provide for monitoring pressure during the injection of the chemical sealants. When necessary, liquid bypass lines equipped with pressure-regulating bypass valves will be incorporated into the pumping system.
 - ii. Sealing Procedures: At each point of leakage within the manhole structure, a hole shall be carefully drilled from within the manhole and shall extend through the entire manhole wall. In cases where there are multiple leaks around the circumference of the manhole, fewer holes may be drilled, providing all leakage is stopped from these holes. Grout ports or sealant injection devices shall be placed in these previously drilled holes in such a way as to provide a watertight seal between the holes and the injection device. A hose, or hoses, shall be attached to the injection device from an injection pump. Chemical sealing materials as specified shall then be pumped through the hose until material refusal is recorded on the pressure gage mounted on the pumping unit or a predetermined quantity of sealant has been injected. Care shall be taken during the pumping operation to insure that excessive pressures do not develop and cause damage to the manhole structure. Upon completion of the injection, the ports shall be removed and the remaining holes filled with mortar and troweled flush with the surface of the manhole walls or other surfaces. The mortar used shall be a nonshrink patching mortar.

2. All materials shall be mixed and applied in accordance with the manufacturer's written instruction. Leaks may be temporarily channeled through "bleed" pipes which are removed and plugged during the final repairs. The manhole sealing repair shall be acceptable to the OWNER before additional work proceeds.

- C. Patching: Loose material shall be removed from the area to be patched or repainted exposing a sound subbase. Holes or voids around steps, joints or pipes, spalled areas and cavities caused by missing or broken brick shall be patched and missing mortar repainted using a nonshrink patching mortar specified in Article 2.03. Cracks not subject to movement and greater than 1/16 inch in width shall be routed out to a minimum width and depth of 0.5 inches and patched with nonshrink patching mortar.

3.3 MANHOLE COATINGS

- A. Manholes shall be given a minimum 0.5-inch coat of Sewper Coat, Strong Seal, Refratta HAC 100 or other approved calcium aluminate corrosion barrier.

3.4 FRAME AND COVER REPAIRS AND REPLACEMENT

- A. Work Orders will identify one of the following repairs:
 1. **Realign, Grout, and Seal Manhole Casting (Frame)**: Remove the frame by excavating as necessary, lifting off the frame, thoroughly cleaning its bottom bearing surface, coating it with asphalt paint similar to the original coating, removing the old mortar from the top of the wall and replacing it with a 2-inch (nominal) layer of new mortar consisting of one part of Portland cement to three parts of clean, washed sand, mixed with an adequate amount of water and carefully resealing the frame in its correct position. Realignment may be horizontal or vertical. Where vertical realignment is required, grade rings may be required in order to raise the manhole frame and cover to the existing grade elevation.
 2. **Replace Manhole Ring and Cover and Install Seal**: Where identified by the OWNER, cast iron rings and covers shall be replaced by the CONTRACTOR. The CONTRACTOR shall remove and replace the entire assembly with a new frame and cover. The frame shall be set on the manhole wall as described in Paragraph 1 entitled "Realign, Grout, and Seal Manhole Casting (Frame)" above.

3.5 INVERT REPLACEMENT

- A. The CONTRACTOR shall remove existing channel and benches to the base of the manhole, then rebuild channel by reshaping channel invert and building new slope of shelves or benches. Work shall include aligning inflow and outflow ports in such a manner to prevent the deposition of solids at the transition point. All inverts shall

follow the grades of the pipe entering the manholes. Changes in direction of the sewer and entering branch or branches shall have a true curve of as large a radius as the size of the manhole will permit, but will be shaped to allow easy entrance of maintenance equipment including buckets, TV camera, etc.

3.6 TESTING

- A. After the specified rehabilitation work has been completed, the manholes shall be visually reviewed and tested in accordance with manufacturer's testing procedures by the CONTRACTOR in the presence of the OWNER and found to be acceptable. The manhole environment shall be properly vented prior to testing to ensure hazardous conditions do not exist.
 - 1. Visual Review:
 - a. All rehabilitated manholes shall be visually reviewed for water tightness against leakage of water into the manhole. All visible leaks and defects observed during the review shall be repaired to the OWNER's satisfaction at no additional cost to the OWNER. There shall be no visible infiltration.
 - b. All pipe connections shall be open and clear.
 - c. There shall be no cracks, voids, pinholes, uncured spots, dry spots, lifts, delaminations or other type defects in the lining.
 - d. The epoxy lining top coat shall provide a continuous monolithic surfacing with uniform thickness throughout the manhole interior and be free of pinholes, slumps and drips.
- B. Field acceptance of the epoxy manhole lining system shall be based on the OWNER's evaluation of the appropriate installation of the base coat and top coat per field inspections and on observation of the measurements of the wet film thickness. Acceptance shall also be based on the OWNER's evaluation of the curing test data and final testing.
- C. If any defective lining is discovered after it has been installed, it shall be repaired or replaced in a satisfactory manner within a 72-hour period and at no additional cost to the OWNER. This requirement shall apply for the entire guarantee period.

END OF SECTION

SECTION 02936

SODDING

PART 1 - GENERAL

1.01 PERFORMANCE

- A. Section generally defines CONTRACTOR's responsibilities, unless otherwise indicated for the following:
 - 1. Preparation of subsoil.
 - 2. Placing topsoil.
 - 3. Fertilizing.
 - 4. Sod installation.
 - 5. Maintenance.

1.02 RELATED SECTIONS

- A. All of Division 1.
- B. **Section 02210** – Grading.

1.03 REFERENCES

- A. FDOT - Florida Department of Transportation - Standard Specifications for Road and Bridge, Latest Edition.

1.04 QUALITY ASSURANCE

- A. Sod Producer: Company specializing in sod production and harvesting with a minimum five years of experience and certified by the State of Florida.
- B. Installer: Company approved by the sod producer.
- C. Sod: Minimum age of 18 months, with root development that will support its own weight, without tearing, when suspended vertically by holding the upper two (2) corners.
- D. Submit sod certification for grass species and location of sod source.

- E. The ENGINEER reserves the right to test, reject or approve all materials before application.

1.05 REGULATORY REQUIREMENTS

- A. Comply with regulatory agencies for fertilizer.

1.06 DELIVERY, STORAGE, AND HANDLING

- A. Deliver products to site under provisions of **Section 01600** – Material and Equipment.
- B. Store and protect products under provisions of **Section 01600** – Material and Equipment.
- C. Deliver sod on pallets. Protect exposed roots from dehydration.
- D. Do not deliver more sod than can be laid within 48 hours.
- E. Deliver fertilizer in waterproof bags showing weight, chemical analysis, and name of manufacturer.
- F. The CONTRACTOR shall furnish the ENGINEER invoices of all materials received in order that the minimum application rate of materials may be determined.

1.07 MAINTENANCE SERVICE

- A. Maintain sodded areas immediately after placement until grass is well established and exhibits a vigorous growing condition.

PART 2 - PRODUCTS

2.01 MATERIALS

- A. Sod:
 - 1. Sod shall be ASPA approved grade, Argentine Bahia, Tifton Bermuda, Floritam, or St. Augustine to match existing or better as directed, with firm texture having a compacted growth and good root development.
 - 2. Sod shall be absolutely true to varietal type, and free from weeds or other objectionable vegetation, fungus, insects and disease of any kind.
 - 3. Cut sod in area not exceeding 24 inches by 24 inches with minimum one

(1) inch and maximum three inch of topsoil base.

4. The sod shall be planted as soon as possible after being harvested and shall be shaded and kept moist from the time of harvesting to the time it is planted.

B. Topsoil:

1. Excavated from site and free of weeds.
2. Topsoil to be minimum three (3) inches thick.

C. Fertilizer:

1. In accordance with FDOT 982-1.

D. Water:

1. Clean, fresh, and free of substances or matter, which could inhibit vigorous growth of grass.

PART 3 - EXECUTION

3.01 INSPECTION

- A. Verify that prepared subsoil is ready to receive the work of this Section.

3.02 FERTILIZING

- A. Apply fertilizer in accordance with manufacturer's instructions.
- B. Apply after smooth raking of topsoil and prior to installation of sod.
- C. Apply fertilizer no more than 48 hours before laying sod.
- D. Mix thoroughly into upper two (2) inches of topsoil.
- E. Lightly water to aid the dissipation of fertilizer.

3.03 LAYING SOD

- A. Moisten prepared surface immediately prior to laying sod.
- B. Lay sod tight with no open joints visible, and no overlapping; stagger end joints 12 inches minimum. Do not stretch or overlap sod pieces.

C. Stake sod with 1x2 stakes on all areas with slopes greater than one (1) vertical to five (5) horizontal.

D. Coordinate sod installation with irrigation system components.

3.04 MAINTENANCE

A. Water to prevent grass and soil from drying out.

B. Immediately replace sod in areas, which show deterioration or bare spots.

3.05 APPROXIMATE AREA TO BE SODDED

A. All construction areas disturbed by construction of the project except those areas receiving pavement or rock. CONTRACTOR is to take into account his anticipated ditch width and pit sizes at the surface when accounting for the cost of this work.

END OF SECTION

DIVISION 16

ELECTRICAL

SECTION 16000

ELECTRICAL GENERAL REQUIREMENTS

PART 1 GENERAL

1.01 RELATED DOCUMENTS

- A. The general provisions of the Contract, including General Conditions, apply to all the Work specified in the Electrical 16000 Sections.

1.02 LAWS, PERMITS, FEES AND NOTICES

- A. Secure and pay all permits, fees and licenses necessary for the proper execution of the Work. Submit all notices and comply with all laws, ordinances, rules and regulations of any public agency bearing on the Work. CONTRACTOR shall be licensed Electrical CONTRACTOR in the county of construction.

1.03 DEPARTURES

- A. If any departures from the Contract drawings or specifications are deemed necessary, details of such departures and the reasons therefore shall be submitted to the ENGINEER for advance written approval, prior to departure.

1.04 GUARANTEES

- A. Furnish written guarantee covering all materials, workmanship, labor and equipment for a period of one (1) year from the date of acceptance as described in the Contract General Conditions.
- B. The OWNER reserves the right to operate and use all materials and equipment failing to meet the requirements of the Contract documents until such unacceptable materials and equipment are replaced or repaired to the satisfaction of the ENGINEER.

1.05 AS-BUILT INFORMATION

- A. A set of "red-lined" electrical drawings shall be carefully maintained at the job site. Actual conditions are to be put on the drawings in red on a daily basis so the drawings will continuously show locations and routes of cable trays, conduits, pull-boxes, circuit numbers, and other information required by the ENGINEER.

1.06 JOB SITE VISIT

- A. Visit the project site before submitting a bid. Verify all dimensions shown and determine the characteristics of existing facilities which will

affect performance of the Work, but which may not be shown on drawings or described within these specifications.

1.07 CLEANUP

- A. Maintain a continuous cleanup during the progress of the Work and use appointed storage areas for supplies. The premises shall be kept free from accumulations of waste materials and rubbish.

1.08 CUTTING AND PATCHING

- A. Cut and prepare all openings, chases and trenches required for the installation of equipment and materials. Repair, remodel and finish in strict conformance with the quality of workmanship and materials in the surroundings. Obtain written permission from the ENGINEER for any alterations to structural members before proceeding.

1.09 MAINTENANCE

- A. Render all necessary measures to ensure complete protection and maintenance of all systems, materials and equipment prior to final acceptance. Any materials or equipment not properly maintained or protected to assure a factory new condition at the time of final acceptance shall be replaced immediately at no additional cost to the OWNER.

1.10 WATERPROOFING

- A. Whenever any Work penetrates any waterproofing, seal and render the Work waterproof. All Work shall be accomplished so as not to void or diminish any waterproofing bond or guarantee.

1.11 TESTS

- A. Conduct an operating test of equipment prior to the ENGINEER's approval. The equipment shall be demonstrated to operate in accordance with the requirements of these specifications. The tests shall be performed in the presence of the ENGINEER or an authorized representative. The electrical CONTRACTOR shall furnish all instruments, electricity and personnel required for the tests.

1.12 SUMMARY OF ELECTRICAL WORK

- A. Provide all labor, materials, tools, supplies, equipment and temporary utilities to complete the Work shown on the drawings and specified herein. All systems are to be completely installed and fully operational. Specifically, the Work includes, but is not necessarily limited to:
 - 1. Provide coordination with FPL representative for new service, including temporary construction power as required.

2. Provide new power service as indicated; include coordination with power company.
3. Provide and install all the electrical equipment, equipment rack, meter, main disconnect, control panel, raceways, terminal boxes, power and control wiring, pumps, wetwell instruments, including relocation of existing RTU equipment, reuse Rohm tower, and the like.
4. Provide and install wetwell floats.
5. Provide grounding of the equipment.
7. Provide testing and startup of the pump station equipment.
9. Provide training of Owner's personnel.
10. Provide all as-built to the drawings and closing documents.

1.13 CODES AND STANDARDS

- A. General Applicable provisions of the following codes and standards and other codes and standards required by the State of Florida and local jurisdictions are hereby imposed on a general basis for electrical Work (in addition to specific applications specified by individual Work sections of these specifications):
 1. U.L.: Electrical materials shall be approved by Underwriters' Laboratories, Inc. This applies to materials which are covered by U.L. standards. Factory applied labels are required.
 2. National Electrical Code.
 3. OSHA: Standards of the Occupational Safety and Health Administration are to be complied with.
 4. NEMA: National Electrical Manufacturers Association Standards are to be met wherever standards have been established by that agency and proof is specifically required with material submittals for switchboards, motor control centers, panelboards, cable trays, motors, switches, circuit breakers and fuses.
 5. ANSI: America National Standards Institute
 6. NESC: National Electrical Safety Code
 7. Any and all local codes.

1.14 ELECTRICAL TEMPORARY FACILITIES

A. The electrical CONTRACTOR shall include in his bid the cost of furnishing, installing, maintaining and removing all materials and equipment required to provide temporary light and power to perform his Work during construction and until Work is completed.

B. Safety

1. All reasonable safety requirements shall be observed to protect workers and the public from shock and fire hazards. Ground fault interrupters shall be employed in accordance with codes.
2. Ground wires are required in all circuits. Ground poles are required on all outlets. All metallic cases shall be grounded.
3. Raintight cabinets shall be used for all equipment employed in wet areas.

1.15 EXCAVATING FOR ELECTRICAL WORK

A. General – Not needed

1.16 ELECTRICAL SUBMITTALS

A. Submittals for Approval

1. Refer to Contract General Conditions for additional instructions on the General Conditions and this section, the more stringent requirements shall apply.
2. Shop Drawings and Manufacturer's data sheets are required for all electrical materials.
3. Submittals will not be accepted for partial systems. Submit all materials for each specification section at one time. Submittals must be arranged, correlated, indexed and bound in orderly sets for ease of review.
4. Samples are to be supplied for any substitute as requested by the ENGINEER.
5. The following numbers of copies are required:

Shop drawings	6 sets
Samples	1 each
Manufacturer's data	6 sets
Certifications	6 sets
Test reports	6 sets
Warranties/Guarantees	6 sets

6. Submit shop drawings, Manufacturer's data and certifications on all items of electrical Work prior to the time such equipment and materials are to be ordered. Order no equipment or

materials without approval from the ENGINEER. Submittals will not be accepted for partial system submittals; submit all data at one time. Submittals will be promptly returned, approved, approved as noted, or not approved. Items "approved as noted" must be changed to comply with the ENGINEER's comments and need not be resubmitted for "approved" status. Items "not approved" are not suitable, requiring complete new submittals.

7. Time delays caused by rejection of submittals are not cause for extra charges to OWNER or time extensions. CONTRACTOR shall be responsible for investigating existing systems or shop drawings in order to fully integrate the new equipment into the system. Adequate shop drawings may or may not exist for all existing systems.

B. Operation and Maintenance Manuals

1. Submit to the ENGINEER five (5) copies of all Manufacturer's service installation and operation manuals, instructions and bulletins. These manuals shall be subject to review of the ENGINEER. If acceptable they shall be forwarded to the OWNER. If not acceptable they shall be returned to the CONTRACTOR for revision and resubmittal. Manuals shall contain, but not be limited to, the following:
 - a. Brief description of system and basic features.
 - b. Manufacturer's name and model number for all components in the system.
 - c. List of local factory authorized service companies.
 - d. Operating instructions.
 - e. Maintenance instructions
 - f. Trouble shooting instructions
 - g. Manufacturer's literature describing each piece of equipment.
 - h. Power and control wiring diagrams
 - i. Parts lists

1.17 ELECTRICAL PRODUCTS

A. Standards Products

1. Unless otherwise indicated in writing by the ENGINEER, the products to be furnished under this specification shall be the

Manufacturer's latest design. Units of equipment and components of the same purpose and rating shall be interchangeable throughout the project. All products shall be newly manufactured. Defective equipment or equipment damaged in the course of installation or test, shall be replaced or repaired in a manner meeting with the approval of the ENGINEER at no additional expense to the OWNER.

B. Delivery, Storage and Handling

1. Deliver products to project properly identified with names, model numbers, types, grades, compliance labels and similar information needed for distinct identification; adequately packaged or protected to prevent deterioration during shipment, storage and handling. Store in a dry, well ventilated, indoor space, except where prepared and protected by the Manufacturer specifically for exterior instructions for storage locations.

C. Substitutions

1. Comply with instructions in the Contract General Conditions and Special Conditions and obtain pre-approval of the ENGINEER regarding substitutions.

1.18 SKILLED ELECTRICAL CRAFTSMEN

- A. CONTRACTOR shall employ and staff the project with skilled Craftsmen experienced in the project requirements.
- B. As a minimum, a Licensed Journeyman Electrician shall be present on the project at all times.
- C. Other skilled persons shall be present as the project requirements dictate including Manufacturers representatives, start-up technicians, ENGINEERS, etc.

1.19 DRAWINGS AND SPECIFICATIONS

- A. Refer to the drawings for additional requirements. There are requirements indicated on the drawings which are not indicated in the specification.
- B. Bidders, suppliers, equipment vendors, General CONTRACTOR, Sub Contractors and other similar entities are required to read all the Contract documents including drawings and specifications.

1.20 SCHEMATIC NATURE

- A. Plan views are schematic in nature and meant to show the schematic arrangement of equipment and conduit.

- B. CONTRACTOR shall provide the OWNER/ENGINEER with an 11 x 17 (min) drawing (to scale) of the final layout of the equipment and conduit routing for approval. This drawing shall include measurements for all NEC required clearances and separations for equipment and conduit. Refer to other spec sections for conduit routing requirements.

1.21 APPROVED SHOP DRAWINGS

- A. Use approved shop drawings for lay out of equipment. The Contract documents will vary from the shop drawings. Inform the ENGINEER immediately if there are lay out issues or inadequate space for equipment or clearances. Land conduits in openings of enclosures per the approved shop drawings, do not use the Contract drawings.
- B. Housekeeping pads, equipment racks and the like shall be based on the approved shop drawings.

1.22 CLEARANCES

- A. It shall be the CONTRACTOR's responsibility to meet N.E.C. clearances about equipment.

1.23 ROUTING

- A. Conduit routing is schematic in nature. Conduit routing is shown for clarity on the Contract drawings. See other spec sections for additional conduit routing requirements.

1.24 FUTURE FACILITIES

- A. Where future facilities are indicated, conduit routing shall account for such facilities.
- B. Where conduits are installed as spares or for future equipment, these conduits shall include pull string, any conduits installed exposed along a concrete pad or slab, shall be capped .

1.25 DRAWINGS FURNISHED BY CONTRACTOR

- A. OWNER shall be provided all CONTRACTOR furnished drawings. Such drawings include, but are not limited to: Control panels, MCC.s, switch boards, instrumentation details, redline mark-up of the Contract drawing and the like.
- B. Drawings shall be furnished for review and approval. No materials shall be provided without the ENGINEER's approval.
- C. Final drawings shall be furnished or as field modified accounting for any changes made during start up.

1.26 HOMERUNS

- A. CONTRACTOR shall coordinate home runs between plan views. Where any conduit is shown in any plan view it shall be installed the entire length may be required.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION (NOT USED)

END OF SECTION

SECTION 16050

BASIC MATERIALS AND METHODS

PART 1 GENERAL

1.01 SUBMITTALS

- A. Submit data sheets on all items per Section 16000.

1.02 CODES AND STANDARDS

- A. General applicable provisions of the following codes and standards and other codes and standards required by the State of Florida and local jurisdictions are hereby imposed on a general basis for electrical Work (in addition to specific applications specified by individual Work sections of these specifications):
 - 1. U.L.: Electrical materials shall be approved by the Underwriters' Laboratories, Inc. This applies to materials which are covered by U.L. standards. Factory applied labels are required.
 - 2. NEC: National Electrical Code
 - 3. OSHA: Standard of the Occupational Safety and Health Administration are to be complied with.
 - 4. NEMA: National Electrical Manufacturers Association Standards are to be met wherever standards have been established by that agency, and proof is specifically required with material submittals for switchboards, motor control centers, panelboards, cable trays, motors, switches, circuit breakers, and fuses.
 - 5. ANSI: American National Standards Institute
 - 6. NESC: National Electrical Safety Code

PART 2 PRODUCTS

2.01 GROUNDING MATERIALS

- A. All ground rods shall be 20 foot 5/8" copperclad, unless otherwise indicated.
- B. Ground wires shall be soft drawn copper sized per National Electrical Code, unless otherwise indicated.

2.02 CONDUIT

A. PVC Conduit

1. PVC conduit shall be Schedule 80 or Schedule 40 unless otherwise noted and shall be U.L. approved. Comply with Federal Spec WC-1094 and NEMA TC-1.

B. Flexible Conduit

1. All flexible conduits shall be liquidtight, made of corrosion resistant plated steel with extruded polyvinyl covering and watertight connectors.

C. Refer to schedule in drawing for location requirements.

2.03 CABLE, WIRE AND CONNECTORS

A. 600 Volt Power Wiring

1. Individual conductors shall be rated for 600 volts and shall meet the requirements below:
 - a. Conductors shall be stranded.
 - b. All wire shall be brought to the job in unbroken packages and shall bear the date of manufacturing; not older than 12 months.
 - c. Type of wire shall be THWN except where required otherwise by the Contract drawings.
 - d. No wire smaller than No. 12 gauge shall be used unless specifically indicated.
 - e. Conductor metal shall be copper.
 - f. All conductors shall be meggered after installation. Megger testing shall exceed 50 mega ohms.
2. Multi-conductor cables shall be type TC UL 1277 THWN, PVC jacketed 600V with conductor and quantities as indicated.

B. Instrumentation and Control Cable

1. Process instrumentation wire shall be 16 gauge twisted pair, 600 V., aluminum tape shielded, polyvinyl chloride jacketed, as manufactured by the American Insulated Wire Co., Eaton Corp., or

equal. Multiconductor cables with individually shielded twisted pairs shall be installed where indicated.

2. Multiconductor control cable shall be stranded 14 gauge, 600 V. THWN insulated overall shielded with PVC jacket, as manufactured by the American Insulated Wire Co., Eaton Corp., or equal.

2.04 TERMINATIONS AND SPLICES (600 VOLTS AND LESS)

- A. Terminations of power cable shall be by means of U.L. approved connectors. All connectors shall meet U.L. 486B and shall be compatible with the conductor material.
- B. Terminate all control and instrumentation cable with screw-clamp type terminal blocks.
- C. Splicing of power, control, or instrumentation wiring will not be allowed except by written approval of the ENGINEER. Where splicing is allowed, splices shall be made with approved compression connectors, and splices shall be made waterproof regardless of location.

2.05 BOXES

- A. Boxes for wiring devices, switches and receptacles installed outdoors shall be weatherproof fiberglass with polycarbonate cover plates, or stainless steel 316.

2.06 PULL BOXES AND SPLICE BOXES

- A. Location
 1. Units used outdoor or in a damp or corrosive environment shall be 316 ss or fiberglass unless otherwise indicated on plans.
 2. Units used indoors in dry and clean A/C environments shall be NEMA 1.
- B. Size
 1. Units shall be sized per NEC as minimum.
- C. Required Units
 1. Plans depict minimum requirements. Additional units shall be provided as may be required to complete raceway systems.

2.07 MOUNTING AND SUPPORTING ELECTRICAL EQUIPMENT

- A. Furnish and install all supports, hangers, and inserts required to mount fixtures, conduits, cables, pull boxes, and other equipment.

- B. Support system used indoors in clean, dry and air-conditioned areas shall be galvanized steel. All other areas shall be 316 ss with ss fasteners.
- C. Perforated straps and wires are not permitted for supporting electrical devices. Anchors shall be of approved types.
- D. All supports, hangers, hardware, etc. used outdoors or in in non-air-conditioned indoor areas or in hazardous areas shall be non-ferrous, corrosion resistant or 316 stainless steel. Supports shall be selected to avoid galvanic reactions. Support devices shall be submitted for approval.
- E. Provide trapeze, bridge systems or wall bracketed cantilevered system to support the raceway system.
- F. Spacing of support systems shall be per NEC. Provide spacing of conduits according to the NEC and the materials used. For PVC conduit, refer to NEC table 347-8.
- G. Plans depict minimum requirements. Provide additional units as required to complete raceway system.

2.08 DUCT SEAL

- A. Provide Garvin Industries' duct seal or an approved equal
- B. Provide and install duct seal at all conduit ends for all new conduit installations, including wetwell and valve vault.
- C. Duct seal shall be used to seal all penetrations at junction boxes, control panels, RTU enclosures, terminal boxes, starter enclosures, timers, MCC equipment, panelboards and the like, It shall be a permanently soft, non toxic compound. It shall also not affect other plastic materials or corrode metals.

PART 3 EXECUTION

3.01 GROUNDING

- A. Provide ground system as indicated on the drawings and as required by the National Electrical Code.
- B. All raceways require grounding conductors. Metallic raceways are not adequate grounding paths. Bonding conductors through the raceway systems shall be continuous from main switch ground buses to panel ground bars of the panelboards, and from panel grounding bars of panelboards and motor control centers to branch circuit outlets, motors, lights, etc. THESE GROUND CONDUCTORS ARE REQUIRED THROUGHOUT THE PROJECT REGARDLESS OF WHETHER

CONDUIT RUNS SHOW GROUND CONDUCTORS ON THE DRAWINGS.

- C. All connections made below grade shall be of the exothermic type.
- D. The grounding system test shall not exceed a 48 hour span dry resistance of 10 ohms. Additional grounding to meet this requirement shall be installed at no extra cost. Grounding and bonding connections shall not be painted.

3.02 CONDUIT

A. Locations:

Conduits shall be used as follows:

- 1. Refer to schedule on drawings.

B. Installation

- 1. Conduits subjected to rough handling or usage shall be removed from the premises.
- 2. Conduits must be kept dry and free of water or debris with approved pipe plugs or caps. Care shall be given that plugs or caps be installed before pouring of concrete.
- 3. Where conduits pass through exterior concrete walls or fittings below grade, the entrances shall be made watertight.
- 4. Infurred ceilings, conduit runs shall be supported from structure, not furring.
- 5. Conduits entering panelboards, pull boxes, or outlet boxes shall be secured in place by galvanized locknuts and bushings, one (1) locknut outside and one (1) locknut inside of box with bushing on conduit end. The locknuts shall be tightened against the box without deforming the box. Bushings shall be of the insulating type.
- 6. Field conduit bends shall be made with standard tools and equipment manufactured especially for conduit bending.
- 7. Where embedded conduits cross expansion joints, furnish and install offset expansion joints or sliding expansion joints. Sliding expansion joints shall be made with straps and clamps.
- 8. Exposed runs of conduits shall be installed with runs parallel or perpendicular to walls, structural members or intersections of vertical planes and ceilings, with right angle turns consisting of symmetrical bends. No attempts are made in plans to show

required pull boxes, gutters, etc. necessary for the construction of the raceway system but the CONTRACTOR shall provide these raceways as may be required.

9. Conduits in structural slabs shall be placed between the upper and the lower layers of reinforcing steel, requiring careful bending of conduits. Conduits embedded in concrete slabs shall be spaced not less than eight (8) inches on centers or as widely spaced as possible where they converge at panels or junction boxes. Conduits running parallel to slab supports, such as beams, columns and structural walls shall be installed not less than 12 inches from such supporting elements. To prevent displacement during concrete pour, saddle supports for conduit, outlet boxes, junction boxes, inserts, etc., shall be secured.
10. Conduit runs shall always be concealed except where indicated on plans.
11. Pull lines shall be installed in all empty conduits. All pull wires shall be identified with conduit number at each end.
12. Where conduits are run individually, they shall be supported by approved pipe straps secured by means of toggle bolts or tapcons on hollow masonry; tapcons on concrete or solid masonry; machine screws or bolts on metal surfaces and wood screws on wood construction. The use of perforated straps or wires will not be permitted.
13. Wire shall not be installed until all Work of any nature that may cause damage is completed, including pouring of concrete. Mechanical means shall not be used in pulling in wires No. 8 or smaller.
14. Underground conduits not under concrete slabs are to be buried at least two (2) feet below finished grade for circuits rated 600 volts or less, except under traffic areas where motor vehicles may cross. Under traffic areas, conduits are to be buried at least three (3) feet below finished grade.
15. All conduits shall be cleaned by pulling a brush swab through before installing cables.
16. All conduits shall be sealed at each end with electrical putty. Special care shall be taken at all equipment where entrance of moisture could be detrimental to equipment. Approved backing gauze is required prior to the installation of conduit putty.
17. A maximum of two (2) feet of flexible conduit shall be used at connections of all motors, transformers, motor operated valve and gates, instruments and other items of equipment where vibration is

present. It shall be supported where required with stainless steel bands.

20. PVC conduit shall be supported to walls and slabs using carlon snap strap conduit wall hangers. Two hole PVC conduit clamps shall not be permitted.

3.03 WIRES, CABLES AND CONNECTIONS

- A. Cables pulled into conduits shall be pulled using pulling eyes attached to conductors.
- B. Shields shall be grounded at only one termination point.

3.04 BOXES

- A. Installation of boxes shall be in accordance with the National Electrical Code requirements.
- B. Boxes shall be mounted plumb and level in accessible locations and mounting shall be secure, vibration resistant and galvanically compatible. Hardware shall be used that is specifically intended for the purpose. When mounted in corrosive, damp or wet locations, stainless steel hardware shall be utilized.

3.05 WIRING DEVICES

- A. Wiring devices shall be installed in device boxes approved for the application. All connections shall be made with screw terminals. Wiring devices shall be Leviton or approved equal.
- B. Wire devices on UPS systems shall be isolated ground, colored orange.
- C. Cover plates shall be provided as follows except as otherwise noted.
 1. Interior finished area – brushed aluminum
 2. Wet areas – gasketed plastic with flip cover.
- D. Receptacles installed outdoors, below grade, or in areas other than clean and dry environments shall be GFI and weatherproof. Receptacles shall be weatherproof with cords plugged in.
- E. All receptacles shall be GFI protected.

3.06 SUPPORTING DEVICES

- A. All items shall be supported from the structural portion of the building and studs, except standard ceiling mounted lighting fixtures and small devices may be supported from ceiling system where permitted by the ENGINEER.

However, no sagging of the ceiling will be permitted. Supports and hangers shall be types approved by Underwriters' Laboratories.

- B. All floor-mounted devices (switchboards, large control panels, motor control centers, transformers, etc.) shall be securely anchored to the floors. Where recommendations are made by Manufacturer, these recommendations shall be followed.

3.07 CLEANING

- A. All electrical equipment enclosures shall be thoroughly cleaned before acceptable by the OWNER. As a minimum, CONTRACTOR shall remove all debris including stripped wire insulation, dirt, and debris.

END OF SECTION

SECTION 16912

RTU CELL BASE SYSTEM

PART 1 – GENERAL

1.1 WORK INCLUDED

- A. The Contractor shall furnish, install and place into service a cellular based radio telemetry system including all hardware, software for a complete and functional telemetry system, so it communicates with the existing LRD SCADA system at the wastewater plant.
- B. Provide all equipment and configuration for proper communication with the existing SCADA Personal Computer (PC) at the wastewater plant.
- C. All communications hardware, radio software (as may be required) , discrete and analog wiring, cat 5e cable, and all other cables shall be provided.
- D. In order to establish sole source responsibility; the instrumentation and Control (I&C) system vendor shall be responsible for hardware equipment and all systems tied to the proposed cell based RTU control panel. The RTU/Pump Controller programming shall be provided by the I&C Contractor.
- E. The LRD existing SCADA system shall be programmed and configured by LRD programming staff, but with the help and assistance of the I&C Contractor for each lift station/cellular based radio
- E. Like items of equipment provided hereunder shall be the end products of one manufacturer in order to achieve standardization for appearance operation and maintenance.
- F. Refer to drawings, pump controller radio & component/Cell based telemetry is to be provided at each of the existing sewage pump station location indicated in the contract documents.

1.2 MANUFACTURER

- A. The Cellular based radio system shall be composed of a pump controller that will collect all discrete and analog signals and provided pumping control based on float levels from the wetwell. This system will also read the analog continuous wetwell level from

a level transducer sensor in the wetwell. This pump controller shall be one of two approved manufacturers, the Xylem Multitrode pump controller with multismart display unit, or the SEL (Schweitzer Engineering Laboratories) pump controller.

- B. Provide all supporting equipment and components that go with the Pump Controller.

Minimally provide the following major equipment RTU panel components along with the pump controller:

1. SQ D 1 pole 15A CB
2. SQ D single phase surge arrestor SDA1175T series
3. Hubble 20A GFCI duplex receptacle
4. Sierra Wireless Raven RV50X series G3/G4 LTE to provide 24V power supply power, Ethernet communications switch, Ethernet connected G3/G4 LTE cellular based Sierra Wireless Raven modem RV50X.
5. Cellular Antenna, L-bracket externally mounted on RTU panel
6. Puls 24VDC power supply UB10.241 or equal
7. Power Sonics or equal 9AH 12VDC Battery
8. Finder or equal 3PDT 120VAC relays & relay 11 pin sockets
9. Phoenix Contact UT4 Terminal Block or equal
- 10 Other miscellaneous equipment like: Coax Polyphaser for surge protection to rf cellular antenna cable, enclosure mounting kits, Panduits, mounting hardware, swing out deadfront kit
Steel sub-panel/ backplate & mounts, door clamps

1.3 RELATED WORK SPECIFIED ELSEWHERE

- A. Section 16901 – I&C Systems
- B. Section 16050 – Electrical General Provisions.
- C. Section 16910 – Programmable Logic Controller.

1.4 SUBMITTALS

- A. Submittals shall be made in accordance with the General Requirements.
 1. It is incumbent upon the Contractor to coordinate the work specified in these Sections so that a complete Radio telemetry system be provided.

2. During the period of preparation of this submittal, the Contractor shall authorize direct informal liaison between his single I&C Supplier and the Engineer for exchange of technical information. As a result of this liaison certain minor refinements and revisions in the systems as specified may be authorized informally by the Engineer, but these shall not alter the scope of the work or cause increase or decrease in the Contract price. During this informal exchange no oral statement by the Engineer shall be construed to give formal approval of any component or method, nor shall any statement be construed to grant formal exception to, or variation from these specifications.

B. Four complete sets of Operation and Maintenance Manuals shall be provided.

C. Warranty information shall be submitted in accordance with general conditions.

1.5 QUALITY ASSURANCE

A. All equipment, software and programming furnished under this specification shall be new and unused, shall be the product of a manufacturer having a successful record of manufacturing and servicing the equipment specified herein for a minimum of 10 (10) years.

1.6 WARRANTY

A. The Contractor shall warrant all equipment and its installation for a period of one (1) year from the date of Owner acceptance of the system.

B. Certain equipment components like the Pump Controller shall carry a 10 years warranty.

PART 2 – PRODUCTS

2.1 GENERAL

B. Radio telemetry system shall properly integrate with the field equipment like floats, pump running and fault signals from pump control panel relays, wetwell float levels, Generator and ATS switch status and alarms for sites where there is a generator and ATS.

2.3 GENERAL ETHERNET RADIO MODEM REQUIREMENTS

- A. The work under this section includes the furnishing of all labor materials equipment and supervision for furnishing the cellular based radio, including the SIM card compatible with LRD's cellular carrier to be used with the Ethernet connected radio modem and pump controller as indicated on the drawings and specifications.
- B. Coordinate with LRD personnel the activation of the cellular based SIM card so the cellular modem operated in the Verizon Wireless or AT&T Cellular network.
- C. Submittals
 - 1. Submit shop drawings and product data for equipment furnished in accordance with the General Conditions.
 - 2. Furnish Operation and Maintenance Manuals in accordance with the General Conditions.
- D. Manufacturer's Start-Up Services
 - 1. Contractor shall integrate the furnished cell based RTU panel with the pump controller, power and control components, and start it up, configure to meet the monitoring and alarm points at the existing wastewater pump station, and meet the telemetry and SCADA requirements as indicated on the drawings and LRD standards.

PART 3 – EXECUTION

3.1 CONSTRUCTION

- A. Construct radio system in accordance with the Contract documents and the pump controller manufacturer's requirements.

3.2 DOCUMENTATION

- A. Reports shall be included in the O&M manuals reflecting radio performance and final corrections.

3.3 TESTING

- A. All elements of the radio telemetry system installation shall be checked in the presence of the Engineer and to his satisfaction.

The I&C supplier shall provide instrument technicians for the purposes of start up and testing.

END OF SECTION

APPENDIX A

LOXAHATCHEE RIVER DISTRICT ENVIRONMENTAL CONTROL DISTRICT MANUAL OF MINIMUM CONSTRUCTION STANDARDS AND TECHNICAL SPECIFICATIONS

CAN BE DOWNLOADED AT

https://loxahatcheeriver.org/wp-content/uploads/2018/06/2018_LRECD-Construction-Standards-and-Technical-Specifications.pdf

APPENDIX B

CONTRACTOR PERFORMANCE EVALUATION REPORT

	Loxahatchee River Environmental Control District	CONTRACT NO.		
ADDRESS	2500 Jupiter Park Drive	CONTRACTOR		
CITY / STATE / ZIP	Jupiter, FL 33458	PERIOD OF PERFORMANCE	FROM	TO
CONTRACT PROJECT MANAGER		LOCATION OF PERFORMANCE		

INSTRUCTIONS: This form can be completed on the computer or printed and completed by hand. Use the mouse to navigate. To check or uncheck a box, **'double click' the box**. If further direction is required on how to complete this evaluation or where to submit it, please contact your Contracting Officer. Comment boxes are formatted to automatically wrap the entered text. Check the box that best describes the level in which the Contractor supported the area described. Comments are essential and must substantiate your rating selection. N/A = not applicable. If additional space is required, use page 2 of the form or attach additional page(s).

SEE PAGE 3 FOR EVALUATION RATINGS DEFINITIONS

1. Quality. Contractor conformed to contract requirements. Was capable, efficient and effective in supporting the programs of this contract. Provided well maintained equipment and highly qualified personnel. Finished product meets the quality requirements set forth in the contract.

☐ N/A ☐ Satisfactory ☐ Unsatisfactory

COMMENTS: 

--

2. Schedule. Contractor was prepared and available to begin work on contract start date and provided daily coverage during the contract period with little to no disruption or unavailability. Contractor completed the work within the dates specified in the contract and any approved extensions of time.

☐ N/A ☐ Satisfactory ☐ Unsatisfactory

COMMENTS: 

--

3. Change Orders. Contractor conformed to contract requirements, providing complete documentation and was reasonable in the negotiations for time and costs. Contractor did not engage with frivolous or unsupported change order requests. Contractor met time requirements in the contract for identification and quantification of additional or deleted work.

☐ N/A ☐ Satisfactory ☐ Unsatisfactory

COMMENTS: 

--

4. Management. Contractor and on-site representatives were professional, well qualified, and committed to customer satisfaction and safety of operations. Contractor provided necessary support for key personnel and if applicable, took necessary action to correct or replace any personnel. Contractor was timely and complete with shop drawings, pay applications, releases, schedules and other required submittals.

☐ N/A ☐ Satisfactory ☐ Unsatisfactory

COMMENTS: 

6. Regulatory Compliance. How well does the contractor comply with governing regulations such as the FDEP, FDOH, SFWMD or others.

☐ N/A ☐ Satisfactory ☐ Unsatisfactory

COMMENTS: 

7. Safety. Contractor and on-site representatives attitude and efforts, as well as actual application and general safety of operations?

☐ N/A ☐ Satisfactory ☐ Unsatisfactory

COMMENTS: 

9. Other Areas:

☐ N/A ☐ Satisfactory ☐ Unsatisfactory

10. Other Areas:

☐ N/A ☐ Satisfactory ☐ Unsatisfactory

11. Other Areas:

☐ N/A ☐ Satisfactory ☐ Unsatisfactory

12. Other Areas:

☐ N/A ☐ Satisfactory ☐ Unsatisfactory

12. Overall Contractor Rating:

☐ N/A ☐ Satisfactory ☐ Unsatisfactory

Additional comments to support your response to any item above or other items.

Name, Title of Individual Completing this Form (include agency, phone and electronic address)

Signature

RATING**DEFINITION****NOTE**

Satisfactory

Performance meets contractual requirements. The contractual performance of the element being assessed may contain some minor problems for which corrective actions taken by the Contractor were satisfactory.

To justify a Satisfactory rating, there should have been only minor problems, or major problems the contractor recovered from without impact to the contract. There should have been NO significant weaknesses identified.

Unsatisfactory

Performance does not meet most contractual requirements and recovery is not likely in a timely manner. The contractual performance of the element contains a serious problem(s) for which the contractor's corrective actions appear or were ineffective.

To justify an Unsatisfactory rating, identify multiple significant events in each category that the Contractor had trouble overcoming and state how it impacted the Government. A singular problem, however, could be of such serious magnitude that it alone constitutes an unsatisfactory rating. An Unsatisfactory rating should be supported by referencing the management tools used to notify the contractor of the contractual deficiencies (e.g. management, quality, safety, etc.)

APPENDIX C

GRAVITY SEWER EVALUATION REPORT

Technical Memorandum

To: Mr. Kris Dean, PE
Loxahatchee River District

From: Christine Miranda, PE
Taylor Lenney, EI
Holtz Consulting Engineers, Inc.

Subject: Rolling Hills Sewer System Evaluation

Date: August 26, 2020

1.0 INTRODUCTION

The purpose of this Technical Memorandum (TM) is to summarize the evaluation of the existing sewer system for the Rolling Hills development in Tequesta, Florida. This gravity sewer system was constructed in the 1970's; however the laterals were never connected to any of the homes in the development. Instead, septic tanks were installed, and the gravity sewer system was left inactive. Holtz Consulting Engineers, Inc (HCE) was contracted by the Loxahatchee River District (District) to provide an assessment of the existing system and based upon the assessment, provide a preliminary cost estimate for the recommended improvements to the system in order to connect the approximately fifty homes to the District's wastewater collection system.

The completed assessment consisted of three main components. These included a gravity sewer pipe condition assessment conducted by HCE's sub-consultant, Shenandoah Construction, a manhole assessment performed by two of HCE's MACP NASSCO certified inspectors, and a topographic survey performed by Lidberg Land Surveying. The following sections detail the findings of these evaluations and the results serve as the basis for the recommendations and cost estimate presented in **Section 5**.

2.0 GRAVITY SEWER CONDITION ASSESSMENT

The pipe condition assessment was completed as a video inspection of the pipeline interior. HCE's subconsultant, Shenandoah Construction, cleaned and videoed approximately 2,562 linear feet of existing 8-inch gravity sewer to assess the condition of the pipelines and to verify the connectivity, pipe size, and material of the existing system. Shenandoah Construction provided the video and their inspection report, which is attached in **Appendix A**. The information obtained as part of the gravity sewer pipe assessment was used in **Section 5** to provide recommendations of repairs/replacements necessary to rehabilitating the existing gravity sewer pipe.

Shenandoah's manhole identification numbers differ from those used in HCE's report. HCE utilized the numbers that were painted on each of the manholes. **Figure 1 and Table 1** provides a key for the contrasting manhole labels when viewing the DVD's and TV reports in the appendix.

Figure 1: Manhole Number Identification for Rolling Hills Gravity Sewer System

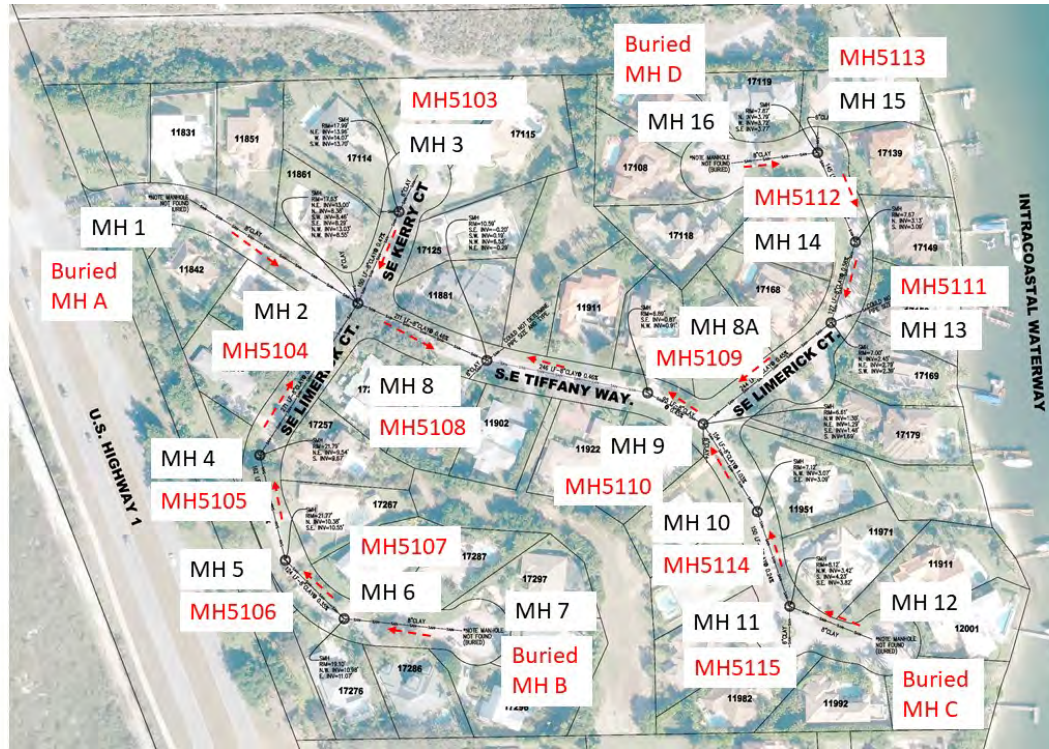


Table 1: Manhole I.D. Key

HCE Manhole I.D.	Shenandoah Manhole I.D.
MH 5103	MH 3
MH 5104	MH 2
MH 5105	MH 4
MH 5106	MH 5
MH 5107	MH 6
MH 5108	MH 8
MH 5109	MH 8A
MH 5110	MH 9
MH 5111	MH 13
MH 5112	MH 14
MH 5113	MH 15
MH 5114	MH 10
MH 5115	MH 11
MH A	MH 1
MH B	MH 7
MH C	MH 12
MH D	MH 16

A summary of the results from Shenandoah's TV and inspection results is presented in **Table 2**. The size and location of the laterals discovered in the field are listed along with the location of the defects and observations identified by the CCTV operator. All pipe assessed was field-verified to be 8-inch diameter vitrified clay pipe. Overall, the condition of the Rolling Hills sewer system is in fair condition, however

there are several pipe runs in which defects were observed. There is minor tree root intrusion at three points in the videoed sewer runs. There is also one location (MH A to MH 5104) where the pipe is offset at the joint. More significantly, there are two instances of broken pipes, which include the run between MH B and MH 5107 and the run between MH 5104 and MH 5108. The break between MH B and MH 5107 also involved an object obstructing the pipe (see Appendix A). An additional obstruction was found in the pipe segment between MH 5103 and MH 5104, where pipe material in the invert is covering 50% of the cross-sectional area. The video survey was abandoned at the locations where the sewer was broken or offset.

Table 2: Summary of Sewer System TV Inspection Results

Run I.D. (Upstream MH to Downstream MH)	Pipe Size (in)	Pipe Material	Defect and/or Observation	Location	Notes
MH D to MH 5113	8	Vitrified Clay	6" Lateral	57.9 ft from downstream MH at 9 o'clock	MH D is buried
MH 5113 to MH 5112	8	Vitrified Clay	6" Lateral	76.5 ft from upstream MH at 9 o'clock	-
MH 5112 to MH 5111	8	Vitrified Clay	-	-	-
MH 5111 to MH 5110	8	Vitrified Clay	Roots Fine Joint	59.9 ft from upstream MH from 6 to 7 o'clock	Fine, stringy roots intruding through joint
			6" Lateral	99.7 ft from upstream MH at 3 o'clock	-
			6" Lateral	145.4 ft from upstream MH at 9 o'clock	-
MH C to MH 5115	8	Vitrified Clay	-	-	MH C is buried
MH 5115 to MH 5114	8	Vitrified Clay	6" Lateral	54.8 from upstream MH at 9 o'clock	-
			6" Lateral	110.9 ft from upstream MH at 3 o'clock	-
MH 5114 to MH 5110	8	Vitrified Clay	4" Lateral	108.2 ft from upstream MH at 9 o'clock	-
MH 5110 to MH 5109	8	Vitrified Clay	-	-	-
MH 5109 to MH 5108	8	Vitrified Clay	6" Lateral	69.8 ft from upstream MH at 3 o'clock	-
			4" Lateral	71.5 ft from upstream MH at 10 o'clock	-

Run I.D. (Upstream MH to Downstream MH)	Pipe Size (in)	Pipe Material	Defect and/or Observation	Location	Notes
			4" Lateral	199.4 ft from upstream MH at 10 o'clock	-
MH B to MH 5107	8	Vitrified Clay	Broken Pipe	126.5 ft from downstream MH from 8 to 2 o'clock	MH B is buried, and CCTV survey was abandoned due to the broken pipe and obstruction
			Roots Fine Joint	126.2 ft from downstream MH from 6 to 7 o'clock	Fine, stringy roots intruding through joint
			4" Lateral	114.2 ft from downstream MH at 9 o'clock	-
			6" Lateral	35.9 ft from downstream MH at 2 o'clock	-
MH 5107 to MH 5106	8	Vitrified Clay	4" Lateral	95.7 ft from upstream MH at 2 o'clock	-
MH 5106 to MH 5105	8	Vitrified Clay	Roots Fine Joint	11.4 ft from upstream MH from 1 to 2 o'clock	Fine, stringy roots intruding through joint
			6" Lateral	128.3 ft from upstream MH at 2 o'clock	-
			Roots Fine Joint	139.5 ft from upstream MH from 1 to 2 o'clock	Fine, stringy roots intruding through joint
MH 5105 to MH 5104	8	Vitrified Clay	6" Lateral	135.6 ft from upstream MH at 3 o'clock	-
MH 5103 to MH 5104	8	Vitrified Clay	Obstacle	118 ft from upstream MH from 9 to 3 o'clock	Pipe material in invert covering 50% of the cross-sectional area – CCTV survey was abandoned here
			8" Lateral	5 ft from downstream MH at 6 o'clock	-
MH A to MH 5104	8	Vitrified Clay	8" Lateral	5 ft from downstream MH at 6 o'clock	-
			Pipe Offset	30 ft from downstream MH	MH A is buried, and pipe is offset at joint

Run I.D. (Upstream MH to Downstream MH)	Pipe Size (in)	Pipe Material	Defect and/or Observation	Location	Notes
					– CCTV survey was abandoned here
MH 5104 to MH 5108	8	Vitrified Clay	6" Lateral	133.1 ft from upstream MH at 10 o'clock	-
			6" Lateral	134.7 ft from upstream MH at 3 o'clock	-
			Broken Pipe	207.3 ft from upstream MH from 12 o'clock to 12 o'clock	Pipe segment is broken
			6" Lateral	210 ft from upstream MH	-

Although not televised, service laterals identified as part of the gravity sewer main inspection are reflected in the Shenandoah report. There were 16 service laterals identified, ranging in size from 4- to 6-inches. As part of the survey completed as described in **Section 4**, seven (7) additional laterals were found in existing manholes. In order to determine which homes could potentially be serviced by the existing laterals found, HCE pulled the Martin County Health Department septic tank records to locate the existing septic tank location on each property. **Figure 2** on the following page depicts reflects the collected data on the service laterals. The red stars indicate the location of the septic tank based upon the Health Department records and the service lateral size and locations based upon the Shenandoah report are shown. Based upon the analysis of this information, there appears to be 16 of the 50 homes that can potentially be serviced with the existing service laterals. Ten of these services would be single services and three services would be double services. These properties are highlighted in yellow.

Since it appears there are numerous home without service laterals, and the existing condition of the found laterals is unknown, it is recommended to televise the 13 found laterals that could potentially be utilized (10 single and 3 double services) for determination of repair and/or replacement of the lateral. It was assumed all 13 laterals would need to be either lined or replaced, with new cleanouts installed. The cost for the installation of the remaining 34 service laterals was also accounted for. Based upon the analysis of the existing septic tank locations it appears that 24 single services and 5 double services could be installed to service the 34 homes. This study did not include the cost of service lateral installation on private property or the cost for septic tank abandonment.

Figure 2. Existing Sanitary Sewer Laterals and Septic Tank Locations



3.0 MANHOLE ASSESSMENT

As part of the sewer system evaluation of the Rolling Hills Neighborhood, HCE completed a manhole assessment of the gravity sewer system. HCE provided a two-man crew of MACP NASSCO certified inspectors to visually inspect each of the seventeen (17) manholes and lift station wet well to identify and record all visible defects according to MACP NASSCO standards. Inspections of the manhole interiors were conducted using the Cues QZII high-resolution manhole inspection camera system.

HCE inspectors were unable to find four (4) of the seventeen (17) manholes. Shenandoah Construction was able to TV some of these manholes through the sewer line itself (see DVD attachment), but they could not be identified from the surface. It is suspected that these manholes were previously paved over. The existing wet well was uncovered and inspected. A sewer system map labeled with the located and missing manholes is given in **Appendix B**.

The results of the assessment of the thirteen (13) accessible manholes are detailed in **Table 3**. The MACP NASSCO inspection field forms are also provided in **Appendix C**. Each manhole was evaluated for visible defects and recommendations necessary to improve the existing condition were provided. Defects were detected in all thirteen (13) manholes. As evidenced in **Table 3**, common deficiencies included

broken and/or offset pipes, minor, non-structural circumferential cracking in the chimney, compromised pipe seals, exposed aggregate in the bench and channel, build-up of cementitious material, split adjustment rings, and pitting of the adjustment ring/cover. More significant defects were identified at Manhole No. 5104, where vertical cracking was found near the top of the manhole wall, and Manhole No. 5113, where the adjustment ring/cover and frame were severely corroded.

HCE inspectors identified eight (8) standard recommendations necessary for the rehabilitation of the Rolling Hills gravity sewer system. These included: heavy pressure cleaning, replacement of pipe connections (and resealing as necessary), installation of inflow protectors, pressure grouting and/or Xpex grouting, reforming of the bench and channel, installation of new cover/adjustment rings, and installation of new frames.

As shown in **Table 3**, every manhole that was inspected is recommended for heavy pressure cleaning, replacement of pipe connections (and resealing as necessary), installation of an inflow protector, and reforming of the bench and channel to various degrees. Out of the thirteen (13) manholes evaluated, nine (9) will require a new cover/adjustment ring. One manhole, No. 5104, should be pressure grouted and/or Xypex grouted to address the cracking found near the top of the manhole wall. Additionally, Manhole No. 5113 should receive a new frame, as the inspection revealed significant pitting of the adjustment ring/cover and frame.

Table 3: Summary of Manhole Inspection Results

Manhole	Defects	Recommendations						
		Heavy Pressure Cleaning	Replace Pipe Connections	Install Inflow Protector	Pressure Grouting	Reforming of Bench and	Install New Cover/Adjustm	Install New Frame
5103	Minor Circumferential Crack in Chimney (Likely at Joint, Non-Structural)							
	Pipe No. 1 Broken and/or Offset 18" Upstream of Connection	✓	✓	✓		✓		
	Pipe No. 3 Appears Broken and/or Offset Approximately 6" Downstream of Connection					[1]		
5104	Minor Vertical Cracking Near Top of Manhole Wall							
	Pipe No. 1 Appears Broken and/or Offset Approximately 5 ft Upstream of Connection	✓	✓	✓	✓	✓		
	Pipe No. 2 Seal Appears to be Compromised					[1]		

Manhole	Defects	Recommendations						
		Heavy Pressure Cleaning	Replace Pipe Connections	Install Inflow Protector	Pressure Grouting	Reforming of Bench and	Install New Cover/Adjustm	Install New Frame
5105	Minor Circumferential Crack in Chimney (Likely at Joint, Non-Structural)							
	Exposed Aggregate in Bench/Channel	✓	✓	✓		✓		
	Pipe No. 2 Seal Appears to be Compromised							
5106	Minor Circumferential Crack in Chimney (Likely at Joint, Non-Structural)							
	Exposed Aggregate in Bench/Channel	✓	✓	✓		✓		
	Pipe No. 2 Seal Appears to be Compromised							
5107	Minor Circumferential Crack in Chimney (Likely at Joint, Non-Structural)							
	Exposed Aggregate in Bench/Channel							
	Cementitious Material Build-up in Channel	✓	✓	✓		✓	✓	
	Pitting of Adjustment Ring Perimeter							
5108	Pipe Connection No. ¾ (outside drop) pipe is offset Approximately 6"							
	Exposed Aggregate in Bench/Channel	✓	✓	✓		✓	✓	
	Cementitious Material Build-up in Channel							

Manhole	Defects	Recommendations						
		Heavy Pressure Cleaning	Replace Pipe Connections	Install Inflow Protector	Pressure Grouting	Reforming of Bench and	Install New Cover/Adjustm	Install New Frame
	Pitting of Adjustment Ring Perimeter							
5109	Minor Circumferential Crack in Chimney (Likely at Joint, Non-Structural)	✓	✓	✓		✓	✓	
	Pitting of Adjustment Ring Perimeter					[2]		
5110	Split Adjustment Ring							
	Minor Circumferential Crack in Chimney (Likely at Joint, Non-Structural)	✓	✓	✓		✓	✓	
	Minor areas of Exposed Aggregate in Bench/Channel					[2]		
	Cementitious Material Build-up in Channel							
5111	Pitting of Adjustment Ring/Cover	✓	✓	✓		✓	✓	
	Appearance of Exposed Aggregate in Bench/Channel					[2]		
5112	Pitting of Adjustment Ring/Cover – Cover Does Not Seat Properly							
	Minor Circumferential Crack in Chimney (Likely at Joint, Non-Structural)	✓	✓	✓		✓	✓	
	Appearance of Exposed Aggregate in Bench/Channel					[2]		
5113	Significant Pitting of Adjustment Ring/Cover and Frame	✓	✓	✓		✓	✓	✓

Manhole	Defects	Recommendations						
		Heavy Pressure Cleaning	Replace Pipe Connections	Install Inflow Protector	Pressure Grouting	Reforming of Bench and	Install New Cover/Adjustm	Install New Frame
	Minor Circumferential Crack in Chimney (Likely at Joint, Non-Structural)					[3]		
	Appearance of Exposed Aggregate in Bench/Channel							
5114	Split Adjustment Ring	✓	✓	✓		✓	✓	
	Appearance of Exposed Aggregate in Bench/Channel					[2]		
5115	Split Adjustment Ring	✓	✓	✓		✓ [4]	✓	

[1] Only minor reforming of the channels is required.

[2] Possible reforming of bench and channel necessary. Manhole was not cleaned sufficiently for evaluation of bench and channel due to heavy inflow of mud. Inflow likely due to damaged upstream gravity sewer.

[3] Only minor reforming of bench and channel is required.

[4] Reforming of bench and channel will occur in tandem with installation of the liner.



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Holtz Consulting Engineers, Inc.
Job # 15711



Table of Contents

Project		
2020_02_13 HOLTZ CONSULTING ENGINEERS, INC. J#15711		2/13/2020

Section Summary	P-1
Section: 1; LS MH16 - LS MH15	1
Section: 2; LS MH15 - LS MH14	2
Section: 3; LS MH14 - LS MH13	3
Section: 4; LS MH13 - LS MH9	4
Section: 5; LS MH12 - LS MH11	6
Section: 6; LS MH11 - LS MH10	7
Section: 7; LS MH10 - LS MH9	8
Section: 8; LS MH7 - LS MH6	9
Section: 9; LS MH6 - LS MH5	11
Section: 10; LS MH5 - LS MH4	12



Inspection report

Date: 2/13/2020	Work Order: 15711	Weather: Dry	Surveyed By: yves	Certificate Number: 007	Pipe Segment Ref.:
Year laid:	Pre-cleaning:	Direction: Upstream	Pipe Joint Length:	Total Length:	Length Surveyed:

City: TEQUESTA/JUPITER	Drainage Area:	Upstream MH: LS MH16
Street: SE TIFFANY WAY AND US1	Media Label:	Up Rim to Invert: 0.0
Location Code: Light highway	Flow Control: Not Controlled	Downstream MH: LS MH15
Location Details:	Sheet Number:	Down Rim to Invert: 4.2
Pipe shape: Circular	Sewer Use: Sanitary	Total gallons used: 0.0
Pipe size: 8 "	Sewer Category: SEC	Joints passed: 0
Pipe material: Vitrified Clay Pipe	Purpose: Infiltration/Inflow Investigation	Joints failed: 0
Lining Method:	Owner:	

Additional Info:

1:1182	Distance	Code	Observation	Counter	Photo	Grade	
LS MH15							
	0.00	AMH	Manhole / LS MH15				
	0.00	MWL	Water Level, 5% of the vertical dimension	00:00:25			
	57.90	TF	Tap Factory Made at 9 o'clock, 6inch dim, within 8 inch	00:01:36			
	156.60	AMH	Manhole / LS MH16	00:03:48			
LS MH16							
QSR	QMR	SPR	MPR	OPR	SPRI	MPRI	OPRI
0000	0000	0.0	0.0	0.0	0.0	0.0	0.0



Inspection report

Date: 2/13/2020	Work Order: 15711	Weather: Dry	Surveyed By: yves	Certificate Number: 007	Pipe Segment Ref.:
Year laid:	Pre-cleaning:	Direction: Downstream	Pipe Joint Length:	Total Length:	Length Surveyed:

City:	TEQUESTA/JUPITER	Drainage Area:	Upstream MH:	LS MH15
Street:	SE TIFFANY WAY AND US1	Media Label:	Up Rim to Invert:	4.2
Location Code:	Light highway	Flow Control:	Downstream MH:	LS MH14
Location Details:		Sheet Number:	Down Rim to Invert:	4.5
Pipe shape:	Circular	Sewer Use:	Total gallons used:	0.0
Pipe size:	8 "	Sewer Category:	Joints passed:	0
Pipe material:	Vitrified Clay Pipe	Purpose:	Joints failed:	0
Lining Method:		Owner:		

Additional Info:

1:1096	Distance	Code	Observation	Counter	Photo	Grade
	0.00	AMH	Manhole / LS MH15	00:04:02		
	0.00	MWL	Water Level, 5% of the vertical dimension	00:00:41		
	76.50	TF	Tap Factory Made at 9 o'clock, 6inch dim, within 8 inch	00:02:32		
	145.10	AMH	Manhole / LS MH14	00:04:22		
<div> <div>QSR</div> <div>QMR</div> <div>SPR</div> <div>MPR</div> <div>OPR</div> <div>SPRI</div> <div>MPRI</div> <div>OPRI</div> </div>						
<div> <div>0000</div> <div>0000</div> <div>0.0</div> <div>0.0</div> <div>0.0</div> <div>0.0</div> <div>0.0</div> <div>0.0</div> </div>						



Inspection report

Date: 2/13/2020	Work Order: 15711	Weather: Dry	Surveyed By: yves	Certificate Number: 007	Pipe Segment Ref.:
Year laid:	Pre-cleaning:	Direction: Downstream	Pipe Joint Length:	Total Length:	Length Surveyed:

City:	TEQUESTA/JUPITER	Drainage Area:		Upstream MH:	LS MH14
Street:	SE TIFFANY WAY AND US1	Media Label:		Up Rim to Invert:	4.5
Location Code:	Light highway	Flow Control:	Not Controlled	Downstream MH:	LS MH13
Location Details:		Sheet Number:		Down Rim to Invert:	4.7
Pipe shape:	Circular	Sewer Use:	Sanitary	Total gallons used:	0.0
Pipe size:	8 "	Sewer Category:	SEC	Joints passed:	0
Pipe material:	Vitrified Clay Pipe	Purpose:	Infiltration/Inflow Investigation	Joints failed:	0
Lining Method:		Owner:			

Additional Info:

1:963

Distance

Code

Observation

Counter

Photo

Grade

LS MH14

0.00

MWL

Water Level, 5% of the vertical dimension

00:00:10

0.00

AMH

Manhole / LS MH14

00:04:35

127.50

AMH

Manhole / LS MH13

00:02:56

LS MH13

QSR

0000

QMR

0000

SPR

0.0

MPR

0.0

OPR

0.0

SPRI

0.0

MPRI

0.0

OPRI

0.0



Inspection report

Date: 2/13/2020	Work Order: 15711	Weather: Dry	Surveyed By: yves	Certificate Number: 007	Pipe Segment Ref.:
Year laid:	Pre-cleaning:	Direction: Downstream	Pipe Joint Length:	Total Length:	Length Surveyed:

City:	TEQUESTA/JUPITER	Drainage Area:	Upstream MH:	LS MH13
Street:	SE TIFFANY WAY AND US1	Media Label:	Up Rim to Invert:	4.7
Location Code:	Light highway	Flow Control:	Downstream MH:	LS MH9
Location Details:		Sheet Number:	Down Rim to Invert:	0.0
Pipe shape:	Circular	Sewer Use:	Total gallons used:	0.0
Pipe size:	8 "	Sewer Category:	Joints passed:	0
Pipe material:	Vitrified Clay Pipe	Purpose:	Joints failed:	0
Lining Method:		Owner:		

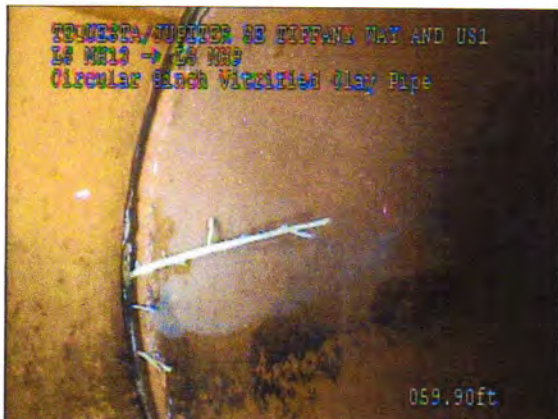
Additional Info:

1:1862	Distance	Code	Observation	Counter	Photo	Grade
	0.00	AMH	Manhole / LS MH13	00:03:16		
	0.00	MWL	Water Level, 0% of the vertical dimension	00:00:32		
	59.90	RFJ	Roots Fine Joint from 6 o'clock to 7 o'clock, within 8 inch	00:01:44	18de143a-ff8f-4c47-a915-5053e	M1
	99.70	TF	Tap Factory Made at 3 o'clock, 6inch dim, within 8 inch	00:02:38		
	145.40	TF	Tap Factory Made at 9 o'clock, 4inch dim, within 8 inch	00:03:39		
	246.60	AMH	Manhole / LS MH9	00:05:50		
<div> <div>QSR</div> <div>QMR</div> <div>SPR</div> <div>MPR</div> <div>OPR</div> <div>SPRI</div> <div>MPRI</div> <div>OPRI</div> </div>						
<div> <div>0000</div> <div>1100</div> <div>0.0</div> <div>1.0</div> <div>1.0</div> <div>0.0</div> <div>1.0</div> <div>1.0</div> </div>						



Section Pictures - 2/13/2020

City	Street	Date	Pipe Segment Reference	Nr.
TEQUESTA/JUPITER	SE TIFFANY WAY AND	2/13/2020		4



18de143a-ff8f-4c47-a915-5053e440ff9d_20200213_094359_8
69.jpg, 00:01:44, 59.90ft
Roots Fine Joint from 6 o'clock to 7 o'clock, within 8 inch

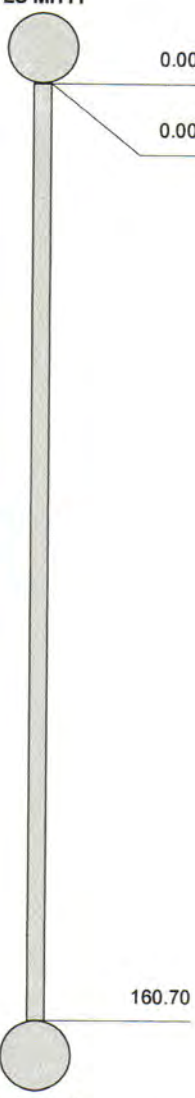


Inspection report

Date: 2/13/2020	Work Order: 15711	Weather: Dry	Surveyed By: yves	Certificate Number: 007	Pipe Segment Ref.:
Year laid:	Pre-cleaning:	Direction: Upstream	Pipe Joint Length:	Total Length:	Length Surveyed:

City:	TEQUESTA/JUPITER	Drainage Area:		Upstream MH:	LS MH12
Street:	SE TIFFANY WAY AND US1	Media Label:		Up Rim to Invert:	0.0
Location Code:	Light highway	Flow Control:	Not Controlled	Downstream MH:	LS MH11
Location Details:		Sheet Number:		Down Rim to Invert:	4.4
Pipe shape:	Circular	Sewer Use:	Sanitary	Total gallons used:	0.0
Pipe size:	8 "	Sewer Category:	SEC	Joints passed:	0
Pipe material:	Vitrified Clay Pipe	Purpose:	Infiltration/Inflow Investigation	Joints failed:	0
Lining Method:		Owner:			

Additional Info:

1:1213	Distance	Code	Observation	Counter	Photo	Grade
LS MH11						
	0.00	AMH	Manhole / LS MH11	00:06:02		
	0.00	MWL	Water Level, 5% of the vertical dimension	00:00:16		
	160.70	AMH	Manhole / LS MH12	00:03:28		
LS MH12						
QSR	QMR	SPR	MPR	OPR	SPRI	MPRI
0000	0000	0.0	0.0	0.0	0.0	0.0



Inspection report

Date: 2/13/2020	Work Order: 15711	Weather: Dry	Surveyed By: yves	Certificate Number: 007	Pipe Segment Ref.:
Year laid:	Pre-cleaning:	Direction: Downstream	Pipe Joint Length:	Total Length:	Length Surveyed:

City: TEQUESTA/JUPITER	Drainage Area:	Upstream MH: LS MH11
Street: SE TIFFANY WAY AND US1	Media Label:	Up Rim to Invert: 4.4
Location Code: Light highway	Flow Control: Not Controlled	Downstream MH: LS MH10
Location Details:	Sheet Number:	Down Rim to Invert: 4.7
Pipe shape: Circular	Sewer Use: Sanitary	Total gallons used: 0.0
Pipe size: 8 "	Sewer Category: SEC	Joints passed: 0
Pipe material: Vitrified Clay Pipe	Purpose: Infiltration/Inflow Investigation	Joints failed: 0
Lining Method:	Owner:	

Additional Info:

1:1143	Distance	Code	Observation	Counter	Photo	Grade
LS MH11						
	0.00	AMH	Manhole / LS MH11	00:03:47		
	0.00	MWL	Water Level, 0% of the vertical dimension	00:00:18		
	54.80	TF	Tap Factory Made at 9 o'clock, 6inch dim, within 8 inch	00:01:30		
	110.90	TF	Tap Factory Made at 3 o'clock, 6inch dim, within 8 inch	00:02:36		
	151.40	AMH	Manhole / LS MH10	00:03:33		
LS MH10						

QSR	QMR	SPR	MPR	OPR	SPRI	MPRI	OPRI
0000	0000	0.0	0.0	0.0	0.0	0.0	0.0



Inspection report

Date: 2/13/2020	Work Order: 15711	Weather: Dry	Surveyed By: yves	Certificate Number: 007	Pipe Segment Ref.:
Year laid:	Pre-cleaning:	Direction: Downstream	Pipe Joint Length:	Total Length:	Length Surveyed:

City: TEQUESTA/JUPITER	Drainage Area:	Upstream MH: LS MH10
Street: SE TIFFANY WAY AND US1	Media Label:	Up Rim to Invert: 4.7
Location Code: Light highway	Flow Control: Not Controlled	Downstream MH: LS MH9
Location Details:	Sheet Number:	Down Rim to Invert: 0.0
Pipe shape: Circular	Sewer Use: Sanitary	Total gallons used: 0.0
Pipe size: 8 "	Sewer Category: SEC	Joints passed: 0
Pipe material: Vitrified Clay Pipe	Purpose: Infiltration/Inflow Investigation	Joints failed: 0
Lining Method:	Owner:	

Additional Info:

1:1157	Distance	Code	Observation	Counter	Photo	Grade
LS MH10						
	0.00	AMH	Manhole / LS MH10	00:03:44		
	0.00	MWL	Water Level, 0% of the vertical dimension	00:00:11		
	108.20	TF	Tap Factory Made at 9 o'clock, 4inch dim, within 8 inch	00:02:16		
	153.30	AMH	Manhole / LS MH9	00:03:21		
LS MH9						
QSR	QMR	SPR	MPR	OPR	SPRI	MPRI
0000	0000	0.0	0.0	0.0	0.0	0.0



WinCan

Inspection report

Date: 2/13/2020	Work Order: 15711	Weather: Dry	Surveyed By: yves	Certificate Number: 007	Pipe Segment Ref.:
Year laid:	Pre-cleaning:	Direction: Upstream	Pipe Joint Length:	Total Length:	Length Surveyed:

City: TEQUESTA/JUPITER	Drainage Area:	Upstream MH: LS MH7
Street: SE TIFFANY WAY AND US1	Media Label:	Up Rim to Invert: 0.0
Location Code: Light highway	Flow Control: Not Controlled	Downstream MH: LS MH6
Location Details:	Sheet Number:	Down Rim to Invert: 8.0
Pipe shape: Circular	Sewer Use: Sanitary	Total gallons used: 0.0
Pipe size: 8 "	Sewer Category: SEC	Joints passed: 0
Pipe material: Vitrified Clay Pipe	Purpose: Infiltration/Inflow Investigation	Joints failed: 0
Lining Method:	Owner:	

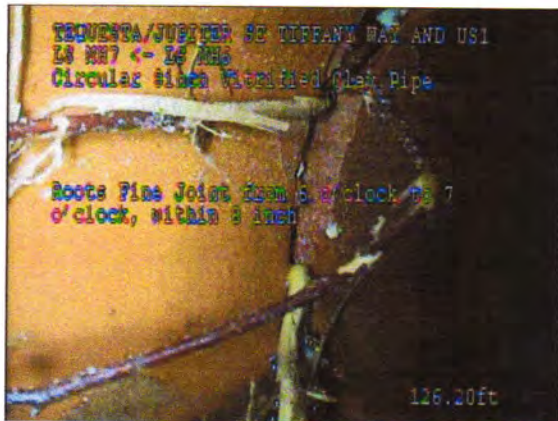
Additional Info:

1:962	Distance	Code	Observation	Counter	Photo	Grade
LS MH6						
	0.00	AMH	Manhole / LS MH6	00:03:34		
	0.00	MWL	Water Level, 10% of the vertical dimension	00:00:44		
	35.90	TF	Tap Factory Made at 2 o'clock, 6inch dim, within 8 inch	00:01:30		
	114.20	TF	Tap Factory Made at 9 o'clock, 4inch dim, within 8 inch	00:02:56		
	126.20	RFJ	Roots Fine Joint from 6 o'clock to 7 o'clock, within 8 inch	00:04:33	be08eaa4-8e75-4e58-aeba-a58	M1
	126.50	B	Broken from 8 o'clock to 2 o'clock, within 8 inch	00:03:38	65811e3f-fc6d-4d26-9801-179d	S5
	127.40	MSA	Survey Abandoned / BROKEN PIPE WITH OBJECT IN THE WAY	00:05:36	8f2d707a-91d2-416b-8a06-ce8f	
QSR	QMR	SPR	MPR	OPR	SPRI	MPRI
5100	1100	5.0	1.0	6.0	5.0	1.0
						OPRI
						3.0



Section Pictures - 2/13/2020

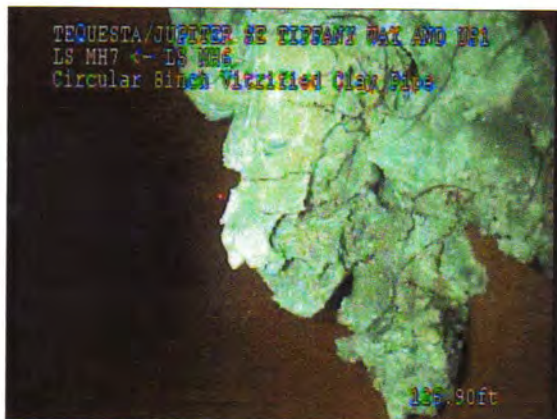
City	Street	Date	Pipe Segment Reference	Nr.
TEQUESTA/JUPITER	SE TIFFANY WAY AND	2/13/2020		8



be08aaa4-8e75-4e58-aeba-a58c54e8e04e_20200213_124623_220.jpg, 00:04:33, 126.20ft
Roots Fine Joint from 6 o'clock to 7 o'clock, within 8 inch



65811e3f-fc6d-4d26-9801-179dc9d5e888_20200213_124517_541.jpg, 00:03:38, 126.50ft
Broken from 8 o'clock to 2 o'clock, within 8 inch



8f2d707a-91d2-416b-8a06-ce8f62e0366b_20200213_124827_400.jpg, 00:05:36, 127.40ft
Survey Abandoned / BROKEN PIPE WITH OBJECT IN THE WAY

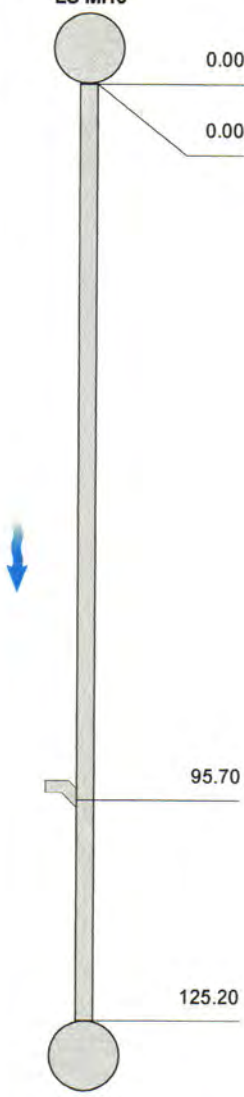


Inspection report

Date: 2/13/2020	Work Order: 15711	Weather: Dry	Surveyed By: yves	Certificate Number: 007	Pipe Segment Ref.:
Year laid:	Pre-cleaning:	Direction: Downstream	Pipe Joint Length:	Total Length:	Length Surveyed:

City:	TEQUESTA/JUPITER	Drainage Area:	Upstream MH:	LS MH6
Street:	SE TIFFANY WAY AND US1	Media Label:	Up Rim to Invert:	8.0
Location Code:	Light highway	Flow Control:	Downstream MH:	LS MH5
Location Details:		Sheet Number:	Down Rim to Invert:	8.3
Pipe shape:	Circular	Sewer Use:	Total gallons used:	0.0
Pipe size:	8 "	Sewer Category:	Joints passed:	0
Pipe material:	Vitrified Clay Pipe	Purpose:	Joints failed:	0
Lining Method:		Owner:		

Additional Info:

1:945	Distance	Code	Observation	Counter	Photo	Grade
LS MH6						
	0.00	AMH	Manhole / LS MH6	00:06:07		
	0.00	MWL	Water Level, 5% of the vertical dimension	00:00:14		
	95.70	TF	Tap Factory Made at 2 o'clock, 4inch dim, within 8 inch	00:02:03		
	125.20	AMH	Manhole / LS MH5	00:02:49		
LS MH5						

QSR	QMR	SPR	MPR	OPR	SPRI	MPRI	OPRI
0000	0000	0.0	0.0	0.0	0.0	0.0	0.0



Inspection report

Date: 2/13/2020	Work Order: 15711	Weather: Dry	Surveyed By: yves	Certificate Number: 007	Pipe Segment Ref.:
Year laid:	Pre-cleaning:	Direction: Downstream	Pipe Joint Length:	Total Length:	Length Surveyed:

City:	TEQUESTA/JUPITER	Drainage Area:	Upstream MH:	LS MH5
Street:	SE TIFFANY WAY AND US1	Media Label:	Up Rim to Invert:	8.3
Location Code:	Light highway	Flow Control:	Downstream MH:	LS MH4
Location Details:		Sheet Number:	Down Rim to Invert:	0.0
Pipe shape:	Circular	Sewer Use:	Total gallons used:	0.0
Pipe size:	8 "	Sewer Category:	Joints passed:	0
Pipe material:	Vitrified Clay Pipe	Purpose:	Joints failed:	0
Lining Method:		Owner:		

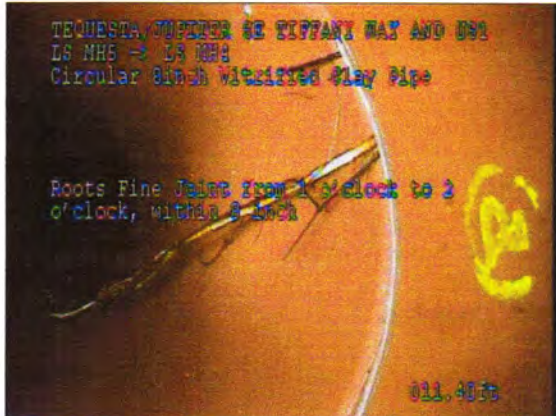
Additional Info:

1:1224	Distance	Code	Observation	Counter	Photo	Grade
LS MH5						
	0.00	AMH	Manhole / LS MH5	00:03:01		
	0.00	MWL	Water Level, 5% of the vertical dimension	00:00:11		
	11.40	RFJ	Roots Fine Joint from 1 o'clock to 2 o'clock, within 8 inch	00:00:33	38f72106-0b8d-4e65-b416-9a0	M1
	128.30	TF	Tap Factory Made at 2 o'clock, 6inch dim, within 8 inch	00:02:44		
	139.50	RFJ	Roots Fine Joint at 9 o'clock, within 8 inch	00:03:06	e710c36c-e333-4537-94bb-59c	M1
	162.10	AMH	Manhole / LS MH4	00:04:02		
LS MH4						
QSR	QMR	SPR	MPR	OPR	SPRI	MPRI
0000	1200	0.0	2.0	2.0	0.0	1.0

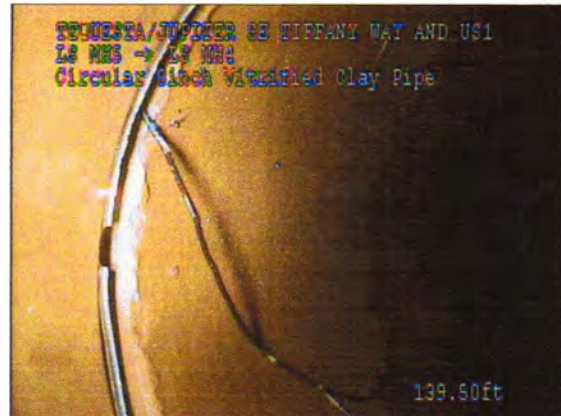


Section Pictures - 2/13/2020

City	Street	Date	Pipe Segment Reference	Nr.
TEQUESTA/JUPITER	SE TIFFANY WAY AND	2/13/2020		10



38f72106-0b8d-4e65-b416-9a02dfa9cfd2_20200213_130226_868.jpg, 00:00:33, 11.40ft
Roots Fine Joint from 1 o'clock to 2 o'clock, within 8 inch



e710c36c-e333-4537-94bb-59cb3bbac92d_20200213_130529_724.jpg, 00:03:06, 139.50ft
Roots Fine Joint at 9 o'clock, within 8 inch



Section Summary

Project	2020_02_13 HOLTZ CONSULTING ENGINEERS, INC. J#15711	2/13/2020
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Number of sections	10
Total length of sewer network	1555.90 ft
Inspected length of sewer network	1555.90 ft
Not inspected length of sewer network	0.00 ft
Total abandoned inspections	1
Number of section inspection photos	6
Number of section inspection videos	10
Number of section inspection scans	0
Number of section inclination measurements	0

Pipe Segment Reference		Upstream MH	LS MH16
City	TEQUESTA/JUPITER	Downstream MH	LS MH15
Street	SE TIFFANY WAY AND US1	Shape	Circular 8inch
Total Length	156.6	Material	Vitrified Clay Pipe

	Distance	PACP Code	Observation
1	0.00	AMH	Manhole
2	0.00	MWL	Water Level, 5% of the vertical dimension
3	57.90	TF	Tap Factory Made at 9 o'clock, 6inch dim, within 8 inch
4	156.60	AMH	Manhole

Pipe Segment Reference		Upstream MH	LS MH15
City	TEQUESTA/JUPITER	Downstream MH	LS MH14
Street	SE TIFFANY WAY AND US1	Shape	Circular 8inch
Total Length	145.1	Material	Vitrified Clay Pipe

	Distance	PACP Code	Observation
1	0.00	AMH	Manhole
2	0.00	MWL	Water Level, 5% of the vertical dimension
3	76.50	TF	Tap Factory Made at 9 o'clock, 6inch dim, within 8 inch
4	145.10	AMH	Manhole

Pipe Segment Reference		Upstream MH	LS MH14
City	TEQUESTA/JUPITER	Downstream MH	LS MH13
Street	SE TIFFANY WAY AND US1	Shape	Circular 8inch
Total Length	127.5	Material	Vitrified Clay Pipe

	Distance	PACP Code	Observation
1	0.00	MWL	Water Level, 5% of the vertical dimension
2	0.00	AMH	Manhole
3	127.50	AMH	Manhole



Section Summary

Project 2020_02_13 HOLTZ CONSULTING ENGINEERS, INC. J#15711	2/13/2020
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Pipe Segment Reference		Upstream MH	LS MH13
City	TEQUESTA/JUPITER	Downstream MH	LS MH9
Street	SE TIFFANY WAY AND US1	Shape	Circular 8inch
Total Length	246.6	Material	Vitrified Clay Pipe

	Distance	PACP Code	Observation
1	0.00	AMH	Manhole
2	0.00	MWL	Water Level, 0% of the vertical dimension
3	59.90	RFJ	Roots Fine Joint from 6 o'clock to 7 o'clock, within 8 inch
4	99.70	TF	Tap Factory Made at 3 o'clock, 6inch dim, within 8 inch
5	145.40	TF	Tap Factory Made at 9 o'clock, 4inch dim, within 8 inch
6	246.60	AMH	Manhole

Pipe Segment Reference		Upstream MH	LS MH12
City	TEQUESTA/JUPITER	Downstream MH	LS MH11
Street	SE TIFFANY WAY AND US1	Shape	Circular 8inch
Total Length	160.7	Material	Vitrified Clay Pipe

	Distance	PACP Code	Observation
1	0.00	AMH	Manhole
2	0.00	MWL	Water Level, 5% of the vertical dimension
3	160.70	AMH	Manhole

Pipe Segment Reference		Upstream MH	LS MH11
City	TEQUESTA/JUPITER	Downstream MH	LS MH10
Street	SE TIFFANY WAY AND US1	Shape	Circular 8inch
Total Length	151.4	Material	Vitrified Clay Pipe

	Distance	PACP Code	Observation
1	0.00	AMH	Manhole
2	0.00	MWL	Water Level, 0% of the vertical dimension
3	54.80	TF	Tap Factory Made at 9 o'clock, 6inch dim, within 8 inch
4	110.90	TF	Tap Factory Made at 3 o'clock, 6inch dim, within 8 inch
5	151.40	AMH	Manhole

Pipe Segment Reference		Upstream MH	LS MH10
City	TEQUESTA/JUPITER	Downstream MH	LS MH9
Street	SE TIFFANY WAY AND US1	Shape	Circular 8inch
Total Length	153.3	Material	Vitrified Clay Pipe

	Distance	PACP Code	Observation
1	0.00	AMH	Manhole
2	0.00	MWL	Water Level, 0% of the vertical dimension
3	108.20	TF	Tap Factory Made at 9 o'clock, 4inch dim, within 8 inch
4	153.30	AMH	Manhole

Pipe Segment Reference		Upstream MH	LS MH7
City	TEQUESTA/JUPITER	Downstream MH	LS MH6
Street	SE TIFFANY WAY AND US1	Shape	Circular 8inch
Total Length	127.4	Material	Vitrified Clay Pipe

	Distance	PACP Code	Observation
1	0.00	AMH	Manhole
2	0.00	MWL	Water Level, 10% of the vertical dimension



Section Summary

Project 2020_02_13 HOLTZ CONSULTING ENGINEERS, INC. J#15711	2/13/2020
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	Distance	PACP Code	Observation
3	35.90	TF	Tap Factory Made at 2 o'clock, 6inch dim, within 8 inch
4	114.20	TF	Tap Factory Made at 9 o'clock, 4inch dim, within 8 inch
5	126.20	RFJ	Roots Fine Joint from 6 o'clock to 7 o'clock, within 8 inch
6	126.50	B	Broken from 8 o'clock to 2 o'clock, within 8 inch
7	127.40	MSA	Survey Abandoned

Pipe Segment Reference	Upstream MH	LS MH6
City	Downstream MH	LS MH5
Street	Shape	Circular 8inch
Total Length	Material	Vitrified Clay Pipe

	Distance	PACP Code	Observation
1	0.00	AMH	Manhole
2	0.00	MWL	Water Level, 5% of the vertical dimension
3	95.70	TF	Tap Factory Made at 2 o'clock, 4inch dim, within 8 inch
4	125.20	AMH	Manhole

Pipe Segment Reference	Upstream MH	LS MH5
City	Downstream MH	LS MH4
Street	Shape	Circular 8inch
Total Length	Material	Vitrified Clay Pipe

	Distance	PACP Code	Observation
1	0.00	AMH	Manhole
2	0.00	MWL	Water Level, 5% of the vertical dimension
3	11.40	RFJ	Roots Fine Joint from 1 o'clock to 2 o'clock, within 8 inch
4	128.30	TF	Tap Factory Made at 2 o'clock, 6inch dim, within 8 inch
5	139.50	RFJ	Roots Fine Joint at 9 o'clock, within 8 inch
6	162.10	AMH	Manhole



Table of Contents

Project		
2020_02_25 HOLTZ CONSULTING ENGINEERS, INC. J#15711		2/25/2020

Section Summary	P-1
Section: 1; MH 3 - MH 2	1
Section: 2; MH 3 - MH 2	3
Section: 3; MH 1 - MH 2	4
Section: 4; MH 4 - MH 2	6
Section: 5; MH 2 - MH 8	7
Section: 6; MH 9 - MH 8A	9
Section: 7; MH 8A - MH 8	10




Inspection report

Date: 2/25/2020	Work Order: 15711	Weather: Dry	Surveyed By: yves	Certificate Number: 007	Pipe Segment Ref.:
Year laid:	Pre-cleaning:	Direction: Downstream	Pipe Joint Length:	Total Length:	Length Surveyed:

City:	TEQUESTA/JUPITER	Drainage Area:	Upstream MH:	MH 3
Street:	TIFFANY WAY AND US1	Media Label:	Up Rim to Invert:	4.0
Location Code:	Light highway	Flow Control:	Downstream MH:	MH 2
Location Details:		Sheet Number:	Down Rim to Invert:	9.0
Pipe shape:	Circular	Sewer Use:	Total gallons used:	0.0
Pipe size:	8 "	Sewer Category:	Joints passed:	0
Pipe material:	Vitrified Clay Pipe	Purpose:	Joints failed:	0
Lining Method:		Owner:		

Additional Info:

1:893	Distance	Code	Observation	Counter	Photo	Grade	
	MH 3						
	0.00	AMH	Manhole / MH 3	00:00:00			
	0.00	MWL	Water Level, 0% of the vertical dimension	00:01:06			
	118.00	OBM	Obstacles Pipe Material, 50% of cross sectional area from 9 o'clock to 3 o'clock	00:03:17	7b3cc293-ed89-4850-b42a-5bf7	M5	
	118.30	MSA	Survey Abandoned / PIPE IN THE WAY	00:03:31			
QSR	QMR	SPR	MPR	OPR	SPRI	MPRI	OPRI
0000	5100	0.0	5.0	5.0	0.0	5.0	5.0



Section Pictures - 2/25/2020

City	Street	Date	Pipe Segment Reference	Nr.
TEQUESTA/JUPITER	TIFFANY WAY AND US1	2/25/2020		1



7b3cc293-ed89-4850-b42a-5bf77856338e_20200225_112130_708.jpg, 00:03:17, 118.00ft
Obstacles Pipe Material, 50% of cross sectional area from 9 o'clock to 3 o'clock



Inspection report

Date: 2/25/2020	Work Order: 15711	Weather: Dry	Surveyed By: yves	Certificate Number: 007	Pipe Segment Ref.:
Year laid:	Pre-cleaning:	Direction: Upstream	Pipe Joint Length:	Total Length:	Length Surveyed:

City:	TEQUESTA/JUPITER	Drainage Area:	Upstream MH:	MH 3
Street:	TIFFANY WAY AND US1	Media Label:	Up Rim to Invert:	4.0
Location Code:	Light highway	Flow Control:	Downstream MH:	MH 2
Location Details:		Sheet Number:	Down Rim to Invert:	9.0
Pipe shape:	Circular	Sewer Use:	Total gallons used:	0.0
Pipe size:	8 "	Sewer Category:	Joints passed:	0
Pipe material:	Vitrified Clay Pipe	Purpose:	Joints failed:	0
Lining Method:		Owner:		

Additional Info:

1:239	Distance	Code	Observation	Counter	Photo	Grade	
MH 2							
	0.00	MWL	Water Level, 0% of the vertical dimension	00:00:00			
	0.00	AMH	Manhole / MH 2	00:03:39			
	5.00	TF	Tap Factory Made at 6 o'clock, 8inch dim, within 8 inch	00:01:14			
	31.60	MSA	Survey Abandoned / PIPE IN THE WAY	00:02:08			
QSR	QMR	SPR	MPR	OPR	SPRI	MPRI	OPRI
0000	0000	0.0	0.0	0.0	0.0	0.0	0.0

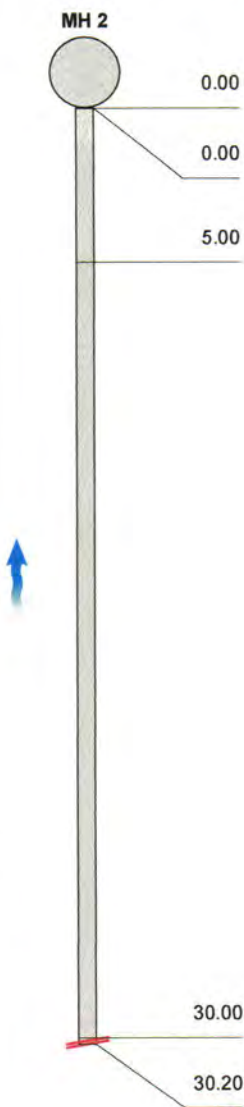


Inspection report

Date: 2/25/2020	Work Order: 15711	Weather: Dry	Surveyed By: yves	Certificate Number: 007	Pipe Segment Ref.:
Year laid:	Pre-cleaning:	Direction: Upstream	Pipe Joint Length:	Total Length:	Length Surveyed:

City: TEQUESTA/JUPITER	Drainage Area:	Upstream MH: MH 1
Street: TIFFANY WAY AND US1	Media Label:	Up Rim to Invert: 0.0
Location Code: Light highway	Flow Control: Not Controlled	Downstream MH: MH 2
Location Details:	Sheet Number:	Down Rim to Invert: 9.0
Pipe shape: Circular	Sewer Use: Sanitary	Total gallons used: 0.0
Pipe size: 8 "	Sewer Category: SEC	Joints passed: 0
Pipe material: Vitrified Clay Pipe	Purpose: Infiltration/Inflow Investigation	Joints failed: 0
Lining Method:	Owner:	

Additional Info:

1:228	Distance	Code	Observation	Counter	Photo	Grade
						



Section Pictures - 2/25/2020

City	Street	Date	Pipe Segment Reference	Nr.
TEQUESTA/JUPITER	TIFFANY WAY AND US1	2/25/2020		3



c438457c-2181-4947-b97b-3232f12abca_20200225_120144_660.jpg, 00:01:43, 30.00ft

General Observation / PIPE OFFSET AT JOINT



WinCan

Inspection report

Date: 2/25/2020	Work Order: 15711	Weather: Dry	Surveyed By: yves	Certificate Number: 007	Pipe Segment Ref.:
Year laid:	Pre-cleaning:	Direction: Upstream	Pipe Joint Length:	Total Length:	Length Surveyed:

City: TEQUESTA/JUPITER	Drainage Area:	Upstream MH: MH 4
Street: TIFFANY WAY AND US1	Media Label:	Up Rim to Invert: 0.0
Location Code: Light highway	Flow Control: Not Controlled	Downstream MH: MH 2
Location Details:	Sheet Number:	Down Rim to Invert: 9.0
Pipe shape: Circular	Sewer Use: Sanitary	Total gallons used: 0.0
Pipe size: 8 "	Sewer Category: SEC	Joints passed: 0
Pipe material: Vitrified Clay Pipe	Purpose: Infiltration/Inflow Investigation	Joints failed: 0
Lining Method:	Owner:	

Additional Info:

1:2052	Distance	Code	Observation	Counter	Photo	Grade	
 MH 2	0.00	AMH	Manhole / MH 2	00:00:00			
	0.00	MWL	Water Level, 10% of the vertical dimension	00:00:07			
	135.60	TF	Tap Factory Made at 3 o'clock, 6inch dim, within 8 inch	00:02:17			
	271.80	AMH	Manhole / MH 4	00:04:42			
	MH 4						
QSR	QMR	SPR	MPR	OPR	SPRI	MPRI	OPRI
0000	0000	0.0	0.0	0.0	0.0	0.0	0.0



Inspection report

Date: 2/25/2020	Work Order: 15711	Weather: Dry	Surveyed By: yves	Certificate Number: 007	Pipe Segment Ref.:
Year laid:	Pre-cleaning:	Direction: Downstream	Pipe Joint Length:	Total Length:	Length Surveyed:

City:	TEQUESTA/JUPITER	Drainage Area:		Upstream MH:	MH 2
Street:	TIFFANY WAY AND US1	Media Label:		Up Rim to Invert:	9.0
Location Code:	Light highway	Flow Control:	Not Controlled	Downstream MH:	MH 8
Location Details:		Sheet Number:		Down Rim to Invert:	0.0
Pipe shape:	Circular	Sewer Use:	Sanitary	Total gallons used:	0.0
Pipe size:	8 "	Sewer Category:	SEC	Joints passed:	0
Pipe material:	Vitrified Clay Pipe	Purpose:	Infiltration/Inflow Investigation	Joints failed:	0
Lining Method:		Owner:			

Additional Info:

1:1608	Distance	Code	Observation	Counter	Photo	Grade	
	0.00	AMH	Manhole / MH 2				
	0.00	MWL	Water Level, 0% of the vertical dimension	00:01:02			
	133.10	TF	Tap Factory Made at 10 o'clock, 6inch dim, within 8 inch	00:03:22			
	134.70	TF	Tap Factory Made at 3 o'clock, 6inch dim, within 8 inch	00:03:37			
	207.30	B	Broken from 12 o'clock to 12 o'clock	00:05:27	5e290320-5ba9-4acf-b335-0d81	S5	
	210.00	TF	Tap Factory Made at 6 o'clock, 6inch dim, within 8 inch	00:06:21			
	213.00	AMH	Manhole / MH 8	00:06:42			
QSR	QMR	SPR	MPR	OPR	SPRI	MPRI	OPRI
5100	0000	5.0	0.0	5.0	5.0	0.0	5.0



Section Pictures - 2/25/2020

City	Street	Date	Pipe Segment Reference	Nr.
TEQUESTA/JUPITER	TIFFANY WAY AND US1	2/25/2020		5



5e290320-5ba9-4acf-b335-0d8101fa3f44_20200225_140020_435.jpg, 00:05:27, 207.30ft
Broken from 12 o'clock to 12 o'clock




Inspection report

Date: 2/25/2020	Work Order: 15711	Weather: Dry	Surveyed By: yves	Certificate Number: 007	Pipe Segment Ref.:
Year laid:	Pre-cleaning:	Direction: Downstream	Pipe Joint Length:	Total Length:	Length Surveyed:

City:	TEQUESTA/JUPITER	Drainage Area:	Upstream MH:	MH 9
Street:	TIFFANY WAY AND US1	Media Label:	Up Rim to Invert:	5.3
Location Code:	Light highway	Flow Control:	Downstream MH:	MH 8A
Location Details:		Sheet Number:	Down Rim to Invert:	6.0
Pipe shape:	Circular	Sewer Use:	Total gallons used:	0.0
Pipe size:	8 "	Sewer Category:	Joints passed:	0
Pipe material:	Vitrified Clay Pipe	Purpose:	Joints failed:	0
Lining Method:		Owner:		

Additional Info:

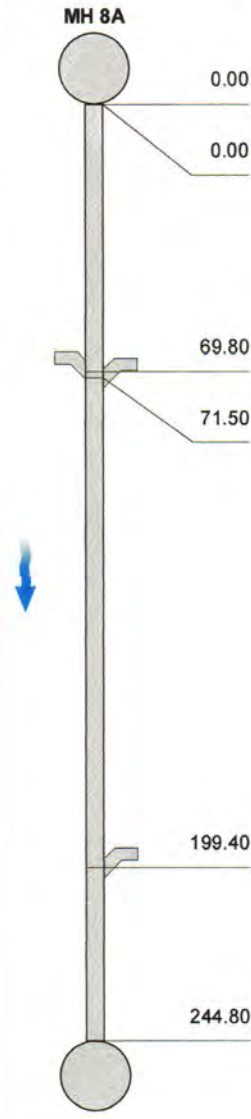
1:733	Distance	Code	Observation	Counter	Photo	Grade	
	0.00	AMH	Manhole / MH 9	00:06:52			
	0.00	MWL	Water Level, 5% of the vertical dimension	00:00:08			
	97.10	AMH	Manhole / MH 8A	00:01:52			
QSR	QMR	SPR	MPR	OPR	SPRI	MPRI	OPRI
0000	0000	0.0	0.0	0.0	0.0	0.0	0.0

Inspection report

Date: 2/25/2020	Work Order: 15711	Weather: Dry	Surveyed By: yves	Certificate Number: 007	Pipe Segment Ref.:
Year laid:	Pre-cleaning:	Direction: Downstream	Pipe Joint Length:	Total Length:	Length Surveyed:

City:	TEQUESTA/JUPITER	Drainage Area:	Upstream MH:	MH 8A
Street:	TIFFANY WAY AND US1	Media Label:	Up Rim to Invert:	6.0
Location Code:	Light highway	Flow Control:	Downstream MH:	MH 8
Location Details:		Sheet Number:	Down Rim to Invert:	0.0
Pipe shape:	Circular	Sewer Use:	Total gallons used:	0.0
Pipe size:	8 "	Sewer Category:	Joints passed:	0
Pipe material:	Vitrified Clay Pipe	Purpose:	Joints failed:	0
Lining Method:		Owner:		

Additional Info:

1:1848	Distance	Code	Observation	Counter	Photo	Grade	
	0.00	AMH	Manhole / MH 8A	00:02:05			
	0.00	MWL	Water Level, 0% of the vertical dimension	00:00:20			
	69.80	TF	Tap Factory Made at 3 o'clock, 6inch dim, within 8 inch	00:01:39			
	71.50	TF	Tap Factory Made at 10 o'clock, 4inch dim, within 8 inch	00:01:52			
	199.40	TF	Tap Factory Made at 10 o'clock, 4inch dim, within 8 inch	00:04:06			
	244.80	AMH	Manhole / MH 8	00:05:20			
QSR	QMR	SPR	MPR	OPR	SPRI	MPRI	OPRI
0000	0000	0.0	0.0	0.0	0.0	0.0	0.0



Section Summary

Project	2020_02_25 HOLTZ CONSULTING ENGINEERS, INC. J#15711	2/25/2020
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Number of sections	7
Total length of sewer network	1006.80 ft
Inspected length of sewer network	1006.80 ft
Not inspected length of sewer network	0.00 ft
Total abandoned inspections	3
Number of section inspection photos	3
Number of section inspection videos	7
Number of section inspection scans	0
Number of section inclination measurements	0

Pipe Segment Reference		Upstream MH	MH 3
City	TEQUESTA/JUPITER	Downstream MH	MH 2
Street	TIFFANY WAY AND US1	Shape	Circular 8inch
Total Length	118.3	Material	Vitrified Clay Pipe

	Distance	PACP Code	Observation
1	0.00	AMH	Manhole
2	0.00	MWL	Water Level, 0% of the vertical dimension
3	118.00	OBM	Obstacles Pipe Material, 50% of cross sectional area from 9 o'clock to 3 o'clock
4	118.30	MSA	Survey Abandoned

Pipe Segment Reference		Upstream MH	MH 3
City	TEQUESTA/JUPITER	Downstream MH	MH 2
Street	TIFFANY WAY AND US1	Shape	Circular 8inch
Total Length	31.6	Material	Vitrified Clay Pipe

	Distance	PACP Code	Observation
1	0.00	MWL	Water Level, 0% of the vertical dimension
2	0.00	AMH	Manhole
3	5.00	TF	Tap Factory Made at 6 o'clock, 8inch dim, within 8 inch
4	31.60	MSA	Survey Abandoned

Pipe Segment Reference		Upstream MH	MH 1
City	TEQUESTA/JUPITER	Downstream MH	MH 2
Street	TIFFANY WAY AND US1	Shape	Circular 8inch
Total Length	30.2	Material	Vitrified Clay Pipe

	Distance	PACP Code	Observation
1	0.00	AMH	Manhole
2	0.00	MWL	Water Level, 0% of the vertical dimension
3	5.00	TF	Tap Factory Made at 6 o'clock, 8inch dim, within 8 inch

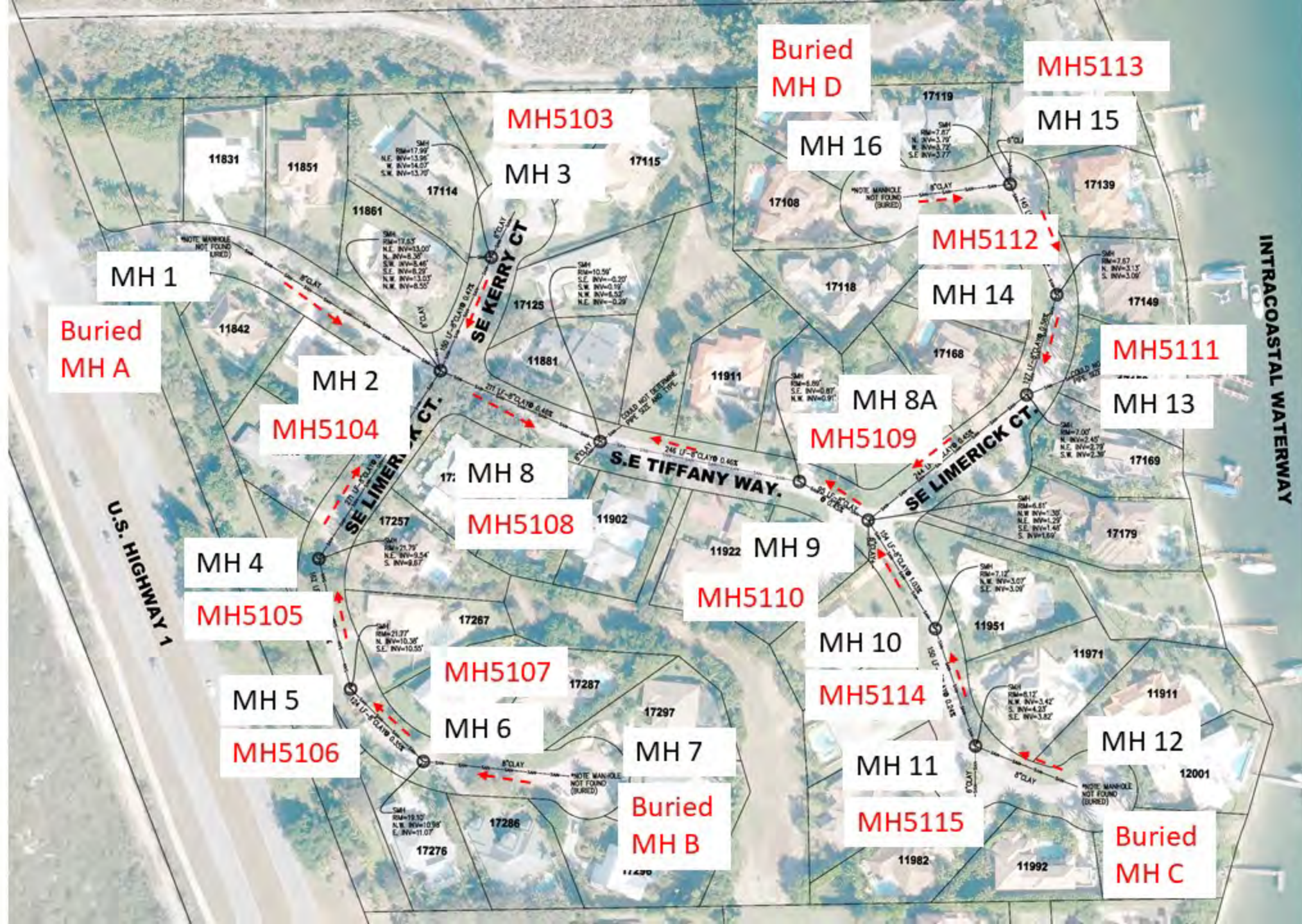


Section Summary

Project	2020_02_25 HOLTZ CONSULTING ENGINEERS, INC. J#15711	2/25/2020
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Distance	PACP Code	Observation
4	30.00	MGO General Observation
5	30.20	MSA Survey Abandoned
Pipe Segment Reference City TEQUESTA/JUPITER Street TIFFANY WAY AND US1 Total Length 271.8		
Upstream MH		MH 4
Downstream MH		MH 2
Shape		Circular 8inch
Material		Vitrified Clay Pipe
Distance	PACP Code	Observation
1	0.00	AMH Manhole
2	0.00	MWL Water Level, 10% of the vertical dimension
3	135.60	TF Tap Factory Made at 3 o'clock, 6inch dim, within 8 inch
4	271.80	AMH Manhole
Pipe Segment Reference City TEQUESTA/JUPITER Street TIFFANY WAY AND US1 Total Length 213.0		
Upstream MH		MH 2
Downstream MH		MH 8
Shape		Circular 8inch
Material		Vitrified Clay Pipe
Distance	PACP Code	Observation
1	0.00	AMH Manhole
2	0.00	MWL Water Level, 0% of the vertical dimension
3	133.10	TF Tap Factory Made at 10 o'clock, 6inch dim, within 8 inch
4	134.70	TF Tap Factory Made at 3 o'clock, 6inch dim, within 8 inch
5	207.30	B Broken from 12 o'clock to 12 o'clock
6	210.00	TF Tap Factory Made at 6 o'clock, 6inch dim, within 8 inch
7	213.00	AMH Manhole
Pipe Segment Reference City TEQUESTA/JUPITER Street TIFFANY WAY AND US1 Total Length 97.1		
Upstream MH		MH 9
Downstream MH		MH 8A
Shape		Circular 8inch
Material		Vitrified Clay Pipe
Distance	PACP Code	Observation
1	0.00	AMH Manhole
2	0.00	MWL Water Level, 5% of the vertical dimension
3	97.10	AMH Manhole
Pipe Segment Reference City TEQUESTA/JUPITER Street TIFFANY WAY AND US1 Total Length 244.8		
Upstream MH		MH 8A
Downstream MH		MH 8
Shape		Circular 8inch
Material		Vitrified Clay Pipe
Distance	PACP Code	Observation
1	0.00	AMH Manhole
2	0.00	MWL Water Level, 0% of the vertical dimension
3	69.80	TF Tap Factory Made at 3 o'clock, 6inch dim, within 8 inch
4	71.50	TF Tap Factory Made at 10 o'clock, 4inch dim, within 8 inch
5	199.40	TF Tap Factory Made at 10 o'clock, 4inch dim, within 8 inch
6	244.80	AMH Manhole

APPENDIX B



APPENDIX C



MACP Inspection Form

Header Section

5103

General Information

1. Surveyed By (1,2) HB, RH	2. Certificate Number (1,2) U-0917-07009362/9358	3. Reviewed By	4. Reviewer Certificate No.
5. Owner	6. Customer	7. P/O Number	8. Work Order
9. Media Label	10. Project	11. Date (1,2) 3/24 MMDD	12. Time
13. Sheet Number (1,2) N/A	14. Weather	15. Pre-Cleaning (2) L	16. Date Cleaned YYYYMMDD
17. Purpose of Survey (1,2) D	18. Inspection Level (1,2) 2	19. Inspection Status (1,2) RI	20. Consequence of Failure

Location

21. Drainage Area	22. MH/Access Point No. (1,2) 5103	23. Street (1,2) 17115 SE Kerry St.	24. City (1,2) Jupiter
25. Location Code (2) C	26. Surface Type (2) Asphalt	27. Inflow Potential from Runoff	
28. Location Details			

Manhole

29. MH Use (2) SS	30. Access Type (1,2) AMH	31. Year Constructed YYYY
32. Year Renewed YYYY	33. Evidence of Surcharge (2) N	

Measurements

34. Rim to Invert (2) 47'4"	35. Rim to Grade (2) 47'4"	36. Grade to Invert (2) 47'4"	37. Rim to Grade Exposed
38. Northing*	39. Easting*	40. Elevation**	41. Coordinate System*
42. Vertical Datum**		43. GPS Accuracy	

44. Additional Information

* Information required if Northing, Easting or Coordinate System data is recorded.

** Information required if Elevation or Vertical Datum data is recorded.

Red Font Fields = Mandatory, Black Font Fields = Optional

Defects:

- Minor Circumferential crack in Chimney (likely at joint, non-structural).
- Pipe No. 1 broken/offset approx. 18" upstream of connection.
- Pipe No. 3 appears broken/offset approx. 6" downstream of connection.

Recommendations:

- Heavy pressure cleaning.
- Install complete interior lining system.
- Replace pipe connections and reseal as necessary.
- Install inflow protector.
- Minor reforming of channels.



MACP Inspection Form

Manhole Component Observation Section

Cover

45. Type (2) Solid	46. Shape (2) C	47. Size (2) 24"	48. Center Cover Size	49. Size Width (2) 24"
50. Cover Material (2) Granite CAS	51. Hole Diameter (Vent) (2) N/A	52. Hole Number (2) N/A	53. Bearing Surface Diameter (2) 23 1/2"	
54. Bearing Surface Width (2) 1/2"	55. Cover/Frame Fit (2) G		56. Cover Condition (1,2) SOUND	

Cover Insert

57. Insert Type (2) NONE	58. Cover Insert Condition (2) N/A
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Cover Adjustment Ring

59. Ring Type (1, 2) NONE	60. Ring Material (2) N/A	61. Ring Condition (1,2) N/A	62. Ring Height
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Frame

63. Frame Material (2) CAS	64. Bearing Surface Width (2) 1"	65. Bearing Surface Depth (2) 1 1/4"	66. Clear Opening Diam (2) 22"
67. Clear Opening Width (2) 22"	68. Frame Condition (1,2) G	69. Seal Condition (2) N/A	70. Offset Distance (2) 0
71. Seal Inflow (2) IS	72. Frame Depth		

Chimney

73. Chimney Present (2) YES	74. First Material (2) CR	75. Second Material	76. Chimney I/I	77. Clear Opening
78. Chimney Depth (2) 21 3/4"	79. Lining Interior	80. Lining Exterior	81. Chimney Condition (1) SOUND	

Cone

82. Type (2) N/A	83. Material (2)	84. Depth (2)	85. Lining Interior	86. Lining Exterior	87. Cone Condition (1)
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Wall

88. Wall Diameter (Length)	89. Wall by Size (Width)	90. Material (2) CR	91. Depth (2) 35"
92. Wall Lining Interior	93. Wall Lining Exterior	94. Wall Condition (1) S	

Bench

95. Bench Present (2) YES	96. Bench Material (2) CN	97. Bench Lining	98. Bench Condition (1) S
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Channel

99. Channel Installed (2) YES	100. Channel Material (2) CN	101. Type (2) F	102. Exposure (2) F	103. Channel Condition (1) S
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Steps

104. Number (2) NONE	105. Material (2)
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Additional Component Information

106. Additional Component Information

Pipe Connections

107. Pipe No. (2)	108. Clock Pos (2)	109. Rim to Invert (2)	110. Direction (2)	111. Material (2)	112. Shape (2)	113. Height (Diam) (2)	114. Width (2)	115. Cond (2)	116. Seal Cond (2)	117. Pipe Type (2)	118. Struct ID	119. Comment
3	2:00	47"	I	VCP	C	6"				GR		
2	8:00	47 1/2"	I	VCP	C	4"				GR		
1	6:00	48"	O	VCP	C	6"				GR		
4	3:00	47"	I	VCP	C	4"				GR		

1 = Mandatory Level 1 Inspection Required, 2 = Mandatory Level 2 Inspection Required



MACP Inspection Form

Header Section

5104

General Information

1. Surveyed By (1,2) HB, RH	2. Certificate Number (1,2) U-0917-07009362/9358	3. Reviewed By	4. Reviewer Certificate No.
5. Owner	6. Customer	7. P/O Number	8. Work Order
9. Media Label	10. Project	11. Date (1,2) 3/24	12. Time
13. Sheet Number (1,2) N/A	14. Weather	15. Pre-Cleaning (2) L	16. Date Cleaned YYYYMMDD
17. Purpose of Survey (1,2) D	18. Inspection Level (1,2) 2	19. Inspection Status (1,2) RI	20. Consequence of Failure

Location

21. Drainage Area	22. MH/Access Point No. (1,2) 5104	23. Street (1,2) SE Galway Ct & SE Tiffany Way	24. City (1,2) Jupiter
25. Location Code (2) C	26. Surface Type (2) Asphalt	27. Inflow Potential from Runoff	
28. Location Details			

Manhole

29. MH Use (2) SS	30. Access Type (1,2) AMH	31. Year Constructed YYYY
32. Year Renewed YYYY	33. Evidence of Surcharge (2) N	

Measurements

34. Rim to Invert (2) 109"	35. Rim to Grade (2) 0	36. Grade to Invert (2) 109"	37. Rim to Grade Exposed
38. Northing*	39. Easting*	40. Elevation**	41. Coordinate System*
42. Vertical Datum**		43. GPS Accuracy	

44. Additional Information

* Information required if Northing, Easting or Coordinate System data is recorded.

** Information required if Elevation or Vertical Datum data is recorded.

Red Font Fields = Mandatory, Black Font Fields = Optional

Defects:

- Minor vertical cracking near top of Manhole Wall
- Pipe No. 1 appears broken/offset approx. 5-ft upstream of connection.
- Pipe No. 2 seal appears to be compromised.

Recommendations:

- Heavy pressure cleaning.
- Possible pressure grouting and/or Xypex grouting.
- Install complete interior lining system.
- Replace pipe connections and reseal as necessary (in tandem with gravity sewer replacement).
- Install inflow protector.
- Minor reforming of channels.



MACP Inspection Form Manhole Component Observation Section

Cover

45. Type (2) Solid	46. Shape (2) C	47. Size (2) 24	48. Center Cover Size	49. Size Width (2) 24
50. Cover Material (2) CAS	51. Hole Diameter (Vent) (2) N/A	52. Hole Number (2)	53. Bearing Surface Diameter (2) 23 1/2	
54. Bearing Surface Width (2) 1/2"	55. Cover/Frame Fit (2) G	56. Cover Condition (1,2) S		

Cover Insert

57. Insert Type (2) NONE	58. Cover Insert Condition (2) N/A
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Cover Adjustment Ring

59. Ring Type (1, 2) N/A SOLID	60. Ring Material (2) CAS N/A	61. Ring Condition (1,2) S N/A	62. Ring Height
-----------------------------------	----------------------------------	-----------------------------------	-----------------

Frame

63. Frame Material (2) CAS	64. Bearing Surface Width (2) N/A 3/4"	65. Bearing Surface Depth (2) 1 1/4"	66. Clear Opening Diam (2) 22"
67. Clear Opening Width (2) 22"	68. Frame Condition (1,2) S	69. Seal Condition (2) N/A	70. Offset Distance (2) 0
71. Seal Inflow (2) NONE	72. Frame Depth		

Chimney

73. Chimney Present (2) YES	74. First Material (2) CR	75. Second Material	76. Chimney I/I	77. Clear Opening
78. Chimney Depth (2) 17"	79. Lining Interior	80. Lining Exterior	81. Chimney Condition (1) S	

Cone

82. Type (2) CC	83. Material (2) CR	84. Depth (2) 24"	85. Lining Interior	86. Lining Exterior	87. Cone Condition (1) S
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Wall

88. Wall Diameter (Length)	89. Wall by Size (Width)	90. Material (2) CR	91. Depth (2) 94' 1/4"
92. Wall Lining Interior	93. Wall Lining Exterior	94. Wall Condition (1) S	

Bench

95. Bench Present (2) YES	96. Bench Material (2) CR	97. Bench Lining	98. Bench Condition (1) S
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Channel

99. Channel Installed (2) YES	100. Channel Material (2) CN	101. Type (2) F	102. Exposure (2) F	103. Channel Condition (1) S
----------------------------------	---------------------------------	--------------------	------------------------	---------------------------------

Steps

104. Number (2) NONE	105. Material (2) N/A
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Additional Component Information

106. Additional Component Information

Pipe Connections

107. Pipe No. (2)	108. Clock Pos (2)	109. Rim to Invert (2)	110. Direction (2)	111. Material (2)	112. Shape (2)	113. Height (Diam) (2)	114. Width (2)	115. Cond (2)	116. Seal Cond (2)	117. Pipe Type (2)	118. Struct ID	119. Comment
1	6:00	11 1/2"	O	VCP	C	All conns. are 8"				GR		
2	9:00	112"	I	VCP	C					GR		
3	12:00	109"	I	VCP	C					OL		
4	3:00	108 1/2"	I	VCP	C					OL		

5 12:00 59" I VCP C N/A DU
1 = Mandatory Level 1 Inspection Required, 2 = Mandatory Level 2 Inspection Required



WRc

5105

MACP Inspection Form

Header Section

General Information

1. Surveyed By (1,2) HB, RH	2. Certificate Number (1,2) U-0917-07009362/9358	3. Reviewed By	4. Reviewer Certificate No.
5. Owner	6. Customer	7. P/O Number	8. Work Order
9. Media Label	10. Project	11. Date (1,2) 3/24	12. Time
13. Sheet Number (1,2) N/A	14. Weather	15. Pre-Cleaning (2) L	16. Date Cleaned YYYYMMDD
17. Purpose of Survey (1,2) D	18. Inspection Level (1,2) 2	19. Inspection Status (1,2) RI	20. Consequence of Failure

Location

21. Drainage Area	22. MH/Access Point No. (1,2) 5105	23. Street (1,2) 17257 SE Galway Ct	24. City (1,2) Jupiter
25. Location Code (2) C	26. Surface Type (2) Asphalt	27. Inflow Potential from Runoff	
28. Location Details			

Manhole

29. MH Use (2) SS	30. Access Type (1,2) AMH	31. Year Constructed YYYY
32. Year Renewed YYYY	33. Evidence of Surcharge (2) N	

Measurements

34. Rim to Invert (2) 145 1/2"	35. Rim to Grade (2) Ø	36. Grade to Invert (2) 145 1/2"	37. Rim to Grade Exposed
38. Northing*	39. Easting*	40. Elevation**	41. Coordinate System*
42. Vertical Datum**	43. GPS Accuracy		

44. Additional Information

* Information required if Northing, Easting or Coordinate System data is recorded.

** Information required if Elevation or Vertical Datum data is recorded.

Red Font Fields = Mandatory, Black Font Fields = Optional

Defects:

- Minor circumferential crack in Chimney (likely at joint, non-structural).
- Exposed aggregate in bench/channel.
- Pipe No. 2 seal appears to be compromised.

Recommendations:

- Heavy pressure cleaning.
- Install complete interior lining system.
- Replace pipe connections and reseal as necessary (in tandem with gravity sewer replacement).
- Install inflow protector.
- Reforming of bench and channel.



MACP Inspection Form Manhole Component Observation Section

Cover

45. Type (2) Solid	46. Shape (2) C	47. Size (2) 24	48. Center Cover Size	49. Size Width (2) 24
50. Cover Material (2) CAS	51. Hole Diameter (Vent) (2) N/A	52. Hole Number (2) N/A	53. Bearing Surface Diameter (2) 23 1/2"	
54. Bearing Surface Width (2) 1/2"	55. Cover/Frame Fit (2) G		56. Cover Condition (1,2) S	

Cover Insert

57. Insert Type (2) NONE	58. Cover Insert Condition (2)
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Cover Adjustment Ring

59. Ring Type (1, 2) SOLID	60. Ring Material (2) CAS	61. Ring Condition (1,2) S	62. Ring Height
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Frame

63. Frame Material (2) CAS	64. Bearing Surface Width (2) 3/4"	65. Bearing Surface Depth (2) 1 1/4"	66. Clear Opening Diam (2) 22"
67. Clear Opening Width (2) 22"	68. Frame Condition (1,2) S	69. Seal Condition (2) N/A	70. Offset Distance (2) 0
71. Seal Inflow (2) IS	72. Frame Depth		

Chimney

73. Chimney Present (2) YES	74. First Material (2) CR	75. Second Material	76. Chimney I/I	77. Clear Opening
78. Chimney Depth (2) 14"	79. Lining Interior	80. Lining Exterior	81. Chimney Condition (1) D (MIN CRACKING)	

Cone

82. Type (2) CO	83. Material (2) CR	84. Depth (2) 46 1/2"	85. Lining Interior	86. Lining Exterior	87. Cone Condition (1) S
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Wall

88. Wall Diameter (Length)	89. Wall by Size (Width) 48"	90. Material (2) CR	91. Depth (2) 132"
92. Wall Lining Interior	93. Wall Lining Exterior	94. Wall Condition (1) S	

Bench

95. Bench Present (2) YES	96. Bench Material (2) CN	97. Bench Lining	98. Bench Condition (1) D (SPALLING, COR) S/Pa
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Channel

99. Channel Installed (2) YES	100. Channel Material (2) CN	101. Type (2) F	102. Exposure (2) F	103. Channel Condition (1) D (SPALL, PITTING)
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Steps

104. Number (2) NONE	105. Material (2)
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Additional Component Information

106. Additional Component Information

Pipe Connections

107. Pipe No. (2)	108. Clock Pos (2)	109. Rim to Invert (2)	110. Direction (2)	111. Material (2)	112. Shape (2)	113. Height (Diam) (2)	114. Width (2)	115. Cond (2)	116. Seal Cond (2)	117. Pipe Type (2)	118. Struct ID	119. Comment
1	6:00	14.00	O	VCP	E	All conns. are 8"				GR		
2	11:00	14.00	I	VCP	E						GR	

1 = Mandatory Level 1 Inspection Required, 2 = Mandatory Level 2 Inspection Required



MACP Inspection Form

Header Section

5196

General Information

1. Surveyed By (1,2) HB, RH	2. Certificate Number (1,2) U-0917-07009362/9358	3. Reviewed By	4. Reviewer Certificate No.
5. Owner	6. Customer	7. P/O Number	8. Work Order
9. Media Label	10. Project	11. Date (1,2) 3/24	12. Time
13. Sheet Number (1,2) N/A	14. Weather	15. Pre-Cleaning (2) L	16. Date Cleaned YYYYMMDD
17. Purpose of Survey (1,2) D	18. Inspection Level (1,2) 2	19. Inspection Status (1,2) RI	20. Consequence of Failure

Location

21. Drainage Area	22. MH/Access Point No. (1,2) 5106	23. Street (1,2) 17267 SE Galway Ct	24. City (1,2) Jupiter
25. Location Code (2) C	26. Surface Type (2) Asphalt	27. Inflow Potential from Runoff	
28. Location Details			

Manhole

29. MH Use (2) SS	30. Access Type (1,2) AMH	31. Year Constructed YYYY
32. Year Renewed YYYY	33. Evidence of Surcharge (2) N	

Measurements

34. Rim to Invert (2) 136 1/4"	35. Rim to Grade (2) Ø	36. Grade to Invert (2) 136 1/4"	37. Rim to Grade Exposed
38. Northing*	39. Easting*	40. Elevation**	41. Coordinate System*
42. Vertical Datum**	43. GPS Accuracy		

44. Additional Information

* Information required if Northing, Easting or Coordinate System data is recorded.

** Information required if Elevation or Vertical Datum data is recorded.

Red Font Fields = Mandatory, Black Font Fields = Optional

Defects:

- Minor circumferential crack in Chimney (likely at joint, non-structural).
- Exposed aggregate in bench/channel.
- Pipe No. 2 seal appears to be compromised.

Recommendations:

- Heavy pressure cleaning.
- Install complete interior lining system.
- Replace pipe connections and reseal as necessary (in tandem with gravity sewer replacement).
- Install inflow protector.
- Reforming of bench and channel.



MACP Inspection Form Manhole Component Observation Section

Cover

45. Type (2) Solid	46. Shape (2) C	47. Size (2) 24	48. Center Cover Size	49. Size Width (2) 24
50. Cover Material (2) CAS	51. Hole Diameter (Vent) (2) N/A	52. Hole Number (2)	53. Bearing Surface Diameter (2) 23 1/4	
54. Bearing Surface Width (2) 1/2"	55. Cover/Frame Fit (2) G	56. Cover Condition (1,2) Sound		

Cover Insert

57. Insert Type (2) None	58. Cover Insert Condition (2)
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Cover Adjustment Ring

59. Ring Type (1, 2) Solid	60. Ring Material (2) CAS	61. Ring Condition (1,2) G	62. Ring Height
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Frame

63. Frame Material (2) CAS	64. Bearing Surface Width (2) 3/4	65. Bearing Surface Depth (2) 1 1/4"	66. Clear Opening Diam (2) 22"
67. Clear Opening Width (2) 22"	68. Frame Condition (1,2) S	69. Seal Condition (2) cracked N/A	70. Offset Distance (2) 0
71. Seal Inflow (2) IS	72. Frame Depth		

Chimney

73. Chimney Present (2) YES	74. First Material (2) CR	75. Second Material	76. Chimney I/I	77. Clear Opening
78. Chimney Depth (2) 24 1/4"	79. Lining Interior	80. Lining Exterior	81. Chimney Condition (1) D (CRACKS)	

Cone

82. Type (2) None	83. Material (2)	84. Depth (2)	85. Lining Interior	86. Lining Exterior	87. Cone Condition (1)
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Wall

88. Wall Diameter (Length)	89. Wall by Size (Width)	90. Material (2) CR	91. Depth (2) 126 1/4"
92. Wall Lining Interior	93. Wall Lining Exterior	94. Wall Condition (1) S	

Bench

95. Bench Present (2) YES	96. Bench Material (2) CN	97. Bench Lining	98. Bench Condition (1) D (SPALLING)
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Channel

99. Channel Installed (2) YES	100. Channel Material (2) CN	101. Type (2) F#	102. Exposure (2) F	103. Channel Condition (1) D (SPALLING)
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Steps

104. Number (2) None	105. Material (2)
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Additional Component Information

106. Additional Component Information

Pipe Connections

107. Pipe No. (2)	108. Clock Pos (2)	109. Rim to Invert (2)	110. Direction (2)	111. Material (2)	112. Shape (2)	113. Height (Diam) (2)	114. Width (2)	115. Cond (2)	116. Seal Cond (2)	117. Pipe Type (2)	118. Struct ID	119. Comment	
1	6:00	137 3/4	D		C	All conns. are 8"				GR			
2	12:00	135	I	VCP	C						GR		

1 = Mandatory Level 1 Inspection Required, 2 = Mandatory Level 2 Inspection Required



WRc

MACP Inspection Form

Header Section

5107

General Information

1. Surveyed By (1,2) HB, RH	2. Certificate Number (1,2) U-0917-07009362/9358	3. Reviewed By	4. Reviewer Certificate No.
5. Owner	6. Customer	7. P/O Number	8. Work Order
9. Media Label	10. Project	11. Date (1,2) 3/24	12. Time
13. Sheet Number (1,2) N/A	14. Weather	15. Pre-Cleaning (2) L	16. Date Cleaned YYYYMMDD
17. Purpose of Survey (1,2) D	18. Inspection Level (1,2) 2	19. Inspection Status (1,2) RI	20. Consequence of Failure

Location

21. Drainage Area	22. MH/Access Point No. (1,2) 5107	23. Street (1,2) 17277 SE Galway Ct	24. City (1,2) Jupiter
25. Location Code (2) C	26. Surface Type (2) Asphalt	27. Inflow Potential from Runoff	
28. Location Details			

Manhole

29. MH Use (2) SS	30. Access Type (1,2) AMH	31. Year Constructed YYYY
32. Year Renewed YYYY	33. Evidence of Surcharge (2) N	

Measurements

34. Rim to Invert (2) 98'14"	35. Rim to Grade (2) 0	36. Grade to Invert (2) 98'14"	37. Rim to Grade Exposed
38. Northing*	39. Easting*	40. Elevation**	41. Coordinate System*
42. Vertical Datum**		43. GPS Accuracy	

44. Additional Information

* Information required if Northing, Easting or Coordinate System data is recorded.

** Information required if Elevation or Vertical Datum data is recorded.

Red Font Fields = Mandatory, Black Font Fields = Optional

Defects:

- Minor circumferential cracking in Chimney (likely at joint, non-structural).
- Exposed aggregate in bench/channel.
- Cementitious material build-up in channel.
- Pitting of adjustment ring perimeter.

Recommendations:

- Heavy pressure cleaning.
- Install complete interior lining system.
- Replace pipe connections and reseal as necessary (in tandem with gravity sewer replacement).
- Install inflow protector.
- Reforming of bench and channel.
- Possible candidate for new cover/adjustment ring.



MACP Inspection Form

Manhole Component Observation Section

Cover

45. Type (2) Solid	46. Shape (2) C	47. Size (2) 24	48. Center Cover Size	49. Size Width (2)
50. Cover Material (2) CAS	51. Hole Diameter (Vent) (2) N/A	52. Hole Number (2) N/A	53. Bearing Surface Diameter (2) 23.5"	
54. Bearing Surface Width (2) 0.5"	55. Cover/Frame Fit (2) G		56. Cover Condition (1,2) Corroded	

Cover Insert

57. Insert Type (2) none	58. Cover Insert Condition (2)
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Cover Adjustment Ring

59. Ring Type (1, 2) Solid	60. Ring Material (2) CAS	61. Ring Condition (1,2) G	62. Ring Height
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Frame

63. Frame Material (2) CAS	64. Bearing Surface Width (2) 3/4	65. Bearing Surface Depth (2) 1 1/4	66. Clear Opening Diam (2) 22"
67. Clear Opening Width (2) 22"	68. Frame Condition (1,2) S	69. Seal Condition (2) N/A	70. Offset Distance (2) Ø
71. Seal Inflow (2) FS	72. Frame Depth		

Chimney

73. Chimney Present (2) YES	74. First Material (2) CR	75. Second Material	76. Chimney I/I	77. Clear Opening
78. Chimney Depth (2) 23 1/4	79. Lining Interior	80. Lining Exterior	81. Chimney Condition (1) D (CRACKS)	

Cone

82. Type (2) CO	83. Material (2) CR	84. Depth (2) 54 3/4	85. Lining Interior	86. Lining Exterior	87. Cone Condition (1) S
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Wall

88. Wall Diameter (Length)	89. Wall by Size (Width)	90. Material (2) CR	91. Depth (2) 91"
92. Wall Lining Interior	93. Wall Lining Exterior	94. Wall Condition (1) S	

Bench

95. Bench Present (2) YES	96. Bench Material (2) CN	97. Bench Lining	98. Bench Condition (1) D (SPALL)
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Channel

99. Channel Installed (2) YES	100. Channel Material (2) CN	101. Type (2) F	102. Exposure (2) F	103. Channel Condition (1) D (SPALL)
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Steps

104. Number (2) NONE	105. Material (2)
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Additional Component Information

106. Additional Component Information

Pipe Connections

107. Pipe No. (2)	108. Clock Pos (2)	109. Rim to Invert (2)	110. Direction (2)	111. Material (2)	112. Shape (2)	113. Height (Diam) (2)	114. Width (2)	115. Cond (2)	116. Seal Cond (2)	117. Pipe Type (2)	118. Struct ID	119. Comment
1	6:00	98 1/2	D	VCP	OC	All conns. are 8"				GR		
2	10:30	96 1/2	I	VCP	C					GR		

1 = Mandatory Level 1 Inspection Required, 2 = Mandatory Level 2 Inspection Required



WRc

S108

MACP Inspection Form

Header Section

General Information

1. Surveyed By (1,2) HB, RH	2. Certificate Number (1,2) U-0917-07009362/9358	3. Reviewed By	4. Reviewer Certificate No.
5. Owner	6. Customer	7. P/O Number	8. Work Order
9. Media Label	10. Project	11. Date (1,2) 5/24	12. Time
13. Sheet Number (1,2) N/A	14. Weather	15. Pre-Cleaning (2) L	16. Date Cleaned YYYYMMDD
17. Purpose of Survey (1,2) D	18. Inspection Level (1,2) 2	19. Inspection Status (1,2) RI	20. Consequence of Failure

Location

21. Drainage Area	22. MH/Access Point No. (1,2) 5108	23. Street (1,2) 11881 SE Tiffany Way	24. City (1,2) Jupiter
25. Location Code (2) C	26. Surface Type (2) Asphalt	27. Inflow Potential from Runoff	
28. Location Details			

Manhole

29. MH Use (2) SS	30. Access Type (1,2) AMH	31. Year Constructed YYYY
32. Year Renewed YYYY	33. Evidence of Surcharge (2) N	

Measurements

34. Rim to Invert (2) 130"	35. Rim to Grade (2) Ø	36. Grade to Invert (2) 130"	37. Rim to Grade Exposed
38. Northing*	39. Easting*	40. Elevation**	41. Coordinate System*
42. Vertical Datum**	43. GPS Accuracy		

44. Additional Information

* Information required if Northing, Easting or Coordinate System data is recorded.

** Information required if Elevation or Vertical Datum data is recorded.

Red Font Fields = Mandatory, Black Font Fields = Optional

Defects:

- Pipe Connection No. 3/4 (outside drop) pipe is offset approx. 6"
- Exposed aggregate in bench/channel.
- Cementitious material build-up in channel.
- Pitting of adjustment ring perimeter.

Recommendations:

- Heavy pressure cleaning.
- Install complete interior lining system.
- Replace pipe connections and reseal as necessary (in tandem with gravity sewer replacement).
- Install inflow protector.
- Reforming of bench and channel.
- Possible candidate for new cover/adjustment ring.



MACP Inspection Form Manhole Component Observation Section

Cover

45. Type (2) Solid	46. Shape (2) C	47. Size (2) 24"	48. Center Cover Size	49. Size Width (2)
50. Cover Material (2) CAS	51. Hole Diameter (Vent) (2) N/A	52. Hole Number (2) N/A	53. Bearing Surface Diameter (2) 23.5"	
54. Bearing Surface Width (2) 0.5"	55. Cover/Frame Fit (2) G	56. Cover Condition (1,2) Corroded		

Cover Insert

57. Insert Type (2) NONE	58. Cover Insert Condition (2)
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Cover Adjustment Ring

59. Ring Type (1, 2) SOUND	60. Ring Material (2) CAS	61. Ring Condition (1,2) COR	62. Ring Height
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Frame

63. Frame Material (2) CAS	64. Bearing Surface Width (2) 3/4"	65. Bearing Surface Depth (2) 1/4"	66. Clear Opening Diam (2) 22"
67. Clear Opening Width (2) 22"	68. Frame Condition (1,2) S	69. Seal Condition (2) N/A	70. Offset Distance (2) 0
71. Seal Inflow (2) IS	72. Frame Depth		

Chimney

73. Chimney Present (2) YES	74. First Material (2) CR	75. Second Material	76. Chimney I/I	77. Clear Opening
78. Chimney Depth (2) 29"	79. Lining Interior	80. Lining Exterior	81. Chimney Condition (1) G	

Cone

82. Type (2) NONE	83. Material (2)	84. Depth (2)	85. Lining Interior	86. Lining Exterior	87. Cone Condition (1)
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Wall

88. Wall Diameter (Length)	89. Wall by Size (Width)	90. Material (2) CR	91. Depth (2) 114"
92. Wall Lining Interior	93. Wall Lining Exterior	94. Wall Condition (1) G	

Bench

95. Bench Present (2) YES	96. Bench Material (2) CN	97. Bench Lining	98. Bench Condition (1) D (SPALL)
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Channel

99. Channel Installed (2) YES	100. Channel Material (2) CN	101. Type (2) F	102. Exposure (2) F	103. Channel Condition (1) D (SPALL)
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Steps

104. Number (2) NONE	105. Material (2)
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Additional Component Information

106. Additional Component Information

Pipe Connections

107. Pipe No. (2)	108. Clock Pos (2)	109. Rim to Invert (2)	110. Direction (2)	111. Material (2)	112. Shape (2)	113. Height (Diam) (2)	114. Width (2)	115. Cond (2)	116. Seal Cond (2)	117. Pipe Type (2)	118. Struct ID	119. Comment
1	6:00	130"	D	VCP	C					GR		
2	7:00	130"	I	VCP	C					GR		
3	2:30	124 1/4"	I	VCP	C					DL		
4	2:30	51 1/2"	I	VCP	C					OU		

1 = Mandatory Level 1 Inspection Required, 2 = Mandatory Level 2 Inspection Required



MACP Inspection Form

Header Section

5109

General Information

1. Surveyed By (1,2) HB, RH	2. Certificate Number (1,2) U-0917-07009362/9358	3. Reviewed By	4. Reviewer Certificate No.
5. Owner	6. Customer	7. P/O Number	8. Work Order
9. Media Label	10. Project	11. Date (1,2) 3/24	12. Time
13. Sheet Number (1,2) N/A	14. Weather	15. Pre-Cleaning (2) L	16. Date Cleaned YYYYMMDD
17. Purpose of Survey (1,2) D	18. Inspection Level (1,2) 2	19. Inspection Status (1,2) RI	20. Consequence of Failure

Location

21. Drainage Area	22. MH/Access Point No. (1,2) 5109	23. Street (1,2) 11922 SE Tiffany Way	24. City (1,2) Jupiter
25. Location Code (2) C	26. Surface Type (2) Asphalt	27. Inflow Potential from Runoff	
28. Location Details			

Manhole

29. MH Use (2) SS	30. Access Type (1,2) AMH	31. Year Constructed YYYY
32. Year Renewed YYYY	33. Evidence of Surcharge (2) N	

Measurements

34. Rim to Invert (2) 12'14"	35. Rim to Grade (2) 0	36. Grade to Invert (2) 12'14"	37. Rim to Grade Exposed
38. Northing*	39. Easting*	40. Elevation**	41. Coordinate System*
42. Vertical Datum**		43. GPS Accuracy	

44. Additional Information

* Information required if Northing, Easting or Coordinate System data is recorded.

** Information required if Elevation or Vertical Datum data is recorded.

Red Font Fields = Mandatory, Black Font Fields = Optional

Defects:

- Minor circumferential cracking in Chimney (likely at joint, non-structural).
- Pitting of adjustment ring perimeter.

Recommendations:

- Heavy pressure cleaning.
- Install complete interior lining system.
- Replace pipe connections and reseal as necessary (in tandem with gravity sewer replacement).
- Install inflow protector.
- Possible reforming of bench and channel. Manhole was not cleaned sufficiently for evaluation of bench and channel due to heavy inflow of mud. Inflow likely due to damaged upstream gravity sewer.
- Install new cover/adjustment ring.



MACP Inspection Form Manhole Component Observation Section

Cover

45. Type (2) SOLID	46. Shape (2) C	47. Size (2) 24"	48. Center Cover Size	49. Size Width (2) 24"
50. Cover Material (2) CAS	51. Hole Diameter (Vent) (2) N/A	52. Hole Number (2) Ø	53. Bearing Surface Diameter (2) 23 1/2"	
54. Bearing Surface Width (2) 1/2"	55. Cover/Frame Fit (2) G		56. Cover Condition (1,2) G	

Cover Insert

57. Insert Type (2) N	58. Cover Insert Condition (2)
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Cover Adjustment Ring

59. Ring Type (1, 2) S	60. Ring Material (2) CAS	61. Ring Condition (1,2) CORRODED	62. Ring Height
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Frame

63. Frame Material (2) CAS	64. Bearing Surface Width (2) 3/4"	65. Bearing Surface Depth (2) 1/4"	66. Clear Opening Diam (2) 22"
67. Clear Opening Width (2) 22"	68. Frame Condition (1,2) SOUND	69. Seal Condition (2) N/A	70. Offset Distance (2) Ø
71. Seal Inflow (2) IS	72. Frame Depth		

Chimney

73. Chimney Present (2) Y	74. First Material (2) CR	75. Second Material	76. Chimney I/I	77. Clear Opening
78. Chimney Depth (2) 19 1/2"	79. Lining Interior	80. Lining Exterior	81. Chimney Condition (1) S	

Cone

82. Type (2) N	83. Material (2)	84. Depth (2)	85. Lining Interior	86. Lining Exterior	87. Cone Condition (1)
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Wall

88. Wall Diameter (Length)	89. Wall by Size (Width)	90. Material (2) CR	91. Depth (2) 67 1/2"
92. Wall Lining Interior	93. Wall Lining Exterior	94. Wall Condition (1) G	

Bench

95. Bench Present (2) Y	96. Bench Material (2) CN	97. Bench Lining	98. Bench Condition (1) X
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Channel

99. Channel Installed (2) Y	100. Channel Material (2) CN	101. Type (2) F	102. Exposure (2) F	103. Channel Condition (1) X
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Steps

104. Number (2) Ø	105. Material (2)
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Additional Component Information

106. Additional Component Information

Pipe Connections

107. Pipe No. (2)	108. Clock Pos (2)	109. Rim to Invert (2)	110. Direction (2)	111. Material (2)	112. Shape (2)	113. Height (Diam) (2)	114. Width (2)	115. Cond (2)	116. Seal Cond (2)	117. Pipe Type (2)	118. Struct ID	119. Comment
1	6:00	72 1/2"	O	VCP	C	8"	8"	S	S	GR		
2	12:00	72 1/4"	I	VCP	C	8"	8"	S	S	GR		

1 = Mandatory Level 1 Inspection Required, 2 = Mandatory Level 2 Inspection Required



MACP Inspection Form

Header Section

5110

General Information

1. Surveyed By (1,2) HB, RH	2. Certificate Number (1,2) U-0917-07009362/9358	3. Reviewed By	4. Reviewer Certificate No.
5. Owner	6. Customer	7. P/O Number	8. Work Order
9. Media Label	10. Project	11. Date (1,2) 3/14	12. Time
13. Sheet Number (1,2) N/A	14. Weather	15. Pre-Cleaning (2) L	16. Date Cleaned YYYYMMDD
17. Purpose of Survey (1,2) D	18. Inspection Level (1,2) 2	19. Inspection Status (1,2) RI	20. Consequence of Failure

Location

21. Drainage Area	22. MH/Access Point No. (1,2) 5110	23. Street (1,2) Tiffany Way & Limerick Ct	24. City (1,2) Jupiter
25. Location Code (2) C	26. Surface Type (2) Asphalt	27. Inflow Potential from Runoff	
28. Location Details			

Manhole

29. MH Use (2) SS	30. Access Type (1,2) AMH	31. Year Constructed YYYY
32. Year Renewed YYYY	33. Evidence of Surcharge (2) N	

Measurements

34. Rim to Invert (2) 63'14"	35. Rim to Grade (2) 0	36. Grade to Invert (2) 63'14"	37. Rim to Grade Exposed
38. Northing*	39. Easting*	40. Elevation**	41. Coordinate System*
42. Vertical Datum**		43. GPS Accuracy	

44. Additional Information

* Information required if Northing, Easting or Coordinate System data is recorded.

** Information required if Elevation or Vertical Datum data is recorded.

Red Font Fields = Mandatory, Black Font Fields = Optional

Defects:

- Split adjustment ring.
- Minor circumferential cracking in Chimney (likely at joint, non-structural).
- Minor areas of exposed aggregate in bench/channel.
- Cementitious material build-up in channel.

Recommendations:

- Heavy pressure cleaning.
- Install complete interior lining system.
- Replace pipe connections and reseal as necessary (in tandem with gravity sewer replacement).
- Install inflow protector.
- Reforming of bench and channel. Manhole was not cleaned sufficiently for evaluation of bench and channel due to heavy inflow of mud. Inflow likely due to damaged upstream gravity sewer.
- Install new cover/adjustment ring.



MACP Inspection Form

Manhole Component Observation Section

Cover

45. Type (2) SOLID	46. Shape (2) C	47. Size (2) 24"	48. Center Cover Size	49. Size Width (2) 24"
50. Cover Material (2) CAS	51. Hole Diameter (Vent) (2) N/A	52. Hole Number (2) 0	53. Bearing Surface Diameter (2) 23 1/2"	
54. Bearing Surface Width (2) 1/2"	55. Cover/Frame Fit (2) G		56. Cover Condition (1,2) G	

Cover Insert

57. Insert Type (2) N	58. Cover Insert Condition (2)
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Cover Adjustment Ring

59. Ring Type (1, 2) A	60. Ring Material (2) CAS	61. Ring Condition (1,2) BROKEN	62. Ring Height
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Frame

63. Frame Material (2) CAS	64. Bearing Surface Width (2) 3/4"	65. Bearing Surface Depth (2) 1/4"	66. Clear Opening Diam (2) 22"
67. Clear Opening Width (2) 22"	68. Frame Condition (1,2) SOUND	69. Seal Condition (2) N/A	70. Offset Distance (2) 0
71. Seal Inflow (2) IS	72. Frame Depth		

Chimney

73. Chimney Present (2) Y	74. First Material (2) CR	75. Second Material	76. Chimney I/I	77. Clear Opening
78. Chimney Depth (2) 30 1/4"	79. Lining Interior	80. Lining Exterior	81. Chimney Condition (1) S	

Cone

82. Type (2) N	83. Material (2)	84. Depth (2)	85. Lining Interior	86. Lining Exterior	87. Cone Condition (1)
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Wall

88. Wall Diameter (Length)	89. Wall by Size (Width)	90. Material (2) CR	91. Depth (2) 58 1/2"
92. Wall Lining Interior	93. Wall Lining Exterior	94. Wall Condition (1) S	

Bench

95. Bench Present (2) Y	96. Bench Material (2) CN	97. Bench Lining	98. Bench Condition (1) S
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Channel

99. Channel Installed (2) Y	100. Channel Material (2) CN	101. Type (2) F	102. Exposure (2) F	103. Channel Condition (1) S
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Steps

104. Number (2) 0	105. Material (2)
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Additional Component Information

106. Additional Component Information

Pipe Connections

107. Pipe No. (2)	108. Clock Pos (2)	109. Rim to Invert (2)	110. Direction (2)	111. Material (2)	112. Shape (2)	113. Height (Diam) (2)	114. Width (2)	115. Cond (2)	116. Seal Cond (2)	117. Pipe Type (2)	118. Struct ID	119. Comment
1	6:00	63 1/4	0	VCP	C	8"	8"	S	S	GR		
2	9:30	63 1/2	I	VCP	C	8"	8"	S	S	GR		
3	12:00	62 1/4	I	VCP	C	8"	8"	S	S	GR		
4	3:00	59 1/4	I	VCP	C	4"	4"	S	S	GR		

1= Mandatory Level 1 Inspection Required, 2 = Mandatory Level 2 Inspection Required



MACP Inspection Form

Header Section

General Information

1. Surveyed By (1,2) HP, RH	2. Certificate Number (1,2) 110917-01109362/9358	3. Reviewed By	4. Reviewer Certificate No.
5. Owner	6. Customer	7. P/O Number	8. Work Order
9. Media Label	10. Project	11. Date (1,2) 20200824	12. Time
13. Sheet Number (1,2) 1	14. Weather	15. Pre-Cleaning (2) L	16. Date Cleaned YYYYMMDD
17. Purpose of Survey (1,2) D	18. Inspection Level (1,2) 2	19. Inspection Status (1,2) RI	20. Consequence of Failure

Location

21. Drainage Area	22. MH/Access Point No. (1,2) 5111	23. Street (1,2) 17179 SE LIMECK	24. City (1,2) JUPITER
25. Location Code (2) C	26. Surface Type (2) ASPHALT	27. Inflow Potential from Runoff	
28. Location Details			

Manhole

29. MH Use (2) SS	30. Access Type (1,2) AMH	31. Year Constructed YYYY
32. Year Renewed YYYY	33. Evidence of Surcharge (2) Y	

Measurements

34. Rim to Invert (2)	35. Rim to Grade (2) 0	36. Grade to Invert (2)	37. Rim to Grade Exposed
38. Northing*	39. Easting*	40. Elevation**	41. Coordinate System*
42. Vertical Datum**		43. GPS Accuracy	

44. Additional Information

UNABLE TO MEASURE INVERT DEPTH DUE TO MUD IN MH.

* Information required if Northing, Easting or Coordinate System data is recorded.

** Information required if Elevation or Vertical Datum data is recorded.

Red Font Fields = Mandatory, Black Font Fields = Optional

Defects:

- Pitting of adjustment ring/cover
- Appearance of exposed aggregate in bench/channel

Recommendations:

- Heavy pressure cleaning.
- Install complete interior lining system.
- Replace pipe connections and reseal as necessary (in tandem with gravity sewer replacement).
- Install inflow protector.
- Reforming of bench and channel. Manhole was not cleaned sufficiently for evaluation of bench and channel due to heavy inflow of mud. Inflow likely due to damaged upstream gravity sewer.
- Install new cover/adjustment ring.



MACP Inspection Form

Manhole Component Observation Section

Cover

45. Type (2) SOLID	46. Shape (2) C	47. Size (2) 24"	48. Center Cover Size	49. Size Width (2) 24"
50. Cover Material (2) CAS	51. Hole Diameter (Vent) (2) N/A	52. Hole Number (2) Ø	53. Bearing Surface Diameter (2) 23 1/2"	
54. Bearing Surface Width (2) 1/2"	55. Cover/Frame Fit (2) G		56. Cover Condition (1,2) G	

Cover Insert

57. Insert Type (2) N	58. Cover Insert Condition (2)
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Cover Adjustment Ring

59. Ring Type (1, 2) S	60. Ring Material (2) CAS	61. Ring Condition (1,2) BROKEN	62. Ring Height
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Frame

63. Frame Material (2) CAS	64. Bearing Surface Width (2) 3/4"	65. Bearing Surface Depth (2) 1 1/4"	66. Clear Opening Diam (2) 22"
67. Clear Opening Width (2) 22"	68. Frame Condition (1,2) SOUND	69. Seal Condition (2) N/A	70. Offset Distance (2) Ø
71. Seal Inflow (2) IS	72. Frame Depth		

Chimney

73. Chimney Present (2) Y	74. First Material (2) CR	75. Second Material	76. Chimney I/I	77. Clear Opening
78. Chimney Depth (2) 22 1/4"	79. Lining Interior	80. Lining Exterior	81. Chimney Condition (1) S	

Cone

82. Type (2) N	83. Material (2)	84. Depth (2)	85. Lining Interior	86. Lining Exterior	87. Cone Condition (1)
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Wall

88. Wall Diameter (Length)	89. Wall by Size (Width)	90. Material (2) CR	91. Depth (2) 51"
92. Wall Lining Interior	93. Wall Lining Exterior	94. Wall Condition (1) S	

Bench

95. Bench Present (2) Y	96. Bench Material (2) CN	97. Bench Lining	98. Bench Condition (1) D
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Channel

99. Channel Installed (2) Y	100. Channel Material (2) CN	101. Type (2) F	102. Exposure (2) F	103. Channel Condition (1)
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Steps

104. Number (2) Ø	105. Material (2)
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Additional Component Information

106. Additional Component Information 108: PITING, SPALLING 109, 115, 116: UNKNOWN DUE TO MUD UNKNOWN (MUD)
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Pipe Connections

107. Pipe No. (2)	108. Clock Pos (2)	109. Rim to Invert (2)	110. Direction (2)	111. Material (2)	112. Shape (2)	113. Height (Diam) (2)	114. Width (2)	115. Cond (2)	116. Seal Cond (2)	117. Pipe Type (2)	118. Struct ID	119. Comment
1	6:00		O	VCP	C	8"	8"			GR		
2	12:00		I	VCP	C	8"	8"			GR		
3	2:00		I	VCP	C	6"	6"			GR		

1 = Mandatory Level 1 Inspection Required, 2 = Mandatory Level 2 Inspection Required



MACP Inspection Form

Header Section

General Information

1. Surveyed By (1,2) HB, RH	2. Certificate Number (1,2) 11-09117-01009302/9358	3. Reviewed By	4. Reviewer Certificate No.
5. Owner	6. Customer	7. P/O Number	8. Work Order
9. Media Label	10. Project	11. Date (1,2) 20200324	12. Time
13. Sheet Number (1,2) 1	14. Weather	15. Pre-Cleaning (2) L	16. Date Cleaned YYYYMMDD
17. Purpose of Survey (1,2) D	18. Inspection Level (1,2) 2	19. Inspection Status (1,2) KI	20. Consequence of Failure

Location

21. Drainage Area	22. MH/Access Point No. (1,2) 5112	23. Street (1,2) 17159 SE LIMERICK	24. City (1,2) JUPITER
25. Location Code (2) C	26. Surface Type (2) ASPHALT	27. Inflow Potential from Runoff	
28. Location Details			

Manhole

29. MH Use (2) SS	30. Access Type (1,2) AMH	31. Year Constructed YYYY
32. Year Renewed YYYY	33. Evidence of Surcharge (2) N	

Measurements

34. Rim to Invert (2) 54"	35. Rim to Grade (2) 0	36. Grade to Invert (2) 54"	37. Rim to Grade Exposed
38. Northing*	39. Easting*	40. Elevation**	41. Coordinate System*
42. Vertical Datum**		43. GPS Accuracy	

44. Additional Information

* Information required if Northing, Easting or Coordinate System data is recorded.

** Information required if Elevation or Vertical Datum data is recorded.

Red Font Fields = Mandatory, Black Font Fields = Optional

Defects:

- Pitting of adjustment ring/cover. Cover does not seat properly.
- Minor circumferential cracking in Chimney (likely at joint, non-structural).
- Appearance of exposed aggregate in bench/channel

Recommendations:

- Heavy pressure cleaning.
- Install complete interior lining system.
- Replace pipe connections and reseal as necessary (in tandem with gravity sewer replacement).
- Install inflow protector.
- Reforming of bench and channel. Manhole was not cleaned sufficiently for evaluation of bench and channel due to heavy inflow of mud. Inflow likely due to damaged upstream gravity sewer.
- Install new cover/adjustment ring.



MACP Inspection Form

Manhole Component Observation Section

Cover

45. Type (2) <u>SOLID</u>	46. Shape (2) <u>C</u>	47. Size (2) <u>24"</u>	48. Center Cover Size	49. Size Width (2) <u>24"</u>
50. Cover Material (2) <u>CAS</u>	51. Hole Diameter (Vent) (2) <u>N/A</u>	52. Hole Number (2) <u>0</u>	53. Bearing Surface Diameter (2) <u>23 1/2"</u>	
54. Bearing Surface Width (2) <u>1/2"</u>	55. Cover/Frame Fit (2) <u>G</u>		56. Cover Condition (1,2) <u>G</u>	

Cover Insert

57. Insert Type (2) <u>N</u>	58. Cover Insert Condition (2)
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Cover Adjustment Ring

59. Ring Type (1, 2) <u>SOLID</u>	60. Ring Material (2) <u>CAS</u>	61. Ring Condition (1,2) <u>POOR INSTALLATION</u>	62. Ring Height
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Frame

63. Frame Material (2) <u>CAS</u>	64. Bearing Surface Width (2) <u>3/4"</u>	65. Bearing Surface Depth (2) <u>1 1/4"</u>	66. Clear Opening Diam (2) <u>22"</u>
67. Clear Opening Width (2) <u>22"</u>	68. Frame Condition (1,2) <u>SOUND</u>	69. Seal Condition (2) <u>N/A</u>	70. Offset Distance (2) <u>0</u>
71. Seal Inflow (2) <u>ID</u>	72. Frame Depth		

Chimney

73. Chimney Present (2) <u>Y</u>	74. First Material (2) <u>CR</u>	75. Second Material	76. Chimney I/I	77. Clear Opening
78. Chimney Depth (2) <u>20"</u>	79. Lining Interior	80. Lining Exterior	81. Chimney Condition (1) <u>S</u>	

Cone

82. Type (2) <u>N</u>	83. Material (2)	84. Depth (2)	85. Lining Interior	86. Lining Exterior	87. Cone Condition (1)
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Wall

88. Wall Diameter (Length)	89. Wall by Size (Width)	90. Material (2) <u>CR</u>	91. Depth (2) <u>48"</u>
92. Wall Lining Interior	93. Wall Lining Exterior	94. Wall Condition (1) <u>S</u>	

Bench

95. Bench Present (2) <u>Y</u>	96. Bench Material (2) <u>CN</u>	97. Bench Lining	98. Bench Condition (1) <u>S</u>
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Channel

99. Channel Installed (2) <u>Y</u>	100. Channel Material (2) <u>CN</u>	101. Type (2) <u>F</u>	102. Exposure (2) <u>F</u>	103. Channel Condition (1) <u>S</u>
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Steps

104. Number (2) <u>0</u>	105. Material (2)
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Additional Component Information

106. Additional Component Information

Pipe Connections

107. Pipe No. (2)	108. Clock Pos (2)	109. Rim to Invert (2)	110. Direction (2)	111. Material (2)	112. Shape (2)	113. Height (Diam) (2)	114. Width (2)	115. Cond (2)	116. Seal Cond (2)	117. Pipe Type (2)	118. Struct ID	119. Comment
<u>1</u>	<u>6:00</u>	<u>54</u>	<u>0</u>	<u>VCP</u>	<u>C</u>	<u>8"</u>	<u>8"</u>	<u>S</u>	<u>S</u>	<u>GR</u>		
<u>2</u>	<u>12:00</u>	<u>54 1/2</u>	<u>I</u>	<u>VCP</u>	<u>C</u>	<u>8"</u>	<u>8"</u>	<u>S</u>	<u>S</u>	<u>GR</u>		

1 = Mandatory Level 1 Inspection Required, 2 = Mandatory Level 2 Inspection Required



MACP Inspection Form

Header Section

General Information

1. Surveyed By (1,2) HB, RH	2. Certificate Number (1,2) 4-0917-0709362/9358	3. Reviewed By	4. Reviewer Certificate No.
5. Owner	6. Customer	7. P/O Number	8. Work Order
9. Media Label	10. Project	11. Date (1,2) 20200824	12. Time
13. Sheet Number (1,2) 1	14. Weather	15. Pre-Cleaning (2) L	16. Date Cleaned YYYYMMDD
17. Purpose of Survey (1,2) D	18. Inspection Level (1,2) 2	19. Inspection Status (1,2) KI	20. Consequence of Failure

Location

21. Drainage Area	22. MH/Access Point No. (1,2) 5113	23. Street (1,2) 1739 SE LIMERICK	24. City (1,2) JUPITER
25. Location Code (2) C	26. Surface Type (2) ASPHALT	27. Inflow Potential from Runoff	
28. Location Details			

Manhole

29. MH Use (2) SS	30. Access Type (1,2) AMH	31. Year Constructed YYYY
32. Year Renewed YYYY	33. Evidence of Surcharge (2) N	

Measurements

34. Rim to Invert (2) 50 1/2"	35. Rim to Grade (2) Ø	36. Grade to Invert (2) 50 1/2"	37. Rim to Grade Exposed
38. Northing*	39. Easting*	40. Elevation**	41. Coordinate System*
42. Vertical Datum**		43. GPS Accuracy	

44. Additional Information

* Information required if Northing, Easting or Coordinate System data is recorded.

** Information required if Elevation or Vertical Datum data is recorded.

Red Font Fields = Mandatory, Black Font Fields = Optional

Defects:

- Significant pitting of adjustment ring/cover AND frame.
- Minor circumferential cracking in Chimney (likely at joint, non-structural).
- Appearance of exposed aggregate in bench/channel

Recommendations:

- Heavy pressure cleaning.
- Install complete interior lining system.
- Replace pipe connections and reseal as necessary (in tandem with gravity sewer replacement).
- Install inflow protector.
- Minor reforming of bench and channel.
- Install new cover/adjustment ring.
- Install new frame.



MACP Inspection Form

Manhole Component Observation Section

Cover

45. Type (2) <i>Sand</i>	46. Shape (2) <i>C</i>	47. Size (2) <i>22 1/2"</i>	48. Center Cover Size	49. Size Width (2) <i>22 1/2"</i>
50. Cover Material (2) <i>CAS</i>	51. Hole Diameter (Vent) (2) <i>N/A</i>	52. Hole Number (2) <i>Ø</i>	53. Bearing Surface Diameter (2) <i>22 1/2"</i>	
54. Bearing Surface Width (2) <i>3/4"</i>	55. Cover/Frame Fit (2) <i>G</i>		56. Cover Condition (1,2) <i>CORRODED</i>	

Cover Insert

57. Insert Type (2) <i>N</i>	58. Cover Insert Condition (2)
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Cover Adjustment Ring

59. Ring Type (1, 2) <i>N</i>	60. Ring Material (2)	61. Ring Condition (1,2)	62. Ring Height
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Frame

63. Frame Material (2) <i>CAS</i>	64. Bearing Surface Width (2) <i>3/4"</i>	65. Bearing Surface Depth (2) <i>1 1/4"</i>	66. Clear Opening Diam (2) <i>22"</i>
67. Clear Opening Width (2) <i>22"</i>	68. Frame Condition (1,2) <i>CORRODED</i>	69. Seal Condition (2) <i>N/A</i>	70. Offset Distance (2) <i>Ø</i>
71. Seal Inflow (2) <i>IS</i>	72. Frame Depth		

Chimney

73. Chimney Present (2) <i>Y</i>	74. First Material (2) <i>CR</i>	75. Second Material	76. Chimney I/I	77. Clear Opening
78. Chimney Depth (2) <i>18"</i>	79. Lining Interior	80. Lining Exterior	81. Chimney Condition (1) <i>G</i>	

Cone

82. Type (2) <i>N</i>	83. Material (2)	84. Depth (2)	85. Lining Interior	86. Lining Exterior	87. Cone Condition (1)
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Wall

88. Wall Diameter (Length)	89. Wall by Size (Width)	90. Material (2) <i>CR</i>	91. Depth (2) <i>47"</i>
92. Wall Lining Interior	93. Wall Lining Exterior	94. Wall Condition (1) <i>S</i>	

Bench

95. Bench Present (2) <i>Y</i>	96. Bench Material (2) <i>CN</i>	97. Bench Lining	98. Bench Condition (1) <i>S</i>
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Channel

99. Channel Installed (2) <i>Y</i>	100. Channel Material (2) <i>CN</i>	101. Type (2) <i>F</i>	102. Exposure (2) <i>F</i>	103. Channel Condition (1) <i>S</i>
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Steps

104. Number (2) <i>Ø</i>	105. Material (2)
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Additional Component Information

106. Additional Component Information

Pipe Connections

107. Pipe No. (2)	108. Clock Pos (2)	109. Rim to Invert (2)	110. Direction (2)	111. Material (2)	112. Shape (2)	113. Height (Diam) (2)	114. Width (2)	115. Cond (2)	116. Seal Cond (2)	117. Pipe Type (2)	118. Struct ID	119. Comment
1	6:00	50 1/2	Ø	VCP	C	8"	8"	S	S	GR		
2	10:00	49 1/2	I	VCP	C	8"	8"	S	S	GR		
3	12:00	49	I	VCP	C	6"	6"	S	S	GR		

1 = Mandatory Level 1 Inspection Required, 2 = Mandatory Level 2 Inspection Required



MACP Inspection Form

Header Section

General Information

1. Surveyed By (1,2) HB, RH	2. Certificate Number (1,2) 11-0917-07009362/9358	3. Reviewed By	4. Reviewer Certificate No.
5. Owner	6. Customer	7. P/O Number	8. Work Order
9. Media Label	10. Project	11. Date (1,2) 20200824	12. Time
13. Sheet Number (1,2) 1	14. Weather	15. Pre-Cleaning (2) L	16. Date Cleaned YYYYMMDD
17. Purpose of Survey (1,2) D	18. Inspection Level (1,2) 2	19. Inspection Status (1,2) RI	20. Consequence of Failure

Location

21. Drainage Area	22. MH/Access Point No. (1,2) 5114	23. Street (1,2) 11962 SE TIFFANY	24. City (1,2) JUPITER
25. Location Code (2) C	26. Surface Type (2) ASPHALT	27. Inflow Potential from Runoff	
28. Location Details			

Manhole

29. MH Use (2) SS	30. Access Type (1,2) AMH	31. Year Constructed YYYY
32. Year Renewed YYYY	33. Evidence of Surcharge (2) N	

Measurements

34. Rim to Invert (2) 48 3/4"	35. Rim to Grade (2) 0	36. Grade to Invert (2) 48 3/4"	37. Rim to Grade Exposed
38. Northing*	39. Easting*	40. Elevation**	41. Coordinate System*
42. Vertical Datum**		43. GPS Accuracy	

44. Additional Information

* Information required if Northing, Easting or Coordinate System data is recorded.

** Information required if Elevation or Vertical Datum data is recorded.

Red Font Fields = Mandatory, Black Font Fields = Optional

Defects:

- Split adjustment ring.
- Appearance of exposed aggregate in bench/channel

Recommendations:

- Heavy pressure cleaning.
- Install complete interior lining system.
- Replace pipe connections and reseal as necessary (in tandem with gravity sewer replacement).
- Install inflow protector.
- Reforming of bench and channel. Manhole was not cleaned sufficiently for evaluation of bench and channel due to heavy inflow of mud. Inflow likely due to damaged upstream gravity sewer.
- Install new cover/adjustment ring.



MACP Inspection Form

Manhole Component Observation Section

Cover

45. Type (2) SOLID	46. Shape (2) C	47. Size (2) 24"	48. Center Cover Size	49. Size Width (2) 24"
50. Cover Material (2) CAS	51. Hole Diameter (Vent) (2) N/A	52. Hole Number (2) Ø	53. Bearing Surface Diameter (2) 23 1/2"	
54. Bearing Surface Width (2) 1/2"	55. Cover/Frame Fit (2) G		56. Cover Condition (1,2) G	

Cover Insert

57. Insert Type (2) N	58. Cover Insert Condition (2)
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Cover Adjustment Ring

59. Ring Type (1, 2) A	60. Ring Material (2) CAS	61. Ring Condition (1,2) BROKEN	62. Ring Height
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Frame

63. Frame Material (2) CAS	64. Bearing Surface Width (2) 3/4"	65. Bearing Surface Depth (2) 1/4"	66. Clear Opening Diam (2) 22"
67. Clear Opening Width (2) 22"	68. Frame Condition (1,2) SOUND	69. Seal Condition (2) N/A	70. Offset Distance (2) Ø
71. Seal Inflow (2) IS	72. Frame Depth		

Chimney

73. Chimney Present (2) Y	74. First Material (2) CR	75. Second Material	76. Chimney I/I	77. Clear Opening
78. Chimney Depth (2) 28"	79. Lining Interior	80. Lining Exterior	81. Chimney Condition (1) S	

Cone

82. Type (2) N	83. Material (2)	84. Depth (2)	85. Lining Interior	86. Lining Exterior	87. Cone Condition (1)
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Wall

88. Wall Diameter (Length)	89. Wall by Size (Width)	90. Material (2) CR	91. Depth (2) 43 3/4"
92. Wall Lining Interior	93. Wall Lining Exterior	94. Wall Condition (1) D	

Bench

95. Bench Present (2) Y	96. Bench Material (2) CN	97. Bench Lining	98. Bench Condition (1)
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Channel

99. Channel Installed (2) Y	100. Channel Material (2) CN	101. Type (2) F	102. Exposure (2) F	103. Channel Condition (1)
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Steps

104. Number (2) Ø	105. Material (2)
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Additional Component Information

106. Additional Component Information 94 Cracks; Spalling. 98 & 103 UNABLE TO VIEW DUE TO MUD.

Pipe Connections

107. Pipe No. (2)	108. Clock Pos (2)	109. Rim to Invert (2)	110. Direction (2)	111. Material (2)	112. Shape (2)	113. Height (Diam) (2)	114. Width (2)	115. Cond (2)	116. Seal Cond (2)	117. Pipe Type (2)	118. Struct ID	119. Comment
1	6:00	49'	O	VCP	C	8"	8"	S	S	GR		
2	12:00	48 1/2'	I	VCP	C	8"	8"	S	S	GR		

1= Mandatory Level 1 Inspection Required, 2= Mandatory Level 2 Inspection Required



MACP Inspection Form

Header Section

General Information

1. Surveyed By (1,2) HB, RH	2. Certificate Number (1,2) U-0917-07009262/9350	3. Reviewed By	4. Reviewer Certificate No.
5. Owner	6. Customer	7. P/O Number	8. Work Order
9. Media Label	10. Project	11. Date (1,2) 20200324	12. Time
13. Sheet Number (1,2) 1	14. Weather	15. Pre-Cleaning (2) L	16. Date Cleaned YYYYMMDD
17. Purpose of Survey (1,2) D	18. Inspection Level (1,2) 2	19. Inspection Status (1,2) RI	20. Consequence of Failure

Location

21. Drainage Area	22. MH/Access Point No. (1,2) 5115	23. Street (1,2) 11902 SE TIFFANY	24. City (1,2) JUPITER
25. Location Code (2) C	26. Surface Type (2) ASPHALT	27. Inflow Potential from Runoff	
28. Location Details			

Manhole

29. MH Use (2) SS	30. Access Type (1,2) AMH	31. Year Constructed YYYY
32. Year Renewed YYYY	33. Evidence of Surcharge (2) N	

Measurements

34. Rim to Invert (2)	35. Rim to Grade (2) 0	36. Grade to Invert (2)	37. Rim to Grade Exposed
38. Northing*	39. Easting*	40. Elevation**	41. Coordinate System*
42. Vertical Datum**		43. GPS Accuracy	

44. Additional Information

UNABLE TO MEASURE INVERT DUE TO MUD IN MH.

* Information required if Northing, Easting or Coordinate System data is recorded.

** Information required if Elevation or Vertical Datum data is recorded.

Red Font Fields = Mandatory, Black Font Fields = Optional

Defects:

- Split adjustment ring.

Recommendations:

- Heavy pressure cleaning.
- Install complete interior lining system.
- Replace pipe connections and reseal as necessary (in tandem with gravity sewer replacement).
- Install inflow protector.
- Reforming of bench and channel in tandem with installation of liner.
- Install new cover/adjustment ring.



MACP Inspection Form Manhole Component Observation Section

Cover

45. Type (2) SOLID	46. Shape (2) C	47. Size (2) 24"	48. Center Cover Size	49. Size Width (2) 24"
50. Cover Material (2) CAS	51. Hole Diameter (Vent) (2) N/A	52. Hole Number (2) 0	53. Bearing Surface Diameter (2) 23 1/2"	
54. Bearing Surface Width (2) 1/2"	55. Cover/Frame Fit (2) G		56. Cover Condition (1,2) G	

Cover Insert

57. Insert Type (2) N	58. Cover Insert Condition (2)
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Cover Adjustment Ring

59. Ring Type (1, 2) A	60. Ring Material (2) CAS	61. Ring Condition (1,2) BROKEN	62. Ring Height
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Frame

63. Frame Material (2) CAS	64. Bearing Surface Width (2) 3/4"	65. Bearing Surface Depth (2) 1 1/4"	66. Clear Opening Diam (2) 22"
67. Clear Opening Width (2) 22"	68. Frame Condition (1,2) SOUND	69. Seal Condition (2) N/A	70. Offset Distance (2) 0
71. Seal Inflow (2) IS	72. Frame Depth		

Chimney

73. Chimney Present (2) Y	74. First Material (2) CR	75. Second Material	76. Chimney I/I	77. Clear Opening
78. Chimney Depth (2)	79. Lining Interior	80. Lining Exterior	81. Chimney Condition (1) S	

Cone

82. Type (2) N	83. Material (2)	84. Depth (2)	85. Lining Interior	86. Lining Exterior	87. Cone Condition (1)
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Wall

88. Wall Diameter (Length)	89. Wall by Size (Width)	90. Material (2) CR	91. Depth (2)
92. Wall Lining Interior	93. Wall Lining Exterior	94. Wall Condition (1) S	

Bench

95. Bench Present (2) Y	96. Bench Material (2) CN	97. Bench Lining	98. Bench Condition (1) S
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Channel

99. Channel Installed (2) Y	100. Channel Material (2) CN	101. Type (2) F	102. Exposure (2) F	103. Channel Condition (1) S
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Steps

104. Number (2) 0	105. Material (2)
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Additional Component Information

106. Additional Component Information UNABLE TO GET MEASUREMENTS DUE TO RING BEING BROKEN.

Pipe Connections

107. Pipe No. (2)	108. Clock Pos (2)	109. Rim to Invert (2)	110. Direction (2)	111. Material (2)	112. Shape (2)	113. Height (Diam) (2)	114. Width (2)	115. Cond (2)	116. Seal Cond (2)	117. Pipe Type (2)	118. Struct ID	119. Comment
1			D	VCP	C			S	S	GR		
2			I	VCP	C			S	S	GR		
3			I	VCP	C			S	S	GR		

1 = Mandatory Level 1 Inspection Required, 2 = Mandatory Level 2 Inspection Required