

Invitation for Bids

IFB-083-23-JJ

**INFLOW/INFILTRATION (I/I) EXCAVATED POINT REPAIRS
ESSD Project No. 7106A
FOR THE
CITY OF HOLLYWOOD, FLORIDA (CITY)**

IFB Issue Date: April 27, 2023
Questions Due Date: May 24, 2023
Submittal Due Date: May 31, 2023, at 3 p.m. ET

CITY OF HOLLYWOOD
IFB-083-23-JJ
INFLOW/INFILTRATION (I/I) EXCAVATED POINT REPAIRS
Project No. 7106A

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SECTION I – INTRODUCTION

1.1 **Purpose**

The City of Hollywood, Florida (City) is seeking bids from qualified and experienced firms, hereinafter referred to as the Contractor or Bidder, to provide work under this Contract consists of performing sanitary sewer repairs and grouting abandoned sewer pipes and installations; provides temporary sanitary sewer service laterals, bypass pumping/or plugging and other miscellaneous items for completed project for the City, in accordance with the terms, conditions, and specifications contained in this solicitation. Responses to this solicitation are due by **May 31, 2023, by 3:00 PM EST**, and will be opened in a virtual public setting on **May 31, 2023, at 3:00 PM EST** at **<https://opengov.com>**

Submittals shall be received electronically through OpenGov.

Submittals shall be considered an offer on the part of the bidder/proposer, which offer shall be deemed accepted upon approval of the City, and in case of default, the City reserves the right to accept or reject any or all bids/proposals, to waive irregularities and technicalities, and request new bids/proposals. The City also reserves the right to award any resulting agreement as it deems will best serve the interests of the city.

1.2 **Pre-bid Conference and/or Site Visit (Not Applicable)**

There will not be a pre-bid conference or site visit for this solicitation.

Please keep in mind that site visits at other times might not be available. It is the sole responsibility of the Contractor to become familiar with the scope of the City's requirements prior to submitting a bid. No variation in price or conditions shall be permitted based upon a claim of ignorance. Submission of a bid will be considered evidence that the Bidder has familiarized themselves with the nature and extent of the work, equipment, materials, and labor required.

1.3 **OpenGov**

The City of Hollywood uses OpenGov (<https://procurement.opengov.com/portal/hollywoodfl>) to administer the competitive solicitation process, including but not limited to soliciting bids, issuing addenda, posting results and issuing notification of an intended decision.

The City shall not be responsible for a Bidders inability to submit a bid by the bid end date and time for any reason, including issues arising from the use of OpenGov.

1.4 **Point of Contact**

For information concerning procedures for responding to this solicitation, contact the Point of Contact within the Office of Procurement Services, Jean Joinville, Senior Purchasing Agent at jjoinville@hollywoodfl.org or by phone at (954) 921-3224, or Staci Alli, Office Assistant I at salli@hollywoodfl.org or by phone at 954-921-3222. Such contact is to be for clarification purposes only. All questions must be submitted in writing via OpenGov by **May 24, 2023, by 5:00 PM EST** in order to receive a response.

Project Manager: Giselle Hipolito, Department of Public Utilities, email: ghipolito@hollywoodfl.org or by phone: (954) 924-2985.

For information concerning technical specifications, please utilize the question / answer feature provided by OpenGov at <https://procurement.opengov.com/portal/hollywoodfl>. Questions of a material nature must be received prior to the cut-off date specified in the solicitation schedule. Material changes, if any, to the scope of services or bidding procedures will only be transmitted by written addendum. (See addendum section of OpenGov Site). Bidders please note: No part of

your bid can be submitted via FAX. No variation in price or conditions shall be permitted based upon a claim of ignorance. Submission of a bid will be considered evidence that the Bidder has familiarized themselves with the nature and extent of the work, and the equipment, materials, and labor required. The entire bid response must be submitted in accordance with all specifications contained in this solicitation. The questions and answers submitted in OpenGov shall become part of any contract that is created from this solicitation.

It is the sole responsibility of the Bidder to ensure that their bid is submitted electronically through OpenGov at <https://procurement.opengov.com/portal/hollywoodfl>.

1.5 Cone of Silence

The City of Hollywood City Commission adopted Ordinance No. O-2007-05, which created Section 30.15(F) imposing a Cone of Silence for certain City purchases of goods and Services.

The Cone of Silence refers to limits on communications held between vendors and vendor's representatives and City elected officials, management and staff during the period in which a Formal Solicitation is open.

The Ordinance does allow potential vendors or vendor's representatives to communicate with designated employees for the limited purpose of seeking clarification or additional information. The names and contact information of those employees that may be contacted for clarification or additional information are included in the solicitation.

The Cone of Silence does not prohibit a vendor or vendor's representative from communicating verbally, or in writing with the City Manager, the City Manager's designee, the City Attorney or the City Attorney's designee on those procurement items to be considered by the City Commission.

The Cone of Silence does not prohibit a vendor or vendor's representative from making public presentations at a duly noticed pre-bid conference or duly noticed evaluation committee meeting or from communicating with the City Commission during a duly noticed public meeting.

The Cone of Silence shall be imposed when a formal competitive solicitation has been issued and shall remain in effect until an award is made, a contract is approved, or the City Commission takes any other action which ends the solicitation.

To view the Cone of Silence, go to the City of Hollywood Code of Ordinance online, and view [Section 30.15F](#).

All communications regarding this bid should be sent in writing to the Procurement Services Division as identified in this bid.

END OF SECTION

SECTION II - SPECIAL TERMS AND CONDITIONS

2.1 **Addenda, Changes, and Interpretations**

It is the sole responsibility of each firm to notify the Point of Contact utilizing the question / answer feature provided by OpenGov and request modification or clarification of any ambiguity, conflict, discrepancy, omission or other error discovered in this competitive solicitation. Requests for clarification, modification, interpretation, or changes must be received prior to the Question and Answer (Q & A) Deadline. Requests received after this date may not be addressed. Questions and requests for information that would not materially affect the scope of services to be performed or the solicitation process will be answered within the question / answer feature provided by OpenGov and shall be for clarification purposes only. Material changes, if any, to the scope of services or the solicitation process will only be transmitted by official written addendum issued by the City and uploaded to OpenGov as a separate addendum to the solicitation. Under no circumstances shall an oral explanation given by any City official, officer, staff, or agent be binding upon the City and should be disregarded. All addenda are a part of the competitive solicitation documents and each firm will be bound by such addenda. It is the responsibility of each to read and comprehend all addenda issued.

2.2 **Dimensions, Quantities and Subsurface Information**

Dimensions, quantities, and subsurface information supplied by the City are in no way warranted to indicate true amounts or conditions. Bidders/Contractors shall neither plead misunderstanding or deception nor make claims against the City if the actual amounts, conditions, or dimensions do not conform to those stated. Any "Outside" reports made available by the Engineer are neither guaranteed as to accuracy or completeness, nor a part of the Contract Documents.

2.3 **Trench Safety Form**

The Trench Safety Form included in the Bid Documents must be completed and signed. Noncompliance with this requirement may invalidate the bid.

2.4 **Changes and Alterations**

Bidder may change or withdraw a Bid at any time prior to Bid submission deadline; however, no oral modifications will be allowed. Modifications shall not be allowed following the Bid deadline.

2.5 **Bidder's Costs**

The City shall not be liable for any costs incurred by Bidders in responding to this solicitation.

2.6 **Pricing/Delivery**

All pricing must include delivery and installation and be quoted FOB: Destination, unless specified otherwise in Section III.

2.7 **Price Validity**

Prices provided in this solicitation shall be valid for at least One-Hundred and Twenty (120) days from time of solicitation opening unless otherwise extended and agreed upon by the City and Bidder.

2.8 **No Exclusive Contract**

Bidder agrees and understands that the contract shall not be construed as an exclusive arrangement and further agrees that the City may, at any time, secure similar or identical services from another vendor at the City's sole option.

2.9 **Responsive**

In order to be considered responsive to the solicitation, the firm's bid shall fully conform in all material respects to the solicitation and all of its requirements, including all form and substance.

2.10 Responsible

In order to be considered as a responsible firm, firm shall be fully capable to meet all of the requirements of the solicitation and subsequent contract, must possess the full capability, including financial and technical, to perform as contractually required, and must be able to fully document the ability to provide good faith performance.

2.11 Minimum Qualifications

To be eligible for award of a contract in response to this solicitation, the Bidder must demonstrate that they have successfully completed services, as specified in Section III of this solicitation, are normally and routinely engaged in performing such services, and are properly and legally licensed (if required) to perform such work. Bidder must possess, and be able to provide the City with any and all required Federal, State, County and/or municipal licenses, and occupational licenses. Bidder must be able to provide proof of valid licensing for all subcontractors and/or material suppliers hired by the contractor, if requested. In addition, the Bidder must have no conflict of interest with regard to any other work performed by the Bidder for the City.

2.12 Award of Contract

Award may be in the aggregate, or by line item, or by group, whichever is determined to be in the best interest of the City.

The Contract will be awarded only to a Bidder, who in the opinion of the **Engineer**, is fully qualified to undertake the work, quoting the lowest price, for that product/service that will best serve the needs of the City. The City reserves the right before awarding the Contract to require a Bidder to submit such evidence of his qualifications as it may deem necessary and may consider any available evidence of his financial status, technical qualifications, and other qualifications and abilities.

The City also reserves the right to accept or reject any or all bids, part of bids, and to waive minor irregularities or variations to specifications contained in bids, and minor irregularities in the bidding process. The City also reserves the right to award the contract on a split order basis, lump sum basis, individual item basis, or such combination as shall best serve the interest of the City.

2.13 Execution Of Contract

The Bidder to whom the Contract is awarded shall, within ten days of the date of award, execute and deliver three (3) copies of the following to the Engineer.

- A. The Contract
- B. Performance and Payment Bond
- C. Evidence of required Insurance
- D. Proof of authority to execute the Contract
- E. Proof of authority to execute the Bond on behalf of the Awardee
- F. List of Subcontractors, estimated Contract Value for each and proof that such subcontractors possess all required Federal, State, County and/or municipality licenses, including but not limited to certified of competency and occupational license

The above documents must be furnished, executed and delivered before the Contract will be executed by the City. The Contract shall not be binding upon the City until it has been executed by the City and a copy of such fully executed Contract is delivered to the Contractor.

2.14 Failure To Execute Contract, Bid Guaranty Forfeited

Should the Bidder to whom the Contract has been awarded refuse or fail to complete the requirements

of Section 2.13 above within ten (10) days after Notice of Award, the additional time in days (including weekends) required to CORRECTLY complete the documents will be deducted, in equal amount, from the Contract Time, or the City may elect to revoke the Award. The Bid Guaranty of any Bidder failing to execute the awarded Contract shall be retained by the City and the Contract awarded as the Commission desires.

2.15 Manufacturer/Brand/Model Specific Request

This is a manufacturer/brand/model specification. No substitutions will be allowed unless specified in Form 3 or Attachment D, – Technical Specifications.

2.16 Permits and Fees Refer to Attachment D – Technical Specifications (Section 01025 Basis of Payment)

2.17 Contract Security

When the awarded bidder delivers the executed contract to the City, it must be accompanied by the required bonds.

2.18 Contract Period

The initial contract term shall commence upon date of award by the City for a two (2) year term. The City reserves the right to renew the contract for two (2) additional one (1) year periods providing all terms, conditions and specifications remain the same, both parties agree to the renewal, and such renewal is approved by the City. In the event services are scheduled to end because of the expiration of this contract, the Contractor shall continue the service upon the request of the City as authorized by the awarding authority. The extension period shall not extend for more than 120 days beyond the expiration date of the existing contract. The Contractor shall be compensated for the service at the rate in effect when this extension clause is invoked by the City.

2.19 Bid Guaranty

A Bid Guaranty in the form of a Cashier's Check, Certified Check or Bid Bond executed by the Bidder and a qualified Surety in the amount of 5% of the Bid is required for this project.

2.20 Warranties of Usage

Any estimated quantities listed are for information and tabulation purposes only. No warranty or guarantee of quantities needed is given or implied. It is understood that the Contractor will furnish the City's needs as they arise.

2.21 Rules and Submittals of Bids

The signer of the bid must declare that the only person(s), company or parties interested in the proposal as principals are named therein; that the bid is made without collusion with any other person(s), company or parties submitting a bid; that it is in all respects fair and in good faith, without collusion or fraud; and that the signer of the bid has full authority to bind the principal bidder.

2.22 Tie Breaker

In cases where there is a tie for the bid award, the award shall be made by giving preference to the low bidder(s) with the following items (in this order): (1) maintenance of a drug-free workplace in accordance with the requirements of Florida Statutes Section 287.087, (2) local Hollywood vendor preference, (3) closest proximity/location to project site or City Hall, and/or (4) minority-owned or disadvantaged business status. If a tie still exists after the aforementioned tiebreakers are utilized, the Chief Procurement Officer will make a recommendation for award among the tied bidders.

2.23 Conflict of Interests Prohibited

Any respondent submitting a response to this solicitation is responsible for being aware of, and complying with [Section 34.02](#) of the City Code of Ordinances. If you have questions concerning

whether you may or may not need to comply with the ordinance, please contact the City of Hollywood, City Clerk's Office at 954-921-3211.

2.24 Protest Procedure

Any respondent who is not recommended for award of a contract and who alleges a failure by the City to follow the City's [Procurement Code](#) or any applicable law may protest to the CPO, by delivering a letter of protest to the CPO in accordance with [Section 38.52](#) of the City's [Procurement Code](#) within five days after a notice of intent to award is posted on the City's web site, OPENGOV, City Clerk's Office, Open Government, and/or City's Sunshine Board (<https://www.hollywoodfl.org/Archive.aspx?AMID=140>).

2.25 Insurance Requirements

Contractor shall maintain, at its sole expense, during the term of this agreement the following insurances:

The insurance policy shall not contain any exceptions that would exclude coverage for risks that can be directly or reasonably related to the scope of goods or services in this bid/proposal. A violation of this requirement at any time during the term, or any extension thereof shall be grounds for the immediate termination of any contract entered in to pursuant to this bid/proposal. In order to show that this requirement has been met, along with an insurance declaration sheet demonstrating the existence of a valid policy of insurance meeting the requirements of this bid/proposal, the successful proposer must submit a signed statement from insurance agency of record that the full policy contains no such exception.

The insurance required by Article 5.6 of the General Conditions shall be as follows:

Any Sub-Contractor used by the contractor shall supply such similar insurance required of the contractor. Such certificates shall name the City of Hollywood as an Additional Insured.

1. BUILDERS RISK (BR 1) - Installation Floater: (Not Applicable)

2. Insurance Requirements

1. BUILDERS RISK (BR 1) - Installation Floater: (Not Applicable)

2. GENERAL LIABILITY (GL3):

Prior to the commencement of work governed by this contract, the Contractor shall obtain General Liability Insurance. Coverage shall be maintained throughout the life of the contract and include, as a minimum:

- Premises Operations
- Products and Completed Operations
- Blanket Contractual Liability
- Personal Injury Liability
- Expanded Definition of Property Damage

The minimum limits acceptable shall be:

\$2,000,000 Combined Single Limit (CSL)

If split limits are provided, the minimum limits acceptable shall be:

\$1,000,000 per Person

\$2,000,000 per Occurrence

\$100,000 Property Damage

An Occurrence Form policy is preferred. If coverage is provided on a Claims Made policy, its provisions should include coverage for claims filed on or after the effective date of this contract. In addition, the period for which claims may be reported should extend for a minimum of twelve (12) months following the acceptance of work by the City.

The City of Hollywood shall be named as Additional Insured on all policies issued to satisfy the above requirements.

3. GENERAL LIABILITY (GLXCU):

Recognizing that the work governed by this contract involves either underground exposures, explosive activities, or the possibility of collapse of a structure, the Contractor's General Liability Policy shall include coverage for the XCU (explosion, collapse, and underground) exposures with limits of liability equal to those of the General Liability Insurance policy.

4. VEHICLE LIABILITY (VL3):

Recognizing that the work governed by this contract requires the use of vehicles, the Contractor, prior to the commencement of work, shall obtain Vehicle Liability Insurance. Coverage shall be maintained throughout the life of the contract and include, as a minimum, liability coverage for:

- Owned, Non-Owned, and Hired Vehicles The minimum limits acceptable shall be:

\$1,000,000 Combined Single Limit (CSL)

If split limits are provided, the minimum limits acceptable shall be:

\$500,000 per Person
\$1,000,000 per Occurrence
\$100,000 Property Damage

The City of Hollywood shall be named as Additional Insured on all policies issued to satisfy the above requirements.

5. WORKERS' COMPENSATION (WC2):

Prior to the commencement of work governed by this contract, the Contractor shall obtain Workers' Compensation Insurance with limits sufficient to respond to the applicable state statutes.

In addition, the Contractor shall obtain Employers' Liability Insurance with limits of not less than:

\$500,000 Bodily Injury by Accident
\$500,000 Bodily Injury by Disease, policy limits
\$500,000 Bodily Injury by Disease, each employee

Coverage shall be maintained throughout the entire term of the contract.

6. POLLUTION LIABILITY INSURANCE

The minimum limits of liability shall be:

\$1,000,000 per each claim / \$2,000,000 aggregate

Coverage shall be provided by a company or companies authorized to transact business in the state of Florida and the company or companies must maintain a minimum rating of "A" and Class X, as assigned by the A.M. Best Company.

The policy must be endorsed to provide the City with (30) days' notice of cancellation.

If the Contractor has been approved by the Florida's Department of Labor, as an authorized self-insurer, the City shall recognize and honor the Contractor's status. The Contractor may be required to submit a Letter of Authorization issued by the Department of Labor and a Certificate of Insurance, providing details on the Contractor's Excess Insurance Program.

If the Contractor participates in a self-insurance fund, a Certificate of Insurance will be required. In addition, the Contractor may be required to submit updated financial statements from the fund upon request from the City.

Any sub-consultant shall supply such similar insurance required of the Consultant. Such certificates shall name the City as additional insured in the general liability and auto liability policies.

2.26 Uncontrollable Circumstances (Force Majeure)

The City and Contractor will be excused from the performance of their respective obligations under this agreement when and to the extent that their performance is delayed or prevented by any circumstances beyond their control including, fire, flood, explosion, strikes or other labor disputes, acts of God or public emergency, war, riot, civil commotion, malicious damage, act or omission of any governmental authority, delay or failure or shortage of any type of transportation, equipment, or service from a public utility needed for their performance, provided that:

2.26.1 The non performing party gives the other party prompt written notice describing the particulars of the Force Majeure including, but not limited to, the nature of the occurrence and its expected duration, and continues to furnish timely reports with respect thereto during the period of the Force Majeure;

2.26.2 The excuse of performance is of no greater scope and of no longer duration than is required by the Force Majeure; and

2.26.3 No obligations of either party that arose before the Force Majeure causing the excuse of performance are excused as a result of the Force Majeure; and

2.26.4 The non-performing party uses its best efforts to remedy its inability to perform. Notwithstanding the above, performance shall not be excused under this Section for a period in excess of two (2) months, provided that in extenuating circumstances, the City may excuse performance for a longer term. Economic hardship of the Contractor will not constitute Force Majeure. The term of the agreement shall be extended by a period equal to that during which either party's performance is suspended under this Section.

2.27 Supplier Portal (Oracle) Payment Method

The City has implemented software that contains a supplier portal allowing suppliers to submit and update their information via the supplier portal. New suppliers will be required to register; and current suppliers will need to confirm and update their information.

Firms are responsible for ensuring that all contact, payment, and general information is updated at all times, and will not hold the City liable for any inaccurate information.

2.28 Debarred or Suspended Bidders or Proposers

Firm(s) certifies, by submission of a response to this solicitation, that neither it nor its principals and subcontractors are presently debarred or suspended by any federal, state, county or municipal department or agency.

2.29 Payment and Performance Bond

A Performance Bond and a Payment Bond each equal to 100 percent of the total Bid will be required of the Awardee. The Bond must be written through a company licensed to do business in the State of Florida and be rated at least "A", Class X, in the latest edition of "Best's Key Rating Guide", published by A.M. Best Company. As per Florida Statute Section 255.05, the Contractor shall be required to record the payment and performance bonds in the public records of Broward County

2.30 Public Records

A. Public Records/Trade Secrets/Copyright:

All responses will become the property of the City. The Consultant's response to the solicitation is a public record pursuant to Florida law and is subject to disclosure by the City pursuant to Chapter 119.07, Florida Statutes ("Public Records law"). The City shall permit public access to all documents, papers, letters or other material submitted in connection with this solicitation and the Contract to be executed for this solicitation, subject to the provisions of Chapter 119, Florida Statutes.

Any language contained in the Consultant's response to the solicitation purporting to require confidentiality of any portion of the Consultant's response to the solicitation, except to the extent that certain information is in the City's opinion a Trade Secret pursuant to Florida law, shall be void. If a Consultant submits any documents or other information to the City that the Consultant claims is Trade Secret information and exempt from Florida Statutes Chapter 119.07 ("Public Records Laws"), the Consultant shall clearly designate that it is a Trade Secret and that it is asserting that the document or information is exempt. The Consultant must specifically identify the exemption being claimed under Florida Statutes 119.07. The City shall be the final arbiter of whether any information contained in the Consultant's response to the solicitation constitutes a Trade Secret. The City's determination of whether an exemption applies shall be final, and the Consultant agrees to defend, indemnify, and hold harmless the City and the City's officers, employees, and agent, against any loss or damages incurred by any person or entity as a result of the City's treatment of records as public records. In the event of Contract award, all documentation produced as part of the Contract shall become the exclusive property of the City. Proposals purporting to be subject to copyright protection in full or in part will be rejected.

EXCEPT FOR CLEARLY MARKED PORTIONS THAT ARE BONA FIDE TRADE SECRETS PURSUANT TO FLORIDA LAW, DO NOT MARK YOUR RESPONSE TO THE SOLICITATION AS PROPRIETARY OR CONFIDENTIAL. DO NOT MARK YOUR RESPONSE TO THE SOLICITATION OR ANY PART THEREOF AS COPYRIGHTED.

B. PUBLIC RECORDS GENERAL

IF THE CONSULTANT HAS QUESTIONS REGARDING THE APPLICATION OF CHAPTER 119, FLORIDA STATUTES, TO THE CONSULTANT'S DUTY TO PROVIDE PUBLIC RECORDS RELATING TO THIS CONTRACT, CONTACT THE CUSTODIAN OF PUBLIC RECORDS AT: (954-921-3211), pcerny@hollywoodfl.org, CITY CLERK'S OFFICE, 2600 HOLLYWOOD BLVD, HOLLYWOOD, FLORIDA 33020)

Consultant shall:

1. Keep and maintain public records that ordinarily and necessarily would be required by the City in order to perform the service.
2. Upon request from the City's custodian of public records, provide the City with a copy of the requested records or allow the records to be inspected or copied within a reasonable time at a cost that does not exceed the cost provided in Chapter 119, Florida Statutes.
3. Ensure that public records that are exempt or confidential and exempt from public records disclosure requirements are not disclosed except as authorized by law for the duration of the contract term and following completion of this contract if the Consultant does not transfer the records to the City.
4. Upon completion of the Contract, transfer, at no cost, to the City all public records in possession of the Consultant or keep and maintain public records required by the City to perform the service. If the Consultant transfers all public records to the City upon completion of this Contract, the Consultant shall destroy any duplicate public records that are exempt or confidential and exempt from public records disclosure requirements. If the Consultant keeps and maintains public records upon completion of this Contract, the Consultant shall meet all applicable requirements for retaining public records. All records stored electronically must be provided to the City, upon request from the City's custodian of public records, in a format that is compatible with the information technology systems of the City. It is solely and exclusively the Contractor's responsibility to familiarize itself with Chapter 119, Florida Statutes, and to ensure compliance with its requirements.

2.31 Local Preference

When the lowest responsive responsible bidder is a non-Hollywood business and a responsive responsible local Hollywood vendor's Bid is within 5% of the Bid submitted by the lowest responsive responsible bidder, the local vendor is allowed to submit a second Bid. The second bid from the local Hollywood bidder must be lower than the bid submitted by the lowest responsive and responsible non-Hollywood bidder by at least 1% in order for the bid to be awarded to the local Hollywood bidder. If more than one responsive and responsible local Hollywood vendor is within 5%, each would be permitted to submit a best and final offer and the local Hollywood vendor submitting the lowest bid will be awarded the contract; provided, however, if none of the local Hollywood vendors bids are lower than the lowest responsive and responsible non-Hollywood bidder by at least 1%, the non- Hollywood bidder will be awarded the contract.

END OF SECTION

SECTION III - SCOPE OF SERVICES

3.1 Project Description

Work under this Contract consists of performing sanitary sewer repairs and grouting abandoned sewer pipes and installations; provides temporary sanitary sewer service laterals, bypass pumping/or plugging and other miscellaneous items for completed project.

The Contractor agrees to cooperate and work with other projects in the same construction area

3.2 Technical Specifications

Refer to Appendix D.

3.3 Contractor Qualifications

The contract will be awarded only to a responsive contractor qualified by experience to do the Work specified. The bidder shall submit, prior to award of contract, satisfactory evidence of his experience in like Work and that he is fully prepared with the necessary organization, capital, equipment and machinery to complete the Work to the satisfaction of the City within the time limit stated. In addition to the above, the Contractor shall satisfy the following criteria:

The Bidder shall have successfully completed a minimum of three (3) projects demonstrating experience with Excavation Point Repairs. These projects shall have been performed within the past two (2) years from the date of the Invitation to Bid.

The Bidder shall have a minimum of five years previous experience in the work required in this section. The determination of whether a project is sufficiently similar shall be at the sole discretion of the City and the Engineer.

Form 15 – Information Required from Bidders, shall be completed fully and accurately by the Contractor and submitted with the bid. Information included on the questionnaire will be used in evaluating the qualifications of the Contractor. The City reserves the right to request additional information not identified on the questionnaire.

3.4 Subcontractors

For the City to be assured that only competent and qualified subcontractors will be employed on this project, each Bidder shall submit in the bid a list of the subcontractors performing work on this project. This subcontractors list shall include each firm's name, address, telephone number, contact person and work to be performed. Subcontractors shall be properly registered or licensed with the State of Florida, Broward County and the City of Hollywood. Subcontractors shall, in the City's opinion, be qualified both technically and financially to perform the work.

The City reserves the right to reject any subcontractor who is deemed by the City to be unacceptable technically or financially, or has previously performed work which the City believes to be unsatisfactory. No change may be made to this list of subcontractors by the Contractor, before or after contract award, without the express written consent of the City.

If, prior to award, the City rejects any subcontractor, the Contractor shall be afforded the opportunity to submit qualifications for an alternate subcontractor with no attendant increase in the base lump sum bid amount, adjustment of contract time or alteration of the bid documents. Such qualifications will be due within ten (10) days of receipt of notification of subcontractor rejection. Failure to submit an acceptable alternate subcontractor may result in rejection of the bid. In this event, the bid bond shall be returned to Contractor without claim by the City and with forfeiture of all claim rights by the Contractor.

- 3.5 **Deliverables and Objectives**
Refer to Attachment B General Conditions, Attachment C Supplementary General Conditions, Attachment D Technical Specifications and Attachment E Drawings.
- 3.6 **Project Schedule / Timeline**
Refer to Appendix C, Supplementary conditions, Section 1, Project Schedule.
- 3.7 **Questions**
Refer to Form 15, Information Required from Bidders.
- 3.8 **Substantial Completion**
Refer to Appendix C, Supplementary conditions, Section 1, Project Schedule.

END OF SECTION

SECTION IV – GENERAL TERMS AND CONDITIONS

1.1 INTENT

It is the policy of the City to encourage full and open competition among all available qualified vendors. All vendors regularly engaged in the type of Work specified in the Bid Solicitation are encouraged to submit bids. To receive notification and to be eligible to bid vendor should be registered with OpenGov. Vendors may register with the OpenGov (registration is free) to be included on a mailing list for selected categories of goods and Services. In order to be processed for payment, any awarded vendor must register with the City by completing and returning a Vendor Application and all supporting documents. For information and to apply as a vendor, please visit our website at hollywoodfl.org to download an application and submit it to Procurement Services Division.

It is the intent of the City of Hollywood, FL (“the City”), through this solicitation and the contract conditions contained herein, to establish to the greatest possible extent complete clarity regarding the requirements of both parties to the agreement resulting from this solicitation.

Before submitting a bid, the Vendor shall be thoroughly familiarized with all contract conditions referred to in this document and any addenda issued before the bid/proposal submission date. Such addenda shall form a part of the SOLICITATION and shall be made a part of the contract. It shall be the Vendor's responsibility to ascertain that the bid/proposal includes all addenda issued prior to the bid/proposal submission date. Addenda will be posted on the City's internet site along with the SOLICITATION.

The terms of the SOLICITATION and the selected Vendor's bid and any additional documentation (e.g. questions and answers) provided by the Vendor during the solicitation process will be integrated into the final contract for services entered into between the City and the selected Vendor. The Vendor shall determine, by personal examination and by such other means as may be preferred, the conditions and requirements under which the agreement must be performed.

1.2 PROPOSER'S RESPONSIBILITIES

Proposers are required to submit their bids upon the following express conditions:

- A. Proposers shall thoroughly examine the drawings, specifications, schedules, instructions and all other contract documents.
- B. Proposers shall make all investigations necessary to thoroughly inform themselves regarding delivery of material, equipment or services as required by the SOLICITATION conditions. No plea of ignorance, by the proposer, of conditions that exist or that may hereafter exist as a result of failure or omission on the part of the proposer to make the necessary examinations and investigations, or failure to fulfill in every detail the requirements of the contract documents, will be accepted as a basis for varying the requirements of the City or the compensation due the proposer.
- C. Proposers are advised that all City contracts are subject to all legal requirements provided for in the City of Hollywood Charter, Code of Ordinances and applicable County Ordinances, State Statutes and Federal Statutes.

1.3 PREPARATION OF BIDS/PROPOSALS

Bids/proposals shall be prepared in accordance with the bid/proposal response format. Bids/proposals not complying with this format may be considered non-responsive and may be removed from consideration on this basis. Each proposer, by making a bid/proposal, represents that this document has been read and is fully understood.

Bids/proposals will be prepared in accordance with the following:

- A. The City's enclosed bid/proposal Forms, in their entirety, are to be used in submitting your bid/proposal. **NO OTHER FORM WILL BE ACCEPTED.**
- B. All information required by the bid/proposal form shall be furnished. The proposer shall sign each continuation sheet (where indicated) on which an entry is made.
- C. Prices shall be shown and where there is an error in extension of prices, the unit price shall govern.

The City of Hollywood is exempt from payment to its vendors of State of Florida sales tax and, therefore, such taxes should not be figured into the SOLICITATION. However, this exemption does not apply to suppliers to the City in their (supplier) purchases of goods or services, used in work or goods supplied to the City. Proposers are responsible for any taxes, sales or otherwise, levied on their purchases, subcontracts, employment, etc. An exemption certificate will be signed where applicable, upon request. The City will pay no sales tax.

1.4 DESCRIPTION OF SUPPLIES (As Applicable)

Any manufacturer's names, trade names, brand names, or catalog numbers used in these applications are for the purpose of describing and establishing minimum requirements or level of quality, standards of performance, and design required, and are in no way intended to prohibit the bidding of other manufacturers' items of equal material, unless specifications state "NO SUBSTITUTIONS."

Proposers must indicate any variances to the specifications, terms, and conditions, no matter how slight. If variations are not stated in the bid/proposal, it shall be construed that the bid/proposal fully complies with the Specifications, Terms and Conditions.

Proposers are required to state exactly what they intend to furnish; otherwise they shall be required to furnish the items as specified.

Proposers will submit, with their bid/proposal, necessary data (factory information sheets, specifications, brochures, etc.) to evaluate and determine the quality of the item(s) they are proposing.

The City shall be the sole judge of equality and its decision shall be final.

1.5 ADDENDA

The Procurement Services Division may issue an addendum in response to any inquiry received, prior to bid/proposal opening, which changes, adds to or clarifies the terms, provisions or requirements of the solicitation. The Proposer should not rely on any representation, statement or explanation, whether written or verbal, other than those made in this solicitation document or in any addenda issued. Where there appears to be a conflict between this solicitation and any addendum, the last addendum issued shall prevail. It is the proposer's responsibility to ensure receipt of all addenda and any accompanying documents. Proposer(s) shall acknowledge receipt of any formal Addenda by signing the addendum and including it with their bid/proposal. Failure to include signed formal addenda in its bid/proposal shall cause the City to deem the bid/proposal non-responsive provided, however, that the City may waive this requirement in its best interest.

1.6 REJECTION OF BIDS/PROPOSALS

To the extent permitted by applicable state and federal laws and regulations, the City reserves the right to reject any and all bids/proposals, to waive any and all informalities, irregularities and technicalities not involving price, time or changes in the commodities and/or services, and the right to disregard all nonconforming, non-responsive, unbalanced or conditional bids/proposals. Bids/proposals will be considered irregular and may be rejected if they show serious omissions, alterations in form, additions not called for, conditions or unauthorized alterations or irregularities of any kind.

The City also reserves the right to waive minor technical defects in a bid/proposal. The City reserves the right to determine, in its sole discretion, whether any aspect of a bid/proposal satisfies the criteria established in this Solicitation.

The City reserves the right to reject, in whole or in part, the bid/proposal of any Proposer if the City believes that it would not be in the best interest of the City to make an award to that Proposer, whether because the bid/proposal is not responsive or the Proposer is unqualified or of doubtful financial ability or fails to meet any other pertinent standard or criterion established by City.

The foregoing reasons for rejection of bids/proposals are not intended to be exhaustive.

The City may reject a bid/proposal if:

- A. The Proposer fails to acknowledge receipt of an addendum, or if
- B. The Proposer misstates or conceals any material fact in the bid/proposal, or if
- C. The bid/proposal does not strictly conform to the law or requirements of the SOLICITATION, or if

D. The City is under a pre- lawsuit claim or current litigation with the proposer.

Additionally, any one of the following causes (not limited to) may be considered as sufficient justification to disqualify a Bidder and reject his/her Bid:

- A. Submission of more than one Bid for the same work by an individual, firm, partnership or corporation under the same or different names.
- B. Evidence of collusion.
- C. Previous participation in collusive Bidding on work for the City of Hollywood, Florida.
- D. Submission of an unbalanced Bid in which the prices Bid for some items are out of proportion to the prices Bid for other items.
- E. Lack of competency. The Engineer may declare any Bidder ineligible, at any time during the process or receiving Bids or awarding the Contract, if developments arise which, in his opinion, adversely affects the Bidder's responsibility. The Bidder will be given an opportunity, by the Engineer, to present additional evidence before final action is taken.
- F. Lack of responsibility as shown by past work judged by the Engineer from the standpoint of workmanship and progress.
- G. Uncompleted work for which the Bidder is committed by Contract, which is in the judgment of the Engineer, might hinder or prevent the prompt completion of work under this Contract

The City may reject all bids whenever it is deemed in the best interest of the City to do so, and may reject any part of a bid unless the bid has been qualified as provided in herein.

1.7 WITHDRAWAL OF BIDS

- A. Bids may not be withdrawn and shall be deemed enforceable for a period of 180 days after the time set for the SOLICITATION opening.
- B. Bids may be withdrawn prior to the time set for the SOLICITATION opening. Such request must be in writing.
- C. The City will permanently retain as liquidated damages and the bid deposit furnished by any Bidder who requests to withdraw a bid after the SOLICITATION opening.

1.8 BIDS TO REMAIN OPEN

All bids shall remain open for 180 calendar days after the day of the bid opening, but the City may, at its sole discretion, release any bid and return the bid Security prior to that date.

Extensions of time when bids shall remain open beyond the 180 day period may be made only by mutual written agreement between the City, the successful Bidder and the surety, if any, for the successful Bidder.

1.9 LATE BIDS OR MODIFICATIONS

Only bids received as of the opening date and time will be considered timely. Bids and modifications received after the time set for the opening will be returned un-opened to the sender and rejected as late.

1.10 CONFLICTS WITHIN THE SOLICITATION

Where there appears to be a conflict between the General Terms and Conditions, Special Conditions, the Technical Specifications, the SOLICITATION Submittal Section, or any addendum issued, the order of precedence shall be the last addendum issued, the SOLICITATION Submittal Section, the Technical Specifications, the Special Conditions, and then the General Terms and Conditions.

1.11 CLARIFICATION OR OBJECTION TO BID SPECIFICATIONS

If any person contemplating submitting a bid for this contract is in doubt as to the true meaning of the specifications or other SOLICITATION documents or any part thereof, they may submit requests for clarification to the Procurement Services Division on or before the date specified for a request for clarification. All such requests for clarification shall be made in writing and the person submitting the request will be responsible for its prompt delivery. Any interpretation of the SOLICITATION, if made, will be made only by Addendum duly issued. A copy of such Addendum will be made available to each person receiving a Solicitation. The City will not be responsible for any other explanation or interpretation of the SOLICITATION given prior to the award of the contract. Any objection to the specifications and requirements as set forth

in this SOLICITATION must be filed in writing with the Chief Procurement Officer on or before the date specified for a request for clarification.

1.12 COMPETENCY OF PROPOSERS

Pre-award inspection of the Bidder's facility may be made prior to the award of a contract. Bids will be considered only from firms which are regularly engaged in the business of providing the goods and/or services as described in this SOLICITATION(s); have a record of performance for a reasonable period of time; and have sufficient financial support, equipment and organization to ensure that they can satisfactorily deliver the material and/or services if awarded a Contract under the terms and conditions herein stated. The terms "equipment and organization" as used herein shall be construed to mean a fully equipped and well established company in line with the best business practices in the industry and as determined by the proper authorities of the City.

The City may consider any evidence available to it of the financial, technical and other qualifications and abilities of a proposer, including past performance (experience) in making the award in the best interest of the City. In all cases the City of Hollywood shall have no liability to any proposer for any costs or expense incurred in connection with this SOLICITATION or otherwise.

1.13 QUALIFICATIONS OF PROPOSERS

No Bid will be accepted from, nor will any contract be awarded to any person who is in arrears to the City upon any debt or contract, or who is a defaulter, as surety or otherwise, upon any obligation to City, or who is deemed responsible or unreliable by the City.

As part of the bid evaluation process, City may conduct a background investigation including a record check by the Hollywood Police Department. Proposer's submission of a bid constitutes acknowledgment of the process and consent to such investigation. City shall be the sole judge in determining a Bidder's qualifications.

1.14 CONSIDERATION OF BIDS

In cases where an item requested is identified by a manufacturer's name, trade name, catalog number, or reference, it is understood that the Vendor proposes to furnish the item so identified and does not propose to furnish an "equal" unless the proposed "equal" is pre-approved by the City.

References to any of the above are intended to be descriptive but not restrictive and only indicate articles that will be satisfactory. A bid of an "equal" will be considered, provided that the Vendor states in his bid exactly what he proposes to furnish, including sample, illustration, or other descriptive matter which will clearly indicate the character of the article covered by such bid. The designated City representative hereby reserves the right to approve as an "equal", or to reject as not being an "equal", any article proposed which contains major or minor variations from specifications requirements.

1.15 AWARD OF CONTRACT

If the Contract is to be awarded, it will be awarded, after evaluation by the City, to the responsible and responsive Proposer whom the City determines will be in the best interests of the City and not necessarily to the lowest cost Proposer. Proposers may be invited to an oral interview before the committee. A short list of finalists will be determined and presented to either the City Manager or his/her designee or to the City Commission, in accordance with the applicable City of Hollywood Code of Ordinances, and will make the final ranking for the purposes of negotiating a contract with the top ranked firm. The successful Proposer shall be required to sign a negotiated contract; the refusal or failure of a successful Proposer to execute a contract which contains the mandatory material terms and conditions contained in the SOLICITATION, shall be grounds for deeming the Proposer and/or the Proposer's bid/proposal non-responsive.

If applicable, the Proposer to whom award is made shall execute a written contract prior to award by the City Commission. If the Proposer to whom the first award is made fails to enter into a contract as herein provided, the Contract may be let to the next highest ranked Proposer who is responsible and responsive in the opinion of the City.

1.16 BASIS FOR AWARD, EVALUATION CRITERIA AND QUESTIONS

The qualification of bid/proposal responders on this project will be considered in making the award. The City is not obligated to accept any bid/proposal if deemed not in the best interest of the City to do so. The City shall make award to a qualified proposer based on fees submitted and responses to this SOLICITATION.

Failure to include in the bid all information outlined herein may be cause for rejection of the bid.

The City reserves the right to accept or reject any and all bids, in whole or in part, as determined to be in the best interest of the City in its sole discretion.

The City reserves the right to waive any informalities or irregularities in bids.

The City reserves the right to negotiate separately the terms and conditions or all or any part of the bids as deemed to be in the City's best interest in its sole discretion.

Information and/or factors gathered during interviews, negotiations and any reference checks, and any other information or factors deemed relevant by the City, shall be utilized in the final award. The final award of a contract is subject to approval by the City Commission.

1.17 AGREEMENT

An agreement shall be sent to the awarded proposer to be signed, witnessed, and returned to the City for execution. The City will provide a copy of the fully executed agreement to the awarded proposer.

1.18 NOTICE TO PROCEED

A signed purchase order, blanket purchase order or fully executed agreement will be the Proposer's authorization to proceed and may substitute for a "Notice to Proceed" form.

1.19 BID PROTESTS

The City shall provide notice of its intent to award or reject to all Proposers by posting such notice on the City's website.

After a notice of intent to award a contract is posted, any actual or prospective proposer who is aggrieved in connection with the pending award of the contract or any element of the process leading to the award of the contract may protest to the Director of Procurement Services. A protest must be filed within five business days after posting or any right to protest is forfeited. The protest must be in writing, must identify the name and address of the protester, and must include a factual summary of, and the basis for, the protest. Filing shall be considered complete when the protest, including a deposit, is received by the Procurement Services Division. Failure to file a protest within the time-frame specified herein shall constitute a full waiver of all rights to protest the City's decision regarding the award.

The written protest shall state in detail the specific facts and law or ordinance upon which the protest of the proposed award is based, and shall include all pertinent documents.

A written protest may not challenge the relative weight of evaluation criteria or a formula for assigning points.

Upon receipt of a formal written protest, the City shall stop award proceedings until resolution of the protest; unless it has been determined that the award of the contract without delay is necessary to protect substantial interests of the City.

Any and all costs incurred by a protesting party in connection with a bid protest shall be the sole responsibility of the protesting party.

Upon receipt of a protest of the pending award of a contract, a copy of the protest shall promptly be forwarded to the City Attorney. The City Attorney shall thereupon review the charge to determine its sufficiency, including whether the protest was timely filed. If upon review the City Attorney determines that the charge is insufficient, the City Attorney may issue a summary dismissal of the protest. If upon review the City Attorney determines that the charge is sufficient, a hearing of the protest committee shall be scheduled.

A protest committee shall have the authority to review, settle and resolve the protest. The committee shall consist of three members appointed by the City Manager. The committee's review shall be informal.

If the protest committee determines that the pending award of a contract or any element of the process leading to the award involved a significant violation of law or applicable rule or regulation, all steps necessary and proper to correct the violation shall be taken. If the committee determines that the protest is without merit,

The Director shall promptly issue a decision in writing stating the reason for the decision and furnish a copy to the protester and any other interested party, and the process leading to the award shall proceed.

1.20 REQUIREMENTS FOR SIGNING BIDS/PROPOSALS

Requirements for Signing Bid/Proposal:

- A. The bid/proposal must be signed in ink by an individual authorized to legally bind the person, partnership, company, or corporation submitting the bid/proposal. In cases where the bid/proposal is signed by a deputy or subordinate, the principal's proper written grant of authority to such deputy or subordinate must accompany the bid/proposal.
- B. Bids/proposals by corporations must be executed in the corporate name by the President or other corporate officers accompanied by evidence of authority to sign. The corporate address and state of incorporation must be shown below the signature.
- C. Bids/proposals by partnerships must be executed in the partnership name and signed by a general partner whose title must appear under the signature and the official address of the partnership must be shown below the signature.
- D. All manual signatures must have the name typed directly under the line of the signature
- E. The above requirements apply to all SOLICITATION addenda.

1.21 EXAMINATION OF BID DOCUMENTS

Before submitting a bid, each Bidder must: examine the bid Documents thoroughly; consider federal, state and local laws, ordinances, rules and regulations that may in any manner affect cost, progress, performance, or provision of the commodities and/or services; study and carefully correlate Proposer's observations with the bid Documents, and notify the City's agent of all conflicts, errors and discrepancies in the bid Documents.

The submission of a bid/proposal will constitute an incontrovertible representation by the Bidder, that the Bidder has complied with every requirement of this SOLICITATION, that without exception, the bid is premised upon performing the services and/or furnishing the commodities and materials in accordance with such means, methods, techniques, sequences or procedures as may be indicated in or required by the bid/proposal Documents, and that the bid Documents are sufficient in scope and detail to indicate and convey understanding of all terms and conditions of performance and furnishing of the goods and/or services.

1.22 PUBLIC RECORDS LAW

If applicable, for each public agency contract for services, the Proposer is required to comply with F.S. 119.0701, which includes the following:

- A. Keep and maintain public records that ordinarily and necessarily would be required by the public agency in order to perform the service.
- B. Provide the public with access to public records on the same terms and conditions that the public agency would provide the records and at a cost that does not exceed the cost provided in F.S. Chapter 119 or as otherwise provided by law.
- C. Ensure that public records that are exempt or confidential and exempt from public records disclosure requirements are not disclosed except as authorized by law.
- D. Meet all requirements for retaining public records and transfer, at no cost, to the public agency, all public records in possession of the proposer upon termination of the contract and destroy any duplicate public records that are exempt or confidential and exempt from public records disclosure requirements. All records stored electronically must be provided to the public agency in a format that is compatible with the information technology systems of the public agency.

Public records may be inspected and examined by anyone desiring to do so, at a reasonable time, under reasonable conditions, and under supervision by the custodian of the public record. Sealed Bids become subject to the public records disclosure requirements of F.S. Chapter 119, notwithstanding a proposer's request to the contrary, at the time the City provides notice of a decision or intended decision, or 30 days after the bid/proposal opening, whichever is earlier.

Financial statements submitted in response to a request by the City may be confidential and exempt from disclosure.

Data processing software obtained under a licensing agreement which prohibits its disclosure may also exempt.

Proposers are hereby notified and agree that all information submitted as part of, or in support of SOLICITATION submittals will be available for public inspection after opening of SOLICITATION in compliance with Chapter 119 of the Florida Statutes. The proposer shall not, unless required as part of this SOLICITATION, submit any information in response to this invitation which the proposer considers to be a trade secret, proprietary or confidential. The submission, not required as part of this SOLICITATION, of any information to the City in connection with this invitation shall be deemed conclusively to be a waiver of any trade secret or other protection, which would otherwise be available to the proposer.

1.23 INFORMATION

For information concerning procedure for responding to this Solicitation (SOLICITATION), contact the Point of Contact in the Section 1.4. Such contact shall be for clarification purposes only. **It is preferred that all other questions be submitted in writing via OpenGov at least 10 calendar days prior to the bid/proposal due/opening date.**

1.24 N/A – INTENTIONALLY OMITTED

1.25 MODIFICATION AND WITHDRAWAL OF BIDS/PROPOSALS

Bids must be modified or withdrawn 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 at any time prior to the deadline for submitting bids. A request for withdrawal or a modification must be in writing and signed by a person duly authorized to do so and, in a case where signed by a deputy or subordinate, the principal's proper written grant of authority to such deputy or subordinate must accompany the request for withdrawal or modification. Withdrawal of a bid will not prejudice the rights of a Bidder to submit a new bid prior to the bid date and time. Except where provided in the following paragraph no bid may be withdrawn or modified after expiration of the period for receiving bids.

If, within twenty-four (24) hours after bids are opened, any Bidder files a duly signed written notice with the City and within five (5) calendar days thereafter demonstrates to the reasonable satisfaction of the City by clear and convincing evidence that there was a material and substantial mistake in the preparation of its bid, or that the mistake is clearly evident on the face of the bid but the intended correct bid is not similarly evident, then the Bidder may withdraw its bid and the bid Security will be returned.

1.26 N/A – INTENTIONALLY OMITTED

1.27 OPEN END CONTRACT

No guarantee is expressed or implied as to the total quantity of commodities/services to be purchased under any open end contract. Estimated quantities will be used for bid comparison purposes only. The City reserves the right to issue purchase orders as and when required, or a blanket purchase order and release partial quantities as and when required or any combination of the preceding.

ORDERING: The CITY reserves the right to purchase commodities/services specified herein through Contracts established by other governmental agencies or through separate procurement actions due to unique or special needs. If an urgent delivery is required within a period shorter than the delivery time specified in the contract, and if the seller is unable to comply therewith, the City reserves the right to obtain such delivery from others without penalty or prejudice to the City or to the Bidder.

1.28 AUDIT RIGHTS

The City reserves the right to audit the records of the successful Bidder for the commodities and/or services provided under the Contract at any time during the performance and term of the Contract and for a period of three (3) years after completion and acceptance by the City. If required by the City, the successful Bidder agrees to submit to an audit by an independent certified public accountant selected by the City. The successful Bidder shall allow the City to inspect, examine and review the records of the successful Bidder in relation to this contract at any and all times during normal business hours during the term of the Contract.

1.29 LOCAL, STATE AND FEDERAL COMPLIANCE REQUIREMENTS

The Bidder shall comply with all local, state and federal directives, orders and laws as applicable to this SOLICITATION and subsequent contract(s) including, but not limited to:

- A. Equal Employment Opportunity (EEO), in compliance with Executive Order 11246 as amended and applicable to this contract.
- B. All manufactured items and fabricated assemblies shall comply with applicable requirements of the Occupation Safety and Health Act of 1970 as amended, and be in compliance with Chapter 442, Florida Statutes. Any toxic substance listed in Section 38F-41.03 of the Florida Administrative Code delivered as a result of this order must be accompanied by a completed Material Safety Data Sheet (MSDS).
- C. The Immigration and Nationality Act prohibits (i) the employment of an unauthorized alien when the employer knows the individual is an unauthorized alien and (ii) the employment of an individual without complying with the requirements of the federal employment verification system. If a proposer commits either of these violations, such violation shall be cause for unilateral cancellation of the contract.
- D. This Section applies only to any contract for goods or services of \$1 million or more: The Proposer certifies that it is not on the Scrutinized Companies with Activities in Sudan List or the Scrutinized Companies with Activities in the Iran Petroleum Energy Sector List and that it does not have business operations in Cuba or Syria as provided in section 287.135, Florida Statutes (2011), as may be amended or revised. The City may terminate this Contract at the City's option if the Proposer is found to have submitted a false certification as provided under subsection (5) of section 287.135, Florida Statutes (2011), as may be amended or revised, or been placed on the Scrutinized Companies with Activities in Sudan List or the Scrutinized Companies with Activities in the Iran Petroleum Energy Sector List or has engaged in business operations in Cuba or Syria, as defined in Section 287.135, Florida Statutes (2011), as may be amended or revised.

1.30 FRAUD AND MISREPRESENTATION

Any individual, corporation or other entity that attempts to meet its contractual obligations with the City through fraud, misrepresentation or material misstatement, may be debarred from doing business with the City. The City as further sanction may terminate or cancel any other contracts with such individual, corporation or entity. Such individual or entity shall be responsible for all direct or indirect costs associated with termination or cancellation, including attorney's fees.

1.31 DEBARRED OR SUSPENDED BIDDERS

The bidder certifies, by submission of a response to this solicitation, that neither it nor its principals and sub bidder are presently debarred or suspended by any Federal department or agency.

1.32 COLLUSION

More than one bid/proposal received for the same work from an individual, firm, partnership, corporation or association under the same or different names will not be considered. Reasonable grounds for believing that any Bidder is interested in more than one bid for the same work will cause the rejection of such bid which the Bidder is interested. If there are reasonable grounds for believing that collusion exists among the Bidder, the bids of participants in such collusion will not be considered.

1.33 COPELAND "ANTI-KICKBACK"

The Bidder and all sub bidders will comply with the Copeland Anti-Kickback Act (18 U.S.C. 874) as supplemented in Department of Labor regulations (29 CFR Part 3).

1.34 FORCE MAJEURE

The Agreement which is awarded to the successful proposer may provide that the performance of any act by the City or Bidder hereunder may be delayed or suspended at any time while, but only so long as, either party is hindered in or prevented from performance by acts of God, the elements, war, rebellion, strikes, lockouts or any cause beyond the reasonable control of such party, provided however, the City shall have the right to provide substitute service from third parties or City forces and in such event the City shall withhold payment due the Bidder for such period of time. If the condition of force majeure exceeds a period of 14 days the City may, at its option and discretion, cancel or renegotiate this Agreement.

1.35 PUBLIC ENTITY CRIMES

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 Bidder, supplier, sub bidder, 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 Florida Statutes, Section 287.017, for CATEGORY TWO for a period of 36 months from the date of being placed on the convicted vendor list.

1.36 DRUG-FREE WORKPLACE PROGRAM

Preference shall be given to businesses with drug-free workplace programs. Whenever two or more bids which are equal with respect to price, quality, and service are received by the State or by any political subdivision for the procurement of commodities or contractual services, a bid received from a business that certifies that it has implemented a drug-free workplace program shall be given preference in the award process. Established procedures for processing tie bids will be followed if none of the tied vendors have a drug-free workplace program.

1.37 SOLICITATION, GIVING, AND ACCEPTANCE OF GIFTS POLICY

Bidder shall sign and submit the attached form indicating understanding and compliance with the City's and State's policies prohibiting solicitation and acceptance of gifts by public officers, employees and candidates. Failure to submit the signed form will result in your bid being declared non-responsive; provided, however, that a responsible Bidder whose bid would be responsive but for the failure to submit the signed form in its bid may be given the opportunity to submit the form to the City within five calendar days after notification by the City, if this is determined to be in the best interest of the City.

1.38 CONFLICT OF INTEREST

The Bidder represents that:

No officer, director, employee, agent, or other consultant of the City or a member of the immediate family or household of the aforesaid has directly or indirectly received or been promised any form of benefit, payment or compensation, whether tangible or intangible, in connection with the grant of this Agreement.

There are no undisclosed persons or entities interested with the Proposer in this Agreement. This Agreement is entered into by the Proposer without any connection with any other entity or person making a bid Bidder for the same purpose, and without collusion, fraud or conflict of interest. No elected or appointed officer or official, director, employee, agent or other consultant of the City, or of the State of Florida (including elected and appointed members of the legislative and executive branches of government), or member of the immediate family or household of any of the aforesaid:

1. Is interested on behalf of or through the Bidder directly or indirectly in any manner whatsoever in the execution or the performance of this Agreement, or in the services, supplies or work, to which this Agreement relates or in any portion of the revenues; or
2. Is an employee, agent, advisor, or consultant to the Proposer or to the best of the Proposer's knowledge, any sub bidder or supplier to the Bidder.

Neither the Bidder nor any officer, director, employee, agent, parent, subsidiary, or affiliate of the Bidder shall have an interest which is in conflict with the Bidder's faithful performance of its obligations under this Agreement; provided that the City, in its sole discretion, may consent in writing to such a relationship, and provided the Bidder provides the City with a written notice, in advance, which identifies all the individuals and entities involved and sets forth in detail the nature of the relationship and why it is in the City's best interest to consent to such relationship.

The provisions of this Article are supplemental to, not in lieu of, all applicable laws with respect to conflict of interest. In the event there is a difference between the standards applicable under this Agreement and those provided by statute, the stricter standard shall apply.

In the event the Bidder has no prior knowledge of a conflict of interest as set forth above and acquires information which may indicate that there may be an actual or apparent violation of any of the above, the Bidder shall promptly bring such information to the attention of the City's ENGINEER. The Bidder shall thereafter cooperate with the City's review and investigation of such information, and comply with the instructions the Bidder receives from the ENGINEER in regard to remedying the situation.

1.39 DISCRIMINATION

Any entity or affiliate who has been placed on the discriminatory vendor list may not submit a bid on a contract to provide goods or services to a public entity, may not submit a bid on a contract with a public entity for construction or repair of a public building or public work, may not submit bids on leases of real property to a public entity, may not award or perform work as a proposer, supplier, sub bidder, or consultant under contract with any public entity, and may not transact business with any public entity.

1.40 ADVICE OF OMISSION OR MISSTATEMENT

In the event it is evident to a Vendor responding to this SOLICITATION that the City has omitted or misstated a material requirement to this SOLICITATION and/or the services required by this SOLICITATION, the responding Vendor shall advise the contact identified in the SOLICITATION Clarifications and Questions section above of such omission or misstatement.

1.41 CONFIDENTIAL INFORMATION

Information contained in the Vendor's bid that is company confidential must be clearly identified in the bid/proposal itself. The City will be free to use all information in the Vendor's bid for the City's purposes, in accordance with State Law. Vendor bids shall remain confidential for 30 days or until a notice of intent to award is posted, which is sooner. The Vendor understands that any material supplied to the City may be subject to public disclosure under the Public Records Law.

1.42 GOVERNING LAW

This Contract, including appendices, and all matters relating to this Contract (whether in contract, statute, tort (such as negligence), or otherwise) shall be governed by, and construed in accordance with, the laws of the State of Florida. This shall apply notwithstanding such factors which include, but are not limited to, the place where the contract is entered into, the place where the accident occurs and not withstanding application of conflicts of law principles.

1.43 LITIGATION VENUE

The parties waive the privilege of venue and agree that all litigation between them in the state courts shall take place in Broward County, Florida and that all litigation between them in the federal courts shall take place in the Southern District of Florida.

1.44 SOVEREIGN IMMUNITY

Nothing in this agreement shall be interpreted or construed to mean that the city waives its common law sovereign immunity or the limits of liability set forth in Section 768.28, Florida Statute.

1.45 SURVIVAL

The parties acknowledge that any of the obligations in this Agreement will survive the term, termination and cancellation hereof. Accordingly, the respective obligations of the Proposer and the City under this Agreement, which by nature would continue beyond the termination, cancellation or expiration thereof, shall survive termination, cancellation or expiration hereof.

1.46 INDEMNIFICATION AND HOLD HARMLESS AGREEMENT

The Contractor shall indemnify and hold harmless the City of Hollywood and its officers, employees, agents and instrumentalities from any and all liability, losses or damages. In addition, the City shall be entitled to attorney's fees and costs of defense, which the City of Hollywood, or its officers, employees, agents or instrumentalities may incur as a result of claims, demands, suits, causes of actions or proceedings of any kind or nature arising out of, relating to or resulting from the performance of this project by the awarded Bidder or its employees, agents, servants, partners, principals or subcontractors. Furthermore, the awarded Bidder shall pay all claims and losses in connection therewith and shall investigate and defend all claims, suits or actions of any kind of nature in the name of the City of Hollywood, where applicable, including appellate proceedings, and shall pay all costs, judgments, and attorney's fees which may issue thereon. The awarded Bidder expressly understands and agrees that any insurance protection required by the resulting agreement or otherwise provided by the awarded Bidder shall cover the City of Hollywood, its officers, employees, agents and instrumentalities and shall include claims for damages resulting from and/or caused by the negligence, recklessness or intentional wrongful misconduct of the Contractor and persons employed by or utilized by the Contractor in the performance of the contract.

1.47 PATENT AND COPYRIGHT INDEMNIFICATION

The Bidder warrants that all deliverables furnished hereunder, including but not limited to: services, equipment programs, documentation, software, analyses, applications, methods, ways, processes, and the like, do not infringe upon or violate any patent, copyrights, service marks, trade secret, or any other third party proprietary rights.

The Bidder shall be liable and responsible for any and all claims made against the City for infringement of patents, copyrights, service marks, trade secrets or any other third party proprietary rights, by the use or supplying of any programs, documentation, software, analyses, applications, methods, ways, processes, and the like, in the course of performance or completion of, or in any way connected with, the work, or the City's continued use of the deliverables furnished hereunder. Accordingly, the Bidder, at its own expense, including the payment of attorney's fees, shall indemnify, and hold harmless the City and defend any action brought against the City with respect to any claim, demand, and cause of action, debt, or liability.

In the event any deliverable or anything provided to the City hereunder, or a portion thereof, is held to constitute an infringement and its use is or may be enjoined, the Bidder shall have the obligation, at the City's option, to (i) modify, or require that the applicable sub bidder or supplier modify, the alleged infringing item(s) at the Bidder's expense, without impairing in any respect the functionality or performance of the item(s), or (ii) procure for the City, at the Bidder's expense, the rights provided under this Agreement to use the item(s).

The Bidder shall be solely responsible for determining and informing the City whether a prospective supplier or sub bidder is a party to any litigation involving patent or copyright infringement, service mark, trademark, violation, or proprietary rights claims or is subject to any injunction which may prohibit it from providing any deliverable hereunder. The Bidder shall enter into agreements with all suppliers and sub bidder at the Bidder's own risk. The City may reject any deliverable that it believes to be the subject of any such litigation or injunction, or if, in the City's judgment, use thereof would delay the work or be unlawful.

The Bidder shall not infringe any copyright, trademark, service mark, trade secrets, patent rights, or other intellectual property rights in the performance of the work.

1.48 ADVERTISING

Vendor shall not advertise or publish the fact that the City has placed this order without prior written consent from the City, except as may be necessary to comply with a proper request for information from an authorized representative of a governmental unit or agency.

1.49 DISCLAIMER

The Hollywood may, in its sole discretion, accept or reject, in whole or in part, for any reason whatsoever any or all bids; re-advertise this SOLICITATION, postpone or cancel at any time this SOLICITATION process; or, waive any formalities of or irregularities in the bid process. Bids that are not submitted on time and/or do not conform to the City of Hollywood's requirements will not be considered. After all bids are analyzed, organization(s) submitting bid that appear, solely in the opinion of the City of Hollywood, to be the most competitive, shall be submitted to the City of Hollywood's City Commission, and the final selection will be made shortly thereafter with a timetable set solely by the City of Hollywood. The selection by the City of Hollywood shall be based on the bid, which is, in the sole opinion of the City Commission of the City of Hollywood, in the best interest of the City of Hollywood. The issuance of this SOLICITATION constitutes only an invitation to make a bid to the City of Hollywood. The City of Hollywood reserves the right to determine, in its sole discretion, whether any aspect of the bid satisfies the criteria established by the City. In all cases the City of Hollywood shall have no liability to any proposer for any costs or expense incurred in connection with this bid or otherwise.

1.50 TRADEMARKS

The City warrants that all trademarks the City requests the Vendor to affix to articles purchased are those owned by the City and it is understood that the Vendor shall not acquire or claim any rights, title, or interest therein, or use any of such trademarks on any articles produced for itself or anyone other than the City.

1.51 RIGHT TO REQUEST ADDITIONAL INFORMATION

The City reserves the right to request any additional information that might be deemed necessary during the evaluation process.

1.52 BID PREPARATION COSTS

The Vendor is responsible for any and all costs incurred by the Vendor or his/her sub bidders in responding to this solicitation.

1.53 DESIGN COSTS (N/A)

1.54 ADDITIONAL CHARGES

No additional charges, other than those listed on the price breakdown sheets, shall be made. Prices quoted will include verification/coordination of order, all costs for shipping, delivery to all sites, unpacking, setup, installation, operation, testing, cleanup, training and Vendor travel charges.

1.55 RIGHTS TO PERTINENT MATERIALS

All responses, inquires, and correspondence relating to this SOLICITATION and all reports, charts, displays, schedules, exhibits and other documentation produced by the Vendor that are submitted as part of the bid shall become the property of the City upon receipt, a part of a public record upon opening, and will not be returned.

1.56 INSURANCE REQUIREMENTS

See insurance requirements in the main solicitation document.

1.57 NATURE OF THE AGREEMENT

The Agreement incorporates and includes all negotiations, correspondence, conversations, agreements, and understandings applicable to the matters contained in the Agreement. The parties agree that there are no commitments, agreements, or understandings concerning the subject matter of the Agreement that are not contained in the Agreement, and that the Agreement contains the entire agreement between the parties as to all matters contained herein. Accordingly, it is agreed that no deviation from the terms hereof shall be predicated upon any prior representations or agreements, whether oral or written. It is further agreed that any oral representations or modifications concerning this Agreement shall be of no force or effect, and that the Agreement may be modified, altered or amended only by a written amendment duly executed by both parties hereto or their authorized representatives.

The Bidder shall provide the services set forth in the Scope of Services, and render full and prompt cooperation with the City in all aspects of the services performed hereunder.

The Bidder acknowledges that the Agreement requires the performance of all things necessary for or incidental to the effective and complete performance of all work and services under this Contract. All things not expressly mentioned in the Agreement but necessary to carrying out its intent are required by the Agreement, and the Bidder shall perform the same as though they were specifically mentioned, described and delineated.

The Bidder shall furnish all labor, materials, tools, supplies, and other items required to perform the work and services that are necessary for the completion of this Contract. All work and services shall be accomplished at the direction of and to the satisfaction of the City's ENGINEER.

The Bidder acknowledges that the City shall be responsible for making all policy decisions regarding the Scope of Services. The Proposer agrees to provide input on policy issues in the form of recommendations.

The Bidder agrees to implement any and all changes in providing services hereunder as a result of a policy change implemented by the City. The Bidder agrees to act in an expeditious and fiscally sound manner in providing the City with input regarding the time and cost to implement said changes and in executing the activities required to implement said changes

1.58 AUTHORITY OF THE CITY'S ENGINEER

The Bidder hereby acknowledges that the City's ENGINEER will determine in the first instance all questions of any nature whatsoever arising out of, under, or in connection with, or in any way related to or on account of, this Agreement including without limitations: questions as to the value, acceptability and fitness of the services; questions as to either party's fulfillment of its obligations under the Contract; negligence, fraud or misrepresentation before or subsequent to acceptance of the Bid; questions as to the interpretation of the Scope of Services; and claims for damages, compensation and losses.

The Bidder shall be bound by all determinations or orders and shall promptly obey and follow every order of the ENGINEER, including the withdrawal or modification of any previous order and regardless of whether the Bidder agrees with the ENGINEER's determination or order. Where orders are given orally, they will be issued in writing by the ENGINEER as soon thereafter as is practicable.

The Bidder must, in the final instance, seek to resolve every difference concerning the Agreement with the ENGINEER. In the event that the ENGINEER and the Bidder are unable to resolve their difference, the Bidder may initiate a dispute in accordance with the procedures set forth in the section below. Exhaustion of these procedures shall be a condition precedent to any lawsuit permitted hereunder.

In the event of such dispute, the parties to this Agreement authorize the City Manager or designee, who may not be the ENGINEER or anyone associated with this Project, acting personally, to decide all questions arising out of, under, or in connection with, or in any way related to or on account of the Agreement (including but not limited to claims in the nature of breach of contract, fraud or misrepresentation arising either before or subsequent to execution hereof) and the decision of each with respect to matters within the City Manager's purview as set forth above shall be conclusive, final and binding on the parties. Any such dispute shall be brought, if at all, before the City Manager within 10 days of the occurrence, event or act out of which the dispute arises.

The City Manager may base this decision on such assistance as may be desirable, including advice of experts, but in any event shall base the decision on an independent and objective determination of whether the Bidder's performance or any deliverable meets the requirements of this Agreement and any specifications with respect thereto set forth herein. The effect of any decision shall not be impaired or waived by any negotiations or settlements or offers made in connection with the dispute, whether or not the City Manager participated therein, or by any prior decision of others, which prior decision shall be deemed subject to review, or by any termination or cancellation of the Agreement. All such disputes shall be submitted in writing by the Bidder to the City Manager for a decision, together with all pertinent information in regard to such questions, in order that a fair and impartial decision may be made. The parties agree that whenever the City Manager is entitled to exercise discretion or judgment or to make a determination or form an opinion pursuant to the provisions of this Article, such action shall be deemed fair and impartial when exercised or taken. The City Manager shall render a decision in writing and deliver a copy of the same to the Bidder. Except as such remedies may be limited or waived elsewhere in the Agreement, the Bidder reserves the right to pursue any remedies available under law after exhausting the provisions of this Article.

1.59 MUTUAL OBLIGATIONS

This Agreement, including attachments and appendices to the Agreement, shall constitute the entire Agreement between the parties with respect hereto and supersedes all previous communications and representations or agreements, whether written or oral, with respect to the subject matter hereof unless acknowledged in writing by the duly authorized representatives of both parties.

Nothing in this Agreement shall be construed for the benefit, intended or otherwise, of any third party that is not a parent or subsidiary of a party or otherwise related (by virtue of ownership control or statutory control) to a party.

In those situations where this Agreement imposes an indemnity or defense obligation on the Bidder, the City may, at its expense, elect to participate in the defense if the City should so choose. Furthermore, the City may at its own expense defend or settle any such claims if the Bidder fails to diligently defend such claims, and thereafter seek indemnity for costs and attorney's fees from the Bidder.

1.60 SUBCONTRACTUAL RELATIONS

If the Bidder will cause any part of this Agreement to be performed by a sub bidder, the provisions of this Contract will apply to such sub bidder and its officers, agents and employees in all respects as if it and they were employees of the Proposer; and the Proposer will not be in any manner thereby discharged from its obligations and liabilities hereunder, but will be liable hereunder for all acts and negligence of the sub bidder, its officers, agents, and employees, as if they were employees of the Proposer. The services performed by the sub bidder will be subject to the provisions hereof as if performed directly by the Bidder.

The Bidder, before making any subcontract for any portion of the services, will state in writing to the City the name of the proposed sub bidder, the portion of the services which the sub bidder is to do, the place of business of such sub bidder, and such other information as the City may require. The City will have the right to require the Bidder not to award any subcontract to a person, firm or corporation disapproved by the City.

Before entering into any subcontract hereunder, the Bidder will inform the sub bidder fully and completely of all provisions and requirements of this Agreement relating either directly or indirectly to the services to be performed. Such services performed by such sub bidder will strictly comply with the requirements of this Contract.

In order to qualify as a sub bidder satisfactory to the City, in addition to the other requirements herein provided, the sub bidder must be prepared to prove to the satisfaction of the City that it has the necessary facilities, skill and experience, and ample financial resources to perform the services in a satisfactory manner. To be considered skilled and experienced, the sub bidder must show to the satisfaction of the City that it has satisfactorily performed services of the same general type which are required to be performed under this Agreement.

The City shall have the right to withdraw its consent to a subcontract if it appears to the City that the subcontract will delay, prevent, or otherwise impair the performance of the Bidder's obligations under this Agreement. All sub bidder are required to protect the confidentiality of the City and City's proprietary and confidential information. The Bidder shall furnish to the City copies of all subcontracts between the Bidder and sub bidder and suppliers hereunder. Within each such subcontract, there shall be a clause for the benefit of the City permitting the City to request completion of performance by the sub bidder of its obligations under the subcontract, in the event the City finds the Bidder in breach of its obligations, and the option to pay the sub bidder directly for the performance by such sub bidder. The foregoing shall neither convey nor imply any obligation or liability on the part of the City to any sub bidder hereunder as more fully described herein.

1.61 PROMPT PAYMENT: LATE PAYMENTS BY BIDDER TO SUB BIDDER AND MATERIAL SUPPLIERS; PENALTY:

When a Bidder receives from the City of Hollywood any payment for contractual services, commodities, materials, supplies, or construction contracts, the proposer shall pay such moneys received to each sub bidder and material supplier in proportion to the percentage of work completed by each sub bidder and material supplier at the time of receipt. If the Bidder receives less than full payment, then the proposer shall be required to disburse only the funds received on a pro rata basis to the sub bidder and materials Suppliers, each receiving a prorated portion based on the amount due on the payment. If the proposer without reasonable cause fails to make payments required by this section to sub bidder and material suppliers within fifteen (15) working days after the receipt by the Bidder of full or partial payment, the proposer shall pay to the sub bidder and material suppliers a penalty in the amount of one percent (1%) of the amount due, per month, from the expiration of the period allowed herein for payment. Such penalty shall be in addition to actual payments owed. Retainage is also subject to the prompt payment requirement and must be returned to the sub bidder or material supplier whose work has been completed, even if the prime contract has not been completed. The Bidder shall include the above obligation in each subcontract it signs with a sub bidder or material supplier.

1.62 TERMINATION FOR CONVENIENCE AND SUSPENSION OF WORK

The City may terminate this Agreement if an individual or corporation or other entity attempts to meet its contractual obligation with the City through fraud, misrepresentation or material misstatement.

The City may, as a further sanction, terminate or cancel any other contract(s) that such individual or corporation or other entity has with the City. Such individual, corporation or other entity shall be responsible for all direct and indirect costs associated with such termination or cancellation, including attorney's fees.

The foregoing notwithstanding, any individual, corporation or other entity which attempts to meet its contractual obligations with the City through fraud, misrepresentation or material misstatement may be debarred from City contracting in accordance with the City debarment procedures. The Bidder may be subject to debarment for failure to perform and any other reasons related to the Bidder's breach or failure of satisfactory performance.

In addition to cancellation or termination as otherwise provided in this Agreement, the City may at any time, in its sole discretion, with or without cause, terminate this Agreement by written notice to the Bidder and in such event:

The Bidder shall, upon receipt of such notice, unless otherwise directed by the City:

1. Stop work on the date specified in the notice ("the Effective Termination Date");
2. Take such action as may be necessary for the protection and preservation of the City's materials and property;
3. Cancel orders;

4. Assign to the City and deliver to any location designated by the City any non-cancelable orders for deliverables that are not capable of use except in the performance of this Agreement and which have been specifically developed for the sole purpose of this Agreement and not incorporated in the services;
5. Take no action which will increase the amounts payable by the City under this Agreement.

In the event that the City exercises its right to terminate this Agreement pursuant to this Article, the Bidder will be compensated as stated in the payment articles herein, for the:

1. Portion of the services completed in accordance with the Agreement up to the Effective Termination Date; and
2. Non-cancelable deliverables that are not capable of use except in the performance of this Agreement and which have been specifically developed for the sole purpose of this Agreement but not incorporated in the services.

All compensation pursuant to this Article is subject to audit.

1.63 EVENT OF DEFAULT

An Event of Default shall mean a breach of this Agreement by the Bidder. Without limiting the generality of the foregoing and in addition to those instances referred to herein as a breach, an Event of Default, shall include the following:

1. The Bidder has not delivered deliverables on a timely basis;
2. The Bidder has refused or failed, except in any case for which an extension of time is provided, to supply enough properly skilled staff personnel;
3. The Bidder has failed to make prompt payment to sub bidder or suppliers for any services;
4. The Bidder has become insolvent (other than as interdicted by the bankruptcy laws), or has assigned the proceeds received for the benefit of the Bidder 's creditors, or the Bidder has taken advantage of any insolvency statute or debtor/creditor law or if the Bidder 's affairs have been put in the hands of a receiver;
5. The Bidder has failed to obtain the approval of the City where required by this Agreement;
6. The Bidder has failed to provide "adequate assurances" as required under subsection "B" below; and
7. The Bidder has failed in the representation of any warranties stated herein.

When, in the opinion of the City, reasonable grounds for uncertainty exist with respect to the Proposer's ability to perform the services or any portion thereof, the City may request that the Proposer, within the time frame set forth in the City's request, provide adequate assurances to the City, in writing, of the Proposer's ability to perform in accordance with terms of this Agreement. Until the City receives such assurances the City may request an adjustment to the compensation received by the Proposer for portions of the services which the Proposer has not performed. In the event that the Proposer fails to provide to the City the requested assurances within the prescribed time frame, the City may:

1. Treat such failure as a repudiation of this Agreement;
2. Resort to any remedy for breach provided herein or at law, including but not limited to, taking over the performance of the services or any part thereof either by itself or through others.

In the event the City shall terminate this Agreement for default, the City or its designated representatives may immediately take possession of all applicable equipment, materials, products, documentation, reports and data.

1.64 REMEDIES IN THE EVENT OF DEFAULT

If an Event of Default occurs, the Proposer shall be liable for all damages resulting from the default, including but not limited to:

- A. Lost revenues;
- B. The difference between the cost associated with procuring services hereunder and the amount actually expended by the City for procurement of services, including procurement and administrative costs; and,

C. Such other damages that the City may suffer.

The Proposer shall also remain liable for any liabilities and claims related to the Proposer's default. The City may also bring any suit or proceeding for specific performance or for an injunction.

1.65 BANKRUPTCY

The City reserves the right to terminate this contract if, during the term of any contract the Proposer has with the City, the Proposer becomes involved as a debtor in a bankruptcy proceeding, or becomes involved in a reorganization, dissolution, or liquidation proceeding, or if a trustee or receiver is appointed over all or a substantial portion of the property of the Proposer under federal bankruptcy law or any state insolvency law.

1.66 CANCELLATION FOR UNAPPROPRIATED FUNDS

The obligation of the City for payment to a Proposer is limited to the availability of funds appropriated in a current fiscal period, and continuation of the contract into a subsequent fiscal period is subject to appropriation of funds, **unless otherwise authorized by law.**

1.67 VERBAL INSTRUCTIONS PROCEDURE

No negotiations, decisions, or actions shall be initiated or executed by the Proposer as a result of any discussions with any City employee. Only those communications which are in writing from an authorized City representative may be considered. Only written communications from Proposers, which are signed by a person designated as authorized to bind the Proposer, will be recognized by the City as duly authorized expressions on behalf of the Proposer.

1.68 E-VERIFY

Proposer acknowledges that the City may be utilizing the Proposer's services for a project that is funded in whole or in part by State funds pursuant to a contract between the City and a State agency. The Proposer shall be responsible for complying with the E-Verify requirements in the contract and using the U.S. Department of Homeland Security's E-Verify system to verify the employment of all new employees hired by the Proposer during the Agreement term. The Proposer is also responsible for e-verifying its bidders, if any, pursuant to any agreement between the City and a State Agency, and reporting to the City any required information. The Proposer acknowledges that the terms of this paragraph are material terms, the breach of any of which shall constitute a default under this Agreement.

1.69 BUDGETARY CONSTRAINTS

In the event the City is required to reduce contract costs due to budgetary constraints, all services specified in this document may be subject to a permanent or temporary reduction in budget. In such an event, the total cost for the affected service shall be reduced as required. The Proposer shall also be provided with a minimum 30-day notice prior to any such reduction in budget.

1.70 COST ADJUSTMENTS (As Applicable)

The cost for all items as quoted herein shall remain firm for the first term of the contract. Costs for subsequent years and any extension term years shall be subject to an adjustment only if increases occur in the industry. However, unless very unusual and significant changes have occurred in the industry, such increases shall not exceed 3% per year or, whichever is less, the latest yearly percentage increase in the All Urban Consumers Price Index (CPU-U) (National) as published by the Bureau of Labor Statistics, U.S. Dept. of Labor. The yearly increase or decrease in the CPI shall be that latest index published and available ninety (90) days prior to the end of the contract year than in effect compared to the index for the same month one year prior. Any requested cost increase shall be fully documented and submitted to the City at least ninety (90) days prior to the contract anniversary date. Any approved cost adjustments shall become effective upon the anniversary date of the contract. In the event the CPI or industry costs decline, the City shall have the right to receive from the Proposer a reduction in costs that reflects such cost changes in the industry. The City may, after examination, refuse to accept the adjusted costs if they are not properly documented, increases are considered to be excessive, or decreases are considered to be insufficient. In the event the City does not wish to accept the adjusted costs and the matter cannot be resolved to the satisfaction of the City, the contract can be cancelled by the City upon giving thirty (30) days written notice to the Proposer.

1.71 OSHA STANDARDS

Proposer acknowledges and agrees that as Contractor for the City of Hollywood, Florida, within the limits of the City of Hollywood, Florida, will have the sole responsibility for compliance with all requirements of the Federal Occupational Safety and Health Act of 1970, and all State and local safety and health regulations, and agrees to defend, indemnify and hold harmless the City of Hollywood, Florida, its officials, employees, service providers, and its agents against any and all legal liability or loss the City of Hollywood, Florida may incur due to the Contractor's failure to comply with such act.

END OF SECTION



City of Hollywood
Procurement Services
Steve Stewart, Chief Procurement Officer
2600 Hollywood Boulevard, Hollywood, FL 33020

PROPOSAL DOCUMENT REPORT

IFB No. IFB-083-23-JJ

INFLOW/INFILTRATION- (I/I) EXCAVATED POINT REPAIRS

RESPONSE DEADLINE: June 7, 2023 at 3:00 pm

Report Generated: Wednesday, June 21, 2023

EnviroWaste Services Group Proposal

CONTACT INFORMATION

Company:

EnviroWaste Services Group

Email:

info@ewsg.com

Contact:

John Rinehart

Address:

18001 Old Cutler Road
Suite 643
Palmetto Bay, FL 33157

Phone:

(407) 948-2524

Website:

www.ewsg.com

Submission Date:
Jun 7, 2023 11:30 AM

ADDENDA CONFIRMATION

Addendum #1
Confirmed May 26, 2023 11:33 AM by Eduardo Barba

QUESTIONNAIRE

1. VENDOR REFERENCE FORM*

Please download the below documents, complete, and upload.

- [Vendor Reference Form.pdf](#)

Form_4_-_Vendor_Reference_Form_-_Hollywood.pdf
Form_4_-_Vendor_Reference_Form_-_Broward_County.pdf
Form_4_-_Vendor_Reference_Form_-_Ft_Lauderdale,_City_of.pdf
Form_4_-_Vendor_Reference_Form_-_Town_of_Cutler_Bay.pdf
Form_4_-_Vendor_Reference_Form_-_Town_of_Davie.pdf

2. HOLD HARMLESS AND INDEMNITY CLAUSE*

I, an authorized representative, the contractor, shall indemnify, defend and hold harmless the City of Hollywood, its elected and appointed officials, employees and agents for any and all suits, actions, legal or administrative proceedings, claims, damage, liabilities, interest, attorney's fees, costs of any kind whether arising prior to the start of activities or following the completion or acceptance and in any manner directly or indirectly caused, occasioned or contributed to in whole or in part by reason of any act, error or omission, fault or negligence whether active or passive by the contractor, or anyone acting under its direction, control, or on its behalf in connection with or incident to its performance of the contract.

Confirmed

3. NON-COLLUSION STATEMENT*

I, being first duly sworn, depose that:

- A. He/she is an authorized representative of the Company, the Proposer that has submitted the attached Proposal.
- B. He/she has been fully informed regarding the preparation and contents of the attached Proposal and of all pertinent circumstances regarding such Proposal;
- C. Such Proposal is genuine and is not a collusion or sham Proposal;
- D. Neither the said Proposer nor any of its officers, partners, owners, agents, representatives, employees or parties in interest, including this affiant has in any way colluded, conspired, connived or agreed, directly or indirectly with any other Proposer, firm or person to submit a collusive or sham Proposal in connection with the contractor for which the attached Proposal has been submitted or to refrain from bidding in connection with such contract, or has in any manner, directly or indirectly, sought by agreement or collusion or communication or conference with any other Proposer, firm or person to fix the price or prices, profit or cost element of the Proposal price or the Proposal price of any other Proposer, or to secure an advantage against the City of Hollywood or any person interested in the proposed Contract; and
- E. The price or prices quoted in the attached Proposal are fair and proper and are not tainted by any collusion, conspiracy, connivance or unlawful agreement on the part of the Proposer or any of its agents, representatives, owners, employees, or parties in interest, including this affiant.

Confirmed

4. CERTIFICATIONS REGARDING DEBARMENT, SUSPENSION AND OTHER RESPONSIBILITY MATTERS*

The applicant certifies that it and its principals:

- A. Are not presently debarred, suspended, proposed for debarment, declared ineligible, sentenced to a denial of Federal benefits by a State or Federal court, or voluntarily excluded from covered transactions by any Federal department or agency;

- B. Have not within a three-year period preceding this application been convicted of or had a civil judgment rendered against them for commission of fraud or a criminal offense in connection with obtaining, attempting to obtain, or performing a public (Federal, State, or local) transaction or contract under a public transaction, violation of Federal or State antitrust statutes or commission of embezzlement, theft, forgery, bribery, falsification or destruction of records, making false statements, or receiving stolen property;
- C. Are not presently indicted for or otherwise criminally or civilly charged by a governmental entity (Federal, State, or local) with commission of any of the offenses enumerated in paragraph (b) of this certification; and
- D. Have not within a three-year period preceding this application had one or more public transactions (Federal, State, or local) terminated for cause or default.

Confirmed

5. DRUG-FREE WORKPLACE PROGRAM*

- A. IDENTICAL TIE PROPOSALS - Preference shall be given to businesses with drug-free workplace programs. Whenever two or more bids which are equal with respect to price, quality, and service are received by the State or by any political subdivision for the procurement of commodities or contractual services, a bid received from a business that certifies that it has implemented a drug-free workplace program shall be given preference in the award process. Established procedures for processing tie proposals will be followed if none of the tied vendors have a drug-free workplace program. In order to have a drug-free workplace program, a business shall:
 - 1. Publish a statement notifying employees that the unlawful manufacture, distribution, dispensing, possession, or use of a controlled substance is prohibited in the workplace and specifying the actions that will be taken against employees for violations of such prohibition.
 - 2. Inform employees about the dangers of drug abuse in the workplace, the business's policy of maintaining a drug-free workplace, any available drug counseling, rehabilitation, and employee assistance programs, and the penalties that may be imposed upon employees for drug abuse violations.
 - 3. Give each employee engaged in providing the commodities or contractual services that are under bid a copy of the statement specified in subsection (1).

4. In the statement specified in subsection (1), notify the employee that, as a condition of working on the commodities or contractual services that are under bid, the employee will abide by the terms of the statement and will notify the employer of any conviction of, or plea of guilty or nolo contendere to, any violation of chapter 893 or of any controlled substance law of the United States or any state, for a violation occurring in the workplace no later than five (5) days after such conviction.
5. Impose a sanction on, or require the satisfactory participation in a drug abuse assistance or rehabilitation program (if such is available in the employee's community) by, any employee who is so convicted.
6. Make a good faith effort to continue to maintain a drug-free workplace through implementation of these requirements.

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

Confirmed

6. SOLICITATION, GIVING, AND ACCEPTANCE OF GIFTS POLICY *

Florida Statute 112.313 prohibits the solicitation or acceptance of Gifts. "No Public officer, employee of an agency, local government attorney, or candidate for nomination or election shall solicit or accept anything of value to the recipient, including a gift, loan, reward, promise of future employment, favor, or service, based upon any understanding that the vote, official action, or judgment of the public officer, employee, local government attorney, or candidate would be influenced thereby." The term "public officer" includes "any person elected or appointed to hold office in any agency, including any person serving on an advisory body."

The City of Hollywood/Hollywood CRA policy prohibits all public officers, elected or appointed, all employees, and their families from accepting any gifts of any value, either directly or indirectly, from any contractor, vendor, consultant, or business with whom the City/CRA does business.

The State of Florida definition of "gifts" includes the following:

- Real property or its use,
- Tangible or intangible personal property, or its use,
- A preferential rate or terms on a debt, loan, goods, or services,
- Forgiveness of indebtedness,

- Transportation, lodging, or parking,
- Food or beverage,
- Membership dues,
- Entrance fees, admission fees, or tickets to events, performances, or facilities,
- Plants, flowers or floral arrangements
- Services provided by persons pursuant to a professional license or certificate.
- Other personal services for which a fee is normally charged by the person providing the services.
- Any other similar service or thing having an attributable value not already provided for in this section.

Any contractor, vendor, consultant, or business found to have given a gift to a public officer or employee, or his/her family, will be subject to dismissal or revocation of contract.

As the person authorized to sign the statement, I certify that this firm will comply fully with this policy.

Confirmed

7. Certificate of Insurance*

See requirements in the [#SPECIAL TERM AND CONDITIONS](#) section.

COI_-_City_of_Hollywood_IFB-083-23-JJ.pdf

8. PROOF OF SUNBIZ REGISTRATION*

Enter company FEIN to be verified in Sunbiz

65-0829090

[Click to Verify](#) *Value will be copied to clipboard*

9. ACKNOWLEDGMENT AND SIGNATURE PAGE

IF CORPORATION - DATE INCORPORATED/ORGANIZED:*

1998

STATE INCORPORATED/ORGANIZED:*

Florida

REMITTANCE ADDRESS*

PO Box 521163, Longwood, FL 32752-1163

AR@envirowastesg.com

BIDDER/PROPOSER'S AUTHORIZED REPRESENTATIVE'S TYPED FULL NAME*

David L. Orr, SVP and Corporate Secretary

IT IS HEREBY CERTIFIED AND AFFIRMED THAT THE BIDDER/PROPOSER CERTIFIES ACCEPTANCE OF THE TERMS, CONDITIONS, SPECIFICATIONS, ATTACHMENTS AND ANY ADDENDA. THE BIDDER/PROPOSER SHALL ACCEPT ANY AWARDS MADE AS A RESULT OF THIS SOLICITATION. BIDDER/PROPOSER FURTHER AGREES THAT PRICES QUOTED WILL REMAIN FIXED FOR THE PERIOD OF TIME STATED IN THE SOLICITATION.*

Confirmed

THE EXECUTION OF THIS FORM CONSTITUTES THE UNEQUIVOCAL OFFER OF BIDDER/PROPOSER TO BE BOUND BY THE TERMS OF ITS PROPOSAL. FAILURE TO SIGN THIS SOLICITATION WHERE INDICATED BY AN AUTHORIZED REPRESENTATIVE SHALL RENDER THE

BID/PROPOSAL NON-RESPONSIVE. THE CITY MAY, HOWEVER, IN ITS SOLE DISCRETION, ACCEPT ANY BID/PROPOSAL THAT INCLUDES AN EXECUTED DOCUMENT WHICH UNEQUIVOCALLY BINDS THE BIDDER/PROPOSER TO THE TERMS OF ITS OFFER.*

Confirmed

PROPOSAL FORM*

Please download the below documents, complete, and upload.

- [Proposal Form.docx](#)

Hollywood_IFB-083-23-JJ.pdfForm_16_-_Proposal.pdf

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

THIS FORM STATEMENT IS SUBMITTED TO THE CITY OF HOLLYWOOD BY:*

(Print individual's name and title) (Print name of entity submitting sworn statement)

David L. Orr, SVP and Corporate Secretary - EnviroWaste Services Group, Inc.

SWORN STATEMENT CONTINUATION:*

Enter business address:

18001 Old Cutler Road, Suite 643 Palmetto Bay, FL 33157

SWORN STATEMENT CONTINUATION:*

Enter Federal Employer Identification Number (FEIN) is:

If the entity has no FEIN, include the Social Security Number of the individual signing this sworn statement.

65-0829090

SWORN STATEMENT CONTINUATION:*

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 an 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.

Understood

SWORN STATEMENT CONTINUATION:*

I understand that “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 a prima facie case that one person controls another person. A person who knowingly enters into a joint venture with a person who has been convicted of a public entity crime in Florida during the preceding 36 months shall be considered an affiliate.

Confirmed

SWORN STATEMENT CONTINUATION:*

I understand that “person,” as defined in Paragraph 287.133(1)(e), Florida Statutes, means any natural person or any 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 let by a public entity, or which otherwise transacts or applies to transact business with a public entity.

The term “person” includes those officers, executives, partners, shareholders, employees, members, and agents who are active in management of an entity

Confirmed

SWORN STATEMENT CONTINUATION:*

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

Division of Administrative Hearings, 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).

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

SWORN STATEMENT CONFIRMATION*

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

ANY CHANGE IN THE INFORMATION CONTAINED IN THIS FORM.

Confirmed

PRICE TABLES

Line Item	Description	Quantity	Unit of Measure	Unit Cost	Total
1	Point repairs and 6 inch through 10 inch gravity pipe (up to 6 feet in depth)	40	EA	\$5,460.00	\$218,400.00
2	Point repairs and 6 inch through 10 inch gravity pipe (6 to 8 feet in depth)	20	EA	\$5,750.00	\$115,000.00
3	Point repairs and 6 inch through 10 inch gravity pipe (8 to 10 feet in depth)	10	EA	\$7,875.00	\$78,750.00
4	Point repairs and 6 inch through 10 inch gravity pipe (10 to 12 feet in depth)	1	EA	\$1,060.00	\$1,060.00
5	Point repairs and 6 inch through 10 inch gravity pipe (12 to 14 feet in depth)	1	EA	\$11,500.00	\$11,500.00
6	Point repairs and 6 inch through 10 inch gravity pipe (14 to 16 feet in depth)	1	EA	\$13,800.00	\$13,800.00
7	Point repairs and 12 inch through 15 inch gravity pipe (up to 6 feet in depth)	5	EA	\$7,365.00	\$36,825.00
8	Point repairs and 12 inch through 15 inch gravity pipe (6 to 8 feet in depth)	5	EA	\$8,625.00	\$43,125.00

PROPOSAL DOCUMENT REPORT

IFB No. IFB-083-23-JJ

INFLOW/INFILTRATION- (I/I) EXCAVATED POINT REPAIRS

Line Item	Description	Quantity	Unit of Measure	Unit Cost	Total
9	Point repairs and 12 inch through 15 inch gravity pipe (8 to 10 feet in depth)	3	EA	\$11,500.00	\$34,500.00
10	Point repairs and 12 inch through 15 inch gravity pipe (10 to 12 feet in depth)	2	EA	\$12,650.00	\$25,300.00
11	Point repairs and 12 inch through 15 inch gravity pipe (12 to 14 feet in depth)	1	EA	\$16,100.00	\$16,100.00
12	Point repairs and 12 inch through 15 inch gravity pipe (14 to 16 feet in depth)	1	EA	\$17,250.00	\$17,250.00
13	Point repairs and 18 inch through 21 inch gravity pipe (up to 8 feet in depth)	1	EA	\$11,400.00	\$11,400.00
14	Point repairs and 18 inch through 21 inch gravity pipe (8 to 12 feet in depth)	1	EA	\$16,800.00	\$16,800.00
15	Point repairs and 18 inch through 21 inch gravity pipe (12 to 16 feet in depth)	1	EA	\$21,000.00	\$21,000.00
16	Install CIP sectional pipe liner, 8 inch to 12 inch diameter (8 feet in length, all depths)	10	EA	\$3,600.00	\$36,000.00
17	Install CIP sectional pipe liner, 15 inch to 18 inch diameter (8 feet in length, all depths)	1	EA	\$4,500.00	\$4,500.00
18	Install CIP sectional pipe liner, 24 inch diameter (8 feet in length, all depths)	1	EA	\$5,200.00	\$5,200.00
19	Install CIP sectional pipe liner, 8 inch to 12 inch diameter (additional length >8 feet and up to 12 feet, all depths)	8	LF	\$300.00	\$2,400.00

PROPOSAL DOCUMENT REPORT

IFB No. IFB-083-23-JJ

INFLOW/INFILTRATION- (I/I) EXCAVATED POINT REPAIRS

Line Item	Description	Quantity	Unit of Measure	Unit Cost	Total
20	Install CIP sectional pipe liner, 15 inch to 18 inch diameter (additional length >8 feet and up to 12 feet, all depths)	8	LF	\$325.00	\$2,600.00
21	Install CIP sectional pipe liner, 24 inch diameter (additional length >8 feet and up to 12 feet, all depths)	8	LF	\$350.00	\$2,800.00
22	Excavate, cut and reinstall new 6 to 8 inch FM connection. No bypass	1	EA	\$7,000.00	\$7,000.00
23	Excavate, cut and reinstall new 10 to 12 inch FM connection. No bypass	3	EA	\$8,000.00	\$24,000.00
24	Excavate, cut and reinstall new 14 to 16 inch FM connection. No bypass	1	EA	\$10,000.00	\$10,000.00
25	Excavate, cut and reinstall new 18 to 20 inch FM connection. No bypass	2	EA	\$13,000.00	\$26,000.00
26	Excavate, cut and reinstall new 24 inch FM connection. No bypass	1	EA	\$17,000.00	\$17,000.00
27	Install polyethylene fused-on saddle (open Trench)	10	EA	\$650.00	\$6,500.00
28	Sewer main cleaning and TV inspection (6 inch through 12 inch)	6,000	L.F.	\$2.65	\$15,900.00
29	Sewer main cleaning and TV inspection (14 inch through 24 inch)	750	L.F.	\$5.75	\$4,312.50
30	Sewer main cleaning and TV inspection (30 inch through 36 inch)	800	L.F.	\$11.45	\$9,160.00

PROPOSAL DOCUMENT REPORT

IFB No. IFB-083-23-JJ

INFLOW/INFILTRATION- (I/I) EXCAVATED POINT REPAIRS

Line Item	Description	Quantity	Unit of Measure	Unit Cost	Total
31	Sewer main cleaning and TV inspection (42 inch through 48 inch)	500	L.F.	\$15.00	\$7,500.00
32	Sewer lateral cleaning and TV inspection from main toward the private property (up to 30 feet)	20	EA	\$375.00	\$7,500.00
33	Sewer lateral cleaning and TV inspection from main toward the private property (beyond 30 feet)	1	L.F.	\$10.00	\$10.00
34	Sewer lateral cleaning and TV inspection from cleanout (up to 30 feet)	1	EA	\$300.00	\$300.00
35	Sewer lateral cleaning and TV inspection from cleanout (beyond 30 feet)	1	L. F.	\$10.00	\$10.00
36	Mechanical root or grease removal (12 inch and smaller)	500	L.F.	\$6.00	\$3,000.00
37	Mechanical root or grease removal (15 inch to 21 inch)	500	L.F.	\$8.00	\$4,000.00
38	Mechanical root or grease removal (15 inch to 21 inch)	500	L.F.	\$8.00	\$4,000.00
39	Mechanical tuberculation/concrete removal (12 inch to smaller)	500	L.F.	\$7.00	\$3,500.00
40	Mechanical tuberculation/concrete removal (15-inch to 24-inch)	100	L.F.	\$9.00	\$900.00
41	Mechanical tuberculation/concrete removal (30 inch to 36 inch)	100	L.F.	\$20.00	\$2,000.00
42	Mechanical tuberculation/concrete removal (42 inch to 48 inch)	100	L.F.	\$35.00	\$3,500.00

PROPOSAL DOCUMENT REPORT

IFB No. IFB-083-23-JJ

INFLOW/INFILTRATION- (I/I) EXCAVATED POINT REPAIRS

Line Item	Description	Quantity	Unit of Measure	Unit Cost	Total
43	Grout 6 inch pipe abandoned (up to 12 feet depth)	500	L.F.	\$10.00	\$5,000.00
44	Grout 8 inch pipe abandoned (up to 12 feet depth)	1,500	L.F.	\$12.00	\$18,000.00
45	Grout 12 inch pipe abandoned (up to 12 feet depth)	450	L.F.	\$13.00	\$5,850.00
46	Grout 15 to 18 inch pipe abandoned (up to 12 feet depth)	2,500	L.F.	\$18.75	\$46,875.00
47	Grout 24 inch pipe abandoned (up to 12 feet depth)	100	L.F.	\$25.00	\$2,500.00
48	Recut lateral insufficiently reinstated by others	10	EA	\$375.00	\$3,750.00
49	Protuding service connection removal by internal means.	1	EA	\$750.00	\$750.00
50	Exploratory excavation in asphalt or concrete area (up to 5 feet depth)	5	EA	\$925.00	\$4,625.00
51	Exploratory excavation in grass area (up to 5 feet depth)	20	EA	\$450.00	\$9,000.00
52	Exploratory excavation (over 5 feet depth)	20	V.F.	\$85.00	\$1,700.00
53	Bypass pumping (6 inch through 10 inch sewer)	6	DAY	\$1,250.00	\$7,500.00
54	Bypass pumping (12 inch and 16 inch sewer)	1	DAY	\$1,725.00	\$1,725.00
55	Bypass pumping (18 inch and 24 inch sewer)	1	DAY	\$3,600.00	\$3,600.00
56	Bypass pumping (30 inch through 36 inch sewer)	1	DAY	\$5,250.00	\$5,250.00
57	Bypass pumping (42 inch and 48 inch sewer)	1	DAY	\$6,950.00	\$6,950.00
58	Cleanout Installation in grass area (up to 5 feet in depth)	10	EA	\$920.00	\$9,200.00

PROPOSAL DOCUMENT REPORT
 IFB No. IFB-083-23-JJ
 INFLOW/INFILTRATION- (I/I) EXCAVATED POINT REPAIRS

Line Item	Description	Quantity	Unit of Measure	Unit Cost	Total
59	Cleanout Installation in asphalt area (up to 5 feet in depth)	1	EA	\$1,200.00	\$1,200.00
60	Cleanout Installation in concrete area (up to 5 feet in depth)	1	EA	\$1,200.00	\$1,200.00
61	Cleanout Installation (beyond 5 feet in depth)	10	V.F.	\$265.00	\$2,650.00
62	Cleanout Installation (open trench)	1	EA	\$725.00	\$725.00
63	Asphalt roadway replacement (2 Inch Thick)	1,500	S.Y.	\$35.00	\$52,500.00
64	Asphalt pavement overlay (1 inch thick)	100	S.Y.	\$18.00	\$1,800.00
65	Limerock base (up to 12-inch thick)	100	CY	\$35.00	\$3,500.00
66	Stabilized subgrade	100	CY	\$25.00	\$2,500.00
67	Concrete sidewalk replacement	100	S.Y.	\$95.00	\$9,500.00
68	Concrete curb and gutter replacement	100	L.F.	\$40.00	\$4,000.00
69	Asphalt driveway replacement	100	S.Y.	\$30.00	\$3,000.00
70	Concrete driveway replacement	100	S.Y.	\$105.00	\$10,500.00
71	Replace concrete slabs and/or aprons	100	S.Y.	\$95.00	\$9,500.00
72	Sod replacement	2,300	S.F.	\$1.75	\$4,025.00
73	Work in rear yard easement (applicable to Items 1 to 15 & 22 to 26)	10	EA	\$2,000.00	\$20,000.00
74	Work in rear yard easement (applicable to Items 16 to 18 & items 50 to 54)	40	EA	\$1,000.00	\$40,000.00

PROPOSAL DOCUMENT REPORT

IFB No. IFB-083-23-JJ

INFLOW/INFILTRATION- (I/I) EXCAVATED POINT REPAIRS

Line Item	Description	Quantity	Unit of Measure	Unit Cost	Total
75	Traffic control - Flagman (each)	50	HR	\$70.00	\$3,500.00
76	Traffic control - Arrow Board (each)	5	DAY	\$250.00	\$1,250.00
77	Traffic control - Barricade (each)	10	DAY	\$15.00	\$150.00
78	Expedited mobilization (within 24 hours of request)	1	EA	\$4,500.00	\$4,500.00
79	Additional excavation (more than 2 feet below the pipe), disposal of muck, furnish and install additional backfill materials	500	C.Y.	\$25.00	\$12,500.00
80	Well point system, 25 points, complete	10	DAY	\$5,000.00	\$50,000.00
81	Well point system, 50 points, complete	10	DAY	\$6,500.00	\$65,000.00
82	Undefined Allowance, cost allowance for work as directed by Engineer and upon authorization by the City of Hollywood Director of Public Utilities due to undefined conditions. (PLEASE INPUT \$100,000.00 IN THIS LINE ITEM)	1	L.S.	\$100,000.00	\$100,000.00
83	Crew hourly rate to address utility conflicts	160	HR	\$550.00	\$88,000.00
84	Consideration for indemnification (PLEASE INPUT \$10 FOR THIS ITEM)	1	LS	\$10.00	\$10.00
TOTAL					\$1,494,187.50

VENDOR REFERENCE FORM

City of Hollywood Solicitation #: IFB-083-23-JJ
 Reference for: Inflow / Infiltration (I/I) Excavated Point Repairs ESSD Project N. 7106A

Organization/Firm Name providing reference: City of Hollywood

Organization/Firm Contact Name: Feng Jiang Title: Project Manager
 Email: FJiang@hollywoodfl.org Phone: 954-921-3930
 Name of Referenced Project: Gravity Sewer System Condition Assessment, Renewal and Replacement (I/I) Program Contract No: 20-7106
 Date Services were provided: Jan 2021 - Sept 2023 Project Amount: \$1,144,967.00

Referenced Vendor's role in Project: Prime Vendor Subcontractor/
 Subconsultant
 Would you use the Vendor again? Yes No. Please specify in additional comments

Description of services provided by Vendor (provide additional sheet if necessary):
 Performing sanitary sewer repairs and grouting abandoned sewer pies and installation; providing temporary sanitary sewer service laterals, bypass pumping or plugging and other miscellaneous items to complete.

Please rate your experience with the Vendor	Need Improvement	Satisfactory	Excellent	Not Applicable
Vendor's Quality of Service				
a. Responsive	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
b. Accuracy	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
c. Deliverables	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Vendor's Organization:				
a. Staff expertise	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
b. Professionalism	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
c. Staff turnover	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Timeliness/Cost Control of:				
a. Project	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
b. Deliverables	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Additional Comments (provide additional sheet if necessary):

****THIS SECTION FOR CITY USE ONLY****						
Verified via:	Email:	<input type="checkbox"/>	Verbal:	<input type="checkbox"/>	Mail:	<input type="checkbox"/>
Verified by:	Name:				Title:	
	Department:				Date:	

VENDOR REFERENCE FORM

City of Hollywood Solicitation #: IFB-083-23-JJ
 Reference for: Inflow / Infiltration (I/I) Excavated Point Repairs ESSD Project N. 7106A

Organization/Firm Name providing reference: Broward County Utilities

Organization/Firm Contact Name: Nestor Berrios Title: Project Manager

Email: nberrios@broward.org Phone: 954-831-0728

Name of Referenced Project: Cleaning, Televising, Contract No: OPN2121531B1

Date Services were provided: Grouting and Video Capture Project Amount: \$1.3M
2021 to 2026

Referenced Vendor's role in Project: Prime Vendor Subcontractor/
 Subconsultant
 Would you use the Vendor again? Yes No. Please specify in additional comments

Description of services provided by Vendor (provide additional sheet if necessary):
Cleaning, Televising, Grouting and Video Capture Services

Please rate your experience with the Vendor	Need Improvement	Satisfactory	Excellent	Not Applicable
Vendor's Quality of Service				
a. Responsive	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
b. Accuracy	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
c. Deliverables	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Vendor's Organization:				
a. Staff expertise	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
b. Professionalism	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
c. Staff turnover	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Timeliness/Cost Control of:				
a. Project	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
b. Deliverables	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Additional Comments (provide additional sheet if necessary):

****THIS SECTION FOR CITY USE ONLY****						
Verified via:	Email:	<input type="checkbox"/>	Verbal:	<input type="checkbox"/>	Mail:	<input type="checkbox"/>
Verified by:	Name:				Title:	
	Department:				Date:	

VENDOR REFERENCE FORM

City of Hollywood Solicitation #: IFB-083-23-JJ
 Reference for: Inflow / Infiltration (I/I) Excavated Point Repairs ESSD Project N. 7106A

Organization/Firm Name providing reference: City of Ft Lauderdale

Organization/Firm Contact Name: Elkin Diaz Title: Project Manager

Email: ediaz@Ft Lauderdale.gov Phone: 954-828-8000

Name of Referenced Project: Stormwater Infra. Cleaning ... Contract No: ITB 12520-813

Date Services were provided: 2021 to 2025 Project Amount: \$150K

Referenced Vendor's role in Project: Prime Vendor Subcontractor/
 Subconsultant
 Would you use the Vendor again? Yes No. Please specify in additional comments

Description of services provided by Vendor (provide additional sheet if necessary):
Stormwater Infrastructure Cleaning and Maintenance Services

Please rate your experience with the Vendor	Need Improvement	Satisfactory	Excellent	Not Applicable
Vendor's Quality of Service				
a. Responsive	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
b. Accuracy	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
c. Deliverables	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Vendor's Organization:				
a. Staff expertise	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
b. Professionalism	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
c. Staff turnover	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Timeliness/Cost Control of:				
a. Project	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
b. Deliverables	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Additional Comments (provide additional sheet if necessary):

****THIS SECTION FOR CITY USE ONLY****						
Verified via:	Email:	<input type="checkbox"/>	Verbal:	<input type="checkbox"/>	Mail:	<input type="checkbox"/>
Verified by:	Name:				Title:	
	Department:				Date:	

VENDOR REFERENCE FORM

City of Hollywood Solicitation #: IFB-083-23-JJ
 Reference for: Inflow / Infiltration (I/I) Excavated Point Repairs ESSD Project N. 7106A

Organization/Firm Name providing reference: Town of Cutler Bay

Organization/Firm Contact Name: Alfredo Quintero Title: P.W. Director

Email: aquintero@cutlerbay-fl.gov Phone: 305 878 8601

Name of Referenced Project: Catch Basin Maintenance Contract No: Piggyback on Cont#2013-32

Date Services were provided: December 2018 to September 2020 Project Amount: \$300,000.00

Referenced Vendor's role in Project: Prime Vendor Subcontractor/
 Subconsultant
 Would you use the Vendor again? Yes No. Please specify in additional comments

Description of services provided by Vendor (provide additional sheet if necessary):
Town-Wide Catch Basin Maintenance Program

Please rate your experience with the Vendor	Need Improvement	Satisfactory	Excellent	Not Applicable
Vendor's Quality of Service				
a. Responsive	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
b. Accuracy	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
c. Deliverables	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Vendor's Organization:				
a. Staff expertise	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
b. Professionalism	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
c. Staff turnover	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Timeliness/Cost Control of:				
a. Project	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
b. Deliverables	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Additional Comments (provide additional sheet if necessary):

****THIS SECTION FOR CITY USE ONLY****						
Verified via:	Email:	<input type="checkbox"/>	Verbal:	<input type="checkbox"/>	Mail:	<input type="checkbox"/>
Verified by:	Name:				Title:	
	Department:				Date:	

VENDOR REFERENCE FORM

City of Hollywood Solicitation #: IFB-083-23-JJ
 Reference for: Inflow / Infiltration (I/I) Excavated Point Repairs ESSD Project N. 7106A

Organization/Firm Name providing reference: Town of Davie

Organization/Firm Contact Name:	<u>Natasha Alexander</u>	Title:	<u>Project Manager</u>
Email:	<u>nalexander@davie-fl.gov</u>	Phone:	<u>954-797-1000</u>
Name of Referenced Project:	<u>Stormwater Maintenance</u>	Contract No:	<u>ITB-RM-20-20</u>
Date Services were provided:	<u>June 2021 to Jul 2025</u>	Project Amount:	<u>\$300K</u>

Referenced Vendor's role in Project: Prime Vendor Subcontractor/
 Subconsultant

Would you use the Vendor again? Yes No. Please specify in additional comments

Description of services provided by Vendor (provide additional sheet if necessary):
Stormwater Maintenance

Please rate your experience with the Vendor	Need Improvement	Satisfactory	Excellent	Not Applicable
Vendor's Quality of Service				
a. Responsive	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
b. Accuracy	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
c. Deliverables	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Vendor's Organization:				
a. Staff expertise	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
b. Professionalism	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
c. Staff turnover	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Timeliness/Cost Control of:				
a. Project	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
b. Deliverables	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Additional Comments (provide additional sheet if necessary):

****THIS SECTION FOR CITY USE ONLY****						
Verified via:	Email:	<input type="checkbox"/>	Verbal:	<input type="checkbox"/>	Mail:	<input type="checkbox"/>
Verified by:	Name:				Title:	
	Department:				Date:	

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Additional Insured-Automatic-Owners, Lessees Or Contractors



Coverage Part One-Commercial General Liability
 Coverage Part Two-Contractor's Pollution Liability

Policy No.	Eff. Date of Pol.	Exp. Date of Pol.	Eff. Date of End.	Producer	Add'l Prem.	Return Prem.
GPL-1806389-02	07/31/2022	07/31/2023	07/31/2022	84179000	-----	-----

Named Insured and Mailing Address:

ENVIROWASTE SERVICES GROUP, INC.
 18001 OLD CUTLER RD # 554
 PALMETTO BAY, FL 33157-6440

Producer:

USI INSURANCE SERVICES, LLC
 PO BOX 141916
 CORAL GABLES, FL 33114-1916

THIS ENDORSEMENT CHANGES THE POLICY. PLEASE READ IT CAREFULLY.

This endorsement modifies insurance provided under the following:

Environmental Services Package Policy

- COVERAGE PART ONE-COMMERCIAL GENERAL LIABILITY
- COVERAGE PART TWO-CONTRACTOR'S POLLUTION LIABILITY

1. Who is an Insured (Section I.) in the COMMON COVERAGE PROVISIONS is amended to include as an additional insured any person(s) or organization(s) whom you are required to add as an additional insured on this policy under a written contract or written agreement.
2. The insurance provided to the additional insured person(s) or organization(s) applies only to:
 - a. "Bodily injury", "property damage" or "personal and advertising injury" under COVERAGE PART ONE-COMMERCIAL GENERAL LIABILITY, COVERAGE A - BODILY INJURY AND PROPERTY DAMAGE LIABILITY and COVERAGE B - PERSONAL AND ADVERTISING INJURY LIABILITY caused, in whole or in part, by:
 - (1) Your acts or omissions; or
 - (2) The acts or omissions of those acting on your behalf;
 and resulting directly from:
 - (a) Your ongoing operations performed for the additional insured, which is the subject of the written contract or written agreement; or
 - (b) "Your work" completed as included in the "products-completed operations hazard", performed for the additional insured, which is the subject of the written contract or written agreement; and/or
 - b. "Claims" arising out of a "pollution event" under COVERAGE PART TWO - CONTRACTOR'S POLLUTION LIABILITY, caused, in whole or in part, by:
 - (1) Your acts or omissions; or
 - (2) The acts or omissions of those acting on your behalf,
 and resulting directly from:
 - (a) "Covered operations" performed for the additional insured, which is the subject of the written contract or written agreement; or

(b) "Completed operations" of the "covered operations" performed for the additional insured, which is the subject of the written contract or written agreement.

3. However, regardless of the provisions of paragraphs 1. and 2. above, the insurance afforded to such additional insured:

- a. Only applies to the extent permitted by law; and
- b. Will not be broader than that which you are required by the written contract or written agreement to provide to such additional insured.

4. With respect to the insurance afforded to the additional insured under this endorsement, the following is added to **Section III – Limits Of Insurance and Deductible:**

The most we will pay on behalf of the additional insured is the amount of insurance:

- a. Required by the written contract or written agreement you have entered into with the additional insured; or
- b. Available under the applicable Limits of Insurance shown in the Declarations, whichever is less.

This endorsement shall not increase the applicable Limits of Insurance shown in the Declarations

5. The insurance provided to the additional insured person or organization does not apply to:

"Bodily injury", "property damage" or "personal and advertising injury" arising out of the rendering or failure to render any professional architectural, engineering or surveying services including:

- (1) The preparing, approving or failing to prepare or approve maps, shop drawings, opinions, reports, surveys, field orders, change orders or drawings and specifications; and
- (2) Supervisory, inspection, architectural or engineering activities.

This exclusion applies even if the claims against any insured allege negligence or other wrongdoing in the supervision, hiring, employment, training or monitoring of others by that insured, if the "occurrence" which caused the "bodily injury" or "property damage", or the offense which caused the "personal and advertising injury", involved the rendering of or the failure to render any architectural, engineering or surveying services.

6. The additional insured must see to it that:

- a. We are notified as soon as practicable of an "occurrence", offense or "pollution event", as applicable, that may result in a claim;
- b. We receive written notice of a claim or "suit" as soon as practicable; and
- c. A request for defense and indemnity of the claim or "suit" will promptly be brought against any policy issued by another insurer under which the additional insured may be an insured in any capacity. This provision does not apply to insurance on which the additional insured is a Named Insured, if the written contract or written agreement requires that this coverage be primary and non-contributory.

7. For the coverage provided by this endorsement:

a. The following paragraph is added to Paragraph 8.a. Other Insurance, Conditions (Section V.) in the COMMON COVERAGE PROVISIONS:

Primary and Noncontributory Insurance

This Insurance is primary to and will not seek contribution from any other insurance available to an additional insured under this endorsement provided that:

- (1) The additional insured is a Named Insured under such other insurance; and
- (2) You have agreed in a written contract or written agreement that this insurance would be primary and would not seek contribution from any other insurance available to the additional insured.

b. The following paragraph is added to Paragraph 8.b. Other Insurance, Conditions (Section V.) in the COMMON COVERAGE PROVISIONS:

This insurance is excess over:

Any of the other insurance, whether primary, excess, contingent or on any other basis, available to an additional insured, in which the additional insured on our policy is also covered as an additional insured on another policy providing coverage for the same "occurrence", offense, claim or "suit". This provision does not apply to any policy in which the additional insured is a Named Insured on such other policy and where our policy is required by written contract or written agreement to provide coverage to the additional insured on a primary and non-contributory basis.

8. This endorsement does not apply to an additional insured which has been added to this policy by an endorsement showing the additional insured in a Schedule of additional insureds, and which endorsement applies specifically to that identified additional insured.

ALL OTHER TERMS AND CONDITIONS OF THE POLICY SHALL APPLY AND REMAIN UNCHANGED.

City of Hollywood
Gravity Sewer System Condition Assessment and Renewal and Replacement (Inflow /
Infiltration - I/I) Excavated Point Repairs
Project 20-7106

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FORM 2

ACKNOWLEDGMENT AND SIGNATURE PAGE

This form must be completed and submitted by the date and the time of bid opening.

Legal Company Name (include d/b/a if applicable): EnviroWaste Services Group, Inc.

If Corporation - Date Incorporated/Organized: 2/13/1998 Federal Tax Identification Number: 65-0829090

State Incorporated/Organized: Florida

Company Operating Address: 18001 Old Cutler Road, Suite 643

City: Palmetto Bay State: Florida Zip Code: 33157

Remittance Address (if different from ordering address): PO Box 521163

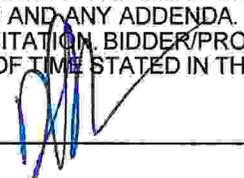
City: Longwood State: FL Zip Code: 32752-1163

Company Contact Person: Karla Noa KarlaNoa@ewsg.com Email Address: INFO@EWSG.COM / AR@envirowastesg.com

Phone Number (include area code): 305-637-9665 Fax Number (include area code): 877-637-9659

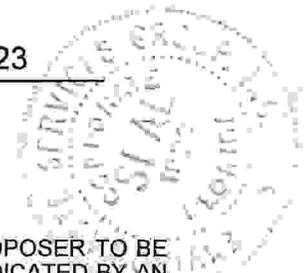
Company's Internet Web Address: EWSG.COM

IT IS HEREBY CERTIFIED AND AFFIRMED THAT THE BIDDER/PROPOSER CERTIFIES ACCEPTANCE OF THE TERMS, CONDITIONS, SPECIFICATIONS, ATTACHMENTS AND ANY ADDENDA. THE BIDDER/PROPOSER SHALL ACCEPT ANY AWARDS MADE AS A RESULT OF THIS SOLICITATION. BIDDER/PROPOSER FURTHER AGREES THAT PRICES QUOTED WILL REMAIN FIXED FOR THE PERIOD OF TIME STATED IN THE SOLICITATION.

Bidder/Proposer's Authorized Representative's Signature:  Date: 6-5-2023

Type or Print Name: David L. Orr
SVP and Corporate Secretary

THE EXECUTION OF THIS FORM CONSTITUTES THE UNEQUIVOCAL OFFER OF BIDDER/PROPOSER TO BE BOUND BY THE TERMS OF ITS PROPOSAL. FAILURE TO SIGN THIS SOLICITATION WHERE INDICATED BY AN AUTHORIZED REPRESENTATIVE SHALL RENDER THE BID/PROPOSAL NON-RESPONSIVE. THE CITY MAY, HOWEVER, IN ITS SOLE DISCRETION, ACCEPT ANY BID/PROPOSAL THAT INCLUDES AN EXECUTED DOCUMENT WHICH UNEQUIVOCALLY BINDS THE BIDDER/PROPOSER TO THE TERMS OF ITS OFFER.



Line Item	Description	Quantity	Unit of Measure	Unit Cost	Total
	Point repairs and 6 inch through 10 inch gravity				
1	pipe (up to 6 feet in depth)	40	EA	\$5,460.00	\$218,400.00
	Point repairs and 6 inch through 10 inch gravity				
2	pipe (6 to 8 feet in depth)	20	EA	\$5,750.00	\$115,000.00
	Point repairs and 6 inch through 10 inch gravity				
3	pipe (8 to 10 feet in depth)	10	EA	\$7,875.00	\$78,750.00
	Point repairs and 6 inch through 10 inch gravity				
4	pipe (10 to 12 feet in depth)	1	EA	\$1,060.00	\$1,060.00
	Point repairs and 6 inch through 10 inch gravity				
5	pipe (12 to 14 feet in depth)	1	EA	\$11,500.00	\$11,500.00
	Point repairs and 6 inch through 10 inch gravity				
6	pipe (14 to 16 feet in depth)	1	EA	\$13,800.00	\$13,800.00
	Point repairs and 12 inch through 15 inch gravity				
7	pipe (up to 6 feet in depth)	5	EA	\$7,365.00	\$36,825.00
	Point repairs and 12 inch through 15 inch gravity				
8	pipe (6 to 8 feet in depth)	5	EA	\$8,625.00	\$43,125.00
	Point repairs and 12 inch through 15 inch gravity				
9	pipe (8 to 10 feet in depth)	3	EA	\$11,500.00	\$34,500.00
	Point repairs and 12 inch through 15 inch gravity				
10	pipe (10 to 12 feet in depth)	2	EA	\$12,650.00	\$25,300.00
	Point repairs and 12 inch through 15 inch gravity				
11	pipe (12 to 14 feet in depth)	1	EA	\$16,100.00	\$16,100.00
	Point repairs and 12 inch through 15 inch gravity				
12	pipe (14 to 16 feet in depth)	1	EA	\$17,250.00	\$17,250.00
	Point repairs and 18 inch through 21 inch gravity				
13	pipe (up to 8 feet in depth)	1	EA	\$11,400.00	\$11,400.00
	Point repairs and 18 inch through 21 inch gravity				
14	pipe (8 to 12 feet in depth)	1	EA	\$16,800.00	\$16,800.00
	Point repairs and 18 inch through 21 inch gravity				
15	pipe (12 to 16 feet in depth)	1	EA	\$21,000.00	\$21,000.00
	Install CIP sectional pipe liner, 8 inch to 12 inch				
16	diameter (8 feet in length, all depths)	10	EA	\$3,600.00	\$36,000.00
	Install CIP sectional pipe liner, 15 inch to 18 inch				
17	diameter (8 feet in length, all depths)	1	EA	\$4,500.00	\$4,500.00
	Install CIP sectional pipe liner, 24 inch diameter (8				
18	feet in length, all depths)	1	EA	\$5,200.00	\$5,200.00
	Install CIP sectional pipe liner, 8 inch to 12 inch				
19	diameter (additional length >8 feet and up to 12				
	feet, all depths)	8	LF	\$300.00	\$2,400.00
	Install CIP sectional pipe liner, 15 inch to 18 inch				
20	diameter (additional length >8 feet and up to 12				
	feet, all depths)	8	LF	\$325.00	\$2,600.00
	Install CIP sectional pipe liner, 24 inch diameter				
21	(additional length >8 feet and up to 12 feet, all				
	depths)	8	LF	\$350.00	\$2,800.00
	Excavate, cut and reinstall new 6 to 8 inch FM				
22	connection. No bypass	1	EA	\$7,000.00	\$7,000.00
	Excavate, cut and reinstall new 10 to 12 inch FM				
23	connection. No bypass	3	EA	\$8,000.00	\$24,000.00
	Excavate, cut and reinstall new 14 to 16 inch FM				
24	connection. No bypass	1	EA	\$10,000.00	\$10,000.00
	Excavate, cut and reinstall new 18 to 20 inch FM				
25	connection. No bypass	2	EA	\$13,000.00	\$26,000.00
	Excavate, cut and reinstall new 24 inch FM				
26	connection. No bypass	1	EA	\$17,000.00	\$17,000.00
27	Install polyethylene fused-on saddle (open	10	EA	\$650.00	\$6,500.00

Sewer main cleaning and TV inspection (6 inch 28 through 12 inch)	6000 L.F.	\$2.65	\$15,900.00
Sewer main cleaning and TV inspection (14 inch 29 through 24 inch)	750 L.F.	\$5.75	\$4,312.50
Sewer main cleaning and TV inspection (30 inch 30 through 36 inch)	800 L.F.	\$11.45	\$9,160.00
Sewer main cleaning and TV inspection (42 inch 31 through 48 inch)	500 L.F.	\$15.00	\$7,500.00
Sewer lateral cleaning and TV inspection from 32 main toward the private property (up to 30 feet)	20 EA	\$375.00	\$7,500.00
Sewer lateral cleaning and TV inspection from 33 main toward the private property (beyond 30 feet)	1 L.F.	\$10.00	\$10.00
Sewer lateral cleaning and TV inspection from 34 cleanout (up to 30 feet)	1 EA	\$300.00	\$300.00
Sewer lateral cleaning and TV inspection from 35 cleanout (beyond 30 feet)	1 L. F.	\$10.00	\$10.00
Mechanical root or grease removal (12 inch and 36 smaller)	500 L.F.	\$6.00	\$3,000.00
Mechanical root or grease removal (15 inch to 21 37 inch)	500 L.F.	\$8.00	\$4,000.00
Mechanical root or grease removal (15 inch to 21 38 inch)	500 L.F.	\$8.00	\$4,000.00
Mechanical tuberculation/concrete removal (12 39 inch to smaller)	500 L.F.	\$7.00	\$3,500.00
Mechanical tuberculation/concrete removal (15- 40 inch to 24- inch)	100 L.F.	\$9.00	\$900.00
Mechanical tuberculation/concrete removal (30 41 inch to 36 inch)	100 L.F.	\$20.00	\$2,000.00
Mechanical tuberculation/concrete removal (42 42 inch to 48 inch)	100 L.F.	\$35.00	\$3,500.00
43 Grout 6 inch pipe abandoned (up to 12 feet)	500 L.F.	\$10.00	\$5,000.00
44 Grout 8 inch pipe abandoned (up to 12 feet)	1500 L.F.	\$12.00	\$18,000.00
45 Grout 12 inch pipe abandoned (up to 12 feet depth)	450 L.F.	\$13.00	\$5,850.00
46 Grout 15 to 18 inch pipe abandoned (up to 12 feet depth)	2500 L.F.	\$18.75	\$46,875.00
47 Grout 24 inch pipe abandoned (up to 12 feet depth)	100 L.F.	\$25.00	\$2,500.00
48 Recut lateral insufficiently reinstated by others	10 EA	\$375.00	\$3,750.00
49 Protuding service connection removal by internal means.	1 EA	\$750.00	\$750.00
50 Exploratory excavation in asphalt or concrete area (up to 5 feet depth)	5 EA	\$925.00	\$4,625.00
51 Exploratory excavation in grass area (up to 5 feet depth)	20 EA	\$450.00	\$9,000.00
52 Exploratory excavation (over 5 feet depth)	20 V.F.	\$85.00	\$1,700.00
53 Bypass pumping (6 inch through 10 inch sewer)	6 DAY	\$1,250.00	\$7,500.00
54 Bypass pumping (12 inch and 16 inch sewer)	1 DAY	\$1,725.00	\$1,725.00
55 Bypass pumping (18 inch and 24 inch sewer)	1 DAY	\$3,600.00	\$3,600.00
56 Bypass pumping (30 inch through 36 inch sewer)	1 DAY	\$5,250.00	\$5,250.00
57 Bypass pumping (42 inch and 48 inch sewer)	1 DAY	\$6,950.00	\$6,950.00
58 Cleanout Installation in grass area (up to 5 feet in depth)	10 EA	\$920.00	\$9,200.00
59 Cleanout Installation in asphalt area (up to 5 feet in depth)	1 EA	\$1,200.00	\$1,200.00
60 Cleanout Installation in concrete area (up to 5 feet in depth)	1 EA	\$1,200.00	\$1,200.00

61 Cleanout Installation (beyond 5 feet in depth)	10 V.F.	\$265.00	\$2,650.00
62 Cleanout Installation (open trench)	1 EA	\$725.00	\$725.00
63 Asphalt roadway replacement (2 Inch Thick)	1500 S.Y.	\$35.00	\$52,500.00
64 Asphalt pavement overlay (1 inch thick)	100 S.Y.	\$18.00	\$1,800.00
65 Limerock base (up to 12-inch thick)	100 CY	\$35.00	\$3,500.00
66 Stabilized subgrade	100 CY	\$25.00	\$2,500.00
67 Concrete sidewalk replacement	100 S.Y.	\$95.00	\$9,500.00
68 Concrete curb and gutter replacement	100 L.F.	\$40.00	\$4,000.00
69 Asphalt driveway replacement	100 S.Y.	\$30.00	\$3,000.00
70 Concrete driveway replacement	100 S.Y.	\$105.00	\$10,500.00
71 Replace concrete slabs and/or aprons	100 S.Y.	\$95.00	\$9,500.00
72 Sod replacement	2300 S.F.	\$1.75	\$4,025.00
Work in rear yard easement (applicable to Items 1 73 to 15 & 22 to 26)	10 EA	\$2,000.00	\$20,000.00
Work in rear yard easement (applicable to Items 74 16 to 18 & items 50 to 54)	40 EA	\$1,000.00	\$40,000.00
75 Traffic control - Flagman (each)	50 HR	\$70.00	\$3,500.00
76 Traffic control - Arrow Board (each)	5 DAY	\$250.00	\$1,250.00
77 Traffic control - Barricade (each)	10 DAY	\$15.00	\$150.00
78 Expedited mobilization (within 24 hours of Additional excavation (more than 2 feet below the pipe), disposal of muck, furnish and install	1 EA	\$4,500.00	\$4,500.00
79 additional backfill materials	500 C.Y.	\$25.00	\$12,500.00
80 Well point system, 25 points, complete	10 DAY	\$5,000.00	\$50,000.00
81 Well point system, 50 points, complete	10 DAY	\$6,500.00	\$65,000.00
Undefined Allowance, cost allowance for work as directed by Engineer and upon authorization by the City of Hollywood Director of Public Utilities due to undefined conditions.			
82 (PLEASE INPUT \$100,000.00 IN THIS LINE ITEM)	1 L.S.	\$100,000.00	\$100,000.00
83 Crew hourly rate to address utility conflicts Consideration for indemnification	160 HR	\$550.00	\$88,000.00
84 (PLEASE INPUT \$10 FOR THIS ITEM)	1 LS	\$10.00	\$10.00
Total			\$1,494,187.50

VENDOR REFERENCE FORM

City of Hollywood Solicitation #: IFB-083-23-JJ
 Reference for: Inflow / Infiltration (I/I) Excavated Point Repairs ESSD Project N. 7106A

Organization/Firm Name providing reference: Town of Davie

Organization/Firm Contact Name: Natasha Alexander Title: Project Manager
 Email: nalexander@davie-fl.gov Phone: 954-797-1000
 Name of Referenced Project: Stormwater Maintenance Contract No: ITB-RM-20-20
 Date Services were provided: June 2021 to Jul 2025 Project Amount: \$300K

Referenced Vendor's role in Project: Prime Vendor Subcontractor/
 Subconsultant
 Would you use the Vendor again? Yes No. Please specify in additional comments

Description of services provided by Vendor (provide additional sheet if necessary):
Stormwater Maintenance

Please rate your experience with the Vendor	Need Improvement	Satisfactory	Excellent	Not Applicable
Vendor's Quality of Service				
a. Responsive	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
b. Accuracy	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
c. Deliverables	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Vendor's Organization:				
a. Staff expertise	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
b. Professionalism	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
c. Staff turnover	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Timeliness/Cost Control of:				
a. Project	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
b. Deliverables	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Additional Comments (provide additional sheet if necessary):

THIS SECTION FOR CITY USE ONLY				
Verified via:	Email: <input type="checkbox"/>	Verbal: <input type="checkbox"/>	Mail: <input type="checkbox"/>	
Verified by:	Name:		Title:	
	Department:		Date:	

VENDOR REFERENCE FORM

City of Hollywood Solicitation #: IFB-083-23-JJ
 Reference for: Inflow / Infiltration (I/I) Excavated Point Repairs ESSD Project N. 7106A

Organization/Firm Name providing reference: City of Hollywood

Organization/Firm Contact Name: Feng Jiang Title: Project Manager

Email: FJiang@hollywoodfl.org Phone: 954-921-3930

Name of Referenced Project: Gravity Sewer System Condition Assessment, Renewal and Replacement (I/I) Program Contract No: 20-7106

Date Services were provided: Jan 2021 - Sept 2023 Project Amount: \$1,144,967.00

Referenced Vendor's role in Project: Prime Vendor Subcontractor/ Subconsultant

Would you use the Vendor again? Yes No. Please specify in additional comments

Description of services provided by Vendor (provide additional sheet if necessary):

Performing sanitary sewer repairs and grouting abandoned sewer pies and installation; providing temporary sanitary sewer service laterals, bypass pumping or plugging and other miscellaneous items to complete.

Please rate your experience with the Vendor	Need Improvement	Satisfactory	Excellent	Not Applicable
Vendor's Quality of Service				
a. Responsive	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
b. Accuracy	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
c. Deliverables	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Vendor's Organization:				
a. Staff expertise	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
b. Professionalism	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
c. Staff turnover	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Timeliness/Cost Control of:				
a. Project	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
b. Deliverables	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Additional Comments (provide additional sheet if necessary):

THIS SECTION FOR CITY USE ONLY				
Verified via:	Email: <input type="checkbox"/>	Verbal: <input type="checkbox"/>	Mail: <input type="checkbox"/>	
Verified by:	Name:	Title:		
	Department:	Date:		

VENDOR REFERENCE FORM

City of Hollywood Solicitation #: IFB-083-23-JJ
 Reference for: Inflow / Infiltration (I/I) Excavated Point Repairs ESSD Project N. 7106A

Organization/Firm Name providing reference: Broward County Utilities

Organization/Firm Contact Name: Nestor Berrios Title: Project Manager

Email: nberrios@broward.org Phone: 954-831-0728

Name of Referenced Project: Cleaning, Televising, Contract No: OPN2121531B1
 Date Services were provided: Grouting and Video Capture Project Amount: \$1.3M
2021 to 2026

Referenced Vendor's role in Project: Prime Vendor Subcontractor/
 Subconsultant

Would you use the Vendor again? Yes No. Please specify in additional comments

Description of services provided by Vendor (provide additional sheet if necessary):
Cleaning, Televising, Grouting and Video Capture Services

Please rate your experience with the Vendor	Need Improvement	Satisfactory	Excellent	Not Applicable
Vendor's Quality of Service				
a. Responsive	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
b. Accuracy	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
c. Deliverables	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Vendor's Organization:				
a. Staff expertise	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
b. Professionalism	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
c. Staff turnover	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Timeliness/Cost Control of:				
a. Project	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
b. Deliverables	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Additional Comments (provide additional sheet if necessary):

THIS SECTION FOR CITY USE ONLY				
Verified via:	Email: <input type="checkbox"/>	Verbal: <input type="checkbox"/>	Mail: <input type="checkbox"/>	
Verified by:	Name:	Title:		
	Department:	Date:		

VENDOR REFERENCE FORM

City of Hollywood Solicitation #: IFB-083-23-JJ
 Reference for: Inflow / Infiltration (I/I) Excavated Point Repairs ESSD Project N. 7106A

Organization/Firm Name providing reference: Town of Cutler Bay

Organization/Firm Contact Name: Alfredo Quintero Title: P.W. Director

Email: aquintero@cutlerbay-fl.gov Phone: 305 878 8601

Name of Referenced Project: Catch Basin Maintenance Contract No: Piggyback on Cont#2013-32

Date Services were provided: December 2018 to September 2020 Project Amount: \$300,000.00

Referenced Vendor's role in Project: Prime Vendor Subcontractor/
 Subconsultant

Would you use the Vendor again? Yes No. Please specify in additional comments

Description of services provided by Vendor (provide additional sheet if necessary):
Town-Wide Catch Basin Maintenance Program

Please rate your experience with the Vendor	Need Improvement	Satisfactory	Excellent	Not Applicable
Vendor's Quality of Service				
a. Responsive	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
b. Accuracy	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
c. Deliverables	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Vendor's Organization:				
a. Staff expertise	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
b. Professionalism	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
c. Staff turnover	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Timeliness/Cost Control of:				
a. Project	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
b. Deliverables	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Additional Comments (provide additional sheet if necessary):

****THIS SECTION FOR CITY USE ONLY****						
Verified via:	Email:	<input type="checkbox"/>	Verbal:	<input type="checkbox"/>	Mail:	<input type="checkbox"/>
Verified by:	Name:				Title:	
	Department:				Date:	

VENDOR REFERENCE FORM

City of Hollywood Solicitation #: IFB-083-23-JJ
 Reference for: Inflow / Infiltration (I/I) Excavated Point Repairs ESSD Project N. 7106A

Organization/Firm Name providing reference:

City of Ft Lauderdale

Organization/Firm Contact

Name:

Elkin Diaz

Title:

Project Manager

Email:

ediaz@Ft Lauderdale.gov

Phone:

954-828-8000

Name of Referenced Project:

Stormwater Infra. Cleaning ...

Contract No:

ITB 12520-813

Date Services were provided:

2021 to 2025

Project Amount:

\$150K

Referenced Vendor's role in Project:

Prime Vendor

Subcontractor/
Subconsultant

Would you use the Vendor again?

Yes

NO. Please specify in additional comments

Description of services provided by Vendor (provide additional sheet if necessary):

Stormwater Infrastructure Cleaning and Maintenance Services

Please rate your experience with the Vendor	Need Improvement	Satisfactory	Excellent	Not Applicable
Vendor's Quality of Service				
a. Responsive	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
b. Accuracy	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
c. Deliverables	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Vendor's Organization:				
a. Staff expertise	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
b. Professionalism	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
c. Staff turnover	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Timeliness/Cost Control of:				
a. Project	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
b. Deliverables	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Additional Comments (provide additional sheet if necessary):

THIS SECTION FOR CITY USE ONLY

Verified via:	Email:	<input type="checkbox"/>	Verbal:	<input type="checkbox"/>	Mail:	<input type="checkbox"/>
Verified by:	Name:				Title:	
	Department:				Date:	



FORM 5

HOLD HARMLESS AND INDEMNITY CLAUSE

EnviroWaste Services Group, Inc. David L. Orr, SVP

(Company Name and Authorized Signature, Print Name)

, the contractor, shall indemnify, defend and hold harmless the City of Hollywood, its elected and appointed officials, employees and agents for any and all suits, actions, legal or administrative proceedings, claims, damage, liabilities, interest, attorney's fees, costs of any kind whether arising prior to the start of activities or following the completion or acceptance and in any manner directly or indirectly caused, occasioned or contributed to in whole or in part by reason of any act, error or omission, fault or negligence whether active or passive by the contractor, or anyone acting under its direction, control, or on its behalf in connection with or incident to its performance of the contract.

Signature

David L. Orr

Printed Name

EnviroWaste Services Group, Inc.

Name of Company

SVP and Corporate Secretary

Title

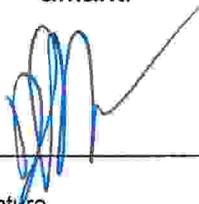
FORM 6

NON-COLLUSION AFFIDAVIT

STATE OF: Florida

COUNTY OF: Seminole, being first duly sworn, deposes and says that:

- (1) He/~~She~~ is SVP and Corporate Secretary of EnviroWaste Services Group, Inc., the Proposer that has submitted the attached Proposal.
- (2) He/she has been fully informed regarding the preparation and contents of the attached Proposal and of all pertinent circumstances regarding such Proposal;
- (3) Such Proposal is genuine and is not a collusion or sham Proposal;
- (4) Neither the said Proposer nor any of its officers, partners, owners, agents, representatives, employees or parties in interest, including this affiant has in any way colluded, conspired, connived or agreed, directly or indirectly with any other Proposer, firm or person to submit a collusive or sham Proposal in connection with the contractor for which the attached Proposal has been submitted or to refrain from bidding in connection with such contract, or has in any manner, directly or indirectly, sought by agreement or collusion or communication or conference with any other Proposer, firm or person to fix the price or prices, profit or cost element of the Proposal price or the Proposal price of any other Proposer, or to secure an advantage against the City of Hollywood or any person interested in the proposed Contract; and
- (5) The price or prices quoted in the attached Proposal are fair and proper and are not tainted by any collusion, conspiracy, connivance or unlawful agreement on the part of the Proposer or any of its agents, representatives, owners, employees, or parties in interest, including this affiant.



Signature

David L. Orr

Printed Name

EnviroWaste Services Group, Inc.

Name of Company

SVP and Corporate Secretary

Title

FORM 7

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

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

1. This form statement is submitted to the City of Hollywood by David L. Orr for EnviroWaste Services Group, Inc.

(Print individual's name and title) (Print name of entity submitting sworn statement)

whose business address is

18001 Old Cutler Road, #554 Palmetto Bay, FL 33157

and if applicable its Federal Employer Identification Number (FEIN) is 65-0829090. If the entity has no FEIN, include the Social Security Number of the individual signing this sworn statement.

2. I understand that "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, proposal, reply, or contract for goods or services, any lease for real property, or any contract for the construction or repair of a public building or public work, involving antitrust, fraud, theft, bribery, collusion, racketeering, conspiracy, or material misinterpretation.
3. I understand that "convicted" or "conviction" as defined in Paragraph 287.133(1)(b), Florida Statutes, means a finding of guilt or a conviction of a public entity crime, with or without an adjudication of guilt, in an 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.
4. I understand that "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 a prima facie case that one person controls another person. A person who knowingly enters into a joint venture with a person who has been convicted of a public entity crime in Florida during the preceding 36 months shall be considered an affiliate.

5 I understand that "person," as defined in Paragraph 287.133(1)(e), Florida Statutes, means any natural person or any 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 let by a public entity, or which otherwise transacts or applies to transact business with a public entity. The term "person" includes those officers, executives, partners, shareholders, employees, members, and agents who are active in management of an entity.

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

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

The entity submitting this sworn statement, or one or more of its officers, directors, executives, partners, shareholders, employees, members, or agents who are active in the management of the entity, or an affiliate 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, but the Final Order entered by the Hearing Officer in a subsequent proceeding before a Hearing Officer of the State of the State of Florida,

Division of Administrative Hearings, 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).

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

[Handwritten Signature]

(Signature)

Sworn to and subscribed before me this 6th day of June, 2023.

Personally known _____

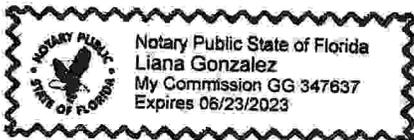
Or produced identification _____ Notary Public-State of Florida

(Type of identification)

my commission expires 6-23-23

[Handwritten Name]

(Printed, typed or stamped commissioned name of notary public)



FORM 8

CERTIFICATIONS REGARDING DEBARMENT, SUSPENSION AND OTHER RESPONSIBILITY MATTERS

The applicant certifies that it and its principals:

- (a) Are not presently debarred, suspended, proposed for debarment, declared ineligible, sentenced to a denial of Federal benefits by a State or Federal court, or voluntarily excluded from covered transactions by any Federal department or agency;
- (b) Have not within a three-year period preceding this application been convicted of or had a civil judgment rendered against them for commission of fraud or a criminal offense in connection with obtaining, attempting to obtain, or performing a public (Federal, State, or local) transaction or contract under a public transaction, violation of Federal or State antitrust statutes or commission of embezzlement, theft, forgery, bribery, falsification or destruction of records, making false statements, or receiving stolen property;
- (c) Are not presently indicted for or otherwise criminally or civilly charged by a governmental entity (Federal, State, or local) with commission of any of the offenses enumerated in paragraph (b) of this certification; and
- (d) Have not within a three-year period preceding this application had one or more public transactions (Federal, State, or local) terminated for cause or default.

Applicant Name and Address:

EnviroWaste Services Group, Inc.

18001 Old Cutler Road, #554 Palmetto Bay, FL 33157

Application Number and/or Project Name:

IFB-083-23-JJ - Inflow / Infiltration (I/I) Excavated Point Repairs ESSD Project No. 7106A

Applicant IRS/Vendor Number: _____



David L. Orr

Signature

Printed Name

EnviroWaste Services Group, Inc.

SVP and Corporate Secretary

Name of Company

Title

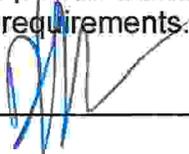
FORM 9

DRUG-FREE WORKPLACE PROGRAM

IDENTICAL TIE PROPOSALS - Preference shall be given to businesses with drug-free workplace programs. Whenever two or more bids which are equal with respect to price, quality, and service are received by the State or by any political subdivision for the procurement of commodities or contractual services, a bid received from a business that certifies that it has implemented a drug-free workplace program shall be given preference in the award process. Established procedures for processing tie proposals will be followed if none of the tied vendors have a drug-free workplace program. In order to have a drug-free workplace program, a business shall:

1. Publish a statement notifying employees that the unlawful manufacture, distribution, dispensing, possession, or use of a controlled substance is prohibited in the workplace and specifying the actions that will be taken against employees for violations of such prohibition.
2. Inform employees about the dangers of drug abuse in the workplace, the business's policy of maintaining a drug-free workplace, any available drug counseling, rehabilitation, and employee assistance programs, and the penalties that may be imposed upon employees for drug abuse violations.
3. Give each employee engaged in providing the commodities or contractual services that are under bid a copy of the statement specified in subsection (1).
4. In the statement specified in subsection (1), notify the employee that, as a condition of working on the commodities or contractual services that are under bid, the employee will abide by the terms of the statement and will notify the employer of any conviction of, or plea of guilty or nolo contendere to, any violation of chapter 893 or of any controlled substance law of the United States or any state, for a violation occurring in the workplace no later than five (5) days after such conviction.
5. Impose a sanction on, or require the satisfactory participation in a drug abuse assistance or rehabilitation program (if such is available in the employee's community) by, any employee who is so convicted.
6. Make a good faith effort to continue to maintain a drug-free workplace through implementation of these requirements.

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



Signature

David L. Orr

Printed Name

EnviroWaste Services Group, Inc.

Name of Company

SVP and Corporate Secretary

Title

FORM 10

SOLICITATION, GIVING, AND ACCEPTANCE OF GIFTS POLICY

Florida Statute 112.313 prohibits the solicitation or acceptance of Gifts. "No Public officer, employee of an agency, local government attorney, or candidate for nomination or election shall solicit or accept anything of value to the recipient, including a gift, loan, reward, promise of future employment, favor, or service, based upon any understanding that the vote, official action, or judgment of the public officer, employee, local government attorney, or candidate would be influenced thereby." The term "public officer" includes "any person elected or appointed to hold office in any agency, including any person serving on an advisory body."

The City of Hollywood/Hollywood CRA policy prohibits all public officers, elected or appointed, all employees, and their families from accepting any gifts of any value, either directly or indirectly, from any contractor, vendor, consultant, or business with whom the City/CRA does business.

The State of Florida definition of "gifts" includes the following:

- Real property or its use,
- Tangible or intangible personal property, or its use,
- A preferential rate or terms on a debt, loan, goods, or services,
- Forgiveness of indebtedness,
- Transportation, lodging, or parking,
- Food or beverage,
- Membership dues,
- Entrance fees, admission fees, or tickets to events, performances, or facilities,
- Plants, flowers or floral arrangements
- Services provided by persons pursuant to a professional license or certificate.
- Other personal services for which a fee is normally charged by the person providing the services.
- Any other similar service or thing having an attributable value not already provided for in this section.

Any contractor, vendor, consultant, or business found to have given a gift to a public officer or employee, or his/her family, will be subject to dismissal or revocation of contract.

As the person authorized to sign the statement, I certify that this firm will comply fully with this policy.



Signature

David L. Orr

Printed Name

EnviroWaste Services Group, Inc.

SVP and Corporate Secretary

Name of Company

Title

Request for Taxpayer Identification Number and Certification

**Give Form to the
requester. Do not
send to the IRS.**

▶ Go to www.irs.gov/FormW9 for instructions and the latest information.

1 Name (as shown on your income tax return). Name is required on this line; do not leave this line blank. Envirowaste Services Group, Inc.	
2 Business name/disregarded entity name, if different from above	
3 Check appropriate box for federal tax classification of the person whose name is entered on line 1. Check only one of the following seven boxes. <input type="checkbox"/> Individual/sole proprietor or single-member LLC <input checked="" type="checkbox"/> C Corporation <input type="checkbox"/> S Corporation <input type="checkbox"/> Partnership <input type="checkbox"/> Trust/estate <input type="checkbox"/> Limited liability company. Enter the tax classification (C=C corporation, S=S corporation, P=Partnership) ▶ _____ <small>Note: Check the appropriate box in the line above for the tax classification of the single-member owner. Do not check LLC if the LLC is classified as a single-member LLC that is disregarded from the owner unless the owner of the LLC is another LLC that is not disregarded from the owner for U.S. federal tax purposes. Otherwise, a single-member LLC that is disregarded from the owner should check the appropriate box for the tax classification of its owner.</small> <input type="checkbox"/> Other (see instructions) ▶ _____	4 Exemptions (codes apply only to certain entities, not individuals; see instructions on page 3): Exempt payee code (if any) _____ Exemption from FATCA reporting code (if any) _____ <small>(Applies to accounts maintained outside the U.S.)</small>
5 Address (number, street, and apt. or suite no.) See instructions. 18001 Old Cutler Road, Suite 643	Requester's name and address (optional)
6 City, state, and ZIP code Palmetto Bay, FL 33157	
7 List account number(s) here (optional)	

Print or type.
See Specific Instructions on page 3.

Part I Taxpayer Identification Number (TIN) Enter your TIN in the appropriate box. The TIN provided must match the name given on line 1 to avoid backup withholding. For individuals, this is generally your social security number (SSN). However, for a resident alien, sole proprietor, or disregarded entity, see the instructions for Part I, later. For other entities, it is your employer identification number (EIN). If you do not have a number, see <i>How to get a TIN</i> , later. <small>Note: If the account is in more than one name, see the instructions for line 1. Also see <i>What Name and Number To Give the Requester</i> for guidelines on whose number to enter.</small>																																																			
	<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td colspan="10" style="text-align: center;">Social security number</td> </tr> <tr> <td style="width: 20px; height: 20px;"></td> </tr> <tr> <td colspan="10" style="text-align: center;">or</td> </tr> <tr> <td colspan="10" style="text-align: center;">Employer identification number</td> </tr> <tr> <td style="width: 20px; height: 20px;">6</td> <td style="width: 20px; height: 20px;">5</td> <td style="width: 20px; height: 20px;"></td> <td style="width: 20px; height: 20px;">0</td> <td style="width: 20px; height: 20px;">8</td> <td style="width: 20px; height: 20px;">2</td> <td style="width: 20px; height: 20px;">9</td> <td style="width: 20px; height: 20px;">0</td> <td style="width: 20px; height: 20px;">9</td> <td style="width: 20px; height: 20px;">0</td> </tr> </table>	Social security number																				or										Employer identification number										6	5		0	8	2	9	0	9	0
Social security number																																																			
or																																																			
Employer identification number																																																			
6	5		0	8	2	9	0	9	0																																										

Part II Certification Under penalties of perjury, I certify that:	
1. The number shown on this form is my correct taxpayer identification number (or I am waiting for a number to be issued to me); and 2. I am not subject to backup withholding because: (a) I am exempt from backup withholding, or (b) I have not been notified by the Internal Revenue Service (IRS) that I am subject to backup withholding as a result of a failure to report all interest or dividends, or (c) the IRS has notified me that I am no longer subject to backup withholding; and 3. I am a U.S. citizen or other U.S. person (defined below); and 4. The FATCA code(s) entered on this form (if any) indicating that I am exempt from FATCA reporting is correct.	
Certification Instructions. You must cross out item 2 above if you have been notified by the IRS that you are currently subject to backup withholding because you have failed to report all interest and dividends on your tax return. For real estate transactions, item 2 does not apply. For mortgage interest paid, acquisition or abandonment of secured property, cancellation of debt, contributions to an individual retirement arrangement (IRA), and generally, payments other than interest and dividends, you are not required to sign the certification, but you must provide your correct TIN. See the instructions for Part II, later.	

Sign Here	Signature of U.S. person ▶	Date ▶ 02/22/2023
------------------	----------------------------	--------------------------

General Instructions

Section references are to the Internal Revenue Code unless otherwise noted.

Future developments. For the latest information about developments related to Form W-9 and its instructions, such as legislation enacted after they were published, go to www.irs.gov/FormW9.

Purpose of Form

An individual or entity (Form W-9 requester) who is required to file an information return with the IRS must obtain your correct taxpayer identification number (TIN) which may be your social security number (SSN), individual taxpayer identification number (ITIN), adoption taxpayer identification number (ATIN), or employer identification number (EIN), to report on an information return the amount paid to you, or other amount reportable on an information return. Examples of information returns include, but are not limited to, the following.

- Form 1099-INT (interest earned or paid)
- Form 1099-DIV (dividends, including those from stocks or mutual funds)
- Form 1099-MISC (various types of income, prizes, awards, or gross proceeds)
- Form 1099-B (stock or mutual fund sales and certain other transactions by brokers)
- Form 1099-S (proceeds from real estate transactions)
- Form 1099-K (merchant card and third party network transactions)
- Form 1098 (home mortgage interest), 1098-E (student loan interest), 1098-T (tuition)
- Form 1099-C (canceled debt)
- Form 1099-A (acquisition or abandonment of secured property)

Use Form W-9 only if you are a U.S. person (including a resident alien), to provide your correct TIN.

If you do not return Form W-9 to the requester with a TIN, you might be subject to backup withholding. See What is backup withholding, later.

FORM 12

TRENCH SAFETY

This form must be completed and signed by the Respondent.

Failure to complete this form may result in the solicitation being declared non-responsive.

Respondent acknowledges that the Florida Trench Safety Act, Section 553.60 et. seq., which became effective October 1, 1990, shall be in effect during the period of construction of the project. The respondent by signing and submitting the solicitation is, in writing, assuring that it will perform any trench excavation in accordance with applicable trench safety standards. The respondent further identifies the following separate item of cost of compliance with the applicable trench safety standards as well as the method of compliance:

<u>Method of Compliance</u>	<u>Cost</u>
Sloping and trench box	\$1,000.00
	Total \$ _____

Respondent acknowledges that this cost is included in the applicable items of their submittal and in the Grand Total Solicitation Price. Failure to complete the above will result in the solicitation being declared non-responsive.

The Respondent is, and the Owner and Engineer are not, responsible to review or assess Respondent's safety precautions, programs or costs, or the means, methods, techniques or technique adequacy, reasonableness of cost, sequences or procedures of any safety precaution, program or cost, including but not limited to, compliance with any and all requirements of Florida Statute Section 553.60 et. seq. cited as the "Trench Safety Act." Respondent is, and the owner and Engineer are not, responsible to determine if any safety related standards apply to the project, including but not limited to, the "Trench Safety Act."



Witness Signature

John Rinehart

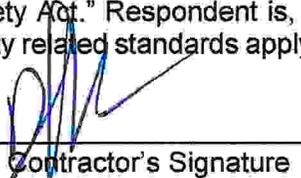
Witness Printed Name

2170 West SR 434, Suite 384 Longwood, FL 32779

Witness Address

June 5, 2023

Date



Contractor's Signature

David L. Orr

Printed Name

SVP and Corporate Secretary

Title

June 5, 2023

Date

- END OF SECTION -

THE AMERICAN INSTITUTE OF ARCHITECTS

AIA Document A310 Bid Bond

KNOW ALL MEN BY THESE PRESENTS, THAT WE EnviroWaste Services Group, Inc.

18001 Old Cutler Road, #643, Palmetto Bay, FL 33157

as Principal, hereinafter called the Principal, and Ascot Surety & Casualty Company

55 W 46th Street, New York, NY 10036

a corporation duly organized under the laws of the State of CO

as Surety, hereinafter called the Surety, are held and firmly bound unto City of Hollywood, Florida

2600 Hollywood Boulevard, Hollywood, FL 33020

as Obligee, hereinafter called the Obligee, in the sum of Five Percent of Amount Bid

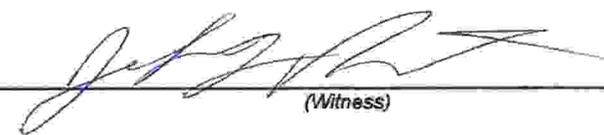
Dollars (\$ 5%),

for the payment of which sum well and truly to be made, the said Principal and the said Surety, bind ourselves, our heirs, executors, administrators, successors and assigns, jointly and severally, firmly by these presents.

WHEREAS, the Principal has submitted a bid for IFB-083-23-JJ, INFLOW/INFILTRATION (I/I) EXCAVATED POINT REPAIRS, ESSD Project No. 7106A

NOW, THEREFORE, if the Obligee shall accept the bid of the Principal and the Principal shall enter into a Contract with the Obligee in accordance with the terms of such bid, and give such bond or bonds as may be specified in the bidding or Contract Documents with good and sufficient surety for the faithful performance of such Contract and for the prompt payment of labor and materials furnished in the prosecution thereof, or in the event of the failure of the Principal to enter such Contract and give such bond or bonds, if the Principal shall pay to the Obligee the difference not to exceed the penalty hereof between the amount specified in said bid and such larger amount for which the Obligee may in good faith contract with another party to perform the Work covered by said bid, then this obligation shall be null and void, otherwise to remain in full force and effect.

Signed and sealed this 5th day of June, 2023


(Witness)

EnviroWaste Services Group, Inc.

(Principal)

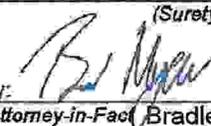
By: 

(Title)

(Seal)

Ascot Surety & Casualty Company

(Surety)

By: 

Attorney-in-Fact, Bradley Mapes

(Title)

(Seal)

Sarah C. Belcastro

(Witness)





Ascot Surety & Casualty Company
 Ascot Insurance Company
 55 W 46th Street, 26th Floor
 New York, NY 10036

Power of Attorney

KNOW ALL MEN BY THESE PRESENTS:

That Ascot Surety & Casualty Company, and Ascot Insurance Company, each a corporation organized and existing under the laws of the State of Colorado (the "Companies"), do hereby constitute and appoint

Stephen A. Vann, Sarah C. Belcastro, Jodi L. Jennings, Mario Medina, Oana R. Dimulescu and Bradley Mapes

of Atlanta, GA and each its true and lawful Attorney(s)-in-Fact, with full authority to sign, execute, seal, acknowledge and deliver for, and on its behalf, and as its act and deed any place within the United States, or, if the following line is filled in, only within the area and up to the amount therein designated, any and all bonds, undertakings, recognizances, and other contracts of indemnity or writings obligatory in the nature thereof, issued in the course of its surety business, and to bind the Companies as follows:

Any such obligations in the United States not to exceed \$50,000,000.00

The Companies hereby ratify and confirm all and whatsoever said Attorney(s)-in-fact may lawfully do in the premises by virtue of these presents. These appointments are made under and by authority of the following Resolutions adopted by the Board of Directors of the Companies, which resolutions are still in effect:

RESOLVED, that any of the Chief Executive Officer, the Chief Operating Officer or the Chief Underwriting Officer, acting in conjunction with the head of the surety business line for the Corporation (each an "Authorized Individual" and, collectively, the "Authorized Individuals"), are authorized to jointly appoint one or more attorneys-in-fact to represent and act for and on behalf of the Corporation in the transaction of the Corporation's surety business to execute (under the common seal of the Corporation if appropriate) bonds, undertakings, recognizances and other contracts of indemnity and writings obligatory in the nature thereof;

RESOLVED, that in connection with the Corporation's transaction of surety business the signatures and attestations of the Authorized Individuals and the seal of the Corporation be affixed to any such Power of Attorney or to any certificate relating thereto (electronic or otherwise) by facsimile and any such Power of Attorney or certificate bearing such facsimile signatures or facsimile seal (electronic or otherwise) shall be valid and binding upon the Corporation when so affixed with respect to any bond, undertaking, recognizance or other contract of indemnity or writing obligatory in the nature thereof;

RESOLVED, that in connection with the Corporation's transaction of surety business, the facsimile electronic or mechanically reproduced signature of any Authorized Individual, whether made heretofore or hereafter, whenever appearing upon a copy of any Power of Attorney of the Corporation, with signatures affixed as next above noted, shall be valid and binding upon the Corporation with the same force and effect as though manually affixed.

IN WITNESS WHEREOF, the Companies have caused these presents to be sealed with the respective corporate seals and to be executed by the individuals named below who are duly authorized and empowered to execute this Power of Attorney on the Companies' behalf, this 23rd day of August, 2022.



ASCOT SURETY & CASUALTY COMPANY
 ASCOT INSURANCE COMPANY



Matthew Kramer (Chief Executive Officer)

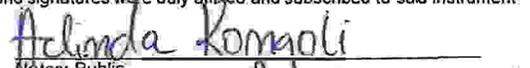


Tara Quigley (Executive Vice President, Surety)

STATE OF NEW JERSEY)
 COUNTY OF MIDDLESEX) ss.

On this 23rd day of August 2022, before me came the above named Chief Executive Officer of each of Ascot Surety & Casualty Company and Ascot Insurance Company and the head of the surety business line for each of Ascot Surety & Casualty Company and Ascot Insurance Company, to me personally known to be the individuals described herein, and acknowledged that the seals affixed to the preceding instrument are the corporate seals of Ascot Surety & Casualty Company and Ascot Insurance Company, and that the said corporate seals and signatures were duly affixed and subscribed to said instrument by the authority and direction of said Companies.




 Arlinda Kongoli
 Notary Public
 My commission expires on April 3, 2027

I, the undersigned Secretary of the Company, do hereby certify that the foregoing excerpts of the Resolution adopted by the Board of Directors of the Companies, and the Power of Attorney issued pursuant thereto, are true and correct, and further certify that both the Resolution and the Power of Attorney are still in full force and effect.

This Certificate may be signed by facsimile under and by authority of the following resolution of the Board of Directors of the Companies:

RESOLVED, that in connection with the Corporation's transaction of surety business the signatures and attestations of the Authorized Individuals and the seal of the Corporation be affixed to any such Power of Attorney or to any certificate relating thereto (electronic or otherwise) by facsimile and any such Power of Attorney or certificate bearing such facsimile signatures or facsimile seal (electronic or otherwise) shall be valid and binding upon the Corporation when so affixed with respect to any bond, undertaking, recognizance or other contract of indemnity or writing obligatory in the nature thereof;

IN WITNESS WHEREOF, I have hereunto set my hand and affixed the seal of the Companies, this 5th day of June, 2023

ASCOT SURETY & CASUALTY COMPANY
 ASCOT INSURANCE COMPANY

Jeff Sipos, Secretary

Form 14

LIST OF SUBCONTRACTORS

The Respondent shall list below the name and address of each Subcontractor who will perform work under this Contract, and shall also list the portion of the work which will be done by such Subcontractor. After the opening of Submittals, changes or substitutions will be allowed with written approval of the City of Hollywood. Subcontractors must be properly licensed.

	Work to be Performed	Subcontractor's Name / Address
1.	_____	_____
	None	_____
2.	_____	_____
	_____	_____
3.	_____	_____
	_____	_____
4.	_____	_____
	_____	_____
5.	_____	_____
	_____	_____
6.	_____	_____
	_____	_____
7.	_____	_____
	_____	_____
8.	_____	_____
	_____	_____
9.	_____	_____
	_____	_____
10.	_____	_____
	_____	_____

NOTE: Attach additional sheets if required.

- END OF SECTION -

FORM 15

INFORMATION REQUIRED FROM BIDDERS

GENERAL INFORMATION

The Bidder shall furnish the following information. Failure to comply with this requirement may cause its rejection. Additional sheets shall be attached as required.

1. Contractor's Name/Address: EnviroWaste Services Group, Inc.
18001 Old Cutler Road, Suite 643
Palmetto Bay, FL 33157

2. Contractor's Telephone Number: 877-637-9665
and e-mail address: INFO@EWSG.com

3. Contractor's License (attach copy): CGC1533927
Primary Classification: Certified General Contractor
Broward County License Number (attach copy): _____

4. Number of years as a Contractor in construction work of the type involved in this Contract: Jim Long CEO, Marc Bourhis CFO, Stephen Reynolds EVP,
David Gershman EVP Secretary & General Counsel, David L Orr SVP, Michelsa Calderon Asst Secretary

5. List the names and titles of all officers of Contractor's firm:
Jim Long
George A. Gross, Jr.
Setphen Reynolds
Julio Fojon

6. Name of person who inspected site or proposed work for your firm:
Name: Mike Garcia
Date of Inspection: 6-1-2022

7. What is the last project of this nature you have completed?
City of Hollywood 20-7106

8. Have you ever failed to complete work awarded to you; if so, where and why?

No

9. Name three individuals or corporations for which you have performed work and to which you refer:

City of Hollywood, Clece Aurelus

Town of Cutler Bay, Alfredo Quintero 305-878-8601

City of Doral, Carlos Arroyo 786-367-5083

10. List the following information concerning all contracts on hand as of the date of submission of this proposal (in case of co-venture, list the information for all coventures).

Name of Project	City	Total Contract Value	Contracted Date of Completion	% Completion to Date
-----------------	------	----------------------	-------------------------------	----------------------

See attached Qualifications Submittal

(Continue list on inset sheet, if necessary)

11. What equipment do you own that is available for the work?

See attached Qualifications Submittal

12. What equipment will you purchase for the proposed work?

None

13. The Bidder shall have a minimum of five years previous experience in the work required in this section. The determination of whether a project is sufficiently similar shall be at the sole discretion of the City and the Engineer.

See attached Qualifications Submittal

(Add sheets as requested.)

14. Name the Project Manager proposed for this project. Attach a copy of the project manager's resume.
Mike Garcia, PM, OPS 305-796-9357 mikegarcia@ewsg.com
-

NOTE: If requested by CITY, the Bidder shall furnish a notarized financial statement, references and other information, sufficiently comprehensive to permit an appraisal of its current financial condition.



MIKE GARCIA
Director of Construction - EnviroWaste Services Group, Inc.

PROFESSIONAL PROFILE

Mr. Garcia joined EWSG as Director of Construction in September of 2008 and has worked in a number of complex public Right-of-Way projects involving sanitary and storm drain pipe replacement. All of his projects have been delivered within contract schedule. He oversees the overall horizontal construction end of the company as well as bidding for future job opportunities and meeting with public officials.

In addition to being in charge of all horizontal and underground construction in South Florida, Mr. Garcia also handles all of cleaning and cctv inspection work based out of our Miami office. With a local fleet of 10 jet/vacs and 4 cctv inspection trucks, Mr. Garcia is directly responsible for roughly 1,000,000 linear feet of storm and sanitary sewers inspections yearly.

EWSG has the ability to self perform all of the open cut pipe replacement work, and generally subcontracts asphalt paving. Concrete paving is self performed.

- City of Miami Beach Horizontal JOC – Sanitary Sewer Pipe replacement and Point Repairs - \$ 150,000
- Town of Miami Lakes – Paving Drainage - \$ 206,000
- North Bay Village – Drainage and Paving - & 164,000
- Tamayo Engineering – FDOT Emergency Response – Sanitary Sewer Pipe Replacement - \$ 115,000
- City of Miami Beach JOC Contract- Cleaning, Lining, Point Repairs \$1,500,000
- City of Miramar – Cleaning, Inspection and Repair of Sanitary Sewer \$185,000
- Miami International Airport – Cleaning, Inspection and Repair of Sanitary Sewer - \$ 71,000
- Homestead Air Reserve Base - Sanitary Sewer Evaluation Study and Repairs – \$ 126,000
- City of Punta Gorda – Annual Grouting Contract - \$ 60,000
- City of Orlando Smoke Testing, and Sectional Point Repair - \$ 400,000 Annual
- FDOT – District 5 E5J21 Storm Sewer Inspection and Repair - \$ 670,000
- Indian Creek Village Storm Sewer Inspection and Rehabilitation - \$ 390,000
- InsituformTechnologies, Inc. – CCTV Inspection subcontracting: City of Miami Storm Capital Improvements, Pompano Beach Storm Sewer, City of Fort Lauderdale, City of North Miami , City of Clearwater, City of Tampa \$800,000
- Miami Dade WASD S-793 Countywide One-Year Contract Removal/Replacement and Rehabilitation of Sanitary Sewer Laterals - \$450,000
- City of Coral Gables Sanitary Sewer Rehabilitation Evaluation Assessment - \$1,200,000.00
- City of Miami C.I.P. Department Storm Drainage Improvements - \$790,000.00
- City of Miami C.I.P. Department concrete speed table installations City wide- \$100,000.00
- Town of Cutler Bay Concrete and Roadway Resurfacing - \$3,000,000.00

Headquarters: 18001 Old Cutler Road, #554, Miami, FL 33157 * (877) 637-9665 * F (877) 637-9659
Offices: Miami, FL * Orlando, FL * Tampa, FL
www.envirowasteg.com * email: info@envirowasteg.com



- City of Ft. Lauderdale Sanitary Sewer Rehabilitation Evaluation Assessment - \$325,000.00
- City of Homestead Sanitary Sewer Rehabilitation Evaluation Assessment - \$725,000.00
- City of Hollywood Sanitary Sewer Rehabilitation Evaluation Assessment - \$5,525,000.00
- City of Sunrise Sanitary Sewer Rehabilitation Evaluation Assessment - \$225,000.00
- City of Boca Raton Sanitary Sewer Rehabilitation Evaluation Assessment - \$1,285,000.00
- Broward County Sanitary Sewer Rehabilitation Evaluation Assessment - \$1,000,000.00
- City of Weston Sanitary Sewer Rehabilitation Evaluation Assessment - \$185,000.00
- Town of Davie Sanitary Sewer manhole removal/point repair - \$37,000.00
- City of North Miami Beach Sanitary Sewer Rehabilitation Evaluation Assessment - \$625,000.00
- City of North Miami Beach 18" water main replacement - \$125,000.00
- Village of Bal Harbour Sanitary Sewer Rehabilitation Evaluation Assessment - \$300,000.00
- Village of Pinecrest Storm Water Drainage Improvements - \$50,000.00
- Village of Pinecrest Sidewalk Improvements - \$90,000.00
- Collier County Storm Water Pipe Replacement - \$48,000.00
-

PREVIOUS EXPERIENCE

Mr. Garcia has been in the construction arena for over 26 years. Throughout his years in the industry, he has been involved in some of the largest homebuilding and land development jobs throughout South Florida.

He has also been involved in three opportunities to participate in Habitat for Humanity offering his help and experience during the development of new homes.

EDUCATION

Florida International University	-	1998
Miami Dade Community College	-	1996

SPECIAL QUALIFICATIONS

OSHA certified
First Aid certified

Headquarters: 18001 Old Cutler Road, #554, Miami, FL 33157 * (877) 637-9665 * F (877) 637-9659
Offices: Miami, FL * Orlando, FL * Tampa, FL
www.envirowastesg.com * email: info@envirowastesg.com

LIST OF SUBCONTRACTORS (NOT USED/See Form 14)

The Bidder shall list below the name and address of each Subcontractor who will perform work under this Contract in excess of one-half percent of the total lump sum base bid price, and shall also list the portion of the work which will be done by such Subcontractor. After the opening of Proposals, changes or substitutions will be allowed with written approval of the City of Hollywood. Subcontractors must be properly licensed and hold a valid Hollywood Certificate of Competency.

	Work to be Performed	Subcontractor's Name / Address
1.	_____	_____
	None	_____
2.	_____	_____
	_____	_____
3.	_____	_____
	_____	_____
4.	_____	_____
	_____	_____
5.	_____	_____
	_____	_____
6.	_____	_____
	_____	_____
7.	_____	_____
	_____	_____
8.	_____	_____
	_____	_____
9.	_____	_____
	_____	_____
10.	_____	_____
	_____	_____

NOTE: Attach additional sheets if required.

++ END OF SECTION

State of Florida

Department of State

I certify from the records of this office that ENVIROWASTE SERVICES GROUP, INC. is a corporation organized under the laws of the State of Florida, filed on February 13, 1998.

The document number of this corporation is P98000014467.

I further certify that said corporation has paid all fees due this office through December 31, 2023, that its most recent annual report/uniform business report was filed on February 16, 2023, and that its status is active.

I further certify that said corporation has not filed Articles of Dissolution.

*Given under my hand and the
Great Seal of the State of Florida
at Tallahassee, the Capital, this
the Fifth day of June, 2023*




Secretary of State

Tracking Number: 4857670776CU

To authenticate this certificate, visit the following site, enter this number, and then follow the instructions displayed.

<https://services.sunbiz.org/Filings/CertificateOfStatus/CertificateAuthentication>

FORM 16

PROPOSAL

TO THE MAYOR AND COMMISSIONERS
CITY OF HOLLYWOOD, FLORIDA

SUBMITTED June 7, 2023

Dear Mayor and Commissioners:

The undersigned, as BIDDER, hereby declares that the only person or persons interested in the Proposal as principal or principals is or are named herein and that no other person than herein mentioned has any interest in this Proposal or in the Contract to be entered into; that this Proposal is made without connection with any other person, company or parties making a Bid or Proposal; and that it is in all respects fair and in good faith without collusion or fraud.

The BIDDER further declares that he has examined the site of the Work and informed himself fully in regard to all conditions pertaining to the place where the Work is to be done; that he has examined the Drawings and Specifications for the Work and contractual documents relative thereto, including the Notice to Bidders, Instructions to Bidders, Proposal Bid Form, Form of Bid Bond, Form of Contract and Form of Performance Bond, General, Supplementary and Technical Specifications, Addenda, Drawings, and Local Preference Program, Exhibit A, and has read all of the Provisions furnished prior to the opening of bids; and that he has satisfied himself relative to the work to be performed.

The undersigned BIDDER has not divulged to, discussed or compared his bid with other bidders and has not colluded with any other BIDDER of parties to this bid whatever.

If this Proposal is accepted, the undersigned BIDDER proposes and agrees to enter into and execute the Contract with the City of Hollywood, Florida, in the form of Contract specified; of which this Proposal, Instructions to Bidders, General Specifications, Supplementary Conditions and Drawings shall be made a part for the performance of Work described therein; to furnish the necessary bond equal to one hundred (100) percent of the total Contract base bid, the said bond being in the form of a Cash Bond or Surety Bond prepared on the applicable approved bond form furnished by the CITY; to furnish all necessary materials, equipment, machinery, tools, apparatus, transportation, supervision, labor and all means necessary to construct and complete the work specified in the Proposal and Contract and called for in the Drawings and in the manner specified; to commence Work on the effective date established in the "Notice to Proceed" from the ENGINEER; and to substantially complete all Contract Work within 30 days with final completion within 45 days, and stated in the "Notice to Proceed" or pay liquidated damages for each calendar day in excess thereof, or such actual and consequential damages as may result therefrom, and to abide by the Local Preference Ordinance, Exhibit A.

The BIDDER acknowledges receipt of the following addenda:

No. <u> #1 </u>	Dated <u>5-23-2023</u>
No. <u> </u>	Dated <u> </u>
No. <u> </u>	Dated <u> </u>

And the undersigned agrees that in case of failure on his part to execute the said Contract and the Bond within ten (10) days after being presented with the prescribed Contract forms, the check or Bid Bond accompanying his bid, and the money payable thereon, shall be paid into the funds of the City of Hollywood, Florida, otherwise, the check or Bid Bond accompanying this Proposal shall be returned to the undersigned.

Attached hereto is a certified check on the

_____ Bank of _____

or approved Bid Bond for the sum of

Five Percent (5%) Dollars (\$) according to the conditions under the Instructions to Bidders and provisions therein.

NOTE: If a Bidder is a corporation, the legal name of the corporation shall be set forth below, together with signature(s) of the officer or officers authorized to sign Contracts on behalf of the corporation and corporate seal; if Bidder is a partnership, the true name of the firm shall be set forth below with the signature(s) of the partner or partners authorized to sign Contracts in behalf of the partnership; and if the Bidder is an individual, his signature shall be placed below; if a partnership, the names of the general partners.

WHEN THE BIDDER IS AN INDIVIDUAL:

(Signature of Individual)

(Printed Name of Individual)

(Address)

WHEN THE BIDDER IS A SOLE PROPRIETORSHIP OR OPERATES UNDER A TRADE NAME:

(Name of Firm)

(Address)

(Signature of Individual) (SEAL)

WHEN THE BIDDER IS A PARTNERSHIP:

(Name of Firm) A Partnership

(Address)

By: _____
(SEAL)
(Partner)

Name and Address of all Partners:

WHEN THE BIDDER IS A JOINT VENTURE:

(Correct Name of Corporation)

By: _____ (SEAL)
(Address)

(Official Title)

As Joint Venture
(Corporate Seal)

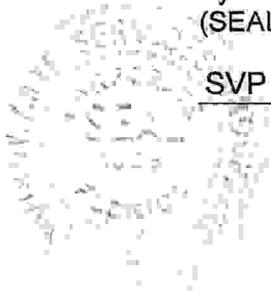
Organized under the laws of the State of _____, and authorized by the law to make this bid and perform all Work and furnish materials and equipment required under the Contract Documents.

WHEN THE BIDDER IS A CORPORATION:

EnviroWaste Services Group, Inc.
(Correct Name of Corporation)

By: _____
(SEAL)

SVP and Corporate Secretary



(Official Title)

18001 Old Cutler Road, #554 Palmetto Bay, FL 33157

(Address of Corporation)

Organized under the laws of the State of Florida, and authorized by the law to make this bid and perform all Work and furnish materials and equipment required under the Contract Documents.

CERTIFIED COPY OF RESOLUTION OF BOARD OF DIRECTORS

EnviroWaste Services Group, Inc.
(Name of Corporation)

RESOLVED that David L. Orr
(Person Authorized to Sign)

SVP and Corporate Secretary of
(Title) (Name of Corporation)

be authorized to sign and submit the Bid or Proposal of this corporation for the following project:

**INFLOW/INFILTRATION (I/I) PROGRAM – EXCAVATED POINT REPAIRS
ECSD Project No. - 7106A
Bid No. IFB-083-23-JJ**

The foregoing is a true and correct copy of the Resolution adopted by

EnviroWaste Services Group, Inc. at a meeting of its Board of
(Name of Corporation)

Directors held on the 1st day of FEBRUARY, 2023.

By: [Signature]

Title: SVP AND CORPORATE SECRETARY

(SEAL)

The above Resolution MUST BE COMPLETED if the Bidder is a Corporation.



- END OF SECTION -



Ron DeSantis, Governor

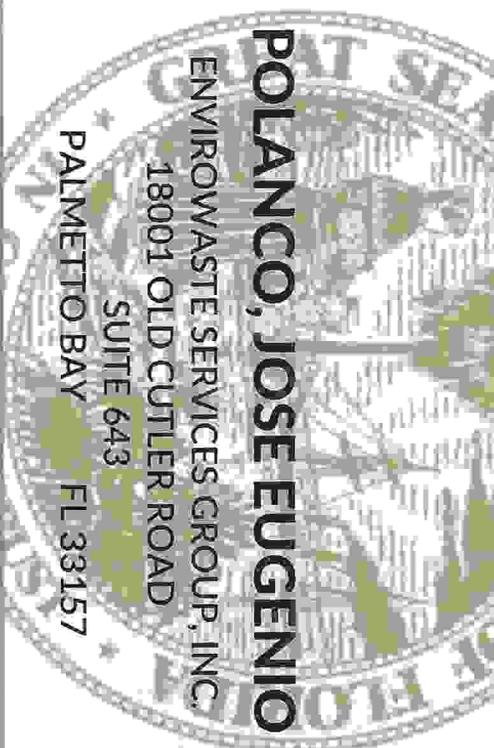
Melanie S. Griffin, Secretary



STATE OF FLORIDA
DEPARTMENT OF BUSINESS AND PROFESSIONAL REGULATION

CONSTRUCTION INDUSTRY LICENSING BOARD

THE GENERAL CONTRACTOR HEREIN IS CERTIFIED UNDER THE
PROVISIONS OF CHAPTER 489, FLORIDA STATUTES



POLANCO, JOSE EUGENIO

ENVIROWASTE SERVICES GROUP, INC.

18001 OLD CUTLER ROAD

SUITE 643

PALMETTO BAY FL 33157

LICENSE NUMBER: CGC1533927

EXPIRATION DATE: AUGUST 31, 2024

Always verify licenses online at MyFloridaLicense.com

Do not alter this document in any form.

This is your license. It is unlawful for anyone other than the licensee to use this document.



From: [Gricela Ayala](#)
To: [Yailin Veloso](#)
Cc: [Lily Gonzalez](#); [Iris Smart](#); [Steve Neves](#)
Subject: RE: Urgent Renewal Notices - Towne of Davie Business Tax Renewal
Date: Thursday, October 20, 2022 4:53:53 PM
Attachments: [image004.png](#)
[image005.png](#)

Yailin,

These are all paid below thank you.

Select licenses for payment

Payment Status	License Status	License Type	License Number	Renewal Number	License For	Effective Date - Expiration Date	Amount Due
Paid	Renewal	Con-Other	227	2022-00000089	ENVIROWASTE SERVICES GROUP INC - 18001 OLD CUTLER RD #554 PALMETTO BAY, FL 33157	10/1/2022 - 9/30/2023	\$0.00
Paid	Renewal	Industrial	42233	2022-00000092	ENVIROWASTE SERVICES GROUP INC - 18001 OLD CUTLER RD #554 PALMETTO BAY, FL 33157	10/1/2022 - 9/30/2023	\$0.00
Paid	Renewal	Office	709	2022-00000416	ENVIROWASTE SERVICES GROUP INC - 18001 OLD CUTLER RD #554 PALMETTO BAY, FL 33157	10/1/2022 - 9/30/2023	\$0.00

Best Regards,

Gricela Ayala
 ACCOUNTS PAYABLE SPECIALIST

Email gricelaayala@ewsg.com
Envirowaste Services Group, Inc


Confidentiality Note: The information contained in this transmission is legally privileged and confidential, intended only for the use of the individual or entity named above. If the reader of this message is not the intended recipient, you are hereby notified that any dissemination, distribution, or copying of this communication is strictly prohibited. If you receive this communication in error, please delete the message immediately.

From: Yailin Veloso <yailinveloso@ewsg.com>
Sent: Thursday, October 20, 2022 2:50 PM
To: Gricela Ayala <gricelaayala@ewsg.com>
Cc: Lily Gonzalez <LilyGonzalez@ewsg.com>; Iris Smart <irissmart@ewsg.com>
Subject: RE: Urgent Renewal Notices - Towne of Davie Business Tax Renewal

Approved.

Please expedite payment.

Thank you

Yailin Veloso
Envirowaste Services Group, Inc.
yailinveloso@ewsg.com
 W 305-637-9665

From: Gricela Ayala <gricelaayala@ewsg.com>
Sent: Thursday, October 20, 2022 2:47 PM
To: Yailin Veloso <yailinveloso@ewsg.com>
Cc: Lily Gonzalez <LilyGonzalez@ewsg.com>; Iris Smart <irissmart@ewsg.com>
Subject: FW: Urgent Renewal Notices - Towne of Davie Business Tax Renewal
Importance: High

Yailin,

We finally received town of Davie Invoices attach.

Lily will be issuing a payment please approve and send back thanks.



[Department of State](#) / [Division of Corporations](#) / [Search Records](#) / [Search by FEI/EIN Number](#) /

Detail by FEI/EIN Number

Florida Profit Corporation
ENVIROWASTE SERVICES GROUP, INC.

Filing Information

Document Number P98000014467
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Principal Address

18001 Old Cutler Road
Suite 643
Palmetto Bay, FL 33157

Changed: 02/26/2022

Mailing Address

18001 Old Cutler Road
Suite 643
Palmetto Bay, FL 33157

Changed: 02/26/2022

Registered Agent Name & Address

CORPORATION SERVICE COMPANY
1201 HAYS STREET
TALLAHASSEE, FL 32301

Name Changed: 06/16/2017

Address Changed: 06/16/2017

Officer/Director Detail

Name & Address

Title Director and Chairman

Wilson, Russ
550 S. Dixie Hwy #300
Coral Gables, FL 33146

Title Director and Executive Vice President

Reynolds, Stephen
550 S. Dixie Hwy #300
Coral Gables, FL 33146

Title Director, Executive Vice President, Secretary and General Counsel

Gershman, David
550 S. Dixie Hwy, #300
Coral Gables, FL 33146

Title Director

Gross, Jorge A, Jr.
550 S. Dixie Hwy #300
Coral Gables, FL 33146

Title Director and Chief Executive Officer

Long, Jim
18001 Old Cutler Road
Suite 643
Palmetto Bay, FL 33157

Title Corporate Secretary

ORR, DAVID
18001 Old Cutler Road
Suite 643
Palmetto Bay, FL 33157

Title CFO

BOURHIS, MARC
18001 Old Cutler Road
Suite 643
Palmetto Bay, FL 33157

Title Assistant Secretary

Calderon, Michelsa
550 S. Dixie Way, #300
Coral Gables, FL 33146

Title Director

FOJON, JULIO
18001 Old Cutler Road
Suite 643
Palmetto Bay, FL 33157

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Additional Insured-Automatic-Owners, Lessees Or Contractors

Coverage Part One-Commercial General Liability
Coverage Part Two-Contractor's Pollution Liability

Policy No.	Eff. Date of Pol.	Exp. Date of Pol.	Eff. Date of End.	Producer	Add'l Prem.	Return Prem.
GPL-1806389-02	07/31/2022	07/31/2023	07/31/2022	84179000	-----	-----

Named Insured and Mailing Address:

ENVIROWASTE SERVICES GROUP, INC.
18001 OLD CUTLER RD # 554
PALMETTO BAY, FL 33157-6440

Producer:

USI INSURANCE SERVICES, LLC
PO BOX 141916
CORAL GABLES, FL 33114-1916

THIS ENDORSEMENT CHANGES THE POLICY. PLEASE READ IT CAREFULLY.

This endorsement modifies insurance provided under the following:

Environmental Services Package Policy

- COVERAGE PART ONE-COMMERCIAL GENERAL LIABILITY
- COVERAGE PART TWO-CONTRACTOR'S POLLUTION LIABILITY

1. Who is an Insured (Section I.) in the COMMON COVERAGE PROVISIONS is amended to include as an additional insured any person(s) or organization(s) whom you are required to add as an additional insured on this policy under a written contract or written agreement.
2. The insurance provided to the additional insured person(s) or organization(s) applies only to:
 - a. "Bodily injury", "property damage" or "personal and advertising injury" under COVERAGE PART ONE-COMMERCIAL GENERAL LIABILITY, COVERAGE A - BODILY INJURY AND PROPERTY DAMAGE LIABILITY and COVERAGE B - PERSONAL AND ADVERTISING INJURY LIABILITY caused, in whole or in part, by:
 - (1) Your acts or omissions; or
 - (2) The acts or omissions of those acting on your behalf;
 and resulting directly from:
 - (a) Your ongoing operations performed for the additional insured, which is the subject of the written contract or written agreement; or
 - (b) "Your work" completed as included in the "products-completed operations hazard", performed for the additional insured, which is the subject of the written contract or written agreement; and/or
 - b. "Claims" arising out of a "pollution event" under COVERAGE PART TWO - CONTRACTOR'S POLLUTION LIABILITY, caused, in whole or in part, by:
 - (1) Your acts or omissions; or
 - (2) The acts or omissions of those acting on your behalf,
 and resulting directly from:
 - (a) "Covered operations" performed for the additional insured, which is the subject of the written contract or written agreement; or

(b) "Completed operations" of the "covered operations" performed for the additional insured, which is the subject of the written contract or written agreement.

3. However, regardless of the provisions of paragraphs 1. and 2. above, the insurance afforded to such additional insured:

- a. Only applies to the extent permitted by law; and
- b. Will not be broader than that which you are required by the written contract or written agreement to provide to such additional insured.

4. With respect to the insurance afforded to the additional insured under this endorsement, the following is added to **Section III – Limits Of Insurance and Deductible:**

The most we will pay on behalf of the additional insured is the amount of insurance:

- a. Required by the written contract or written agreement you have entered into with the additional insured; or
- b. Available under the applicable Limits of Insurance shown in the Declarations, whichever is less.

This endorsement shall not increase the applicable Limits of Insurance shown in the Declarations

5. The insurance provided to the additional insured person or organization does not apply to:

"Bodily injury", "property damage" or "personal and advertising injury" arising out of the rendering or failure to render any professional architectural, engineering or surveying services including:

- (1) The preparing, approving or failing to prepare or approve maps, shop drawings, opinions, reports, surveys, field orders, change orders or drawings and specifications; and
- (2) Supervisory, inspection, architectural or engineering activities.

This exclusion applies even if the claims against any insured allege negligence or other wrongdoing in the supervision, hiring, employment, training or monitoring of others by that insured, if the "occurrence" which caused the "bodily injury" or "property damage", or the offense which caused the "personal and advertising injury", involved the rendering of or the failure to render any architectural, engineering or surveying services.

6. The additional insured must see to it that:

- a. We are notified as soon as practicable of an "occurrence", offense or "pollution event", as applicable, that may result in a claim;
- b. We receive written notice of a claim or "suit" as soon as practicable; and
- c. A request for defense and indemnity of the claim or "suit" will promptly be brought against any policy issued by another insurer under which the additional insured may be an insured in any capacity. This provision does not apply to insurance on which the additional insured is a Named Insured, if the written contract or written agreement requires that this coverage be primary and non-contributory.

7. For the coverage provided by this endorsement:

a. The following paragraph is added to Paragraph 8.a. Other Insurance, Conditions (Section V.) in the COMMON COVERAGE PROVISIONS:

Primary and Noncontributory Insurance

This Insurance is primary to and will not seek contribution from any other insurance available to an additional insured under this endorsement provided that:

- (1) The additional insured is a Named Insured under such other insurance; and
- (2) You have agreed in a written contract or written agreement that this insurance would be primary and would not seek contribution from any other insurance available to the additional insured.

b. The following paragraph is added to Paragraph 8.b. Other Insurance, Conditions (Section V.) in the COMMON COVERAGE PROVISIONS:

This insurance is excess over:

Any of the other insurance, whether primary, excess, contingent or on any other basis, available to an additional insured, in which the additional insured on our policy is also covered as an additional insured on another policy providing coverage for the same "occurrence", offense, claim or "suit". This provision does not apply to any policy in which the additional insured is a Named Insured on such other policy and where our policy is required by written contract or written agreement to provide coverage to the additional insured on a primary and non-contributory basis.

8. This endorsement does not apply to an additional insured which has been added to this policy by an endorsement showing the additional insured in a Schedule of additional insureds, and which endorsement applies specifically to that identified additional insured.

ALL OTHER TERMS AND CONDITIONS OF THE POLICY SHALL APPLY AND REMAIN UNCHANGED.



ENVIRO 
WASTE SERVICES GROUP

Outsmart Your Underground.

877.637.9665 / ewsg.com



Envirowaste Let's Do This the Smart Way.



Envirowaste gives you a smarter way to handle everything from flooded streets and undermined roads ... to industrial cleaning and compliance deadlines.

START SOONER

You haven't got time to wait, so we've got enough people and equipment on hand to make sure you don't have to.

WORK SMARTER

By taking a "think-first" approach to everything we do, we find ways to reduce costs, speed completion, avoid pitfalls and deliver results that others aren't seeing.

FINISH STRONGER

The job's not done until all of its done. We never leave a job unfinished.

From regular maintenance to comprehensive rehabilitation, Envirowaste provides the full range of field services, personnel and expertise to meet our clients' needs in storm and wastewater system integrity and compliance.



100
Heavy
Trucks

45
Crews

0
Projects
We Can't
Handle

Envirowaste. No babysitting required. Our services include...

Maintenance

- Sewer/Storm System Cleaning
- CCTV/Video Inspection
- Inflow & Infiltration Studies

Emergency Response

- Sewer System Failures
- Hurricane & Disaster (no 'clean up' necessary)
- Industrial Spills

Rehabilitation

- Trenchless & Open Cut Point Repair
- Manhole Rehab & Replacement
- CIPP Lining
- Pipe Bursting
- Slip Lining
- Hydroexcavation

Heavy/Industrial Cleaning

- WWTP Cleaning
- Industrial Tanks & Silos
- Media Removal & Replacement
- Pond Cleaning
- Sediment Removal





When the Going Gets Tough, the Tough Start Vacuuming.

We know accidents and natural disasters happen, that's why we are available around-the-clock for emergency clean up, repair and rehabilitation projects.

ENVIROWASTE IS AVAILABLE 24 HOURS A DAY, SEVEN DAYS A WEEK, TO RESPOND TO EMERGENCY REQUESTS.

Envirowaste. Doing It the Smart Way since 1998.

Envirowaste maintains more than 100 active contracts with municipalities throughout the southeastern United States, as well as FDOT and NCDOT. We are also pleased to count multiple Fortune 500 Companies among our clients.



The Envirowaste Difference.

Extraordinary Resources, Technical Expertise, Proven Track Record
Commitment to Safety

877.637.9665 / ewsg.com



SUMMARY OF QUALIFICATIONS

EWSG is an industry leader in the maintenance, inspection and repair of storm and sanitary systems throughout the Southeast.

Our fleet of Vactors, Vac-Cons, pump trucks, and TV inspection trucks ensure we deliver the technology necessary to meet our customers' maintenance and emergency requirements.

For over 20 years we have established the most appropriate game plan for our customers to achieve their goals.

ENVIRO
WASTE SERVICES GROUP

MIAMI • ORLANDO • TAMPA • FT. LAUDERDALE • GEORGIA • NORTH CAROLINA

ewsg.com | 18001 Old Cutler Rd, Mia



EnviroWaste Services Group Inc., specializes in the cleaning of storm-water drainage systems and sanitary sewers. EWSG provides any services related to storm and sanitary sewers for private clients, commercial industries, municipalities, DOT, government agencies, and more!

- Pressure Test, Smoke Test, and Pre and Post Video PACP Inspections
- Storm and Sanitary Systems Inspection and Cleaning Services
- Two in House Certified NASSCO PACP/MACP/LACP Trainers
- Full Horizontal Construction Division Specializing in Sidewalks, C&G, Paving
- Three Full Time Pipe Bursting / Slip Lining Crews
- Cementitious and Epoxy Manhole Rehabilitation
- Full Line or Point Repair Sanitary and Storm Sewers
- Drainage Installation up to 80" Diameter
- Lateral Service Line Inspections, Installations, and Lining
- Repair of Lines using Sealing, Grouting, and Sectionals Liners
- Full Line CIPP Lining 6"-72"

A new drainage system is designed to drain in a matter of minutes.

It is recommended that regular maintenance is performed on your drainage system at least once a year to ensure proper water flow. Without appropriate care, leaves, sediment, and trash accumulate, pipes corrode, tree roots perforate the pipes, cracks appear in the system, and oil and tire

particles from cars build up sludge. These factors cause an obstruction of proper drainage and cause pipe performance to deteriorate, thus rendering your drainage system useless. EnviroWaste has the necessary equipment and experience to identify the problem and quickly and efficiently correct it as well.



BEFORE LINING



AFTER LINING

CCTV Video Inspection

EnviroWaste's CCTV (closed captioned television) inspection uses custom controlled cameras to locate wreckage within the pipes. Our remote-controlled cameras operate on a four-wheel sled and allow the

customer to see the exact condition of their drainage system to identify the problem and its severity. EWSG even offers a new technology that provides cured in place lining services which rehabilitates damaged pipes of any diameter without the costly excavation, while keeping disruptions of service to the very minimum.



ROOTS IN SEWER



ROOTS IN SEWER

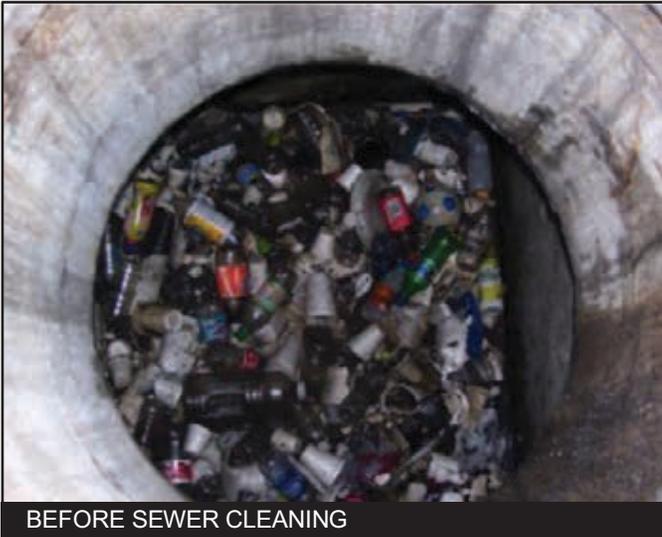
Sewer and Drain Cleaning

EnviroWaste Services Group has been providing Florida with sewer and drain cleaning services since 1998. EnviroWaste uses the latest, most advanced storm drain cleaning equipment to serve your maintenance and emergency needs.

EnviroWaste has the largest fleet of Jet/Vac trucks in the Southeastern United State's. These trucks are specially designed to restore your system to optimal conditions. Unlike "Septic Tank" trucks, which only suck trash out of the manhole, our superior trucks are specially designed to clean catch basins and lines and come equipped with a jet hose with a high-pressure nozzle to completely clear out the pipe walls and a powerful vacuum to dislodge and remove the debris and blockage to provide maximum water flow. EWSG also provides root cutters to properly remove intrusive roots without using chemicals.

EnviroWaste Services Group Inc., specializes in the cleaning of storm-water drainage systems and sewers. EWSG provides any services related to storm and sanitary sewers for private clients, commercial industries, municipalities, DOT, government agencies, and more!





Inflow and Infiltration

I/I Study

Inflow and infiltration occurs when clean ground water or storm water enters a sewer system through improper connections, cracked pipes, and defective joints.

Inflow is the term used to explain when the surface water enters a sewer system through improper connections of yard, roof, and cellar drains, cracked pipes, holes in manhole covers, catch basins, and cross connections between storm and sanitary sewers.

Infiltration occurs when the ground water enters the wastewater system through deteriorated manholes, cracks, and leaks in the joints.

After a rain or snowstorm, the inflow and infiltration sources begin filling up the sanitary sewer systems with clear water. These systems eventually become full resulting in the waste water to flow out at a significantly higher water level. If drains and sanitary fixtures are below this overload level water will be able to flow back through the sanitary sewer pipe. As a result, there will be flooding in homes and manholes will burst open, allowing the wastewater onto the streets.

These are the following 3 methods of identifying Inflow and Infiltration:

1. Smoke Testing
2. Flow Monitoring
3. Television Inspection

Flow Monitoring is when special measuring devices are inserted into the sewer lines to monitor the amount of water flowing through the wastewater system.



Industrial Vacuum Services

In 2019 EWSG acquired Industrial Vacuum Services (IVAC). While adding to EWSG previous experience in industrial vacuum cleaning, EWSG has now also added all of IVAC's experience, equipment, and personnel.

EWSG/IVAC now has 6 large industrial vacuum loaders. EWSG specializes in removal of materials, wet or dry, from water and wastewater treatment plants, manufacturing plants, energy plants, construction sites,

silos, elevators, quarries, foundries, and other industrial sites.



INDUSTRIAL VACUUM SERVICES, INC.

Sewer Pipeline Repairs/Rehabilitation

A team of highly qualified professionals and technicians are eager to take care of all of your Sewer Pipeline Repair /rehabilitation needs. With hundreds of years of combined experience, our professionals are committed to providing superior services! With the acquisition of KRG Utilities in 2019, EWSG now offers its clients pipe bursting as well as slip lining in addition to the CIPP full main lining EWSG already performs. With three full time pipe bursting crews and almost 1,000,000 LF of pipe bursting to date, EWSG is the right choice every time.

We offer 24 Hour Emergency Response, Specializing in Emergency Clean up, Disaster Recovery including Hurricanes and Natural Disasters. Call 877-637-9665.



EnviroWaste Services Group

Storm and Sanitary Sewer Maintenance Inspection, Repair,
Rehabilitation, and Horizontal Construction

Honorably Serving the Entire Southeastern United States!

COMPANY INFORMATION

EnviroWaste Services Group, Inc.

18001 Old Cutler Road, Suite 643, Miami, FL 33157

(305) 637-9665, Fax (305) 637-9659, (877) 637-9665

License: # QB 32296

CGC 060385

OWNER	City of Hollywood
PROJECT TITLE	11-7063, 13-7068, 16-7078, 16-7081 Sanitary Sewer Eval. And Repair
BUDGET	\$3,500,000
TIME PERIOD	2011-Current
CONTACT	Clece Aurelus, PE Ph: 954-921-3930 caurelus@hollywoodfl.org
SCOPE	EWSG has been contracted to cctv, clean and perform full line and point repair sewer replacements. The above lists three separate contracts, we are currently on contract number four. Since 2011 EWSG has been the only company performing work on the City's sewer system. Over 750 excavated point repairs have been done for the City as large as 30" in diameter and 18' in depth. Since 2011 approximately 1,000 sectional cipp liners have been installed. The City of Hollywood has a significant amount of easement work, approximately, 20,000LF per year.

OWNER	FDOT
PROJECT TITLE	E5T90 Desilting, Video Inspection, and CIPP of Strom Sewer System
BUDGET	\$1,500,000
TIME PERIOD	January 2017-December 2017
CONTACT	Rick Coe Ph: 386-740-3490 frederick.Coe@dot.state.fl.us
SCOPE	EWSG has been contracted to cctv, clean and CIPP line the FDOT owned storm water system in Volusia Counties. In addition to standard cleaning and inspections, EWSG has CIPP lined 10,000LF of 18-42" sewer, replaced 80LF of 48" sewer and 300LF of 30" sewer. EWSG also seals and rehabilitates the department's manholes and inlets. The CIPP work was performed by Cobra Environmental.

OWNER	City of Boca Raton
PROJECT TITLE	Bid 2012-031
BUDGET	\$1,500,000 Per Year
TIME PERIOD	November 2017-Current
CONTACT	Jimmy Georgievski Ph: 561-338-7317 JGeorgievski@ci.boca-raton.fl.us
SCOPE	EWSG has been contracted to cctv, clean, perform point repairs, sectionals and CIPP lining to the City's wastewater system. Since 2017 more than 40,000 LF of CIPP lining has been performed by Cobra Environmental.

OWNER	Bal Harbour Village
PROJECT TITLE	Sanitary Sewer Evaluation Study and associated repairs
BUDGET	\$750,000 Per Year
TIME PERIOD	May 2017-Current
CONTACT	Mike Alvarez 786-566-3462 malvarez@balharbourfl.gov
SCOPE	EWSG has been contracted to provide sewer rehabilitation services for the Village including CIPP rehabilitation, sewer cleaning/TV'ing, point repairs. EnviroWaste cleans and inspects the City's sanitary sewer system and makes the recommendation for repairs, and performs the repairs. All the manholes which have been coated under this contract were done with SewperCoat. More than 10,000 LF of sanitary sewers have been CIPP'd with our subcontractor Cobra Environmental.

OWNER	FDOT
PROJECT TITLE	E7L52 Desilting and Video Inspection of Storm Sewer System
BUDGET	\$6,000,000
TIME PERIOD	January 2017-2019
CONTACT	Pedro Lopez Ph: 813-975-6107 pedro.Lopez@dot.state.fl.us
SCOPE	EWSG has been contracted to cctv and clean the FDOT owned storm water system in Hillsborough, Pasco, Pinellas, Hernando, and Citrus Counties. EWSG also seals and rehabilitates the department's manholes and inlets. In addition to standard cleaning and inspections, EWSG has removed over 10,000 cubic yards of debris from box culverts.

OWNER	City of Coral Gables
PROJECT TITLE	IFB 2015.10.07 Routine & Emergency Sewer Repairs and Inspection
BUDGET	\$500,000 per year
TIME PERIOD	September 2013-Current
CONTACT	Noel Polo 305-460-5022 npolo@coralgables.com
SCOPE	EWSG has been contracted to provide sewer rehabilitation services for the City of Coral Gables in sewer cleaning/TV'ing, point repairs. EnviroWaste cleans and inspects the City's sanitary sewer system and makes the recommendation for repairs, and performs the repairs. Manhole coatings have been done on 150 manholes. More than 100 excavated point repairs.

OWNER	City of Sunrise
PROJECT TITLE	Bid 15-12-01-JC Sewer Rehab, Maintenance, and I&I Reduction
BUDGET	\$1,000,000 per year
TIME PERIOD	October 2012-Current
CONTACT	Gio Batista 954-815-8861 GBatista@sunrisefl.gov
SCOPE	EWSG has been contracted to provide sewer rehabilitation services for the City of Sunrises in sewer cleaning/TV'ing, point repairs. EnviroWaste cleans and inspects the City's sanitary sewer system and makes the recommendation for repairs, and performs the repairs. 450 Manholes have been rehabbed, over 150 excavated point repairs.

OWNER	City of North Miami Beach
PROJECT TITLE	ITB 2011-08 Sewer Rehab, Maintenance, and I&I Reduction
BUDGET	\$600,000
TIME PERIOD	2012-Current
CONTACT	Pedro Melo 305-770-5135 pedro.melo@citynmb.com
SCOPE	EWSG has been contracted to provide sewer rehabilitation services for the City of North Miami Beach in sewer cleaning/TV'ing, point repairs. EnviroWaste cleans and inspects the City's sanitary sewer system and makes the recommendation for repairs, and performs the repairs. We also have installed new water main with fire hydrants.

OWNER	City of Miami Beach, FL
PROJECT TITLE	Horizontal Job Order Contract
BUDGET	\$25,000,000
TIME PERIOD	July 2009–July 2014
CONTACT	Mike Alvarez 786-566-3462 malvarez@balharbourfl.gov

SCOPE	EWSG has been contracted to provide horizontal general contracting services for the City of Miami Beach including CIPP rehabilitation, manhole rehab, sewer cleaning/ TV'ing, point repairs, demolition, drainage, paving, sidewalks, curbs, gutters, excavation, and all other "horizontal" construction services. EnviroWaste cleans and televises all of the outfalls located with the City of Miami Beach. Specifically we have extensively cleaned storm sewer and many outfalls within the city.
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OWNER	Town of Cutler Bay
PROJECT TITLE	Miscellaneous Construction and Repairs Town Wide
BUDGET	\$1,500,000 per Year
TIME PERIOD	July 2008-Current
CONTACT	Alfredo Quintero 305-234-4262 aquintero@cutlerbay-fl.gov
SCOPE	EWSG has been contracted to provide clean storm sewers, remove and replace sidewalks, asphalt roadways, drainage repairs, along with other miscellaneous tasks. EWSG has installed new or replaced more than 200,000 LF of sidewalks, and paved over 200,000 SY of asphalt roads.

OWNER	Manatee County
PROJECT TITLE	Wastewater Hauling Emergency Contract
BUDGET	\$250,000
TIME PERIOD	September 2014
CONTACT	Bonnie Sietma 941-749-3046 bonnie.sietman@mymanatee.org
SCOPE	EWSG has been contracted to provide emergency vector and vacuum truck services for all of Manatee County.

OWNER	City of Miami Beach, FL
PROJECT TITLE	Routine & Emergency Sewer Repairs ITB 113-2013
BUDGET	\$2,500,000 per Year
TIME PERIOD	September 2013-September 2018
CONTACT	Mike Alvarez 786-566-3462 malvarez@balharbourfl.gov

SCOPE	<p>EWSG has been contracted to provide sewer rehabilitation services for the City of Miami Beach including CIPP rehabilitation, sewer cleaning/TV'ing, point repairs.</p> <p>EnviroWaste cleans and inspects the City's sanitary sewer system and makes the recommendation for repairs, and performs the repairs. EnviroWaste Services Group has installed 180,000' of mainline CIPP for the City since 2008. Before this contract, EWSG also held two different JOC contracts with the city doing any and all horizontal work, including but not limited sidewalks, outfalls, seawalls, landscaping, canoe launch ramp, installing new water mains, storm water pump stations. More than 500 sanitary sewer manholes have been lined with SewperCoat.</p>
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OWNER	Dekalb County, GA
PROJECT TITLE	Sewer Assessment OSARP 1188362
BUDGET	\$4,200,000
TIME PERIOD	October 2019-Current
CONTACT	Julio Trinidad 6782373812 Jtrinidad@dekalbcountyga.gov
SCOPE	EWSG has been contracted to clean, cctv, smoke test, sonar inspection, manhole inspections with Dekalb County.

OWNER	Hillsborough County, FL
PROJECT TITLE	Wastewater Pumping and Disposal Contract
BUDGET	\$2,000,000 per Year
TIME PERIOD	December 2013-Current
CONTACT	David Lundberg 813-663-3229 lundbergd@hillsboroughcounty.org
SCOPE	EWSG has been contracted to provide emergency and scheduled vector and vacuum truck services for all of Hillsborough County. EWSG has regularly hauled in excess of 100,000 gallons per hour during emergency situations.

OWNER	Hillsborough County, FL
PROJECT TITLE	Manhole-Wastewater Lines-Lift Station Cleaning and Inspection
BUDGET	\$2,000,000 per Year

TIME PERIOD	April 2014-Current
CONTACT	Suresh Maharaj 813-554-5011 ext 43836 maharajs@hillsboroughcounty.org
SCOPE	EWSG has been contracted to provide all of the sanitary sewer inspection and cleaning for Hillsborough County. Yearly more than 500,000' of sanitary sewers are cleaned.

OWNER	City of Miami
PROJECT TITLE	Outfall and Drainage Cleaning Contract
BUDGET	\$750,000 per Year
TIME PERIOD	2005-Current
CONTACT	Ely Estevez Ph: 305-416-1295 eestevez@miamigov.com
SCOPE	EWSG has been contracted to provide cleaning of the City of Miami's storm drainage system. More than 2,000,000 LF of storm sewers have been cleaned since '05.

OWNER	Orange County, FL
PROJECT TITLE	Sanitary Sewer Cleaning and Inspection(Y12-1060, Y15-1140, Y19-110)
BUDGET	\$1,100,000 per Year
TIME PERIOD	June 2008-Current, 2 separate contracts
CONTACT	Dustin Putney 407-836-6822 dustin.putney@ocfl.net
SCOPE	EWSG has been contracted to provide various sewer related contracting services for Orange County, FL, including cleaning and video inspection. EWSG has cleaning and cctv'd over 3,000,000 LF of sanitary sewers. More than 30,000 LF of the sewer cleaning work in 30" or larger per year.

OWNER	Orange County, FL
PROJECT TITLE	Orange County Gravity CIPP Lining Y13-1019
BUDGET	\$1,000,000
TIME PERIOD	May 2013-April 2014
CONTACT	Patty Hobbs 407-836-5456 Patty.Hobbs@ocfl.net

SCOPE	EWSG was contracted to provide mainline CIPP lining on sanitary sewers 8-42” in diameter. 30,000 LF of pipe were lined.
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OWNER	Orange County, FL
PROJECT TITLE	Orange County Sewage Hauling Y14-191A
BUDGET	\$250,000
TIME PERIOD	April 2014-Current
CONTACT	Brian Vos 321-239-3339 Brian.Vos@ocfl.net
SCOPE	EWSG has been contracted to provide emergency and scheduled vacuum truck services for all of Orange County. EWSG has been the primary emergency sewage hauling contractor for the County since 2014. EWSG has had multiple 10 plus truck emergency responses all handled in-house.

OWNER	Orange County, FL
PROJECT TITLE	Stormwater System Inspection, Cleaning, Sealing, Void Detection & Void Filling (Y8- 1034, Y8-1110, Y9-1022, Y11-112, Y12-1060, Y13-1083, Y14-1075, Y14-1025, Y17-100)
BUDGET	\$3,000,000 per Year
TIME PERIOD	June 2008–Current, 9 separate contracts
CONTACT	Bill Burnham 407-836-8036 William.Burnham@ocfl.net
SCOPE	EWSG has been contracted to provide various drainage related contracting services for Orange County, FL, including cleaning, video inspection, chemical grouting, internal joint seals, sonar inspection, ground penetrating radar, soil stabilization, injection holes, and injection & sealing of cracks. EWSG has pumped more than 30,000 Cubic Feet of grout for soil stabilization, cleaned and inspected over 2,000,000 Lf of 12-96” storm sewer, and grouted thousands of joints.

OWNER	City of Ocala
PROJECT TITLE	Sanitary Sewer System Inspection, Cleaning
BUDGET	\$1,250,000
TIME PERIOD	2008–2016

CONTACT	Edwards Earnest Ph: 352-629-8521 Fax: 352-629-8242
SCOPE	EWSG has been contracted to provide cleaning and inspection of sanitary sewer as well as smoke testing. 750,000 LF of sewer were smoke tested.

OWNER	City of Miami Beach, FL
PROJECT TITLE	Smoke Testing
BUDGET	\$350,000
TIME PERIOD	July 2010–July 2012
CONTACT	Mike Alvarez 786-566-3462 malvarez@balharbourfl.gov
SCOPE	Smoke testing of 700,000+ feet of sanitary sewer along with related report submittal.

OWNER	Miami-Dade Water & Sewer Department
PROJECT TITLE	S-782 Lateral Sewer Testing – 2005-2007
BUDGET	\$3,300,000 (completed at \$2,450,000)
TIME PERIOD	2 years
CONTACT	Miguel Pichardo 786-258-2573 Miguel.Pichardo@miamidade.gov
SCOPE	EWSG was contracted to test approximately 6,000 sanitary sewer service lateral connections in 40 lift stations throughout Miami-Dade County. The lines were tested using the pressure test and/or the smoke test method. This pilot study program, the first of its kind in the U.S., was requested to determine the I&I problems with the lateral connections throughout the County.

OWNER	The City of Anderson, S.C.
PROJECT TITLE	Wastewater Collection Assessment Project 2020-0425
BUDGET	\$275,000
TIME PERIOD	November 2020- January 2021
CONTACT	Jeff Caldwell, PE 864-231-5230 jcaldwell@cityofandersonsc.com
SCOPE	EWSG was contracted by the City to clean and cctv 100,000 LF of sanitary sewers.

OWNER	Miami-Dade Water & Sewer Department
PROJECT TITLE	S-803 Sectional Line Repair – 2006 / 2009
BUDGET	\$2,000,000
TIME PERIOD	Scheduled to complete project within half the allotted time frame.
CONTACT	Miguel Pichardo 786-258-2573 Miguel.Pichardo@miamidade.gov
SCOPE	EWSG was contracted to clean, CCTV video, and inspect sewer lines throughout Miami-Dade County to determine where a repair is required. The specific repair method used under this contract is sectional lining. Over 2,000 sectionals were installed.

OWNER	Miami-Dade Water & Sewer Department
PROJECT TITLE	S-847 Sectional Line Repair – 2010-2014
BUDGET	\$2,000,000
TIME PERIOD	Scheduled to complete project within half the allotted time frame.
CONTACT	Miguel Pichardo 786-258-2573 Miguel.Pichardo@miamidade.gov
SCOPE	EWSG was contracted to clean, CCTV video, and inspect sewer lines throughout Miami-Dade County to determine where a repair is required. The specific repair method used under this contract is sectional lining. Over 2,000 sectionals were installed.

OWNER	FDOT – Lake County
PROJECT TITLE	Maintenance contract E5J21
BUDGET	\$630,000 (completed on time and under budget)
TIME PERIOD	August 2007–March 2008
SCOPE	EWSG was contracted by the FDOT to repair and maintain the storm water system on any of the Department’s rights-of-way in Lake County. The primary work duties included CIPP repair of drainage pipes, joint repairs, sealing of drainage pipes and structures, pressure grouting, desilting of pipes, inlets, and culverts, production of video records and written reports. The installation of liners included sizes ranging from 15” to 36”.

OWNER	Indian Creek Village
PROJECT TITLE	Rehabilitation of Storm Sewer System
BUDGET	\$330,000
TIME PERIOD	July 2006–March 2007
SCOPE	EWSG was contracted by the Village to provide various storm sewer services. The scope of services includes CIPP lining, grouting, sectional lining, storm drain cleaning, video inspection, point repairs, repair of inlets and manholes, and site restoration. The installation of liners included sizes ranging from 8” to 36”.

OWNER	Lighthouse Point
PROJECT TITLE	Rehabilitation of Storm Sewers on 24th Street
BUDGET	\$85,000
SCOPE	EWSG was subcontracted by a Prime Contractor to provide various storm sewer services. The scope of services includes CIPP lining, storm drain cleaning, and video inspection. The installation of liners included sizes ranging from 15” to 36”.

OWNER	Kenneth City, FL
PROJECT TITLE	Sanitary Sewer Service Laterals CIPP Rehabilitation
BUDGET	\$60,000
TIME PERIOD	2006
SCOPE	EWSG was contracted by the Prime Contractor to line 45 sanitary sewer service laterals throughout areas of Kenneth City, FL.

OWNER	Homestead Air Reserve Base, FL
PROJECT TITLE	Sanitary Sewer Evaluation Study & Repairs
BUDGET	\$126,000
TIME PERIOD	2007
SCOPE	The project consisted of evaluating the sanitary sewer system by smoke testing, followed by further evaluation by cleaning and video inspection. This resulted in a variety of repair methods such as CIPP lining, CIPP sectional repairs, installing cleanouts, restoration of manholes, raising chimneys, installation of new sanitary pipes, service reinstatement, open cut point repair, chemical cleaning of joints, and site restoration.

OWNER	Miami International Airport, FL
PROJECT TITLE	Sanitary Sewer Evaluation Study & Repairs
BUDGET	\$71,000
TIME PERIOD	2007-2008
SCOPE	The project consisted of evaluating the sanitary sewer system by cleaning and video inspection. This resulted in a variety of repair methods such as CIPP lining, CIPP sectional repairs, installing cleanouts, installation of new sanitary pipes, service reinstatement, open cut point repair, chemical grouting of joints, and site restoration.

OWNER	City of North Bay Village
PROJECT TITLE	SSES and Sanitary Sewer Repair
BUDGET	\$1,500,000
TIME PERIOD	January 2007-Current
CONTACT	Juan Valiente 305-865-0506 jvaliente@nbvillage.com
SCOPE	EWSG has been contracted to perform a complete sanitary sewer system evaluation of the city along with associated repairs. Part of this project has been the repeated smoke testing of the system throughout the years. Over 600,000 feet of pipe has been smoke tested.

OWNER	City of Orlando
PROJECT TITLE	Bio7-2295-03 Smoke Testing and CIPP Sectional Liner
BUDGET	\$650,000
TIME PERIOD	July 2007–July 2009
CONTACT	Ronald Proulx 407-246-2213
SCOPE	EWSG has been contracted to provide sectional lining and smoke testing services. Throughout our contract we smoked 750,000 feet.

OWNER	Broward County, FL (Water and Wastewater Services)
PROJECT TITLE	Sewer Cleaning / Televising / Grouting / Video Capture

BUDGET	\$672,150
TIME PERIOD	August 2008–October 2009
SCOPE	EWSG has been contracted to provide various drainage related contracting services for Broward County, FL, including cleaning, video inspection, chemical grouting, and bypass pumping.

OWNER	Town of Cutler Bay, FL
PROJECT TITLE	97 Ave Drainage Improvements
BUDGET	\$238,475
TIME PERIOD	September 2012-December 2012
CONTACT	Alfredo Quintero Jr. 305-234-4262 aquintero@cutlerbay-fl.gov
SCOPE	Milling and installing 1300 sy asphalt, install 14 drains, raise manholes, install 900 lf of 18-24” pipe, install 300 lf of french drain, signing and pavement markings, 200 lf of 5’ wide sidewalk.

OWNER	Town of Cutler Bay, FL
PROJECT TITLE	Roadway Resurfacing Phase I & II
BUDGET	\$713,000
TIME PERIOD	September 2012-March 2013
CONTACT	Alfredo Quintero Jr. 305-234-4262 aquintero@cutlerbay-fl.gov
SCOPE	Milling and resurfacing and striping of 100,000 sy asphalt.

OWNER	Town of Cutler Bay, FL
PROJECT TITLE	Cutler Ridge Parking Lot
BUDGET	\$160,000
TIME PERIOD	August 2010-December 2010
CONTACT	Alfredo Quintero Jr. 305-234-4262 aquintero@cutlerbay-fl.gov
SCOPE	Milling and installing asphalt, install 8 drains, install French drain, signing and pavement markings.

PROJECT TITLE	Stop Bar Striping City Wide
BUDGET	\$78,000
TIME PERIOD	September 2009-Current
CONTACT	Alfredo Quintero Jr. 305-234-4262 aquintero@cutlerbay-fl.gov
SCOPE	Installing 520, 24" Stop Bars with 50' Double Yellow Striping with RPMs at stop signs when required.

OWNER	City of Miami Beach, FL
PROJECT TITLE	Lincoln Road West Street End Improvements and Seawall
BUDGET	\$750,000
TIME PERIOD	2010
CONTACT	Aaron Sinnes 305-898-8100 aaronsinnes@gmail.com
SCOPE	EWSG has been contracted to renovate the west street end of Lincoln Road in the City of Miami Beach. The work includes the installation of a new outfall, relocation of a fire hydrant, installation of brick pavers, sidewalk, curb and gutter, asphalt, pouring a new seawall cap and sheet piles, landscape as well as all new street and landscape lighting.

OWNER	City of Winston-Salem (Work performed as KRG Utility)
PROJECT TITLE	Zion Neighborhood Sewer Rehab
BUDGET	\$4,362,525
TIME PERIOD	March 2020–December 2020
CONTACT	HDR D 336.955.8271 M 336.391.3555 Channin.Bennett@hdrinc.comStart
SCOPE	15,000 ft Pipe Bursting, CIPP, Point Repairs, Service Work, 185 ft of Cementitious Manhole Rehab

OWNER	City of Winston-Salem (Work performed as KRG Utility)
PROJECT TITLE	Winston-Salem System-Wide Ph 2
BUDGET	Original \$4,070,390
TIME PERIOD	September 2019– December 2020

CONTACT	HDR D 336.955.8271 M 336.391.3555 Channin.Bennett@hdrinc.comStart
SCOPE	15,000 ft Pipe Bursting, CIPP, Point Repairs, Service Work

OWNER	City of Greensboro (Work performed as KRG Utility)
PROJECT TITLE	Contract 2019-005 – Water & Sewer Rehab
BUDGET	Original \$5,093,229
TIME PERIOD	October 2019–December 2020
CONTACT	Jay Guffey, Engineering Supervisor, City of Greensboro (336) 373-7779
SCOPE	Over 20,000 ft HDPE Slip Lining, Pipe Bursting, CIPP, Point Repairs, Service Work, 4,000 LF of Water Main Replacement

OWNER	City of Greensboro (Work performed as KRG Utility)
PROJECT TITLE	Contract 2018-063A – North Buffalo Cured In Place Pipe (CIPP)
BUDGET	Original \$4,799,788
TIME PERIOD	May 2019–August 2020
CONTACT	Jay Guffey, Engineering Supervisor, City of Greensboro (336) 373-7779
SCOPE	45,000 ft 8 to 24-inch CIPP, 125 Internal Lateral Reinstatements

OWNER	City of Greensboro (Work performed as KRG Utility)
PROJECT TITLE	Contract 2012-95 – Sanitary Sewer and Water Rehab
BUDGET	Original \$34,108,809
TIME PERIOD	June 2013–June 2019
CONTACT	Jay Guffey, Engineering Supervisor, City of Greensboro (336) 373-7779
SCOPE	Over 100,000 ft Pipe Bursting, 6” to 8”, 10” to 12”, 8” to 12” Over 150,000 ft HDPE Slip Lining, Point Repairs, Service Work, CIPP Over 60,000 ft Fusible PVC Bursting, 4” to 6”, 6” to 8” (water) (static) Over 9,000 ft of Cementitious Manhole Rehab

OWNER	FDOT District VI – Miami, FL
PROJECT TITLE	Sidewalk Repair

BUDGET	\$200,000
TIME PERIOD	August 2008–August 2011
SCOPE	EWSG has been contracted to provide sidewalk repair for the Florida Department of Transportation.

OWNER	Village of Pinecrest, FL
PROJECT TITLE	Sidewalk Repair
BUDGET	\$100,000
TIME PERIOD	March 2009–August 2009
SCOPE	EWSG has been contracted to provide sidewalk repair for the Village of Pinecrest.

OWNER	FDOT
PROJECT TITLE	E7K39 Desilting and Video Inspection of Storm Sewer System
BUDGET	\$225,000
TIME PERIOD	November 2014-2017
CONTACT	Pedro Lopez Ph: 813-975-6107 pedro.Lopez@dot.state.fl.us
SCOPE	EWSG has been contracted to cctv and clean the FDOT owned storm water system.

OWNER	FDOT – Broward E4J05
PROJECT TITLE	Maintenance contract
BUDGET	\$215,000 per Year
TIME PERIOD	2006-2009
CONTACT	Brenda Morgan 954-931-6177
SCOPE	EWSG was contracted by the FDOT to clean and inspect the storm drainage system within the county.

OWNER	FDOT – Broward County E4G62
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PROJECT TITLE	Maintenance contract
BUDGET	\$300,000 per Year
TIME PERIOD	2003-2005
CONTACT	Brenda Morgan 954-931-6177
SCOPE	EWSG was contracted by the FDOT to clean and inspect the storm drainage system within the county.

OWNER	FDOT – Miami Dade E6E58
PROJECT TITLE	Maintenance contract
BUDGET	\$165,000 per Year
TIME PERIOD	2009-2011
CONTACT	Mary Lou Karner 305-256-6330
SCOPE	EWSG was contracted by the FDOT to clean and inspect the deep well injection system within the county.

OWNER	FDOT – Miami Dade E6B68
PROJECT TITLE	Maintenance contract
BUDGET	\$200,000 per Year
TIME PERIOD	2003-2005
CONTACT	Mary Lou Karner 305-256-6330
SCOPE	EWSG was contracted by the FDOT to clean and inspect the storm drainage system within the county.

OWNER	FDOT – Miami Dade E6B70
PROJECT TITLE	Maintenance contract
BUDGET	\$200,000 per Year
TIME PERIOD	2003-2005
CONTACT	Mary Lou Karner 305-256-6330
SCOPE	EWSG was contracted by the FDOT to clean and inspect the storm drainage system within the county.

OWNER	FDOT – Miami Dade E6D75
PROJECT TITLE	Maintenance contract
BUDGET	\$200,000 per Year
TIME PERIOD	2006-2007
CONTACT	Mary Lou Karner 305-256-6330
SCOPE	EWSG was contracted by the FDOT to clean and inspect the storm drainage system within the county, large diameter pipes.

OWNER	FDOT – Lake County E5M28
PROJECT TITLE	Maintenance contract
BUDGET	\$225,000 per Year
TIME PERIOD	2009
SCOPE	EWSG was contracted by the FDOT to clean the storm drainage system within the county after Hurricane Frances.

OWNER	FDOT – Deland H-5069
PROJECT TITLE	Emergency Clean up contract, Hurricane Frances
BUDGET	\$189,000
TIME PERIOD	2004
SCOPE	EWSG was contracted by the FDOT to clean the storm drainage system within the county after Hurricane Frances.

OWNER	FDOT – Miami Dade H-6069
PROJECT TITLE	Emergency Clean up contract, Hurricane Wilma
BUDGET	\$1,000,000
TIME PERIOD	2005
CONTACT	Mary Lou Karner 305-256-6330
SCOPE	EWSG was contracted by the FDOT to clean the storm drainage system within the county after Hurricane Wilma.

OWNER	FDOT – Miami Dade, Key West H-6065
PROJECT TITLE	Emergency Clean up contract, Hurricane Wilma
BUDGET	\$200,000
TIME PERIOD	2005
CONTACT	Mary Lou Karner 305-256-6330
SCOPE	EWSG was contracted by the FDOT to clean the storm drainage system within the county after Hurricane Wilma.

OWNER	City of Miami, FL
PROJECT TITLE	Citywide Storm Drain Cleaning - 2006
BUDGET	\$1,900,000 (in-budget)
TIME PERIOD	3 months (within 25% of time schedule)
CONTACT	Eli Estevez 305-416-1200
SCOPE	EWSG was contracted to perform storm drain cleaning services of various pipe diameters throughout the City of Miami. The project was awarded as a combination of annual maintenance service and Hurricane Wilma emergency service.

OWNER	Miami-Dade County, FL
PROJECT TITLE	Countywide Storm Drain Cleaning (STDC-4) – 2007
BUDGET	\$1,700,000
TIME PERIOD	1 year (completed in 7 months)
CONTACT	Mercedes Barrera 786-256-2625
SCOPE	EWSG was contracted to provide maintenance services including the clean out of existing drainage structures and associated culverts throughout Miami-Dade County. The project's scope of work includes hydraulic cleaning and vacuum removal of all foreign material, obstructions, debris, silt, litter, and all other associated work.

OWNER	Miami-Dade County, FL
PROJECT TITLE	Countywide Storm Drain Cleaning (STDC-9) – 2007
BUDGET	\$1,000,000
TIME PERIOD	1 year (completed in 4 months)
CONTACT	Mercedes Barrera 786-256-2625
SCOPE	EWSG was contracted to provide maintenance services including the clean out of existing drainage structures and associated culverts throughout Miami-Dade County. The project’s scope of work includes hydraulic cleaning and vacuum removal of all foreign material, obstructions, debris, silt, litter, and all other associated work.

OWNER	Miami-Dade County, FL
PROJECT TITLE	Countywide Storm Drain Cleaning (STDC-11) – 2007
BUDGET	\$1,000,000
TIME PERIOD	1 year (completed in 4 months)
CONTACT	Mercedes Barrera 786-256-2625
SCOPE	EWSG was contracted to provide maintenance services including the clean out of existing drainage structures and associated culverts throughout Miami-Dade County. The project’s scope of work includes hydraulic cleaning and vacuum removal of all foreign material, obstructions, debris, silt, litter, and all other associated work.

OWNER	Miami-Dade County, FL
PROJECT TITLE	Countywide Storm Drain Cleaning (STDC-12) – 2007
BUDGET	\$1,000,000
TIME PERIOD	1 year (completed in 4 months)
CONTACT	Mercedes Barrera 786-256-2625
SCOPE	EWSG was contracted to provide maintenance services including the clean out of existing drainage structures and associated culverts throughout Miami-Dade County. The project’s scope of work includes hydraulic cleaning and vacuum removal of all foreign material, obstructions, debris, silt, litter, and all other associated work.

OWNER	Jefferson Parish, LA
PROJECT TITLE	Hurricane Katrina drain cleaning - 2005
BUDGET	\$1,200,000 (in-budget)
TIME PERIOD	1 month (in-time)
SCOPE	EWSG was contracted to perform storm drain cleaning services of various pipe diameters throughout Jefferson Parish, LA, in response to Hurricane Katrina. EWSG mobilized a fleet of jetter/vacuum trucks within 24 hours to assist in clean-up of Parish.

OWNER	Town of Miami Lakes, FL
PROJECT TITLE	General Roadway Construction
BUDGET	\$700,000
TIME PERIOD	July 2008–July 2012
SCOPE	EWSG has been contracted to provide sidewalk repair for the Florida Department of Transportation.

OWNER	City of Miami, FL
PROJECT TITLE	Slab Covered Trench Cleaning
BUDGET	\$360,000 per Year
TIME PERIOD	2008–2012
SCOPE	EWSG has been contracted to clean slab covered trenches for the City of Miami.

REFERENCES

Sewer refers to storm and sanitary.

- Miami Dade County W&SD (Sewer) – Miguel Pichardo - 786-258-2573
- City of Sunrise (Sewer) – Gio Batista (954) 815-8861
- Town of Cutler Bay (Storm & Construction) – Alfredo Quintero (786) 348-5323
- Village of Pinecrest (Sewer) – Gary Krackenberg (305) 301-9825
- City of Doral (Sewer) – Carlos Arroyo (786) 367-5083
- City of Hollywood (Sewer) – Jose Polanco (954) 921-3930

- City of Coral Gables (Sewer & Construction) – Noel Polo (305) 460-5022
- City of North Miami (Sewer) – Wisler Pierre-Louis (305) 895-9838
- City of Miami(Sewer) – Elyrosa Estevez – (305) 416-1200
- FDOT (Broward) (Sewer) – Chi Sheu – (954)- 776-4300
- FDOT (Miami-Dade) (Sewer) – Mary Lou Karner – (305) 256-6330
- FDOT (Miami Dade) (Sewer) – Houshang Zahedi – (305) 654-7163
- Miami Dade County Public Works (Sewer) – Mercedes Barrera – (786) 256-2625



HEADQUARTERS: 18001 Old Cutler Road, #643, Miami, FL 33157 • (877) 637-9665 • F (877) 637-9659
OFFICES: Miami, FL • Orlando, FL • Tampa, FL • Kernersville, NC • Atlanta, GA • Pineville, NC
www.EWSG.com • email: info@ewsg.com

Category / ID	Make	Category	VIN No.	Category / ID	Make	Category	VIN No.
V100-200: Vactors & Vac-con				E500: Off-Street Equipment			
	50				77		
V126	Sterling	Vactor	2FZHATAK64AL76085	E501	ASPT - All Pro	Trailer	NOVIN0200499016
V127	Sterling	Vactor	2FZHATDC05AN67474	E502	Anderson	Trailer	4YNBN16294C022097
V132	Sterling	Vactor	2FZHATDC45AU85067	E503	Hooper	Trailer	4TOFB253551004307
V134	Sterling	Vactor	2FZHATDCX6AV69217	E504	Haulmark	Trailer	16HCB12116G081147
V136	International	Vac-con	1HTWHAAT86J253378	E505	Express	Trailer	5GLBE20225C000121
V137	International	Vactor	1HTWGAST86J293063	E506	Harben	Trailer	1U9FS13191A044778
V141	Sterling	Vactor	2FZHATDC46AW65909	E507	Haulmark	Trailer	16HGB28216G084895
V142	Sterling	Vactor	2FZHATDC06AW65910	E508	Hooper	Trailer	4TOFB182361000741
V143	Sterling	Vactor	2FZHATDC76AW65421	E509	Eager Beaver	Trailer	112HAN3087L073430
V145	Sterling	Vactor	2FZHAZDE87AW65434	E510	Lark	Trailer	5RTBE2029AD018819
V146	Sterling	Vactor	2FZHAZDE07AW65766	E511	Eager Beaver	Trailer	112H5V326YL054432
V147	Sterling	Vactor	2FZHAZDE27AW65767	E512	SGAC	Trailer	54GVC16T5F7015001
V149	Sterling	Vactor	2FZHAZDE56AW65714	E513		Arrow Board	5F11S101381000561
V150	Sterling	Vactor	2FZHATDC87AX52875	E514		Arrow Board	511S101581000559
V151	Sterling	Vactor	2FZHATDC87AX52874	E515	Anvil Trailer	Trailer	7FYBE1211JD004093
V152	Sterling	Vactor	2FZHATDC07AX52658	E516	Eagle Cargo	Trailer	7FWBE1216J1002673
V153	International	Vactor	1HTWGAST57J564811	E517	Wanco	Arrow Board	5F11S10131J1000615
V154	International	Vactor Mini	1HTMMAAL89H145468	E518	Wanco	Arrow Board	5F11S10161J1000592
V156	International	Vactor Mini	1HTMMAALX9H145469	E519	Wanco	Arrow Board	5F11S101X21000225
V165	Sterling	Vac-Con	2FZNRJBB7XAA81132	E520	John Deere		
V167	Sterling	Vactor	2FZHAWDA96AV69273	E521	Easement Mach.		
V168	Sterling	Vac-Con	2FZHATAK72AJ59075	E522	Kawasaki		JK1AFDD108B501431
V169	Freightliner	Vactor	1FVHG3DV6CDBK4218	E523	Ver-Mac / Arrow Board		259U52111A51132514
V170	International	Vactor	1HTWYSBT07J399389	E524	John Deere	Gator	
V171	International	Vactor	1HTWYSBT97J399388	E525	Easement Machine		
V172	International	Vactor	1HTWYSBT97J399391	E526	SULL		2.00604E+11
V174	International	Vactor	1HTWYSBT67J399643	E527	WACK		5892700
G175	Sterling	Guzzler	2FZHAZDE85AN80316	E528	Aiman		846B10310
V176	Sterling	Vac-Con	2FZAATAK72AK14027	E529	Royal	RST Camera Trailer	5LABE14276MO12813
V178	Peterbilt	Vac-Con	2NP3LI0X9FM266712	E530	Soga	Trailer	54GVC20T8E7013238
V179	Peterbilt	Vac-Con	2N93LI0X5HM444912	E531	Kauf	Trailer	5VGF20209L000105
V180	Peterbilt	Vac-Con	2NP3LI0X7HM444913	E532	Qual	Trailer	5W0FB10188L000800
V181	Peterbilt	Vac-Con	2NP3LI0X3JM4474786	E533	Free	Trailer	5WKBE2228J1055578
V182	International	Vactor	1HTWNAZTXB.J334244	E534	Roac	Trailer	46UFU162351098737
V183	Freightliner	Vac-Con	1FVHC3BS4CHB.J4249	E535	King	Trailer	1TKUO1629BM033678
V184	International	Vac-Con	1HTWPAZT9CJ601630	E536	Northern	Water Pressure Trailer	67741011
V185	Freightliner	Vac-Con	1FVHG3CY3FHGC7368	E537	Kaufman	Trailer	5VGF1826GL002149
G186	Sterling	Guzzler	2FZHAZDE18AY47414	E538	Kaufman	Trailer	5VGF1826HL003075
V188	International	Vactor	1HTWGAZT17J399503	E539	Kaufman	Trailer	5VGF1828HL003076
V189	International	Vac-con	1HTWHAAT37J422496	E540	Kaufman	Trailer	5VGF1826GL003074
G190	Kenworth	Combo	1NKZL40X9GJ111684	E541	GPI	Trailer	1GNUS16B5B1035460
G191	Peterbilt	Supersucker	1NPCL70X4HD447051	E542	GPI	Trailer	1G0DB1823LM080887
G192	Sterling	Supersucker	2FZKXSYB8XAB17355	E543	ASPT - All Pro	Triple Crown Trailer 6x16 Utility	1XNUS16B5B1035460
G193	Sterling	Supersucker	2FZHAZAS42AK19123	E544	Anderson	Anderson Trailer EQ7186T	4YNBN18256C041178
G194	Sterling	Supersucker	2FZHAZDE66AV51172	E545	COVE	Trailer	53FBE1627LM056348
TBD	Western Star	Front part of Vac-Truck	5KKHAVFEXLLLG7954	E546	Hurco	Power Smoker	
TBD	Sterling	Vac-Con	2FZHAZAS03AK67462	E547	Ridgid	SR-20 / SN 213-36332	
TBD	Sterling	Vac-Con	2FZHAZDE96AU28594	E548		Arrow Board	1T2ZYR9ZC3EDP
TBD	Western Star	Vac-Con	5KKHAVDV0KLV1096	E549	GPI	Trailer	1G9UB1827LM080925
TBD	Western Star	Vac-Con	5KKHAVDV6GPHS6385	TBD		Easement Machine	
C300: Camera Units				TBD			
	26						
C303	Ford	Aries	1FDXE47F3WHB98130	TBD		Easement Machine	
C305	International	Aries	1HTMMAAM76H239572	TBD		Pipe Trailer	NCX634157
C306	Ford	Aries	1FDXE45P38DA38836	TBD		Trailer	40LAB2829JP003661
C308	Ford	Aries	1FDWE45P68DB04081	TBD		Fuel Trailer	Made by KRG no VIN
C309	Ford	Aries	1FDAF56R58ED86978	TBD		trailer	1B9DP2825L118050
C310	Ford	Aries	3FRWF65C68V668017	TBD		trailer	4MNDPZ529S0015400
C319	Ford	Aries	1FDXE47F4WHA70592	TBD		Trailer	10HHS16361000004
C321	Ford	Cues	1FDXE4FS7CDA05110	TBD		Home Trailer	NCX1105051
C322	Ford	Cues	1FDXE4FS0EDB00790	TBD		Trailer	10HHTD1A261000051
C323	Ford	Envirosight	1FDXE4FS7GDC45828	TBD		Right of Way Trailer	5HABH12244N038396

C324	Ford	Envirosight	1FTYE1CM7GKB39260	TBD		Trailer	5HABH16296N057197
C325	Ford	Envirosight	1FTNE2CM8FKA90240	TBD		Home Trailer	NCX1132634
C326	Ford	Envirosight	1FTYR2CM8HKA44427	TBD		Trailer	1MPUC0398C495378
C327	Ford	RST Camera Truck	1FDXE4S87DA05561	TBD		Trailer with Compressor	NCX11446006
C328	Ford	RST Camera Truck	1FDUF4GT1HED81178	TBD		Roller Trailer	NCX1144993
C329	Ford	RST Camera Truck	1FDXE4FS8CDA62643	TBD		Trailer	1M9LL4634CC495544
C330	Chevy	Cues / Video / Seal	1GBE4V1E65F511836	TBD		Trailer	5VTBU12236RBB1245
C331	Ford	Cues / Video / Seal / Lase	1FDAF56P96ED08862	TBD		Trailer	5WKBE1216C1013673
C332	Nissan	Aries	1N6BF0LY6CN102609	TBD		Patch Trailer	5WKBE2028C1015393
C333	Chevy	Cues / Cutter	1GBE5V1275F528700	TBD		Trailer	1A9UB12247L429042
C334	Ford	Cues / Groute / Ranger	3FRNF6HD3FV682681	TBD		Trailer	5HABH16286N059572
C335 (Not a truck)	Ford	RST Camera Cube		TBD		Trailer	NCX1199678
TBD	Ford	Van Transit	1FTRS4XV6JKA67220	TBD		Trailer Tilt Top	1BDU18205D1007193
TBD	Ford	Van Only	1FTSS34F83HB17656	TBD		Trailer Tri-Axle	1BDU36301E1007593
TBD	Ford	Transit Van - New Not In Service Yet (CUES Equipment)	1FTYR2CM8KKB30196	TBD		Trailer	5WKBE1223F1031772
TBD	Ford	CUES Transit Van	1FDXE4FS0HDC50208	TBD		Pipe Trailer	1BUP40307G1008144
TBD		Cues / 4 wheeler		TBD		Tilt Top Trailer	1BDU24207G1008341

H400: Heavy Equipment 51

H401	Sterling		2FZHACZV77AX37791	TBD			
H402	Ford		1FDZS96TOVVA18608	TBD		OLD Arrowboard	
H403	Peterbilt		2NPNLD9X21M565786	TBD		NEW Arrowboard	
H404	Peterbilt	Dump Truck	1XPXDB9X99D771141	TBD		Arrowboard	
H405	JOHN DEERE	BACKHOE	T0310GX952694	TBD	Atlas Tapco	Air Compressor	
H406	HITACHI	Excavator	FF01MBQ235957	TBD	Sullivan Patakek	Air Compressor	
H407	Caterpillar	Excavator	03025A4AZ04954	TBD		Air Compressor	
H408	Yale	Forklift	GLCO050TGNJAE082	TBD	John Deere	Air Compressor	
H409	Bobcat	Skid Steers		TBD		Air Compressor	
H410	Caterpillar	Skid Steers		TBD	McElroy	12 inch pulled fusing machine	
H411	Caterpillar	Skid Steers		TBD		Pressure XDCR	
H412	Bobcat	Skid Steers		TBD		Fusing Machine	
H413	Bobcat	Mini Excavator		TBD		Fusing Machine	
H414	Volvo	Excavator		TBD		Fusing Machine	
H415	Takeuchi			TBD		Fusing Machine	
H416	Caterpillar	Terrain Loader	CAT0287DVHMT00261	TBD	McElroy	Fusing Machine	
H417	Caterpillar	Midi Excavator	CAT0308EJFX02203	TBD	McElroy	4 inch Pit Bull fusing machine	
H418	Caterpillar	Midi Excavator	CAT3055EAEJX00803	TBD	Genesis	Fusing Machine	
H419	Sterling		2FZAASAK11AG97445	TBD	McElroy	Fusing Machine	
H420	Sterling		49H67FBA61HH42387	TBD	McElroy	Fusing Machine	
TBD	Caterpillar	Back Hoe		TBD	McElroy	4 inch Pit Bull Fusing Machine	
TBD	Caterpillar	Back Hoe		TBD	McElroy	ta Logger/ Add on to fusing machine	
TBD	Caterpillar	Back Hoe		TBD		Fusing Machine	
TBD	John Deere	Back Hoe		TBD			
TBD	Ford	Tractor		TBD	MWM Murphy	Pump	
TBD	Freightliner	Dump Truck	1FVXJLBC3XHB87327	TBD	Godwin	4" Pump	
TBD	Mack	Dump Truck	1MZAG11C16M030992	TBD	Godwin	6" Pump	
TBD	Ford	Winch Truck	1FDYA90W3GVA49517	TBD	Kabota	RTV	
TBD	Volvo	Dump Truck	4VK99G3H7N449880	TBD	Can-Am	side by side	
TBD	Western Star	Dump Truck	5KKMAVDV2GPHV4697	TBD		Tracto-Technik - Specialized Winch	
TBD	Komatsu	Loader		TBD		Power Pack - Specialized Winch	
TBD	John Deere	Loader		TBD		Rods (5 Racks)	
TBD	Roadhog	Roadhog with cold planer		TBD		R35mm Rods (2 Racks)	
TBD	Roadhog	Roadhog with cold planer		TBD	TT Technologies	Static Burst Machine	
TBD	Multiquip	Roller		TBD	TT Technologies		
TBD	Sakai	Roller		TBD		Static Puller/Tugger	
TBD	John Deere	Skid Steer		TBD		Static Puller/Tugger	
TBD	John Deere	Track Loader - Skid Steer		TBD	TT Technologies	Winch	
TBD	Bobcat	Skid Steer - Track Loader		TBD	TT Technologies	Winch	
TBD	HITACHI	Track Hoe		TBD	TT Technologies	Winch	
TBD	HITACHI	Track Hoe		TBD	TT Technologies	Track Winch	
TBD	Caterpillar	Track Hoe		TBD	SGAC	Trailer	54GVC20TXK7038136
TBD	John Deere	Track Hoe - RubberTrack & Blade		TBD	AMPAC		N/A
TBD	John Deere	Track Hoe		TBD	NPK	Hammer/Breaker - Hydraulic	N/A
TBD	John Deere	Track Hoe		TBD	NPK	HAMMER	N/A
TBD	John Deere	Track Hoe		TBD	NPK	Tamp	N/A
TBD	John Deere	Track Hoe		TBD	NPK	Tamp	N/A
TBD	HITACHI	Track Hoe		TBD	McElroy	ta Logger, add on to fusing machi	N/A
TBD	HITACHI	Track Hoe		TBD	Genesis	Fusing Machine	N/A
TBD	John Deere	Track Hoe		TBD	McElroy	4inch Pit Bull fusing machine	N/A

P600: Pump Trucks 19

L700: Lining Equipment 7							
L701	HAUM	Trailer	4XSPB16242G037248	P601	International	Pump Truck	1HTSDAAN7SH678054
L702	Boggs	Trailer	1C9EB132121305047	P608	WSTR	Pump Truck	2WKPCDJH6TK940470
L703	HMEDE	Heat Exchange	HRT446499408010HB	P611	Peterbilt	Pump Truck	1NPSXJEX1BD127491
L704	TEST	Re-Rounded/Pipe Shifter	1001	P612	International	Pump Truck	1HTWY AHR18J573963
L705	Sterling	Boiler Truck	2FZNCMDB0YAB48011	P613	Freightliner	Pump Truck	1FUBA5CG77L216350
L706	Freightliner	Reefer Truck	3ALACWDT5DDFD6557	P614	Freightliner	Pump Truck	1FUBA5CG17LY00478
L707	FRHT	Boiler	2FUY3MBCB4TA796641	P615	International	Pump Truck	1HSHWAHN79J122683
				P616	International	Pump Truck	1HSHWAHN39J122678
				P617	Kenworth	Pump Truck	1NKDLU0X26J129453
				P618	Sterling	Pump Truck	2FZHAATDC24AM47917
				P619	Sterling	Pump Truck	2FZHAATDC96AV69225
				P620	Mack	Pump Truck	1M2AG12C03M004491
				P621	Kenworth	Pump Truck	1XKDDU9X66J133446
				P622	Kenworth	Pump Truck	3WKDAU8X55F084642
				P623	Peterbilt	Pump Truck	1NPALFOX7N633823

FORM 16

PROPOSAL

TO THE MAYOR AND COMMISSIONERS
CITY OF HOLLYWOOD, FLORIDA

SUBMITTED June 7, 2023

Dear Mayor and Commissioners:

The undersigned, as BIDDER, hereby declares that the only person or persons interested in the Proposal as principal or principals is or are named herein and that no other person than herein mentioned has any interest in this Proposal or in the Contract to be entered into; that this Proposal is made without connection with any other person, company or parties making a Bid or Proposal; and that it is in all respects fair and in good faith without collusion or fraud.

The BIDDER further declares that he has examined the site of the Work and informed himself fully in regard to all conditions pertaining to the place where the Work is to be done; that he has examined the Drawings and Specifications for the Work and contractual documents relative thereto, including the Notice to Bidders, Instructions to Bidders, Proposal Bid Form, Form of Bid Bond, Form of Contract and Form of Performance Bond, General, Supplementary and Technical Specifications, Addenda, Drawings, and Local Preference Program, Exhibit A, and has read all of the Provisions furnished prior to the opening of bids; and that he has satisfied himself relative to the work to be performed.

The undersigned BIDDER has not divulged to, discussed or compared his bid with other bidders and has not colluded with any other BIDDER of parties to this bid whatever.

If this Proposal is accepted, the undersigned BIDDER proposes and agrees to enter into and execute the Contract with the City of Hollywood, Florida, in the form of Contract specified; of which this Proposal, Instructions to Bidders, General Specifications, Supplementary Conditions and Drawings shall be made a part for the performance of Work described therein; to furnish the necessary bond equal to one hundred (100) percent of the total Contract base bid, the said bond being in the form of a Cash Bond or Surety Bond prepared on the applicable approved bond form furnished by the CITY; to furnish all necessary materials, equipment, machinery, tools, apparatus, transportation, supervision, labor and all means necessary to construct and complete the work specified in the Proposal and Contract and called for in the Drawings and in the manner specified; to commence Work on the effective date established in the "Notice to Proceed" from the ENGINEER; and to substantially complete all Contract Work within 30 days with final completion within 45 days, and stated in the "Notice to Proceed" or pay liquidated damages for each calendar day in excess thereof, or such actual and consequential damages as may result therefrom, and to abide by the Local Preference Ordinance, Exhibit A.

The BIDDER acknowledges receipt of the following addenda:

No. <u> #1 </u>	Dated <u>5-23-2023</u>
No. <u> </u>	Dated <u> </u>
No. <u> </u>	Dated <u> </u>

And the undersigned agrees that in case of failure on his part to execute the said Contract and the Bond within ten (10) days after being presented with the prescribed Contract forms, the check or Bid Bond accompanying his bid, and the money payable thereon, shall be paid into the funds of the City of Hollywood, Florida, otherwise, the check or Bid Bond accompanying this Proposal shall be returned to the undersigned.

Attached hereto is a certified check on the

_____ Bank of _____

or approved Bid Bond for the sum of

Five Percent (5%) _____ Dollars (\$) according to the conditions under the Instructions to Bidders and provisions therein.

NOTE: If a Bidder is a corporation, the legal name of the corporation shall be set forth below, together with signature(s) of the officer or officers authorized to sign Contracts on behalf of the corporation and corporate seal; if Bidder is a partnership, the true name of the firm shall be set forth below with the signature(s) of the partner or partners authorized to sign Contracts in behalf of the partnership; and if the Bidder is an individual, his signature shall be placed below; if a partnership, the names of the general partners.

WHEN THE BIDDER IS AN INDIVIDUAL:

(Signature of Individual)

(Printed Name of Individual)

(Address)

WHEN THE BIDDER IS A SOLE PROPRIETORSHIP OR OPERATES UNDER A TRADE NAME:

(Name of Firm)

(Address)

(Signature of Individual) (SEAL)

WHEN THE BIDDER IS A PARTNERSHIP:

(Name of Firm) A Partnership

(Address)

By: _____
(SEAL)
(Partner)

Name and Address of all Partners:

WHEN THE BIDDER IS A JOINT VENTURE:

(Correct Name of Corporation)

By: _____ (SEAL)
(Address)

(Official Title)

As Joint Venture
(Corporate Seal)

Organized under the laws of the State of _____, and authorized by the law to make this bid and perform all Work and furnish materials and equipment required under the Contract Documents.

WHEN THE BIDDER IS A CORPORATION:

EnviroWaste Services Group, Inc.
(Correct Name of Corporation)

By: _____
(SEAL)

SVP and Corporate Secretary



(Official Title)

18001 Old Cutler Road, #554 Palmetto Bay, FL 33157

(Address of Corporation)

Organized under the laws of the State of Florida, and authorized by the law to make this bid and perform all Work and furnish materials and equipment required under the Contract Documents.

CERTIFIED COPY OF RESOLUTION OF BOARD OF DIRECTORS

EnviroWaste Services Group, Inc.

(Name of Corporation)

RESOLVED that David L. Orr

(Person Authorized to Sign)

SVP and Corporate Secretary of

(Title) (Name of Corporation)

be authorized to sign and submit the Bid or Proposal of this corporation for the following project:

**INFLOW/INFILTRATION (I/I) PROGRAM – EXCAVATED POINT REPAIRS
ECSD Project No. - 7106A
Bid No. IFB-083-23-JJ**

The foregoing is a true and correct copy of the Resolution adopted by

EnviroWaste Services Group, Inc. at a meeting of its Board of

(Name of Corporation)

Directors held on the 1st day of FEBRUARY, 2023.

By: [Signature]

Title: SVP AND CORPORATE SECRETARY

(SEAL)

The above Resolution MUST BE COMPLETED if the Bidder is a Corporation.



- END OF SECTION -

ATTACHMENT C
SUPPLEMENTARY GENERAL CONDITIONS
INDEX TO ARTICLES

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General Note:

The General Conditions refer to specific section numbers in the Supplementary General Conditions. These reference numbers may not coordinate with the actual Article numbers utilized in the Supplementary General Conditions. The CONTRACTOR shall comply with all General Conditions and all Supplementary General Conditions as well as related conditions included in the General Requirements, Division 1 of the Technical Specifications. Incorrect cross-reference numbers shall not relieve this requirement.

1. Project Schedule

Time is of the essence for this work. The following defines the schedule for the project:

**CONSTRUCTION WORK SCHEDULE
CONSTRUCTION / STARTUP / ACCEPTANCE:**

Major Milestones	Completion Time (Calendar Days)	Liquidated Damages (Per Day)
Substantial Completion	730	\$500.00
Project Closeout	730	\$500.00

Failure to meet any of the above defined construction/startup/acceptance completion dates shall subject the CONTRACTOR to pay damages as specified in these Supplementary General Conditions in Article 3.

⁽¹⁾Substantial Completion

1. Refer to Attachment B - General Conditions Articles 14.1 and 14.2. (Certification of Substantial Completion Services appended to the Supplementary General Conditions).
2. Substantial Completion shall also include:
 - Completion of all construction work associated with the specific "Major Milestone" listed in the construction work schedule including completion of punch list items. "Completion of punch list items" shall be as determined by the Engineer in the field.
 - Coating touchup completed.
 - Record shop drawings and O&M submittals received and accepted by the Engineer.
 - Record drawing red-lines received and accepted by the Engineer.
 - Guarantee certifications, performance affidavits, and all other certifications received and accepted by the Engineer.

Contractor shall also conform to construction sequence constraints as defined on the Drawings and in Specifications.

⁽²⁾Project Closeout

1. Refer to Division 1 General Requirement, Section 01700 Project Closeout.
2. Project Closeout shall also include:
 - All requirements of substantial completion met plus the following
 - Site cleanup and restoration completed
 - All other sitework completed
 - Minor punch list items completed (minor as defined by the Engineer in the field)
 - Demobilization completed
 - Releases from all parties who are entitled to claims

The title "Engineer" utilized in these descriptions for substantial and final completion shall mean the City staff engineer assigned to this project, or his designated representative.

2. **Insurance Requirements (Not Used. Refer to ARTICLE 2.25 of SECTION II – SPECIAL TERMS AND CONDITIONS OF THE CONTRACT DOCUMENTS**

3. Liquidated Damages

Liquidated damages shall be paid by the CONTRACTOR to the CITY for failure to complete work on time in accordance with the following schedule:

CONSTRUCTION/STARTUP/ACCEPTANCE:		
<u>Major Milestones</u>	<u>Completion Time (calendar days)</u>	<u>Liquidated Damages (Per Day)</u>
1. Substantial Completion	730	\$1,000.00
2. Project Closeout	730	\$1,000.00

The CITY is hereby authorized to deduct the sums described above from the monies which may be due to the CONTRACTOR for the work under this contract. Liquidated damages shall be additive such that the maximum total which may be deducted shall be \$1,000.00/day. Other damages for failure to meet warranty conditions as defined in other sections of the Specifications shall also be added with liquidated damages for failure to meet completion times.

4. **Restricted Area**

The CONTRACTOR shall, in installing the new facilities, confine all activities within the CITY property, easement, and right-of-ways indicated.

5. **Existing Facilities and Structures**

All existing facilities shall be protected, and if damaged, shall be repaired by the CONTRACTOR at no additional cost to the CITY.

6. **Explosives**

Explosives shall not be used on this project.

7. **Contract Documents**

The CITY will provide the CONTRACTOR with one (1) set of Contract Documents after the Notice to Proceed.

8. **Required Notifications**

When provisions of the pertinent codes, standards or regulations conflict with this Specification, the more stringent shall apply.

Prior to any site work, the CONTRACTOR shall notify the Engineering and Construction Services Division Inspector at (954) 921-3930.

Prior to excavation at the site, the CONTRACTOR shall notify the appropriate utilities and Sunshine State One-Call of Florida, Inc. (formerly U.N.C.L.E.) at 1-800-432-4770 for locations of buried utilities.

Prior to closure of any CITY streets or alleyways, or other activity which requires the diversion of traffic, the CONTRACTOR shall notify and obtain the permission of the CITY of Hollywood Fire and Police Communications Section at (954) 967-4321.

9. **Notice of Completion**

See attached form.

10. **Prevailing Wage Requirement**

A. The CONTRACTOR shall be responsible for ensuring payment of the rate of wages and fringe benefits, or cash equivalent, for all laborers, mechanics and apprentices employed by him/her or his/her SUBCONTRACTORS on the work covered by this contract which shall be not less than the prevailing rate of wages and fringe benefits payment or cash equivalent for similar skills or classifications of work as established by the General Wage Decision by the United States Department of Labor for Broward County, Florida that is in effect prior to the date the CITY issued the invitation for bids for this project (the prevailing rate of wages and fringes can be obtained at website <http://www.access.gpo.gov/davisbacon>).

If the General Wage Decision fails to provide for a fringe benefit rate for any worker classification, then the fringe benefit rate applicable to such worker classification shall be the fringe benefit rate that has a basic wage rate closest in dollar amount to the work classification for which no fringe benefit rate has been provided.

- B. Upon commencement of work, the CONTRACTOR and all of his/her SUB-CONTRACTORS shall post a notice in a prominent place at the work site stating the requirements of this Article.
- C. As per the City of Hollywood Code of Ordinances, Prevailing Wage Requirements and Fringe Benefits are applicable to the following: (A) Utilities projects over \$1,000,000.00 (one million dollars) and (B) All other projects over \$500,000.00 (five hundred thousand dollars).

11. Inspections and Testing During Overtime

- A. The following supplement Article 3.15 and 3.16 of the General Conditions:

For weekend work, CONTRACTOR shall submit a written request to the CITY by the preceding Wednesday. A separate request is required for each week that the CONTRACTOR wished to work on a weekend. For evening and holiday work, CONTRACTOR shall submit a written request to the CITY three (3) days in advance. The CITY will provide inspection services for all overtime work and the CONTRACTOR shall pay for inspection services per Article 3.15, no exceptions.

Similarly, Holiday and other overtime work shall be requested a minimum of 36-hours in advance and CITY will provide inspection for all overtime.

- B. Exceptions to the hours and days of the week for work and other related limitations are allowed only for tie-ins during low flow periods / early morning hours, coatings that need to be applied during lower temperature times of the day and whenever the Documents specifically define that work shall be completed outside of the limitations for "normal" work hours, days, etc.

Inspection for tie-ins during low flow/early morning and specialty coating application performed during nighttime will not be cause for extra inspection costs unless such work is remedial in nature as a result of defective work.

12. Retainage

After Substantial Completion of the construction services purchased pursuant to this contract, CONTRACTOR may present to CITY a payment request for one-half of the retainage then held by CITY. CITY shall promptly make payment to CONTRACTOR, unless CITY has grounds for withholding the payment of retainage. CITY shall have grounds for withholding the payment of retainage with respect to any amounts that are the subject of a good-faith dispute, the subject of a claim brought pursuant to Florida Statute Section 255.05, or otherwise the subject of a claim or demand by CITY or CONTRACTOR.

At acceptance of Substantial Completion, CITY shall promptly make payment to CONTRACTOR of one-half of the retainage then held by CITY. At acceptance of completion of all punch list items, CITY shall promptly make payment to CONTRACTOR the balance of retainage then held by CITY.

13. Owner's Contingency (NOT USED)

This allowance is in its entirety dedicated for the use of the Owner (The City of Hollywood) to address conditions (or work) associated with undefined conditions. All work resulting from undefined conditions shall be authorized in writing and in advance by the Owner, specifically the Director of Public Services, through the full execution of a Field Order. The actual amount to be paid per Field Order will be negotiated and agreed by both parties (the Owner and the Contractor). The final/negotiated amount of the field order will be deducted from the Owner's Allowance designated in the Bid Proposal and Schedule of Values. The Owner reserves the right to award none, any portion of, or all of the money associated with this allowance. By executing the CONTRACT between the City of Hollywood and the Contractor, the Contractor acknowledges that under no circumstances he or she should assume that he or she would be entitled to any amounts set aside by the City of Hollywood within the Owner's Allowance.

CERTIFICATE OF SUBSTANTIAL COMPLETION

PROJECT: **ENGINEER:** Engineering & Const. Services Division

TO: **CONTRACTOR:**

CONTRACT FOR:

NOTICE TO PROCEED DATE:

DATE OF ISSUANCE:

PROJECT OR DESIGNATED PORTION SHALL INCLUDE:

Portions of the work performed under this Contract as described above, have been reviewed and found to be substantially complete. The Date of Substantial Completion of Project or designated portion thereof designated above is hereby established as _____ which is also the date of commencement of applicable warranties required by the Contract Documents for the noted area.

DEFINITION OF DATE OF SUBSTANTIAL COMPLETION

The Date of Substantial Completion of the work or designated portion thereof is the date certified by the ENGINEER ("Date of Issuance" above) when construction is sufficiently complete, in accordance with the Contract Documents, so the CITY can occupy or utilize the work or designated portion thereof for the use for which it is intended, as expressed in the Contract Documents.

A list of items to be completed or corrected, prepared by the CONTRACTOR and verified and amended by the ENGINEER, for the above referenced "Project or Designated Portion" is attached to this form (attached "Punch List" dated _____).

The failure to include any items on such list does not alter the responsibility of the CONTRACTOR to complete all work in accordance with the Contract Documents.

CERTIFICATE OF SUBSTANTIAL COMPLETION

Please note that in accordance with Article 14 General Conditions, the Contractor retains full responsibility for the satisfactory completion of all work regardless of whether the Owner occupies and / or operates a part of the facility and that the taking possession and use of such work shall not be deemed an acceptance of any work not completed in accordance with the Contract Documents.

City of Hollywood - ECSD

ENGINEER **BY** **DATE**

CONTRACTOR **BY** **DATE**

The CITY OF HOLLYWOOD, through the City's authorized representative, accepts the work or designated portion thereof as substantially complete and will assume full possession thereof at _____(time) on _____
_____ (date).

BY **DATE**

- END OF SECTION -

ATTACHMENT E
GENERAL CONDITIONS, PUBLIC UTILITIES

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**ATTACHMENT B
GENERAL CONDITIONS, PUBLIC UTILITIES**

**CITY OF HOLLYWOOD, FLORIDA
GENERAL CONDITIONS
FOR CONSTRUCTION CONTRACTS**

ARTICLE 1 - DEFINITIONS

In the interpretation of these Contract Documents the following terms shall have the meaning indicated:

ADDENDA - Written or graphic instruments issued prior to the opening of Bids which clarify, correct or change the Contract Documents.

CHANGE ORDER - A written order to CONTRACTOR executed in accordance with City procurement procedures, as amended authorizing an addition, deletion or revision in the work, or an adjustment in the Contract Price or the Contract Time, issued after the date of Award.

CITY (OWNER) - The City of Hollywood, Florida.

COMMISSION - The City Commission of the City of Hollywood, Florida, being the legislative body of the CITY as set forth in the City of Hollywood Charter.

CONTRACT - The written agreement between the CITY and the CONTRACTOR covering the work to be performed in accordance with the other Contract Documents which are attached to the Contract and made a part thereof.

CONTRACTOR - The person, firm, or corporation with whom the CITY has entered into the Contract.

CONTRACT DOCUMENTS - The Notice to Bidders, Instruction to Bidders, Proposal, Information Required of Bidders, all Bonds, Agreement, and all supporting documents, these General Requirements and Covenants, the Specifications, Drawings and Permits, together with all Addenda and Change Orders issued with respect thereto.

CONTRACT PRICE - Total monies payable by the CITY to the CONTRACTOR under the terms and conditions of the Contract Documents.

CONTRACT TIME - The number of days agreed to in the Proposal, commencing with the date of the Notice to Proceed for completion of the work.

CONTROL - shall mean having the primary power, direct or indirect, to influence the management of a business enterprise. The controlling party must have the demonstrable ability to make independent and unilateral business decisions on a day-to-day basis, as well as the independent and unilateral ability to make decisions which may influence and chart the future course of the business.

DATE OF SUBSTANTIAL COMPLETION - The date when the work on the project, or specified part thereof, is substantially completed in accordance with the Contract Documents, such that

the CITY can occupy or utilize the project or specified part thereof for the use and purpose for which it was intended as determined and accepted by the Engineer.

DAYS - Calendar days of 24 hours measured from midnight.

DRAWINGS - The drawings which show the character and scope of the work to be performed and which have been prepared by the DESIGN ENGINEER approved by ENGINEER and are referred to in and are a part of the Contract Documents.

ENGINEER - The Director of Public Utilities of the CITY of Hollywood, Florida, or his authorized designee.

EXCUSABLE DELAY - Delay caused by the CITY, hurricane, tornadoes, fires, floods, epidemics or labor strikes.

GENERAL CONDITIONS - That segment of the Contract Specifications incorporating the Provisions common to all CITY Construction Contracts.

INEXCUSABLE DELAY - Any delay caused either (i) by events or circumstances within the control of the CONTRACTOR not specified in the definition of excusable delay.

INSPECTOR - The authorized field representative of the ENGINEER.

LIQUIDATED DAMAGES - The amount prescribed in the General Requirements to be paid the CITY, or to be deducted from any payments due the CONTRACTOR for each day's delay in completing the whole or any specified portion of the work beyond the Contract Time.

NOTICE OF AWARD - The written notice by the CITY to the successful Bidder stating that upon his execution of the Agreement and other requirements as listed therein within the time specified the CITY will sign and deliver the Agreement.

NOTICE TO PROCEED - A written notice by the ENGINEER to the CONTRACTOR fixing the date on which the Contract Time will commence to run and on which the CONTRACTOR shall start to perform his obligation under the Contract Documents.

"OR EQUAL" - Equivalent or superior in construction, efficiency and effectiveness to a type, brand, model or process called out in the Contract Documents to establish a basis of quality as determined by the ENGINEER.

SHOP DRAWINGS - All certified affidavits, drawings, diagrams, illustrations, schedules and other data which are specifically prepared by CONTRACTOR, a Subcontractor, manufacturer, fabricator, supplier or distributor to illustrate some portion of the work and all illustrations, brochures, standard schedules, performance charts, instructions, diagrams and other information prepared by a manufacturer, fabricator, supplier or distributor and submitted by CONTRACTOR to illustrate material or equipment for some portion of the WORK.

SPECIFICATIONS - Division 1 through 17 of these Contract Documents, consisting of administrative details and written technical descriptions of materials, equipment, standards and workmanship.

SUPPLEMENTARY CONDITIONS - Division 1 of the Contract Specifications incorporating the provisions peculiar to a specific project.

SUBCONTRACTOR - An individual, firm or corporation having a direct contract with CONTRACTOR or with any other Subcontractor for the performance of a part of the work

SURETY - The person, firm or corporation responsible for the Bidder's acts in the execution of the Contract, or which is bound to the CITY with and for the CONTRACTOR to insure performance of the Contract and payment of all obligations pertaining to the work.

WORK - All the work materials or products specified, indicated, shown or contemplated in the Contract Documents to construct and complete the improvement, including all alterations, modifications, amendments or extension thereto made by Change Orders.

ARTICLE 2 - ORGANIZATIONAL ABBREVIATIONS

Abbreviations of organizations which may be used in these Specifications are:

AASHTO:	American Association of State Highway and Transportation Officials
ACI:	American Concrete Institute
AIA:	American Institute of Architects
AISC:	American Institute of Steel Construction
AITC:	American Institute of Timber Construction
ANSI:	American National Standards Institute
APWA:	American Public Works Association
ASTM:	American Society for Testing and Materials
ASCE:	American Society of Civil Engineers
ASME:	American Society of Mechanical Engineers
ASHRAE:	American Society of Heating, Refrigerating and Air Conditioning Engineers
AWPA:	American Wood Preservers Association
AWWA:	American Water Works Association
AWS:	American Welding Society
BCEQCB:	Broward County Environmental Quality Control Board
CRSI:	Concrete Reinforcing Steel Institute
FDEP:	Florida Department of Environmental Protection
FDNR:	Florida Department of Natural Resources
FDOT:	Florida Department of Transportation
FPL:	Florida Power and Light
IEEE:	Institute of Electrical and Electronic Engineers
NACE:	National Association of Corrosion Engineers
NCPI:	National Clay Pipe Institute

NEC: National Electrical Code

NEMA: National Electrical Manufacturers Association

NFPA: National Fire Protection Association

OSHA: Occupational Safety and Health Act

PCI: Prestressed Concrete Institute

SFBC: South Florida Building Code, Broward Edition, Latest Revision

SFWMD: South Florida Water Management District

SSPC: Structural Steel Painting Council

UL: Underwriters' Laboratories, Inc.

UNCLE: Utility Notification Center for Location before Excavation (1-800-432-4770)

USEPA: United States Environmental Protection Agency

USGS: United States Geological Survey

WWEMA: Water and Wastewater Equipment Manufacturers Association

ARTICLE 3 - MISCELLANEOUS PRELIMINARY MATTERS

3.1 Contract Document Discrepancies:

Any discrepancies, conflicts, errors or omissions found in the Contract Documents shall be promptly reported to the ENGINEER who will issue a correction, if necessary, in writing. The CONTRACTOR shall comply with any corrective measures regarding the same as prescribed by the ENGINEER.

3.2 Submissions:

Unless indicated otherwise in the Contract Documents, within seven days subsequent to the CONTRACTOR executing and submitting the required documents of Article 2.13 in Section II - Special Terms and Conditions, the CONTRACTOR shall submit to the ENGINEER an estimated progress schedule indicating the starting and completion days of the various stages of the work. A preliminary Schedule of Values and a preliminary schedule of Shop Drawing submissions may also be required by Section 01300 of Division 1 - General Requirements.

3.3 Pre-construction Conference:

The Contractor will be required to attend a mandatory Pre- Construction Conference for review of the above schedules, establishing procedures and establishing a working understanding among the parties as to the work.

3.4 Contract Time:

The Contract Time will commence on the date of the Notice to Proceed and shall exist for the total number of days as specified in Attachment C – Supplementary General Conditions, Section 1, Project Schedule as modified by any subsequent Change Orders, Unless the CONTRACTOR fails to complete the requirements of Section II - Special Terms and Conditions, the additional time in days (including weekends) required to correctly complete the documents will be deducted by CITY from the Contract Time specified by the CONTRACTOR in this Proposal.

3.5 Computation of Time:

When any period of time is referred to the Contract Documents by days, it shall be computed to exclude the first and include the last day of such period. If the last day of any such period falls on a Saturday or Sunday or on a legal holiday, such day shall be omitted from the computation.

3.6 Commencement of Work:

The CONTRACTOR shall not perform work at the site prior to the date of the Notice to Proceed.

3.7 Extension of Contract Time:

Extensions of time shall be based solely upon the effect of delays to the work as a whole. Extensions of time shall not be granted for delays to the work, unless the CONTRACTOR can clearly demonstrate, through schedule analysis, that the delay to the work as a whole arose in accordance with Article 11, Changes in Contract Time and that such delays did or will, in fact, delay the progress of work as a whole. Time extensions shall not be allowed for delays to parts of the work that are not on the critical path of the Project schedule. Time extensions shall not be granted until all float or contingency time, at the time of the delay, available to absorb specific delays and associated impacts, is used.

3.8 Notice and Service Thereof:

All notices, demands, requests, instructions, approvals and claims shall be in writing. Notices, demands, etc. shall be deemed to have been validly given if delivered in person to the individual or to a member of the firm or to an officer of the corporation for whom it is intended, or if delivered at or sent by registered or certified mail, postage prepaid, to the business address as defined at the Pre-Construction Conference.

3.9 Separate Contract:

The CITY reserves the right to let other Contracts in connection with this Project. The CONTRACTOR shall afford other Contractors reasonable opportunity for the introduction and storage for their materials and the execution of their work and shall properly connect and coordinate his work with theirs.

3.10 Assignments of Contract:

No assignment by the CONTRACTOR of the Contract or of any part thereof, or any monies due or to become due thereunder shall be made.

3.11 Patents:

It is mutually understood and agreed that without exception, Contract prices are to include all royalties and costs arising from patents, trademarks, and copyrights in any way involved in the work. It is the intent that whenever the Contractor is required or desired to use any design, device, material or process covered by letters, patent, or copyright, the right for such use shall be provided for by suitable legal agreements with the Patentee or Owner and a copy of this agreement shall be filed with the ENGINEER. However, whether or not such an agreement is made or filed as noted, the CONTRACTOR and the Surety in all cases shall indemnify and save harmless the CITY from any and all claims for infringement by reason of the use of any such patented design, device, material or process, to be performed under the Contract, and shall indemnify the said CITY from any costs, expenses, and damages which it may be obliged to pay, by reason of such infringement, at any time during the prosecution or after the completion of the work.

3.12 Federal Excise Tax:

The forms needed for applying for exemption certificates for materials and equipment, normally subject to the Federal Excise Tax, may be obtained from the Director of Internal Revenue, Jacksonville, Florida.

The CONTRACTOR is solely responsible for obtaining the desired exemption certificate from the Federal Government.

3.13 Savings Due to Excise Tax Exemptions:

The Bidder shall include in the Bid price the estimated cost of all goods, supplies and equipment which will be incorporated in the Work and the taxes that the Bidder would be required to pay if the Bidder were to purchase such goods, supplies or equipment. By subsequent Change Order(s), the parties shall reduce the Bid price to reflect any goods, supplies and equipment purchased directly by City and the resulting tax savings due to City's exemption from Excise Taxes.

CONTRACTOR shall pay all sales, consumer, use and other similar taxes required to be paid by CONTRACTOR in accordance with the laws and regulations of the State of Florida and its political subdivisions. Consistent with the tax exemption for municipalities provided by state law, CITY and CONTRACTOR shall jointly operate so that CITY may purchase directly, goods, supplies and equipment which will be incorporated into the Work. The goods, supplies and equipment that will be purchased by CITY shall be approved in advance by the parties.

With respect to all goods, supplies and equipment to be purchased by CITY, CONTRACTOR shall, on behalf of CITY, take all actions necessary and appropriate to cause all purchases to be made and shall be responsible for delivery of all such goods, supplies and equipment, including verification of correct quantities and documents or orders, coordination of purchases and delivery schedules, sequence of delivery, unloading, handling and storage through installation, obtaining warranties and guarantees required by the Contract Documents, inspection and acceptance of the goods, supplies and equipment at the time of delivery, and other arrangements normally required for the particular goods, supplies or equipment purchased. Unless otherwise directed by CITY, such actions shall also include taking the lead in efforts to resolve any and all disputes with the vendor. CONTRACTOR shall ensure that each vendor of goods, supplies and equipment purchased by CITY agrees in writing to the terms and conditions contained in CITY'S standard purchase order, which terms and conditions are set forth in Attachment C - Supplementary General Conditions of the Contract Documents. Even though CITY may purchase such goods, supplies and equipment, the goods, supplies and equipment shall be stored at the site in the same manner as goods, supplies and equipment purchased by CONTRACTOR.

CONTRACTOR shall hold CITY harmless from delays in manufacturing, delivery, and other unforeseen conditions that may arise as part of the procurement of CITY-purchased goods, supplies and equipment.

3.14 Overtime Work:

The CONTRACTOR shall receive no additional compensation for overtime work, i.e., work in excess of eight hours in any one calendar day or 40 hours in any one calendar week, even though such overtime work may be required under emergency conditions and may be ordered by the ENGINEER in writing. Additional compensation will be paid the CONTRACTOR for overtime work only in the event extra work is ordered by the ENGINEER and the Change Order specifically authorizes the use of overtime work and then only to such extent as overtime wages are regularly being paid by the CONTRACTOR for overtime work of a similar nature in the same locality.

3.15 Inspections and Testing during Overtime:

The CONTRACTOR shall establish a normal work schedule which does not exceed eight hours per day in a normal work day nor 40 hours per week in a normal work week. Normal work days shall be Monday through Friday. Whenever CONTRACTOR's work requires scheduled overtime, unless such overtime work is specifically required by the Contract Documents, CONTRACTOR shall reimburse the CITY for the extra costs incurred for providing Inspectors. Overtime shall be scheduled only after CONTRACTOR obtains written permission from the CITY. A change order shall be prepared to cover the CITY costs. Inspector costs shall be charged to the CONTRACTOR at a rate of \$80.00 per hour with a minimum of four hours charged for weekends and holidays. If the CONTRACTOR has an overtime work force size of fifty or more persons a second Inspector will be required and the costs for two Inspectors will be \$160.00 per hour.

3.16 Nights, Sunday or Holiday Work:

Except upon specific permission of the ENGINEER, the CONTRACTOR shall not perform any work on Sundays or on legal State or Municipal holidays. In accordance with City of Hollywood Code of Ordinances, Section 21.49, no work between 6:00 p.m. and 8:00 a.m. will be permitted, except in case of an emergency, that violates Section 21.49 concerning noise levels. All costs of testing and inspection performed during night, Sunday or holiday work shall be borne by the CONTRACTOR. The CONTRACTOR shall notify all regulatory agencies, including but not limited to the City Police Department, Fire Department, Building Department and Code Enforcement Department.

3.17 Injury or Damage Claims:

Should CITY or CONTRACTOR suffer injury or damage to their person or property because of any error, omission or act of the other party or of any of the other party's employees or agents or others for whose acts the other party is legally liable, claim shall be made in writing to the other party within a reasonable time of the first observance of such injury or damage. However, nothing herein shall be deemed to affect the rights, privileges and immunities of City as are set forth in Section 768.28, Florida Statutes.

ARTICLE 4 - CONTRACT DOCUMENTS

4.1 Intent:

The Contract Documents comprise the entire Agreement between the CITY and CONTRACTOR concerning the work. The Contract Documents can be altered only by Change Order. The Contract Documents are complementary; what is called for by one is as binding as if called for by all. It is the intent of the Contract Documents that the CONTRACTOR, for due consideration, shall furnish all equipment, material, supervision and labor, (except as may be specifically noted otherwise) required or necessary to complete the work in total accordance with said Documents. It is the intent of the Drawings and Specifications to describe the Project to be constructed in accordance with the Contract Documents. Any work that may reasonably be inferred from the Drawings or Specifications as being required in order to produce the intended result shall be supplied whether or not it is specifically called for.

4.2 Order of Precedence of Contract Documents:

In resolving differences resulting from conflicts, errors or discrepancies in any of the following Contract Documents, the order of precedence shall be as follows:

1. Permits
2. Change Orders
3. Contract Agreement
4. Specification
5. Drawings

Within the Specifications the order of precedence is as follows:

1. Addenda
2. Section I - Introduction
3. Section II – Special Terms and Conditions
4. General Terms & Conditions
5. Attachment C- Supplementary General Conditions
6. Attachment B - General Conditions
7. Division 1, General Requirements
8. Technical Specifications
9. Referenced Standard Specifications

With reference to the Drawings the order of precedence is as follows:

1. Figures Govern over Scaled Dimensions
2. Detail Drawings Govern over General Drawings
3. Change Order Drawings Govern over Contract Drawings
4. Contract Drawings Govern over Standard or Shop Drawings

4.3 Reference To Standards:

Any reference to standard Specifications, manuals or codes of any organization or governmental authority shall mean the latest edition, in effect as of the Bid Opening Date.

ARTICLE 5 - BONDS AND INSURANCE

5.1 Bid Guarantee:

Bidders maybe required to submit a Bid Guarantee in an amount indicated in the SECTION II - SPECIAL TERMS AND CONDITIONS. This Guarantee may be a Certified or Cashier's Check on a solvent National or State Bank, or a Bid Bond written by a Surety licensed to do business in Florida and rated at least "A", Class X in the latest edition of "Best's Key Rating Guide" published by A.M. Best Company.

5.2 Performance and Payment Bond:

CONTRACTOR shall furnish Performance and Payment Bonds, in amounts equal to the Contract Price as Security for the faithful performance and payment of CONTRACTOR's obligations. The Bond or Bonds shall remain in effect one year after the date of final payment. The Surety must be qualified as specified above in Paragraph 5.1. However, the City reserves the right to require additional bonds as set forth in Article 5 of the Contract.

5.3 Signatures:

All Bonds signed by an Agent must be accompanied by a Certified copy of the authority to act, with said copy having been signed (not typed nor printed) by an Officer of the Surety and carrying the seal of the Surety.

5.4 Insurance Coverage:

Within ten days from Notice of Award the CONTRACTOR shall purchase and maintain such insurance as specified in Article 2.25 of Section II – Special Terms and Requirements as will protect him from claims set forth below which may arise out of or result from the CONTRACTOR's operations under the Contract or Contract Documents, whether such operations be by himself or by any Subcontractor or by anyone directly or indirectly employed by any of them, or by anyone for whose acts any of them may be liable.

5.5 Certificates of Insurance:

Within ten days of award, the Contractor shall obtain a Certificate of Insurance reflecting the necessary coverages as required by the Contract Documents. Certificates of Insurance shall contain a provision that coverages afforded under the policies will not be canceled until at least 30 days prior written notice has been given to the CITY. The City of Hollywood must be named as additional insured on all coverage with the exception of Workmen's Compensation. Policies shall be issued by companies authorized to do business under the Laws of the State of Florida. Policyholders and Financial Ratings must be no less than "A" and Class X respectively in the latest edition of "Best Key Rating Guide", published by A.M. Best Company.

5.6 Insurance Limits of Liability:

The insurance required by this Article shall be written for no less than the level of liability specified in "Insurance Requirements", Section 2 of the Supplementary General Conditions, or required by law, whichever is greater. The insurance shall include contractual liability insurance applicable to the CONTRACTOR's obligations under this contract.

The level required in Section 2 of the Supplementary General Conditions will not be reduced for any reason.

ARTICLE 6 - AVAILABILITY OF LAND; REFERENCE POINTS

6.1 Rights-of-Way:

Lands or Rights-of-Way for the work to be constructed under the Contract will be provided by the CITY. Nothing contained in the Contract Documents shall be interpreted as giving the CONTRACTOR exclusive occupancy of the lands or Rights-of-Way provided. Any additional lands or Rights-of-Way required for construction operations shall be provided by the CONTRACTOR at his own expense; provided, that the CONTRACTOR shall not; and the CITY nor the ENGINEER shall not be liable for any claims or damages resulting from the CONTRACTOR's unauthorized trespass or use of any such properties.

6.2 Permits:

When required by Article 2.16 of the Section II – Special Terms and Conditions, the CONTRACTOR shall secure, from the agencies having jurisdiction, the necessary permits to create obstructions, to make excavations if required under the Contract, and to otherwise encroach upon Rights-of-Way, and to present evidence to the ENGINEER that such permission has been granted, before work is commenced. Regulations and requirements of all agencies concerned shall be strictly adhered to in the performance of the Contract. The enforcement of such requirements under the Contract shall not be made the basis for additional compensation.

6.3 Lines and Grades:

The CONTRACTOR shall furnish all grades and all other lines required for the proper execution of the work.

ARTICLE 7 - CONTRACTOR'S RESPONSIBILITIES

7.1 Laws/Regulations to Be Observed:

The CONTRACTOR shall familiarize himself and comply with all Federal, State, County and CITY laws, by-laws, ordinances or regulations controlling the action or operation of those engaged or employed in the work or affecting material used, and govern himself in accordance with them. He shall indemnify and save harmless the CITY and all of its officers, agents and employees against any claims or liability arising from or based on the violation of any such laws, by-laws, ordinances, regulations, orders or decrees, whether by himself or his employees or Subcontractors.

7.2 Indemnification of City:

- (a) Refer to ARTICLE 1.46 – INDEMNIFICATION AND HOLD HARMLESS AGREEMENT of Section IV – General Terms and Conditions.
- (b) Refer to ARTICLE 1.47 – PATENT AND COPYRIGHT INDEMNIFICATION of Section IV – General Terms and Conditions.
- (c) The provisions of (a) and (b) above shall survive the expiration or earlier termination of the Contract Documents.

7.3 Guarantee of Payments:

The CONTRACTOR guarantees the payments of all just claims for materials, supplies, tools, labor and other just claims against him, or any Subcontractor in connection with this Contract, and his bond will not be released by final acceptance and payment by the CITY unless all such claims are paid or released.

7.4 Permits and Licenses:

The CONTRACTOR shall obtain all permits and licenses required by the Contract Documents. A copy of the permit(s) and such conditions and requirements thereon are a part of the Contract Documents. Failure to obtain such permits or licenses shall subject the CONTRACTOR to the provisions of the South Florida Building Code, Broward Edition.

7.5 Emergencies:

In emergencies affecting the safety or protection of persons or the work or property at the site or adjacent thereto, CONTRACTOR, without special instruction or authorization from ENGINEER or CITY, is obligated to act to prevent threatened damage, injury or loss. CONTRACTOR shall give ENGINEER prompt written notice of any significant changes in the work or deviations from the Contract Documents caused thereby.

7.6 Substitutes or "Or Equal":

A. Substitutes or "Or-Equal" Materials or Equipment:

Whenever materials or equipment are specified or described in the Contract Documents by using the name of a proprietary item or the name of a particular supplier the naming of the item is intended to establish the type, function and quality required. Unless the name is followed by words indicating that no substitution is permitted, materials or equipment of other Suppliers may be accepted by the ENGINEER if sufficient information submitted by the CONTRACTOR to allow the ENGINEER to determine that the material or equipment proposed is equivalent or equal to that named. The ENGINEER will be allowed 30 days within which to evaluate each proposed substitute. The ENGINEER will be the sole judge of acceptability, and NO SUBSTITUTE WILL BE ORDERED, INSTALLED OR UTILIZED WITHOUT THE ENGINEER'S PRIOR WRITTEN ACCEPTANCE which will be evidenced by either a Change Order or an approved set of Shop Drawings. Requests for review of substitute items of material and equipment will not be accepted by the ENGINEER from anyone other than the CONTRACTOR. The procedure for review by the ENGINEER is as follows:

If the CONTRACTOR wishes to furnish or use a substitute item of material or equipment, the CONTRACTOR shall make written application to the ENGINEER for acceptance thereof, certifying that the proposed substitute will perform adequately the functions and achieve the results called for by the general design, be similar and of equal substance to that specified and be suited to the same use as that specified. In addition, the application shall

1. State that the evaluation and acceptance of the proposed substitute will not prejudice the CONTRACTOR's achievement of completion on time.
2. State whether or not acceptance of the substitute for use in the WORK will require a change in any of the Contract Documents to adapt design to the proposed substitute. The CONTRACTOR shall be responsible for any extra design adaptation costs associated with a proposed substitute.
3. State whether or not incorporation or use of the substitute in connection with the work is subject to payment of any license fee or royalty.
4. Provide complete substitute identification and description, including manufacturer's and local distributor's name and address, performance and test data, and reference standards.

5. Provide samples, as required by ENGINEER.
 6. Provide name and address of similar projects on which the proposed substitute has been used, and date of installation.
 7. Identify all variations of the proposed substitute from that specified.
 8. Indicate available maintenance, repair and replacement service.
 9. Submit an itemized estimate of all costs that will result directly or indirectly from acceptance of such substitute, including costs of redesign and claims of other Contractors affected by the resulting change. The CONTRACTOR shall be responsible for the costs of redesign and claims of other Contractors.
 10. Provide any additional data about the proposed substitute as the ENGINEER may require of the CONTRACTOR.
- B. Substitute means, method, technique, sequence or procedure of construction:
- If a specific means, method, technique, sequence or procedure of construction is indicated in or required by the Contract Documents, the CONTRACTOR may furnish or utilize a substitute means, method, sequence, technique or procedure of construction acceptable to the ENGINEER, if the CONTRACTOR submits sufficient information to allow the ENGINEER to determine that the substitute proposed is equivalent to that indicated or required by the Contract Documents. The procedure for review by the ENGINEER will be similar to that provided in Paragraph 7.6 A.
- C. The CITY may require the CONTRACTOR to furnish at the CONTRACTOR's expense, a special performance guarantee or other surety with respect to any substitute.
- D. The ENGINEER will record time required by the ENGINEER and/or the ENGINEER's consultants in evaluating substitutions proposed by the CONTRACTOR and in making changes in the Contract Documents occasioned thereby. Whether or not the ENGINEER accepts a proposed substitute, THE CONTRACTOR SHALL REIMBURSE THE CITY FOR THE CHARGES OF THE ENGINEER AND THE ENGINEER'S CONSULTANTS FOR EVALUATING EACH PROPOSED SUBSTITUTE.
- E. Any and all costs which result from changes to/adaptations of the work shall be paid by the CONTRACTOR including but limited to design, materials, installation, etc.

7.7 Shop Drawings:

Shop Drawing submittals shall be as follows:

- A. The CONTRACTOR shall submit a sufficient number of copies of each Shop Drawing to enable the ENGINEER to retain three copies unless additional copies are specified in the Contract Documents. Resubmissions of Shop Drawings shall be made in the same quantity until final approval is obtained.
- B. The CONTRACTOR shall submit Shop Drawings for all equipment, apparatus, machinery, fixtures, piping, fabricated structures, manufactured articles and structural components Manufacturer's Certified Affidavit that the item supplied complies with the design Specifications, and all other submittal requirements.
- C. Shop Drawings for structural components, electrical or mechanical systems shall be Certified by a Registered Engineer of the discipline involved.
- D. The CONTRACTOR shall thoroughly review and check the Shop Drawings, and each and every copy shall show his approval thereon. If the Shop Drawings show or indicate departures from the Contract requirements, the CONTRACTOR shall make specific mention thereof in his letter of transmittal. Failure to point out such departures shall not relieve the CONTRACTOR from his responsibility to comply with the Drawings and Specifications.
- E. No approval will be given to partial submittals of Shop Drawings for items which interconnect and/or are interdependent. It is the CONTRACTOR's responsibility to assemble the Shop Drawings for all such interconnecting and/or interdependent items, check them himself and then make one submittal to the ENGINEER along with his comments as to compliance, non-compliance, or features requiring special attention.
- F. If catalog sheets or prints of manufacturer's standard drawings are submitted as Shop Drawings, any additional information or changes on such Drawings shall be typewritten or lettered in ink.
- G. The CONTRACTOR shall keep one set of Shop Drawings marked with the ENGINEER's approval at the job site at all times.
- H. Where a Shop Drawing or sample is required by the Specifications, no related work shall be commenced until the submittal has been reviewed and approved by the ENGINEER.
- I. Approval of the Shop Drawings shall constitute approval of the subject matter thereof only, and not of any structure, material, equipment or apparatus shown or indicated. The approval of the Shop Drawings will be general and shall not relieve the CONTRACTOR of responsibility for the accuracy of such Drawings, nor for the proper fitting and construction of the work, nor for the furnishing of materials or work required by the contract and not indicated on the Drawings. Approval shall not relieve the CONTRACTOR from responsibility for errors or omissions of any sort on the Shop Drawings.

7.8

Personnel:

A. Supervision and Superintendence:

1. The CONTRACTOR shall supervise and direct the work competently and efficiently, devoting such attention thereto and applying such skills and expertise as may be necessary to perform the work in accordance with the Contract Documents. The CONTRACTOR shall be solely responsible for the means, methods, techniques, sequences and procedures of construction, but the CONTRACTOR shall not be solely responsible for the negligence of others in the design or selection of a specific means, method, technique, sequence or procedure of construction which is indicated in and required by the Contract Documents. The CONTRACTOR shall be responsible to see that the finished work complies accurately with the Contract Documents.
2. The CONTRACTOR shall keep on the work at all times during its progress a competent resident Superintendent fluent in both oral and written communication in the English language, who shall not be replaced without written notice to the ENGINEER except under extraordinary circumstances. The Superintendent will be the CONTRACTOR's representative at the site and shall have authority to act on behalf of the CONTRACTOR. All communications given to the Superintendent shall be as binding as if given to the CONTRACTOR.

B. Workforce:

1. None but skilled workers shall be employed on work requiring special qualifications. When required in writing by the ENGINEER, the CONTRACTOR or any Subcontractor shall discharge any person who is, in the opinion of the ENGINEER, incompetent, disorderly or otherwise unsatisfactory, and shall not again employ such discharged person on the work except with the consent of the ENGINEER. Such discharge shall not be the basis of any claim for damages against the CITY or any CITY agents.
2. With respect to all skilled, semi-skilled and unskilled workers employed on the Project under this Contract, preference in employment shall be given to persons residing in Hollywood when such persons are available and qualified to perform the work to which the employment relates. No person shall be employed in violation of the State or National Labor Laws. No person under the age of 16 years shall be employed on a Project under the Contract. No person whose age or physical condition is such as to make his employment dangerous to his health or safety or to the health or safety of others shall be employed on the Project under this Contract; provided that this shall not operate against the employment of physically handicapped persons, otherwise employable where such persons may be safely assigned to work which they can ably perform. No person currently serving sentences in a penal or correctional institution and no inmate of an institution for

mentally defective shall be employed on a Project under this Contract without specific approval of the ENGINEER.

3. No discrimination shall be made in the employment of persons on the work by the CONTRACTOR or by any Subcontractor under him, because of the race, color, sex, age or religion of such persons, and there shall be full compliance with the provisions of applicable State and Federal laws in this regard.

7.9 Safety and Protection:

A. Federal Safety and Health Regulations:

The CONTRACTOR and Subcontractors shall comply with the provisions of the Occupational Safety and Health Standards, promulgated by the Secretary of Labor under the "Occupational Safety and Health Act of 1970".

B. Responsibilities:

The CONTRACTOR shall be responsible for initiating, maintaining and supervising all safety precautions and programs in connection with the work. The CONTRACTOR shall take all necessary precautions for the safety of, and shall provide the necessary protection to prevent damage, injury or loss to:

1. All employees on the work and other persons who may be affected thereby.
2. All the work and all materials or equipment to be incorporated therein, whether in storage on or off the site.
3. Other property at the site or adjacent thereto, including trees, shrubs, lawns, walks, pavements, roadways, structures and utilities not designated for removal, relocating or replacement in the course of construction.

C. Designated Safety Officer:

The CONTRACTOR shall designate a responsible member of his organization at the site whose duty shall be the prevention of accidents. This person shall be the CONTRACTOR's Superintendent unless otherwise designated in writing by the CONTRACTOR to the ENGINEER.

D. Protection of the Work:

Until acceptance of the work by the CITY, it shall be under the charge and in care of the CONTRACTOR and he shall take every necessary precaution against injury or damage to the work by action of the elements or from the execution or from the non-execution of the work. The CONTRACTOR shall rebuild, restore and make good, at his own expense, all injuries or damages to any portion of the work occasioned by any of the above causes before its completion and acceptance.

7.10 Traffic Control, Public Safety and Convenience:

- A. The CONTRACTOR shall at all times conduct his work so as to assure the least possible obstruction to traffic and inconvenience to the general public, and provide adequate protection of persons and property in the vicinity of the work.
- B. WHEN THE NORMAL FLOW OF TRAFFIC WILL BE IMPAIRED OR DISRUPTED IN ANY MANNER ON ANY STREET, THE CONTRACTOR SHALL NOTIFY THE POLICE TRAFFIC SERGEANT AT 921-3610 AT LEAST 48 HOURS IN ADVANCE.
- C. Streets shall not be closed, except when and where directed by the ENGINEER, and whenever a street is not closed the work must be conducted with the provision for safe passageway for traffic at all times. The CONTRACTOR shall make all necessary arrangements concerning maintenance of traffic and selection of detours required.
- D. When permission has been granted to close an existing roadway, or portion thereof, the CONTRACTOR shall furnish and erect signs, barricades, lights, flags and other protective devices as necessary subject to the approval of the ENGINEER. From sunset to sunrise, the CONTRACTOR shall furnish and maintain as many yellow lights as the ENGINEER may direct.
- E. During working hours the CONTRACTOR shall furnish watchmen in sufficient numbers to protect and divert the vehicular and pedestrian traffic from working areas closed to traffic, or to protect any new work. Failure to comply with this requirement will result in the ENGINEER shutting down the work until the CONTRACTOR shall have provided the necessary protection.
- F. No separate payment will be made for such signs, barricades, lights, flags, watchmen or other protective devices as required, with all costs thereof deemed to be included in the prices bid for the various items scheduled in the bid.
- G Sidewalks, gutters, drains, fire hydrants and private drives shall, in so far as practicable, be kept in condition for their intended uses. While the work is actually going on at any location, as much as half the street width at that location may be barricaded to exclude traffic entirely, but street traffic shall not be obstructed needlessly. Fire hydrants on or adjacent to the work shall be kept accessible to fire apparatus at all times, and no material or obstruction shall be placed within ten feet of any such hydrant.
- H. Construction material stored upon the public street shall be placed so as to cause as little obstruction to the general public as is reasonably possible.

7.11 Use of Explosives:

When the use of explosives is necessary for the prosecution of the work, the CONTRACTOR shall observe the utmost care so as not to endanger life or property, and whenever directed, the number and size of charges shall be limited. All explosives shall be stored in a secure manner and all such storage places shall be marked clearly "DANGEROUS EXPLOSIVES" and shall be in care of a competent watchman at all times. The CONTRACTOR must familiarize himself with all laws and ordinances pertaining thereto, and govern himself and his employees accordingly.

7.12 Loading of Structures:

The CONTRACTOR shall not load nor permit any part of any structure to be loaded in any manner that will endanger the structure, nor shall the CONTRACTOR subject any part of the work or adjacent property to stresses or pressures that will endanger it.

7.13 Concerning Subcontractors:

- A. The CONTRACTOR, with his own forces, shall perform no less than 25% of the work as determined by the Contract price. Each Subcontractor shall be properly licensed for the type of work he is to perform.
- B. A copy of each Sub-Contract shall be filed promptly with the ENGINEER upon request. Each Sub-Contract shall contain a reference to the Contract between the CITY and the CONTRACTOR, and the terms and conditions of the Contract shall be made a part of each Sub-Contract. Each Sub-Contract shall provide for annulment of same by the CONTRACTOR upon written order of the ENGINEER if the Subcontractor fails to comply with the requirements of this Contract.
- C. The CONTRACTOR shall be responsible to the CITY and ENGINEER for the acts and omissions of his Sub-Contractors and their employees to the same extent as he is responsible for the acts and omissions of his own employees. Nothing contained in this Contract shall create any contractual relationship between any Subcontractor and the CITY or ENGINEER nor relieve the CONTRACTOR of any liability or obligation under this Contract.

7.14 Materials and Equipment:

- A. Material for the Work:
 - 1. The CONTRACTOR shall furnish all materials, equipment, labor, transportation, construction equipment and machinery, tools, appliances, fuel, power, light, heat, telephone, water and sanitary facilities and all other facilities and incidentals necessary for the execution, testing, initial operation and completion of the work.
 - 2. Unless otherwise specified, shown or permitted by the ENGINEER, all material and equipment incorporated in the work shall be new and of current manufacture. The ENGINEER may request the CONTRACTOR to furnish manufacturer's certificates to this effect.

3. The ENGINEER may require any or all materials to be subjected to test by means of samples or otherwise, at production points or after delivery. The CONTRACTOR shall afford such facilities as the ENGINEER may require for collecting and forwarding samples, which samples shall be furnished by the CONTRACTOR without charge. The CONTRACTOR shall furnish evidence satisfactory to the ENGINEER that the materials and finished articles have passed the required test prior to the incorporation of such materials and finished articles in the work. Unless otherwise provided, the cost of such inspection and testing shall be as provided in Article 12.2.
4. All packaged manufactured products for use on the work shall be delivered to the work in their original, unopened packages, bearing thereon the manufacturer's name and the brand name of the product.
5. Wherever any product or material is selected to be used on the work, all such products or material shall be of the same brand and manufacture throughout the work.
6. All equipment, tools and machinery used for handling material or executing any part of the work shall be maintained in a satisfactory working condition. All equipment utilized on any portion of the work shall be such that no injury to personnel, the work, adjacent property or other objects will result from its use.
7. All materials and equipment shall be applied, installed, connected, erected, used, cleaned and conditioned in accordance with the instructions of the applicable manufacturer, fabricator, supplier or distributor, except as otherwise provided in the Contract Documents.

B. Storage of Materials:

1. All materials and equipment including that ordered by the CITY designed for permanent installation in the work shall be properly stored by the CONTRACTOR to insure protection against deterioration of any type. These materials shall be placed as to cause a minimum of inconvenience to other contractors on the work and to the public. The storage piles shall be arranged to facilitate inspections, and any deterioration shall be grounds for rejection.
2. Materials stored in public Rights-of-Way, shall be stored in such a manner so as to be compatible with the Traffic Control requirements set forth in Paragraph 7.10. Materials shall be stored so as not to deny access to public or private property. Stored materials shall be adequately marked with barricades and/or flashing warning lights, where necessary, so as to protect the materials from damage and to protect the public health, safety and welfare.
3. Lawns, grass plots or other private property shall not be used for storage purposes without written permission of the Owner or Lessee of that private

property. Should the CONTRACTOR desire to store equipment or materials of any kind on the property of the CITY, he must obtain permission from the ENGINEER. The CITY reserves the right to order materials to be removed or relocated in such approved storage areas, if necessary.

4. The protection of stored materials shall be the CONTRACTOR's responsibility and the CITY OF HOLLYWOOD shall not be liable for any loss of materials, by theft or otherwise, nor for any damage to the stored materials.

C. **Salvage of Materials and Equipment:**

The CITY reserves the right to retain title to all soil, sand, stone, gravel, equipment, machinery or any other material that was a part of the structure, site or Right- of-Way and which was developed from excavations or other operations connected with the work. The CONTRACTOR will be permitted to use in the work, without charge, any such material which meets the requirements of the Contract Documents. For that material which the CITY desires to retain the CONTRACTOR shall, at his expense, transfer to a site within the CITY as designated by the ENGINEER. That material which the CITY does not wish to retain shall be the property of the CONTRACTOR and removed from the site at CONTRACTOR's expense.

7.15 Temporary Utilities:

The CONTRACTOR shall provide and maintain at his own expense, all water, power, telephone and sanitary facilities as required to comply with State and/or local Codes and Regulations. If water, including that for testing is required, it is the CONTRACTOR's responsibility to arrange through the CITY Water Department for a water meter. A deposit to be paid by the CONTRACTOR is required for meter rental and all water shall be purchased at the prevailing rate.

7.16 Review of Records:

The CONTRACTOR shall allow and permit the ENGINEER or his duly authorized representative to inspect and review all payrolls, records of personnel, conditions of employment, invoice of materials, books of accounts and other relevant data and records pertinent to the CONTRACT and Sub-Contracts.

7.17 Use of Premises:

CONTRACTOR shall confine construction equipment, the storage of materials and equipment and the operations of workmen to areas permitted by law, ordinances, permits or required by the Contract Documents, and shall not interfere with the premises or operation of the City Utilities facilities with construction equipment or other materials or equipment. Construction which interferes with Plant Operations shall be fully coordinated and approved by the ENGINEER.

7.18 CONTRACTOR's Daily Reports:

Except where otherwise provided, the CONTRACTOR shall complete a daily report indicating manpower, major equipment, Subcontractors, etc., involved in the performance of the work. The daily report shall be completed on forms approved by the ENGINEER, and shall be submitted to the ENGINEER at the conclusion of each work day.

7.19 Record Documents:

The CONTRACTOR shall keep one record copy of all Specifications, Drawings, Addenda, Modifications, Shop Drawings and samples at the site, in good order and annotated to show all changes made during the construction process. These shall be available to ENGINEER for examination and shall be delivered to ENGINEER upon completion of the work.

7.20 Cleanliness of the Site:

During the progress of the work, The CONTRACTOR shall keep the premises free from accumulations of waste materials, rubbish and other debris resulting from the work. At the completion of the work the CONTRACTOR shall remove all waste materials, rubbish and debris from and about the premises as well as all tools, appliances, construction equipment and machinery and surplus materials, and shall leave the site clean and ready for occupancy by the CITY. The CONTRACTOR shall restore to their original condition those portions of the site not designated for alteration by the Contract Documents.

7.21 Dust Control:

It shall be the CONTRACTOR's responsibility to control dust by watering as directed by the ENGINEER. The water used shall be paid for by the CONTRACTOR. Should the CONTRACTOR fail to control dust to the satisfaction of the ENGINEER, the CITY will control the dust by whatever means the CITY desires and the CONTRACTOR shall pay all expenses incurred by the CITY associated with the control of the dust.

7.22 Continuing the Work:

The CONTRACTOR shall carry on the work and maintain the Progress Schedule during all disputes or disagreements with the CITY. No work shall be delayed or postponed pending resolution of any disputes or disagreements, except as the CONTRACTOR and the CITY may otherwise agree in writing.

7.23 Indemnification:

In consideration of the amount listed in the Bid Form and other valuable consideration, the Contractor shall defend, indemnify and save harmless the CITY, its officers, agents, and employees from or on account of any personal injury, loss of life or damage to property received or sustained by any person or persons during or on account of any operations connected with the construction of this Project; or by or in consequence of any negligence (excluding negligence of the CITY), in connection with the same; or by use of any improper materials or by or on account of any use of any improper materials or by or on account of any act or omission of the said Contractor or his subcontractor, agents, servants or employees. Contractor agrees to indemnify and save harmless the

CITY against any liability arising from or based upon the violation of any federal, state, county or city laws, by-laws, ordinances or regulations by the Contractor, his subcontractor, agents, servants or employees. Contractor further agrees to indemnify and save harmless the CITY from all such claims and fees, and from any and all suits and actions of every name and description that may be brought against the CITY on account of any claims, fees, royalties, or costs for any invention or patent, and from any and all suits and actions that may be brought against the CITY for the infringement of any and all patents or patent rights claimed by any person, firm, or corporation.

The indemnification provided above shall obligate the Contractor to defend at his own expense or to provide for such defense, at the CITY's option, any and all claims or liability and all suits and actions of every name and description that may be brought against the Owner which may result from the operations and activities under this Contract whether the construction operations be performed by the Contractor, his subcontractor or by anyone directly or indirectly employed by either.

Nothing in this indemnification shall be deemed to affect the rights, privileges or immunities of the CITY as set forth in Section 768.28, Florida Statutes.

The CITY will pay to the Contractor the specific consideration, in the amount stated in the Bid Form. The Contractor shall acknowledge the receipt of payment and other good and valuable consideration from the Owner which has been paid to him as specific consideration for the indemnification provided herein and in accordance with the provisions of Chapter F.S.A., Section 725.06.

ARTICLE 8 - CITY'S RESPONSIBILITIES

8.1 Communications:

The CITY shall issue all communications to the CONTRACTOR through the ENGINEER.

8.2 Furnish Contract Documents:

The CITY shall furnish the number of Contract Documents as specified in the Supplementary General Conditions to the CONTRACTOR at no cost. Referenced Standard Specifications Manuals, guidebooks, etc., will not be provided.

8.3 Furnish Right-of-Way:

The CITY shall furnish the necessary land or Right-of-Way on which the work is to be accomplished, and will provide lines and grades as specified in Article 6.

8.4 Timely Delivery of Materials:

The CITY shall be responsible for the delivery of any CITY furnished material, equipment or labor as specified in the Contract Documents.

ARTICLE 9 - ENGINEER'S STATUS

9.1 Authority of the Engineer:

- A. The general supervision of the execution of this Contract is vested in the ENGINEER who is the CITY's sole representative during the construction period. The instructions of the ENGINEER are to be strictly and promptly followed in every case. The CONTRACTOR's representative (Article 7.8 A. 1.) shall be responsible for the execution of any instructions given by the ENGINEER during the absence of the CONTRACTOR.
- B. The ENGINEER is the initial interpreter of the requirements of the Contract Documents and judge of the acceptability of the work. Claims, disputes and other matters relating to the acceptability of work or requirements of the Contract Documents shall be referred in writing to the ENGINEER within 15 days of the event, with a request for a formal decision, which the ENGINEER will render in writing within a reasonable time. This rendering of a decision by the ENGINEER will be a condition precedent to any exercise by the CITY or CONTRACTOR of rights or remedies as either may otherwise have under the Contract Documents or at law in respect to any such claim, dispute or other matter.
- C. The ENGINEER will issue with reasonable promptness any written clarifications or interpretations of the Contract Documents as he shall deem necessary, which shall be consistent with or reasonably inferable from the overall intent of the Contract Documents. If, as a result of a clarification or interpretation, either the CONTRACTOR or ENGINEER believes a Change Order is justified, it shall be submitted.
- D. The ENGINEER has approval authority over the acceptability of all material or equipment furnished, Shop Drawings, Change Orders, work performed and the rate of progress of the work. Verification of the quantities of work performed for pay purposes is the responsibility of the ENGINEER.
- E. The ENGINEER also has the authority to disapprove or reject work which is defective, and may require special inspection or testing of the work, whether or not it is fabricated, installed or completed.
- F. The ENGINEER has the authority to suspend the work wholly or in part for such period or periods as may be deemed necessary, due to the unsuitable prosecution of the work, or for such time as is necessary due to failure on the part of the CONTRACTOR to carry out orders given or perform any or all provisions of the Contract. The CONTRACTOR shall not suspend the work and shall not remove any equipment, tools, lumber or other materials without the written permission of the ENGINEER.

9.2 Access to the Work:

The ENGINEER is to have free access to the materials and work at all times for laying out, measuring or inspecting same, and the CONTRACTOR is to afford him all necessary facilities and assistance for so doing.

9.3 Limitations on The ENGINEER's Responsibilities:

- A. Neither the ENGINEER's authority to act under this Article or elsewhere in the Contract Documents nor any decision made by the ENGINEER in good faith either to exercise or not exercise such authority shall give rise to any duty or responsibility of the ENGINEER to the CONTRACTOR, any Subcontractor, any manufacturer, fabricator, supplier or distributor or any of their agents or employees or any other person performing any of the work.

- B. Whenever in the Contract Documents the terms "as ordered", "as directed", "as required", "as allowed" or terms of like effect or import are used, or the adjectives "reasonable", "suitable", "acceptable", "proper" or "satisfactory" or adjectives of like effect or import are used, to describe requirement, direction, review or judgment of the ENGINEER as to the work, it is intended that such requirement, direction, review or judgment will be solely to evaluate the work for compliance with the Contract Documents (unless there is a specific statement indicating otherwise). The use of any such term or adjective never indicates that the ENGINEER has authority to supervise or direct performance of the work.

- C. The ENGINEER will not be responsible for the CONTRACTOR's means, methods, techniques, sequences or procedures of construction, nor the safety precautions and programs incident thereto, and the ENGINEER will not be responsible for the CONTRACTOR's failure to perform the work in accordance with the Contract Documents.

- D. The ENGINEER will not be responsible for the acts or omissions of the CONTRACTOR or of any Subcontractors, or of the agents or employees of any CONTRACTOR or subcontractor, or of any other persons at the site or otherwise performing any of the work.

9.4 Inspectors:

- A. Inspectors employed by the CITY assist the ENGINEER in ascertaining the work conforms to the Contract Documents and are authorized to inspect all work done and material furnished as representatives of the ENGINEER. Inspectors shall be stationed at the site of the work to report to the ENGINEER as to the progress of the work and the quality of workmanship and material.

- B. In case of any dispute arising between the CONTRACTOR and the Inspector, the Inspector shall have the authority to reject material or to suspend the work until the question of issue can be referred to and decided upon by the ENGINEER.

- C. If the CONTRACTOR refuses to suspend operation on verbal order, the Inspector shall issue a written order giving the reason for shutting down the work.

After placing the order in the hands of the man in charge, the Inspector shall immediately leave the job. work done during the absence of the Inspector, after such written notice, will not be accepted nor paid for.

- D. Inspectors are not authorized to revoke, alter, enlarge, relax or release any requirements of these Contract Documents, nor to issue instructions contrary to them. Inspectors shall in no case act as foreman or perform other duties for the CONTRACTOR, nor interfere with management of the work by the latter. Any instructions which Inspectors may give the CONTRACTOR shall in no way be construed as releasing the CONTRACTOR from fulfillment of the terms of the Contract.
- E. The payment of any compensation, whatever may be its character or form, or the giving of any gratuity, or the granting of any valuable favor, by the CONTRACTOR to any Inspector, directly or indirectly, is strictly prohibited and any such act on the part of the CONTRACTOR will constitute a violation of this Contract and may subject the CONTRACTOR to other penalties provided for by law or ordinance.

9.5 Inspections:

- A. The ENGINEER will make, or have made, such inspections and tests as he deems necessary to assure that the work is being accomplished in accordance with the requirements of the Contract. In the event such Inspections or tests reveal non-compliance with the requirements of the Contract, the CONTRACTOR shall bear the cost of such corrective measures as well as the cost of subsequent reinspection and retesting.
- B. Work done in the absence of a prescribed inspection may be required to be removed and replaced under proper inspection. The entire cost of removal and replacement, including the cost of all material which may be furnished by the CITY and used in the work thus removed, shall be borne by the CONTRACTOR, regardless of whether the work removed is found to be defective or not. Work covered up without the authority of the ENGINEER, shall, upon order of the ENGINEER, be uncovered to the extent required, and the CONTRACTOR shall similarly bear the entire cost of performing all the work and furnishing all the material necessary for the removal of the covering and its subsequent replacement.
- C. Unless otherwise provided, the cost of inspection and all inspection fees imposed by public agencies other than the fees associated with the issuance of the Master Building Permit by the City of Hollywood shall be paid by the CONTRACTOR.
- D. No inspection nor any failure to inspect at any time or place shall relieve the CONTRACTOR from any obligation to perform all of the work in strict conformance with the requirements of the Contract Documents.

ARTICLE 10 - CHANGES IN THE WORK/CONTRACT PRICE

10.1 Changes in the Work or Terms of Contract Documents:

- A. Without invalidating the Contract and without notice to any surety CITY reserves and shall have the right, from time to time to make such increases, decreases or other changes in the character or quantity of the Work as may be considered necessary or desirable to complete fully and acceptably the proposed construction in a satisfactory manner. Any extra or additional work within the scope of this Project must be accomplished by means of appropriate Clarifications, Field Orders, or Change Orders.
- B. Any changes to the terms of the Contract Documents must be contained in a written document, executed by the parties hereto, with the same formality and of equal dignity prior to the initiation of any work reflecting such change.

This section shall not prohibit the issuance of Change Orders executed only by CITY as hereinafter provided.

10.2 Supplemental Instructions - Clarifications:

- A. The CITY, through the ENGINEER, shall have the right to approve and issue Clarifications setting forth written interpretations of the intent of the Contract Documents and ordering minor changes in Work execution, providing the Clarifications involve no change in the Contract Price or the Contract Time.
- B. The ENGINEER shall have the right to approve and issue Clarifications setting forth written orders, instructions, or interpretations concerning the Contract Documents or its performance, provided such Clarifications involve no change in the Contract Price or the Contract Time.

10.3 Field Orders / Change Orders:

- A. Changes in the quantity or character of the Work within the scope of the Project which are not properly the subject of Clarifications, including all changes resulting in changes in the Contract Price or the Contract Time, shall be authorized only by Field Orders or Change Orders approved in advance and issued in accordance with the provisions of the CITY Procurement Code, as amended from time to time.
- B. CONTRACTOR shall not start work on any changes requiring an increase in the Contract Price or the Contract Time until a Field Order or Change Order setting forth the adjustments is approved by the CITY. Upon receipt of a Change Order CONTRACTOR shall promptly proceed with the work set forth within the document.

- C. Field Orders shall be issued for change in Contract Price related to Cost Allowances specifically included on the Proposal Bid Form. Change Orders shall be issued when required for all other Contract Price Changes. Hereinafter, the term "Change Order(s)" shall be used to include "Change Orders" and "Field Orders" with the exception that Field Order shall not be used for any Contract Time adjustments.
- D. In the event satisfactory adjustment cannot be reached for any item requiring a change in the Contract Price or Contract Time, and a Change Order has not been issued, CITY reserves the right at its sole option to either terminate the Contract as it applies to the items in question and make such arrangements as may be deemed necessary to complete the disputed work; or the work shall be performed on the "cost of work" basis as described in Article 10.4.
- E. On approval of any Contract change increasing the Contract Price, CONTRACTOR shall ensure that the performance bond and payment bond are increased so that each reflects the total Contract Price as increased.
- F. Under circumstances determined necessary by CITY, Change Orders may be issued unilaterally by CITY.

10.4 Value of Change Order Work:

- A. The value of any work covered by a Change Order or of any claim for an increase or decrease in the Contract Price shall be determined in one of the following ways:
 - A.1 Where the work involved is covered by unit prices contained in the Contract Documents, by application of unit prices to the quantities of items involved, subject to the provisions of Article 10.4.G.
 - A.2 By mutual acceptance of a lump sum which CONTRACTOR and CITY acknowledge contains a component for overhead and profit.
 - A.3 On the basis of the "cost of work," determined as provided in this Article, plus a CONTRACTOR's fee for overhead and profit which is determined as provided in Article 10.4.D.
- B. The term "cost of work" means the sum of all direct costs necessarily incurred and paid by CONTRACTOR in the proper performance of the Work described in the Change Order. Except as otherwise may be agreed to in writing by CITY, such costs shall be in amounts no higher than those prevailing in the locality of the Project, shall include only the following items and shall not include any of the costs itemized in Article 10.4.C.
 - B.1 Payroll costs for employees in the direct employ of CONTRACTOR in the performance of the work described in the Change Order under schedules of job classifications agreed upon by CITY and

CONTRACTOR. Payroll costs for employees not employed full time on the work covered by the Change Order shall be apportioned on the basis of their time spent on the work. Payroll costs shall include, but not be limited to, salaries and wages plus the cost of fringe benefits which shall include social security contributions, unemployment, excise and payroll taxes, workers' or workmen's compensation, health and retirement benefits, bonuses, sick leave, vacation and holiday pay application thereto. Such employees shall include superintendents and foremen at the site. The expenses of performing the work after regular working hours, on Sunday or legal holidays shall be included in the above to the extent authorized by CITY.

- B.2 Cost of all materials and equipment furnished and incorporated in the work, including costs of transportation and storage thereof, and manufacturers' field services required in connection therewith. All cash discounts shall accrue to CONTRACTOR unless CITY deposits funds with CONTRACTOR with which to make payments, in which case the cash discounts shall accrue to CITY. All trade discounts, rebates and refunds, and all returns from sale of surplus materials and equipment shall accrue to CITY and CONTRACTOR shall make provisions so that they may be obtained. Rentals of all construction equipment and machinery and the parts thereof whether rented from CONTRACTOR or others in accordance with rental agreements approved by CITY with the advice of ENGINEER and the costs of transportation, loading, unloading, installation, dismantling and removal thereof, all in accordance with the terms of said agreements. The rental of any such equipment, machinery or parts shall cease when the use thereof is no longer necessary for the work.
- B.3 Payments made by CONTRACTOR to Subcontractors for work performed by Subcontractors, If required by CITY, CONTRACTOR shall obtain competitive bids from Subcontractors acceptable to CONTRACTOR and shall deliver such bids to CITY who will then determine, with the advice of ENGINEER, which bids will be accepted. If the Subcontract provides that the Subcontractor is to be paid on the basis of cost of the work plus a fee, the Subcontractor's cost of the work shall be determined in the same manner as CONTRACTOR'S cost of the work. All Subcontractors shall be subject to the other provisions of the Contract Documents insofar as applicable.
- B.4 Cost of special engineers, including, but not limited to, engineers, architects, testing laboratories, and surveyors employed for services specifically related to the performance of the work described in the Change Order.

B.5 Supplemental costs including the following:
The proportion of necessary transportation, travel and subsistence expenses of CONTRACTOR's employees incurred in discharge of duties connected with the work except for local travel to and from the site of the work.

Cost, including transportation and maintenance, of all materials, supplies, equipment, machinery, appliances, office and temporary facilities at the site and hand tools not owned by the workmen, which are consumed in the performance of the work, and cost less market value of such items used but not consumed which remains the property of CONTRACTOR.

Sales, use, or similar taxes related to the work, and for which CONTRACTOR is liable, imposed by any governmental authority. Deposits lost for causes other than CONTRACTOR's negligence; royalty payments and fees for permits and licenses. The cost of utilities, fuel, and sanitary facilities at the site. Receipted minor expenses such as telegrams, long distance telephone calls, telephone service at the site, expressage and similar petty cash items in connection with the work. Cost of premiums for additional bonds and insurance required because of changes in the work.

C. The term "cost of the work" shall not include any of the following:

C.1 Payroll costs and other compensation of CONTRACTOR's officers, executives, principals (of partnership and sole proprietorships), general managers, engineers, architects, estimators, lawyers, auditors, accountants, purchasing and contracting agents, expeditors, timekeepers, clerks and other personnel employed by CONTRACTOR whether at the site or in its principal or a branch office for general administration of the work and not specifically included in the agreed-upon schedule of job classifications referred to in this Article, all of which are to be considered administrative costs covered by CONTRACTOR's fee.

C.2 Expenses of CONTRACTOR's principal and branch offices other than CONTRACTOR's office at the site.

C.3 Any part of CONTRACTOR's capital expenses, including interest on CONTRACTOR's capital employed for the work and charges against CONTRACTOR for delinquent payments.

C.4 Cost of premiums for all Bonds and for all insurance whether or not CONTRACTOR is required by the Contract Documents to purchase and maintain the same, except for additional bonds and insurance required because of changes in the work.

C.5 Costs due to the negligence or neglect of CONTRACTOR, any Subcontractors, or anyone directly or indirectly employed by any of them or for whose acts any of them may be liable, including but not limited to,

the correction of defective work, disposal of materials or equipment wrongly supplied and making good any damage to property.

- C.6 Other overhead or general expense costs of any kind and the cost of any item not specifically and expressly included in this Section.
- D. CONTRACTOR's fee allowed to CONTRACTOR for overhead and profit shall be determined as follows:
 - D.1 A mutually acceptable fixed fee or if none can be agreed upon,
 - D.2 A fee based on the following percentages of the various portions of the cost of the work:

For costs incurred under Article 10.4.B.1, CONTRACTOR's fee shall not exceed ten percent (10%).

For costs incurred under Article 10.4.B.3 and B.4, CONTRACTOR's fee shall not exceed seven and one half percent (7.5%); and if a subcontract is on the basis of cost of the work plus a fee, the maximum allowable to the Subcontractor as a fee for overhead and profit shall not exceed ten percent (10%);

No fee shall be payable on the basis of costs itemized under Article 10.4.B.5 and Article 10.4.C.
- E. The amount of credit to be allowed by CONTRACTOR to CITY for any such change which results in a net decrease in cost, will be the amount of the actual net decrease. When both additions and credits are involved in anyone change, the combined overhead and profit shall be figured on the basis of the net increase, if any, however, CONTRACTOR shall not be entitled to claim lost profits for any Work not performed.
- F. Whenever the cost of any work is to be determined pursuant to Articles 10.4.B and 10.4.C, CONTRACTOR will submit in a form acceptable to CONSULTANT an itemized cost breakdown together with the supporting data.
- G. Where the quantity of any item of the Work that is covered by a unit price is increased or decreased by more than twenty percent (20%) from the quantity of such work indicated in the Contract Documents, an appropriate Change Order shall be issued to adjust the unit price, if warranted.
- H. Whenever a change in the Work is to be based on mutual acceptance of a lump sum, whether the amount is an addition, credit or no change-in-cost, CONTRACTOR shall submit an initial cost estimate acceptable to ENGINEER and CITY.
 - H.1 Breakdown shall list the quantities and unit prices for materials, labor, equipment and other items of cost.
 - H.2 Whenever a change involves CONTRACTOR and one or more Subcontractors and the change is an increase in the Contract Price,

overhead and profit percentage for CONTRACTOR and each Subcontractor shall be itemized separately.

- I. Each Change Order must state within the body of the Change Order whether it is based upon unit price, negotiated lump sum, or "cost of the work."

10.5 Notification and Claim for Change of Contract Price:

- A. Any claim for a change in the Contract Price shall be made by written notice by CONTRACTOR to the CITY and to ENGINEER within five (5) calendar days of the commencement of the event giving rise to the claim and stating the general nature and cause of the claim. Thereafter, within twenty (20) calendar days of the termination of the event giving rise to the claim, written notice of the extent of the claim with supporting information and documentation shall be provided unless ENGINEER allows an additional period of time to ascertain more accurate data in support of the claim and such notice shall be accompanied by CONTRACTOR's written notarized statement that the adjustment claimed is the entire adjustment to which the CONTRACTOR has reason to believe it is entitled as a result of the occurrence of said event. All claims for changes in the Contract Price shall be in accordance with Articles 10.3 and 10.4 hereof, if CITY and CONTRACTOR cannot otherwise agree. **IT IS EXPRESSLY AND SPECIFICALLY AGREED THAT ANY AND ALL CLAIMS FOR CHANGES TO THE CONTRACT PRICE SHALL BE WAIVED IF NOT SUBMITTED IN STRICT ACCORDANCE WITH THE REQUIREMENTS OF THIS SECTION.**

10.6 Notice of Change:

If notice of any change affecting the general scope of the work or change in the Contract Price is required by the provisions of any Bond to be given to the Surety, it will be CONTRACTOR's responsibility to so notify the Surety, and the amount of each applicable Bond shall be adjusted accordingly. The CONTRACTOR shall furnish proof of such adjustment to the CITY. Failure of the CONTRACTOR to obtain such approval from the Surety may be a basis for termination of this Contract by the CITY.

10.7 Records:

The CONTRACTOR's representative and the ENGINEER shall compare records of extra work done at the end of the day. Such records shall be made in duplicate upon a form provided for such purpose by the ENGINEER and shall be signed by both the Inspector and the CONTRACTOR's representative, one copy being submitted to the ENGINEER and the other being retained by the CONTRACTOR.

10.8 Cancelled Items and Payments Therefore:

The CITY COMMISSION shall have the right to cancel those portions of the Contract relating to the construction of any item provided therein. Such cancellation shall entitle the CONTRACTOR to payment in a fair and equitable amount covering all items of cost incurred by him prior to the date of cancellation or suspension of the work. The CONTRACTOR shall be allowed a profit percentage on the materials used and on construction work actually performed, at the same rates as provided for "Extra Work", but no allowance will be made for anticipated profits. Acceptable materials ordered by the CONTRACTOR or delivered on the work, prior to date of such cancellation or suspension, may be purchased from the CONTRACTOR by the CITY at actual cost and shall thereupon, become property of the CITY, or may be returned to the manufacturer for a reasonable restocking charge.

10.9 Full Payment:

The Compensation herein provided shall be received and accepted by the CONTRACTOR as payment in full for all extra work done or costs incurred in event of cancellation.

ARTICLE 11 - CHANGES IN THE CONTRACT TIME

11.1 Change Order:

The Contract Time may only be changed by a Change Order. A FULLY EXECUTED CHANGE ORDER MUST EXIST PRIOR TO EXTENSION OR SHORTENING OF THE CONTRACT TIME.

11.2 Notification and Claim for Change of Contract Time:

- A. Any claim for a change in the Contract Time shall be made by written notice by the CONTRACTOR to the CITY and to ENGINEER within five (5) calendar days of the commencement of the event giving rise to the claim and stating the general nature and cause of the claim. Thereafter within twenty (20) calendar days of the termination of the event giving rise to the claim, written notice of the extent of the claim with supporting information and documentation shall be provided unless ENGINEER allows an additional period of time to ascertain more accurate data in support of the claim and such notice shall be accompanied by CONTRACTOR's written notarized statement that the adjustment claimed is the entire adjustment to which the CONTRACTOR has reason to believe it is entitled as a result of the occurrence of said event. All claims for changes in the Contract Time shall be determined in accordance with Articles 10.3 and 10.4 hereof, if CITY and CONTRACTOR cannot otherwise agree. **IT IS EXPRESSLY AND SPECIFICALLY AGREED THAT ANY AND ALL CLAIMS FOR CHANGES TO THE CONTRACT TIME SHALL BE WAIVED IF NOT SUBMITTED IN STRICT ACCORDANCE WITH THE REQUIREMENTS OF THIS SECTION.**
- B. The Contract Time will be extended an amount equal to time lost on critical Work items due to delays beyond the control of and through no fault or negligence of CONTRACTOR if a claim is made thereafter as provided in Article 11.2. Such delays shall include, but not be limited to, acts or neglect by any separate contractor employed by CITY, fire, floods, labor disputes, epidemics, abnormal weather conditions or acts of God

11.3 Basis for Extension:

Extensions of time shall be considered and will be based solely upon the effect of delays to the work as a whole. Extensions of time shall not be granted for delays to the work, unless the CONTRACTOR can clearly demonstrate, through schedule analysis, that the delay to the work as a whole arose in accordance with Article 12.3 or Article 15.1, and that such delays did or will, in fact, delay the progress of work as a whole. Time extensions shall not be allowed for delays to parts of the work that are not on the critical path of the project schedule. Time extensions shall not be granted until all float or contingency time, at the time of the delay, available to absorb specific delays and associated impacts is used.

11.4 Change of Time Due to Contract Execution Problems:

Refer to Article 3.4 for a decrease in Contract Time when the CONTRACTOR fails to return the correctly executed Contract Documents within the time allowed.

11.5 Change of Time Due to Change Order Evaluation:

When evaluating a proposed Change Order, the ENGINEER shall have access to any available float or contingency time. Extension will only be considered in accordance with Article 11.3.

11.6 Change of Time and Inspection and Testing:

Neither observations by the ENGINEER, nor inspections, tests or approvals by others, passing or failing, will be cause for consideration of time extension.

11.7 Change of Time and Defective Work:

- A. If WORK is found to be defective, CONTRACTOR shall bear all remedial expenses including any additional costs experienced by CITY due to delays to others performing additional WORK. CONTRACTOR shall further bear the responsibility for maintaining schedule, and will be excluded from a time extension and the recovery of delay damages due to the uncovering.
- B. If the WORK is found to be defective per the Specifications, but the CITY chooses to accept it at its sole discretion, CONTRACTOR shall bear the responsibility for maintaining schedule, and will be excluded from a time extension and the recovery of delay damages due to the uncovering.

11.8 Liquidated Damages:

All time limits stated in the Contract Documents are of the essence. The provisions of this Article 11 shall not exclude recovery for damages by CITY as indicated in Section 3 of the Supplementary General Conditions.

ARTICLE 12 - WARRANTY AND GUARANTEE;
TEST AND INSPECTIONS;
CORRECTION, REMOVAL OR ACCEPTANCE OF DEFECTIVE WORK

12.1 Warranty and Guarantee:

The CONTRACTOR warrants and guarantees to the CITY and the ENGINEER that all work will be in accordance with the Contract Documents and will not be defective. Prompt notice of all defects shall be given to the CONTRACTOR. All defective work, whether or not in place, may be rejected, corrected or accepted as provided in this Article.

12.2 Tests and Inspections:

- A. The CONTRACTOR shall give the ENGINEER and, when appropriate, the Building Department and other regulatory authorities which have jurisdiction over the work, timely notice of readiness of the work for all required inspections, tests or approvals.
- B. All inspections performed as a result of the issuance of the Master Building Permit shall be performed by the CITY. All costs associated with such inspections shall be paid by the CITY, EXCEPT THAT should said test or inspection fail to pass the CONTRACTOR shall pay all costs associated with the rework and the retesting.
- C. When any other regulatory authority, by virtue of its rules or regulations, requires specific tests or inspections, the CONTRACTOR shall assume full responsibility for and pay all costs in connection with said tests and inspections.
- D. The CONTRACTOR shall also be responsible for and shall pay all costs in connection with any inspection or testing required in connection with the ENGINEER's acceptance of a manufacturer, fabricator, supplier or distributor of materials or equipment proposed to be incorporated in the work, or of materials or equipment submitted for approval prior to ENGINEER's acceptance thereof for incorporation in the work and as otherwise specified in the Contract Documents.
- E. Neither observations by the ENGINEER nor inspections, tests or approvals by others shall relieve the CONTRACTOR from his obligations to perform the work in accordance with the Contract Documents.

12.3 Uncovering Work:

- A. If any work that is to be inspected, tested or approved is covered without written concurrence of the ENGINEER, it must, if requested, by the ENGINEER, be uncovered. Such uncovering and replacement shall be at the CONTRACTOR's expense.

- B. CONTRACTOR must contact all regulatory agencies issuing construction permits to make all necessary inspections. If CONTRACTOR fails to have the necessary inspections performed and such failure results in uncovering of work already performed, CONTRACTOR shall be responsible for all related time delays and monetary costs.
- C. If the ENGINEER considers it necessary or advisable that work previously covered with his permission or cognizance be observed, inspected or tested, the CONTRACTOR, at the ENGINEER's request, shall uncover, expose or otherwise make available for observation, inspection or testing as the ENGINEER may require, that portion of the work in question, furnishing all necessary labor, material and equipment. If it is found that such work is defective, the CONTRACTOR shall bear all the expenses of such uncovering, exposure, observation, inspection and testing and of satisfactory reconstruction, including compensation for additional professional services. If, however, such work is not found to be defective the CONTRACTOR shall be allowed an increase in the Contract Price or an extension of the Contract Time, or both, directly attributable to such uncovering, exposure, observation, inspection, testing and reconstruction if he makes a claim therefor in accordance with Article 10.2 and Article 11.2.

12.4 City May Stop the Work:

If the work is defective, or the CONTRACTOR fails to supply sufficient skilled workmen or suitable materials or equipment, the CITY may order the CONTRACTOR to stop the work, or any portion thereof, until the cause for such order has been eliminated; however, this right of the CITY to stop the work shall not give rise to any duty on the part of the CITY to exercise this right for the benefit of the CONTRACTOR or any other party.

12.5 Correction or Removal of Defective Work:

If required by the ENGINEER, the CONTRACTOR shall promptly, without cost to the CITY and as specified by the ENGINEER either correct any defective work, whether or not fabricated, installed or completed, or if the work has been rejected by the ENGINEER, remove it from the site and replace it with nondefective work.

12.6 One Year Correction Period:

If within one year after the date of Substantial Completion or Final Completion as applicable, or such longer period of time as may be prescribed by the terms of any applicable special guarantee required by the Contract Documents or by any specific provision of the Contract Documents, any work is found to be defective, the CONTRACTOR shall promptly without cost to the CITY and in accordance with the ENGINEER's written instructions, either correct such defective work, or if it has been rejected by the ENGINEER remove it from the site and replace it with nondefective work. If the CONTRACTOR does not promptly comply with the terms of such instructions, or in an emergency where delay would cause serious risk of loss or damage, the ENGINEER may have the defective work corrected or the rejected work removed and replaced, and all direct and indirect costs of such removal and replacement, including compensation for additional professional services, shall be paid by the CONTRACTOR.

12.7 Acceptance of Defective Work:

If instead of requiring correction or removal and replacement of defective work, the ENGINEER prefers to accept it, he may do so. In such case, if acceptance occurs prior to the ENGINEER's recommendation of final payment, a Change Order shall be issued incorporating the necessary revisions in the Contract Documents, including appropriate reduction in the Contract Price; or if the acceptance occurs after such recommendation, an appropriate amount shall be paid by the CONTRACTOR to the CITY.

12.8 City May Correct Defective Work:

If the CONTRACTOR fails within a reasonable time after written notice of the ENGINEER to proceed to correct and to correct defective work or to remove and replace rejected work as required by the ENGINEER in accordance with Paragraph 12.5, or if the CONTRACTOR fails to perform the work in accordance with the Contract Documents, (including any requirements of the progress schedule), the CITY may, after seven days' written notice to the CONTRACTOR, correct and remedy any such deficiency. In exercising its rights under this Paragraph the CITY shall proceed expeditiously. To the extent necessary to complete corrective and remedial action, the CITY may exclude the CONTRACTOR from all or part of the site, take possession of all or part of the work, and suspend the CONTRACTOR's services related thereto, take possession of the CONTRACTOR's tools, appliances, construction equipment and machinery at the site and incorporate in the work all materials and equipment stored at the site or for which the CITY has paid the CONTRACTOR but which are stored elsewhere. The CONTRACTOR shall allow the CITY, the CITY's representatives, agents and employees such access to the site as may be necessary to enable the CITY to exercise his rights under this Paragraph. All direct and indirect costs of the CITY in exercising such rights shall be charged against the CONTRACTOR in an amount verified by the ENGINEER, and a Change Order shall be issued incorporating the necessary revisions in the Contract Documents and a reduction in the Contract Price. Such direct and indirect costs shall include, in particular but without limitations, compensation for additional professional services required and all costs of repair and replacement of work of others destroyed or damaged by correction, removal or replacement of the CONTRACTOR's defective work. The CONTRACTOR shall not be allowed an extension of the Contract Time because of any delay in performance of the work attributable to the exercise by the CITY of the CITY's rights hereunder.

ARTICLE 13 - PAYMENTS TO THE CONTRACTOR

13.1 Basis of Payment:

Progress payments shall be based on the aggregate of the unit price amounts listed in the Proposal or in the Schedule of Values which have been incorporated in the work acceptable to the ENGINEER.

13.2 Unit Price Inclusion:

The unit prices stated in the Proposal include all costs and expenses for materials, labor, tools, equipment, transportation, commissions, patent fees and royalties, removing crossings or other obstructions, protection or maintaining pipes, drains, railroad tracks, buildings, bridges, or other structures furnishing temporary crossings or bridges, furnishing all supplemental construction stakes, batter boards, templates, common and ordinary labor for handling materials during inspection replacing any property damage, together with any and all costs or expenses for performing and completing the work as specified.

13.3 Schedule of Values: (Lump Sum Price Breakdown)

A Schedule of Values must be submitted within seven days subsequent to the CONTRACTOR executing and submitting the Documents required of Article 2.13 of the Section II – Special Terms and Conditions. The schedules shall be satisfactory in form and substance to the ENGINEER, and shall include quantity and unit prices aggregating the Contract Price, and shall subdivide the work into component parts in sufficient detail to serve as the basis for progress payments during construction. Upon acceptance of the schedule of values by the ENGINEER, it shall be incorporated into a form of Application for Payment acceptable to the ENGINEER.

13.4 Changed Conditions: (Unit Price Only)

It is mutually agreed that due to latent field conditions which can not be foreseen at the time of advertising for bids, adjustments of the Plans to field conditions will be necessary during construction; and, therefore, such changes in the plans shall be recognized as constituting a normal and accepted margin of adjustment not unusual and not involving or permitting any change or modification of unit prices, in which case payment will be made for the revised quantities at the unit price bid in the Proposal.

13.5 Application for Progress Payment:

On the 20th day of the month or the first working day thereafter, the CONTRACTOR shall submit to the ENGINEER for review an Application for Payment form filled out and signed by the CONTRACTOR. The form shall be notarized, and shall cover the work completed as of the date of the application. The Application for Payment shall be accompanied by a Schedule of Values, and any other supporting documentation as the ENGINEER may reasonably require.

13.6 Payment for Materials:

If payment is requested on the basis of materials and equipment not incorporated in the work but delivered and suitably stored at the site or at another location agreed to in writing, the Application for Payment shall also be accompanied by such data, satisfactory to the ENGINEER, as will establish the CITY's title to the material and equipment and protect the CITY's interest therein, including applicable insurance.

13.7 Affidavit Required:

All Applications for Payment shall include an Affidavit of the CONTRACTOR stating that all previous progress payments received on account of the work have been applied to discharge in full all of CONTRACTOR's obligations reflected in prior Applications for Payment. The amount of retainage with respect to progress payments will be 5%.

13.8 Retainage:

The amount of retainage with respect to progress payments will be 5% until completion of the construction services purchased pursuant to the Contract, as more specifically set forth in the Article 3 of the main contract entitled "Partial and Final Payment.

13.9 CONTRACTOR's Warranty of Title:

The CONTRACTOR warrants and guarantees that title to all work, materials and equipment covered by any Application for Payment whether incorporated in the Project or not, will pass to the CITY at the time of payment free and clear of all liens, claims, security interests and encumbrances (hereinafter in these General Conditions referred to as "Liens").

13.10 Review of Application for Payment:

The ENGINEER will, within seven (7) days, review the Application for Payment and either approve and submit it for payment or notify the CONTRACTOR of the deficiencies such that the CONTRACTOR may make the necessary corrections and resubmit in time for the month's payment. However, the ENGINEER may refuse to recommend the whole or any part of any payment if, in his opinion, it would be incorrect to make such representations. He may also refuse to recommend any such payment, or because of subsequently discovered evidence or the results of subsequent inspections or tests, nullify any such payment previously recommended to such extent as may be necessary in the ENGINEER's opinion to protect the CITY from loss because:

- A. The work is defective, or completed work has been damaged requiring correction or replacement.
- B. Written claims have been made against the CITY or Liens have been filed in connection with the work.
- C. The Contract Price has been reduced because of Change Order.
- D. The CITY has been required to correct defective work or complete the work in accordance with Article 12.8.
- E. The CONTRACTOR's unsatisfactory prosecution of the work in accordance with the Contract Documents.
- F. The CONTRACTOR's failure to make payment to Sub- Contractors, or for labor, materials or equipment.

13.11 Payment to the Contractor:

Payments are made only on the fifteenth day or first workday thereafter of each month.

ARTICLE 14 - SUBSTANTIAL COMPLETION, PARTIAL UTILIZATION,
FINAL CLEAN UP, INSPECTION, PAYMENT AND ACCEPTANCE

14.1 Substantial Completion:

When the CONTRACTOR considers the entire work ready for its intended use, the CONTRACTOR shall, in writing to the ENGINEER, certify that the entire work is substantially complete and request that the ENGINEER issue a Certificate of Substantial Completion. Within a reasonable time thereafter the CONTRACTOR and the ENGINEER shall make an inspection of the work to determine the status of completion. If the ENGINEER does not consider the work substantially complete, the ENGINEER will notify the CONTRACTOR in writing giving his reasons therefor. If the ENGINEER considers the work substantially complete, the ENGINEER will prepare and deliver to the CONTRACTOR a Certificate of Substantial Completion, which shall fix the date of Substantial Completion. There shall be attached to the certificate a proposed Punch List, developed by the CONTRACTOR, of items to be completed or corrected before final payment.

Within ten (10) days after delivery of the certificate, the CITY shall review the proposed Punch List and either approve it or contact the CONTRACTOR to commence good faith efforts to develop a Punch List that is satisfactory to both parties. If the parties are unable to resolve any differences they may have in the development of the Punch List, the ENGINEER shall resolve their differences. The parties shall expedite the process of developing the Punch List with the intent of finalizing the Punch List within sixty (60) days after the date of Substantial Completion.

At the time of delivery of the Certificate of Substantial Completion the ENGINEER will deliver to the CONTRACTOR written notice as to division of responsibilities pending final payment between the CITY and the CONTRACTOR with respect to security, operation, safety, maintenance, heat, utilities and insurance, said responsibilities will be binding on the CITY and the CONTRACTOR until final payment. Unless otherwise stated herein or on the Certificate of Substantial Completion, all building, product, equipment, and machinery warranties will commence on the date of Substantial Completion. The CITY shall have the right to exclude the CONTRACTOR from the work after the date of Substantial Completion, but the CITY shall allow the CONTRACTOR reasonable access to complete or correct items on the Punch List.

14.2 Partial Utilization:

Use by the CITY of any finished part of the work which has specifically been identified in the Contract Documents or which the ENGINEER and the CONTRACTOR agree constitutes a separately functioning and usable part of the work that can be used by the CITY without significant interference with CONTRACTOR's performance of the remainder of the work, may be accomplished prior to Substantial Completion of all the work subject to the following:

- A. The ENGINEER at any time may request the CONTRACTOR in writing to permit the CITY to use any such part of the work which the ENGINEER believes to be ready for its intended use and substantially complete. If the CONTRACTOR agrees, the CONTRACTOR will certify to the ENGINEER that said part of the work is substantially complete and request the ENGINEER to issue a Certificate of Substantial Completion for that part of the work. The CONTRACTOR, at any time, may notify the ENGINEER in writing that the CONTRACTOR considers any such part of the work ready for its intended use and substantially complete and request the ENGINEER to issue a Certificate of Substantial Complete for the part of the work. Within a reasonable time after either such request, the CONTRACTOR and the ENGINEER shall make an inspection of that part of the work to determine its status of completion. If the ENGINEER does not consider that part of the work to be substantially complete, the ENGINEER will notify the CONTRACTOR in writing giving the reasons therefore. If the ENGINEER considers that part of the work to be substantially complete, the provisions of Article 14.1 will apply with respect to Certificate of Substantial Completion of that part of the work and the division of responsibility in respect thereof and access thereto. It shall be understood by the CONTRACTOR that until such written notification is issued, all responsibility for care and maintenance of all of the WORK shall be borne by the CONTRACTOR. Upon issuance of said written notice of partial utilization, the OWNER will accept responsibility for the protection and maintenance of all such items or portions of the WORK described in the written notice.

14.3 Final Clean-Up:

Upon completion of the work and before final inspection shall be made, the CONTRACTOR shall clean and remove from the site, the Right-of-Way and adjacent property, all surplus and discarded materials, rubbish, and temporary structures; restore in an acceptable manner all property, both public and private, which has been damaged during the prosecution of the work; and shall leave the site and vicinity unobstructed in a neat and presentable condition throughout the entire area or length of the work under Contract. The placing of materials of every character, rubbish, or equipment on the abutting property, with or without the consent of the property owners, shall not constitute the satisfactory disposal. If the work is of such a character as may be done by block or sections, the CONTRACTOR may be required to promptly remove and dispose of accumulated rubbish, debris or surplus materials from blocks or sections as completed or partially completed. No separate payment will be made for final cleaning up and restoration of property, but all costs thereof shall be included in the prices bid for the various scheduled items of work.

14.4 Final Inspection:

Upon written notice from the CONTRACTOR that the entire work or an agreed portion thereof is complete and final clean-up has been completed, the ENGINEER will make a final inspection with the CONTRACTOR and will notify the CONTRACTOR in writing of all particulars in which this inspection reveals that the work is incomplete or defective. The CONTRACTOR shall immediately take such measures as are necessary to remedy such deficiencies.

14.5 Final Application for Payment:

After the CONTRACTOR has completed all such corrections to the satisfaction of the ENGINEER and delivered all maintenance and operating instructions, schedules, guarantees, Bonds, certificates of inspection, marked-up record documents (as provided in Article 7.19 of the General Conditions and other documents; all as required by the Contract Documents and after the ENGINEER has indicated that the work is acceptable (subject to the provisions of Article 14.9) the CONTRACTOR may make Application for Final Payment following the procedure for progress payments. The final Application for Payment shall be accompanied by all documentation called for in the Contract Documents, together with complete and legally effective releases or waivers (satisfactory to the CITY) of all Liens arising out of or filed in connection with the work. In lieu thereof and as approved by the CITY, the CONTRACTOR may furnish receipts or releases in full; an affidavit of the CONTRACTOR that the releases and receipts include all labor, services, material and equipment for which a Lien could be filed, and that all payrolls, material and equipment bills, and other indebtedness connected with the work for which the CITY or the CITY's property might in any way be responsible, have been paid or otherwise satisfied; and consent of the Surety, if any, to final payment. If any Subcontractor or Supplier fails to furnish a release or receipt in full, the CONTRACTOR may furnish a Bond or other collateral satisfactory to the CITY to indemnify the CITY against any Lien.

14.6 Final Payment and Acceptance:

If on the basis of the ENGINEER's observation of the work during construction and final inspection, and the ENGINEER's review of the final Application for Payment and accompanying documentation, all as required by the Contract Documents, the ENGINEER is satisfied that the work has been completed and the CONTRACTOR's other obligations under the Contract Documents have been fulfilled, the ENGINEER will recommend payment. Thereupon the ENGINEER will give written notice to the CITY and the CONTRACTOR that the work is acceptable subject to the provisions of Article 14.9.

14.7 Payment of Retainage Without Final Completion:

If through no fault of the CONTRACTOR, final completion of the work is significantly delayed and if the ENGINEER so confirms, the CITY shall, upon receipt of the CONTRACTOR's final Application for Payment and recommendation of the ENGINEER, and without terminating the Agreement, make payment of the balance due for the portion of the work fully completed and accepted. If the remaining balance to be held by the CITY for work not fully completed or corrected is less than the retainage stipulated in the Agreement and if Bonds have been furnished as required in Article 5.2, the written consent of the Surety to the payment of the balance due for that portion of the work fully completed and accepted shall be submitted by the CONTRACTOR to the ENGINEER with the application for such payment. Such payment shall be made under the terms and conditions governing final payment, except that it shall not constitute a waiver of claims.

14.8 CONTRACTOR's Continuing Obligation:

The CONTRACTOR's obligation to perform and complete the work in accordance with the Contract Documents shall be absolute. Neither recommendation of any progress or final payment by the ENGINEER, nor the issuance of a Certificate of Substantial Completion, nor any payment by the CITY to the CONTRACTOR under the Contract Documents, nor any use or occupancy of the work or any part thereof by the CITY nor any act of acceptance by the CITY nor any failure to do so, nor any review and approval of a Shop Drawing or sample submission, nor the issuance of a notice of acceptability by the ENGINEER pursuant to Article 14.6, nor any correction of defective work by the CITY will constitute an acceptance of work not in accordance with the Contract Documents or a release of the CONTRACTOR's obligation to perform the work in accordance with the Contract Documents (except as provided in Article 14.9).

14.9 Waiver of Claims:

The making and acceptance of final payment will constitute:

- A. A waiver of all claims by the CITY against the CONTRACTOR, except claims arising from unsettled Liens, from defective work appearing after final inspection pursuant to Article 14.4 or from failure to comply with the Contract Documents or the terms of any special guarantees specified therein; however, it will not constitute a waiver by the CITY of any rights in respect of the CONTRACTOR's continuing obligations under the Contract Documents.
- B. A waiver of all claims by the CONTRACTOR against the CITY other than those previously made in writing and still unsettled.

ARTICLE 15 - SUSPENSION OF WORK AND TERMINATION

15.1 City May Suspend Work:

The CITY may, at any time and without cause, suspend the work or any portion thereof for a period of not more than ninety (90) days by notice in writing to the CONTRACTOR which will fix the date on which work will be resumed. The CONTRACTOR shall resume the work on the date so fixed. The CONTRACTOR shall be allowed an increase in the Contract Price or an extension of the Contract Time, or both, directly attributable to any suspension.

15.2 City May Terminate:

- A. Upon the occurrence of any one or more of the following events:
1. If the CONTRACTOR commences a voluntary case under any chapter of the Bankruptcy Code (Title 11, United States Code), as now or hereafter in effect, or if the CONTRACTOR takes any equivalent or similar action by filing a petition or otherwise under any other federal or state law in effect at such time relating to the bankruptcy or insolvency.
 2. If a petition is filed against the CONTRACTOR under any chapter of the Bankruptcy Code as now or hereafter in effect at the time of filing, or if a petition is filed seeking any such equivalent or similar relief against the CONTRACTOR under any other federal or state law in effect at the time relating to bankruptcy or insolvency.
 3. If the CONTRACTOR makes a general assignment for the benefit of creditors.
 4. If a trustee, receiver, custodian or agent of the CONTRACTOR is appointed under applicable law or under contract, whose appointment or authority to take charge of property of the CONTRACTOR is for the purpose of enforcing a Lien against such property or for the purpose of general administration of such property for the benefit of the CONTRACTOR's creditors.
 5. If the CONTRACTOR admits in writing an inability to pay its debts generally as they become due.
 6. If the CONTRACTOR persistently fails to perform the work in accordance with the Contract Documents (including, but not limited to, failure to supply a qualified superintendent or sufficient skilled workers or suitable materials or equipment or failure to adhere to the approved progress schedule revised from time to time).
 7. If the CONTRACTOR disregards laws or regulations of any public body having jurisdiction.

8. If the CONTRACTOR disregards the authority of the ENGINEER.
 9. If the CONTRACTOR otherwise violates in any substantial way any provisions of the Contract Documents.
- B. The CITY may, after giving the CONTRACTOR and the Surety seven days' written notice and to the extent permitted by laws and regulations, terminate the services of the CONTRACTOR, exclude the CONTRACTOR from the site and take possession of the work and of all the CONTRACTOR's tools, appliances, construction equipment and machinery at the site and use the same to the full extent they could be used by the CONTRACTOR (without liability to the CONTRACTOR for trespass or conversion), incorporate in the work all materials and equipment stored at the site or for which the CITY has paid the CONTRACTOR but which are stored elsewhere, and finish the work as the CITY may deem expedient. In such case the CONTRACTOR shall not be entitled to receive any further payment until the work is finished. If the unpaid balance of the Contract Price exceeds the direct, indirect and consequential costs of completing the work (including but not limited to fees and charges of engineers, architects, attorneys and other professionals, and court and arbitration costs) such excess will be paid to the CONTRACTOR. If such costs exceed such unpaid balance, the CONTRACTOR, or CONTRACTOR's Surety, shall pay the difference to the CITY.
 - C. Where the CONTRACTOR's services have been so terminated by the CITY, the CITY alone shall determine the scope and description of the work to be completed and the method and schedule for completing it.
 - D. Where the CONTRACTOR's services have been so terminated by the CITY the termination will not affect any rights or remedies of the CITY against the CONTRACTOR then existing or which may thereafter accrue. Any retention or payment of moneys due the CONTRACTOR by the CITY will not release the CONTRACTOR from liability.
 - E. Upon seven days' written notice to the CONTRACTOR the CITY may, without cause and without prejudice to any other right or remedy, elect to abandon the work and terminate the Contract. In such case the CONTRACTOR shall be paid for all work executed and any expense sustained plus reasonable termination expenses, which will include, but not be limited to, direct, indirect and consequential costs (including, but not limited to, fees and charges of engineers, architects, attorneys and other professionals and court and arbitration costs).

15.3 Contractor May Stop Work or Terminate:

If through no act or fault of the CONTRACTOR, the work is suspended for a period of more than ninety (90) days by the CITY or under an order of court or other public authority, or the CITY fails for sixty (60) days to pay the CONTRACTOR any sum finally determined to be due, then the CONTRACTOR may, upon seven days' written notice to the CITY terminate the Contract and recover from the CITY payment for all work executed and any expense sustained plus reasonable termination expenses. In addition and in lieu of terminating the Contract, if the CITY has failed to make any payment as aforesaid, the CONTRACTOR may upon seven days' written notice to the CITY stop the work until payment of all amounts then due are paid. The provisions of this paragraph shall not relieve the CONTRACTOR of the obligations to carry on the work in accordance with the progress schedule and without delay during disputes and disagreements with the CITY.

- END OF SECTION -

SECTION 01010

SUMMARY OF WORK

PART 1 - GENERAL

1.01 THE REQUIREMENT

- A. The work to be performed under this Contract shall consist of furnishing all tools, equipment, materials, supplies, and manufactured articles and for furnishing all transportation and services, including fuel, power, water, and essential communications, and for the performance of all labor, work, or other operations required for the fulfillment of the Contract in strict accordance with the Contract Documents. The Work shall be complete, and all work, materials, and services not expressly shown or called for in the Contract documents which may be necessary for the complete and proper construction of the Work in good faith shall be performed, furnished, and installed by the CONTRACTOR as though originally so specified or shown, at no increase in cost to the CITY.
- B. Prior to construction, the CONTRACTOR shall verify existing utilities identified on the Documents and locate other potential utilities in their working area may not shown on the Documents. The utility verifications consist of excavation to verify tie-in points and to locate potential conflicts that may affect the work as shown on the Documents. The CONTRACTOR shall be responsible for the coordination of this work with the associated utility owners and permitting agencies having jurisdiction over the specific locations to be verified.

1.02 SCOPE

- A. The work to be performed includes site, civil, mechanical, and structural work associated with the construction of proposed improvements depicted on the Contract Documents.

The contractor shall perform the work in accordance with all permits.

- B. It is the intent of the CITY to obtain a complete and working installation under this contract and any items of labor, materials or equipment, which may reasonably be assumed as necessary to accomplish this end, should be supplied whether or not specifically shown on the plans or described herein. Maintenance of the existing utility systems is mandated throughout the construction period.

1.03 WORK BY OTHERS

- A. The CONTRACTOR shall cooperate fully with all utility forces of the CITY, or other public or private agencies engaged in the relocation, altering, or otherwise rearranging any facilities which interfere with the progress of the work, and shall schedule the work so as to minimize interference with said relocation, altering, or rearranging of facilities.
- B. The CONTRACTOR'S attention is directed to the fact that work will be conducted at the site by other contractors during the performance of the work under this Contract. The CONTRACTOR shall conduct its operations so as to cause a minimum of interference

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with the Work of such other contractors, and shall cooperate fully with such contractors to provide continued safe access to their respective portions of the site, as required to perform their respective contracts.

- C. When two or more contracts are being executed at one time on the same or adjacent land in such manner that Work on one contract may interfere with that on another, the CITY shall determine the sequence and order of the Work. When the territory of one contract is the necessary or convenient means of access for the execution of another contractor, such privilege of access or any other reasonable privilege may be granted by the CITY to CONTRACTOR.

1.04 LOCATION OF THE PROJECT

- A. All work is to be performed within the project limits and rights-of-way of the roads described on the Contract Documents.

1.05 CONTRACT DRAWINGS

- A. The work to be performed shall be as shown on the Contract Documents.

1.06 CONTRACTOR FURNISHED MATERIAL AND EQUIPMENT

- A. All equipment, materials, or devices incorporated in this project shall be new and unused, unless indicated otherwise in the Contract Documents and shall be the products of reliable manufacturers who, unless otherwise specified, have been regularly engaged in the manufacture of such material and equipment for at least five (5) years. Procedures and additional requirements regarding manufacturer's experience and substitutions are included in Section 01300 - Submittals.

1.07 DRAWINGS OF EXISTING FACILITIES

- A. Drawings of the existing facilities may be inspected at the City's Engineering and Construction Services Office. These drawings are for information only and are not a part of the Contract Documents. In making these drawings available for inspection, the CITY makes no guarantee, either expressed or implied, as to their accuracy or completeness.
- B. The CONTRACTOR shall contact representatives for other utilities, facilities in proximity of the work and Sunshine State One Call Inc., to obtain the as-built information from them directly. The utilities shown on Drawings are based upon available records supplied from various sources. The CITY makes no guarantee, either expressed or implied, as to their accuracy or completeness.

1.08 ITEMS SPECIFIED ON DOCUMENTS

- A. Certain items of material and/or equipment, and their installation may be specified on the Drawings and not mentioned in the Specifications. Such items are to be considered as

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both shown on the Drawings and noted in the Specifications and be provided by the CONTRACTOR in accordance with the Specification on the Documents.

1.09 FIELD LAYOUT OF WORK

- A. All work under this Contract shall be constructed in accordance with the Contract Drawings or as directed by the ENGINEER. Elevations 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 the ENGINEER for interpretation or correction.
- A. All survey work for construction control purposes shall be made by the CONTRACTOR at his expense.
- C. The 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 Drawings, the CONTRACTOR shall develop and make all detail surveys necessary for construction. The CITY will furnish information and location of existing benchmarks.
- D. The CONTRACTOR shall have the responsibility to carefully preserve the benchmarks, reference points and stakes. In case of destruction thereof by the CONTRACTOR or resulting from his negligence, he 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 bench marks, reference points and stakes.
- E. Existing or new control points, property markers, and monuments that will be established or are destroyed during the normal causes of construction shall be re-established by the CONTRACTOR; and all reference ties recorded therefore shall be furnished to the ENGINEER. All computations necessary to establish the exact position of the work shall be made and preserved by the CONTRACTOR.
- F. The ENGINEER may check all or any portion of the work, and the CONTRACTOR shall afford all necessary assistance to the ENGINEER in carrying out such checks. Any necessary corrections to the work shall be performed immediately by the CONTRACTOR and he shall accept all responsibility for the accuracy and completeness of his work.

PART 2 -- PRODUCTS (Not Used)

PART 3 -- EXECUTION (Not Used)

- END OF SECTION -

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PART 1 - GENERAL

1.01 SCOPE OF WORK

- A. Payments to the CONTRACTOR shall be made on the basis of the Bid Proposal as full and complete payment for furnishing all materials, labor, tools and equipment, and for performing all operations necessary to complete the work included in the Contract Documents. Such compensation shall also include payments for any loss or damages arising directly or indirectly from the work, or from any discrepancies between the actual quantities of work and those shown in the Contract Documents.
- B. The prices stated in the Bid Proposal include all costs and expenses for taxes, labor, equipment, materials, commissions, transportation charges and expenses, patent fees and royalties, labor for handling materials during inspection, together with any and all other costs and expenses for performing and completing the work as shown on the details and specified herein. The Basis of Payment for an item at the price shown in the Bid Proposal shall be in accordance with its description of the item in this Section and as related to the work specified. Unit prices will be applied to the actual quantities furnished and installed in conformance with the Contract Documents. The items listed below, refer to and are the same pay items listed in the Bid Proposal. They constitute all of the pay items for the completion of the work. No direct or separate payment will be made for providing miscellaneous temporary or accessory works, services, field offices, layout surveys, job signs, sanitary requirements, testing, safety devices, approval and record drawings, water supplies, power, underground utility locating, maintenance of traffic, site preparation, removal of waste, site cleanup, watchmen, bonds, insurance, mobilization, demobilization, and any other requirements of the General Conditions and Bidding and Contract Requirements. Compensation for all such services, equipment and materials shall be included in the prices stipulated for the unit pay items listed herein.
- C. The CONTRACTOR's attention is called to the fact that the quotations for the various items of work are intended to establish a total price for completing the work in its entirety. Should the CONTRACTOR feel that the cost for any item of work has not been established in the Bid Proposal or this Section, the cost for that Work shall be included in some other applicable Bid Item, so that the Proposal for the project reflects the total price for completing the work in its entirety. It is intended that all work required to complete this Contract will be included in the various items as described herein.
- D. In the event that repairs to laterals, mains, manholes, force mains, utilities, or any other public or private property are required due to damage caused by the CONTRACTOR's operations, the CONTRACTOR shall provide and employ all necessary labor, equipment, and materials, at no additional cost, to complete such repairs in accordance with applicable provisions of these specifications. This shall include but not be limited to materials for repair, if required, including pipe, fittings and specials, pipe bedding, and materials for surface restoration; transportation and handling costs delivered to the work site; any bypass pumping; providing provisional sewers to maintain service; complying with the State of Florida Trench Safety Act, including shoring; removal, transportation and disposal of existing sewer excavation; supporting and protecting existing utilities as required; dewatering; sheeting and shoring, if necessary;

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furnishing and installing replacement pipe, fittings and repair couplings; unloading material and placing it in the trench; cutting pipe; furnishing and installing joint materials including lubricant; making all connections within the lines to existing sewers, laterals and structures; placing and compacting bedding and backfill; furnishing and installing additional suitable backfill material, if required; furnishing all materials and equipment required to clean and test the sewer; cleaning and testing the sewer; temporary paving installation and removal; permanent paving replacement; replacement of pavement markings as existed before repair; replacing utilities, catch basins, manholes, trees, grass, shrubs, mail boxes, sprinkler systems, concrete or rock bed driveways, sidewalk and all other similar items, to original locations and to equal or better than original conditions; obtaining and paying for any necessary permits; satisfying all requirements of the permits, and all other appurtenant and miscellaneous items and work including final cleanup

- E. The CITY will not provide any space or place to store materials for this project. No payment will be made for stored materials.
- F. The CITY will not provide for disposal of any solids resulting from sewer cleaning. The CONTRACTOR shall obtain permits and make arrangements as required to properly dispose of solids. All solids or semisolids resulting from the cleaning operations shall be removed from the site and disposed of by the CONTRACTOR in a legal and sanitary manner as approved by appropriate authorities, at the CONTRACTOR's cost.
- G. Traffic control measures to be included in the prices stipulated for the unit pay items listed herein shall include standard traffic cones and up to 10 barricades and 10 advance warning and/or detour signs. When the CITY agrees in advance that further measures are required, such additional measures shall be separately negotiated and addressed on a site- specific basis.
- H. Whenever "Limits of Construction" is referred to, the limit of construction shall be within an area 7.5 feet each side of the centerline of the pipe and no more than five feet beyond the end of the new pipe installed.

1.02 CONTRACT DURATION

- A. As specified in the Bid Form.

1.03 PERFORMANCE AND PAYMENT BONDS

- A. As specified in Section 00610 & Section 00620 respectively.

1.04 MEASUREMENT

- A. The quantities for payment under this Contract shall be determined by actual measurement of the completed items, in place, ready for service and accepted by the CITY unless otherwise specified. The CITY will witness all field measurements.
- B. When depth of cuts is indicated in the bid items, they shall be measured vertically from the existing grade at excavation point, paved or unpaved, to the pipe invert.

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- C. The quantities stated in the Bid Proposal are approximate only and are intended to serve as a basis for the comparison of bids and to fix the approximate amount of the cost of the Project. The CITY does not expressly or impliedly agree that the actual amount of the work to be done in the performance of the contract will correspond with the quantities in the Bid Proposal; the amount of work to be done may be more or less than the said quantities and may be increased or decreased by the CITY as circumstances may require. The increase or decrease of any quantity shall not be regarded as grounds for an increase in the unit price or in the time allowed for the completion of the work, except as provided in the Contract Documents.
- D. Payment items for cleaning and televising of mains and laterals will apply when sewer is cleaned and televised for inspection only, or when a sewer repair is not performed due to changed field conditions revealed by the pre-repair video inspection. Cleaning and television inspection performed to prepare for a repair or to document a completed repair are not considered separate pay items. Costs for such cleaning and TV inspection shall be included in the contract unit cost for each particular repair. Lateral inspection shall be performed using a camera launched from the main unless conditions within the sewer require lateral inspection from the cleanout. Reference Table 01025-1 for the television inspection requirements pertaining to each type of repair.

1.05 EXCAVATED POINT REPAIRS PAYMENT ITEMS

- A. Items 1 to 15 – Point repairs of gravity mains and laterals, various sizes
 - 1. This work, of whatever nature, will be measured and paid for at the unit price per each as delineated by pipe size and depth brackets as named in the Bid Proposal. Payment of the unit price per each shall provide full compensation for all necessary and required work including, but not limited to pre- and post-construction television inspection and sonde locate if required; traffic control; 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 (a minimum of 6 feet and a maximum of 15 feet), pipe joint material including lubricant, pipe bedding, repair sleeves, flexible banded couplings and adapters, rigid sleeves with compression joints, embedment materials, wyes or tees and the reconnection of service laterals; flow isolation; 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 and structures; testing; cleanup; final cleanup; mobilization; demobilization; 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 requirements; and all incidentals related to point repairs to achieve a repaired segment of sewer gravity main or lateral complete in place, tested, and ready for use. Multiple payments can be made under this item if the repair exceeds 15 feet.

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2. Payment for bypass pumping, if required (other than because of damage caused by the CONTRACTOR) will be paid for under a separate item.
 3. Asphalt and concrete repair, if required, will be paid for as a separate item.
 4. Additional excavation (more than two feet below the pipe, Section 02222) and disposal of muck, furnishing and installing additional suitable backfill materials, if required, will be paid for as separate items.
 5. CITY reserves the right to award any, all, or none of the money associated with this bid items
- B. Items 16 to 21 - Install cured-in-place sectional pipe liner, various sizes
1. Items with Bid form units of "EA" will be measured and paid at the unit price per each cured-in-place sectional pipe liner installed up to 8 feet in length, as delineated by the pipe size brackets named in the Bid Form. Each unit price bid shall provide full compensation for all work including, but not limited to, furnishing and installing section of epoxy impregnated fiberglass liner; pipe cleaning; television inspections; mobilization; demobilization; all labor, materials and equipment specified or not which will provide a complete and acceptable liner installation.
 2. Items with Bid Form units of "L.F." will be paid for in addition to the price paid under corresponding Items with Bid Form units of "EA" as applicable, at the unit price bid per linear foot of liner installed beyond 8 feet and up to 12 feet in length. This item will be full compensation for all additional costs associated with work of installing sectional liner beyond 8 feet up to 12 feet in length. Any sectional liner extending beyond 12 feet and up to 16 feet shall be paid for as two single liners with Bid Form units of "EA".
 3. Payment for bypass pumping, if required (other than because of damage caused by the CONTRACTOR), will be paid for under a separate item.
 4. CITY reserves the right to award any, all, or none of the money associated with this bid items
- C. Items 22 to 26 – Excavate, cut and reinstall new FM connection, various sizes. No bypass
1. These items include the cost for installing closure pieces to permanently rejoin and restore the force main to full function. Payment for these items shall provide full compensation for all necessary and required work, traffic control, mobilization, demobilization, all labor, materials and equipment required to provide a complete and acceptable installation.
- D. Item 27 – Install polyethylene fused-on saddle (open trench)
1. This item of work will be measured and paid at the unit price per each lateral

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reinstated and shall include, but not be limited to, furnishing all labor, equipment, mobilization, demobilization and material necessary to install prefabricated polyethylene saddles by electrofusion in accordance with the manufacturer's recommendations, complete and in place.

2. The starting point for this item of work will be the performance of a point repair (one of Items 1 to 15) to expose the main, to provide an open trench with the sewer main located and exposed, as well as subsequent backfill and compaction.
3. CITY reserves the right to award any, all, or none of the money associated with this bid items

1.06 ITEMS IN COMMON

A. Items 28 to 31 - Sewer main cleaning and TV inspection, various sizes

1. These items will be paid for at the unit price bid per foot of sewer cleaned and televised for inspection only, when a sewer repair is not performed due to change of field conditions revealed by the pre-repair video inspection, or as directed by the CITY. The unit price shall provide full compensation for all work required to perform television inspection of sanitary sewer including, but not limited to, furnishing all labor, mobilization, demobilization, equipment and material for cleaning, flow isolation, TV inspection, and all incidentals related to sewer inspection. The products shall be acceptable to the CITY or otherwise the CONTRACTOR shall re-televiser the sewer line to the satisfaction of the CITY. Sewer main cleaning shall include drop connections.
2. Cleaning and TV inspection performed to prepare for a repair or to document a completed repair are not considered separate pay items. Costs for such cleaning and TV inspection shall be included in the contract unit cost for each particular repair. Reference Table 01025-1 for the television inspection requirements pertaining to each type of repair.
3. CITY reserves the right to award any, all, or none of the money associated with this bid items

B. Items 32 to 35 - Sewer lateral cleaning and TV inspection, various sizes

1. Items with Bid form units of "EA" will be measured and paid at the unit price per each named in the Bid Form, and shall include up to 30 feet of lateral.
2. Items with Bid form units of "L.F." will be measured and paid for at the unit price per foot of sewer lateral cleaned and inspected beyond 30 feet of lateral, in addition to the corresponding item with Bid Form units of "EA".
3. Payment for sewer lateral cleaning and inspection will be made when a sewer lateral is cleaned and televised for inspection only, when a sewer repair is not performed due to a change of field conditions revealed by the pre-repair video inspection, or as directed by the CITY. The unit price shall provide full

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compensation for all work required to perform television inspection of sanitary sewer service laterals including, but not limited to, furnishing all labor, mobilization, demobilization, equipment, tools and material for cleaning, flow isolation, TV inspection, and all incidentals related to sewer inspection. The products shall be acceptable to the CITY or otherwise the CONTRACTOR shall re-televise the sewer line to the satisfaction of the CITY.

4. Lateral inspection shall be performed using a camera launched from the main unless conditions within the sewer require lateral inspection from the cleanout.
5. Cleaning and TV inspection performed to prepare for a repair or to document a completed repair are not considered separate pay items. Costs for such cleaning and TV inspection shall be included in the contract unit cost for each particular repair. Reference Table 01025-1 for the television inspection requirements pertaining to each type of repair.
6. CITY reserves the right to award any, all, or none of the money associated with this bid items

C. Items 36 to 38- Mechanical root or grease removal, various sizes

1. Removal of grease or roots involving the use of special equipment will be considered special cleaning and will be measured and paid per linear foot additionally to cleaning, depending on the pipeline diameter and the type of cleaning, as shown on the Schedule of Prices. The unit price shall provide full compensation for all work required to perform such cleaning including, but not limited to, furnishing all labor, mobilization, demobilization, equipment and material for cleaning, flow isolation, pre- and post-cleaning TV inspection, traffic control, and all incidentals. The products shall be acceptable to the CITY or otherwise the CONTRACTOR shall re-clean and re-televise the sewer line to the satisfaction of the CITY.
2. Special cleaning not authorized in writing by the CITY shall be considered part of the cleaning operation and shall not be considered a separate pay item.
3. Sewer line or manhole cleaning is not a separate bid item. The prices for all cleaning of sewers and manholes; verification of adequate cleaning by pulling double squeegees; hoses; nozzles; water; labor; materials and/or any other work required to clean the sewers to a degree acceptable for television inspection and subsequent repairs shall be included in the bid item in which the rehabilitation occurs.
4. CITY reserves the right to award any, all, or none of the money associated with this bid items

D. Items 39 to 42 - Mechanical tuberculation/concrete removal, various sizes

1. Removal of tuberculation in cast iron pipe, or concrete in pipe, involving the use of special equipment will be considered special cleaning and will be measured and

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paid per linear foot additionally to cleaning, depending on the pipeline diameter and the type of cleaning, as shown on the Schedule of Prices. The unit price shall provide full compensation for all work required to perform such cleaning including, but not limited to, furnishing all labor, mobilization, demobilization ,equipment and material for cleaning, flow isolation, pre- and post-cleaning TV inspection, traffic control, and all incidentals. The products shall be acceptable to the CITY or otherwise the CONTRACTOR shall re-clean and re-televisize the sewer line to the satisfaction of the CITY.

2. Special cleaning not authorized in writing by the CITY shall be considered part of the cleaning operation and shall not be considered a separate pay item.
3. Sewer line or manhole cleaning is not a separate bid item. The prices for all cleaning of sewers and manholes; verification of adequate cleaning by pulling double squeegees; hoses; nozzles; water; labor; materials and/or any other work required to clean the sewers to a degree acceptable for television inspection and subsequent repairs shall be included in the bid item in which the rehabilitation occurs.
4. CITY reserves the right to award any, all, or none of the money associated with this bid items

E. Items 43 to 47 - Grouting abandoned pipe, various sizes

1. The unit price bid for Grouting abandoned pipe shall provide full compensation for all work including, but not limited to, furnishing of all labor, mobilization, demobilization ,equipment and material required for grouting abandoned pipe. All other damage as a result of the CONTRACTOR's operation shall be at the CONTRACTOR's expense.
2. Payment for grouting abandoned pipe will be made per lineal foot and accepted.
3. CITY reserves the right to award any, all, or none of the money associated with this bid items

F. Item 48 - Recut lateral insufficiently reinstated by others

1. This item of work will be measured and paid at the unit price per each lateral recut and shall include, but not be limited to, traffic control; mobilization, demobilization; blocking or plugging incoming line; removal, transportation and disposal of material generated by cleaning and preparation; pre- and post-television surveys, furnishing the equipment necessary to internally cut out the liner to at least 95 percent of the area of the lateral, cutting out the coupon; wire-brushing the cut to remove jagged edges; recovering all waste material from the sewer; service pipe cleaning; performing all repairs required due to damage caused by the CONTRACTOR, and all appurtenant and miscellaneous items and work.
2. If the CONTRACTOR damages the host pipe during lateral reinstatement, the CONTRACTOR shall repair the host pipe to the satisfaction of the CITY at no additional cost.

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3. If grouting of the annular space at the reinstated lateral results in residual grout in greater than 50 percent the area of the lateral, such grout shall be removed at no additional cost.
4. CITY reserves the right to award any, all, or none of the money associated with this bid items

G. Items 49 - Protruding service connection removal by internal means

1. The CITY may request that the CONTRACTOR remove protruding service connections, typically to allow completion of inspection or as a prelude to lining. The CONTRACTOR shall use non-destructive robotic techniques. The use of equipment that may damage the existing service connection will not be allowed. The CONTRACTOR shall not perform this work prior to receiving written authorization from the CITY.
2. Measurement shall be per protruding service connection removed.
3. Payment shall be at the unit price bid, per each protruding service connection removed, provided in the Bid Proposal and shall include full compensation for accessing the site, mobilization, demobilization, wastewater flow control, performing the protruding service connection removal, and all else incidental thereto for which separate payment is not provided under other items in the Bid Proposal.
4. CITY reserves the right to award any, all, or none of the money associated with this bid items

H. Items 50 to 52 - Exploratory excavation

1. This item shall include vacuum excavation services for locating utilities 0 to 5 feet in depth below ground or pavement surface, including excavation, mobilization, demobilization, backfill, asphalt/concrete removal and disposal, compaction, surface restoration, primary locating services and appurtenances.
2. Payment will be made at the contract unit cost for each pothole including survey.
3. For exploratory excavations greater than 5 feet in depth, payment will be made at the contract unit cost for each vertical foot below 5 feet excavated. This item shall be paid in addition to the contract unit cost for the first 5 feet of depth.
4. CITY reserves the right to award any, all, or none of the money associated with this bid items

I. Items 53 to 57 - Bypass pumping, various sizes

1. These items shall provide full compensation for bypass pumping operations required for sewer and manhole repair work. The CONTRACTOR shall attempt to perform the sewer work without bypass pumping. However, if, in the opinion of the CITY bypass pumping is necessary, it will be identified as a payment item. The

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pay item is a charge per day for all bypass pumping operations during a specific sewer repair, including services, regardless of the number of pumps required. Bypass Pumping shall be bid on the basis of sewer size which is bypassed.

2. These items shall include, but not be limited to, all necessary and required traffic control; pumps; piping; gasoline/diesel fuel; maintenance; mobilization, demobilization, transportation and storage; temporary bypass and service piping; labor; materials and/or any other costs associated with bypass pumping.
3. Plugging or blocking a sewer line shall be included in the appropriate bid item for which the flow must be stopped, and shall be considered incidental work and no additional payment shall be considered.
4. This item is not intended to address bypassing of force main flows where such flows discharge directly into a manhole being repaired or through a force main being repaired.
5. CITY reserves the right to award any, all, or none of the money associated with this bid items

J. Items 58 to 61 - Cleanout installation

1. This item of work will be measured and paid for at the unit price per each. Payment of the unit price per each will provide complete compensation for furnishing materials and all labor, mobilization, demobilization, tools, equipment and incidentals, to locate utilities; locate lateral; excavate; install a cleanout riser with cover and plug at the property line; backfill; compact; and restore surface in grass, asphalt, or concrete as applicable, complete in place.
2. For cleanout installations greater than 5 feet in depth, payment will be made at the contract unit cost for each vertical foot below 5 feet excavated. This item shall be paid in addition to the contract unit cost for the first 5 feet of depth.
3. CITY reserves the right to award any, all, or none of the money associated with this bid items

K. Item 62 - Cleanout installation (open trench)

1. This item of work will be measured and paid for at the unit price per each. Payment of the unit price per each will provide complete compensation for furnishing materials and all labor, mobilization, demobilization, tools, equipment and incidentals, to install a cleanout riser with cover and plug at the property line, complete in place, beginning and ending with an open trench.
2. CITY reserves the right to award any, all, or none of the money associated with this bid items

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L. Item 63- Roadway replacement with 2-inch asphalt

1. The unit price bid for Roadway replacement (two lift of 1-inch thick asphaltic concrete wearing surface) shall provide full compensation for all work including, but not limited to furnishing all labor, mobilization, demobilization, equipment and material required for cutting, removing, protecting and replacing all existing asphalt paving and subgrade removed or damaged under this Contract; replacement of limerock base, prime coat, tack coat, asphalt, compaction, traffic markings, and maintenance of traffic. Payment will only be made if asphalt paving is encountered within the "Limits of Construction". All other replacement due to removal or damage as a result of the CONTRACTOR's operation shall be at the CONTRACTOR's expense.
2. Payment for Asphalt Roadway Replacement will be made once and shall include both temporary and permanent Asphalt Roadway Replacement and will be made per square yard, based on base and asphalt thickness dimensions as required, installed and accepted.
3. CITY reserves the right to award any, all, or none of the money associated with this bid items

M. Item 64 - Pavement overlay

1. Item for construction pavement repairs (1-inch thick asphaltic concrete wearing surface overlay) will be paid for at the unit price bid times the number of square yards of overlay installed where directed by the CITY, and the price bid shall provide full compensation for all work including, but not limited to, furnishing all materials, mobilization, demobilization, labor and equipment for a complete installation. Pavement overlay will be in addition to the asphalt concrete pavement restoration.
2. CITY reserves the right to award any, all, or none of the money associated with this bid items

N. Items 65 Limerock Base

1. The quantity to be paid for will be the number of cubic yards of only the new limerock material, conforming to CITY standards and specifications, actually placed for the base roadway course, includes backfill, compaction and testing where to be accepted and directed by the CITY. The quantity will be determined by measurement in loose volume, in truck bodies, at the point of dumping on the road, with proper deduction for all materials wasted, left in trucks or otherwise not actually used in the road. For this purpose, level the material in the truck bodies to facilitate accurate measurement.
2. CITY reserves the right to award any, all, or none of the money associated with this bid items

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O. Items 66 Stabilized subgrade

1. The quantity to be paid for will be the number of cubic yards of only the new stabilized subgrade material, conforming to CITY standards and specifications, actually placed for the subgrade roadway course, includes backfill, compaction and testing where to be accepted and directed by the CITY. The quantity will be determined by measurement in loose volume, in truck bodies, at the point of dumping on the road, with proper deduction for all materials wasted, left in trucks or otherwise not actually used in the road. For this purpose, level the material in the truck bodies to facilitate accurate measurement.
2. CITY reserves the right to award any, all, or none of the money associated with this bid items

P. Item 67 - Concrete sidewalk replacement

1. The unit price bid for Concrete Sidewalk Replacement shall provide full compensation for all work including, but not limited to, furnishing of all labor, mobilization, demobilization, equipment and material required for cutting, removing, protecting and replacing all existing concrete sidewalks removed or damaged under this Contract, concrete, formwork, reinforcing, placing, finishing and curing. Payment will only be made if sidewalks are encountered within the "Limits of Construction" as described herein. All other replacement due to removal or damage as a result of the CONTRACTOR's operation shall be at the CONTRACTOR's expense.
2. Payment for concrete sidewalk will be made per square yard installed and accepted.
3. CITY reserves the right to award any, all, or none of the money associated with this bid items

Q. Item 68 - Concrete curb and gutter replacement

1. The unit price bid for Concrete Curb and Gutter Replacement shall provide full compensation for all work including, but not limited to furnishing all labor, mobilization, demobilization, equipment and material required for cutting, removing, replacing all existing concrete curbs and gutters removed or damaged under this Contract. Payment will only be made if curbs and gutters are encountered within the "Limits of Construction" as described herein. All other replacement due to removal or damage as a result of the CONTRACTOR's operation shall be at the CONTRACTOR's expense.
2. Payment for Concrete Curb and Gutter Replacement will be made per linear foot installed and accepted.
3. CITY reserves the right to award any, all, or none of the money associated with this bid items

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R. Item 69 - Asphalt driveway replacement

1. The unit price for Asphalt Driveway Replacement shall provide full compensation for all work including, but not limited to, furnishing of all labor, mobilization, demobilization, equipment and material required for cutting, removing, protecting and replacing all existing asphalt driveways removed or damaged under this Contract; limerock base, prime coat, tack coat, asphalt and compaction. Payment will only be made if asphalt driveways are encountered within the "Limits of Construction" as described herein. All other replacement due to removal or damage as a result of the CONTRACTOR's operation shall be at the CONTRACTOR's expense.
2. Payment for asphalt driveway replacement will be made per square yard installed and accepted.
3. CITY reserves the right to award any, all, or none of the money associated with this bid items

S. Item 70 - Concrete driveway replacement

1. The unit price for Concrete Driveway Replacement shall provide full compensation for all work including, but not limited to, furnishing of all labor, mobilization, demobilization, equipment and material required for cutting, removing, protecting and replacing all existing concrete driveways removed or damaged under this Contract, concrete, formwork, reinforcing, placing, finishing and curing. Payment will only be made if sidewalks are encountered within the "Limits of Construction" as described herein. All other replacement due to removal or damage as a result of the CONTRACTOR's operation shall be at the CONTRACTOR's expense.
2. Payment for concrete driveway replacement, will be made per square yard installed and accepted.
3. CITY reserves the right to award any, all, or none of the money associated with this bid items

T. Item 71 - Replace concrete slabs and/or aprons

1. The unit price for Concrete Slab and/or Apron Replacement shall provide full compensation for all work including, but not limited to, furnishing of all labor, mobilization, demobilization, equipment and material required for cutting, removing, protecting and replacing all existing concrete removed or damaged under this Contract, concrete formwork, reinforcing, placing, finishing and curing. Payment will only be made if slabs and/or aprons are encountered within the "Limits of Construction" as previously described. All other replacement due to removal or damage as a result of the CONTRACTOR's operation shall be at the CONTRACTOR's expense.
2. Payment for concrete slab and/or aprons replacement will be made per square

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yard installed and accepted.

3. CITY reserves the right to award any, all, or none of the money associated with this bid items

U. Item 72 - Sod replacement

1. Sod replacement will be paid for at the unit price bid and shall provide full compensation for all work including, but not limited to, furnishing all labor, mobilization, demobilization, equipment and material required for replacing sod removed or damaged under this Contract. Payment will only be made if sodded areas are encountered within the "Limits of Construction" as described herein. Measurement of payment shall be the number of square feet actually removed and replaced within the Limits of Construction. All other replacement due to removal or damage as a result of the CONTRACTOR's operation shall be at the CONTRACTOR's expense.
2. Payment for Sod Replacement will be made per square foot installed and accepted.
3. CITY reserves the right to award any, all, or none of the money associated with this bid items

V. Item 73 to 74 – Work in rear-yard easement

1. Payment shall be at the unit price bid, per easement repair performed, provided in the Bid Proposal and shall include full compensation for all additional labor, mobilization, demobilization, materials, equipment and incidentals required to perform work away from vehicular traveled ways and restoration of private property, if so requested by the CITY, in association with any other work under this contract. This item will be paid in addition to the price paid under the corresponding work item, and will only be paid when the area where work must necessarily be performed is in the easement area and presents restrictions to vehicular access from roads, alleys, driveways, or other features suitable for access by the installation vehicles. This item shall be full compensation for all additional costs associated with working in an easement area.
2. When the CONTRACTOR judges that this item is applicable, the CONTRACTOR shall obtain the CITY's concurrence on such judgment in advance of performing the work.
3. When the CITY agrees in advance that further measures are required, such additional measures shall be separately compensated on a site-specific basis using the pay items provided. Payment is based on a unit price per each device or unit price per hour for personnel
4. CITY reserves the right to award any, all, or none of the money associated with this bid items

W. Items 75 to 77 - Traffic control, various devices

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MEASUREMENT AND PAYMENT

1. Traffic control measures to be included in the prices stipulated for all the unit pay items listed under this contract shall include standard traffic cones and up to 10 barricades and 10 advance warning and/or detour signs. No separate payment shall be made for such traffic control measures.
2. The CONTRACTOR shall advise the CITY in advance in the event that additional traffic control measures are deemed necessary.
3. When the CITY agrees in advance that further measures are required, such additional measures shall be separately compensated on a site-specific basis using the pay items provided. Payment is based on a unit price per each device or unit price per hour for personnel.
4. CITY reserves the right to award any, all, or none of the money associated with this bid items

X. Item 78 - Expedited mobilization

1. Payment shall be at the unit price bid, per mobilization performed, provided in the Bid Proposal and shall include full compensation for all additional labor, materials, equipment and incidentals required to complete an expedited mobilization, if so requested by the CITY, in association with any other work under this contract. Payment shall be per mobilization performed, where CONTRACTOR shall commit to the expedited mobilization within 24 hours of the CITY's request and mobilize and actively initiate the repair work within 72 hours of the CITY's request.
2. The CONTRACTOR is not required to accomplish an expedited mobilization but cannot otherwise earn the associated payment.
3. CITY reserves the right to award any, all, or none of the money associated with this bid items

Y. Item 79 – Additional Excavation, disposal of muck, furnish and install backfill material

1. Payment shall be at the unit price bid, provided in the Bid Proposal and shall include full compensation for all additional labor, mobilization, demobilization, materials, equipment and incidentals required to excavate beyond 2 feet below pipe, dispose of unsuitable material and furnish and install suitable backfill material.
2. CITY reserves the right to award any, all, or none of the money associated with this bid items

Z. Item 80 to 81 - Well point systems

1. These items shall provide full compensation for complete well point system operations required for sewer pipe installation. The CONTRACTOR shall attempt to perform the sewer pipe installation without well point system. However, if, in

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MEASUREMENT AND PAYMENT

the opinion of the CITY well point system is necessary, it will be identified as a payment item. The pay item is a charge per day for all well point system operations during a specific sewer installation.

AA . Items 82 Undefined Allowance

1. Payment for work as directed by the Engineer and authorized through the change order process. The CITY reserves the right to award any, all, or none of the money associated with this bid item.
2. CITY reserves the right to award any, all, or none of the money associated with this bid items

BB. Items 83 Crew hourly rate to address utility conflicts

1. Payment under this item is limited to work not already in other pay items of this contract and approved by the CITY Project Manager in advance to address additional site exploration utility conflicts and other unforeseen field issues. The crew's hourly rate shall include: one superintendent, one foreman, three laborers, and utilization of all construction equipment typically used by the CONTRACTOR'S crew.
2. Payment for these items, shall be made at the unit price named in the Schedule of Values, after approval by CITY Project Manager
3. Payment of these items shall constitute full compensation for all labor, equipment, material and work performed in the furnishing and installing agreed upon items, all in accordance with the requirements of the contract documents.
4. CITY reserves the right to award any, all, or none of the money associated with this bid items

CC. Consideration for indemnification

1. In recognition of the CONTRACTOR'S indemnification obligations, the CITY will pay to the CONTRACTOR the specific consideration of ten dollars (\$10.00). Payment of said specific consideration shall be made at the time of the payment of the first progress estimate and the CONTRACTOR shall acknowledge payment of this consideration by letter to the CITY after receipt of the progress payment.
2. CITY reserves the right to award any, all, or none of the money associated with this bid items

PART 2 -- PRODUCTS (Not Used)

PART 3 -- EXECUTION (Not Used)

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MEASUREMENT AND PAYMENT

Table 01025-1. Pre-Repair and Post-Repair TV Inspection Requirements

Work Assignment

	A	C	D	E	F	G	H	I	J	
	Inspect Lateral	Install	Install	Install	Install Main/Lateral Connection	Perform Chemical Grouting (mains and	Perform Chemical Grouting	Perform Excavated Point- Repair (mains and main/lateral	Perform Excavated	Notes
Required Action										
Televise main from upstream manhole to downstream manhole (pan designated lateral(s) from main for B, E, F, G, and I).		•	•	•	•	•		•		
Televise lateral (lateral camera launched from main).	•			•			•		•	(1)
Submit television inspection video and log to Owner to allow Owner to (1) confirm contractor is in the correct location, (2) confirm the repair has not already been completed, (3) confirm possible changed conditions do not require an alternative repair approach, (4) identify conditions that may affect quality of repair, and (5) verify pre-repair conditions for comparison in the event that the contractor damages the pipe during the repair.		•	•	•	•	•	•	•	•	(2), (3)
Upon Owner's approval, perform repair.		•	•	•	•	•	•	•	•	(2)
Televise entire main.		•								(4)
Televise main from upstream manhole to repair(s) and televise repair(s) and at least one pipe length beyond repair(s).			•	•	•	•		•		
Televise lateral to show lateral repair (lateral camera launched from main).				•			•		•	(1)
Submit inspection video to Owner with pay request.	•									
Submit pre-repair and post-repair videos and logs to Owner with pay request.		•	•	•	•	•	•	•	•	(2), (5)

Notes

- (1) Continuous video of the main from the upstream manhole must precede lateral launching and lateral video to allow verification that camera is in the correct lateral. Pan designated laterals from main before launching.
- (2) Engineer may act as Owner's representative if so directed by Owner.

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MEASUREMENT AND PAYMENT

- (3) If Owner cancels original repair following review of pre-repair video, contractor will be paid separately for the pre-repair TV inspection. Otherwise, pre-repair TV inspection is included in the repair price along with post-repair TV inspection.
- (4) Televiser ends following full liner installation.
- (5) If multiple repairs are being performed in the same line by one or more contractors, Owner may direct one contractor to provide pre-repair video and/or post-repair video a single time on behalf of all repairs and/or contractors. In this or any other case where the Owner allows any video inspection to not be performed, contractor(s) shall issue a credit to the Owner for video inspection not performed in the amount of the pay item used for video inspection only.
- (6) If a lateral must be located from the roof vent using a sonde because no cleanout is available and the lateral construction prevents lateral location using a main-launched sonde, contractor will be paid separately for the lateral location. Otherwise, lateral location is included in the repair price.

- END OF SECTION -

SECTION 01070

ABBREVIATIONS

PART 1 – GENERAL

1.01 THE REQUIREMENT

A. Wherever in these specifications references are made to the standards, other published data of the various national, regional, or organizations may be referred to by their acronym or abbreviation user of these specifications, the following acronyms or abbreviations these specifications shall have the meanings indicated herein.

1.02 ABBREVIATIONS AND ACRONYMS

AAMA Architectural Aluminum Manufacturer's Association

AASHTO American Association of the State Highway and ACI American Concrete Institute

ACOE Army Corps of Engineers

ACPA American Concrete Pipe Association

AFBMA Anti-Friction Bearing Manufacturer's Association, AGMA American Gear Manufacturer's Association

AHGDA American Hot Dip Galvanizers Association

AI The Asphalt Institute

AIA American Institute of Architects

AISC American Institute of Steel Construction

AISI American Iron and Steel Institute

AITC American Institute of Timber Construction

AMCA Air Moving and Conditioning Association

ANSI American National Standards Institute, Inc.

APA American Plywood Association

API American Petroleum Institute

APHA American Public Health Association

APWA American Public Works Association

ASA Acoustical Society of America

ASAE American Society of Agriculture Engineers

ASCE American Society of Civil Engineers

ASHRAE American Society of Heating, Refrigerating, and Air-Conditioning Engineers

ASLE American Society of Lubricating Engineers

SECTION 01070

ABBREVIATIONS

ASME American Society of Mechanical Engineers
ASMM Architectural Sheet Metal Manual
ASSE American Society of Sanitary Engineers
ASTM American Society for Testing and Materials
AWPA American Wood Preservers Association
AWPI American Wood Preservers Institute
AWS American Welding Society
AWWA American Water Works Association
BCDPEP Broward County Department of Planning and Environmental Protection
(formerly BCDNRP)
BCEPD Broward County Environmental Protection Department (formerly BCDPEP)
BCEPGMD Broward County Environmental Protection and Growth Management
Department (formerly BCEPD)
BCHD Broward County Health Department
BHMA Builders Hardware Manufacturer's Association
CMA Concrete Masonry Association
CRSI Concrete Reinforcing Steel Institute
DIPRA Ductile Iron Pipe Research Association
EIA Electronic Industries Association
ETL Electrical Test Laboratories
FBC Florida Building Code
FDEP Florida Department of Environmental Protection
FDOT Florida Department of Transportation
FS Federal Specifications
IEEE Institute of Electrical and Electronics Engineers
IES Illuminating Engineering Society
IPCEA Insulated Power Cable Engineers Association
ISA Instrument Systems and Automation
ISO International Organization for Standardization
MBMA Metal Building Manufacturers Association
MMA Monorail Manufacturers Association
MTI Marine Testing Institute
7106A
Inflow/Infiltration (I/I) Program – Excavated Point Repairs

SECTION 01070

ABBREVIATIONS

NAAM National Association of Architectural Metal Manufacturers

NACE National Association of Corrosion Engineers

NBS National Bureau of Standards

NEC National Electrical Code

NEMA National Electrical Manufacturer's Association

NFPA National Fire Protection Association

NIOSH National Institute of Occupational Safety and Health

NIST National Institute of Standards and Testing

NRCA National Roofing Contractors Association

NSF National Science Foundation

OSHA Occupational Safety and Health Administration

PCA Portland Cement Association

SMACCNA Sheet Metal and Air Conditioning Contractors National Association

SSPC Steel Structures Painting Council

SSPWC Standard Specifications for Public Works Construction

SFWMD South Florida Water Management District

UL Underwriters Laboratories, Inc.

PART 2 -- PRODUCTS (Not Used)

PART 3 -- EXECUTION (Not Used)

- END OF SECTION -

SECTION 01090

APPLICABLE STANDARDS

PART 1 - GENERAL

1.01 The REQUIREMENT

- A. Wherever references are made in these specifications to any published standards, codes, standard specifications, or other published data of the various national, regional, or local organizations, such organizations may be referred to by their acronym or abbreviation only. References shall be to the latest versions currently in effect, unless otherwise specified by the City and/or Engineer. As a guide to the user of these specifications, the following acronyms or abbreviations which may appear in these specifications shall have the meanings indicated herein.
- B. The following is a partial list of typical abbreviations which may be used in the Specifications, and the organizations to which they refer. Abbreviated titles for other governing standards are used throughout these specifications and, although most of them are widely known, their complete titles are given below to avoid misunderstanding:
1. AAMA - Architectural Aluminum Manufacturer's Association
 2. AASHTO - American Association of the State Highway and
 3. ACI - American Concrete Institute
 4. ACIFS - American Cast Iron Flange Standards
 5. ACOE - Army Corps of Engineers
 6. ACPA - American Concrete Pipe Association
 7. AFBMA - Anti-Friction Bearing Manufacturer's Association
 8. AGMA - American Gear Manufacturer's Association
 9. AGA - American Gas Association
 10. AGMA - American Gear Manufacturers Association
 11. AHGDA - American Hot Dip Galvanizers Association
 12. AI - The Asphalt Institute
 13. AIA - American Institute of Architects
 14. AISC - American Institute of Steel Construction
 15. AISI - American Iron and Steel Institute
 16. AITC - American Institute of Timber Construction
 17. AMCA - Air Moving and Conditioning Association
 18. ANSI - American National Standards Institute, Inc.
 19. APA - American Plywood Association
 20. API - American Petroleum Institute
 21. APHA - American Public Health Association
 22. APWA - American Public Works Association
 23. ASA - Acoustical Society of America
 24. ASAE - American Society of Agriculture Engineers
 25. ASCE - American Society of Civil Engineers

SECTION 01090

APPLICABLE STANDARDS

26. ASHRAE - American Society of Heating, Refrigerating, and Air-Conditioning Engineers
27. ASLE - American Society of Lubricating Engineers
28. ASME - American Society of Mechanical Engineers
29. ASMM - Architectural Sheet Metal Manual
30. ASSE - American Society of Sanitary Engineers
31. ASTM - American Society for Testing and Materials
32. AWI - Architectural Woodwork Institute
33. AWWA - American Wood Preservers Association
34. AWPI - American Wood Preservers Institute
35. AWS - American Welding Society
36. AWWA - American Water Works Association
37. BCEPGMD - Broward County Environmental Protection and Growth Management Department (formerly BCEPD)
38. BCHD - Broward County Health Department
39. BHMA - Builders Hardware Manufacturer's Association
40. CMA - Concrete Masonry Association
41. CRSI - Concrete Reinforcing Steel Institute
42. CSA - Canadian Standards Association
43. DHI - Door and Hardware Institute
44. DIPRA - Ductile Iron Pipe Research Association
45. EIA - Electronic Industries Association
46. ETL - Electrical Test Laboratories
47. FBC - Florida Building Code
48. FDEP - Florida Department of Environmental Protection
49. FDOT - Florida Department of Transportation
50. FS - Federal Specifications
51. ICEA - Insulated Cable Engineers Association
52. IEEE - Institute of Electrical and Electronics Engineers
53. IES - Illuminating Engineering Society
54. IPCEA - Insulated Power Cable Engineers Association
55. ISA - Instrument Systems and Automation
56. ISO - International Organization for Standardization
57. MBMA - Metal Building Manufacturers Association
58. MMA - Monorail Manufacturers Association
59. MTI - Marine Testing Institute
60. NAAMM - National Association of Architectural Metal Manufacturers
61. NACE - National Association of Corrosion Engineers
62. NBS - National Bureau of Standards
63. NCPI - National Clay Pipe Institute
64. NEC - National Electrical Code
65. NEMA - National Electrical Manufacturer's Association
66. NFPA - National Fire Protection Association
67. NLMA - National Lumber Manufacturers Association
68. NIOSH - National Institute of Occupational Safety and Health

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APPLICABLE STANDARDS

69. NIST - National Institute of Standards and Testing
70. NRCA - National Roofing Contractors Association
71. NSF - National Science Foundation
72. OSHA - Occupational Safety and Health Administration
73. PCA - Portland Cement Association
74. SMACCNA - Sheet Metal and Air Conditioning Contractors National Association
75. SAE - Society of Automotive Engineers Standards
76. SHBI - Steel Heating Boiler Institute
77. SMACCNA - Sheet Metal and Air Conditioning Contractors National Association
78. SSPC - Steel Structures Painting Council
79. SSPWC - Standard Specifications for Public Works Construction
80. SFWMD - South Florida Water Management District
81. UL - Underwriters Laboratories, Inc.

C. CONTRACTOR shall, when required, furnish evidence satisfactory to the ENGINEER that materials and methods are in accordance with such standards where so specified.

D. In the event any questions arise as to the application of these standards or codes, copies shall be supplied on site by the CONTRACTOR.

PART 2 -- PRODUCTS (Not Used)

PART 3 -- EXECUTION (Not Used)

- END OF SECTION -

SECTION 01200

PROJECT MEETINGS

Part 1 - GENERAL

1.01 PRECONSTRUCTION

A. A mandatory preconstruction meeting will be held to acquaint representatives of the City and various other agencies with those in responsible charge of the Contractor's activities for the project. Unless otherwise directed by the City, no construction activities relating to this contract shall commence until after the pre-construction meeting has adjourned, and until any pending business from the meeting has been addressed by the Contractor to the satisfaction of the City and Engineer. The meeting will cover such subjects as the following:

1. Insurance certificates
2. Permits and licenses
3. Affirmative action employment
4. Construction schedules
5. Cost breakdown and applications for payment
6. Material deliveries, storage and payments
7. Shop drawings and submittals
8. Job-site inspection by the Engineer
9. Safety and emergency action procedures
10. Operations of the existing utilities
11. Field offices, security and other housekeeping procedures
12. List of subcontractors
13. Liquidated damages
14. Communications
15. Coordinating
16. All other appropriate matters.

1.02 PROGRESS

A. A progress meeting shall be held on a once-per-week basis for the purpose of coordinating and expediting the work. The CONTRACTOR, as a part of his obligations under the Contract, shall attend in person or by an authorized representative to attend and to act on his behalf. The ENGINEER will conduct such meetings and as necessary, with the CONTRACTOR's input, issue an agenda.

B. In addition, the ENGINEER or CONTRACTOR may call for special job site meetings for the purpose of resolving unforeseen problems or conflicts which may impede the construction schedule. The ENGINEER will prepare a brief

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PROJECT MEETINGS

summary report of the decisions or understandings concerning each of the items discussed at the meeting.

- C. At weekly progress meetings, the CONTRACTOR shall submit to the ENGINEER for review a current two (2) week progress schedule. This schedule submission shall include a two week look ahead schedule and reflect status of the work performed during the preceding week.

Part 2 - PART 2 -- PRODUCTS (Not Used)

Part 3 - PART 3 -- EXECUTION (Not Used)

- END OF SECTION -

SECTION 01300

SUBMITTALS

Part 1 - GENERAL

1.01 THE REQUIREMENT

A. This section specifies the means of all submittals. All submittals, whether their final destination is to the City, Engineer, or other representatives of the City, shall be directed through the Engineer. A summary of the key types of submittals and the number of copies required is as follows:

<u>Copies to Engineer</u>	<u>Type of Submittal</u>
4	Construction schedule
4	Schedule of payment items
1	Audio visual preconstruction record
6	Progress estimates
4	Shop drawings
4	Certificates of compliance
2	Warranties
1*	Product samples
1	Record drawings
5	Final Record Drawings

*Unless otherwise required in the specific Section where requested.

1.02 SUBMITTAL PROCEDURES

- A. Transmit each submittal with a form acceptable to the Engineer, clearly identifying the project Contractor, the enclosed material and other pertinent information specified in other parts of this section. Identify variations from Contract Documents and Product or system limitations which may be detrimental to successful performance of the completed Work.
- B. Revise and resubmit submittals as required, identify all changes made since previous submittals. Resubmittals shall be noted as such.
- C. Distribute copies of reviewed submittals to concerned parties. Instruct parties to promptly report any inability to comply with provisions.

SECTION 01300

SUBMITTALS

1.04 CONSTRUCTION PROGRESS SCHEDULE

- A. The Contractor shall have the capability of preparing and utilizing the specified construction progress scheduling techniques. A statement of capability shall be submitted in writing to the Engineer with the return of the executed Agreement to the City and will verify that either the Contractor's organization has in-house capability qualified to use the technique or that the Contractor employs a consultant who is so qualified. Capability shall be verified by description of the construction projects to which the Contractor or its consultant has successfully applied the scheduling technique and which were controlled throughout the duration of the project by means of systematic use and updating of the construction progress schedule, the network analysis and associated reports. The submittal shall include the name of the individual on the Contractor's staff who will be responsible for the construction progress schedule, and associated reports and for providing the required updating information of same. The Contractor shall submit its proposed progress (baseline) schedule to the Engineer for review and comment within thirty days of the Notice to Award. The Engineer shall have the authority to determine acceptability/correctness of the schedule logic and activity interrelationships. The use of extraneous, nonworking activities and activities which add restraints to the construction schedule shall not be accepted. Baseline schedules that do not meet their contract completion dates shall not be accepted.
- B. The Contractor's progress schedule (baseline and monthly updates) shall be computer generated and resource loaded. Each construction progress schedule, and associated report shall include the following tabulations: a list of activities in numerical order, a list of activity precedence, schedules sequenced by Early Start Date, Total Float, and Late Start Date. Each schedule and report shall include the following minimum items.
1. Activity Numbers
 2. Estimated Duration
 3. Activity Description
 4. Early Start Date (Calendar Dated)
 5. Early Finish Date (Calendar Dated)
 6. Latest Allowable Start Date (Calendar Dated)
 7. Latest Allowable Finish Date (Calendar Dated)
 8. Status (whether critical)
 9. Estimated Cost of The Activity
 10. Total Float and Free Float

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SUBMITTALS

- C. In addition, each construction progress schedule, network analysis and report shall be prefaced with the following summary data:
1. Contract Name and Number
 2. Contractor'S Name
 3. Contract Duration and Float
 4. Contract Schedule
 5. The Effective or Starting Date of The Schedule (the date indicated in the Notice-to-Proceed)
- D. The work day to calendar date correlation shall be based on an 8-hour day and 40-hour week with adequate allowance for holidays and all other special requirements of the Work. A total of six (6) days for adverse weather shall also be allowed for in the progress schedule.
- E. If the Contractor desires to make changes in its method of operating which affect the construction progress schedule and related items, the Contractor shall notify the Engineer in writing stating what changes are proposed and the reason for the change. If the Engineer accepts these changes, in writing, the Contractor shall revise and submit, without additional cost to the City, all of the affected portions of the construction progress schedule, and associated reports. The construction progress schedule and related items shall be adjusted by the Contractor only after prior acceptance, in writing by the Engineer. Adjustments may consist of changing portions of the activity sequence, activity durations, division of activities, or other adjustments as may be required. The addition of extraneous, nonworking activities and activities which add restraints to the construction progress schedule shall not be accepted.
- F. Except where earlier completions are specified, schedule dates which show completion of all Work prior to the contract completion date shall, in no event, be the basis for claim for delay against the City by the Contractor.
- G. Construction progress schedules and related items which contain activities showing negative float or which extend beyond the contract completion date will not be accepted by the Engineer.
- H. Whenever it becomes apparent from the current construction progress schedule and associated reports that delays to the critical path have resulted and the contract completion date will not be met, or when so directed by the Engineer, the Contractor shall take some or all of the following actions at no additional cost to the City. They shall submit to the Engineer for approval, a written statement of the steps they intend to take to remove or arrest the delay to the critical path in the current construction progress schedule, including a computer generated schedule revision to reflect proposed actions.

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SUBMITTALS

1. Increase construction manpower in such quantities and crafts as will substantially eliminate the backlog of work.
 2. Increase the number of working hours per shift, shifts per day, working days per week, the amount of construction equipment, or any combination of the foregoing, sufficiently to substantially eliminate the backlog of work.
 3. Reschedule activities to achieve maximum practical concurrency of accomplishment of activities, and comply with the revised schedule.
- I. If when so requested by the Engineer, the Contractor should fail to submit a written statement of the steps they intend to take or should fail to take such steps as reviewed and accepted in writing by the Engineer, the Engineer may direct the Contractor to increase the level of effort in manpower (trades), equipment and work schedule (overtime, weekend and holiday work, etc.) to be employed by the Contractor in order to remove or arrest the delay to the critical path in the current construction progress schedule, and the Contractor shall promptly provide such level of effort at no additional cost to the City.
- J. If the completion of any activity, whether or not critical, falls more than 100 percent behind its previously scheduled and accepted duration, the Contractor shall submit for approval a schedule adjustment showing each such activity divided into two activities reflecting completed versus uncompleted work.
- K. Shop drawings which are not approved on the first submittal or within the time scheduled, and equipment which does not pass the specified tests and certifications shall be immediately rescheduled.
- L. The contract time will be adjusted only in accordance with the General Requirements and other portions of the Contract Documents as may be applicable. If the Engineer finds that the Contractor is entitled to any extension of the contract completion date, the Engineer's determination as to the total number of days extension shall be based upon the current construction progress schedule and on all data relevant to the extension. Such data shall be included in the next updating of the schedule and related items. Actual delays in activities which, according to the construction progress schedule, do not affect any contract completion date will not be the basis for a change therein.
- M. From time to time it may be necessary for the contract schedule of completion time to be adjusted by the City in accordance with the General Requirements and other portions of the Contract Documents as may be applicable. Under such conditions, the Engineer will direct the Contractor to reschedule the Work or contract completion time to reflect the changed conditions, and the Contractor shall revise the construction progress schedule and related items accordingly, at no additional cost to the City.
- N. Available float time may be used by the City through the City's Engineer.

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SUBMITTALS

- O. The City controls the float time and, therefore, without obligation to extend either the overall completion date or any intermediate completion dates, the City may initiate changes that absorb float time only. City initiated changes that affect the critical path on the network diagram shall be the sole grounds for extending the completion dates. Contractor initiated changes that encroach on the float time may be accomplished only with the City's concurrence. Such changes, however, shall give way to City initiated changes competing for the same float time.
- P. To the extent that the construction project schedule, or associated report or any revision thereof shows anything not jointly agreed upon or fails to show anything jointly agreed upon, it shall not be deemed to have been accepted by the Engineer. Failure to include on a schedule any element of Work required for the performance of this Contract shall not excuse the Contractor from completing all Work required within any applicable completion date, notwithstanding the review of the schedule by the Engineer.
- Q. Review and acceptance of the construction progress schedule, and related reports, by the Engineer is advisory only and shall not relieve the Contractor of the responsibility for accomplishing the Work within the contract completion date. Omissions and errors in the construction progress schedule, and related reports shall not excuse performance less than that required by the Contract and in no way make the Engineer an insurer of the Contractor's success or liable for time or cost overruns flowing from any shortcomings in the construction progress schedule, and related reports.
- R. The Contractor shall present and discuss the proposed schedule at the preconstruction conference.
- S. The construction progress schedule shall be based upon the precedence diagramming method of scheduling and shall be prepared in the form of a horizontal bar chart showing in detail the proposed sequence of the Work and identifying all construction activities included but not limited to yard piping, all structures and treatment units and all related Work specified herein to be performed under the Contract. 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. The project critical path shall be clearly identified in color or by other means acceptable to the Engineer.
- T. The progress schedule shall be plotted on 22-inch by 34-inch and 11-inch by 17-inch paper and shall be revised and updated monthly, depicting progress through the last day of the current month and scheduled progress through completion. Ten (one 22-inch by 34-inch and nine 11-inch by 17-inch), schedules, required schedule "sorts" (tabulations) and an electronic copy of

SECTION 01300

SUBMITTALS

the baseline schedule shall be submitted for review and acceptance. Five (one 22-inch by 34-inch and four 11-inch x 17-inch) up-to-date copies of the schedule and five copies of tabulations and an electronic copy shall be submitted along with the application for monthly progress payments for the same period.

- U. The construction progress schedule shall be developed and maintained using Primavera Sure Trak as manufactured by Primavera Systems, Inc., or equal.

1.05 SCHEDULE OF PAYMENT VALUES

- A. The Contractor shall submit a Schedule of Payment Values, in accordance with Section 01025, for all items in the proposal that are to be paid for on a lump sum basis. The schedule shall contain the labor and material values of the component parts of Work for the purpose of making progress payments during the construction period. The Schedule of Payment Values shall directly correlate on an item by item basis (unless otherwise accepted by the Engineer) to each individual activity detailed in the construction progress schedule.
- B. The schedule shall be given in sufficient detail for the proper identification of Work accomplished. Each item shall include its proportional share of all costs including the Contractor's overhead, contingencies and profit. The sum of all scheduled items shall equal the total value of the Contract.
- C. If the Contractor anticipates the need for payment for materials stored on the project site, it shall also submit a separate list covering the cost of materials, delivered and unloaded with taxes paid. This list shall also include the installed value of the item with coded reference to the Work items in the Schedule of Payment Items.
- D. The Contractor shall expand or modify the above schedule and materials listing as required by the Engineer's initial or subsequent reviews.
- E. The Contractor shall update the Schedule of Payment Values monthly for reviewing by the Engineer. The payment applications shall be reviewed by the Engineer in accordance with the updated Schedule of Payment Values.

1.06 SHOP DRAWINGS, PROJECT DATA AND SAMPLES

- A. General: A Shop Drawing Submittal Schedule shall be provided by the Contractor within thirty (30) days of the Notice to Proceed.
- B. The Contractor shall furnish for review four (4) copies of shop drawings, project data, samples and other submittal items required by the Contract Documents. Two (2) copies shall be returned to the Contractor stamped "Furnish as Submitted" or "Furnish as Corrected". Where major corrections

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are indicated, two (2) copies will be returned stamped "Revise and Resubmit" and a new submittal is required (4 copies).

- C. The review of the Contractor's submissions shall in no way relieve the Contractor of any of his responsibilities under the Contract. An acceptance of a submission shall be interpreted to mean that there are no specific objections to the submitted material, subject to conformance with the Contract Drawings and Specifications.
- D. All submissions shall be dated and properly referenced to the specifications section and Contract Drawing number. The submittal number shall match the following submittal numbering system (or an equivalent system as approved by the Engineer):

Submittal Numbering System

- 1. Package ID: The package number will reflect the CSI (specification) section number as it appears in the specifications.
- 2. Subgroup ID: The submittal number will include the CSI number followed by two additional codes. The first will define the type of submittal as follows:

- 01 - Product Data, Specifications, Cut Sheets, Manufacturers certification or approval letters.
- 02 - Shop Drawings
- 03 - Product Samples and Mock-Ups
- 04 - Special requirements as required in the contract documents
- 05 - As-Built Drawings
- 06 - Warranties
- 07 - O&M
- 08 - Spare Parts

The second code will identify individual submittals within that submittal type. The number to the left of the decimal represents the submittal number and the number to the right of the decimal represents the revision number.

Example:

<u>Package</u>	<u>Submittal</u>	<u>Description</u>
03300	03300-01-1.1	Concrete Admixture A, First Submittal
06400	06400-01-1.2	← Re-submittal

↑ ↑ ↑
01300-7

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——— First Submittal

——— Product Data

————— Finish Carpentry

By the following this code system, all submittals may be entered into the Document Tracking System prior to receipt of submittals. When a particular submittal is received, locate the entry in the Document Tracking project file, add the appropriate information and process. The Document Tracking System will provide the next sequence number.

- E. Shop Drawings and Project Data within practical limits shall be submitted as a single complete package for any operating system and shall include all items of equipment and mechanical units involved in the functioning of such system. Where applicable, the submission shall include elementary wiring diagrams showing circuit functioning and necessary interconnection wiring diagrams for construction.
- F. All submissions shall bear the Contractor's stamp certifying that they have been checked for conformance and accuracy. Submissions without the Contractor's stamp of approval will not be reviewed by the Engineer and will be returned to the Contractor.
- G. For any submission containing any departure from the Contract Documents and the Contractor shall include proper explanation in his letter of submittal.
- H. Work on fabricated or special items shall not be commenced until the required submission information has been reviewed and accepted.
- I. Standard items shall not be assembled or shipped until the required submission information has been reviewed and accepted.
- J. Prior review actions shall not relieve the Contractor of the responsibility for correcting errors, deviations, and/or omissions discovered at a later date.
- K. Shop Drawings: Shop Drawings include, but are not limited to, layout drawings, installation drawings, construction drawings, certified and interconnecting wiring diagrams, etc. The Contractor shall be responsible for security of all the information, details, dimension, drawings, etc. necessary to prepare submission drawings required and necessary under this Contract and to fulfill all other requirements of his Contract. The Contractor shall secure such information, details, drawings, etc. from all possible sources including the Contract Drawings, drawings prepared by subcontractors, Engineer, manufacturers, Contractors, etc.
- L. Submission drawings shall accurately and clearly present the following:
 - 1. All working and installation dimensions.

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2. Arrangement and sectional views.
 3. Units of equipment in the proposed position for installation, details of required attachments and connections and dimensioned locations between units and in relation to the structures.
 4. Necessary details and information for making connections between the various trades including but not limited to, power supplies and interconnection wiring between units, accessories, appurtenances, etc.
- M. Product Data: Where manufacturer's publications in the form of catalogs, brochures, illustrations, or other data sheets are submitted in lieu of prepared shop drawings, such submission shall specifically indicate the particular item offered. Identification of such items and relative pertinent information shall be made with indelible ink. Submissions showing only general information will not be accepted.
- N. Product data shall include materials of construction, dimensions, performance characteristics, capacities, wiring diagrams, piping and controls, etc.
- O. Samples: Contractor shall furnish for review all samples as required by the Contract Documents or requested by the Engineer.
- P. Samples shall be of sufficient size or quantity to clearly illustrate the quality, type, range of color, finish or texture and shall be properly labeled to show the nature of the work where the material represented by the sample will be used.
- Q. Samples shall be checked by the Contractor for conformance to the Contract Documents before being submitted to the Engineer and shall bear the Contractor's stamp certifying that they have been so checked. Transportation charges on samples submitted to the Engineer shall be prepaid by the Contractor.
- R. Engineer's review will be for compliance with the Contract Documents, and his comments will be transmitted to the Contractor with reasonable promptness.
- S. Accepted samples will establish the standards by which the completed work will be judged.

1.07 OPERATION AND MAINTENANCE INSTRUCTIONS (MANUALS)

- A. Individual Instructions: The Contractor, through manufacturer's representatives or other qualified individuals, shall provide instruction of designated employees of the OWNER in the operation and care of all equipment furnished.
- B. Written Instructions: The Contractor shall furnish and deliver to the Engineer, prior to the fifty percent completion point of construction, and no later than thirty (30) days prior to operator training, ten (10) complete sets of instructions, technical bulletins, and any other printed matter such as diagrams, prints or

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drawings, containing full information required for the proper operation, maintenance, and repair of the equipment. As a minimum, the following shall be included in this submittal:

1. Operating Instructions
 2. Troubleshooting Information
 3. Maintenance Schedule(s)
 4. Lubrication Schedule
 5. Location of Service Centers
 6. Parts Diagram and List
 7. Spare Parts List (spare parts furnished shall be defined)
 8. Special Tools List
 9. Installation Instructions
 10. Assembly & Erection Drawings
 11. Dimensional Drawings
 12. Wiring Diagram(s)
 13. Storage Instructions
- C. 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 shall be commensurate with the complexity of the equipment item. Submittal shall be made for all mechanical and electrical equipment included but not limited to pumps, valves, gates, etc.
- D. Information not applicable to the specific piece of equipment installed on this project shall be struck from the submission. Information provided shall include a source of replacement parts and names of service representatives, including address and telephone number.
- E. Extensive pictorial cuts of equipment are required for operator reference in servicing.
- F. When written instructions include shop drawings and other information previously reviewed by the Engineer, only those editions thereof which were accepted by the Engineer, and which accurately depict the equipment installed, shall be incorporated in the instructions.

1.08 RECORD DRAWINGS

- A. The Contractor shall keep and maintain, at the job site, one record set of Drawings. On these, it shall mark all project conditions, locations,

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configurations, and any other changes or deviations which may vary from the details represented on the original Contract 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. As-Built furnished grade information shall be included on the record drawings. Said record drawings shall be supplemented by 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-build conditions, including all revisions made necessary by addenda and change orders shall be maintained up-to-date during the progress of Work.

- B. The record drawings shall be received on the 20th working day of every third month after the month in which the final notice to proceed is given as well as on completion of Work. Failure to maintain the record drawings up-to-date shall be grounds of withholding monthly progress payments until such time as the record drawings are brought up-to-date.
- C. In the case of those drawings which depict the detail requirement for equipment to be assembled and wired in the factory, such as motor control centers and the like, the record drawing shall be updated by indicating those portions which are superseded by change order drawings or final shop drawings, and by including appropriate reference information describing the change orders by number and the shop drawings by manufacturer, drawing, and revision numbers.
- D. Record drawings shall be accessible to the Engineer at all times during the construction period.
- E. Upon substantial completion of the Work and prior to final acceptance, the Contractor shall finalize and deliver a complete set of final record drawings to the Engineer for transmittal to the City, 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 in the Final Record Drawings will be assumed to be correct, and the Engineer will not be responsible for the accuracy of such information, and for any errors or omissions which may appear on the Final Record Drawings as a result.
- F. The information submitted by the Contractor in the Final Record Drawings shall be certified by a land surveyor registered in the State of Florida. For clarity, Final Record Drawings needs to be redrawn and clearly labeled as "Record Drawings". Notations indicated in the drawings shall be legible and printed in black ink. No handwritten notes are allowed.

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- G. Final payment will not be acted upon until the Engineer certifies the record drawings as required by the agencies having jurisdiction. Said up-to-date record drawings shall be in the form of a set of prints with carefully plotted information.
- H. All final record drawings shall be certified by the Engineer of Record. Such certification shall evidence that Engineer has reviewed the information, finds it in substantial accordance with the design; and where deviations from the design exist, that said deviations are not to the detriment of the system. Engineer's certification shall read as follows:
- "I HEREBY NOTIFY THE OWNER OF THE COMPLETION OF CONSTRUCTION OF ALL THE COMPONENTS OF THE WATER, SEWER AND STORMWATER FACILITIES FOR THE ABOVE REFERENCED PROJECT AND CERTIFY THAT THEY HAVE BEEN CONSTRUCTED IN SUBSTANTIAL CONFORMANCE WITH THE PLANS AND SPECIFICATIONS PERMITTED BY THE AGENCIES HAVING JURISDICTION"
- I. The Contractor shall submit all electronic media files of the paving, grading, water, sewer and drainage plans, reports, other supporting information, and the final version of as-built drawings shall be submitted to the Engineer's office. The information provided shall contain an index file with a brief description of the electronic filing contents, and shall be labeled with project name, company name, and point of contact. Documents and spreadsheets shall be submitted in either MS Word, Word Perfect, Excel, Lotus, or other format approved by the Engineer. Drawings shall be submitted in AutoCAD, MicroStation, or other format approved by the Engineer.
- J. Final Record Drawings submitted to the City as part of the project acceptance shall contain at least the following information:
1. Drawings shall be legibly marked to record actual construction.
 2. Drawings shall show actual location of all underground and above ground water and wastewater, stormwater piping and related appurtenances. All changes to piping location including horizontal and vertical locations of utilities and appurtenances shall be clearly shown and referenced to permanent surface improvements. Drawings shall also show actual installed pipe material, class, etc. Profile sheets shall be updated to include all field measurements and elevations taken during construction.
 3. Drawings shall clearly show all field changes of dimension and detail including changes made by field order or by change order.

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4. Drawings shall clearly show all details not on original contract drawings but constructed in the field. All equipment and piping relocation shall be clearly shown.
5. Location of all manholes, hydrants, tees, reducers, crosses, valves, and valve boxes shall be shown. All tees, reducers, crosses, and valves shall be referenced from at least two (2) and preferably three (3) permanent points such as building corners and roadway intersections.
6. Dimensions between all manholes shall be field verified and shown. The rim, inverts and grade elevations of all manholes shall be shown.

1.09 WARRANTIES

- A. Original warranties, called for in the Contract Documents, shall be submitted to the City through the Engineer. When warranties are required, they shall be submitted prior to request for payment.
- B. When advance copies of warranties are requested, they shall be submitted with, and considered as shop drawings.
- C. The Contractor shall warrant to the City that all material and labor used in the construction are covered by his warrantee for a minimum of a one year period upon approval and acceptance by the City. The Contractor shall replace or repair defects at no cost to the City during the warrantee period. No visible or potential leakage shall be allowed during the warrantee period.

1.10 CERTIFICATES

- A. Copies of certificates of compliance and test reports shall be submitted for requested items to the Engineer prior to request for payment.

1.11 AUDIO-VISUAL PRECONSTRUCTION RECORD

- A. General: Prior to commencing work, the Contractor shall have a continuous color audio-video DVD recording taken of the entire Project, including existing areas that will be disturbed by the Contractor's operations, to serve as a record of preconstruction conditions. No construction shall begin prior to review and acceptance of the tapes covering the respective, affected construction area by the Engineer. The Engineer shall have the authority to reject all or any portion of the video DVD not conforming to the specifications and order that it be redone at no additional charge. The Contractor shall reschedule unacceptable coverage within five days after being notified. The Engineer shall designate those areas, if any, to be omitted from or added to the audio-video coverage. Audio-video recordings shall not be performed

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more than ninety days prior to construction in any area. All DVDs and written records shall become property of the City.

- B. Services: The Contractor shall engage the services of a professional electrographer. The color audio-video tapes shall be prepared by a responsible commercial firm known to be skilled and regularly engaged in the business of preconstruction color audio-video tape documentation. The electrographer shall furnish to the Engineer a list of all equipment to be used for the audio-video taping, i.e., manufacturer's name, model number, specifications and other pertinent information. Additional information to be furnished by the electrographer is the names and addresses of two references that the electrographer has performed color audio-video taping for on projects of a similar nature within the last twelve months.
- C. Audio-Video DVDs: Audio-video DVDs shall be new. The DVDs shall be compatible for with a standard player-receiver.
- D. Equipment: All equipment, accessories, materials and labor to perform this service shall be furnished by the Contractor.
 - 1. The total audio-video system shall reproduce bright, sharp, clear pictures with accurate colors and shall be free from distortion, tearing, rolls or any other form of imperfection. The audio portion of the recording shall reproduce the commentary of the camera operator with proper volume and clarity, and be free from distortion and interruptions.
 - 2. When conventional wheeled vehicles are used, the distance from the camera lens to the ground shall not be less than twelve feet. In some instances, audio-video tape coverage may be required in areas not accessible by conventional wheeled vehicles. Such coverage shall be obtained by walking or special conveyance acceptable to the Engineer.
 - 3. The color video camera used in the recording system shall have a horizontal resolution of 300 lines at center, a luminance signal to noise ratio of 45 dB and a minimum illumination requirement of twenty-five foot-candles.
- E. Recorded Information - Audio: Each tape shall begin with the current date, project name and municipality and be followed by the general location; i.e., process structure, or area, viewing side and direction of progress. The audio track shall consist of an original live recording. The recording shall contain the narrative commentary of the electrographer, recorded simultaneously with his fixed elevation video record of the zone of influence of construction.
- F. Recorded Information - Video: All video recordings must, by electronic means, display continuously and simultaneously, generated with the actual taping, transparent digital information to include the date and time of recording. The

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date information shall contain the month, day and year. The time information shall contain the hours, minutes, and seconds. Additional information shall be displayed periodically. Such information shall include, but not be limited to, project name, bid package number, process structure or area, and the viewing side. This transparent information shall appear on the extreme upper left hand third of the screen.

- G. Conditions for Taping: All taping shall be done during times of good visibility. No taping shall be done during precipitation, mist or fog. The recording shall only be done when sufficient sunlight is present to properly illuminate the subjects of recordings and to produce bright, sharp video recordings of those subjects.
- H. Tape Coverage: Tape coverage shall include all surface features located within the zone of influence of construction supported by appropriate audio coverage. Such coverage shall include, but not be limited to, existing road, driveways, sidewalks, curbs, pavement, landscaping, fences, signs and interior and exterior of existing structures affected by the work and the exteriors of structures adjacent to the work, and any other on-site area that will be occupied or impacted by the Contractor or any of his subcontractors or suppliers within the area covered.

Part 2 - PRODUCTS (Not Used)

Part 3 - EXECUTION (Not Used)

- END OF SECTION -

SECTION 01400

TESTING AND INSPECTION

PART 1 -- GENERAL

- A. All testing and inspection will be in accordance with Article 12 of the General Conditions.
- B. The work or actions of the testing laboratory shall in no way relieve the CONTRACTOR of his obligations under the Contract. The laboratory testing work will 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 the CONTRACTOR'S work.
- C. The CONTRACTOR shall allow the ENGINEER ample time and opportunity for testing materials and equipment to be used in the work. He shall advise the ENGINEER promptly upon placing orders for materials and equipment so that arrangements may be made, if desired, for inspection before shipment from the place of manufacture. The CONTRACTOR shall at all times furnish the ENGINEER and his representatives, facilities including labor, and allow proper time for inspecting and testing materials, equipment, and workmanship. The CONTRACTOR must anticipate that possible delays may be caused him in the execution of his work due to the necessity of materials and equipment being inspected and accepted for use. The CONTRACTOR shall furnish, at his own expense, all samples of materials required by the ENGINEER for testing, and shall make his own arrangement for providing water, electric power, or fuel for the various inspections and tests of structures and equipment. As a minimum, 24-hours advance written notice shall be provided by the CONTRACTOR for rebar, structural and similar inspections by the ENGINEER. The amount of time required for advance written notice by the CONTRACTOR to the ENGINEER for other inspections depends upon other factors and shall be solely at the ENGINEER's discretion.
- D. The CONTRACTOR shall furnish the services of representatives of the manufacturers of certain equipment, as prescribed in other sections of the Specifications. The CONTRACTOR shall also place his orders for such equipment on the basis that, after the equipment has been tested prior to final acceptance of the work, the manufacturer will furnish to the CITY the 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 the CONTRACTOR, unless specified otherwise in the section which covers a particular piece of equipment.
- E. The CITY will bear the cost of all additional tests, inspections, or investigations undertaken by the order of the ENGINEER for the purpose of determining conformance with the Contract Documents if such test, inspection, or investigations are not specifically required by the Contract Documents, and if conformance is ascertained thereby. Whenever nonconformance is determined by the ENGINEER as a result of such test, inspections, or investigations, the CONTRACTOR shall bear the full cost thereof or shall reimburse the CITY for said cost. The cost of any additional tests and investigations, which are ordered by the ENGINEER to ascertain subsequent conformance with the Contract Documents, shall be borne by the CONTRACTOR.

PART 2 -- PRODUCTS (Not Used)

PART 3 -- EXECUTION (Not Used)

- END OF SECTION -

SECTION 01410

CONTRACTOR'S HEALTH AND SAFETY PLAN

PART 1 - GENERAL

1.1 DESCRIPTION

A. Scope:

1. This Section describes CONTRACTOR's responsibilities for a written site-specific health and safety plan (SSHP). CONTRACTOR shall conduct all construction activities in a safe manner so as not to result in:
 - a. injuries to employees, Subcontractors or other persons with an interest at or near the Site;
 - b. employee exposures to health hazards above the occupational limits established by the Occupational Health and Safety Administration (OSHA), the American Conference of Governmental Industrial Hygienists (ACGIH), or the Nuclear Regulatory Commission (NRC);
 - c. exposure of area residents to air contaminants above the levels established for general public exposure by the Environmental Protection Agency (EPA), NRC, or the State in which the Project is located;
 - d. significant increases in the levels of contaminants in soil, water, or sediment near the Site; or
 - e. violations of OSHA, or other Laws or Regulations.

- B. Any disregard of the provisions of the SSHP may, without limitation, be deemed just and sufficient reason for termination of CONTRACTOR's services for cause.

1.2 QUALITY ASSURANCE

A. Qualifications:

1. Engage an industrial hygienist certified by the American Board of Industrial Hygiene or a safety professional certified by the Board of Certified Safety Professionals to prepare or supervise the preparation of the SSHP.
2. Submit qualifications along with SSHP.

- B. Regulatory Requirements: CONTRACTOR's health and safety practices shall follow the standards and guidelines established in the following:

1. 29 CFR 1904, OSHA, Record Keeping.
2. 29 CFR 1910, OSHA, General Industry Standards.
3. 29 CFR 1926, OSHA, Construction Industry Standards.
4. 29 CFR 1926.65, OSHA, Hazardous Waste Operations and Emergency Response.
5. 49 CFR 171.8, DOT, Hazardous Materials in Transport.
6. 40 CFR Parts 261.3, 264 and 265, EPA, Resource Conservation and Recovery Act.
7. 29 CFR 1910.146, OSHA, Permit-Required Confined Spaces.
8. 29 CFR 1926.1101, OSHA, Asbestos

1.3 SUBMITTALS

A. Submit to ENGINEER the following:

1. CONTRACTOR's SSHP.
2. Qualifications of industrial hygienist or safety professional.
3. Health and safety reports.
4. Accident reports.

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CONTRACTOR'S HEALTH AND SAFETY PLAN

PART 2 - GENERAL

2.1 GENERAL PROVISIONS

- A. Submit SSHP to ENGINEER one week prior to the Preconstruction Conference, or 30 days prior to planned mobilization at the Site, whichever is sooner.
- B. The SSHP shall bear a stamp or specific written indication that CONTRACTOR has satisfied CONTRACTOR's obligations under the Contract Documents with respect to CONTRACTOR's review and approval of the SSHP.
- C. ENGINEER will review and either accept or return for revision CONTRACTOR's SSHP in accordance with the Schedule of Submittals acceptable to ENGINEER. ENGINEER's review and acceptance will be only to determine if the topics covered by the SSHP conform to the Contract Documents.
- D. ENGINEER's review and acceptance will not extend to means, methods, techniques, procedures of construction, or to whether the representations made in the SSHP comply with regulatory standards or standards of good practice.
- E. At the time of submittal, CONTRACTOR shall give ENGINEER specific written notice of variations, if any, that the SSHP may have from the requirements of the Contract Documents. This notice shall be both a written communication separate from the submittal; and, in addition, by a specific notation made on each submittal to ENGINEER for review and acceptance of each such variation.
- F. No Work shall be performed on the Site until the written SSHP has been accepted by the ENGINEER.
- G. Notwithstanding any other provision of the Contract Documents, extensions to the Contract Times will not be granted if caused by undue delay by CONTRACTOR in developing or revising the SSHP.

2.2 WRITTEN HEALTH AND SAFETY PROGRAM

- A.. The SSHP, which shall be kept on the Site, shall address the safety and health hazards of each phase of operations on the Site and include the requirements and procedures for employee protection. The SSHP as a minimum, shall address and include the following:
 - 1. The organizational structure of CONTRACTOR's organization.
 - 2. A comprehensive work plan.
 - 3. A safety and health risk or hazard analysis for each task and operation found in the work plan.
 - 4. Employee training assignments including copies of 40-hour, 24-hour Supervised Field Activities, 8-hour Supervisors, and 8-hour Refresher Training Certificates for all CONTRACTOR's employees assigned to the Project.
 - 5. Personal protective equipment to be used by employees for each of the tasks and operations being conducted. Respirator fit test certificates for all CONTRACTOR employees assigned to the Project.
 - 6. Medical Surveillance Requirements: Medical clearance certificates for all CONTRACTOR's employees assigned to the Project.

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CONTRACTOR'S HEALTH AND SAFETY PLAN

7. Frequency and types of air monitoring, personnel monitoring, and environmental sampling techniques and instrumentation to be used, including methods of maintenance and calibration of monitoring and sampling equipment.
8. Site control measures for purposes, including but not limited to:
 - a. preventing trespassing;
 - b. preventing unqualified or unprotected workers from entering restricted areas;
 - c. preventing tracking of contaminants out of the Site;
 - d. maintaining log of employees on and visitors to the Site;
 - e. delineating hot, cold and support zones;
 - f. locating personnel and equipment decontamination zones; and
 - g. communicating routes of escape and gathering points.
9. Decontamination procedures.
10. An emergency response plan for safe and effective responses to emergencies, including the necessary PPE and other equipment.
11. Confined space entry procedures (if applicable).
12. A spill containment program.

C. Organizational Structure:

1. The organizational structure part of the SSHP shall refer to or incorporate information on the specific chain of command and specify the overall responsibilities of supervisors and employees, and shall include, at a minimum, the following elements:
 - a. designation of a general supervisor who has the responsibility and authority to direct all hazardous waste operations.
 - b. a Site safety and health supervisor who has the responsibility and authority to implement and modify the SSHP and verify compliance.
 - c. all other personnel needed for hazardous waste Site operations and emergency response and their general functions and responsibilities.
 - d. The lines of authority, responsibility, and communication.
2. The organizational structure shall be reviewed and updated as necessary to reflect the current status of Site operations.

D. Work Plan:

1. The comprehensive work plan part of the SSHP shall refer to or incorporate information on the following:
 - a. The tasks and objectives of the Site operations and the logistics and resources required to achieve those tasks and objectives.
 - b. The anticipated activities as well as the CONTRACTOR's normal operating procedures.
 - c. The personnel and equipment requirements for implementing the work plan.

- E. The SSHP shall include procedures that will be used to ensure safe waste handling during the excavating, handling, loading, and transporting activities.

2.3 ACCIDENT REPORTING AND INVESTIGATION

- A. Document all accidents resulting in bodily injury using OSHA 301 form.
- B. Submit copies of completed OSHA 301 forms to the ENGINEER weekly.
- C. Based upon the results of an accident investigation, make modifications to the SSHP by changing tasks or procedures to prevent a reoccurrence.

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CONTRACTOR'S HEALTH AND SAFETY PLAN

- D. Post a copy of CONTRACTOR's OSHA 300A report in a conspicuous place onsite.

2.4 DAILY HEALTH AND SAFETY FIELD REPORTS

- A. Submit to ENGINEER daily health and safety field reports including, but not limited to, weather conditions, delays encountered in construction, and acknowledgment of deficiencies noted along with corrective actions taken on current and previous deficiencies. In addition, the daily health and safety air monitoring results, documentation of instrument calibration, new hazards encountered, and PPE utilized shall be included.
- B. The daily health and safety field reports shall include a description of problems, real or anticipated, encountered during the course of Work that should be brought to the attention of the ENGINEER and notification of deviations from planned Work shown in the previously submitted daily health and safety field report(s).

PART 3 - EXECUTION (Not Used)

- END OF SECTION -

SECTION 01500
CONSTRUCTION CONSIDERATIONS

PART 1 - GENERAL

1.01 HYDRAULIC UPLIFT ON STRUCTURES

- A. The CONTRACTOR shall be completely responsible for any structures, stormwater conflicting structure, tanks, wet wells, pipelines, manholes, foundations, cellars, or similar structures that may become buoyant during the construction operations due to the ground water, floods or buoyancy of piping caused due to the placement of flowable backfills before the structure is put into operation. Should there be any possibility of buoyancy of a pipeline or structure, the CONTRACTOR shall take the necessary steps to prevent its buoyancy. Damage to any structures due to floating or flooding shall be repaired or the structures replaced at the CONTRACTOR'S expense.

1.02 WATER TIGHTNESS OF STRUCTURES

- A. General: It is the intent of these specifications that all concrete work, sealing work around built-in items and penetrations be performed as required to ensure that groundwater, rainwater, wastewater, chemical solutions or other process liquids in tanks, wetwells, channels, and containers will not leak into any buildings and/or equipment rooms, pipe galleries, habitable areas, or other generally dry areas.

1. The required watertightness shall be achieved by quality concrete construction and proper sealing of all joints and penetrations.
2. Each unit shall be tested separately, and the leakage tests shall be made prior to backfilling and before equipment is installed unless otherwise approved by the ENGINEER. Only potable water shall be used for the tests.
3. The watertightness of buildings exclusive of the portions designed to contain liquids will consist of checking for leaks due to rain or groundwater infiltration.
4. The CONTRACTOR shall provide at his own expense all labor, material, temporary bulkheads, pumps, water, measuring devices, etc., necessary to perform the required test.

- B. Built-in Items and Penetrations: All pipe sleeves, built-in items and penetrations shall be sealed as detailed and as required to ensure a continuous watertight seal.

1.03 CUTTING AND PATCHING

- A. The CONTRACTOR shall perform all cutting and patching of his 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. The CONTRACTOR shall not endanger any work of others by cutting, excavating or otherwise altering their work and shall only cut or alter work with the written consent of the ENGINEER and of the other contractors whose work will be affected.

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CONSTRUCTION CONSIDERATIONS

1.04 ABANDONMENT AND SALVAGE OF EXISTING FACILITIES

- A. General: The scope of work requires the CONTRACTOR to interface with existing structures, and piping which will be abandoned or otherwise removed and/or relocated as part of the work. Prior to beginning any work associated with existing facilities to be abandoned, salvaged, or otherwise removed or relocated, the CONTRACTOR shall inform the CITY and the ENGINEER of his intent so that all arrangements can be made with the CITY for isolating pipelines (where possible) or otherwise removing existing facilities from service to the extent possible. The CONTRACTOR shall not proceed without written authorization from the CITY. **The CONTRACTOR shall contact and coordinate accordingly with utilities companies prior to and during the execution of the relocation, removal or abandonment of existing utilities structures. Existing utilities coordination is exclusively the responsibility of the CONTRACTOR.**
- B. Pipelines: The CONTRACTOR shall abandon, salvage or otherwise remove existing pipelines or segments of existing pipelines shown to be abandoned in place, salvaged, or removed as part of the contract work. Unless otherwise indicated in the Contract Documents, all piping shown on the Drawings to be abandoned shall be abandoned in place. Pipe shown to be abandoned need only be removed a minimum three feet clear of new utilities to be installed. Abandon-in-place shall be defined as installing plugs, or other permanent closure, as reviewed and accepted by the CITY, on all termination's, open ends or ends of pipe designated as being cut, capped and anchored in an acceptable manner. The pipe will remain buried unless otherwise noted.
- C. Piping indicated on the Drawings as being removed, or any piping to be abandoned which interferes with new structures or piping, shall be excavated and removed using methods which will not disturb adjacent piping or other facilities. All pipe materials shall be subject to salvage by the CITY as defined below. Any remaining piping on both ends of pipe segments removed shall be abandoned in-place, per the above definition. After piping has been removed, the CONTRACTOR shall backfill the evacuated area in accordance with requirements set forth in other sections of these specifications.
- D. Equipment: The CONTRACTOR shall abandon, salvage or otherwise remove existing equipment or other facilities as shown on the Contract Drawings or indicated herein. In all cases, the CONTRACTOR shall exercise caution when handling the existing equipment so as not to disturb or damage adjacent facilities. The CONTRACTOR shall make all repairs to adjacent facilities which may be damaged as a result of the CONTRACTOR's efforts in abandoning, salvaging or otherwise removing existing facilities, at no additional cost to the CITY.
- E. Salvage: The CITY may desire to salvage certain items of existing equipment which are to be dismantled and removed during the course of construction. Prior to removal of any existing equipment or piping from the site of work, the CONTRACTOR shall ascertain from the CITY whether or not the particular item or items are to be salvaged. Items to be salvaged shall be stockpiled on the site, in a location as designated by the CITY. All other items of equipment shall be disposed of off-site by the CONTRACTOR at his own expense, in accordance with applicable laws, ordinances and regulations.

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CONSTRUCTION CONSIDERATIONS

1.05 DIMENSIONS OF EXISTING STRUCTURES

- A. Where the dimensions and locations of existing structures are of critical importance in the installation or connection of new work, the 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.

1.06 REHABILITATION

- A. Certain areas of existing structures, piping, conduits, and the like will be affected by work necessary to complete modifications under this Contract. The CONTRACTOR shall be responsible to rehabilitate those areas affected by its construction activities.
- B. Where new rectangular openings are to be installed in concrete or concrete masonry walls or floors, the CONTRACTOR shall score the edges of each opening (both sides of wall or elevated slab) by saw cutting clean straight lines to a minimum depth of one inch and then chipping out the concrete. Alternately, the opening can be formed by saw cutting completely through the slab or wall. Saw cuts deeper than one inch (or the depth of cover over existing reinforcing steel, whichever is less) shall not be allowed to extend beyond the limits of the opening. Corners shall be made square and true by a combination of core drilling, chipping, or grinding. All necessary precautions shall be taken during removal of concrete to prevent debris from falling and damaging adjacent equipment or piping. Saw cuts allowed to extend beyond the opening shall be repaired by filling with nonshrink grout. The concrete around any exposed reinforcement steel shall be chipped back and exposed reinforcement steel cut a minimum of 1-1/2 inches from the finished face of the new opening. The inside face of the new opening shall be grout to fill any voids and cover the exposed aggregate and shall be trowel-finished to provide a plumb and square opening.
- C. Where new conduit or piping is to be installed through existing concrete walls, the CONTRACTOR shall accurately position the core-drill openings. Openings shall be adequately sized to allow alignment of piping or conduit and fittings without deflection and to provide adequate clearance for satisfactory packing in the annular space between the piping or conduit and the core drilling opening as shown on the Drawings.
- D. Where new piping is to be connected to existing piping, the existing piping shall be cut square and the ends properly prepared for the connection shown on the drawings. Any damage to the lining and coating of the existing piping shall be repaired by the CONTRACTOR.
- E. Where existing equipment, equipment pads and bases, piping, piping supports, electrical panels and devices, conduits, and associated appurtenances are removed, the CONTRACTOR shall rehabilitate the affected area such that little or no evidence of the previous installation remains. Opening in concrete floors, walls, and ceiling from piping, conduit, and fastener penetrations shall be filled with nonshrink grout and finished to match the adjacent area. Concrete pads and bases for equipment and supports shall be removed by chipping away concrete and cutting any exposed reinforced steel and anchor bolts a minimum of 1-1/2 inches below finished grade. The area of concrete to be rehabilitated shall be scored by saw cutting clean, straight lines to a minimum depth of 1-1/2 inches, and all concrete within the scored lines removed to a minimum depth of 1-1/2

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inches. The area within the scored lines shall be patched with nonshrink grout to match the adjacent grade and finish. Abandoned connections to piping and conduits shall be terminated with blind flanges, caps, and plugs suited for the material, type, and service of the pipe or conduit.

- F. Where existing structural steel members are removed or modified, the surface of the remaining existing steel members damaged by construction activities shall be repaired. The affected areas shall be surface prepared and coated in accordance with Section entitled "Painting".
- G. Disposal of Debris: All debris, materials, piping, and miscellaneous waste products from the work described in this section shall be removed from the project as soon as possible. They shall be disposed of in accordance with applicable federal, state, and local regulations. The CONTRACTOR is responsible for determining these regulations and shall bear all costs or retain any profit associated with disposal of these items.

1.07 INSTALLATION OF EQUIPMENT

- A. CONTRACTOR shall have on hand sufficient personnel, proper equipment, and machinery of ample capacity to facilitate the work.
- B. CONTRACTOR shall be responsible for locating, aligning and leveling all equipment and shall employ a licensed surveyor to set all lines and levels of equipment to the accuracy required.
- C. Complete manufacturers installation instructions, including permissible tolerances, shall be furnished in duplicate with each unit of equipment or set of identical units.
- D. All equipment shall be installed in accordance with the shop drawings; inclusive of manufacturers specifications, drawings and tolerances; under the direct supervision of the required manufacturers ENGINEER. No instructions shall be issued that are contrary to written specifications without prior written approval by the CITY's ENGINEER.
- E. Equipment shall be erected in a neat and workmanlike manner on the foundations' at the locations and elevations shown on the drawings unless otherwise indicated by the ENGINEER during installation.

1.08 SUPERVISION BY MANUFACTURER'S REPRESENTATIVES

- A. The CONTRACTOR shall provide the services of qualified equipment manufacturers technical representatives who shall adequately supervise the installation and testing of all equipment furnished under this Contract and instruct the CONTRACTOR's personnel and CITY's operating personnel in its maintenance and operation.

1.09 EQUIPMENT MANUFACTURER'S CERTIFICATION

- A. As a condition precedent to acceptance of equipment installed and operating, the CONTRACTOR will provide the CITY with written certification, obtained from each

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company manufacturing equipment for the project, that the equipment is installed and does operate in accordance with the specifications and manufacturers recommendations.

1.10 SLEEVES AND OPENINGS

- A. The CONTRACTOR shall provide all openings, chases, etc., to fit his own work and that of any other subcontractors and contractors. All such openings or chases shown on the Contract Drawings, or reasonably implied thereby, or as confirmed or modified by shop, setting or erecting drawings approved by the ENGINEER, shall be provided by the CONTRACTOR.
- B. Where pipes or conduits are to pass through slabs or walls, or where equipment frames or supports are to be installed as integral part of an opening, the sleeves, opening, forms or frames shall be furnished by the installer of the pipes, conduits or equipment, but shall be placed by the CONTRACTOR.
- C. Where hanger inserts, anchor bolts and similar items are to be embedded in concrete as an integral part of a slab or wall, they shall be furnished by the installer of the pipe or other equipment requiring the hanger, etc. but shall be placed by the CONTRACTOR.
- D. When requested by the CONTRACTOR, the installer of the pipes, conduit, or equipment, including those contractors or subcontractors who require openings or chases in slabs and walls for passage of ducts, mounting or equipment, etc., shall furnish all necessary information, instructions, and materials to effect accurate installation of the required openings, chases, sleeves, frames, inserts, etc. When such items are secured in position, and just prior to construction of the surrounding slab or wall, the subcontractor or contractor for whom the items are installed shall ascertain the proper number, locations, and settings thereof; and the CONTRACTOR shall schedule his operations so as to provide a reasonable opportunity and time interval for such inspection.
- E. Any cost resulting from correction of defective, ill-timed, or mislocated work, or for subsequent work which becomes necessary because of omitted openings, chases, sleeves, frames, inserts, etc., shall be borne by the subcontractor or contractor responsible therefor. No contractor or subcontractor shall arbitrarily cut, drill, alter, damage, or otherwise endanger the work of another Contractor. In no case shall beams lintels, or other structural members be cut without the approval of the ENGINEER. The nature and extent of any corrective or additional work shall be subject to the approval of the ENGINEER following consultation with the affected parties.

1.11 OBSTRUCTIONS

- A. All water pipes, storm drains, sanitary sewers, force mains, gas or other pipe, telephone or power cables or conduits and all other obstructions, whether or not shown, shall be temporarily supported across utility line excavations. The CONTRACTOR shall be responsible for any damage to any such pipes, conduits, or structures. Approximate locations of known water, sanitary, drainage, power and telephone installations along route of new pipelines or in the vicinity of new work are shown, but must be verified in the field by the CONTRACTOR. The CONTRACTOR shall uncover these pipes, ducts, cables, etc., carefully, by hand, prior to installing new lines. Any discrepancies or

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differences found shall be brought to the attention of the ENGINEER in order that necessary changes may be made to permit installation of new work. These conditions are supplemental to general requirements elsewhere in the Contract Documents.

1.12 SITE CONDITIONS

- A. The CONTRACTOR acknowledges that he has investigated prior to bidding and satisfied himself as to the conditions affecting the Work, including but not restricted to those bearing upon transportation, disposal, handling and storage of materials, availability of labor, water, electric power, roads and uncertainties of weather, canal stages, tides, water tables or similar physical conditions at the site, the conformation and conditions of the ground, the character of equipment and facilities needed preliminary to and during prosecution of the Work. The CONTRACTOR further acknowledges that he has satisfied himself as to the character, quality and quantity of surface and subsurface materials or obstacles to be encountered insofar as this information is reasonably ascertainable from an inspection of the site, or any contiguous site, as well as from information presented by the Drawings and Specifications made a part of this Contract, or any other information made available to him prior to receipt of Bids. Any failure by the CONTRACTOR to acquaint himself with the available information will not relieve him from responsibility for estimating properly the difficulty or cost of successfully performing the Work. The CITY assumes no responsibility for any conclusions or interpretations made by the CONTRACTOR on the basis of the information made available by the CITY.

1.13 SUBSURFACE INVESTIGATIONS

- A. The CONTRACTOR shall be responsible for having determined to his satisfaction, prior to the submission of his bid, the nature and location of the work, the conformation of the ground, the character and quality of the substrata, the types and quantity of materials to be encountered, the nature of the groundwater condition, the character of equipment and facilities required preliminary to and during the performance of the work, the general and local conditions and all other matters which can in any way affect the work under this Contract. The prices established for the work to be done shall reflect all costs pertaining to the work. Any claims for extras based on the substrata or ground water table conditions will be disallowed.
- B. The CONTRACTOR further acknowledges that he assumes all risk contingent upon the nature of the subsurface conditions actually encountered by him in performing the work covered by the Contract, even though such actual conditions may result in the CONTRACTOR performing more or less work than he originally anticipated.

1.14 DIFFERING SITE CONDITIONS

- A. The CONTRACTOR shall promptly and before such conditions are disturbed, notify the CITY in writing of: (1) subsurface or latent physical conditions at the site differing materially from those indicated in this contract, or (2) unknown physical conditions at the site, of an unusual nature, differing materially from those ordinarily encountered and generally recognized as inherent in work of the character provided for this contract. The CITY will promptly investigate the conditions, and if he finds that such conditions do materially so differ and cause an increase or decrease in the CONTRACTOR's cost of, or

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the time required for, performance of any part of the work under this contract, whether or not changed as a result of such conditions, an equitable adjustment shall be made and the contract modified in writing accordingly.

1.15 PROTECTION OF PROPERTY

- A. The CONTRACTOR shall protect all property that may be affected by his work or operations. The location and extent of underground and covered facilities are not guaranteed and the CONTRACTOR is cautioned to proceed with care in order to prevent the undermining or damage to existing utilities including piping, power cable, utility poles, conduit, duck bank, fiber optic cable, gas, telephone and cable TV services, structures, piping, and other facilities.
- B. The CONTRACTOR shall take all measures necessary to protect new and existing mechanical equipment from dust and debris. All protective measures shall be furnished, installed, lighted, ventilated, maintained, and removed at the CONTRACTOR'S own cost.
- C. When city water is being used, the supply source shall be protected against contamination in accordance with existing codes and regulations.
- D. In the event any of the CONTRACTOR'S activities were to disrupt or endanger any facilities, he shall at his own expense make all necessary repairs or replacements necessary to correct the situation to the satisfaction of the ENGINEER. Such work shall progress continuously to completion on a 24-hour per day, seven workday basis. The CONTRACTOR shall be responsible for the services of repair crews on call 24 hours per day for emergencies that arise involving work under this Contract.

1.16 WEATHER CONDITIONS

- A. Work that may be affected by inclement weather shall be suspended until proper conditions prevail. In the event of impending storms the CONTRACTOR shall take necessary precautions to protect all work, materials and equipment from exposure. The CITY reserves the right, through the opinion of the ENGINEER, to order that additional protection measures over and beyond those proposed by the CONTRACTOR, be taken to safeguard all components of the project. The CONTRACTOR shall not claim any compensation for such precautionary measures so ordered, nor claim any compensation from the CITY for damage to the work from the elements of weather.

1.17 FIRE PROTECTION

- A. The CONTRACTOR shall take all necessary precautions to prevent fires at or adjacent to the work, including his own buildings and trailers. Adequate fire extinguisher and hose line stations shall be provided throughout the work area.

1.18 SAFETY AND HEALTH REQUIREMENTS

- A. The CONTRACTOR shall comply in every respect with all Federal, State and local safety and health regulations. Copies of the Federal Regulations may be obtained from the U.S.

SECTION 01500
CONSTRUCTION CONSIDERATIONS

Department of Labor, Occupational Safety and Health Administration, 3200 East Oakland Park Boulevard, Room 204, Bridge Building, Fort Lauderdale, Florida 33300.

- B. The CONTRACTOR shall provide all barricades and flashing warning lights or other devices necessary to warn pedestrians and area traffic.

PART 2 -- PRODUCTS (Not Used)

PART 3 -- EXECUTION (Not Used)

- END OF SECTION -

SECTION 01510

TEMPORARY UTILITY SERVICES AND STAGING AREA

PART 1 - GENERAL

1.01 GENERAL

- A. The CONTRACTOR shall provide for temporary utilities and services for his own operations. These shall include electrical power, water, ventilation, sanitary facilities. The 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. In addition, the CONTRACTOR shall provide the following:

1.02 TEMPORARY POWER (NOT USED)

1.03 TEMPORARY WATER

- A. The CONTRACTOR shall supply all water used for construction, flushing, testing, and temporary sanitary facilities. The CONTRACTOR shall provide and maintain all piping, fittings, adapters, and valving required. It is the CONTRACTOR'S responsibility to arrange through the City Underground Utilities Division for a 2-inch fire hydrant water meter. A deposit to be paid by the CONTRACTOR is required for meter rental and all water shall be purchased at the prevailing rate.

1.04 TEMPORARY VENTILATION (NOT USED)

1.05 TEMPORARY SANITARY FACILITIES

- A. The 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.

1.06 TEMPORARY TELEPHONE SERVICE (NOT USED)

1.07 SECURITY (NOT USED)

1.08 STAGING AREA

- A. The CONTRACTOR shall arrange, coordinate and take all necessary steps regarding his work effort to comply with constraints defined in Section 01520, including off site parking, staging, storage, etc., as required. Costs associated with these efforts shall be included in the bid for this project.

PART 2 -- PRODUCTS (Not Used)

PART 3 -- EXECUTION (Not Used)

- END OF SECTION -

SECTION 01520

MAINTENANCE OF FACILITIES AND SEQUENCE OF CONSTRUCTION

PART 1 -- GENERAL

1.01 GENERAL

- A. The CONTRACTOR shall ensure the continuous operation of all existing sanitary sewer systems, potable water systems, and storm water facilities during construction. In addition, the CONTRACTOR shall provide temporary traffic routing and coordinate his work so as to minimize impact to the utilities systems located in the area. In performing the work shown and specified, the CONTRACTOR shall plan and schedule his work as outlined in this Section.

1.02 CONSTRUCTION SCHEDULE

- A. The Construction Schedule shall be submitted by the CONTRACTOR in accordance with Section 01300 of these Specifications

1.03 USE OF FACILITIES BEFORE COMPLETION

- A. The CITY reserves the right to enter and use any portion of the constructed facilities before final completion of the whole work to be done under this Contract in accordance with Article 14-2, Partial Utilization of the General Conditions.

1.04 CONNECTION OF EXISTING SYSTEMS

- A. All connections to existing systems shall be performed in such a manner that no damage and minimal interruption is caused to the existing installation. On completion of its installation, the CONTRACTOR shall complete the connection to the existing systems in a proper manner. Any damage caused to existing installations shall be repaired or replaced by the responsible CONTRACTOR at no additional cost to the CITY.

1.05 COORDINATION WITH UTILITY PERSONNEL

- A. Before commencing work involving removing or placing in operation existing or new facilities or tie-ins to existing facilities, the CONTRACTOR shall notify the CITY at least three (3) business days in advance in writing. The CITY shall be responsible for removing facilities from operation as deemed necessary.
- B. The CONTRACTOR shall, under no circumstances, interfere with wastewater treatment plant and existing potable water, sewer and storm water facilities without the City's authorization, in writing, and supervision. The CONTRACTOR shall notify the City's representative in writing a minimum of three work days prior to each scheduled service request. This notification shall be provided on the City's standard form, or on an approved equivalent form completed in full by the CONTRACTOR.

SECTION 01520

MAINTENANCE OF FACILITIES AND SEQUENCE OF CONSTRUCTION 1.06 COORDINATION WITH PRIVATE PROPERTY OWNERS

Prior to commencing with construction (including mobilization and maintenance of traffic) the CONTRACTOR shall distribute copies of the "Notice to Owners" and "Right of Entry Permit" (refer to Appendix C) to all property owners/tenants within the project area and shall obtain permission from property owners/tenants prior to working within their properties

1.07 GENERAL SEQUENCE OF CONSTRUCTION AND OPERATION REQUIREMENTS

- A. Work under the Contract shall be scheduled and performed in such a manner as to result in the least possible disruption to the public's use of roadways, driveways, parking areas, and utilities. Utilities shall include but not be limited to water, sewerage, irrigation, drainage structures, gas, electrical service, cable TV services, fiber optic cables, and telephone. Prior to commencing with the WORK, CONTRACTOR shall perform a location investigation of all existing underground and above ground utilities and facilities in accordance with Section 01530 entitled "*Protection of Existing Facilities*". Utilities that present potential conflict with the proposed piping shall be field verified with soft digging.
- B. The outlined sequence of construction does not include all items necessary to complete the work, but is intended to identify the sequence of critical events necessary to minimize any disruptions and to avoid any impact to continued collection system service. It shall be understood by the CONTRACTOR that the critical events identified are not all inclusive and that additional items of work not shown may be required. The sequence of construction is a precedence requirement and does not attempt to schedule the CONTRACTOR' work. It is intended only to indicate which activities must precede other activities in order to minimize interference's and disruptions.
- C. All work by the CONTRACTOR that disrupts the normal utilities operations shall be shown on the Construction Schedule specified in Section 01300 and specifically scheduled with the CITY. Schedule notification shall consist of a written notice defining the work to be accomplished, the normal treatment plant that will be interrupted, the duration of the interruption, and the mitigating effort to be performed by the CONTRACTOR. The written notice shall be submitted to the CITY fourteen days in advance of the proposed work and the CITY will respond to the CONTRACTOR in writing within seven days of receipt of the notice regarding the acceptability of the proposed plan.
- D. At no time, the CONTRACTOR shall undertake closing off any pipelines, or opening valves, or take any other action which would affect the operation of the existing system, except as specifically required by the drawings and specifications, and until authorization is granted by the CITY or ENGINEER and after proper notification.
- E. Temporary installations required to complete a particular aspect of the work during the allowed time period shall be determined by the CONTRACTOR and implemented by the

SECTION 01520

MAINTENANCE OF FACILITIES AND SEQUENCE OF CONSTRUCTION
CONTRACTOR at no additional cost to the CITY. All such temporary installations shall be subject to the review and acceptance of the ENGINEER.

- F. Sequence of certain major events and identification of time constraints for removing existing facilities from active service and installation of new facilities are described below in paragraph 1.08. No phase of work (or tasks within a phase) shall preclude or be performed in parallel with a subsequent phase unless specifically defined so in these documents. In all cases, work in each phase shall be checked out and accepted for satisfactory use, subject to the Engineer's approval, prior to the CONTRACTOR proceeding to the next phase of construction.

1.08 DETAILED SEQUENCE OF CONSTRUCTION AND OPERATION REQUIREMENTS

- A. Phase I - Mobilization / Site Preparation: Mobilize for work – Video working areas, set up staging and storage areas, obtain permits, develop and submit construction schedule, submit shop drawing schedule, survey, locate existing utilities and elevations with soft digging, verify existing fittings to be connected, shop drawing submittals, and procure materials.
- B. Phase II – Construction of Water and/or Sewer System : The tasks included under this phase consist of installation of proposed improvements as described in the approved construction plans.
- C. Phase III - Final Sitework and Closeout: Final pavement and asphalt overlay of the affected road sections, final restoration, final grading, sodding, miscellaneous work, demobilization and related closeout activities as described in Section 01700 - Project Closeout.
- D. Construction Constraints: CONTRACTOR shall comply with the following constraints during construction and utilize constraints in determining a sequence of construction:
 - 1. Construction work during the installation of the proposed work shall be limited to the public R/W. Homeowners and tenants shall have access to their driveways at all times.
 - 2. The excavation area shall be surrounded with barricades and obstructions illuminated with temporary light furnished, installed and maintained by the CONTRACTOR.
 - 3. Final restoration of roads, driveways, sidewalks and all other paved areas shall be completed within twenty (20) business days after piping has been installed.
 - 4. Contractor is expected to work regular hours between the hours of 7:00 a.m. and 5:00 p.m., Monday through Friday. Requests for approval to work during other than regular hours must be submitted to the Engineer at least 72 hours in advance of the period proposed for such overtime work and shall set forth the proposed schedule for overtime work to give Engineer ample time to arrange for his

SECTION 01520

MAINTENANCE OF FACILITIES AND SEQUENCE OF CONSTRUCTION
personnel to be at the site of the Work, even for work required to occur by contract. Contractor shall pay for the additional engineering charges on account of the overtime work, except when overtime is associated with contract-required. Such additional engineering charges shall be a subsidiary obligation of Contractor, and no extra payment shall be made by City on account of such overtime work. The Contractor shall not violate the Hollywood Code of Noise Ordinance.

5. The CONTRACTOR shall pay liquidated damages of \$1,000/DAY for not complying with any one of the above requirements.

PART 2 -- PRODUCTS (Not Used)

PART 3 -- EXECUTION

3.01 COORDINATION WITH EXISTING UTILITIES AND OTHER AGENCIES

- A. The CONTRACTOR shall coordinate with Sunshine One-Call Notification at 1-800-432-4770 a minimum of 48 business hours prior to any excavation for location of existing underground facilities.
- B. CONSTRUCTION DEWATERING:
 1. All dewatering equipment such as pumps, air compressors, generators, etc. proposed for use during construction in residential areas shall be provided with noise enclosures suitable to meet the requirements of the City of Hollywood Noise Ordinance and/or Broward County Noise Ordinance, whichever is more stringent.
 2. There is no dewatering permit for this project. If the CONTRACTOR considers that as part of its means and methods of construction, a dewatering permit is required, it is the responsibility of the CONTRACTOR to secure the required permit in order to proceed with the execution of the construction.

3.02 COOPERATION

- A. The CONTRACTOR shall allow the CITY or its agents, and other project contractors or their agents, to enter facilities being constructed under this Contract for the purpose of constructing, installing, operating, maintaining, removing, repairing, altering or replacing such equipment pipes, sewers, conduits, manholes, wires, or other structures and appliances which may be required to be installed at or in the work. The CONTRACTOR shall cooperate with all the aforesaid parties and shall allow reasonable provisions for the prosecution of any other work by the CITY, or others, to be done in connection with his work, or in connection with normal use of the facilities.

- END OF SECTION -

SECTION 01530
PROTECTION OF EXISTING FACILITIES

PART 1 - GENERAL

1.01 THE REQUIREMENT

- A. The CONTRACTOR shall protect all existing utilities and improvements not designated for removal and shall restore damaged or temporarily relocated utilities and improvements to a condition equal to or better than they were prior to such damage or temporary relocation, all in accordance with requirements of the Contract Documents.
- B. The CONTRACTOR shall verify the exact locations and depths of all utilities shown and the CONTRACTOR shall make exploratory excavations of all utilities that may interfere with the Work. All such exploratory excavations shall be performed as soon as practicable after award of Contract and, in any event, a sufficient time in advance of construction to avoid possible delays to the CONTRACTOR'S Work. When such exploratory excavations show the utility location as shown to be in error, the CONTRACTOR shall so notify the CITY.
- C. The number of exploratory excavations required shall be that number which is sufficient to determine the alignment and grade of the utility.

1.02 RIGHTS-OF-WAY (NOT USED)

1.03 PROTECTION OF STREET OR ROADWAY MARKERS (NOT USED)

1.04 RESTORATION OF FACILITIES

- A. General: All paved areas including asphaltic concrete berms cut or damaged during construction shall be replaced with similar materials and of equal thickness to match the existing adjacent undisturbed areas, except where specific resurfacing requirements have been called for in the Contract Documents or in the requirements of the agency issuing the permit. All temporary and permanent pavement shall conform to the requirements of the affected pavement CITY. All pavements which are subject to partial removal shall be neatly saw cut in straight lines.
- B. Temporary Restoration: Temporary restoration includes repair to all driveways, sidewalks and roadways. They shall be swept clean and be maintained free of dirt and dust. All areas disturbed by the construction activities shall be restored to proper grade, cleaned up, including the removal of debris, trash, and deleterious materials. All construction materials, supplies, or equipment, including piles of debris shall be removed from the area. All temporarily restored areas shall be maintained by the CONTRACTOR. These areas shall be kept clean and neat, free of dust and dirt, until final restoration operations are completed. The CONTRACTOR is responsible to utilize dust abatement operations in the temporarily restored areas as required, to the satisfaction of the ENGINEER.
- C. Temporary Resurfacing: Wherever required by the public authorities having jurisdiction, the CONTRACTOR shall place temporary surfacing promptly after backfilling and shall

SECTION 01530
PROTECTION OF EXISTING FACILITIES

maintain such surfacing for the period of time fixed by said authorities before proceeding with the final restoration and improvements.

- E. Permanent Resurfacing: In order to obtain a satisfactory junction with adjacent surfaces, the CONTRACTOR shall saw cut back and trim the edge so as to provide a clean, sound, vertical joint before permanent replacement of an excavated or damaged portion of pavement. Damaged edges of pavement along excavations and elsewhere shall be trimmed back by saw cutting in straight lines. All pavement restoration and other facilities restoration shall be constructed to finish grades compatible with adjacent undisturbed pavement, unless otherwise shown on the drawings.
- F. Final Restoration: Final restoration shall include the completion of all required pavement replacement of roadways, driveways, curbs, gutters, sidewalks and other existing improvements disturbed by the construction: final grading, placement of sod, installation or replacement of any trees or shrubs, repair of irrigation systems, pavement markings, etc., all complete and finished, acceptable to the ENGINEER.

1.05 EXISTING UTILITIES AND IMPROVEMENTS

- A. General: The CONTRACTOR shall protect all underground utilities and other improvements which may be impaired during construction operations. It shall be the CONTRACTOR'S responsibility to ascertain the actual location of all existing utilities and other improvements that will be encountered in its construction operations, and to see that such utilities or other improvements are adequately protected from damage due to such operations.
- B. Utilities to be Moved: In case it shall be necessary to move the property of any public utility or franchise holder, such utility company or franchise holder will, upon request of the CONTRACTOR, be notified by the CITY to move such property within a specified reasonable time. When utility lines that are to be removed are encountered within the area of operations, the CONTRACTOR shall notify the CITY a sufficient time in advance for the necessary measures to be taken to prevent interruption of service.
- C. Where the proper completion of the Work requires the temporary or permanent removal and / or relocation of an existing utility or other improvement which is shown, the CONTRACTOR shall remove and temporarily replace or relocate such utility or improvement in a manner satisfactory to the CITY and the OWNER of the utility/facility. In all cases of such temporary removal or relocation, restoration to former location shall be accomplished by the CONTRACTOR in a manner that will restore or replace the utility or improvement as nearly as possible to its former locations and to as good or better condition than found prior to removal.
- D. CITY'S Right of Access: The right is reserved to the CITY and to the OWNER'S of public utilities and franchises to enter at any time upon any public street, alley, right-of-way, or easement for the purpose of making changes in their property made necessary by the Work of this Contract.

SECTION 01530
PROTECTION OF EXISTING FACILITIES

- E. Underground Utilities Shown or Indicated: Existing utility lines that are shown or the locations of which are made known to the CONTRACTOR prior to excavation and that are to be retained, and all utility lines that are constructed during excavation operations shall be protected from damage during excavation and backfilling and, if damaged, shall be immediately repaired by the CONTRACTOR.
- F. Underground Utilities Not Shown or Indicated: In the event that the CONTRACTOR damages any existing utility lines that are not shown or the locations of which are not made known to the CONTRACTOR prior to excavation by the CITY and Sunshine One-Call Notification, a written report thereof shall be made immediately to the CITY. The CONTRACTOR shall make the repairs immediately under the provisions for changes and extra work contained in the General Conditions.
- G. Approval of Repairs: All repairs to a damaged improvement are subject to inspection and approval by an authorized representative of the CITY before being concealed by backfill or other Work.
- H. No fill, excavation material, construction generated debris or equipment shall obstruct water valves, gas meters or sewer manholes. Water, sewer and gas service shall be made accessible to repair or maintenance crews representing the CITY or a privately-owned utility company.
- I. Maintaining in Service: All oil and gasoline pipelines, power, and telephone or other communication cable ducts, gas and water mains, irrigation lines, reuse lines, sewer lines, storm drain lines, poles, and overhead power and communication wires and cables encountered along the line of the Work shall remain continuously in service during all the operations under the Contract, unless other arrangements satisfactory to the CITY are made with the owner of said utilities. The CONTRACTOR shall be responsible for and shall repair all damage due to its operations, and the provisions of this Section shall not be abated even in the event such damage occurs after backfilling or is not discovered until after completion of the backfilling.

1.06 TREES WITHIN STREET RIGHTS-OF-WAY AND PROJECT LIMITS

If any tree removal or relocation is required, the CONTRACTOR needs to coordinate with the ENGINEER, accordingly. All required permits related to tree removal are the responsibility of the CONTRACTOR.

PART 2 -- PRODUCTS (Not Used)

PART 3 -- EXECUTION (Not Used)

- END OF SECTION -

SECTION 01550

SITE ACCESS AND STORAGE

PART 1 – GENERAL

1.01 SITE ACCESS

- A. The CONTRACTOR shall make its own investigation of the condition of available public and private roads and of clearances, restrictions, bridge load limits, and other limitations affecting transportation and ingress and egress to the site of the Work. It shall be the CONTRACTOR's responsibility to construct and maintain any haul roads required for its construction operations.
- B. The CONTRACTOR will be responsible for monitoring the main gate for its personnel, equipment and material deliveries.

1.02 STORAGE

- A. Limited storage area is available within the work areas shown on the Drawings. Any equipment and materials stored here shall be in accordance with the manufacturer's recommendations and as indicated by the CITY.
- B. Responsibility for protection and safekeeping of equipment and materials will be solely that of the CONTRACTOR, and no claim shall be made against the CITY by reason of any act of an employee or trespasser. Should an occasion arise necessitating access to an area occupied by stored equipment and/or materials, the CONTRACTOR shall immediately move them.
- C. If the CONTRACTOR requires additional staging and storage area than shown on the Drawings, the CONTRACTOR shall obtain such areas from off site sources at no additional cost to the CITY.
- D. Upon completion of the Contract, the CONTRACTOR shall remove from the storage and work areas all of their equipment, temporary fencing, surplus materials, rubbish, etc., and restore the area to its original or better conditions.

PART 2 -- PRODUCTS (Not Used)

PART 3 -- EXECUTION (Not Used)

- END OF SECTION -

SECTION 01560

SPECIAL CONTROLS

PART 1 -- GENERAL

1.01 CHEMICALS

- A. All chemicals used during project construction or furnished for testing of project operation, whether herbicide, pesticide, disinfectant, polymer, reactant or other classification, will be required to show approval of either EPA or HUD. The handling, use, storage and disposal of such materials, containers or residues shall be in strict conformance with manufacturer and/or CONTRACTOR'S secured storage. Copies of antidote literature and a supply of antidotes shall be kept at the job site office.

1.02 DUST

- A. During all work for this Contract, the CONTRACTOR shall by the application of water and/or calcium chloride or other means, approved by the ENGINEER, eliminate dust annoyance to adjacent property, business establishments and the plant site in accordance with Article 7.21, Dust Control, of the General Conditions. The CONTRACTOR shall take all protective measures, to the satisfaction of the ENGINEER, necessary to ensure that dust and debris does not enter any of the mechanical or electrical equipment. The CONTRACTOR shall be responsible for the cleanup of existing buildings, equipment, controls, etc., which have become soiled due to the lack of proper dust control as determined by the ENGINEER. The CONTRACTOR shall provide daily application of water to all unpaved areas designated by the ENGINEER in the field and to the satisfaction of the ENGINEER in the field.

1.03 NOISE

- A. Noise resulting from the CONTRACTOR'S work shall not violate the Hollywood Code of Ordinance Chapter 100, with specific note to the restrictions of paragraph 100.05 or exceed the noise levels and other requirements stated in the Broward County Chapter 27 Pollution Control, relating to noise abatement in Broward County. The CONTRACTOR shall be responsible for curtailing noise resulting from his operation. He shall, upon written notification from the ENGINEER or the noise control officers, make any repairs, replacements, adjustments, additions and furnish mufflers when necessary to fulfill requirements.

1.04 EROSION ABATEMENT AND WATER POLLUTION

- A. It is imperative that the CONTRACTOR'S dewatering operations not contaminate or disturb the plant environment or properties adjacent to the Work. The CONTRACTOR, shall, therefore, schedule and control his operations to confine all runoff water from disturbed surfaces, water from dewatering and/or from excavation below the ground water table operations that becomes contaminated with lime silt, muck and other deleterious matter, fuels, oils, bitumens, calcium chloride, chemicals and other polluting materials.

SECTION 01560

SPECIAL CONTROLS

- B. The 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.
- C. The CONTRACTOR shall be responsible for providing, operating and maintaining materials and equipment used for conveying the 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 the CONTRACTOR shall restore the area to the condition prior to his commencing work.

1.05 HURRICANE AND STORM WARNINGS

- A. As the schedule for this project coincides, in part, with the recognized South Florida hurricane season, the CONTRACTOR's attention is drawn to the possibility of hurricane conditions, or severe storm conditions, occurring at the plant site during the course of Contract work.
- B. Within 30-days of the date of Notice-to-Proceed, the CONTRACTOR shall submit to the ENGINEER and Owner a Hurricane Preparedness Plan. The plan should outline the necessary measures which the CONTRACTOR proposes to perform at no additional cost to the Owner in case of a hurricane warning.
- C. In the event of inclement weather, or whenever the ENGINEER shall direct, the CONTRACTOR shall, and will cause Sub-Contractors to protect carefully the Work and materials against damage or injury by reasons of failure on the part of the CONTRACTOR to so protect the Work. Such Work and materials so damaged shall be removed and replaced at the expense of the CONTRACTOR.
 - 1. Hurricane Watch: Upon designation of a hurricane watch, CONTRACTORS shall be responsible for storing all loose supplies and equipment on the job site that may pose a danger. In addition, the CONTRACTOR shall remove all bulkheads and plugs in pipelines that would impede drainage in the case of flooding. Structures that may be in danger of floatation shall be flooded. The CONTRACTOR shall also cooperate with CITY personnel in protecting other structures at the site.
 - 2. Hurricane Warning: No mobile "temporary facility" under the control of the City of Hollywood, or on City property, shall be staffed during a hurricane warning. CONTRACTOR facilities meeting these criteria shall comply.
- D. The CONTRACTOR is advised to take all necessary precautions to protect his equipment by moving it to higher ground if in an area subject to flooding. Known areas of Hollywood that would be subject to flooding from storm tides include:

Hollywood Blvd.
A1A

North Lake Area
Sheridan Street

South Lake Area
Dania Beach Blvd.

SECTION 01560

SPECIAL CONTROLS

US Highway 1
Blvd.

46th Avenue

Hallandale Beach

1.06 PESTS AND RODENTS

- A. The CONTRACTOR shall be responsible for maintaining the jobsite free from litter, rubbish and garbage. He shall provide containers for the disposal of garbage and other materials that attract and are breeding places for pests and rodents. The CONTRACTOR shall provide the services of an exterminator to inspect the jobsite on a periodic basis and to provide service as required to control pests and rodents.

1.07 PERIODIC CLEAN-UP; BASIC SITE RESTORATION

- A. During construction, the CONTRACTOR shall regularly remove from the site all accumulated debris and surplus materials of any kind which result from his operations, or whenever the accumulation in excess of one truck load. Unused equipment and tools shall be stored at the CONTRACTOR'S yard or base of operations for the project.
- B. When the work involves installation of sewers, drains, water mains, manholes, underground structures, or other disturbance of existing features in or across streets, rights-of-way, easements, or private property, the CONTRACTOR shall (as the work progresses) promptly backfill, compact, grade and otherwise restore the disturbed area to a basic condition which will permit resumption of pedestrian or vehicular traffic and any other critical activity or function consistent with the original use of the land. Unsightly mounds of earth, large stones, boulders, and debris shall be removed so that the site presents a neat appearance.
- C. The CONTRACTOR shall perform the clean-up work on a regular basis and as frequently as ordered by the 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 work shall also be accomplished, when ordered by the ENGINEER, if partially completed facilities must remain incomplete for some time period due to unforeseen circumstances.
- D. Upon failure of the CONTRACTOR to perform periodic clean-up and basic restoration of the site to the ENGINEER'S satisfaction, the ENGINEER may, upon five (5) days prior written notice to the CONTRACTOR, employ such labor and equipment as he deems necessary for the purpose, and all costs resulting therefrom shall be charged to the CONTRACTOR and deducted from the amounts of money that may be due him.

1.08 SECURITY

- A. The CONTRACTOR shall care for and protect against loss or damage of all material to be incorporated in the construction for the duration of the Contract and shall repair or replace damaged or lost materials and damage to structures.

SECTION 01560

SPECIAL CONTROLS

- B. The CONTRACTOR shall be responsible for providing, and maintaining temporary fencing and gates and the daily securing of temporary fencing and gates used for construction purposes for the duration of the project.
- C. The CONTRACTOR shall strictly comply with working hours on the project site. Prior to any work outside of the standard working hours, the CONTRACTOR shall request the City's approval via written request (at least 8 hours in advance). The written request shall clearly define the work to be performed, the names of the employees, their employer and their trade and the hours and days during which the work is planned.

The City is considering and the CONTRACTOR shall comply with additional security requirements including employee photo identification at all times on-site and employee parking passes.

PART 2 -- PRODUCTS (Not Used)

PART 3 -- EXECUTION (Not Used)

- END OF SECTION -

SECTION 01570
TRAFFIC REGULATIONS AND MAINTENANCE OF TRAFFIC

PART 1 – GENERAL

1.01 TRAFFIC CONTROL

- A. CONTRACTOR shall obey all traffic laws and comply with all the requirements, rules and regulations of the State of Florida Department of Transportation (FDOT), the City of Hollywood, Broward County and other local authorities having jurisdiction, to maintain adequate warning signs, lights, barriers, etc., for the protection of traffic on public roadways and the treatment plant site.
- B. The CONTRACTOR shall maintain traffic and protect the public from all damage to persons and property within the Contract Limits, in accordance with the Contract Documents and all applicable state, city and local regulations. The CONTRACTOR shall conduct its construction operations so as to maintain and protect access, for vehicular and pedestrian traffic, to and from all properties and business establishments adjoining or adjacent to those streets affected by his operations, and to subject the public to a minimum of delay and inconvenience. Suitable signs, barricades, railing, etc. shall be erected and the work outlined by adequate lighting at night. Danger lights shall be provided as required. Watchmen, flagmen, and crossing guards shall be provided as may be necessary for the protection of traffic. Traffic Control and Maintenance of traffic during construction shall be included in the CONTRACTOR's bid and no additional payment shall be requested to the City for these activities
- C. For the protection of traffic in public or private streets and alleyways, the CONTRACTOR shall provide, place, and maintain all necessary barricades, traffic cones, warning signs, lights, and other safety devices in accordance with the requirements of the "Manual of Uniform Traffic Control Devices (MUTCD), Part VI, Traffic Controls for Street and Highway Construction and Maintenance Operations", published by U.S. Department of Transportation, Federal Highway Administration (ANSI D6.1).
- D. The CONTRACTOR shall submit a Maintenance of Traffic (MOT) Plan for ENGINEER and/or CITY approval at least 60 days prior to construction work.
- E. Prior to performing any work within or abutting the State rights-of-way, the Contractor shall submit a Maintenance of Traffic (MOT) Plan to FDOT for approval as required by the FDOT Utility Permit.
- F. All signs, signals, and barricades shall conform to the requirements of Subpart G, Part 1926, of the OSHA Safety and Health Standards for Construction.
- G.** All dirt spilled from the CONTRACTOR'S trucks on existing pavements shall be removed by the CONTRACTOR immediately and whenever in the opinion of the CITY the accumulation is sufficient to cause the formation of mud, dust, interference with traffic or create a traffic hazard.
- H. Areas designated by the Broward County Traffic Engineering Division as "Safe Walk Routes" shall adhere to the requirements of the Broward County Maintenance of Traffic School/Pedestrian.

SECTION 01570
TRAFFIC REGULATIONS AND MAINTENANCE OF TRAFFIC

1.02 TEMPORARY CROSSINGS

- A. General: Wherever necessary or required for the convenience of the public or individual residents at street or highway crossings, private driveways, or elsewhere, the CONTRACTOR shall provide suitable temporary bridges over unfilled excavations, except in such cases as the CONTRACTOR shall secure the written consent of the individuals or authorities concerned to omit such temporary bridges, which written consent shall be delivered to the CITY prior to excavation. All such bridges shall be maintained in service until access is provided across the backfilled excavation. Temporary bridges for street and highway crossing shall conform to the requirements of the authority having jurisdiction in each case, and the CONTRACTOR shall adopt designs furnished by said authority for such bridges, or shall submit designs to said authority for approval, as may be required.
- B. Street Use: Nothing herein shall be construed to entitle the CONTRACTOR to the exclusive use of any public street, alleyway, or parking area during the performance of Work hereunder, and it shall so conduct its operations as not to interfere unnecessarily with the authorized work of utility companies or other agencies in such streets, alleyways, or parking areas. No street shall be closed to the public without first obtaining permission of the CITY and proper governmental authority. Where excavation is being performed in primary streets or highways, one lane in each direction shall be kept open to traffic at all times unless otherwise provided or shown. Toe boards shall be provided to retain excavated material if required by the CITY or the agency having jurisdiction over the street or highway. Fire hydrants on or adjacent to the Work shall be kept accessible to fire-fighting equipment at all times. Temporary provisions shall be made by the CONTRACTOR to assure the use of sidewalks and the proper functioning of all gutters, sewer inlets, and other drainage facilities.
- C. The CONTRACTOR shall take all necessary precautions for the protection of the Work and the safety of the public. All barricades and obstructions shall be illuminated at night, and all lights shall be kept burning from sunset until sunrise. The CONTRACTOR shall station such guards or flaggers and shall conform to such special safety regulations relating to traffic control as may be required by the public authorities within their respective jurisdictions. All signs, signals, and barricades shall conform to the requirements of Subpart G, Part 1926, of the OSHA Safety and Health Standards for Construction.
- D. The CONTRACTOR shall remove traffic control devices when no longer needed, repair all damage caused by installation of the devices, and shall remove post settings and backfill the resulting holes to match grade.
- E. Temporary Street Closure: If closure of any street is required during construction, a formal application for a street closure shall be made to the authority having jurisdiction at least 30 days prior to the required street closure in order to determine necessary sign and detour requirements. Detour signs shall be provided, installed prior to street closure, and removed after construction by the CONTRACTOR.

SECTION 01570
TRAFFIC REGULATIONS AND MAINTENANCE OF TRAFFIC

- F. Temporary Driveway Closure: The CONTRACTOR shall notify the CITY or occupant (if not owner-occupied) of closure of driveways to be closed more than one eight-hour work day, at least three working days prior to the closure. The CONTRACTOR shall minimize the inconvenience and minimize the time period that the driveways will be closed. The CONTRACTOR shall fully explain to the owner/occupant how long the work will take and when closure is to start.
- G. Temporary Bridges: Whenever necessary, the CONTRACTOR shall provide suitable temporary bridges or steel plates over unfilled excavations, except in such cases as the CONTRACTOR shall secure the written consent of the individuals or authorities concerned to omit such temporary bridges or steel plates, which written consent shall be delivered to the ENGINEER prior to excavation. All such bridges or steel plates shall be maintained in service until access is provided across the backfilled excavation. Temporary bridges or steel plates for street and highway crossing shall conform to the requirements of the authority having jurisdiction in each case, and the CONTRACTOR shall adopt designs furnished by said authority for such bridges or steel plates, or shall submit designs to said authority for approval, as may be required.

1.03 CONTRACTOR PARKING

- A. The CONTRACTOR shall obtain off-site parking for all personnel vehicles as required.

PART 2 – PRODUCTS (NOT USED)

PART 3 – EXECUTION (NOT USED)

- END OF SECTION -

SECTION 01600

EQUIPMENT AND MATERIALS

PART 1 -- GENERAL

1.01 GENERAL

- A. All equipment, materials, instruments or devices incorporated in this project shall be new and unused, unless indicated otherwise in the Contract Documents.
- B. 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.
- C. The CONTRACTOR shall protect all equipment and materials from deterioration and damage. The equipment and materials shall be handled and stored by the manufacturer, fabricator CONTRACTOR and CONTRACTOR before, during, and after shipment 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 the CONTRACTOR'S expense for both labor and materials.

1.02 STORAGE

- A. The CONTRACTOR shall store its equipment and materials at their site in accordance with the manufacturer's recommendations and as directed by the ENGINEER in the field. No storage area will be provided by CITY. The CONTRACTOR shall enforce the instructions of the CITY and the ENGINEER regarding the posting of regulatory signs for loadings on structures, fire safety, and smoking areas.

1.03 HANDLING AND MAINTENANCE

- A. The manufacturer's storage instructions shall be carefully followed and any deviations shall be approved by the manufacturer in writing with a copy to the ENGINEER. Equipment with moving parts shall be rotated per the manufacturer's recommendations while in storage and during the period between installation and acceptance.
- B. All 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. New lubricants shall be put into the equipment at the time of acceptance.
- C. 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.

PART 2 -- PRODUCTS (Not Used)

PART 3 -- EXECUTION (Not Used)

- END OF SECTION -

SECTION 01700
PROJECT CLOSEOUT

PART 1 – GENERAL

1.01 PROJECT CLOSEOUT

- A. As construction of the project enters the final stages of completion, the CONTRACTOR shall, in accordance with the requirements set forth in the Contract Documents, attend to or have already completed the following items:
1. Scheduling start-up and initial operation.
 2. Correcting or replacing defective work, including completion of items previously overlooked or work which remains incomplete, all as evidenced by the CITY's "Punch" lists.
 3. Make final submittals.
 4. Attend to any other items listed herein or brought to the CONTRACTOR's attention by the CITY.

1.02 CLOSEOUT TIMETABLE

- A. The CONTRACTOR shall establish dates for equipment testing, acceptance periods, and on-site instructional periods (as required under the Contract). Such dates shall be established not less than one week prior to beginning any of the foregoing items, to allow the CITY, the ENGINEER, and their authorized representatives sufficient time to schedule attendance at such activities.

1.03 FINAL SUBMITTALS

- A. Before the acceptance of the project major milestones for substantial completion, the CONTRACTOR shall submit to the ENGINEER (or to the CITY if indicated) certain records, certifications, etc., which are specified elsewhere in the Contract Documents. Missing, incomplete or unacceptable items, as determined by the ENGINEER or the CITY, shall indicate non-compliance with substantial completion major milestone dates. A partial list of such items appears below, but it shall be the CONTRACTOR'S responsibility to submit any other items which are required in the Contract Documents:
1. Written Test results of project components.
 2. Performance affidavits for equipment and materials.
 3. Operation and Maintenance Manuals for equipment.
 4. Record Drawings: During the entire construction operation, the CONTRACTOR shall maintain records of all deviations from the Drawings and Specifications and shall prepare therefrom record drawings showing correctly and accurately all changes and deviations from the Work made during construction to reflect the Work as it was actually constructed. These drawings shall conform to recognized industry standards of drafting, shall be neat and legible, and provided in both electronic (AutoCAD "dwg") file format and hardcopies signed and sealed by a professional Land Surveyor registered in the State of Florida.

SECTION 01700
PROJECT CLOSEOUT

5. Written guarantees, where required.
6. Certificates of inspection and acceptance by local governing agencies having jurisdiction.
7. Releases from all parties who are entitled to claims against the subject project, property, or improvement pursuant to the provisions of law.

1.04 PUNCH LISTS

- A. Final cleaning and repairing shall be scheduled upon completion of the project.
- B. The ENGINEER will make his final inspection whenever the CONTRACTOR has notified the ENGINEER that the work is ready for the inspection. Any work not found acceptable and requiring cleaning, repair and/or replacement will be noted on the "Punch" list. Work that has been inspected and accepted by the ENGINEER shall be maintained by the CONTRACTOR, until final acceptance of the entire project.
- C. Whenever the CONTRACTOR has completed the items on the punch list, he shall again notify the ENGINEER that it is ready for final inspection. This procedure will continue until the entire project is accepted by the ENGINEER. The "Final Payment" will not be processed until the entire project has been accepted by the ENGINEER and all of the requirements in previous Article 1.03 "Final Submittals" have been satisfied.

1.05 MAINTENANCE AND GUARANTEE

- A. The CONTRACTOR shall comply with all maintenance and guarantee requirements of the Contract Documents.
- B. Replacement of earth fill or backfill, where it has settled below the required finish elevations, shall be considered as a part of such required repair work, and any repair or resurfacing constructed by the CONTRACTOR which becomes necessary by reason of such settlement shall likewise be considered as a part of such required repair work unless the CONTRACTOR shall have obtained a statement in writing from the affected private CITY or public agency releasing the CITY from further responsibility in connection with such repair or resurfacing.
- C. The CONTRACTOR shall make all repairs and replacements promptly upon receipt of written order from the CITY. If the CONTRACTOR fails to make such repairs or replacements promptly, the CITY reserves the right to do the Work and the CONTRACTOR and his surety shall be liable to the CITY for the cost thereof.

1.06 TOUCH-UP AND REPAIR

- A. The 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 the original finish. If in the opinion of the ENGINEER the touch-up work is not satisfactory, the CONTRACTOR shall repaint the item. CONTRACTOR shall also furnish additional paint as defined in Section 09900.

SECTION 01700
PROJECT CLOSEOUT

1.07 FINAL CLEANUP

- A. The CONTRACTOR shall promptly remove from the vicinity of the completed Work, all rubbish, unused materials, concrete forms, construction equipment, and temporary structures and facilities used during construction. Final acceptance of the Work by the CITY will be withheld until the CONTRACTOR has satisfactorily complied with the foregoing requirements for final cleanup of the project site.

PART 2 -- PRODUCTS (Not Used)

PART 3 -- EXECUTION (Not Used)

- END OF SECTION -

SECTION 02140

DEWATERING

Part 1 - GENERAL

1.01 DESCRIPTION

- A. Design, furnish, operate, maintain, and remove temporary dewatering systems to control groundwater and surface water to maintain stable, undisturbed subgrades, and permit work to be performed under dry and stable conditions. Work to be done as part of dewatering includes, but is not limited to:
1. Lower the groundwater level
 2. Lower hydrostatic pressure.
 3. Prevent surface water from entering the excavation during construction.
 4. Implement erosion control measures for disposing of discharge water.
- B. Groundwater within the excavation area shall be lowered to at least 1 foot below the lowest excavation levels as specified and as indicated.
- C. Common groundwater recharge methods include, but are not limited to, deep wells, large sumps or any combination thereof.
- D. The Contractor shall obtain the required permits for discharge from the Contractor's dewatering systems in accordance with Broward County Water Management Division and South Florida Water Management District (SFWMD) requirements. The Contractor shall conform with all permit requirements.

1.02 RELATED WORK

- A. Section 01560: Special Controls
- B. Section 02160 - Temporary Excavation Support Systems
- C. Section 02210 - Earth Excavation, Backfill, Fill and Grading
- D. Section 02222 – Excavation and Backfill for Utilities.

1.03 SUBMITTALS

- A. Submit the following in accordance with Section 01300, "Submittals":
1. Qualification of the Contractor's dewatering specialist's or firm's qualifications a minimum of four (4) weeks prior to execution of any dewatering. The submittal shall include, but not be limited to:
 - (a) Qualifications of specialist's or firm's Registered Professional Engineer as specified in Paragraph 1.04 B.

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DEWATERING

- (b) Qualifications of specialist's or firm's field representative, as specified in paragraph 1.04 B, who shall oversee the installation, operation and maintenance of the dewatering system.
2. Submit a dewatering plan at least two weeks prior to start of any dewatering operation. Do not submit design calculations. The review will be only for the information of the Owner and third parties for an overall understanding of the project relating to access, maintenance of existing facilities and proper utilization of the site. The Contractor shall remain responsible for the adequacy and safety of the means, methods and sequencing of construction. The plan shall include the following items as a minimum:
- (a) Dewatering plan and details stamped and signed by a Registered Professional Engineer.
 - (b) Certificate of Design: Refer to Section 01300, "Submittals"
 - (c) A list of equipment including, but not limited to, pumps, prime movers, and standby equipment.
 - (d) Detailed description of dewatering, maintenance, and system removal procedures.
 - (e) Monitoring plan and details, including, but not limited to, number and locations of observation wells, and geotechnical instruments such as settlement markers and piezometers, and frequency of reading the monitoring devices.
 - (f) Erosion/sedimentation control measures, and methods of disposal of pumped water.
 - (g) List of all applicable laws, regulations, rules, and codes to which dewatering design conforms.
 - (h) List of assumptions made for design of dewatering and for groundwater recharge systems, including but not limited to groundwater levels, soil profile, permeability, and duration of pumping and or recharge.
 - (i) Turbidity measurements in receiving waters as required by the permit. A turbidity control and monitoring where discharge is to a body of water.
3. Measurement records consisting of observation well groundwater records and the geotechnical instrumentation readings within one day of monitoring.

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DEWATERING

4. A modified dewatering plan within 24 hours, if open pumping from sumps and ditches results in boils, loss of fines, sinkholes or softening of the ground.

1.04 QUALITY ASSURANCE

- A. Provide in accordance with Section 01400 (Testing and Inspection) and as specified.
- B. Employ the services of a dewatering specialist or firm having the following qualifications:
 1. Have completed at least five (5) successful dewatering projects of equal size and complexity and with equal systems within the last five (5) years.
 2. Retain the services of a Florida Registered Professional Engineer having a minimum of five (5) years of experience in the design of well points, deep wells, or equal systems.
 3. Retain the services of a field representative having a minimum of five (5) years of experience in installation of well points, deep wells, or equal systems.
- C. If subgrade soils are disturbed or become unstable due to dewatering operation or an inadequate dewatering system, notify the Owner's representative, stabilize the subgrade, and modify system to perform as specified at no additional cost to the Owner.
- D. Notify the Owner's representative immediately if any settlement or movement is detected on structures. If the settlement or movement is deemed by the Owner's representative to be related to the dewatering, take actions to protect the adjacent structures and submit a modified dewatering plan to the Owner's representative within 24 hours. Implement the modified plan and repair any damage incurred to the adjacent structures at no additional cost to the Owner.
- E. If oil and/or other hazardous materials are encountered after dewatering begins, immediately notify the Owner's representative.

1.05 DELIVERY, STORAGE AND HANDLING

- A. Provide in accordance with Section 01610 and as specified.

1.06 PROJECT/SITE CONDITIONS

- A. Subsurface Conditions: Refer to Geotechnical Report provided specifically for the project. The Contractor is responsible for investigating existing soil

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DEWATERING

conditions as the Geotechnical Report does not assure all subsurface site conditions are represented.

Part 2 - PRODUCTS

2.01 MATERIALS

- A. Provide settlement markers, observation wells, piezometers and/or any other geotechnical instruments in accordance with the submitted dewatering plan.
- B. Provide casings, well screens, piping, fittings, pumps, power and other items required for dewatering system.
- C. Provide sand and gravel filter around the well screen. Wrapping geotextile fabric directly around the well screen shall not be allowed.
- D. When deep wells, well points, or vacuum well points are used, provide pumping units capable of maintaining high vacuum and handling large volumes of air and water at the same time.
- E. Provide and store auxiliary dewatering equipment, consisting of pumps and hoses on the site in the event of breakdown, at least one (1) pump for every five (5) used.
- F. Provide and maintain erosion/sedimentation control devices as indicated or specified and in accordance with the dewatering plan.
- G. Provide temporary pipes, hoses, flumes, or channels for the transport of discharge water to the discharge location.
- H. Provide cement grout having a water cement ratio of 1 to 1 by volume.

Part 3 - EXECUTION

3.01 EXECUTION

- A. Execution of any earth excavation, installing earth retention systems, and dewatering shall not commence until the related submittals have been reviewed by the Owner' representative with all Owner's representative comments satisfactorily addressed and the geotechnical instrumentation has been installed.
- B. Furnish, install and maintain dewatering system in accordance with the dewatering plan.
- C. Carry out dewatering program in such a manner as to prevent undermining or disturbing foundations of existing structures or of work ongoing or previously completed.
- D. Do not excavate until the dewatering system is operational.

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DEWATERING

- E. Unless otherwise specified, continue dewatering uninterrupted until all structures, pipes, and appurtenances below groundwater level have been completed such that they will not be floated or otherwise damaged by an increase in groundwater elevation.
- F. Discontinue open pumping from sumps and ditches, if such pumping is resulting in boils, loss of fines, softening of the ground, or instability of the slopes. Modify dewatering plan and submit to the Owner's representative at no additional cost to the Owner.
- G. Where subgrade materials are disturbed or become unstable due to dewatering operations, remove and replace the materials in accordance with Section 02210 – Earth Excavation, Backfill, Fill and Grading at no additional cost to the Owner.
- H. Dewatering Discharge:
 - 1. Install and monitor recharge systems when specified and/or indicated and in accordance with the submitted dewatering plan.
 - 2. Install sand and gravel filters in conjunction with well points and deep wells to prevent the migration of fines from the existing soil during the dewatering operation.
 - 3. Transport pumped or drained water to discharge location without interference to other work, damage to pavement, other surfaces, or property.
 - 4. Provide separately controllable pumping lines.
 - 5. The Owner's representative reserves the right to sample discharge water at any time.
 - 6. Immediately notify the Owner's representative if suspected contaminated groundwater is encountered. Do not pump water found to be contaminated with oil or other hazardous material to the discharge locations.
- I. Monitoring Devices and Records:
 - 1. Install, maintain, monitor and take readings from the observation wells and geotechnical instruments in accordance with the dewatering plan.
 - 2. Install settlement markers on structures within the zone of influence for dewatering a distance equal to twice the depth of the excavation, from the closest edge of the excavation. Conduct and report settlement surveys to 0.01 feet.
 - 3. For large rectangular, square or circular mass excavations the zone of influence shall be defined by the actual cone of watering influence corresponding to a 10% increase in effective vertical stress.

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DEWATERING

J. Install and maintain erosion/sedimentation control devices at the point of discharge as indicated or specified during the pre-construction meeting and in accordance with the dewatering plan.

K. Removal:

1. Do not remove dewatering system without written approval from the Engineer.
2. Backfill and compact sumps or ditches with clean fill in accordance with Section 02210 – Earth Excavation, Backfill, Fill and Grading.
3. All dewatering wells shall be abandoned upon completion of the work, and completely backfilled with cement grout.

3.02 CONTRACT CLOSEOUT:

A. Provide in accordance with Section 01700.

- END OF SECTION -

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TEMPORARY BYPASS PUMPING SYSTEMS

Part 1 - GENERAL

1.01 SUMMARY:

- A. Section Includes: Furnishing all materials, labor, equipment, power, maintenance, etc. to implement a temporary pumping system for the purpose of diverting the existing flow around the work area for the durations specified and disassembly of the bypass pumping system as specified herein.
- B. Be responsible for the design, installation and operation of the temporary pumping system. The bypass system shall meet the requirements of all codes and regulatory agencies having jurisdiction.
- C. The Contractor is responsible to maintain flow throughout the contract period of construction. Once the Contractor mobilizes, the City cedes responsibilities of any lift station operations to the Contractor until Substantial Completion is reached.

1.02 SYSTEM DESCRIPTION:

A. Design Requirements:

- 1. Provide bypass pumping systems with firm capacity to handle peak flow conditions, as determined by the ENGINEER.
- 2. Provide all pumps of adequate size to handle peak flow, and temporary discharge piping to ensure that the total flow can be safely diverted around the area of work. Bypass pumping system will be required to operate 24 hours per day.
- 3. Provide control system for the sanitary sewage lift station bypass pumping systems, which will run the pump(s) between preset levels. Additional controls are required for high-high level and low-low level alarms, and any pump faults.
- 4. Provide adequate standby equipment available and ready for immediate operation and use in the event of an emergency or breakdown. One standby pump for each size pump utilized shall be installed at the mainline flow bypassing locations, ready for use in the event of primary pump failure.
- 5. The bypass pumping system shall be capable of bypassing the flow around the work area as necessary for satisfactory performances of work.
- 6. Make all arrangements for bypass pumping during the time when the pumping station is shut down for any reason. System must overcome any downstream pressure on discharge.

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TEMPORARY BYPASS PUMPING SYSTEMS

- B. It is essential to the operations of the existing wastewater system that there be no interruption in the flow of sewage throughout the duration of the project. To this end, provide, maintain and operate all temporary facilities such as, pumping equipment (both primary and back-up units as required), conduits, all necessary power, and all other labor and equipment necessary to intercept the wastewater flow before it reaches the point where it would interfere with the work, carry it past the work and return it to the existing wastewater downstream of the work.
- C. Provide all necessary means to safely convey the raw wastewater past the work area. Do not stop or impede the main flows under any circumstances.
- D. Maintain wastewater flow around the work area in a manner that will not cause surcharging of wastewater, damage to existing pipe line and that will protect public and private property from damage and flooding.
- E. Fluid Character: Provide pumping units to pump applicable type of water.
- F. Furnish pumps which meet rating capacity and head indicated on Process Pump Schedule.
- G. Pumps shall be capable of passing a minimum of a 3-inch non-deformable sphere.

1.03 SUBMITTALS:

- A. ENGINEER approval is required for submittals with an "A" designation; submittals having an "FIO" designation are for information only. Provide all submittals, including the following, in accordance with Section 01300, SUBMITTALS.
- B. Data:
 - 1. Pump Data:
 - (a) Pump performance curves. Draw curves for the specified conditions. Include head, brake horsepower, efficiency and required NPSH, all plotted as a function of capacity, from zero to maximum capacity.
 - (b) Calculations of static lift, friction losses, and flow velocity.
 - (c) Submit a specific, detailed description of the proposed pumping system.
 - (d) Submit operating descriptions, component descriptions, control schematics, electrical connection diagrams and general arrangement drawings, for control equipment.
- C. Drawings:
 - 1. Shop Drawings:

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TEMPORARY BYPASS PUMPING SYSTEMS

- (a) Submit shop drawings, including arrangement and erection drawings of the equipment and equipment operating characteristics. Include the following:
 - (1) Submit detailed plans and descriptions outlining all provisions and precautions to be taken regarding the handling of existing flows. The plan shall include schedules, locations elevations, capacities of equipment, materials and all other incidental items necessary and/or required to insure proper protections of the facilities, including protection of the access and bypass pumping locations from damage due to the discharge flows, and compliance with the requirements and all permit conditions
 - (2) The plan shall include but not be limited to details of the following:
 - (b) Staging areas for pumps;
 - (c) Number, size, material, location and method of installation of suction piping;
 - (d) Number, size, material, location of installation of discharge piping;
 - (e) Bypass pump sizes, capacity, number of each size to be on site and motor power of fuel requirements;
 - (f) Standby power generator size, location;
 - (g) Downstream discharge plan;
 - (h) Thrust and restraint block sizes and locations;
 - (i) Sections showing suction and discharge pipe depth, embedment, select fill and special backfill;
 - (j) Method of noise control for each pump and/or generator;
 - (k) Any temporary pipe supports and anchoring required;
 - (l) Design plans and computation for access to bypass pumping locations indicated on the drawings;
 - (m) Calculations for selection of bypass pumping pipe size;
 - (n) Schedule for installation of and maintenance of bypass pumping lines;
 - (o) Plan indicated selection location of bypass pumping line locations.

Part 2 - PRODUCTS

2.01 EQUIPMENT:

- A. All pumps used for water by-pass shall be centrifugal self-priming units that do not require the use of foot-valves or Compressor in the priming system. The pumps shall be diesel or electric powered. Pumps shall have sound

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TEMPORARY BYPASS PUMPING SYSTEMS

attenuation enclosure designed for operation at sound levels of 70 decibels and below. The Contractor is fully responsible for coordinating and obtaining temporary electrical service.

- B. All pumps used must be constructed to allow dry running for long periods of time to accommodate the cyclical nature of influent flows. The pumps shall not be hydraulic submersible type.
- C. Provide the necessary stop/start control system for each pump. The control system shall remotely alarm the contractor of any problem. The contractor is responsible for responding within one (1) hour to the alarm and correcting the problem.
- D. Discharge Piping – in order to prevent the accidental spillage of flows, all discharge systems shall be temporarily constructed of rigid pipe with positive, restrained joints.
- E. Under no circumstances will aluminum “Irrigation” type piping and glued PVC pipe be allowed. Discharge hose will only be allowed in short sections and by specific permission from the ENGINEER. Provide piping materials of steel pipe, ductile iron pipe, or fused, high density polyethylene pipe.

2.02 MANUFACTURERS:

- A. Acceptable manufacturers are listed below. Other manufacturers of equivalent products may be submitted.

- 1. Thompson Pump & Manufacturing Co., Inc.

Part 3 - EXECUTION

3.01 PRECAUTIONS:

- A. Be responsible for locating any existing utilities in the area selected for installing the bypass pipelines. Locate bypass pipelines to minimize any disturbance to existing utilities and obtain approval of the pipeline locations from the ENGINEER. All costs associated with relocating utilities and obtaining all approvals shall be included in the Contract Price.

3.02 INSTALLATION AND REMOVAL:

- A. Make connections to the existing pipe lines and construct temporary bypass pumping structures only at the access location indicated on the drawings and as may be required to provide adequate suction conduit.
- B. Plugging or blocking of flows shall incorporate a primary and secondary plugging device. When plugging or blocking is no longer needed for

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TEMPORARY BYPASS PUMPING SYSTEMS

performance and acceptance or work, it is to be removed in a manner that permits the flow to slowly return to normal without surge, to prevent surcharging or causing other major disturbances downstream.

- C. The installation of the bypass pipelines is prohibited in all saltmarsh/wetland areas. The pipeline must be located off streets and sidewalks and on shoulder of the roads. When the bypass pipeline crosses local streets and private driveways, place the bypass pipelines in trenches and cover with temporary pavement. Upon completion of the bypass pumping operations, and after the receipt of written permission from the ENGINEER, remove all the piping, restore all property to pre-construction condition and restore all pavement. Be responsible for obtaining any approvals for placement of the temporary pipeline within public ways from the city.

3.03 FIELD QUALITY CONTROL AND MAINTENANCE:

- A. Testing: Perform leakage and pressure tests of the bypass pumping discharge piping using clean water prior to actual operation. Test the piping at a test pressure of 50 psi or anticipated operating pressure multiply by a safety factor of 1.5, whichever is greater. Provide 24 hours notice to the ENGINEER prior to testing.
- B. Inspection: Inspect bypass pumping system as needed to ensure that the system is working correctly.
- C. Maintenance Service: Insure that the temporary pumping system is properly maintained and a responsible operator is on hand at all times when pumps are operating.
- D. Extra Materials:
 - 1. Spare parts for pumps and piping shall be kept on site as required.
 - 2. Adequate hoisting equipment for each pump and accessories shall be maintained on the site.

- END OF SECTION -

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EXCAVATION AND BACKFILL FOR UTILITIES

Part 1 - GENERAL

1.01 THE REQUIREMENT

- A. Excavate, grade and backfill as required for underground piping systems and appurtenances as shown on the Drawings and specified herein.

1.02 RELATED WORK SPECIFIED ELSEWHERE

- A. Section 02500 - Surface Restoration
- B. Division 3 - Concrete

1.03 REFERENCE SPECIFICATIONS, CODES, AND STANDARDS

- A. Codes: All codes, as referenced herein, are specified in Section 01090, "Reference Standards".
- B. Commercial Standards:

ASTM C33	Standard Specification for Concrete Aggregates
ASTM D 422	Method for Particle-Size Analysis of Soils.
ASTM D 698	Test Methods for Moisture-Density Relations of Soils and Soil-Aggregate Mixtures, Using 5.5-lb (2.49-kg) Rammer and 12-in (304.8-mm) Drop.
ASTM D 1556	Test Method for Density of Soil in Place by the Sand-Cone Method.
ASTM D 1557	Test Methods for Moisture-Density Relations of Soils and Soil-Aggregate Mixtures Using 10-lb (4.54-kg) Rammer and 18-in (457-mm) Drop.
ASTM D 2419	Test Method for Sand Equivalent Value of Soils and Fine Aggregate.
ASTM D 2922	Test Methods for Density of Soil and Soil-Aggregate in Place by Nuclear Methods (Shallow Depth).

1.04 SUBMITTALS

- A. General: Submit information and samples to the ENGINEER for review as specified herein in accordance with Section 01300, "Submittals".
- B. Dewatering: The CONTRACTOR shall submit to the ENGINEER its proposed methods of handling trench water and the locations at which the water will be

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disposed of. Methods shall be acceptable to the ENGINEER before starting the excavation.

- C. Bedding and Backfill Materials: The CONTRACTOR shall notify the ENGINEER of the off-site sources of bedding and backfill materials, and submit to the ENGINEER a representative sample weighing approximately 50 lbs. The sample shall be delivered to a location on site determined by the ENGINEER.
- D. Sheeting System: Drawings of the sheeting system and design computations shall be submitted to the ENGINEER; however, the review of these drawings shall in no way relieve the CONTRACTOR of the responsibility to provide a safe and satisfactory sheeting and shoring system. Sheeting and shoring shall be designed by the CONTRACTOR, and the proposed design shall be sealed by a Professional ENGINEER registered in the State of Florida. If the ENGINEER is of the opinion that at any point sufficient or proper supports have not been provided, it may order additional supports put in at the CONTRACTOR's expense.
- E. Dewatering Permits: If the quantity or nature of water withdrawn requires approval/permits from regulatory agencies, the CONTRACTOR shall procure such permits at its expense and submit copies to the ENGINEER before commencing the work. The CONTRACTOR will not be granted contract time extensions due to dewatering permit processing delays.

1.05 QUALITY CONTROL

- A. An independent testing laboratory (Testing Laboratory) will be selected by the CITY to perform field and laboratory soil testing as described in Section 01400, "Testing and Inspection". The cost of the first round of tests will be paid from the "Test Allowance". The costs of subsequent recompaction and retesting resulting from not achieving the required minimum compaction shall be borne by the CONTRACTOR at no additional cost to the CITY.
- B. The CONTRACTOR shall schedule its work so as to permit a reasonable time for testing before placing succeeding lifts and shall keep the Testing Laboratory informed of his progress. A minimum of 48 hours of notice shall be provided to the Testing Laboratory to mobilize its activities.

1.06 SUBSURFACE INFORMATION

- A. The CONTRACTOR shall be responsible for anticipating groundwater conditions and shall provide positive control measures as required. Such measures shall ensure stability of excavations, groundwater pressure control, prevention of tanks, pipes, and other structures from being lifted by hydrostatic pressures, and avoiding the disturbance of subgrade bearing materials.

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1.07 TRENCH SAFETY ACT COMPLIANCE

- A. The CONTRACTOR by signing and executing the contract is, in writing, assuring that it will perform any trench excavation in accordance with the Florida Trench Safety Act, Section 553.60 et. seq.. The CONTRACTOR has further identified the separate item(s) of cost of compliance with the applicable trench safety standards as well as the method of compliance as noted in the "Bid Forms" Section of the Contract front-end documents.
- B. The CONTRACTOR acknowledges that this cost is included in the applicable items of the Proposal and Contract and in the Grand Total Bid and Contract Price.
- C. The CONTRACTOR is, and the CITY and ENGINEER are not, responsible to review or assess the CONTRACTOR's safety precautions, programs or costs, or the means, methods, techniques or technique adequacy, reasonableness of cost, sequences or procedures of any safety precaution, program or cost, including but not limited to, compliance with any and all requirements of Florida Statute Section 553.60 et. seq. cited as the "Trench Safety Act". The CONTRACTOR is, and the CITY and ENGINEER are not, responsible to determine if any safety or safety related standards apply to the project, including but not limited to, the "Trench Safety Act".

1.08 PROTECTION OF PROPERTY AND STRUCTURES

- A. The CONTRACTOR shall, at its own expense, sustain in place and protect from direct or indirect injury, all pipes, poles, conduits, walls, buildings, and all other structures, utilities, and property in the vicinity of its Work. Such sustaining shall be done by the CONTRACTOR. The CONTRACTOR shall take all risks attending the presence or proximity of pipes, poles, conduits, walls, buildings, and all other structures, utilities, and its Work. It shall be responsible for all damage, and assume all expenses, for direct or indirect injury and damage, caused by its Work, to any such pipe, structures, etc., or to any person or property, by reason of injury to them, whether or not such structures, etc., are shown on the Drawings.
- B. Barriers shall be placed at each end of all excavations and at such places as may be necessary along excavations to warn all pedestrian and vehicular traffic of such excavations. Barricades with flashing lights shall also be placed along excavation from sunset each day to sunrise of the next day until such excavation is entirely refilled, compacted, and paved. All excavations shall be barricaded where required to meet OSHA, local and Federal Code requirements, in such a manner to prevent persons from falling or walking into any excavation within the site fenced property limits.

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EXCAVATION AND BACKFILL FOR UTILITIES

1.09 DEWATERING PERMITS

- A. The CONTRACTOR shall be responsible for obtaining all permits required for the dewatering operation.

Part 2 - PRODUCTS

2.01 BEDDING MATERIAL

- A. Bedding materials shall be furnished from acceptable off-site sources. The CONTRACTOR shall submit to the ENGINEER the sources of each material for review in accordance with Section 01300, "Submittals".
- B. Crushed stone (or drainfield limerock) shall be used as bedding material for piping (except for copper pipe) and/or manholes as shown on the Standard Details when the installation is below the ground water table elevation. Crushed stone shall consist of hard, durable, sub-angular particles of proper size and gradation, and shall be free from organic material, wood, trash, sand, loam, clay, excess fines, and other deleterious materials.
 - 1. For pipe diameters less than 24 inches, the stone shall conform to the requirements of ASTM C 33, Size No. 57 (3/4-inch rock) and be graded within the following limits:

<u>Sieve Size</u>	<u>Percent Finer by Weight</u>
1-½ inch	100
1 inch	95 - 100
½ inch	25 - 60
No. 4	0 - 10
No. 8	0 - 5

- 2. For bedding of 24 inch and larger diameter pipe, the stone shall conform to the requirements of ASTM C 33 and be graded within the following limits:

<u>Sieve Size</u>	<u>Percent Finer by Weight</u>
5/8 inch	100
1/2 inch	40 - 100
3/8 inch	15 - 45
No. 10	0 - 5

- C. Sand shall be used for bedding pipe when installed under dry trench conditions, or above the ground water table. Sand shall also be used for bedding copper pipe under all conditions. Sand shall be dry, screened, graded sand with 100

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percent passing a 3/8-inch sieve and not more than 5 percent passing a No. 200 sieve.

- D. Limerock screenings, sand or other fine material shall not be used for bedding.
- E. All pipe bedding material shall be new, unless otherwise approved by the Engineer. Existing pipe bedding material may not be used.

2.02 SELECT BACKFILL

- A. Select Backfill: Select backfill shall be clean sandy material passing through a 3/4-inch sieve as select backfill material.

2.03 GENERAL BACKFILL

- A. All other backfill (general backfill) placed above the select backfill shall pass through a 6-inch ring. General backfill shall contain no more than 10 percent organics. General backfill used under roadways shall be compatible with the materials and compaction specified under Section 02510 – Asphaltic Concrete Pavement and 02526 – Concrete Pavement, Curbs and Sidewalk.

Part 3 - EXECUTION

3.01 EXCAVATION

- A. The CONTRACTOR shall perform all excavation of every description and of whatever substance encountered, to the dimensions, grades and depths shown on the Drawings, or as required for a proper installation. All excavations shall be made by open cut and in accordance with the Trench Safety Act. All existing utilities such as pipes, poles and structures shall be carefully located, supported and protected from injury; in case of damage, they shall be restored at the CONTRACTOR's expense.
- B. Pipe trenches for piping shall be excavated to a width within the limits of the top of the pipe and the trench bottom so as to provide a clearance on each side of the pipe barrel, measured to the face of the excavation, or sheeting if used, of 6 inches to 12 inches as defined on the Drawings. All pipe trenches shall be excavated to a level where suitable material is reached, a minimum of 8 inches below the pipe barrel or that will allow for a minimum of 36 inches of covering unless otherwise indicated on the Drawings.
- C. Ladders or steps shall be provided for and used by workmen to enter and leave trenches.
- D. Excavated unsuitable material shall be removed from the site and disposed of by the CONTRACTOR. Materials removed from the trenches shall be stored and in such a manner that will not interfere unduly with traffic on public roadways and sidewalks and shall not be placed on private property. In congested areas, such materials that cannot be stored adjacent to the trench or used immediately

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as backfill shall be removed to other convenient places of storage acceptable to the CITY at the CONTRACTOR's expense.

- E. Excavated material that is suitable for use as backfill shall be used in areas where sufficient material is not available from the excavation. Suitable material in excess of backfill requirements shall be disposed off-site at the CONTRACTOR's expense.

3.02 SHEETING AND BRACING

- A. The CONTRACTOR shall furnish, place and maintain sheeting and bracing to support sides of the excavation as necessary to provide safe working conditions in accordance with OSHA requirements, and to protect pipes, structures and other Work from possible damage. Where wood sheeting or certain designs of steel sheeting are used, the sheeting shall be cut off at a level of 2 feet above the top of the installed pipe and that portion below the level shall be left in place. If interlocking steel sheeting is used, it may be removed providing removal can be accomplished without disturbing the bedding, pipe or alignment of the pipe. Any damage to the pipe bedding, pipe or alignment of the constructed utility caused by the removal of sheeting shall be cause for rejection of the affected portion of the work. The CITY may permit sheeting to be left in place at the request and expense of the CONTRACTOR, or the CITY may order him in writing to leave in place, for the preventing of damage to structures or property. Payment for sheeting ordered to remain in place shall be paid for at a negotiated price.
- B. If the ENGINEER is of the opinion that at any point sufficient or proper supports, have not be provided, he may order additional supports put in at the CONTRACTOR's expense. The CONTRACTOR shall be responsible for the adequacy of all sheeting used and for all damage resulting from sheeting and bracing failure or from placing, maintaining and removing it.

3.03 REMOVAL OF WATER

- A. General: It is a basic requirement of these Specifications unless otherwise authorized per Article 3.09 that excavations shall be free from water before pipe or structures are installed.
- B. The CONTRACTOR shall provide pumps, and other appurtenant equipment necessary to remove and maintain water at such a level as to permit construction in a dry condition. The CONTRACTOR shall continue dewatering operations until backfilling has progressed to a sufficient depth over the pipe to prevent flotation or movement of the pipe in the trench or so that it is above the water table. If at any point during the dewatering operation it is determined that fine material is being removed from the excavation sidewalls, the dewatering operation shall be stopped. If any of the subgrade or underlying material is

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disturbed by movement of groundwater, surface water, or any other reason, it shall be replaced at the CONTRACTOR's expense with crushed stone or gravel.

- C. The CONTRACTOR shall use dewatering systems that include automatic starting devices, and standby pumps that will ensure continuous dewatering in the event of an outage of one or more pumps.
- D. Disposal: Water from the trenches and excavation shall be disposed of in such a manner as will not cause injury to public health, to public or private property, to the Work completed or in progress, to the surface of the streets, cause any interference with the use of the same by the public, or cause pollution of any waterway or stream. The CONTRACTOR shall submit his proposed methods of handling trench water and locations at which the water will be disposed of to the ENGINEER for review and shall receive acceptance before starting the excavation. Disposal to any surface water body will require silt screens to prevent any degradation in the water body. The CONTRACTOR shall have responsibility for acquiring all necessary permits for disposal.

3.04 TRENCH STABILIZATION

- A. No claim for extras, or additional payment will be considered for cost incurred in the stabilization of trench bottoms which are rendered soft or unstable as a result of construction methods, such as improper or inadequate sheeting, dewatering or other causes. In no event shall pipe be installed when such conditions exist and the CONTRACTOR shall correct such conditions so as to provide proper bedding or foundations for the proposed installation at no additional cost to the CITY before placing the pipe or structures.

3.05 PIPE BEDDING IN DRY TRENCHES

- A. Pipe trenches shall be excavated as described in Article 3.01. The resulting excavation shall be backfilled with acceptable pipe bedding material, up to the level of the centerline of the proposed pipe barrel. This backfill shall be tamped and compacted to provide a proper bedding for the pipe and shall then be shaped to receive the pipe. Bedding shall be provided under the branch of all fittings to furnish adequate support and bearing under the fitting.
- B. Any over excavation below the levels required for installation of the pipe shall be backfilled with acceptable bedding material, tamped, compacted and shaped to provide proper support for the proposed pipe, at the CONTRACTOR's expense.

3.06 BACKFILL

- A. The CONTRACTOR shall not backfill trenches until the piping has been inspected and tested in accordance with Section 15995 - Pipeline Testing and Disinfection.

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- B. Pipelines: Pipeline trenches shall be backfilled to a level 12 inches above the top of the pipe with select backfill. When placed in the dry, such material shall be placed in 9-inch layers, each compacted to the densities specified in Article 3.07. Only hand operated mechanical compacting equipment shall be used within six inches of the installed pipe.
- C. After the select backfill has been placed as specified above, and after all excess water has completely drained from the trench, general backfilling of the remainder of the trench may proceed. General backfill shall be placed in horizontal layers, the depth of which shall not exceed the ability of the compaction equipment employed, and in no event shall exceed a depth of 12 inches. Each layer shall be moistened, tamped, puddled, rolled or compacted to the densities specified in Article 3.07.
- D. Manholes and Vaults: Any excavation below the levels required for the proper construction of manholes or vaults shall be filled with Class B concrete. The use of earth, rock, sand or other materials for this purpose will not be permitted.

3.07 COMPACTION AND DENSITIES

- A. Compaction of backfill shall be 98% of the maximum density where the trench is located under structures or paved areas, and 95% of the maximum density elsewhere. Methods of control and testing of backfill construction are:
 - 1. Maximum density of the material in trenches shall be determined by ASTM D 1557.
 - 2. Field density of the backfill material in place shall be determined by ASTM D 1556 or D 2922.
- B. Density Test Locations for Pipelines: The compacted backfill/fill shall be tested for in-place density at the rate of one test location per 200 lineal feet (or fraction thereof) of trench, or as shown on the Drawings or as directed by the ENGINEER. The density tests shall be taken at the trench bottom and at each location in one foot intervals beginning from the top of the piping and ending at the final grade. At existing road or pavement crossings, a minimum of two (2) density tests per crossing per lift is required.
- C. Trench backfill which does not comply with the specified densities, as indicated by such tests, shall be reworked and recompacted until the required compaction is secured, at no additional cost to the CITY. The costs for retesting such Work shall be paid for by the CONTRACTOR.

3.08 ADDITIONAL EXCAVATION AND BACKFILL

- A. Where organic material, such as roots, muck, or other vegetable matter, or other material which, in the opinion of the ENGINEER, will result in unsatisfactory foundation conditions, is encountered below the level of the proposed pipe

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bedding material, it shall be removed to a depth of two feet below the outside bottom of the pipe or to a greater depths as directed by the ENGINEER and removed from the site. Sheeting shall be installed if necessary to maintain pipe trenches within the limits identified by the ENGINEER. The resulting excavation shall be backfilled with suitable backfill material, placed in 12-inch layers, tamped and compacted up to the level of the bottom of the proposed pipe bedding material. Sufficient compaction of this material shall be performed to protect the proposed pipe against settlement. Lean concrete may be used in lieu of backfill when pipe installation is in the wet or at the CONTRACTOR's option. Construction shall then proceed in accordance with the provisions of Article 3.05.

- B. Additional excavation (more than two feet below the pipe) shall be performed when ordered by the ENGINEER. Where organic or other material is encountered in the excavation, the CONTRACTOR shall bring the condition to the attention of the ENGINEER and obtain his determination as to whether or not the material will require removal, prior to preparing the pipe bedding. The excavation of material up to a depth of two feet below the outside bottom incidental items of construction and the Work shall be done at no additional cost to the CITY. Where ordered by the ENGINEER, excavation greater than two feet below the pipe, backfill and additional sheeting, will be compensated by the CITY.

3.09 ALTERNATE METHOD OF CONSTRUCTION

- A. Use of This Method: A combination of conditions in the substrate, water table, or method of disposal may be encountered during the course of the work which makes dewatering impossible. When such conditions are encountered, but only after all reasonable means (pumps, well points, etc.) to dewater the excavation have been employed without success, the CONTRACTOR, may request to employ the following Alternate Method of Construction. The concurrence of the ENGINEER shall be obtained in writing and shall limit the use of the alternate method of construction to such specific portions of the Work as the ENGINEER shall determine.
- B. The requirements set forth in other sections of these Specifications shall establish the required standards of construction quality for this work. Use of the alternate method of construction described hereinafter shall in no way be construed as relieving the CONTRACTOR of the work. No additional payment will be made to the CONTRACTOR for excavation, backfill, sheeting or any cost incurred for Work or materials, or any other costs incurred as a result of the use of this alternate method of construction. The prices established in the Proposal shall be for full payment for the various items of work.
- C. Subject to all the requirements stated herein, including written acceptance of the ENGINEER, construction will be permitted in accordance with the following

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specifications. All requirements of these Specifications shall apply to this construction unless otherwise specifically modified herein.

- D. Removal of Water: The installation of pipe and appurtenances under water will be permitted and the requirements of Article 3.03 will be waived.
- E. Excavation shall be performed in accordance with Article 3.01 to the specified limits. The excavation shall be completely cleaned of silt and other fines.
- F. Pipe Bedding: Pipe bedding shall be placed from the bottom of the excavation to six inches above the top of the pipe. The bedding material shall be screened gravel or crushed stone as specified in Article 2.01. Limerock screenings, sand or other fine organic material shall not be used.
- G. The bedding material shall be placed to the lower third of the pipe barrel and then be shaped to receive the pipe at the intended elevation. Bedding shall be provided under the branch of all fittings to furnish adequate support and bearing under the fitting. After the pipe section is installed and tested if required, the remaining bedding shall be placed to the top of the pipe.
- H. Select backfill material shall be used to backfill from 6 inches above the top of the pipe to a level one foot above standing ground water. The lift shall then be compacted per Article 3.07. General backfill shall then be placed in 8-inch lifts and compacted per Article 3.07.
- I. If the Alternate Method of Construction is used, all backfill material, including specified pipe bedding material, shall be carefully lifted into the trench and not released to fall freely therein until the bucket or container is at or just above water level. Under no circumstances shall backfill material be dumped or pushed into the trenches containing water. Below water level, the bedding and backfill material shall be carefully rammed into place in uniform layers, of equal depth on each side of the pipe, up to one foot above the water level. Above the water level, backfill material shall be placed and compacted for normal backfill as previously specified.

3.10 RESTORATION OF EXISTING SURFACES

- A. Restore all grassed areas disturbed by the trenching operations by resodding in accordance with Section 02900 – Sodding.

- END OF SECTION –

SECTION 02223

EXCAVATION AND BACKFILL FOR STRUCTURES

Part 1 - GENERAL

1.01 THE REQUIREMENT

- A. This Section includes, except as elsewhere provided, excavation, filling and compacting work for the piping installation.

1.02 RELATED WORK SPECIFIED ELSEWHERE

- A. Section 01300 - Submittals
- B. Section 01560 - Special Controls
- C. Section 02140 – Dewatering
- D. Section 02160 - Temporary Excavation Support Systems
- E. Section 02210 - Earth Excavation, Backfill, Fill and Grading
- F. Section 02222 – Excavation and Backfill for Utilities

1.03 QUALITY CONTROL

- A. Codes and Standards: Excavation and backfill work shall be performed in compliance with applicable codes, standards and requirements of governing authorities having jurisdiction in the area.
- B. Testing and Inspection Service: An independent testing laboratory (Testing Laboratory) will be selected by the CITY to conduct appropriate field and laboratory tests on soils and other materials in accordance with the Contract Documents. The first round of tests will be paid for from the “Cost Allowance for Permits, Licenses and Fees”. The costs of any subsequent recompaction and retesting due to not achieving the required minimum compaction will be borne by the CONTRACTOR at no additional cost to the CITY.

1.04 JOB CONDITIONS

A. Existing Utilities

1. Locate existing underground utilities in the areas of work. Test pits and hand excavation in critical areas will be required prior to initiating work.
2. All existing utilities including piping, electrical conduits, electric duct banks and telephone cables that are shown on the Contract Drawings to be relocated, shall be relocated prior to initiating earth work. Excavation and backfill for relocation of existing utilities shall conform to the requirements of Section 02222 - Excavation and Backfill for Utilities. The CONTRACTOR shall coordinate relocation of utilities with utility companies having jurisdiction in the area. Should unknown or incorrectly identified piping or other utilities be encountered during excavation, the CONTRACTOR shall consult the CITY, ENGINEER and Owner of such piping/utility for directions.

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EXCAVATION AND BACKFILL FOR STRUCTURES

3. The CONTRACTOR shall cooperate with the CITY and utility companies in keeping respective services and facilities in operation.

1.05 PROHIBITION OF BLASTING

- A. The use of explosives for excavation work is strictly prohibited on this project.

1.06 SUBMITTALS

- A. The CONTRACTOR shall submit information and samples to the ENGINEER for review as specified herein in accordance with Section 01300. The information shall include:
 1. Detailed description of the dewatering method chosen and sequence of dewatering operations, if dewatering is necessary.
 2. Plans showing the methods and locations of dewatering and discharge. The drawings shall include a sufficient number of detailed sections to clearly illustrate the scope of work. The drawings showing all of the above information, including calculations, shall be prepared by a qualified Professional Engineer registered in the state of Florida, and shall bear its seal and signature. A copy of any relevant dewatering permit shall be submitted.
 3. Lists of materials and equipment to be used.
 4. Detailed description of the selected method(s) of excavation, fill and compaction.
 5. Plans of open cut excavations showing side slopes and limits of the excavation at grade where not shown on the Contract Drawings. The traffic lane to be closed and maintained shall be indicated in the submittal.
 6. Design computation of sheeting system. Sheeting and shoring plans shall be designed and sealed by a professional Engineer registered in the State of Florida. Submittals shall indicate depth of penetration.
 7. The CONTRACTOR shall furnish the ENGINEER, for approval, a representative sample of structural fill material from off-site sources at least ten calendar days prior to the date of anticipated use of such material. The sample shall be delivered to the site at a location determined by the ENGINEER. The submittal shall identify the source of the material.

1.07 PROTECTION OF PROPERTY AND STRUCTURES

- A. The CONTRACTOR shall, at its own expense, sustain in place and protect from direct and indirect injury, its work at all times as well as all pipes, poles, conduits, walls, buildings, and all other structures, utilities and property in the vicinity of its work. Such sustaining shall be done by the CONTRACTOR. The CONTRACTOR shall take all risks attending the presence or proximity of pipes, poles, conduits, walls, buildings and all other structures, utilities, and property

SECTION 02223

EXCAVATION AND BACKFILL FOR STRUCTURES

in the vicinity of its work. It shall be responsible for all damage, and assume all expenses, for direct or indirect injury and damage, caused by its work, to any such pipes, structures, etc., or to any person or property, by reason of injury to them, whether or not such structures, etc., are shown on the Drawings.

- B. Barriers and lights shall be placed at all excavations in accordance with OSHA requirements.
- C. Safe and suitable ladders for access to trenches shall be provided in accordance with OSHA requirements.

Part 2 - PRODUCTS

2.01 GENERAL

- A. Specific locations/areas of work where these materials shall be utilized are defined on the Drawings.

2.02 STRUCTURAL FILL

- A. Fill material shall be non-cohesive, non-plastic, granular mixture of local clean sand or local clean sand and limerock free from vegetation, organic material, muck or deleterious matter. Material shall conform to AASHTO-2 gradation with no more than ten (10) percent by weight passing the No. 200 sieve. All rock or hard material shall pass through a 3-inch diameter ring. Broken Portland cement or asphaltic concrete shall not be considered an acceptable fill material. Fill material containing limerock shall have sufficient sand to fill the voids in the limerock. Material placed in the upper 6-inches of all backfills or fills shall not contain any stones or rocks larger than 1-inch in diameter. Limits of excavation and fill shall be as defined on the Drawings. All structural fill materials shall be obtained from off-site sources.

2.03 OTHER MATERIALS

- A. Requirements for any other fill material, if needed, are defined on the Drawings.

Part 3 - EXECUTION

3.01 CONTRACTOR INSPECTIONS

- A. Examine the areas and conditions under which excavating, filling, and grading are to be performed. Do not proceed with the work until unsatisfactory conditions have been corrected.
- B. Examine and accept existing grade of the project site walkways, pavements, etc., prior to commencement of work and report to ENGINEER if elevations of existing subgrade substantially vary from elevations shown on the Drawings.

SECTION 02223

EXCAVATION AND BACKFILL FOR STRUCTURES

3.02 EXCAVATION FOR STRUCTURES

- A. Unless otherwise indicated on the Drawings, all excavation shall be made in such a manner, and to such widths, as will give ample room for properly constructing and inspecting the structures they are to contain. Excavation shall be made in accordance with the details shown on the Drawings, and as specified herein. Attention shall be given to the proper handling of storm water runoff. The CONTRACTOR shall intercept and collect surface run off both at the top and bottom of cut slopes. The excavating equipment shall operate in an organized fashion so as to remove silt from one edge of the excavation to the other so as not to trap silt within the undercut area.
- B. Where required on the Drawings, unsuitable material (silt layer) beneath the groundwater encountered at the site shall be removed using equipment, as approved by the ENGINEER. The equipment shall operate in an organized manner so as to remove silt from one edge of the excavation to the other so as not to trap silt within the undercut area. Unsuitable material shall be drained while being removed, removed and disposed of off-site by the CONTRACTOR. The CONTRACTOR shall clean all roadways impacted by his demucking, hauling, any temporary stockpiling and removal operations at a frequency as determined by the ENGINEER in the field.
- C. In excavating for footings and foundations, the CONTRACTOR shall take care not to disturb bottom of excavation. Excavate by hand to final grade just before concrete reinforcement is placed. Trim bottoms to required lines and grades to leave solid base to receive concrete.
- D. The CONTRACTOR shall ensure that its excavation work does not adversely affect the bearing capacity of the structural subsurface. Also, the CONTRACTOR shall proceed with foundation work immediately after excavation work and as expeditiously as possible so as to minimize any potential for subsurface disturbance due to environmental factors, adverse weather, etc. The CONTRACTOR shall also take all necessary precautions to protect its work from potential adverse impacts. Where excavated areas are disturbed by subsequent operations or adverse weather, scarify surface, reshape, fill as required, and compact to required density.
- E. All excavated soil material, removed underground utilities including pipes and fittings, electrical conduits and duct banks, and other undefined materials removed within the limits of the excavation, shall be disposed off-site by the CONTRACTOR.
- F. Refer to the Drawings for additional requirements for excavation for specific locations/areas of work.

3.03 UNAUTHORIZED EXCAVATION

- A. Excavation work carried outside of the work limits required by the Contract Documents shall be at the CONTRACTOR's expense, and shall be backfilled

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EXCAVATION AND BACKFILL FOR STRUCTURES

by the CONTRACTOR at its own expense with structural fill, as directed by the ENGINEER. Where, in the judgment of the ENGINEER, such over-excavation requires use of lean concrete or crushed stone, the CONTRACTOR, at its expense, shall furnish and place such materials.

3.04 SHEETING AND BRACING

- A. The term "sheeting" shall represent any type of shoring used to support sides of the excavation. Walls of the excavation shall be kept vertical where open cut is not practical and, if required to protect the safety of workmen, the general public, this or other work or structure, or excavation walls, the excavation shall be properly sheeted and braced for conditions encountered and in conformance with OSHA requirements. Excavation for the structures shall be sufficient to provide a clearance between their outer surfaces and the face of the excavation, sheeting, or bracing, of not less than two feet, unless otherwise indicated on the Drawings. Materials encountered in the excavation, which have a tendency to slough or flow into the excavation, undermine the bank, weaken the overlying strata, or are otherwise rendered unstable by the excavation operation shall be retained by sheeting, stabilization, grouting or other acceptable methods.
- B. Minimum length of embedment below the deepest part of the excavation shall be 0.3 times the depth of excavation being supported or greater depending on the sheeting. The design of the sheeting arrangement shall be the responsibility of the CONTRACTOR.
- C. Sheetting shall be removed provided its removal will not jeopardize pipes or structures. Any sheeting left in place must be authorized by the ENGINEER and shall be cut-off two feet below finished grade, or as directed. The CONTRACTOR will not receive extra compensation for sheeting left in place or the cut off work required.

3.05 REMOVAL OF WATER

- A. General
 1. Removal of groundwater, or dewatering, shall be accomplished in accordance with the requirements of Section 02140, "Dewatering", and as indicated below. In the event these requirements are in conflict, the most stringent shall govern.
 2. The CONTRACTOR shall provide pumps, well points, and other appurtenant equipment necessary to remove and maintain water at such a level as to permit construction in the dry where defined on the Drawings. The ground water level shall be controlled so as to permit the placing and curing of concrete and the maintenance of supporting foundations and adjacent work and structures in the dry.

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EXCAVATION AND BACKFILL FOR STRUCTURES

3. The CONTRACTOR shall use dewatering systems that include automatic starting devices, and standby pumps that will ensure continuous dewatering in the event of an outage of one or more pumps.
 4. If excavations to be dewatered cannot be maintained dry by the CONTRACTOR's dewatering efforts, then the CONTRACTOR shall provide tremie seals at no additional cost to the CITY. The placement of tremie seals shall not preclude dewatering operations specified herein. The limits of tremie seals shall be recommended by the CONTRACTOR and reviewed and accepted by the ENGINEER.
 5. Dewatering Permits: If the quantity and/or nature of water withdrawn require approval/permits from regulatory agencies, the CONTRACTOR shall procure such permits at its expense, and submit copies to the ENGINEER before commencing the work. The CONTRACTOR will not be granted contract time extensions due to dewatering permit processing delays.
- B. Disposal: The CONTRACTOR shall be responsible to dispose of water from the dewatering operation in accordance with the Contract Documents and shall obtain all necessary permits and conform to all local regulations and codes. Water from the excavation shall be disposed of in such a manner as will not cause injury to public health, to public or private property, to the work completed or in progress, to the surface of the streets, will not cause any interference with the use of the same by the public, or will not cause pollution of any waterway or stream. Water from dewatering operation may be disposed at locations directed by the CITY with the proper installation of siltation screens and operation of the dewatering system in accordance with all local regulations and codes. The CONTRACTOR shall submit its dewatering method and point(s) of discharge to the ENGINEER for review at least twenty (20) days prior to any dewatering activities. The CONTRACTOR shall provide maintenance of canal(s) and drainage ditches to which it discharges. The cost of maintaining drainage ditches and canal(s) shall be included in the bid price. The CONTRACTOR shall remove siltation and haul, and dispose of this material on a regular basis to maintain the original base conditions at all time, so as not to impact drainage in the general area.

3.06 FILL PLACEMENT AND COMPACTION

A. General

1. Fill material (including structural fill and other fill material) shall be placed within the limits of excavations as shown on the Drawings. When placed in the wet, fill material shall be placed in standing groundwater to a level one foot above stabilized groundwater. The material shall be placed at one edge of the excavation and pushed to the other so as to move residuals across the bottom of the excavation. The leading edge of the fill should be

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EXCAVATION AND BACKFILL FOR STRUCTURES

- cleaned regularly to remove it of the advancing residuals. All residuals shall be disposed at off-site locations shown on the Drawings or specified herein.
2. Once fill materials have been placed up to one foot above the stabilized groundwater, the entire lift should then be rolled with six passes from a 10-ton roller. The coverage shall be overlapping, and shall occur while the compactor is operated at a travel speed of not more than two feet per second. If a vibratory compactor is used, it should be operated with the vibrator off so as not to induce capillary moisture into the dry fill soils.
 3. Fill materials placed following this initial lift shall be placed in the dry with loose lift thickness of eight inches or less. Each lift shall be compacted to achieve a minimum of 98 percent Modified Proctor maximum dry density in accordance with ASTM D1557. Fill materials shall be placed within two percent of optimum moisture content.
- B. Inspection and Testing: The fill placement and compaction shall be observed by the ENGINEER. As a minimum, an in-place density test will be made in each lift of compacted soil for every 2,500 square feet of area. The CONTRACTOR shall coordinate and cooperate with the Testing Laboratory.
- C. Final Grades: Final structure fill grades shall be within 0.1 feet of elevations shown. Where shown on the Drawings, surfaces shall be sloped for drainage or other surfaces.
- D. Refer to the Drawings for additional fill and compaction requirements for specific locations/areas of work.

3.07 BACKFILL AGAINST STRUCTURES

- A. Backfill against non-water holding structures shall not be performed until the concrete has been inspected by the ENGINEER. Backfill against walls shall also be deferred until the structural slab for floors above the top fill line have been placed and attained design strength. Partial backfilling against adequately braced walls may be considered by the ENGINEER on an individual situation basis. Where walls are to be waterproofed, all work shall be completed and membrane materials dried or cured according to the manufacturer's instructions before backfilling.

- END OF SECTION -

SECTION 02225

CONTAMINATED SOILS AND GROUNDWATER

Part 1 - GENERAL

1.01 THE REQUIREMENT

- A. This Section includes, except as elsewhere provided, the work necessary to remove, transport, and properly dispose of contaminated soils and groundwater required for complete construction of structures and underground piping systems and appurtenances as shown on the Drawings and specified herein.

1.02 RELATED WORK SPECIFIED ELSEWHERE

- A. Section 02222 – Excavation and Backfill for Utilities
- B. Section 02224 – Excavation and Backfill for Structures

1.03 QUALITY CONTROL

- A. Codes and Standards: All work associated with dewatering, excavation, removal, transportation and disposal of contaminated soils and groundwater shall be performed in compliance with applicable codes, standards and requirements of governing authorities having jurisdiction in the area.
- B. Testing and Inspection Service: A testing laboratory certified by the Broward County Environmental Protection and Growth Management Department (BCEPGMD) and the State of Florida shall be retained by the CONTRACTOR to conduct appropriate soils and groundwater testing in accordance with regulatory requirements and the Contract Documents.

1.04 SUBMITTALS

- A. The CONTRACTOR shall submit information and samples to the CITY for review as specified herein in accordance with Section 01300. The information shall include:
 - 1. Detailed description of the proposed methods for temporary stockpiling, transportation, and disposal of all contaminated soils and groundwater.
 - 2. Copies of permits for all disposal facilities.
 - 3. Copies of all manifest and documentation for handling and disposing of all contaminated soil and groundwater in full compliance with local, state and federal requirements. This documentation must be provided prior to requesting payment under this Bid item.
 - 4. Copies of all laboratory analyses required for transportation and disposal of all contaminated soils and groundwater in full compliance with local, state and federal requirements.
 - 5. Names, addresses and contact numbers of all subcontractors.

SECTION 02225

CONTAMINATED SOILS AND GROUNDWATER

6. Copy of Contractor's Health and Safety Plan and training certificates of personnel who will be handling the contaminated material in accordance with OSHA requirements.

Part 2 - PRODUCTS (NOT USED)

Part 3 - PART 3 - EXECUTION

3.01 CONTAMINATED SOILS

- A. The CONTRACTOR shall retain a laboratory certified by the BCEPGM and the State of Florida to sample the groundwater in the excavation, the stored soil and soil samples in the perimeter of the excavated hole for petroleum contamination (EPA Methods 601, 602, 610). The number of samples shall be sufficient to comply with the requirements of the CONTRACTOR's approved Dewatering Plan and all local, state and federal regulations. The results of the tests shall be forwarded to the CITY.
- B. Excavated materials which are deemed to be contaminated shall be removed, treated and disposed of by the CONTRACTOR in accordance with all applicable regulatory requirements. The soil may be contaminated with petroleum product which may be partly or entirely diesel fuel or gasoline. When such soil conditions are encountered, they shall be brought to the CITY's attention. The extent of excavation shall be determined in the field by the CITY. Payment for this work shall be in accordance with the allowance bid item for excavation, treatment and disposal of contaminated soil, included in the Schedule of Prices Bid.
- C. All contaminated soil which is excavated shall be stockpiled in an area designated for contaminated soils. The CONTRACTOR shall take whatever precautions are necessary to ensure that contaminated soils are not co-mingled with non-contaminated stockpiled soils and/or mucks.
- D. Contaminated soils must be placed on an impermeable barrier when temporarily stockpiled and must be covered with visquine to prevent runoff. All stockpile leachate or runoff must be collected for disposal in accordance with federal, state and local regulations.
- E. Contaminated soils shall be processed and treated at a state licensed facility. These soils shall be transported and disposed of in accordance with federal, state and local regulations.
- F. The CONTRACTOR shall be responsible for testing soil which has been treated to certify treated soil meets applicable federal, state, and local regulations for final disposal.

3.02 CONTAMINATED GROUNDWATER

SECTION 02225

CONTAMINATED SOILS AND GROUNDWATER

- A. All water generated, pumped or removed from excavations as a result of excavation dewatering activities shall be collected, containerized, and managed prior to discharge and/or treatment at an approved discharge point in accordance with local, state and federal regulations and the requirements of the Contract Documents. If groundwater contamination is identified at any time during the performance of the Work, CONTRACTOR shall immediately notify the CITY.
- B. If contaminated groundwater in the dewatering excavation area is encountered, the contaminated groundwater shall be removed, treated and discharged by the CONTRACTOR in accordance with all applicable regulatory requirements. Payment for this work shall be in accordance with the allowance bid item for treatment and discharge of contaminated groundwater, included in the Schedule of Prices Bid.
- C. Treatment of contaminated groundwater will include the following options, depending on the magnitude of the contamination in the trench: Granular Activated Carbon (GAC) Treatment vessels, mobile air stripping units, vacuum truck removal and disposal or other method as approved by the CITY and regulatory agencies with jurisdiction.
- D. If contaminated groundwater is encountered during construction, CONTRACTOR shall provide reference information for the qualified groundwater remediation subcontractor to be utilized, including phone number, contact name, and address. The selected groundwater treatment/recycling facility for hauling contaminated groundwater shall also be identified.
- E. Effluent water from the treatment system will be analyzed by the certified laboratory to confirm that concentrations are below regulatory limits. Effluent water will then be directed to a pre-approved location as determined by local regulatory agencies and/or the CITY.

3.03 TRANSPORT AND DISPOSAL

- A. Transport Regulations: The CONTRACTOR shall be responsible for the loading, labeling, placarding, marking, weighing, and transporting of all waste materials in accordance with the Florida Department of Transportation Regulations, and U.S. Department of Transportation Regulations. The CONTRACTOR shall use only transporters that are licensed and competent to haul these wastes.

3.04 WASTE CONTAINERS

- A. Each transport container of waste shall be visually inspected by the CONTRACTOR for leaks, drips, or container damage prior to being loaded. Containers which are found to be leaking or damaged shall not be loaded until

SECTION 02225

CONTAMINATED SOILS AND GROUNDWATER

the damage is repaired. The CONTRACTOR shall prepare the transport container to prevent spillage or contamination. The CONTRACTOR shall notify the CITY two hours before any loaded transport leaves the site.

- B. All transport containers leaving the site shall be inspected by the CONTRACTOR to ensure that no waste material adheres to the wheels or undercarriage.
- C. All vehicles on which waste is adhering shall be cleaned by sweeping tires and undercarriage or by other dry methods prior to leaving the site.

3.05 SHIPPING RECORDS

- A. The CONTRACTOR shall prepare accurate shipping records for any wastes leaving the site in accordance with applicable federal and state regulations. The CONTRACTOR shall be responsible for providing copies of the records to the CITY and shall immediately notify the CITY of any problems in completing shipments and disposal of wastes.
- B. The CONTRACTOR shall:
 - 1. Be responsible for appropriate measurement of unit quantity (weight or volume) of waste material removed from the site.
 - 2. Coordinate vehicle inspection and recording of quantities leaving the site with the CITY. These quantities shall be compared to recorded quantities received at the treatment or disposal facilities. The CONTRACTOR shall resolve any discrepancies occurring immediately, determining the probable cause for the discrepancy.
 - 3. Be solely responsible for any and all actions necessary to remedy situations involving waste spiked in transit.
- C. The CONTRACTOR shall ensure that a copy of the manifest and disposal receipt/bill of lading are returned to the CITY by the designated treatment or disposal facility within 14 days of receipt of the material to be disposed.

- END OF SECTION -

SECTION 02332

LIMEROCK BASE

Part 1 - GENERAL

1.01 WORK INCLUDED

- A. Furnish all labor, materials, equipment and incidentals required to provide limerock base in accordance with the grades and typical sections shown on the Drawings and as specified herein.

1.02 RELATED WORK:

- A. Section 02100 – Clearing and Grubbing.
- B. Section 02260 – Finish Grading
- C. Section 02510 - Asphaltic Concrete Pavement.

Part 2 - PRODUCTS

2.01 MATERIALS

- A. Source: The material used in limerock base courses shall be material classified as either Miami Oolite Formation or Ocala Formation at the CONTRACTOR'S option; however, only one formation may be used.
- B. Limerock material shall contain not less than 70 percent of carbonates of calcium and magnesium. The maximum percentage of water sensitive clay material shall be 3.
- C. Graduation: At least 97 percent (by weight) of the material shall pass a 3-1/2-inch sieve and the material shall be grades uniformly down to dust. The fine material shall consist entirely of dust of fracture. All crushing or breaking up which might be necessary in order to meet such size requirements shall be done before the material is placed on the road.
- D. Quality:
 1. The limerock material shall be uniform in quality and shall not contain cherty or other extremely hard pieces or lumps, balls or pockets of sand or clay size material in sufficient quantity as to be detrimental to prevent proper bonding, finishing or strength of limerock base. Limerock material shall be non-plastic, and the liquid amount shall not exceed 35.
 2. Compacted limerock material shall have an average LBR value of not less than 100.

SECTION 02332

LIMEROCK BASE

Part 3 - EXECUTION

3.01 PREPARATION

- A. For new limerock base construction, or areas where pavement is to be replaced, CONTRACTOR shall remove existing subgrade as required to provide the minimum thickness of new limerock base course as indicated on plans.
- B. Compact subgrade to a density of no less than 98% of maximum density as determined by AHSHTO T-180.
- C. No separate bid item is provided in the proposal for evacuating, grading and compacting subgrade. The cost thereof shall be included in the BID schedule items.

3.02 PERFORMANCE

- A. Transporting Limerock: The limerock shall be transported to the point where it is to be used, over rock previously placed if practicable, and dumped on the end of the preceding spread. No hauling over the subgrade or dumping on the subgrade shall be done.
- B. Spreading Limerock:
 1. The limerock shall be spread uniformly, and all segregated areas of fine or coarse rock shall be removed and replaced with well-graded rock.
 2. When the specified compacted thickness of the base is greater than 6-inches, the base shall be constructed in two courses. The thickness of the first course shall be approximately one-half the total thickness of the finished base, or enough additional to bear the weight of the construction equipment without disturbing the subgrade.
- C. Establish grades and cross-sections conforming to plans
 1. Provide a minimum of 8 inches of limerock as required to provide grades, elevations and cross sections, or as indicated on plans.
 2. For asphalt driveway restoration, the limerock base course shall be a minimum of 6 inches thick.
 3. The CONTRACTOR must determine for himself the volume of material required for the site.
- D. Compacting and Finishing Base:
 1. Work shall comply with Sections 200 of the FDOT Standard Specifications for Road and Bridge Construction.

SECTION 02332

LIMEROCK BASE

2. Proposed limerock base shall be compacted to a minimum of ninety-eight percent (98%) of maximum density as determined by ASHTO T-180. Properly compact areas adjacent to curbs, catch basins, manholes and other areas not accessible to rollers with mechanical or hand tamping devices.
3. Correction of Defects:
 - (a) If at any time the subgrade material should become mixed with the base course material, the CONTRACTOR shall dig out and remove the mixture, which shall be shaped and compacted as specified above.
 - (b) If cracks or checks appear in the base, either before or after priming, which in the opinion of the ENGINEER would impair the structural efficiency of the base course or checks by rescarifying, reshaping, adding base material where necessary and recompacting.
4. Field and laboratory testing shall be performed by an independent testing laboratory selected by the City. The first round of tests will be paid from the "Cost Allowance for Permits, Licenses and Fees". In the event compacted material does not meet the specified minimum in-place density, the CONTRACTOR shall re-compact the material and density tests will be repeated until specified minimum results are obtained. All costs of recompaction and retesting shall be borne by the CONTRACTOR at no additional cost to the CITY.

- END OF SECTION -

SECTION 02500

SURFACE RESTORATION

PART 1 - GENERAL

1.01 THE REQUIREMENT

- A. Items specified in this Section include repairs to landscaped and grassed areas that may be damaged or disturbed by CONTRACTOR activities.

1.02 RELATED WORK SPECIFIED ELSEWHERE

- A. Asphaltic concrete pavement.
- B. Site Grading

1.03 SUBMITTALS

- A. The CONTRACTOR shall submit submittals for review in accordance with the Section 01300 - Submittals.

1.04 DEFINITIONS

- A. The phrase "DOT Specifications" shall refer to the Florida Department of Transportation Standard Specifications for Road and Bridge Construction. The DOT Specifications are referred to herein and are hereby made a part of this Contract to the extent of such references, and shall be as binding upon the Contract as though reproduced herein in their entirety.

1.05 PROTECTION OF EXISTING IMPROVEMENTS

- A. The CONTRACTOR shall be responsible for the protection of all pavements and other improvements within the work area. All damage to such improvements, as a result of the CONTRACTOR'S operations, beyond the limits of the work of pavement replacement shall be repaired by the CONTRACTOR at his expense.

1.06 GUARANTEE

- A. The CONTRACTOR shall guarantee all trees, ground cover or shrubs planted or replanted under this Contract for a period of one year beyond acceptance of the project. In the event that any new tree, plant or shrub dies within the guarantee period, the CONTRACTOR shall be responsible for replacement in kind. In the event that a transplanted (reused) tree dies within the guarantee period, the CONTRACTOR shall be responsible for replacement in kind, except that the maximum height of any new tree shall be eight feet as measured from the ground surface, once planted, to the top of the tree.

PART 2 - PRODUCTS

2.01 REPLACEMENT TREES, GROUND COVER AND SHRUBS

- A. Replacement trees, ground cover and shrubs shall be of the same type and size and sound, healthy and vigorous, well branched and densely foliated when in leaf. They

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SURFACE RESTORATION

shall have healthy, well developed root systems and shall be free of disease and insect pests, eggs or larvae.

2.02 MULCH

- A. Mulch shall be windproof shredded eucalyptus, mulch shall be clean, fresh, free of branches and other foreign matter. Mulch shall be used around all shrubs, ground covers and tree trunks, and placed to a minimum depth of 2 inches extending from the tree trunk outward two feet.

2.03 GRAVEL BEDS

- A. Filter Fabric: Filter fabric shall be nonwoven polyester material Trevia Type 1120 as manufactured by Hoechst Fibers Industries, or equal. Fabric weight shall be 6 ounces per square yard, puncture strength maximum 40 pounds, minimum Flux 240 gallons per minute per square foot. Fabric shall be installed in accordance with the manufacturer's recommendations, with precautions taken to avoid tearing the fabric. Fabric shall be laid in strips with a minimum overlap of one foot.
- B. Limerock: Limerock shall meet ASTM A57 standards and shall be prewashed. Maximum size shall be 3/4 inches. Limerock shall be carefully placed and spread on the fabric to a minimum depth of 6 inches. Final grades and locations shall be as designated on the Drawings.

PART 3 -- EXECUTION

3.01 GRADING AND SODDING

- A. The CONTRACTOR shall regrade the work areas disturbed by his construction activities to the existing grade prior to commencement of construction.
- B. Sod shall be placed on all grassed areas disturbed by construction activities, unless otherwise indicated on the Drawings. Sodding shall be in accordance with Sections 575 and 981 of the DOT Specifications.
- C. Maintenance: Sufficient watering shall be done by the CONTRACTOR to maintain adequate moisture for optimum development of the sodded areas. Sodded areas shall receive no less than 1.5 inches of water per week.
- D. Repairs to Lawn Areas Disturbed by CONTRACTOR's Operations: Lawn areas damaged by CONTRACTOR's operations shall be repaired at once by proper sod bed preparation, fertilization and resodding, in accordance with these specifications. Regardless of the condition of the lawn area (weed content etc.) prior to the CONTRACTOR working in the area, all repairs shall be made with sod.

3.02 TREES, GROUND COVER AND SHRUBS

- A. Excavation and Plant Holes: Plant hole excavations shall be roughly cylindrical in shape, with the side approximately vertical. Plants shall be centered in the hole. Bottoms of the holes shall be loosened at least six inches deeper than the required depth of excavation.

SECTION 02500

SURFACE RESTORATION

- B. Holes for balled and burlaped plants shall be large enough to allow at least eight inches of backfill around the earth ball. For root balls over 18 inches in diameter, this dimension shall be increased to 12 inches. Where excess material has been excavated from the plant hole, the excavated material shall be disposed of as and where directed by the ENGINEER.
- C. Setting of Plants: When lowered into the hole, the plant shall rest on a prepared hole bottom such that the roots are level with, or slightly above, the level of their previous growth and so oriented such as to present the best appearance. The CONTRACTOR, when setting plants in holes, shall make allowances for any anticipated settling of plants.
- D. Palms of the sabal species may be set deeper than the depth of their original growth, provided that the specified clear trunk height is attained.
- E. The backfill shall be made with planting mixture and shall be firmly rodded and watered-in, so that no air pockets remain. The quantity of water applied immediately upon planting shall be sufficient to thoroughly moisten all of the backfilled earth. Plants shall be kept in a moistened condition for the duration of the Contract.
- F. Staking and Guying: Plants shall be staked in accordance with the following provisions:
 - 1. Small Trees: For trees and shrubs of less than one-inch caliper, the size of stakes and the method of tying shall be such as to rigidly support the staked plant against damage caused by wind action or other effects. Trees larger than one inch and smaller than one and one-half inch caliper shall be staked with a two-inch stake, set at least 24 inches in the ground and extending to the crown of the plant. The plant shall be firmly fastened to the stake with two strands of 14 gauge soft wire, enclosed in rubber hose, or other approved covering. The wire shall then be nailed or stapled to the stake to prevent slippage.
 - 2. Medium Trees: All trees, other than palm trees, larger than one and one-half inch caliper and smaller than two and one-half inch caliper shall be staked with two or more, two-inch by two-inch stakes, eight feet long, set two feet in the ground. The tree shall be midway between the stakes and held firmly in place by two strands of 12-gauge wire, applied as specified above for single stakes. The wires shall be tightened and kept tight by twisting.
 - 3. Large Trees: All trees, other than palm trees, larger than two and one-half inch caliper, shall be braced with three or more two-inch by four-inch wood braces, toenailed to cleats which are securely banded at two points to the palm, at a point at least six feet above the ground. The trunk shall be padded with five layers of burlap under the cleats. Braces shall be approximately equidistantly spaced and secured underground with two-inch by four-inch by 24-inch stake pads. In firm rock soils, Number 4 steel reinforcing rods or one-half inch pipe is acceptable.
 - 4. Palm Trees: Palm trees shall be braced with three or more two-inch by four-inch wood braces, toenailed to cleats which are securely banded at two points to the palm, at a point at least six feet above the ground. The trunk shall be padded with five layers of burlap under the cleats. Braces shall be approximately equidistantly spaced and secured underground with two-inch by four-inch by 24-inch stake pads. In firm rock soils, Number 4 steel reinforcing rods or one-half inch pipe is acceptable.

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SURFACE RESTORATION

- G. Pruning: All broken or damaged roots shall be cut off smoothly, and the tops of all trees shall be pruned in a manner complying with standard horticultural practice. At the time pruning is completed, all remaining wood shall be alive. All cut surfaces of one inch or more in diameter, above the ground, shall be treated with an approved commercial tree paint.
- H. Maintenance: Maintenance shall begin immediately after each plant is planted and shall continue until all work under this Contract has been completed and accepted by the CITY. Plants shall be watered, mulched, weeded, pruned, sprayed, fertilized, cultivated and otherwise maintained and protected. Settled plants shall be reset to proper grade position, planting saucer restored and dead material removed. Guys shall be tightened and repaired.
- I. Defective work shall be corrected as soon as possible after it becomes apparent. Upon completion of planting, the CONTRACTOR shall remove excess soil and debris, and repair any damage to structures, etc., resulting from planting operations.

3.03 GRAVEL BEDS

- A. Clean, grade and place geotextile prior to placing gravel in gravel beds.

- END OF SECTION -

SECTION 02507

PRIME AND TACK COATS

Part 1 - GENERAL

1.01 WORK INCLUDED

- A. The work specified in this section consists of an application of bituminous material on previously prepared base in accordance with these specifications and in conformity with the line, grades, dimensions and notes shown on the Drawings.
- B. Tack coat will be required prior to overlaying existing pavement.

1.02 RELATED WORK

- A. Section 02510 - Asphaltic Concrete Pavement

Part 2 - PRODUCTS

2.01 MATERIALS

- A. Prime Coat: Unless otherwise indicated, the material used for the prime coat shall be cut back asphalt, Grade RC-70 or RC-250 and shall conform with the requirements specified in AASHTO Designated M 81-75 (1982). Unless otherwise indicated, the use of either RC-70 or RC-250 shall be at the CONTRACTOR'S option.
- B. Tack Coat: The material used for the tack coat shall be emulsified asphalt, Grade RS-2 and shall conform with the requirements specified in AASHTO Designation M 140-82.

2.02 EQUIPMENT

- A. The pressure distributor used for placing the tack or prime coat shall be equipped with pneumatic tires having sufficient width of rubber in contact with the road surface to avoid breaking the bond of or forming a rut in the surface. The distance between the centers of openings of the outside nozzles of the spray bar shall be equal to width of the application required, within an allowable variation of 2-inches. The outside nozzle at each end of the spray bar shall have an area of opening of not less than 25 percent, nor more than 75 percent in excess of other nozzles which shall have uniform openings. When the application covers less than the full width, the normal opening of the end nozzle at the junction line may remain the same as those of the interior nozzle.

SECTION 02507

PRIME AND TACK COATS

Part 4 - EXECUTION

4.01 PREPARATION

- A. Before applying any bituminous material, all loose material, dust, dirt, and foreign material, which might prevent proper bond with the existing surface, shall be removed. Particular care shall be taken to clean the outer edges of the strip to be treated in order to insure that the prime or tack coat will adhere.
- B. When the prime or tack coat is applied adjacent to curb and gutter, or another concrete surface (except where they are to be covered with a bituminous wearing coarse) such concrete surfaces shall be protected by heavy paper or other protective material while the primer or tack coat is being applied. Any bituminous material deposited on such concrete surfaces shall be removed immediately.

4.02 WEATHER LIMITATIONS

- A. No bituminous material shall be applied when the air temperature is less than 50 degrees Fahrenheit in the shade, or when the weather conditions or the condition of the existing surface is unsuitable. In no case shall bituminous material be applied while rain is falling or when there is water on the surface to be covered.

4.03 APPLICATION OF PRIME COAT

- A. After the base has been finished the full width of surface shall be swept with a power broom supplemented with hand brooms and mechanical blowers prior to the application of prime coat. Care shall be taken to remove all loose dust, dirt and objectionable matter. If deemed necessary, the base shall be lightly sprinkled with water immediately in advance of the prime coat. The prime coat shall be applied to the full width of the base.
- B. The temperature of the prime material shall be such as to insure uniform distribution. The material shall be applied with a pressure distributor as specified above. The amount to be applied shall be sufficient to coat the surface thoroughly and uniformly without any excess to form pools or to flow off the base. For limerock base, the rate of application shall not be less than 0.10 gallons per square yard; for shell base, the rate of application shall not be less than 0.15 gallons per square yard.
- C. If the roadway is to be opened for use following the application of the prime material, a light uniform application of clean sand shall be applied and rolled. The sand shall be nonplastic, shall be free from slit and rock particles and shall

SECTION 02507

PRIME AND TACK COATS

not contain any sticks, vegetation, grass roots, or organic matter. After the sand covering has been applied, the surface may be opened to traffic.

4.04 APPLICATION OF TACK COAT

- A. In general, a tack coat will not be used on primed bases except in areas which have become excessively dirty and cannot be cleaned or where the prime has cured and lost all of its bonding effect.
- B. No tack coat shall be applied until the primed base or leveling course has been cleaned and is free from sand, dust or other objectionable material.
- C. The tack coat shall be applied with a pressure distributor as specified above. It shall be heated to a suitable consistency and applied in a thin uniform layer at the rate of between .02 gallons and .08 gallons per square yard.
- D. The tack coat shall be applied sufficiently in advance of the laying of the wearing surface to permit drying, but shall not be applied so far in advance or over such an area as to lose its adhesiveness as a result of being covered with dust or other foreign material. Suitable precautions shall be taken by the CONTRACTOR to protect the surface while the tack coat is drying and until the wearing surface is applied.

- END OF SECTION -

SECTION 02510

ASPHALTIC CONCRETE PAVEMENT

Part 1 - GENERAL

1.01 WORK INCLUDED

A. The work specified in this section consists of the construction of asphaltic concrete surface course composed of a mixture of aggregates, mineral filler and asphalt cement properly laid upon a prepared base or a newly constructed and compacted, primed and tacked roadway base course, in accordance with these specifications and in conformity with the lines, grades, thickness and typical cross section shown on the Drawings. The CONTRACTOR shall furnish asphaltic concrete surface course in the locations and to the extent indicated on the Drawings. Minimum required thickness shall be as listed below.

1. For new asphalt roadway pavement construction or reconstruction, provide asphaltic concrete structural surface course consisting of one of the following:
 - (a) "Superpave Asphalt Concrete" per Section 334 of FDOT Standard Specifications for Road and Bridge Construction
 - (b) Type S-III asphaltic concrete surface course
 - (c) Or as otherwise required by the roadway jurisdiction and/or as indicated on the plans.

Thickness of the asphalt course shall be one and a half (1.5") inch thick minimum, or as specified on the Drawings.

1.02 QUALITY ASSURANCE

A. Construction of asphaltic concrete surface courses shall be in accordance with the Standard Specifications for Road and Bridge Construction (current edition), of the Florida Department of Transportation, and supplements thereto, hereinafter referred to as FDOT Specifications, except as amended herein. The FDOT Specifications are hereby made a part of this contract to the extent they are applicable thereto and shall be as binding upon the CONTRACTOR as though reproduced herein.

1.03 RELATED SECTIONS

- A. Section 02332 - Limerock Base.
- B. Section 02507 - Prime and Tack Coats.

SECTION 02510

ASPHALTIC CONCRETE PAVEMENT

Part 2 - PRODUCTS

2.01 MATERIALS

- A. Bituminous Material: Asphalt cement, Viscosity Gard AC-20 or AC-30, shall conform to the requirements of FDOT Specifications, Section 916-1.
- B. Coarse Material: Coarse aggregate, stone or slag shall conform to the requirements of FDOT Specifications, Section 901.
- C. Fine Aggregate Material: Fine aggregate shall conform to the requirements of FDOT Specifications Section 902.
- D. Mineral Filler: Mineral filler shall conform to the requirements of FDOT Specifications, Sections 917-1 and 917-2.

2.02 GENERAL COMPOSITIONS OF MIXTURE:

- A. The bituminous mixture shall be composed of a combination of aggregate (coarse, fine, or mixture thereof), mineral filler, if required, and bituminous material. The several aggregate fractions shall be sized, uniformly graded and combined in such proportion that the resulting mixture will meet the grading and physical properties of the approved job mix formula.
- B. In all cases, the job mix formula shall be within the design ranges specified in the following table.

Gradation Design Range

<u>Sieve Size</u>	<u>% by Weight Passing</u> <u>Type S-III</u>
¾-inch	
½-inch	100
3/8-inch	88-100
No. 4	60-90
No. 10	40-70
No. 40	20-45
No. 80	10-30
No. 200	2-6

2.03 JOB MIX FORMULA

- A. No work shall be started on the specific project until the ENGINEER has approved the job mix formula.

SECTION 02510

ASPHALTIC CONCRETE PAVEMENT

B. The job mix formula shall conform to the requirements of FDOT Specifications, Section 334. In addition, the job mix formula shall include test data showing that the material as produced meets the requirements of the following table:

<u>Mix Type</u>	<u>Minimum Marshall Stability (%)</u>	<u>Flow (0.01 in)</u>	<u>Minimum VMA (%)</u>	<u>Air Voids (%)</u>	<u>Min Effective Asphalt Content (%)</u>
SP-9.5	1,500	8 – 14	15	3 – 7	5.5

Part 3 - EXECUTION

3.01 TRANSPORTATION

A. The mixture shall be transported in tight vehicles previously cleaned of all foreign material and, if necessary, each load shall be covered with a waterproof canvas cover of sufficient dimensions to protect it from weather conditions. The inside surface of the truck bodies may be thinly coated with soapy water, or a mixture of water with not more than five percent of lubricating oil, but no excess of either shall be used. After the truck bodies are coated and before any mixture is placed therein, they shall be raised so that all excess water will drain out. Kerosene, gasoline or similar products shall not be used to prevent adhesion.

3.02 LIMITATION FOR SPREADING

A. The mixture shall be spread only when the surface is properly prepared and is intact, firm, cured and dry. No mixture shall be spread when the air temperature is less than 40 degree Fahrenheit, nor when the spreading cannot be finished and compacted during the daylight hours. The temperature of the mix at the time of spreading shall not be less than 230 degree Fahrenheit.

3.03 PLACING

A. The mixture shall be placed in accordance with the requirements of FDOT Specifications, Section 330-9. The new asphalt pavement shall be placed in two lifts. The second lift shall match the elevation of the adjacent pavement.

3.04 COMPACTING

A. The mixture shall be compacted in accordance with the requirements of FDOT Specifications 330-10.

SECTION 02510

ASPHALTIC CONCRETE PAVEMENT

3.05 JOINTS

- A. Joints shall conform with the requirements of FDOT Specifications, Section 330-11.

3.06 FIELD QUALITY CONTROL

- A. Surface Requirements: Depressions which may develop after initial rolling shall be remedied by loosening or removing the mixture and adding new material to bring the areas to a true surface. No skin patching shall be done. Such portions of the completed pavement which are defective in surface compaction or in composition, or that do not comply with all other requirements of these specifications, shall be taken up and replaced with suitable mixture, properly laid in accordance with these specifications and at the expense of the CONTRACTOR.
- B. Surface depressions with standing water exceeding $\frac{1}{4}$ " in depth will not be allowed by the City, and shall be repaired by the Contractor at no additional cost.
- C. Thickness Requirements: The thickness of the compacted asphaltic concrete surface course shall be no less than that shown on the Drawings as determined by coring. Thickness testing and correction of defective work shall be as specified in FDOT Specifications, Section 330-14 and 330-15.
- D. "As-Built" limerock elevations shall be signed and sealed by a registered land surveyor and submitted to the Project Engineer for approval prior to placement of asphalt. Elevation shall be taken at high and low points, midpoint, intersections and breaks in grade at intervals not to exceed 50 feet. No separate pay item is included in bid form for this work. Include limerock as-built cost in asphalt section.
- E. Protection of Pavement: After the completion of the pavement, no vehicular traffic of any kind shall be permitted on the pavement until it has set sufficiently to prevent rutting or other distortion.

- END OF SECTION -

SECTION 02526

CONCRETE PAVEMENT, CURBS AND SIDEWALKS

Part 1 - GENERAL

1.01 THE REQUIREMENT

- A. Concrete pavement, curbs and sidewalk shall be constructed to the lines and grades and dimensions required for a complete installation as shown on the Drawings and specified herein.

1.02 SUBMITTALS

- A. Shop drawings for reinforcing, joint material and mix designs shall be submitted for review in accordance with Section - 01300 - Submittals.

Part 2 - PRODUCTS

2.01 CONCRETE

Concrete shall be Class B, conforming to Section 03300 – Cast-in-place Concrete, Reinforcing and Formwork”, unless noted or specified otherwise.

2.02 REINFORCING AND WELDED WIRE FABRIC

Joint reinforcing and welded wire fabric shall conform to Section 03300 – Cast-in-place Concrete, Reinforcing and Formwork”

2.03 JOINT SEALER FOR PAVEMENT

Joint sealer shall be a one or two part polysulfide base self leveling sealant for horizontal surfaces that has been developed for foot and vehicular traffic. The sealant shall conform to the requirements of Section 07920 - Sealants and Caulking.

2.04 PREFORMED JOINT FILLER

Prefomed joint filler shall be sponge rubber and conform to the requirements of AASHTO Designated M148, Type 1.

Part 3 - EXECUTION

3.01 SUBGRADE CONDITION

- A. The finished subgrade shall be maintained in a smooth, compact condition and any areas which are disturbed prior to placing of the concrete shall be restored at the CONTRACTOR'S expense. The subgrade shall be moist at the time the

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CONCRETE PAVEMENT, CURBS AND SIDEWALKS

concrete is placed. Water shall be uniformly applied ahead of the paving operations as directed by the ENGINEER. If the CONTRACTOR does not maintain the subgrade in the required moist condition, a vapor barrier sheet will be required between the subgrade and the concrete.

- B. The subgrade shall be accurately trimmed to the required elevation with a 1/4-inch tolerance. High areas shall be trimmed to proper elevation. Low areas may be filled with suitable material and compacted to the specified density or filled with concrete integrally with the placing of the pavement.

3.02 SETTING FORMS

The forms shall be accurately set to line and grade and such that they rest firmly, throughout their entire length, upon the compacted subgrade surface. Forms shall be joined neatly and tightly and braced to test the pressure of the concrete and the finishing operations. The alignment and grade of all forms shall be approved before and immediately prior to the placing of concrete.

3.03 MIXING CONCRETE

Concrete shall be mixed in accordance with Section 03300, "Cast-in-place Concrete, Reinforcing and Formwork".

3.04 PLACING CONCRETE

- A. The concrete shall be distributed on the subgrade to such depth, that, when it is consolidated and finished, the slab thickness required by the Drawings will be obtained at all points and the surface will at no point be below the grade specified for the finished surface, after application of the allowable tolerance. The concrete shall be deposited on the subgrade in a manner which will require as little re-handling as possible.
- B. Fabric reinforcement, where required, shall be placed at mid slab depth, and the fabric shall be maintained at this location during the placing and finishing operations.
- C. Concrete shall be thoroughly consolidated against and along the faces of all forms, by means of hand-operated, spud-type vibrators. Vibrators shall not be permitted to come in contact with the subgrade or a side form. Vibration at any one location shall not continue so long as to produce "puddling", or the accumulation of excessive grout on the surface. In no case shall the vibrator be operated longer than 15 seconds in any one location.

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CONCRETE PAVEMENT, CURBS AND SIDEWALKS

3.05 STRIKING-OFF, CONSOLIDATING AND FINISHING CONCRETE

Immediately after the placing, the concrete shall be struck off, consolidated and finished, to produce a finished pavement conforming to the cross section, width and surface. Sequence of operations shall be as follows: strike-off; vibratory consolidation; screeding; floating; removal of laitance; straight-edging; and final surface finish.

3.06 STRAIGHTEDGING AND SURFACE CORRECTIONS

After floating has been completed and the excess water removed, but while the concrete is still in a plastic state, the surface of the concrete shall be tested for trueness with an accurate 10 foot straightedge. The straightedge shall be furnished by the CONTRACTOR. The straightedge shall be held in successive positions parallel to the road center line, in contact with the surface, and the whole area tested from one side of the slab to the other as necessary. Any depressions shall be immediately filled with freshly mixed concrete and struck-off; consolidated and re-finished. High areas shall be cut down and re-finished. Straight-edge testing and surface correction shall continue until the entire surface appears to conform to the required grade and cross section.

3.07 FINAL FINISH

As soon as the water sheen has disappeared from the surface of the pavement and just before the concrete becomes non plastic, a light broom finish shall be given to the surface.

3.08 EDGING

- A. After the final finish has been applied, but before the concrete has become non plastic, the edges of the pavement along each side of the strip being placed, on each side of construction joints and along any structure extending into the pavement, shall be carefully rounded to a 1/4 inch radius except as otherwise indicated. A well-defined and continuous radius shall be produced and a smoother, dense mortar finish obtained. All concrete shall be completely removed from the top of the joint filler.
- B. All joints shall be checked with a straightedge before the concrete has become non plastic and, if one side of the joint is higher than the other or the entire joint is higher or lower than the adjacent slabs, corrections shall be made as necessary.

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CONCRETE PAVEMENT, CURBS AND SIDEWALKS

3.09 JOINTS

A. Construction Joints

Construction joints shall be located as shown on the Drawings and/or as directed by the ENGINEER.

B. Expansion Joints Around Structures

Expansion joints shall be formed by placing pre-molded expansion joint material about all structures and features projecting through, into or against the pavement. Unless otherwise indicated, such joints shall be ½-inch in width.

C. Transverse Expansion Joints

Open type transverse expansion joints shall be provided at all sidewalk returns and at 50 foot intervals and wherever indicated on the Drawings. Open type joints shall be formed by staking a ¼-inch thick metal bulkhead in place and placing concrete on both sides. After the concrete has set sufficiently to preserve the width and shape of the joint, the bulkhead shall be removed. After the sidewalk has been finished over the joint, the slot shall be opened and edged with a tool having a ½-inch radius. Transverse expansion joints shall be cleaned and filled with joint filler strips ¼-inch thick conforming to the requirements of AASHTO M-153.

D. Scored Joints

Scored joints shall be either formed or sawed at 5 foot intervals and shall extend to a depth of at least one fourth of the sidewalk slab thickness.

3.10 CURING

A. After the finishing operations have been completed and as soon as the concrete has hardened sufficiently that marring of the surface will not occur, the entire surface and the edges of the newly placed concrete shall be covered and cured with membrane curing compound.

B. Curing compound shall be uniformly applied to the surfaces to be cured, in a single coat, continuous film, at the rate of one gallon to not more than 200 square feet, by a mechanical sprayer.

C. Curing compound shall not be applied during periods of rainfall. Curing compound shall not be applied to the inside faces of joints to be sealed. Should the film become damaged from any cause within the required curing period, the

SECTION 02526

CONCRETE PAVEMENT, CURBS AND SIDEWALKS

damaged portions shall be repaired immediately with additional compound. Upon removal of side forms, the sides of the slabs exposed shall immediately be coated to provide a curing treatment equal to that provided for the surface.

3.11 CURB AND SIDEWALK CONSTRUCTION

- A. The concrete curbs and sidewalks shall be constructed on a prepared smooth subgrade of uniform density. Large boulders and other obstructions shall be removed to a minimum depth of 6 inches below the finished subgrade elevation and the space shall be backfilled with sand, base course material or other suitable material which shall be thoroughly compacted by rolling or tamping. The CONTRACTOR shall furnish a template and shall thoroughly check the subgrade prior to depositing concrete.
- B. Concrete for curbs, and sidewalks shall be formed, mixed, placed and finished in conformance with the requirements of Division 3, except as modified herein. Concrete shall be cured with a clear membrane curing compound which shall be applied at a uniform rate of one gallon per 200 square feet in accordance with the requirements specified herein. Sidewalks shall be given a light broom finish.

3.12 CURBS

- A. Curbs shall be constructed in uniform sections ten feet in length except where shorter sections are necessary for closures or arcs. The sections shall be separated by sheet metal templates set perpendicular to the face and tip of the curb and not less than 2 inches longer than the depth of the curb. The templates shall be held firmly during the placing of the concrete and shall be allowed to remain in place until the concrete has set sufficiently to hold its shape, but shall be removed while the forms are still in place.
- B. After the concrete has sufficiently set for a minimum of 12 hours, the CONTRACTOR shall remove the forms and backfill the spaces on each side. The earth shall be compacted in satisfactory manner without damage to the concrete Work. Minor defects shall be filled with a mortar composed of one part Portland cement and two parts fine aggregate.

3.13 PAVEMENT CURB AND SIDEWALK REPAIR

- A. All damage to pavement, curb or sidewalk as a result of work under this Contract shall be repaired in a manner satisfactory to the ENGINEER and at no additional cost to the CITY. The repair shall include all work as specified herein.
- B. The width of all repairs shall extend at least 12 inches beyond the limit of the damage. The edge of the pavement curb or sidewalk to be left in place shall be

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CONCRETE PAVEMENT, CURBS AND SIDEWALKS

cut to a true edge with a saw or other approved method so as to provide a clean edge to abut the repair. The line of the repair shall be reasonably uniform with no unnecessary irregularities.

- END OF SECTION -

SECTION 02580

PAVEMENT MARKINGS

Part 1 - GENERAL

1.01 REQUIREMENT

- A. This section consists of striping pavement and parking stall wheel stops as indicated on the Drawings, specified herein and as required for a complete installation.

1.02 SUBMITTALS

- A. The CONTRACTOR shall submit shop drawings and other information to the ENGINEER for review in accordance with Section 01300, "Submittals".

1.03 QUALITY CONTROL

- A. The phrase "DOT Specifications" shall refer to the Florida Department of Transportation Standard Specifications for Road and Bridge Construction. The DOT Specifications, are referred to herein and are hereby made a part of this Contract to the extent of such references, and shall be as binding upon the Contract as though reproduced herein in their entirety.
"BCTED" shall refer to Broward County Traffic Engineering Division.

Part 2 - PRODUCTS

2.01 PAVEMENT MARKINGS

- A. Temporary Pavement Markings shall be painted in accordance with Sections 710 and 971 of FDOT Standard Specifications for Road and Bridge Construction, and shall be installed immediately following the construction of new asphalt pavement.
- B. Permanent Pavement Markings shall be thermoplastic in accordance with Sections 711 and 971 of FDOT Standard Specifications for Road and Bridge Construction, and shall not be installed until after new asphalt has undergone a 30-day curing period.

Part 3 - EXECUTION

3.01 PAVEMENT MARKING

- A. The surface which is to be painted shall be cleaned, by compressed air or other effective means, immediately before the start of painting, and shall be clean and dry when the paint is applied. Any vegetation or soil shall be removed from the pavement before edge striping is begun.

SECTION 02580

PAVEMENT MARKINGS

- B. The traffic stripe shall be of the specified width, with clean, true edges and without sharp breaks in the alignment. A uniform coating of paint shall be obtained and the finished stripe shall contain no light spots or paint skips. Any stripes which do not have a uniform, satisfactory appearance, both day and night, shall be corrected.
- C. All newly painted stripes, including edge stripes, shall be protected until the paint is sufficiently dry to permit vehicles to cross the stripe without damage from the tires. While the center line stripes are being painted, all traffic shall be rouged away from the painting operations and the newly painted stripe. When necessary, a pilot car shall be used to protect the painting operations from traffic interference.
- D. Any portions of the stripes damaged by passing traffic or from other cause shall be repainted at the CONTRACTOR's expense.
 - 1. Thermoplastic Traffic Stripes and Markings: Thermoplastic pavement markings, including stripes, pavement messages, stop bars, directional arrows, reflective pavement markers and other miscellaneous items, will be replaced to match preconstruction conditions.. The thermoplastic compound shall be as specified in Section 711 of the D.O.T. Specifications. The thermoplastic compound shall be extruded or sprayed onto the pavement surface in a molten state by mechanical means, with surface application of glass spheres, when required, and upon cooling to ambient pavement temperature shall produce an adherent pavement marking of specified thickness and width and capable of resisting deformation.
- E. The portion of the pavement surface or thermoplastic marking to which the marker is attached by the adhesive shall be cleaned of dirt, curing compound, grease, oil, moisture, loose or unsound pavement and any other material which would adversely affect the adhesive. Reflective markers shall be installed in such a manner that the reflective face of the marker is perpendicular to a line parallel to the roadway centerline. No markers shall be installed over longitudinal or transverse joints of the pavement surface. The adhesive shall be spread on the bonding surface (not the marker) so that 100 percent of the bonding area of the marker will be covered.

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PAVEMENT MARKINGS

The adhesive application shall be of sufficient thickness so that when the marker is pressed into the adhesive, excess adhesive shall be forced out around the entire perimeter of the marker. All excessive adhesive shall be removed from in front of the reflective faces, If any adhesive or foreign matter adheres to the reflective face of the marker, the marker shall be replaced. The ENGINEER shall determine the minimum time necessary to cure the adhesive for sufficient set to bear traffic.

- END OF SECTION -

SECTION 02581

TRAFFIC SIGNS

Part 1 - GENERAL

1.01 REQUIREMENT

- A. This section consists of traffic signs as indicated on the Drawings, specified herein and as required for a complete installation.

1.02 SUBMITTALS

- A. The CONTRACTOR shall submit shop drawings and other information to the ENGINEER for review in accordance with Section 01300, "Submittals".

1.03 CERTIFICATION

The CONTRACTOR shall furnish the manufacturer's certification that all signs furnished conform to these specifications and shall replace or repair at its expense all signs that fail to meet this requirement.

1.04 QUALITY CONTROL

- A. The phrase "DOT Specifications" shall refer to the Florida Department of Transportation Standard Specifications for Road and Bridge Construction. The DOT Specifications, are referred to herein and are hereby made a part of this Contract to the extent of such references, and shall be as binding upon the Contract as though reproduced herein in their entirety.
"BCTED" shall refer to Broward County Traffic Engineering Division.

Part 2 - PRODUCTS

2.01 TRAFFIC SIGNS

- A. General: Traffic regulating signs shall conform to the colors, dimensions and requirements of the Manual on Uniform Traffic Control Devices (ANSI) and displaying the lettering and symbols indicated on the Drawings.
- B. Sign Panels and Support Members: Sign panels and support members shall conform to Aluminum Association Alloy 6061-T6.
- C. Sign Posts: Sign posts installed east of U.S. 1 shall be hot dipped galvanized steel or aluminum.

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TRAFFIC SIGNS

- D. Bolts: Bolts shall conform to Aluminum Association Alloy 2024-T4 with an anodic coating 0.0002-inches thick minimum and chromate sealed.
- E. Nuts: Nuts shall conform to Aluminum Association Alloy 6269-T9.
- F. Reflective Sheeting: Reflective sheeting shall conform to DOT Type A requirements.
- G. Construction Warning Signs: The CONTRACTOR shall install traffic and warning signs during construction in accordance with OSHA, DOT and Broward County Public Works requirements.

- END OF SECTION -

SECTION 02582

RAISED RETRO-REFLECTIVE PAVEMENT MARKERS AND BITUMINOUS ADHESIVE

Part 1 - DESCRIPTION

Place raised retroreflective pavement markers (RPMs) and adhesive, which upon installation produces a positive guidance system to supplement other reflective pavement markings.

Part 2 - MATERIALS

- 1) Use only Class B markers unless otherwise shown in the Plans.
- 2) Meet the requirements of Section 970, "Product Acceptance on the Project", of the Florida Department of Transportation's (FDOT) Standard Specifications for Road and Bridge Construction. Use only reflective pavement markers and bituminous adhesive that are listed on FDOT's Qualified Products List (QPL). Provide to the Engineer a manufacturer's certification conforming to the requirements of Section 6, which confirms that each product meets the requirements of this Section.

Part 3 - EQUIPMENT

Use equipment having either thermostatically controlled double boiler type units utilizing heat transfer oil or thermostatically controlled electric heating pots to install hot applied bituminous adhesive. Do not use direct flame melting units with flexible adhesives; however, this type of unit may be used with standard adhesive in accordance with manufacturer's recommendations. Use a melter/applicator unit suited for both melting and pumping the adhesive through heated applicator hoses.

Heat the adhesive to between 375°F and 425°F and apply directly to the bonding surface from the melter/applicator by either pumping or pouring. Maintain the application temperature between 375°F and 425°F. The adhesive may be reheated. However, do not exceed the manufacturer's recommendations for pot life at application temperatures.

Part 4 - APPLICATION

Apply RPMs to the bonding surface using bituminous adhesives only. The Engineer will conduct field testing in accordance with FM 5-566. Correct RPMs not applied in accordance with these requirements at no cost to the City.

Prior to application of adhesive, clean the portion of the bonding surface of any material which would adversely affect the adhesive.

Apply the adhesive to the bonding surface (not the marker) so that 100% of the bonding area of the marker will be covered, in accordance with adhesive manufacturer's recommendations. Apply sufficient adhesive to ensure, that when the marker is pressed downward into the adhesive, adhesive will be forced out around the entire perimeter of the marker.

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Immediately remove excess adhesive from the bonding surface and exposed surfaces of the RPMs. Soft rags moistened with mineral spirits meeting Federal Specifications TT-T-291 or kerosene may be used to remove adhesive from exposed faces of the RPMs. Do not use any other solvent. If any adhesive, pavement marking materials or other foreign matter adheres to the reflective face of the marker, replace the marker at no cost to the City.

Install RPMs with the reflective face of the RPM perpendicular to a line parallel to the roadway centerline.

Ensure that all final RPMs are in place prior to opening the road to traffic. If more than 2% of the RPMs fail in adhesion or alignment within the first 45 days under traffic, replace all failed markers at no expense to the City. If more than 5% of the markers fail in adhesion and or alignment during the initial 45 day period, the Engineer will extend the replacement period an additional 45 days from the date that all replacement markers have been installed. If, at the end of the additional 45 day period, more than 2% of all markers (initial installation and 45 day replacements combined) fail in adhesion or alignment, replace all failed markers at no expense to the City.

CONTRACTOR'S RESPONSIBILITY FOR NOTIFICATION.

Notify the Engineer prior to the placement of RPMs. At the time of notification, indicate the manufacturer and the LOT numbers of RPMs and bituminous adhesive that are intended for use. Verify that the approved LOT numbers appear on the material packages. Furnish a test report to the Engineer certifying that the materials meet all requirements specified.

METHOD OF MEASUREMENT

The quantities to be paid for will be the number of RPMs, furnished and installed, completed and accepted.

- END OF SECTION -

SECTION 02750

WASTEWATER FLOW CONTROL

PART 1 -- GENERAL

1.01 SCOPE OF WORK

- A. The work specified in this Section includes all labor, materials, accessories, equipment and tools for performing all operations required to bypass pump sewage around a manhole or sewer section in which work is to be performed. The CONTRACTOR shall be prepared to bypass pump sewage as a part of his operations.
- B. The work specified in this Section also includes all labor, materials, accessories, equipment and tools for performing all operations required to bypass pump sewage around a section of force main or gravity sewer in which work is to be performed, or around a manhole into which a force main or gravity sewer discharges if work is to be performed at the manhole. The CONTRACTOR shall be prepared to bypass pump sewage as a part of his operations.
- C. The CONTRACTOR shall provide all pumps, piping, and other equipment to accomplish this task; perform all construction; obtain all permits; pay all costs; and perform complete restoration of all existing facilities to equal or better condition to the satisfaction of the CITY.

1.02 GENERAL

- A. When sewer line flows at the upstream manhole of the line being repaired or replaced are above the maximum allowable requirements for television survey, or do not allow the proper sewer or manhole repair / replacement, the flows shall be reduced to the levels indicated by one of the following methods: manual operation of pumping stations by CITY forces, by the CONTRACTOR plugging / blocking of the flows, or by the CONTRACTOR pumping / bypassing of the flows as acceptable to the CITY.
- B. In some applications, the wastewater flow may be plugged and contained within the capacity of the collection system. This shall only be done when it has been determined the system can accommodate the surcharging without any adverse impact.
- C. For the initial television survey, before and after any repair / replacement with the exception of joint testing and sealing, the sewer line shall be blocked completely. No flow, except infiltration/inflow, will be allowed through the respective sewer line being televised on the television survey.
- D. For all other television surveys, including warranty surveys and joint testing and sealing operations, the depth of flow within the sewer shall not exceed that shown below for the respective pipe sizes as measured in the manhole.

1 Maximum Depth of Flow – Warranty Television Survey

6" - 10" Pipe.....	20% of pipe diameter
12" - 24" Pipe.....	25% of pipe diameter

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Above 24" Pipe.....30% of pipe diameter

2 Maximum Depth of Flow – Joint Testing/Sealing

6" - 12" Pipe.....25% of pipe diameter

15" - 24" Pipe.....30% of pipe diameter

Above 24" Pipe.....35% of pipe diameter

E. When sewer line flows at the upstream manhole of the line being repaired or replaced, in the opinion of the CITY, are too excessive to plug while the rehabilitation is being performed, the CONTRACTOR shall submit a written plan and pump/bypass the flow as acceptable to the CITY.

F. When flows of sewage through a force main being repaired, or discharging by gravity or force main to a manhole being repaired or replaced, are in the opinion of the CITY too excessive to plug or stop while the rehabilitation is being performed, the CONTRACTOR shall submit a written plan and pump/bypass the flow as acceptable to the CITY.

1.03 SUBMITTALS

A. The CONTRACTOR shall submit complete, detailed plans for this aspect of the work to the CITY for review.

PART 2 -- PRODUCTS (Not Used)

PART 3 -- EXECUTION

3.01 PLUGGING AND BLOCKING

A. A sewer line plug shall be inserted into the line at a manhole upstream from the section being surveyed, repaired or replaced. The plug shall be so designed that all or any portion of the operation flows can be released. During the survey portion of the operation, flows shall be shut off or reduced to within the maximum flow limits specified. During repairs or replacement, the flows shall be shut off or pumped / bypassed, as acceptable to the CITY. After the work tasks have been completed, flows shall be restored to normal.

3.02 PUMPING AND BYPASSING

A. When pumping/bypassing is required, as determined by the CITY, the CONTRACTOR will supply the necessary pumps, conduits and other equipment to divert the flow of sewage around the manhole section in which work is to be performed. The bypass system shall be of sufficient capacity to handle existing flows plus additional flow that may occur during periods of rain storms. The CONTRACTOR will be responsible for furnishing the necessary labor and supervision to set up and operate the pumping and bypassing system. A "setup" consists of the necessary pumps, conduits and other equipment to divert the flow of sewage around a manhole section, from the start to finish of work performed in the manhole section.

B. Pumps and equipment shall be continuously monitored by a maintenance person capable of starting, stopping, refueling and maintaining these pumps during the rehabilitation. If

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WASTEWATER FLOW CONTROL

pumping is required on a 24-hour basis, engines shall be equipped in a manner to keep noise to a minimum.

- C. In the case of bypassing force main/gravity sewer flows, whether such flows normally discharge into a manhole being repaired/replaced or pass through a force main/gravity sewer being repaired/replaced, bypass shall be accomplished by one of two methods.
1. In the absence of surface conditions that prevent temporary bypass piping, the force main/gravity sewer shall be accessed by excavation and temporary piping shall be installed to bypass the repair/replacement in a manner acceptable to the CITY. In general, for manhole repairs/replacement, the CONTRACTOR shall excavate to the force main outside the manhole, cut the force main, attach bypass piping, and bypass flow to the next downstream manhole. For force main repairs, the CONTRACTOR shall excavate to the force main on each side of the repair, cut the force main on each side of the repair, attach bypass piping on each side of the repair, and bypass flow around the repair. Upon the conclusion of bypass activities and repair work, the CONTRACTOR shall install closure pieces to permanently rejoin and restore the force main to full function.
 2. Where surface conditions prevent the use of temporary bypass piping, and where the CITY cannot accomplish the bypass operations in-house, the CITY shall shut down the associated lift station and the CONTRACTOR shall pump from the wet well into tanker trucks for transport to a designated location. The number of tanker trucks deemed necessary for this operation shall be agreed to in advance by the CITY.

3.03 FLOW CONTROL PRECAUTIONS

- A. Surcharging Sewers. Where the raw sewage flow is blocked or plugged, sufficient precautions must be taken to protect the public health. No septic conditions shall be allowed due to CONTRACTOR's operations. The sewer lines shall also be protected from damage. The following occurrences shall not be allowed:
1. No sewage shall be allowed to back up into any homes or buildings.
 2. No sewage shall overflow any manholes, cleanouts or any other access to the sewers.
 3. Users upstream of the repair area shall be able to use all their water and sewer utilities without interruption.
- B. If any of the above unallowable conditions occur or are expected to occur, the CONTRACTOR shall bypass pump to alleviate one or all of the conditions. Additionally, the CONTRACTOR is required to observe the conditions upstream of the plug and be prepared to immediately start bypass pumping, if needed. It is CONTRACTOR's responsibility to pay for all damage claims.
- C. Pumps. Any sump pumps, bypass pumps, trash pumps or any other type pump which pulls sewage/water or any type of material out of the manhole or sewer shall discharge this material into another manhole, or appropriate vehicle or container acceptable to the CITY.

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Under no circumstances shall this material be discharged, stored or deposited on the ground, swale, road or open environment.

- D. Traffic Control. The CONTRACTOR shall take appropriate steps to ensure that all pumps, piping and hoses that carry raw sewage are protected from traffic. Traffic control shall be performed in accordance with Section 01570 - Traffic Regulation and Maintenance of Traffic.
- E. Sewage Spills. In the event, during any form of "Sewage Flow Control", that raw sewage is spilled, discharged, leaked or otherwise deposited in the open environment, due to the CONTRACTOR's work, the CONTRACTOR is responsible for any clean up of solids and disinfection of the area affected. This work will be performed at the CONTRACTOR's expense with no additional cost to the CITY. The CONTRACTOR is also responsible for notifying the sewer system maintenance personnel and complying with any and all regulatory requirements in regards to the size spill with no additional cost to the CITY.

- END OF SECTION -

SECTION 02751
PREPARATORY CLEANING AND ROOT REMOVAL

PART 1 -- GENERAL

1.01 SCOPE

- A. This Section covers the preparatory cleaning of sewer lines and manholes as needed prior to the internal survey of the sewer lines by closed-circuit television. It also covers the preparatory cleaning and root removal of sewer lines and the cleaning of manholes prior to rehabilitation. The CONTRACTOR shall furnish all necessary material, labor, equipment and services required for cleaning the specific sewer lines.

1.02 GENERAL

- A. Sewer Line Cleaning. The intent of sewer line cleaning is to remove foreign materials from the lines and restore the sewer to a minimum of 95% of the original carrying capacity or as required for proper seating of internal pipe joint sealing packers or performance of other specified work. It is recognized that there are some conditions such as broken pipe and major blockages that prevent cleaning from being accomplished or where additional damage would result if cleaning were attempted or continued. Should such conditions be encountered, the CONTRACTOR will not be required to clean those specific sewer sections. If, in the course of normal cleaning operations, damage does result from preexisting and unforeseen conditions such as broken pipe, the CONTRACTOR will not be held responsible.
- B. Manhole Cleaning General. All concrete and masonry surfaces must be cleaned prior to repair. Grease, laitance, loose bricks, mortar, unsound concrete, and other materials must be completely removed. Water blasting (minimum 1,200 psi) utilizing proper nozzles shall be the primary method of cleaning; however, other methods such as wet or dry sandblasting, acid wash, concrete cleaners, degreasers or mechanical means may be required to properly clean the surface. Surfaces on which these methods are used shall be thoroughly rinsed, scrubbed, and neutralized to remove cleaning agents and their reactant products.

1.03 HYDRAULIC CLEANING EQUIPMENT

- A. Hydraulically Propelled Equipment. The equipment used shall be of a movable dam type and be constructed in such a way that a portion of the dam may be collapsed at any time during the cleaning operation to protect against flooding of the sewer. The movable dam shall be equal in diameter to the pipe being cleaned and shall provide a flexible scraper around the outer periphery to insure removal of grease. If sewer cleaning balls or other equipment which cannot be collapsed is used, special precautions to prevent flooding of the sewers and public or private property shall be taken.

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- B. High-Velocity Jet (Hydrocleaning) Equipment. All high-velocity sewer cleaning equipment shall be constructed for ease and safety of operation. The equipment shall have a selection of two or more high-velocity nozzles. The nozzles shall be capable of producing a scouring action from 15 to 45 degrees in all size lines designated to be cleaned. Equipment shall also include a high-velocity gun for washing and scouring manhole walls and floor. The gun shall be capable of producing flows from a fine spray to a solid stream. The equipment shall carry its own water tank, auxiliary engines, pumps, and hydraulically driven hose reel.

- C. Mechanically Powered Equipment: Bucket machines shall be in pairs with sufficient power to perform the work in an efficient manner. Machines shall be belt operated or have an overload device. Machines with direct drive that could cause damage to the pipe will not be allowed. A power rodding machine shall be either a sectional or continuous rod type capable of holding a minimum of 750 feet of rod. The rod shall be specifically heat-treated steel. To insure safe operation, the machine shall be fully enclosed and have an automatic safety clutch or relief valve.

PART 2 -- PRODUCTS (Not Used)

PART 3 -- EXECUTION

3.01 GENERAL

- A. The designated sewer sections shall be cleaned using hydraulically propelled, high-velocity jet, or mechanically powered equipment. The equipment shall dislodge, transport and remove all sludge, mud, sand, gravel, rocks, bricks, grease, roots, sticks, and all other debris from the interior of the sewer pipe and manholes. The equipment and methods selected shall be based on the conditions of lines and manholes at the time the work commences and shall be satisfactory to the CITY. If cleaning of an entire section cannot be successfully performed from one manhole, the equipment shall be set up on the other manhole and cleaning again attempted. If, again, successful cleaning cannot be performed or the equipment fails to traverse the entire manhole section, the cleaning effort shall be stopped and sufficient inspection performed so that the CITY can be notified of the reason for inability to continue.

3.02 CLEANING PRECAUTIONS

- A. During all cleaning and preparation operations all necessary precautions shall be taken to protect the sewer from damage. During these operations, precautions shall also be taken to insure that no damage is caused to public or private property adjacent to or served by the sewer or its branches.

- B. Satisfactory precautions shall be taken in the use of cleaning equipment. When hydraulically propelled cleaning tools (which depend upon water pressure to provide their cleaning force) or tools which retard the flow in the sewer line are used, precautions shall be taken to insure that the water pressure created does not

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PREPARATORY CLEANING AND ROOT REMOVAL

damage or cause flooding of public or private property being served by the sewer. When possible, the flow of sewage in the sewer shall be utilized to provide the necessary pressure for hydraulic cleaning devices. When additional water from fire hydrants is necessary to avoid delay in normal work procedures, the water shall be conserved and not used unnecessarily. The CONTRACTOR shall employ operational hydrant meters to be obtained from the CITY, and shall obtain water only from the CITY's hydrants. No fire hydrant shall be obstructed in case of a fire in the area served by the hydrant.

3.03 MATERIAL REMOVAL

- A. All sludge, dirt, sand, rocks, grease, roots, and other solid or semisolid material resulting from the cleaning operation shall be removed at the downstream manhole of the section being cleaned. Passing material from manhole section to manhole section, which could cause line stoppages, accumulations of sand in wet wells, or damage pumping equipment, shall not be permitted.
- B. Under no circumstances shall sludge or other debris removed during these operations be dumped or spilled into the streets, ditches, storm drains or other sanitary sewers. The CONTRACTOR shall remove from the site and properly dispose of all solids or semi-solids recovered during the cleaning operation. The CONTRACTOR shall obtain permits and make arrangements as required to properly dispose of solids.
- C. The CONTRACTOR is advised that he shall not dispose of this material by legal or illegal dumping on private or public property, by sale to others, or any means other than those given above.
- D. The CONTRACTOR shall keep his haul route and work area(s) neat and clean and reasonably free of odor, and shall bear all responsibility for the cleanup of any spill which occurs during the transport of cleaning/surface preparation by-products and the cleanup of any such material which is authorized by or pursuant to this Contract and in accord with applicable law and regulations. The CONTRACTOR shall immediately cleanup any such spill, or waste. If the CONTRACTOR fails to cleanup such spill, or waste immediately, the CITY shall have the right to cleanup or arrange for its cleanup and may charge to the CONTRACTOR all costs, including administrative costs and overhead, incurred by the CITY in connection with such cleanup. The CITY may also charge to the CONTRACTOR any costs incurred or penalties imposed on the CITY as a result of any spill, dump or discard. Under no circumstances is this material is to be discharged into the waterways or any place other than where authorized to do so by the appropriate authority. The term "CONTRACTOR" as used in this section shall include the CONTRACTOR's subcontractors and other Contractors.
- E. The general requirements for vehicles hauling such waste materials are as follows: Transport vehicles must be of type(s) approved for this application by the political

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PREPARATORY CLEANING AND ROOT REMOVAL

jurisdictions involved. General requirements are that the vehicles have watertight bodies, that they be properly equipped and fitted with seals and covers to prohibit material spillage or drainage, and that they be cleaned as often as is necessary to prevent deposit of material on roadways. Vehicles must be loaded within legal weight limits and operated safely within all traffic and speed regulations.

- F. The routes used by the CONTRACTOR for the conveyance of this material on a regular basis shall be subject to approval by the governing authority having jurisdiction over such routes.

3.04 DISPOSAL OF MATERIALS

- A. All solids or semisolids resulting from the cleaning operations shall be removed from the site and disposed of by the CONTRACTOR in a legal and sanitary manner as approved by appropriate authorities, at the CONTRACTOR's cost. Copies of records of all disposal shall be furnished to the CITY, indicating disposal site, date, amount and a brief description of material disposed. All materials shall be removed from the site no less often than at the end of each workday. Under no circumstances will the CONTRACTOR be allowed to accumulate debris, etc., on the site of work beyond the stated time, except in totally enclosed containers and as acceptable to the CITY.

3.05 ROOT REMOVAL

- A. Roots shall be removed in the designated sections and manholes where root intrusion is indicated on the work order. Special attention should be exercised during the cleaning operation to assure almost complete removal of roots from the joints. Any roots which could prevent the traveling of the packer or could prevent the proper application of chemical sealants, or could prevent the proper seating and application of cured-in-place, fold-and-formed or sectional cured-in-place liners, shall be removed. Procedures may include the use of mechanical equipment such as rodding machines, bucket machines and winches using root cutters and porcupines, and equipment such as high-velocity jet cleaners.

3.06 ACCEPTANCE OF CLEANING OPERATION

- A. Acceptance of sewer line cleaning shall be made upon the successful completion of the television survey and shall be to the satisfaction of the CITY. Liner installation shall not be initiated until the CITY has reviewed the post-cleaning television survey tapes and has accepted the cleaning. If television survey shows the cleaning to be unsatisfactory, the CONTRACTOR shall be required to reclean and reinspect the sewer line until the cleaning is shown to be satisfactory. In areas where television survey is not performed, the CITY may require the CONTRACTOR to pull a double squeegee (with each squeegee the same diameter as the sewer) through each manhole section as evidence of adequate cleaning. If internal sealing is to follow the television survey, particular attention should be given to the adequacy of the cleaning to insure that proper seating of the sealing packer can be achieved.

SECTION 02751
PREPARATORY CLEANING AND ROOT REMOVAL

- B. In the event that special cleaning involving the mechanical removal of roots, grease, and/or tuberculation has been authorized, acceptance of sewer line cleaning shall be made upon the successful completion of the post-cleaning television survey and shall be to the satisfaction of the CITY. Liner installation shall not be initiated until the CITY has reviewed the post-cleaning television survey tapes and has accepted the cleaning.

- C. In addition, on all those lines which have sags or dips, to an extent that the television camera lens becomes submerged for three (3) or more feet during the television inspection, the CONTRACTOR shall pull double squeegee and/or sponges through the line in order to remove the water from those dips or sags, or draft the water by means of high-velocity jet cleaners. Water removal shall be performed until the television camera lens will no longer be submerged. This requirement may be waived by the CITY if the water in which the camera lens is submerged, is clear enough to allow the identification of pipe defects, cracks, holes and location of service taps.

- END OF SECTION -

SECTION 02752
TELEVISION SURVEY

PART 1 -GENERAL

1.01 SCOPE

- A. The work consists of furnishing all labor, materials, accessories, equipment, tools, transportation, services and technical competence for performing all operations required to execute the internal closed circuit television survey to inspect the entire barrel of sewers up to 48 inches in diameter.
- B. The survey shall show all defects and determine amount of infiltration entering the sewer system.

1.02 GENERAL

- A. After cleaning as specified in Section 02751- Preparatory Cleaning (including special cleaning involving the mechanical removal of roots, grease, and/or tuberculation where authorized), and before and after rehabilitation work, the pipe sections shall be visually surveyed by means of closed-circuit television in the presence of the CITY. The survey shall be performed one manhole-to-manhole section at a time and the flow in the section being surveyed shall be suitably controlled as described in Section 02750 - Wastewater Flow Control.
- B. Pre- and post-construction survey video on CD-ROM shall be delivered to the CITY on a "one line per CD-ROM" basis, accompanied with the corresponding work order, and pre- and post-TV log, for each sewer line surveyed. The video on CD-ROM shall be direct from a live video source into a video file, format MPEG1, and of good quality for viewing. Video tapes shall not be accepted.
- C. The television equipment operator shall be certified under the NASSCO (National Association of Sewer Survey Companies) PACP (Pipe Line Assessment and Certification Program).

1.03 EQUIPMENT

- A. The television camera used for the survey shall be one specifically designed and constructed for such survey and shall be of the pan and tilt type. Lighting for the camera shall be suitable to allow a clear picture of the entire periphery of the pipe. The camera shall be operative in 100% humidity conditions. The camera, television monitor, and other components of the video system shall be capable of producing a minimum 700 line resolution color video picture. The CONTRACTOR shall maintain camera in clear focus at all times. Picture quality and definition shall be to the satisfaction of the CITY; and if unsatisfactory, equipment shall be removed and replaced with adequate equipment at no additional cost to the CITY.
- B. The video camera shall include a titler feature capable of showing on the tape the following information:

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1. City and State
2. Date/Time
3. CONTRACTOR's Name
4. Line Size, Material, and Depth
5. Manhole Identification (both manholes)
6. On-going Footage Counter

1.04 SUBMITTALS

- A. The CONTRACTOR shall submit shop drawings and other information in accordance with Section 01300 - Submittals. The CONTRACTOR's submittals shall include description of the software to be used and a sample of the video titles to be used, along with a sample of the television survey log to be used.

PART 2 -- PRODUCTS

All inspection information and data (including video) written to digital media (CD-ROM).

PART 3 -- EXECUTION

3.01 PRECONSTRUCTION SURVEY

A. Procedure

1. Prior to any repair work, the entire sewer line (from manhole to manhole) shall be televised. The camera shall be placed at the center of the manhole and videotaping shall commence prior to entering the pipe. The CONTRACTOR shall show the inside of the manhole walls and the pipe connection to the wall at both the upstream and downstream manhole.
2. The camera shall be moved through the line in either direction at a moderate rate, stopping when necessary to permit proper documentation of the sewer's condition. In no case shall the television camera be pulled at a speed greater than 30 feet per minute. Manual winches, power winches, TV cable, powered rewinds and tractors or other devices that do not obstruct the camera view or interfere with proper documentation of the sewer conditions shall be used to move the camera through the sewer line. If the camera is being pulled through the sewer line by a hydraulic cleaning unit hose the cleaning nozzle shall be located a minimum of eight (8) feet away from the camera to allow a clear, unobstructed view. Jet nozzle shall be used in front of camera while televising through a dip to draft out water. If, during the survey operation, the television camera will not pass through the entire manhole section, the CONTRACTOR shall set up his equipment so that the survey can be performed from the opposite manhole.

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3. Whenever non-remote powered and controlled winches are used to pull the television camera through the line, telephones or other suitable means of communication shall be set up between the two manholes of the section being surveyed to insure good communications between members of the crew.
4. Measurement for location of defects shall be above ground by means of a meter device. Marking on the cable, or the like, which would require interpolation for depth of manhole, will not be allowed. Measurement meters shall be accurate to tenths of a foot over the length of the section being surveyed. Accuracy of the distance meter shall be checked by use of a walking meter, roll-a-tape, electronic distance meter or other suitable device. Manhole numbers and linear footage shall be shown on screen during taping.
5. Movement of the television camera shall be temporarily halted for a minimum of ten seconds at each visible point source of infiltration and/or inflow until the leakage rate from that source is quantified. The camera shall be stopped at all service connections and the service lateral shall be inspected with the pan and tilt camera. The camera shall also be stopped at active service connections where flow is discharging. If the discharge persists, the property involved shall be checked to determine whether or not the discharge is sewage. If no flows are being discharged from the building, it shall be considered that the observed flow is infiltration/inflow.

B. Field Documentation

1. Television Inspection Forms (Survey Logs). Printed and electronically stored location records shall be kept by the CONTRACTOR and will clearly show the location in relation to an adjacent manhole of each infiltration point observed during survey. Upstream footage at face of manhole (0) and downstream footage at face of manhole (e.g., 250) shall be shown on the log. The television inspection forms to be utilized by the CONTRACTOR shall be those mandated by NASSCO's PACP. Both the "Header" and "Details" information of the form shall be entered as indicated in the PACP standards. The survey logs shall include, but not be limited to the following information:
 - a. Correct pipe segment/manhole numbers
 - b. Correct address of manhole location
 - c. Pipe size, length and material
 - d. Manhole depth (up and downstream)
 - e. UAZ (Utilities Analysis Zone) number
 - f. Lift station service area number

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- g. CD number and index
- h. Footage locations, descriptions and estimated leak rates for visible point sources of infiltration inflow
- i. Footage locations and descriptions of structural defects such as obstructions, any remaining root intrusion, offset joints, cracked pipe, fractured pipe, holes, collapses, sags, protruding service connections and/or blockages in the pipe.

The terminology to be used shall follow NASSCO's PACP standards. All information will be recorded and a copy of such electronic records and a hard copy will be supplied to the CITY.

- 2. Photographs. Digital photographs of the television picture of problems shall be taken by the CONTRACTOR upon request of the CITY.
- 3. Video Recordings. The purpose of video (CD-ROM) recording shall be to supply a visual and audio record of problem areas of the lines that may be replayed. CD-ROM recording playback shall be at the same speed that it was recorded. Slow motion or stop motion playback features shall be supplied by the CONTRACTOR. Once recorded, the CD-ROM becomes property of the CITY. The CONTRACTOR shall have all CD-ROM and necessary playback equipment readily accessible for review by the CITY during the Project.

The observation terminology utilized during audio narration shall be consistent with NASSCO's PACP standards. The television inspection shall be video recorded on high quality CD-W. The CD shall be clearly labeled with the lift station number and individual manhole numbers clearly listed. The CDs are to be furnished to the CITY with a printed hard copy (Survey Logs) and electronic data inspection report.

Video CDs displaying poor video quality will be deemed unacceptable and no payments will be made until lines are retelevized and a new CD is submitted.

Poor video quality refers to, but is not limited to, the following: grease or debris on the lens, camera under water, picture too dark, excessive camera speed through the line, lines improperly cleaned, poor/no audio, etc.

- 4. Audio. All CD-ROM shall have audio record. As a preamble, at the beginning of the CD-ROM, the CONTRACTOR shall state the following: "(Contractor's Name) is performing a pre/post TV survey for Job No. _____ (provided by the CITY), City of Hollywood". State date, time, operator's name, area, upstream manhole number to downstream manhole number, pipe size and material, upstream manhole depth, and TV survey will be from up- to downstream, or down- to upstream. The CONTRACTOR shall verbally state station and position of all laterals and defects. At the end of

SECTION 02752
TELEVISION SURVEY

each line, state: "End of line", upstream manhole number to downstream manhole number, and total linear footage.

3.02 POST CONSTRUCTION SURVEY

A. Procedure

1. The same procedures shall be used as indicated in Section 3.01 PRECONSTRUCTION SURVEY.
2. In addition, the CONTRACTOR shall stop camera at all point repairs, sectional repairs, and reinstated laterals, and inspect entire repaired pipe section.
3. The CONTRACTOR shall invert white foreground to black as needed in the line section with light background.
4. In the case of a post-liner survey, the CONTRACTOR shall fully televise both ends of the liner at the manhole so that the fit of the liner to the host pipe can be evaluated. At the conclusion of a television survey for a given liner, the CONTRACTOR shall physically turn the camera around to film the liner end, so that the camera is facing back in the direction it just traversed, to ensure an adequate and complete picture.
5. The post-liner television survey shall be done within 2 weeks of liner installation.

B. Documentation

1. The same documentation shall be provided as indicated in Section 3.01 PRECONSTRUCTION SURVEY.

- END OF SECTION -

SECTION 02755

LINING INSTALLATION (SEWPERCOAT)

Part 1 - GENERAL

- 1.01 General: This specification defines the method and material for the new manhole coating and rehabilitation of sanitary sewer structures (manholes, wet wells, lift/pump stations, large diameter concrete pipe, etc.) utilizing a spray applied calcium aluminate cementitious structural rehabilitation system. The purpose of this project is to obtain a dense and durable concrete lining that is resistant to biosulfuric acid attack and meets the strength requirements described elsewhere in this specification. The work covered in this specification consists of furnishing all labor, equipment, materials, and supervision necessary to accomplish the rehabilitation as specified. When complete the rehabilitated structure shall:
- A. Provide for a uniformly smooth surface of specified thickness.
 - B. Minimize, if not eliminate sources of inflow/infiltration (I/I).
 - C. Provide a service life that is supported by documented test analysis.
- 1.02 Contractors Sequence of Operation
- A. The Contractor's sequence of operation relative to structural rehabilitation shall include, but not be limited to the following:
 - B. Eliminate all sources of groundwater infiltration and voids in walls.
 - C. Rehabilitate all interior surfaces including walls, ceilings and floors in accordance with specification and nature of the sub-surfaces.
 - D. Provision to "cure" the installed lining material.
 - E. Provision to "test" lining and structural rehabilitation materials.
- 1.03 Submittals
- A. The Contractor shall furnish detailed and complete data pertaining to the surfaces of the structure to be rehabilitated, the rehabilitation product, surface preparation and installation to the engineer for approval. The submission of this data shall be made in a timely manner to prevent project delay. At the request of the Engineer, the Contractor shall test for adverse chemical conditions that may hinder overall product performance.
 - B. Prior to initiating the work, the Contractor shall submit specific technical data with complete physical properties of the structure to be rehabilitated and the proposed product for the rehabilitation of the structure, as well as a specific plan for sub-surface preparation.
 - C. A certificate of "Compliance with Specifications" shall be furnished for all materials supplied.
 - D. A work plan shall be submitted

SECTION 02755

LINING INSTALLATION (SEWPERCOAT)

- E. A safety plan. It is the contractor's responsibility to comply with OSHA standards and all regulations pertaining to the work including confined space entry.

Part 2 - PRODUCTS

2.01 Materials

- A. Lining material furnished under this specification shall be a prepackaged mortar mix, including all cement, aggregates, and any required additives. It is the intent of this specification that the Contractor only be required to add the proper amount of potable water so as to produce concrete suitable for spray application. Do not add portland cement, other aggregates, or any admixtures whatsoever to lining material. Typical package weights shall not be less than 50 lbs and shall be identical for all material furnished on this project.
- B. The chemical composition of the cement portion as well as the aggregates of the mortar mix shall be as follows:

Al ₂ O ₃	CaO	FeO + Fe ₂ O ₃	SiO ₂
39-44%	35-39%	9-14%	5-7%

- C. The design properties of the mortar mix shall be as follows:

Compressive Strength (ASTM C109)	> 5,500 psi	24 hours
Flexural Strength (ASTM C293)	> 1,200 psi	24 hours
Splitting Tensile Strength (ASTM)	> 800 psi	24 hours
Slant Shear test (ASTM C882)	> 1,200 psi	24 hours
Shrinkage at 28 days (ASTM C596)	< 0.08% cured @ 90% relative	
Freeze/Thaw after 300 Cycles	No visible damage after 300 cycles	

The mortar mix shall be either "SewperCoat PG" or "SewperCoat 2000HS Regular", both as manufactured by Kerneos Inc. – Chesapeake, Virginia or approved equal.

- 2.02 Mortar mix must have at least seven (10) years of successful performance in similar applications and be supplied by an ISO 9001 certified manufacturer. Manufacturer's ISO 9001 certificate shall be submitted to engineer and owner.
- A. In addition, the mortar mix shall be designed to withstand long-term exposure to a bacterially corrosive hydrogen sulfide environment that may be expected

SECTION 02755

LINING INSTALLATION (SEWPERCOAT)

to produce a pH of 1 on normal Portland cement based concrete or typical brick and mortar surfaces.

- 2.03 Water used in mixing shall be fresh, clean, potable water, free from injurious amounts of oil, acid, alkali, vegetable, sewage and/or organic matter. Water shall be considered as weighing 8.32 pounds per gallon.
- A. Mortar mix shall be stored with adequate provisions for the prevention of absorption of moisture. It shall be stored in a manner that will permit easy access for inspection and identification of each shipment.

Part 3 - EXECUTION

3.01 Sampling and Testing

- A. A recognized independent testing laboratory shall test mortar materials used on the project. The Manufacturer, instead of an independent laboratory, may test project sample specimens, provided the Owner, Engineer, and Manufacturer are in agreement of this testing method prior to project commencement. Specific materials recommended by the Engineer shall then be tested.
- B. The cost of sampling and testing of the mortar mix during placement and the surface to which it is applied shall be born by the Contractor. Other testing required showing conformance with these specifications shall be the responsibility of the Contractor. Certified test reports and certificates, when so directed, shall be submitted in duplicate to the Engineer and to such other agencies or persons the Engineer may designate.
- C. Any materials failing to meet the requirements of these specifications shall not be incorporated into the work plan.

3.02 Qualification of Work Crew

- A. The lining material Manufacturer shall maintain a listing of competent contractors that have demonstrated requisite skill and training to be qualified applicators of their materials.
- B. Prior to project commencement, the Contractor must satisfy the Engineer that all Contractor's work crew personnel have performed satisfactory work in similar capacities elsewhere for a sufficient period of time to be fully qualified to properly perform the work in accordance with the requirements of the related specifications.
- C. Foreman shall have at least 4 years experience with similar work and project conditions.

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LINING INSTALLATION (SEWPERCOAT)

D. Nozzlemen shall be qualified by having had similar work experience.

3.03 Work Crew responsibilities prior to application of lining material shall include the following:

- A. Surface preparation as discussed in section 4.1.
- B. Ensure the operating air pressure is uniform and provides adequate nozzle velocity for proper compaction.
- C. Continuously regulate the water content so that the applied materials consistently achieve proper compaction with a low percentage of rebound and no visible "sag".
- D. Ensure that the installation equipment nozzle is held at the proper distance away from and as nearly perpendicular to the prepared sub-surface as the working conditions will permit to secure maximum material compaction with minimum rebound and no visible "sag".
- E. Follow a sequence routine that will fill corners with adequately compacted material applied at a maximum practicable layer thickness.
- F. Determine necessary operating procedures for placement in confined spaces, extended distances or around unusual obstructions where placement velocities and mix consistency may need to be adjusted.
- G. Direct the crew as to when to start and stop the flow of materials during installation and to immediately stop all work when material is not arriving uniformly at the nozzle.
- H. Ensure that slough pockets are removed and prepared for installation of replacement material.
- I. Bring the installed materials to established finished elevations in a neat and timely manner and within established tolerances.
- J. Applicator's job foreman shall operate the mixing/placing equipment and direct the work of mixing crew personnel. Applicator's work crew shall also maintain proper line pressures throughout the mixing/placing equipment to ensure the necessary consistent nozzle velocity. Applicator's work crew shall further see that all material fed to the nozzle is uniformly fed through this equipment.

3.04 EQUIPMENT

- A. Equipment shall be of spray type and approved by the material manufacturer. Alternate equipment may be utilized provided it meets the performance requirements of the specification. All equipment must be kept in operating condition and good repair

SECTION 02755

LINING INSTALLATION (SEWPERCOAT)

Part 4 - CONSTRUCTION METHODS

4.01 SURFACE PREPARATION

- A. Ensure all sub-surfaces are clean and free of laitance, loose material, residue and all existing coating and lining materials. See Section 4.4 for Inflow and Infiltration Prevention. For detailed explanation of the required surface preparation see ACI RAP-3 "Spall Repair by Low Pressure Spraying" page 2. ACI 546R "Concrete Repair Guide", chapter 2 also provides a good reference for important considerations for repairing concrete surfaces using mortar.
- B. Sub-surfaces shall be thoroughly saturated with water prior to the application of the lining materials. In no instance shall shotcrete be applied in an area where running water exists. It is the intent of this specification that the existing surface be saturated and free of any running water just prior to installation – or SSD, "saturated surface dry condition." To achieve this condition it may be necessary to presoak the sub-surface for a at least 24 hours.

4.02 OPERATIONS

- A. The Contractor shall provide all equipment necessary to individually gauge, control, and monitor the actual amounts of all component materials necessary to complete the lining installation. The type of equipment and methods used to gauge, control, and monitor component materials shall be subject to approval by the Engineer and Manufacturer.
- B. All lining materials shall be thoroughly mixed by mechanical means to ensure all agglomerated particles are reduced to original size or removed prior to placement into the application equipment (i.e. the hopper). Each batch of material should be entirely discharged before recharging with fresh material. Mixing equipment shall be cleaned at regular intervals to remove all adherent materials.
- C. The addition of water to the mix shall be in strict accordance with the Manufacturer's recommendations.
- D. Re-mixing or tempering shall not be permitted. Rebound materials shall not be reused.

4.03 PROTECTION OF ADJACENT SURFACES

- A. During progress of the work, adjacent areas or grounds which may be permanently discolored, stained or otherwise damaged by dust and rebound material, shall be adequately protected and, if contacted, shall be cleaned by early scraping, brushing or washing as the surroundings permit.

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LINING INSTALLATION (SEWPERCOAT)

4.04 INFLOW and INFILTRATION PREVENTION

- A. If inflow or infiltration is observed within the structure after surface preparation is complete, a rapid setting crystalline enhanced hydraulic cement product specifically formulated for infiltration control shall be used to stop minor infiltration flows in accordance with the manufacturer's recommendations. The material shall meet the following strength requirements:

Compressive Strength (ASTM C597B)	600 psi	(24 hours)
	1,000 psi	(7 days)
Bond Strength (ASTM C321)	30 psi	(1 hour)
	80 psi	(1 day)

- B. The material shall be Preco Plug, Octocrete, Burke Plug or Engineer approved equal. Where infiltration flows are more severe, pressure grouting may be required. The material for pressure grouting shall be Avanti A-220, DeNeef or Engineer approved equal installed in accordance with the manufacturer's written instructions.
- C. All materials, labor, equipment, and incidentals required to correct inflow and infiltration conditions will be considered incidental to rehabilitation.

4.05 APPLICATION OF MATERIALS

- A. Lining material shall not be applied to a frozen surface or to a surface that may freeze within 24 hours of application. Frozen conditions shall be defined as ambient temperatures of 32 degrees Fahrenheit or below.
- B. Sequence of application may be from bottom to top or vice versa if rebound is properly removed.
- C. Application shall be from an angle as nearly perpendicular to the surface as practicable, with the nozzle held at least 1 foot from the working sub-surface (except in confined control). If the flow of material at the nozzle is not uniform and slugs, sand spots, or wet sloughs result, the nozzleman shall direct the nozzle away from the work until the faulty conditions are corrected. Such defects shall be replaced as the work progresses.
- D. Application shall be suspended if:
 - 1. Air velocity separates the cement from the aggregate at the nozzle.
 - 2. Ambient temperature approaches freezing and the newly placed SewperCoat cannot be protected and insulated.

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LINING INSTALLATION (SEWPERCOAT)

- E. The time interval between successive layers of material application must be sufficient to allow “tackiness” to develop but not final set. If final set does occur, this surface shall be prepared in accordance with Sections 4.1.1 of this document.
- F. Construction joints within a manhole shall be avoided. In the event a construction joint is necessary and approved by the Engineer, it shall be sloped off to a thin, clean, regular edge, at a 45-degree angle. Prior to placement of the adjoining materials, the sloped portion and adjacent applied material shall be thoroughly cleaned as necessary, then moistened and scoured with an air jet.
- G. Nozzleman shall bring the material to an even plane and to well-formed corners.
- H. After the body coat has been placed, the surface shall be trued with a thin-edge screed to remove high areas and expose low areas. Low areas shall be properly filled with additional material to insure a true, flat surface in accordance with Section 4.5.5 of this document.
- I. For manhole applications, the minimum thickness of SewperCoat shall be a ½-inch cover over all surfaces. For other larger structures (lift stations, wet wells, treatment plant structures, etc.), the minimum thickness of SewperCoat shall be a 1-inch cover over all surfaces.

4.06 CURING

- A. If the material has been applied and furnished in accordance to the specifications, and it has been determined that the environment is not moist enough for natural curing, the contractor will be required to apply a curing compound to all coated surfaces. Curing compound shall meet the requirements of ASTM C309 and have the approval of the lining material Manufacturer and the Engineer prior to use.
- B. Moist curing may also be used in lieu of curing compound. If moist curing is selected, it should be implemented just after the notice of uniform heat generation of the installed lining. Moist curing can consist of the use of soaker hoses, water sprinklers, or vapor/misting machines. Regardless of delivery method, moist curing should continue for a minimum of 18 hours.

- END OF SECTION -

SECTION 02757

POINT REPAIR OF SANITARY SEWERS

PART 1 -- GENERAL

1.01 SCOPE

- A. The work specified in this Section includes repairs to sections or segments (up to 15 feet) of existing sanitary sewers, mains or service lines, which require excavation from the surface to accurately locate sources of infiltration or inflow and to eliminate them by making necessary repairs.

1.02 GENERAL

- A. Reference is made to Division 15, "Mechanical". 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. "Isolation" of affected reaches of sewer by plugging and/or bypass pumping, if required, shall be performed as specified in Section 02750 - Wastewater Flow Control.
- 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 the designated repairs have been made, the CONTRACTOR will test them as described in this Section of these Specifications. The costs of testing will be borne by the CONTRACTOR. 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 retesting required by the OWNER.
- E. 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.
- F. Excavation, backfill, exploratory excavation, sheeting and shoring, dewatering, conflicts with other utilities, and miscellaneous work shall conform to the requirements of Section 02222 - Excavation and Backfill for Utilities.

SECTION 02757

POINT REPAIR OF SANITARY SEWERS

1.03 SUBMITTALS

- A. The CONTRACTOR shall submit shop drawings in accordance with Section 01300 - Submittals.

1.04 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.

PART 2 -- PRODUCTS

2.01 MATERIALS

- A. Pipe materials are specified in Division 15, "Mechanical".

PART 3 -- EXECUTION

3.01 PROCEDURES

- A. The point repair procedures shall be as follows:
 1. Site preparation shall be performed as described in Division 2. 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.
 2. The CONTRACTOR shall excavate and backfill in accordance with Section 02222 - Excavation and Backfill for Utilities. Under no circumstances shall the CONTRACTOR be allowed to remove concrete or asphalt without prior cutting. The saw cutting shall be deep enough to produce an even, straight cut.

SECTION 02757

POINT REPAIR OF SANITARY SEWERS

3. Dewater, sheet and or brace all excavations in accordance with Section 02222 - Excavation and Backfill for Utilities. 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.
4. Excavate down to the pipe, completely exposing the pipe up to the next undamaged section of pipe on each side.
5. Locate the leak to be repaired.
6. After the leak or failure is located and exposed, the OWNER will identify the method of rehabilitation. One or a combination of the following methods shall be used:
 - a. 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 as manufactured by Fernco, or approved equal. 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.

In the case of point repairs performed on service laterals, the CONTRACTOR shall:

- i. Determine the exact location of the repair by means of television inspection with an electronic locating device (sonde).
- ii. If roots are encountered inside the lateral being repaired, a minimum of 15 feet of lateral shall be replaced.
- iii. If the pipe being replaced reaches the private property line, a cleanout shall be installed at that location in both back yard and front yard easements.
- iv. Where the OWNER has indicated a fused-on saddle, sewer service connections shall be joined to the fold-and-formed pipe by means of an electrofusion sewer saddle as manufactured by Central Plastics Company, 1901 W. Independence, Shawnee, OK 74801, (405) 273-6302, or approved equal. The installation of the saddle shall be done in accordance with manufacturer's recommended procedures. The outlet shall be gasketed, sized for ASTM D 3034 SDR 35 PVD pipe. The fusion of the saddle base must be achieved by input of 40 volts of current supplied by a micro-processor manufactured by Central Plastics Company, or approved equal. The CONTRACTOR must receive training by the manufacturer before installing saddle.

SECTION 02757

POINT REPAIR OF SANITARY SEWERS

- 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.
7. 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.
 - a. 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.
 - b. 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:
 - i. Not more than 4-feet of static head are induced on the main at the lower end of the reach, and
 - ii. No back-up problems are caused in service lines.
8. Complete placement and compaction of backfill.
9. Restore surface features to at least as good condition as existed before construction began, including roadways, driveways and walks.

SECTION 02757

POINT REPAIR OF SANITARY SEWERS

3.02 TELEVISION SURVEY

- A. Television survey, including Preconstruction Survey and Post Construction Survey as indicated in Section 02752 - Television Survey, is required for all point repairs of sanitary sewers.

- END OF SECTION -

PART 2 -- PRODUCTS (Not Used)

PART 3 -- EXECUTION (Not Used)

- END OF SECTION -

SECTION 02759
REPLACEMENT OF SANITARY SERVICE
LATERAL AND CLEANOUT

PART 1 - GENERAL

1.01 SCOPE

- A. This Section consists of removing existing sewer service pipe between mainline and the property line, and furnishing, installing, testing and placing in operation new sewer service piping, complete in its place, with fittings, and other appurtenances required for a complete installation.

1.02 GENERAL INFORMATION AND DESCRIPTION

- A. The pipe and fittings covered by these specifications shall be furnished by fully qualified manufacturers experienced in the fabrication, casting and manufacture of the pipe materials specified herein. The pipe and fittings shall be designed, fabricated and installed in accordance with the best practice of the trade and the standards specified herein.
- B. Portions or reaches of existing sanitary sewer service lines shall be replaced as specified in this Section. The OWNER may authorize additional pipe be removed and replaced as construction proceeds and defective sections of pipe are discovered by direct visual observation.
- C. Replacement pipe to the property line including cleanout as per OWNER'S minimum standards shall be the same size and shall be laid between the mainline pipe and the existing service pipe which shall remain in place acceptable to the OWNER unless decided otherwise by the OWNER. It is the CONTRACTOR's complete responsibility to set controls as necessary to attain true line and grade for the replacement pipe.
- D. When replacing sewer service lines from adjacent buildings or residences to the run of a collector main, the CONTRACTOR shall set a time schedule for the period of service interruption in writing and obtain acceptance of it from the OWNER. The CONTRACTOR shall then notify the appropriate tenants at least 24 hours in advance of the pending interruption and inform them of its time frame. Temporary pumping or other measures will be required if the period of interruption of service occurs before 8:00 a.m. or after 5:00 p.m. The importance of avoiding extended periods of public inconvenience cannot be overemphasized.

1.03 SUBMITTALS

- A. The CONTRACTOR shall submit shop drawings in accordance with Section 01300 - Submittals.

PART 2 -- PRODUCTS

2.01 GENERAL

- A. Pipe materials are specified in Division 15 - Mechanical.

PART 3 -- EXECUTION

3.01 GENERAL

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REPLACEMENT OF SANITARY SERVICE
LATERAL AND CLEANOUT

- A. The CONTRACTOR shall furnish all labor, tools, materials, and equipment necessary for installation and jointing of the pipe. All piping shall be installed in accordance with the Contract Documents in a neat workmanlike manner and shall be set for accurate line and elevation. All piping shall be thoroughly cleaned before installation, and care shall be taken to keep the piping clean throughout the installation.

3.02 PREPARATION

- A. Traffic Control. The CONTRACTOR is required to obtain all permits, use appropriate traffic regulating devices, notify all appropriate governmental agencies and conform to all the requirements specified in Section 01570 - Traffic Regulations and Maintenance of Traffic.
- B. Flow Control. Flow control shall be exercised as required to ensure that no flowing sewage comes into contact with sections of the sewer under repair or replacement.
 - 1. Plugging and Blocking of Flow. A sewer line plug shall be inserted into the main-line when service pipe is disconnected. The plug shall be so designed that all or any portion of the sewage flows cannot be released. During the survey, testing and replacement portion of the construction, flows shall be shut off or substantially reduced as acceptable to the OWNER. After the testing, survey or repair is complete, service shall be restored to normal level. See Section 02750 - Wastewater Flow Control for additional information.
 - 2. Pumping and Bypassing of Flow. Wherever lines are blocked off and the possibility of backing up the sewage and causing harm to public and private property is foreseen, it shall be the CONTRACTOR's responsibility to bypass flow from the disconnected lateral to a down-stream manhole.
 - 3. Bypassing shall be accomplished using sewer plugs with pump connections or by other methods acceptable to the OWNER. All bypassed flow must be discharged to a sanitary sewer. Bypassed flow shall not be allowed to enter any storm line, drainage ditch or street gutter. See Section 02750 - Wastewater Flow Control for additional information.
 - 4. During a bypass operation, the pump shall be manned continuously. The CONTRACTOR shall maintain the pump and bypass equipment and shall be responsible for any damages to public or private property due to the malfunction of same.

3.03 EXCAVATION AND BACKFILL

- A. The CONTRACTOR shall excavate and backfill in accordance with Section 02222 - Excavation and Backfill for Utilities. Under no circumstances shall the CONTRACTOR be allowed to remove concrete or asphalt without prior cutting. The saw cutting shall be deep enough to produce an even, straight cut.

3.04 DEWATERING, SHEETING AND BRACING

- A. The CONTRACTOR shall dewater, sheet and or brace all excavations in accordance with Section 02222 - Excavation and Backfill for Utilities. Well points, pumps, sheeting, bracing

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REPLACEMENT OF SANITARY SERVICE
LATERAL AND CLEANOUT

and/or sock drain shall be used to provide a safe, dry, open hole for all repairs or replacements specified herein.

3.05 SHIPPING, HANDLING AND STORAGE

- A. Special care in handling shall be exercised during delivery, distribution and storage of pipe to avoid damage and setting up stresses. Damaged pipe will be rejected and shall be replaced at no additional cost to the OWNER. Pipe and fittings stored prior to use shall be stored in such a manner as to keep the interior free from dirt and foreign matter.
- B. No pipe shall be dropped from cars or trucks to the ground. All pipe shall be carefully lowered to the ground by mechanical means. In shipping, pipe and fittings shall be blocked in such manner as to prevent damage to castings or lining. Any broken or chipped lining shall be carefully patched. Where it is impossible to repair broken or damaged lining in pipe because of its size, the pipe shall be rejected as unfit for use.

3.06 REMOVAL AND REPLACEMENT OF SEWER LATERAL PIPE AND CLEANOUT

- A. Lateral sewers shall be installed in accordance with all the applicable requirements for pipe installation. Branch fittings shall be installed in the main line sewer as it is constructed, in the locations and configuration of the original laterals or as designated by the OWNER.
- B. The existing laterals shall be hand excavated to a joint, saw cut, clean and square and the appropriate adapter installed to connect the replacement laterals. Care shall be taken to maintain the slopes of the existing laterals. The laterals shall be removed and replaced from the main line to the private property line, or to a point along the existing lateral as determined by the OWNER to be in acceptable condition.
- C. The CONTRACTOR shall not excavate trenches for laterals on both sides of the street at the same time unless written permission has been secured in advance to close the street.
- D. Placement of bedding / cover materials in the trench shall be the same for laterals as provided in Section 02222 - Excavation and Backfill for Utilities.
- E. After the limits of a particular portion of the existing sewer which is to be removed and replaced, have been established on the ground, operations shall progress generally as follows:
 - 1. Carefully remove or protect surface features in work area. Excavate to completely expose the existing pipe, taking adequate precautions not to disturb any other existing underground facilities and handling excavated materials as described in other Sections of the Specifications.
 - 2. That section or reach of pipe to be replaced shall be isolated by plugging and/or bypass pumping as described in other Sections of these Specifications, or by any other method proposed by the CONTRACTOR and acceptable by the OWNER.
 - 3. Remove and dispose of the existing pipe and concrete encasement, if any. This shall be phased and coordinated with its replacement so as to minimize public inconvenience.

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REPLACEMENT OF SANITARY SERVICE
LATERAL AND CLEANOUT

4. The trench bottom shall be overexcavated a minimum of 8-inches and new embedment material to go beneath the pipe placed and shaped so as to form uniform support for the pipe barrel.
5. Pipe shall be installed in accordance with the manufacturer's recommendations and to the grade and slope as its existing conditions. Pipe shall be installed and jointed, normally beginning at its low or outlet end and proceeding upstream, with the bell ends facing upstream toward the direction of flow. Replace cleanout. Make connections to new sewer main and cleanouts, and to existing pipe remaining in place. Complete embedment or encasement and place compacted backfill as necessary to avoid flotation if water should enter the trench.
6. Perform leakage test. When this has been successfully completed and acceptable to the OWNER, remove temporary plugs and reconnect wyes or tees to service lines.
7. Complete placement and compaction of backfill.
8. Restore surface features to at least as good condition as existed before construction began, including roadways, driveways and walks.

3.07 PIPE-TO-PIPE CONNECTIONS

- A. Pipe-to-pipe connections shall be made by using stainless steel shear rings as manufactured by Fernco, or approved equal.

3.08 TELEVISION SURVEY

- A. Television survey, including Preconstruction Survey and Post Construction Survey, as indicated in Section 02760 - Service Lateral Television Survey, is required for all replacement of sanitary sewer lateral pipe.

- END OF SECTION -

SECTION 02760
SERVICE LATERAL TELEVISION SURVEY

PART 1 - GENERAL

1.01 SCOPE

- A. The work consists of furnishing all labor, materials, accessories, equipment, tools, transportation, services and technical competence for performing all operations required to execute the internal closed circuit television survey to inspect service laterals.
- B. The survey shall show all defects and determine amount of infiltration entering the service laterals.

1.02 GENERAL

- A. After cleaning as specified in Section 02751 – Preparatory Cleaning (including special cleaning involving the mechanical removal of roots, grease, and/or tuberculation where authorized), and before and after repair/replacement work, the lateral shall be visually surveyed by means of closed-circuit television in the presence of the OWNER. The survey shall be performed one lateral at a time.
- B. Pre- and post-construction survey video on CD-ROM shall be delivered to the OWNER on CD-ROM, accompanied with the corresponding work orders, and pre- and post-TV logs, for sewer laterals surveyed. The video on CD-ROM shall be direct from a live video source into a video file, format MPEG1, and of good quality for viewing. The recording of multiple laterals on a single CD is acceptable.
- C. The television equipment operator shall be certified under the NASSCO (National Association of Sewer Survey Companies) PACP (Pipe Line Assessment and Certification Program).

1.03 EQUIPMENT

- A. The television camera used for the lateral survey shall be one specifically designed and constructed for such survey. A Sonde locating device shall be attached to the camera. Lighting for the camera shall be suitable to allow a clear picture of the entire periphery of the pipe. The camera shall be operative in 100% humidity conditions. The camera, television monitor, and other components of the video system shall be capable of producing a minimum 700 line resolution color video picture. The CONTRACTOR shall maintain camera in clear focus at all times. Picture quality and definition shall be to the satisfaction of the OWNER; and if unsatisfactory, equipment shall be removed and replaced with adequate equipment at no additional cost to the OWNER. The lateral camera shall have a pan-and-tilt capability.
- B. The camera system shall be able to inspect 3-, 4-, and 6-inch lateral connections up to 70 feet from the sewer mainline. The launcher shall be mounted on a tread tractor that moves through main sewers and positions the inspection camera launcher opposite the lateral line connection.
- C. The camera system shall have mini black and white or color, fixed position, “positioning” camera to observe and place the mini color, push, “inspection” camera at the lateral. The inspection camera shall be attached to an 80-foot long push cable with a fiberglass rod core

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SERVICE LATERAL TELEVISION SURVEY

for cable rigidity. The camera head shall point forward while traveling through the sewer mainline.

- D. The camera used from a cleanout shall be able to be launched from the cleanout and travel down to the sewer mainline, up to 100 feet. The camera system shall be able to inspect 3-, 4-, and 6-inch lateral connections.
- E. The video camera shall include a titler feature capable of showing on the tape the following information:
 - 1. City and State
 - 2. Date/Time
 - 3. CONTRACTOR's Name
 - 4. Pipe Size (Diameter) and Material
 - 5. Upstream Manhole Number & Distance to Lateral
 - 6. On-going Footage Counter
- F. A Sonde shall be provided for locating unmarked sewer laterals. A sonde is a transmitter tied on a line and moved through a sewer or duct. A receiver on the surface follows its movement, documenting the line location. The pipe position is then marked on the ground. The sonde is pushed farther into the pipe, the receiver relocates the sonde and the pipe position is marked again. This process is repeated until the desired section of pipe is traced. It is pulled out on completion of the locate. The sonde will be inserted into the lateral through a sewer cleanout or, in case of no cleanout, through a roof vent to locate the cleanout as well as unmarked sewer lateral. The sonde may also be attached to the lateral television camera.

1.04 SUBMITTALS

- A. The CONTRACTOR shall submit shop drawings and other information in accordance with Section 01300 - Submittals. The CONTRACTOR's submittals shall include description of the software to be used and a sample of the video titles to be used, along with a sample of the television survey log to be used.

1.05 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.

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Substitutions of personnel and/or methods will not be allowed without written authorization of the OWNER.

4. Specialty technicians shall be certified by the equipment manufacturer and/or its authorized representative. Certifications shall be submitted to the OWNER.
5. The CONTRACTOR shall provide his references of previous project lists going back five years including his customers' names, addresses, and telephone numbers.
6. To be qualified, the CONTRACTOR shall have a minimum of five years previous experience in the work required in this section.

PART 2 -- PRODUCTS

All inspection information and data (including video) written to digital media (CD-ROM).

PART 3 -- EXECUTION

3.01 PRECONSTRUCTION SURVEY

A. Procedure

1. Prior to any repair work, the entire service lateral (from mainline to property line / cleanout, whichever is farther from the mainline) shall be televised.
2. Measurement for location of defects shall be above ground by means of a meter device. Measurement meters shall be accurate to tenths of a foot over the length of the section being surveyed. Accuracy of the distance meter shall be checked by use of a walking meter, roll-a-tape, or other suitable device. Linear footage shall be shown on screen during recording.
3. Movement of the television camera shall be temporarily halted for a minimum of ten seconds at each visible point of flow until the source and flow rate from that point are determined.
4. The inspection shall be performed from either the main sewer or the cleanout with proper equipment specified. If the CONTRACTOR chooses to perform the inspection from the cleanout and the cleanout is either inaccessible or does not exist, he shall install a cleanout to facilitate the inspection. All costs of material, equipment, labor, and other costs due to unspecified field conditions shall be borne by the CONTRACTOR. Payment for cleanout installation shall be made by the OWNER as indicated in Section 01025, Measurement and Payment.
5. Above ground horizontal location of lateral shall be marked every five (5) feet utilizing surveyor's paint on an asphalt or concrete surface and surveyor's flags in grass. Approximate depth of laterals at these location shall be recorded on the TV logs.

B. Field Documentation

1. Television Survey Logs. Location of the lateral by indicating the upstream manhole number, distance from the upstream manhole, lateral connection to the main line

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SERVICE LATERAL TELEVISION SURVEY

(left, center or right), and address of the customer serviced by the lateral, shall be noted on the television survey log. Printed and electrically stored location records shall be kept by the CONTRACTOR and will clearly show the location, in relation to the cleanout or the mainline of each infiltration point observed during survey. Footage shall be shown on the log. In addition, other points of significance such as unusual conditions, roots, broken pipe, presence of scale and corrosion, and other discernible features will be recorded and a copy of such records will be supplied to the OWNER. The CONTRACTOR shall measure the depth of the upstream and downstream manholes. Measurements shall be from the invert of the pipe to the top of the manhole rim and shall be recorded on the survey log.

2. Photographs. Digital photographs of the television picture of problems shall be taken by the CONTRACTOR upon request of the OWNER.
3. Video Recordings. The purpose of video (CD-ROM) recording shall be to supply a visual and audio record of problem areas of the lines that may be replayed. CD-ROM recording playback shall be at the same speed that it was recorded. Slow motion or stop motion playback features shall be supplied by the CONTRACTOR. Once recorded, the CD-ROM becomes the property of the OWNER. The CONTRACTOR shall have all CD-ROM and necessary playback equipment readily accessible for review by the OWNER during the Project.
4. Audio. All CD-ROM shall have audio record. As a preamble, at the beginning of the CD-ROM, the CONTRACTOR shall state the following: "(Contractor's Name) is performing a pre/post TV survey for Job No. _____ (provided by the OWNER), City of Hollywood". State date, time, operator's name, area, pipe size and material, upstream manhole number and depth. The CONTRACTOR shall verbally state the position of the lateral with respect to the upstream manhole and describe defects. At the end of each line, state: "End of line" and total linear footage.

3.02 POST CONSTRUCTION SURVEY

A. Procedure

1. The same procedures shall be used as indicated in Section 3.01 PRECONSTRUCTION SURVEY.
2. In addition, the CONTRACTOR shall stop the camera at all point repairs and inspect entire repaired pipe sections.
3. The CONTRACTOR shall invert white foreground to black as needed in the line section with light background.
4. In the case of a post-liner survey, the CONTRACTOR shall fully televise both ends of the liner so that the fit of the liner to the host pipe can be evaluated.
5. The post-liner television survey shall be done within 2 weeks of liner installation.

B. Documentation

1. The same documentation shall be provided as indicated in Section 3.01 PRECONSTRUCTION SURVEY.

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SERVICE LATERAL TELEVISION SURVEY

3.03 LOCATION OF LATERAL FROM RESIDENCE

A. Procedure

1. Run a sonde through a roof vent to locate cleanout as well as unmarked sewer lateral. A sonde is a transmitter tied on a line and moved through a sewer or duct. A receiver on the surface follows its movements, documenting the line location. The pipe position is then marked on the ground. The sonde is pushed farther into the pipe, the receiver relocates the sonde and the pipe position is marked again. This process is repeated until the desired section of pipe is traced. It is pulled out on completion of the locate.

B. Documentation

1. Above ground horizontal location of lateral shall be marked every five (5) feet utilizing surveyor's paint on an asphalt or concrete surface and surveyor's flags in grass. Approximate depth of laterals at these locations shall be recorded on the TV logs. Location of buried cleanouts, or location for the purposes of installing a new cleanout shall be marked by two measured distances to permanent recoverable objects. CONTRACTOR shall furnish a schematic of these locations with sufficient detail to be able to relocate from above ground, at a later date.

- END OF SECTION -

SECTION 02762
CHEMICAL ROOT TREATMENT

PART 1 – GENERAL

1.01 SCOPE

- A. The work specified in this Section includes all labor, materials, accessories, equipment, and tools necessary for chemical root treatment to kill tree roots in sanitary sewer pipe prior to chemical grouting and lining and to inhibit root regrowth without damaging the trees, the environment, or the wastewater treatment plant microbes.
- B. The CONTRACTOR is advised that the use of chemicals to control tree roots is a specialized type of sewer maintenance which requires licensing, experience, and financial responsibilities unique to this type of work. Substances designed to control tree roots in sewers are defined as pesticides by the government of the United States, and their manufacture, handling, transportation, and use are stringently regulated by Federal and State law. These specifications are not intended to be all inclusive of the Federal, State, and Local laws and regulations relevant to this type of work. It is the responsibility of the CONTRACTOR to be knowledgeable of, and to be in full compliance with, all relevant Federal, State, and Local laws, regulations, and ordinances. Nothing contained in these specifications or elsewhere in the contract documents shall be construed as limiting the extent of the CONTRACTOR's responsibility.
- C. The CONTRACTOR attests, through submittal of a bid or proposal, or by agreeing to the contract, that the Contractor is expert in this type of work, and recognizes and understands the risks posed by this type of work on wastewater treatment plant processes. The CONTRACTOR shall not rely on the Owner for guidance in this regard.

1.02 REFERENCE SPECIFICATIONS

- A. Section 02751 - Preparatory Cleaning and Root Removal
- B. Section 02763 - Chemical Grouting

1.03 SUBMITTALS

- A. The CONTRACTOR shall submit the following in accordance with Section 01300 - Submittals:
 - 1. A specimen product label showing the United States Environmental Protection Agency (EPA) Registration listing numbers of the product.
 - 2. A specimen product label indicating EPA approval of the chemical root treatment for sanitary and storm sewers.
 - 3. The manufacturer's recommended guidelines for proper mixing ratios for maximum daily usage of materials.
 - 4. Material Safety Data Sheet (MSDS) for the product.
- B. The above informational data shall clearly indicate compliance with the Specifications. The CONTRACTOR shall submit written exceptions to the specifications.

SECTION 02762
CHEMICAL ROOT TREATMENT

1.04 QUALIFICATIONS

- A. Prior to contract award, the Contractor must demonstrate a minimum of five (5) years experience in applying chemical sewer root control of the type specified herein. The Contractor must have successfully treated in excess of 100,000 linear feet of sanitary sewer.

1.05 GUARANTEE

- A. For each sewer section (manhole-to-manhole) that is treated under the Contract, the Contractor shall provide a written guarantee for the work as follows:
 - 1. At the option of the Owner, the Contractor shall, at his own expense, re-treat a sewer section, or refund 100% of the payment received to treat that section, in the event that: (1) live roots are found in the section within six months after the application; or, (2) the section plugs up and floods due to tree root obstructions within a period of two years, beginning the date of treatment, and ending two years after the date of treatment.
- B. Retreatments, performed at no charge in honor of the guarantee, do not extend the expiration date of the guarantee. The same notification and documentation requirements apply to any retreatment.

PART 2 – PRODUCTS

2.01 GENERAL

- A. The chemical root treatment material shall be EPA registered and labeled for use in sanitary sewer lines and acceptable to the state and local government agencies having jurisdiction over its use.

2.02 ROOT TREATMENT MATERIAL

- A. The chemical root treatment material shall be the formula RootX or an approved equal. The formula shall be composed of two dry components which when mixed and come in contact with water foam immediately. The active ingredient of the chemical treatment shall be Dichlobenil (minimum 100 ppm). Extra equipment such as a foam machine should not be required. This active ingredient for killing roots shall be an aquatically approved, non-systemic herbicide (Dichlobenil) which will kill roots at low concentrations but will not permanently affect parts of the plant distant from the treated roots. The active ingredient must be detoxified by natural chemical / biochemical processes following its use. The active ingredient, adjuvants, or either ingredient's by-products shall not adversely affect the performance of wastewater treatment plants.
- B. The active ingredient for inhibiting root regrowth (Dichlobenil) in sanitary and storm sewers shall inhibit root cell growth on contact, but shall not be transported so as to damage other portions of the plant. The material shall form a persistent chemical barrier suppressing the growth of root tips. The material shall be sufficiently stable under conditions of use to provide protection for twelve months, but shall be subject to decomposition in wastewater treatment plants without disturbing plant processes.
- C. To improve transportation of the active ingredients into root tissues, the root treatment material shall contain emulsifiers to degrease root masses and remove fatty acids from root tissue.

SECTION 02762
CHEMICAL ROOT TREATMENT

PART 3 – EXECUTION

3.01 GENERAL

- A. All materials and mixing / application procedures for chemical root treatment shall conform to the latest industrial standards and requirements and follow the recommendations of the manufacturer of the chemical root treatment material used.

3.02 PREPARATORY PROCEDURES

- A. Root tips are the principal growth areas and are the surfaces most effectively penetrated by root treatment chemicals. When the root tips are damaged or removed by sewer line cleaning, chemical treatment will be less effective. Consequently, no cleaning is recommended in lines prior to chemical root treatment unless extensive grease, root masses, or debris preclude proper application of the material.

3.03 FLOW CONTROL

- A. Sewer service shall generally not be interrupted during root treatment. In situations where it is necessary, the CONTRACTOR shall block / bypass flow in accordance with Section 02750 - Wastewater Flow Control.

3.04 PERSONAL PROTECTIVE EQUIPMENT

- A. The CONTRACTOR shall use appropriate protective clothing and equipment as recommended by the manufacturer during the use and handling of the material.

3.05 MIXING PROCEDURES

- A. All materials shall be delivered to the site in undamaged, unopened containers bearing the manufacturer's label. Mixing of the root treatment material shall be done in accordance with the manufacturer's recommendations and no more than 12 hours prior to use. The water used shall be clear and free of acid, alkali, oxidizing agents, oil, or other organic materials. Mixing water temperature shall be between 40 degrees F and 80 degrees F. Contractor shall be responsible for insuring that handling, transportation, and use of any hazardous materials, and disposal of all pesticide containers, are according to the State and Federal regulations pertaining thereto. Should any chemical root control agent spill on the ground, the chemical and affected soil shall be removed and safely disposed of. The area shall be restored to a condition equal to or better than before the spill. Any damage to vegetation resulting from misuse of the chemical root control agent shall be the responsibility of the Contractor.

B. 3.06 APPLICATION PROCEDURES

- A. Where conditions permit, the volume of foam shall be sufficient to completely fill the air space above the flow, manhole to manhole. In all cases, the volume of foam delivered to the sewer line shall be sufficient to attach to and permeate all root masses.
- B. The foam shall be applied to sufficient pressure to penetrate a minimum of 5 feet into service connections.

SECTION 02762
CHEMICAL ROOT TREATMENT

3.07 DISCHARGE OF EFFLUENT

- A. The chemical root treatment material is not removed from the sewer and will travel to the treatment plant. The active ingredient for inhibiting root regrowth shall attach to pipe surfaces in the line being treated or in route to the treatment plant. The amount of chemical root treatment material reaching the plant shall be negligible, and no special precautions shall be required. The CONTRACTOR shall follow the manufacturer's maximum use guidelines. Note: Large sewer trunk line directly upstream from the treatment plant may require special precautions.
- B. Contractor shall be responsible for ensuring that there are no adverse effects on wastewater treatment plant processes, or adverse effects on the quality of wastewater treatment plant effluent, as a result of chemical applications. The Contractor shall be financially responsible for any adverse effects on wastewater treatment plant processes which are, directly or indirectly, caused by the chemical applications, including but not limited to the following: damages to plant processes or equipment, clean-up and restoration costs, fines imposed on the Owner or on the operator of the wastewater treatment plant by State or Federal agencies, pollution of receiving waters, and civil suits. The Contractor shall further indemnify and hold harmless the Owner, and the operator of the wastewater treatment plant, against all costs, including legal expenses, relating to treatment plant failure or other damages or pollution caused by the applications of chemicals by the Contractor.

3.08 ROOT REMOVAL / CHEMICAL GROUTING

- A. Removal of dead roots, where required, should be postponed as long as possible after chemical root treatment to facilitate easier cleaning. Sewer line cleaning shall be scheduled no less than six weeks after root treatment.
- B. Root removal shall be in accordance with Section 02751 - Preparatory Cleaning and Root Removal.

3.09 RECORDING OF FIELD OBSERVATIONS

- A. Contractor shall keep complete, accurate records of each day's operation. Records shall show date of treatment, sections of line treated, pipe size and distance, and other pertinent information. Log sheets shall be submitted with the invoice.
- B. Upon completion of the project and accompanying the invoice, or whenever requested to by the Owner, the Contractor shall submit log sheets and reports which show, as a minimum, the following information:
 - 1. The name of the Owner
 - 2. The report date
 - 3. The date each sewer line was treated
 - 4. Street name for each treated sewer line
 - 5. A description (collection basin name, upstream and downstream manhole numbers) to enable the Owner to exactly identify the location of the treated sewer line
 - 6. The pipe size for each treated sewer line

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CHEMICAL ROOT TREATMENT

7. The length (manhole to manhole) for each treated sewer line
8. Special conditions found by the Contractor's crew
9. The date the guarantee expires on each treated sewer line

- END OF SECTION -

SECTION 02763

CHEMICAL GROUTING

PART 1 - GENERAL 1.01 SCOPE

- A. The work specified in this Section includes all labor, materials, accessories, equipment and tools necessary for chemical grouting, sealing, and air testing sanitary sewer pipe joints, pursuant to ASTM F2304-03.

1.02 GENERAL

A. Chemical Root Treatment

1. When so directed by the OWNER, the CONTRACTOR shall perform chemical root treatment in accordance with Section 02762 - Chemical Root Treatment.
2. The CONTRACTOR shall schedule his work to perform chemical root treatment a minimum of 8 weeks prior to performing the work specified under this Section.
3. When so directed by the OWNER, prior to performing chemical grouting, the CONTRACTOR shall remove roots and clean the sewer in accordance with Section 02751 - Preparatory Cleaning and Root Removal.

B. Leak Testing

1. Sewer line joint testing shall be accomplished by applying air pressure to each sewer joint, and monitoring the pressure in the void over a one-minute period. The intent of joint testing is to identify defective joints prior to the joint sealing process and check the effectiveness of the seal.
2. Testing cannot be performed and shall not be required on cracked, structurally unsound, or broken pipe, severely corroded or out-of-round pipe, or on visibly leaking joints.

C. Leak Sealing

1. Sources, or possible sources, of infiltration within the sewer system, are to be sealed to eliminate infiltration.
2. The application of the sealing grout within the pipe shall be by means of remote-controlled equipment designed to be positioned at the specific joint or crack to be sealed and to apply the grout under sufficient pressure for the grout to pass through the opening and fill voids outside the pipe as well as the opening in the pipe wall. Control of the device and review of the results shall be by operating the closed-circuit television camera and van-mounted monitor conforming to the requirements of Section 02752 - Television Survey. The method of sealing used shall not damage the pipe or change pipe alignment, and the original cross sectional area shall not be permanently reduced or changed.

1.03 QUALIFICATIONS

- A. The Qualifications of the Grouting CONTRACTOR shall be submitted prior to contract award. These Qualifications shall include detailed descriptions of the following:

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1. Name, business address and telephone number of the CONTRACTOR.
2. Name(s) of all supervisory personnel to be directly involved with Grouting for 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. Specialty technicians shall be certified by the equipment manufacturer and/or its authorized representative. Certifications shall be submitted to the OWNER.
5. The CONTRACTOR shall provide his references of previous project lists going back five years including his customers' names, addresses, and telephone numbers.
6. To be qualified, the CONTRACTOR shall have a minimum of five years previous experience in grouting.

PART 2 - PRODUCTS

2.01 CHEMICAL JOINT SEALING MATERIALS

- A. Chemical joint sealing materials used on this project shall be AV-118 Duriflex, or AV-100 plus activators, initiators and inhibitors recommended by the manufacturer, Avanti International, Houston, Texas or an approved equal.
- B. In those lines which had root removal performed, a chemical root inhibitor shall be added to the grout prior to sealing the joints. CONTRACTOR shall submit the chemical to be used for OWNER's approval prior to utilization.

PART 3 -- EXECUTION

3.01 LEAK TESTING EQUIPMENT

- A. The basic equipment used shall consist of a television camera, joint testing device such as a packer, and test monitoring equipment. In combination, the equipment shall be constructed in such a way as to provide means for introducing a test medium under pressure, into the Void area created by the expanding ends of the joint testing device. The testing equipment shall also have the means for regulating the flow rate of the test medium into the Void area in conjunction with the means for continuously measuring the actual static pressure of the test medium at and within the Void area only. The packer device shall be constructed in such a manner as to allow some flow to pass through its center annulus.
- B. Void pressure data shall be transmitted electrically and without the use of the test medium or hoses. All test monitoring shall be above ground and in a location to allow for simultaneous continued observation of the television monitor and test monitoring equipment by the CONTRACTOR. The OWNER shall witness the testing operation.

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- C. Sewer line joint testing shall be accomplished before and after the grouting operation by applying a positive pressure to each sewer joint and monitoring the pressure in the Void. The intent of joint testing is to identify defective joints prior to the joint sealing process and determine the effectiveness of the seal repaired.

3.02 CONTROL TEST PROCEDURES

- A. Prior to and during the joint testing phases of the work, the CONTRACTOR shall perform Control, Intermediate, and Final testing in accordance with the latest edition of ASTM F2304.

3.03 JOINT TESTING PROCEDURE

- A. Sewer line joints shall be individually tested at a test pressure equal to $\frac{1}{2}$ psi per vertical foot of pipe depth, but in no case exceeding a pressure of 10 psi and in accordance with the following procedures:
 1. The packer or testing device shall be positioned within the line in such a manner as to straddle the joint to be tested.
 2. The packer ends or testing device ends shall be expanded so as to isolate the joint from the remainder of the line and create a Void area between the packer or testing device and the pipe joint. The ends of the testing device shall be expanded against the pipe with sufficient inflation pressure to contain the test medium within the Void without leakage past the expanded end.
 3. The test medium shall be introduced into the Void area until a pressure or flow rate equal or greater than the required test pressure is observed with the Void pressure monitoring equipment.
 - a. Air Test – After the void pressure is observed to be equal to or greater than the required test pressure, the airflow shall be stopped and the air test supply line vented. The operator will observe this void pressure for a period of 15 s, if the pressure is maintained, with a pressure drop of less than 1 psi (7 kPa), then the joint will be considered as having passed the test. If the pressure shows additional decay during the recommended time period, it will be considered as having failed and shall be sealed as described in Section 12. Upon completion of the sealing, the joint will be retested at the established test criteria (post-test).
 - b. Water Test – A liquid (water) shall be introduced into the void area until a pressure equal to or greater than the required test pressure is observed with the void pressure monitoring equipment. If the required test pressure cannot be developed (due to joint leakage), the joint will have failed the test and shall be sealed as specified. The flow rate of the test liquid shall then be regulated to a rate at which the void pressure is observed to be the required test pressure for a period of 30 seconds. A reading of the test liquid flow meter shall then be taken. If the flow rate exceeds $\frac{1}{4}$ gallon per minute (due to joint leakage), the joint will have failed the test and shall be sealed as specified.

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4. The test medium shall be air or liquid.

3.04 TEST RECORDS

- A. During the joint testing procedure, complete records shall be kept, to include the following data:
 1. Identification of the manhole section tested.
 2. Type of pipe.
 3. Diameter of pipe.
 4. Length of pipe sections between joints.
 5. Depth of pipe to surface.
 6. Test pressure used and duration of test.
 7. Statement indicating the pass/fail test results for each joint tested, Location (stationing) of each joint tested and location of any joints not tested with an explanation for not testing.
- B. In the case of a "passing" joint, a single pressure reading may be recorded. In the case of a "failing" joint requiring grout, three pressures shall be recorded: the initial "failing" pressure; the zero pressure after grout has been injected and the packer deflated; and the final pressure after the grout has been injected and the packer reinflated.

3.05 JOINT SEALING EQUIPMENT

- A. The basic equipment shall consist of a closed circuit television system, necessary chemical sealant containers, pumps, regulators, valves, hoses, etc., and joint sealing packers for the various sizes of sewer pipe. The packer shall be a cylindrical case of a size less than pipe size, with the cables at either end used to pull it through the line. The packer device shall be constructed in such a manner as to allow a restricted amount of sewage to flow at all times. Generally, the equipment shall be capable of performing the specified operations in lines where flows do not exceed the maximum line flows as specified in Section 02750 - Wastewater Flow Control. When the packer is inflated, two widely spaced annular bladders shall be formed, each having an elongated shape and producing an annular void around the center portion of the packer.
- B. Before starting the work, a performance test demonstration verifying the accuracy and repeatability of the void pressure meter and fluid pumping equipment should be performed. If these test demonstrations fail to show that the readings are accurate, ± 0.5 psi (3 kPa) for void pressure repeatability, and ± 0.1 (0.4 L) of chemical pumped into a measured container, the CONTRACTOR shall be required to make the required repair or adjustments to the equipment and gages and retest until the results are satisfactory to the OWNER's representative. The test demonstration may be required at each work shift during the sealing operation.

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3.06 JOINT SEALING PROCEDURE

- A. In the preparation and application of the sealing grout, the recommendations of the manufacturer of the grout materials shall be followed. Before joint sealing, chemical grout gel times should be measured and recorded. Gel times should also be measured and recorded whenever a new batch is made and at the end of the shift. These gel times measurements are a very effective and meaningful quality assurance procedure.
- B. Joint sealing shall be accomplished by forcing chemical sealing materials into or through infiltration points by a system of pumps, hoses, and sealing packers. Jetting or driving pipes from the surface that could damage or cause undermining of the pipe lines, will not be allowed. Excavating the pipe, which would disrupt traffic, undermine adjacent utilities and structures, will not be allowed. The packer shall be positioned over the area of infiltration by means of a metering device and the closed circuit television in the line. It is important that the procedure used by the CONTRACTOR for positioning the packer be accurate to avoid over-pulling the packer and thus not effectively sealing the point of infiltration. The packer sleeves shall then be expanded using precisely controlled pressures. The pneumatically expanded sleeve or elements shall seal against the inside periphery of the pipe to form a void area at the point of infiltration, now completely isolated from the remainder of the pipe line. Into this isolated area, sealant materials shall be pumped through the hose system at controlled pressures, which are in excess of groundwater pressures. The pumping, metering, and packer device shall be integrated so that the proportions and quantities of materials can be regulated in accordance with the type and size of the leak being sealed.
- C. The grout must be injected beyond the joint interface into the soil surrounding the pipe joint.
- D. A color additive (dye) should be added to the grout so that a visual residual layer of grout rings the joint providing confirmation the packer was located over the joint and the void was filled during the sealing operation.
- E. No joint shall be considered sealed unless, while under continual pressure, an attempt is made to pump grout to "refusal" (up to ½ gallon per inch diameter pipe size). This is to insure that sufficient chemical has been dispersed into the soil surrounding the joint and that a temporary seal has not been made by applying a minimum amount of chemical grout to the void and the joint area inside the pipe. When chemical grout cannot be pumped to "refusal" within a volume less than or equal to ½-gal per inch diameter pipe size due to latent physical conditions, no additional work shall be undertaken until authorization to proceed has been given by the OWNER/OWNER's representative.
- F. Upon completing the sealing of each individual joint, the packer shall be deflated; moved at least one packer length in either direction, and then repositioned over the joint; with the void pressure meter reading zero pressure, then reinflated and tested as specified in subsection 3.03 - Joint Testing Procedure. Should the void pressure meter not read zero, the CONTRACTOR shall clean his equipment of residual grout material or make the necessary equipment repairs to provide for an accurate void pressure reading. Joints that fail to meet the specified test criteria shall be resealed and retested until the test criteria can be met in order to receive payment.

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CHEMICAL GROUTING

- G. All testing shall be performed by the CONTRACTOR in the presence of the OWNER. It shall be the responsibility of the CONTRACTOR to completely seal every leak authorized for sealing to the extent determined by the OWNER. If, in the OWNER's opinion, it is not necessary to continue with a particular leak, the crew shall move to the next joint or leak. The CONTRACTOR shall remove any small excess sealing grout inside the sewer line. CONTRACTOR shall operate his equipment with care and shall be responsible for any damage to the sewer system or other facilities caused by his operations, and shall repair such damage at his expense and without delay as instructed by the OWNER.

3.07 JOINT SEALING RECORDS

- A. Included in the records for joint sealing shall be:
1. The test pressure before and after sealing and the duration of the test.
 2. The volume of grout material used to seal each joint.
 3. The volume of grout placed per section.
 4. The gel set time used.
 5. The barrel test results.
 6. The grouting material used including additives and their respective quantities.

3.08 LATERAL SEALING PROCEDURE

- A. The following shall apply to the sealing of all reinstated laterals after the main has been lined.
1. The total batch shall be no more than 50 gallons. That means reducing the water in each tank by 5 gallons. This will increase the strength of the "gel" by increasing the solids to 12 percent.
 2. The "gel" time shall be 10 seconds longer than the time required by the pumps to fill the inside packer void and at no time shall the "gel" time be less than 20 seconds.

3.09 TELEVISION SURVEY

- A. Television survey, including Preconstruction Survey, Post Construction Survey, and Warranty Survey, as indicated in Section 02752 - Television Survey, is required for all grouted lines.

3.10 WARRANTY: All chemical grouting work described herein shall be guaranteed against faulty workmanship and/or materials for a period of 3 years after the completion of the work.

- END OF SECTION -

SECTION 02765
CURED-IN-PLACE PIPE LINING

PART 1 -- GENERAL

1.01 SCOPE

- A. It is the intent of this specification to provide for the reconstruction of pipelines and conduits by the installation of a resin-impregnated flexible tube which is formed to the original conduit and cured to produce a continuous and tight fitting Cured-In-Place Pipe (CIPP).
- B. The work specified in this Section includes all labor, materials, accessories, equipment and tools necessary to install and test cured-in-place pipe lining in main lines and in service laterals.

1.02 GENERAL

- A. This specification references ASTM F1216 (Rehabilitation of pipelines by the inversion and curing of a resin-impregnated tube), ASTM F1743 (Rehabilitation of pipelines by pulled-in-place installation of a cured-in-place thermosetting resin pipe), and ASTM D790 (Test methods for flexural properties of unreinforced plastics) which are made a part hereof by such reference and shall be the latest edition and revision thereof. In case of conflicting requirements between this specification and these referenced documents, this specification will govern.

1.03 SUBMITTALS

- A. The CONTRACTOR shall submit shop drawings and other information to the OWNER for review in accordance with Section 01300, "Submittals".
- B. With the bid, the following submittals are required.
 - 1. Documentation as outlined herein under the section titled, PRODUCT AND INSTALLER ACCEPTABILITY, including installation references of projects that are similar in size and scope to this project. The submittal shall include, at a minimum, the client contact name, phone number, and the diameter and footage of pipe rehabilitated. Documentation for product and installation experience must be satisfactory to the OWNER.
- C. After contract award, the following submittals are required.
 - 1. Detailed design calculations as specified herein under the section titled, MATERIALS FOR MAIN LINES AND LATERALS.
 - 2. Various test results as specified herein under the section titled, TESTING REQUIREMENTS.
 - 3. Documentation as specified herein under the sections titled WET-OUT AND CURE REPORT and TELEVISION SURVEY.

1.04 PRODUCT AND INSTALLER ACCEPTABILITY

- A. Since sewer products are intended to have a 50 year design life, and in order to minimize the OWNER'S risk, only proven products and installers with substantial successful long term track records will be approved.
- B. Products and installers seeking approval must document an ability to meet all of the following criteria to be deemed commercially acceptable:
 - 1. For a product to be considered commercially proven, a minimum of 1,000,000 linear feet or 4,000 manhole-to-manhole line sections of successful wastewater collection system installations in the U.S. must be documented to the satisfaction of the OWNER to assure commercial viability. In addition, at least 250,000 linear feet of the product shall have been in successful service within the State of Florida for a minimum of five years.
 - 2. For an Installer to be considered as commercially proven, the installer must satisfy all insurance, financial, and bonding requirements of the OWNER, and must have had at least 5 (five) years active experience in the commercial installation of the product. For sewer mains, the installer must have successfully installed at least 250,000 feet of the product in wastewater collection systems in Florida. For sewer laterals, the installer must have successfully installed a minimum of 500 lateral liners in Florida. Acceptable documentation of these minimum installations must be submitted to the OWNER.

The CONTRACTOR shall have a State of Florida Underground Utility Contractor's License and must have been in business in the State of Florida for the last (5) five years in providing Cured-in-Place-Pipe Lining contracting services utilizing the product being proposed for this bid.

- 2. Sewer rehabilitation products submitted for approval must provide third party test results supporting the long term performance and structural strength of the product and such data shall be satisfactory to the OWNER. Test samples shall be prepared so as to simulate installation methods and trauma of the product. No product will be approved without independent third party testing verification.

PART 2 -- PRODUCTS

2.01 MATERIALS FOR MAIN LINES AND LATERALS

- A. The sewn tube shall consist of one or more layers of absorbent non-woven felt fabric and meet the requirements of ASTM F1216 or ASTM F1743, Section 5. The tube shall be constructed to withstand installation pressures, have sufficient strength to bridge breaks and missing sections of the existing pipe, and stretch to fit irregular pipe sections. The new jointless pipe-within-a-pipe must fit tightly against the old pipe wall and consolidate all disconnected sections into a single continuous conduit, substantially reducing or eliminating infiltration or exfiltration.

- B. The wetout tube shall have a uniform thickness that when compressed at installation pressures will meet or exceed the Design thickness.
- C. The tube shall be sewn to a size that when installed will tightly fit the internal circumference and length of the original pipe with minimal shrinkage, in such a way as to minimize water migration (tracking) between the liner and the host pipe. Allowance should be made for circumferential stretching during inversion, and longitudinal stretching during pull in. Overlapped layers of felt in longitudinal seams that cause lumps in the final product shall not be utilized.
- D. The minimum tube length shall be that deemed necessary by the Contractor to effectively span the distance between the access points and to facilitate a good, "non-tracking" seal. The Contractor shall verify the lengths in the field before cutting liner to length and otherwise preparing it for installation.
- E. The outside layer of the tube (before wetout) shall be coated with an impermeable, flexible membrane that will contain the resin and facilitate monitoring of resin saturation during the resin impregnation (wetout) procedure.
- F. The tube shall be homogeneous across the entire wall thickness containing no intermediate or encapsulated elastomeric layers. No material shall be included in the tube that may cause delamination in the cured CIPP. No dry or unsaturated layers shall be evident.
- G. The wall color of the interior pipe surface of CIPP after installation shall be a light reflective color so that a clear detailed examination with closed circuit television inspection equipment may be made.
- H. Seams in the tube shall be stronger than the unseamed felt.
- I. The outside of the tube shall be marked for distance at regular intervals along its entire length, not to exceed 5 ft. Such markings shall include the Manufacturers name or identifying symbol. The tubes must be manufactured in the USA.
- J. The resin system shall be a corrosion resistant polyester, vinyl ester, or epoxy and catalyst system that when properly cured within the tube composite meets the requirements of ASTM F1216 and ASTM F1743, the physical properties herein, and those which are to be utilized in the Design of the CIPP for this project. The resin shall produce CIPP which will comply with the structural and chemical resistance requirements of this specification.
- K. The finished pipe in place shall be fabricated from materials which when cured will be chemically resistant to withstand internal exposure to domestic sewage. All constituent materials will be suitable for service in the environment intended. The final product will not deteriorate, corrode or lose structural strength that will reduce the projected product life. In industrial areas a liner system using epoxy vinyl ester resin shall be utilized and a polyester resin shall be used in non-industrial areas. The OWNER shall determine the type of appropriate resin to be utilized for each line segment.
- L. The CIPP shall be designed as per ASTM F1216, Appendix X1. The CIPP design shall assume no bonding to the original pipe wall. The structural performance of the finished pipe must be adequate to accommodate all anticipated loads throughout its design life.

- M. The CIPP must have a minimum design life of fifty (50) years. The minimum design life may be documented by submitting life estimates by national and/or international authorities or specifying agencies. Otherwise, long-term testing and long-term in-service results (minimum ten (10) years) may be used, with the results extrapolated to fifty (50) years.
- N. The CONTRACTOR must have performed long-term testing for flexural creep of the CIPP pipe material installed by his company. Such testing results are to be used to determine the long-term, time dependent flexural modulus to be utilized in the product design. This is a performance test of the materials (tube and resin) and general workmanship of the installation and curing. A percentage of the instantaneous flexural modulus value (as measured by ASTM D-790 testing) will be used in design calculations for external buckling. The percentage, or the long-term creep retention value utilized, will be verified by this testing. Values in excess of 50% will not be applied unless substantiated by qualified third party test data. The materials utilized for the contracted project shall be of a quality equal to or better than the materials used in the long-term test with respect to the initial flexural modulus used in design.
- O. The minimum required structural CIPP wall thickness shall be based on the physical and structural properties described herein and in accordance with the design equations in the appendix of ASTM F 1216, and the following design parameters:

Design Safety Factor	2.0
Retention Factor for Long-Term Flexural Modulus to be used in Design <i>(as determined by Long-Term tests described in paragraph 2.02.B)</i>	50 %
Ovality*	2 %
Water Table = Grade Elevation	ft.
Soil Depth (above crown)*	ft.
Soil Modulus	700 psi
Soil Density	120 pcf
Live Load	One H20 passing truck
Design Condition	Fully deteriorated
<i>*Denotes information which can be provided here or in inspection video tapes or project construction plans. Multiple line segments may require a table of values.</i>	

- P. The lining manufacturer shall submit to the OWNER for review complete design calculations for the liner, signed and sealed by a Professional Engineer registered in the State of Florida and certified by the manufacturer as to the compliance of his materials to the values used in the calculations. The buckling analysis shall account for the combination of dead load, live load, hydrostatic pressure and grout pressure (if any). The liner side support shall be considered as if provided by soil pressure against the liner. The existing pipe shall not be considered as providing any structural support. Modulus of soil reaction shall be 700, corresponding to a moderate degree of compaction of bedding and a fine-grained soil as shown in AWWA Manual M45, Fiberglass Pipe Design.
- Q. As part of the design calculation submittal, the liner manufacturer shall submit a tabulation of time versus temperature. This tabulation shall show the lengths of time that exposed portions of the liner will endure without self-initiated cure or other deterioration beginning. This tabulation shall be at five degree Fahrenheit increments ranging from 70 degrees F to 100 degrees F. The manufacturer shall also submit his analysis of the progressive effects of such "pre-cure" on the insertion and cured properties of the liner. This information shall

be submitted in a timely fashion prior to the preconstruction conference so that the OWNER may set procedures for dealing with such an instance caused by construction delays.

- R. The layers of the cured CIPP shall be uniformly bonded. It shall not be possible to separate any two layers with a probe or point of a knife blade so that the layers separate cleanly or the probe or knife blade moves freely between the layers. If separation of the layers occurs during testing of field samples, new samples will be cut from the work. Any reoccurrence may cause rejection of the work.
- S. Any layers of the tube that are not saturated with resin prior to insertion into the existing pipe shall not be included in the structural CIPP wall thickness computation.
- T. Liner shall be neither accepted nor installed until design calculations are acceptable to the OWNER. Liner shall be as manufactured by Insituform Technologies, Inc., 702 Spirit 40 Avenue, Chesterfield, MO 63005, Phone No. 800-325-1159, or approved equal.

2.02 STRUCTURAL REQUIREMENTS FOR MAIN LINES

- A. Since the pipe strength is related to the uniformity and density of the pipe wall, only resin vacuum impregnation will be allowed. Resin impregnation without vacuum entraps air and creates voids which weaken the pipe wall. If reinforcing materials (fiberglass, etc.) are used, the reinforcing material must be fully encapsulated within the resin to assure that the reinforcement is not exposed, either to the inside of the pipe or at the interface of the CIPP and the existing pipe.
- B. The design for the CIPP wall thickness will be based on the following strengths, unless otherwise submitted to and approved by the OWNER.

<u>Property</u>	<u>Test Method</u>	<u>Cured Composite per ASTM F1216</u>
Flexural Modulus of Elasticity	ASTM D-790	250,000 psi
Flexural Stress	ASTM D-790	4,500 psi

2.03 STRUCTURAL REQUIREMENTS FOR SERVICE LATERALS

- A. The design for the CIPP wall thickness will be based on the following strengths, unless otherwise submitted to and approved by the OWNER:

<u>Property</u>	<u>Test Method</u>	<u>Cured Composite per ASTM F1216</u>
Flexural Modulus of Elasticity	ASTM D-790	250,000 psi
Flexural Stress	ASTM D-790	4,500 psi

2.04 REQUIREMENTS FOR MAINLINE/LATERAL CONNECTIONS

A. Mainline/Lateral Connection Interface Seal

1. The interface seal shall provide a water tight connection between the lateral (service connection) and the mainline pipe. The lateral and mainline pipe may or may not have liners installed. If the interface seal requires insertion, the interface seal shall be completely installed via remote device without any excavation. The interface seal between the lateral and the mainline sewer pipe shall be compatible with the lateral pipe (either lined or unlined) and the sewer pipe (either lined or unlined). The interface seal shall have structural properties in accordance with ASTM F1216. The interface seal shall meet the 50 year design life of the CIPP lateral liner.
2. The interface seal shall be a polyester impregnated, corrosion resistant fiberglass insert with an epoxy component. The seal shall be of one-piece construction and shall be designed such that when expanded shall tightly fit both Tee and Wye connections at the interface between the main line and the lateral sewer. The seal shall extend into the mainline so as to provide a 3-inch "brim" and shall provide a minimum of eight-inch overlap inside the lateral pipe. An epoxy sealant rated for piping applications shall be applied to the interface seal to ensure that there is a watertight connection between the mainline pipe whether lined or unlined and the lateral pipe whether lined or unlined.
3. Where the OWNER has indicated the installation of 4-inch and 6-inch CIP lateral liner with mainline/lateral connection interface seal up to 16 feet in depth, the connection, with a minimum 3-inch "brim" to create a watertight seal inside the main (lined or unlined), shall be either integrally manufactured to the lateral liner or achieved with the installation of an interface seal.
4. The integrally manufactured lateral liner and mainline connection shall be as manufactured by Insituform Technologies, Inc., 702 Spirit 40 Park Drive, Chesterfield, MO 63005, (800)234-2992, or approved equal. The interface seal connection shall be as manufactured by Cosmic Soudermashthinenbau, Kasten, Austria, and distributed by AMerik Supplies, Inc., 2600 Ainsley Ct., Marietta, GA 30066, (770)924-2899, or approved equal.

2.05 TESTING REQUIREMENTS

- A. Chemical Resistance - The CIPP shall meet the chemical resistance requirements of ASTM F1216, Appendix X2. CIPP samples for testing shall be of tube and resin system similar to that proposed for actual construction. It is required that CIPP samples with and without plastic coating meet these chemical testing requirements.
- B. Hydraulic Capacity - Overall, the hydraulic profile shall be maintained as large as possible. The CIPP shall provide at least 100 percent of the flow capacity of the original pipe before rehabilitation. In lieu of actual measurements, calculated capacities may be derived using commonly accepted equations and values of the Manning flow coefficients (designated "n" coefficients). The original pipe material and condition at the time of reconstruction will determine the Manning coefficient used in the host pipe. A Manning coefficient of 0.009 for a jointless, relatively smooth-wall cured-in-place pipe will be used for the lateral CIPP flow calculation.

- C. CIPP Field Samples - When requested by the OWNER, the CONTRACTOR shall submit test results from field installations in the USA of the same resin system and tube materials as proposed for the actual installation. These test results must verify that the CIPP physical properties specified herein have been achieved in previous field applications.
- D. Prior to any liner installation, the CONTRACTOR shall submit technical data sheets showing the physical and chemical properties and infrared spectrum analysis per ASTM E1252 (chemical fingerprint) of the proposed resin system as modified for the cured-in-place process. Additionally, copies of the certificates of analysis for resin used on the project must be made available to the OWNER. The CONTRACTOR shall test each lot of resin used by conducting infrared spectrum analyses on field samples. These analyses shall be conducted at the CONTRACTOR's expense.
- E. The CONTRACTOR shall provide resin samples as directed by the OWNER during the duration of the project and infrared spectrography chemical fingerprints shall be run and compared to the submitted fingerprint to verify the resin used is the resin submitted for use on this project. These analyses shall be conducted at the OWNER's expense.
- F. In the case of liner installation performed under this contract, CIPP samples shall be prepared and physical properties tested in accordance with ASTM F1216 or ASTM F1743, Section 8, using either method proposed.
 - 1. The CONTRACTOR shall submit a method to the OWNER, for approval, to obtain representative samples from the installed liners. These samples will be tested by the OWNER, at the OWNER's expense, to verify compliance with the installed material specifications. The CONTRACTOR shall produce these test samples when so directed by the OWNER. The OWNER reserves the right to request samples from as many as 10 percent of the liners installed, unless a pattern of failure occurs. In this case, the CONTRACTOR will be requested to provide a greater quantity of samples, up to 25 percent, at no additional cost, and the CONTRACTOR shall bear all costs of this additional testing. Liners which do not pass these material tests will be accepted at reduced payment or rejected pursuant to Section 01025.
 - 2. The cost for sample collection shall be included in the bid price for rehabilitation.
 - 3. Test specimens shall be marked in indelible ink with the appropriate lateral or main section, work order number, date of installation, and orientation to the top of the pipe (direction of up) so the results can be correlated to the field work performed. All test results shall use this designated labeling as a reference.
 - 4. The extraction and labeling of test specimens shall be done in the presence of the OWNER. The OWNER and CONTRACTOR shall, upon completion of sample extraction and labeling, both sign a chain-of-custody form that shall subsequently accompany the sample at all times and shall ultimately be received and signed at the testing laboratory. Test reports shall include a copy of the chain-of-custody form with all signatures to ensure that reported test results are for the correct sample.
 - 5. The flexural properties must meet or exceed the values specified herein.
 - 6. Wall thickness of samples shall be determined as described in paragraph 8.1.6 of ASTM F1743.

7. Visual inspection of the CIPP shall be by closed-circuit television.

PART 3 -- EXECUTION

3.01 CLEANING/SURFACE PREPARATION

- A. It shall be the responsibility of the CONTRACTOR to clean the pipeline with a high-pressure water jet and to remove all internal debris out of the pipeline in accordance with Section 02751, "Cleaning and Root Removal".

3.02 SEWER REPAIRS

- A. Any protruding pieces of concrete, dropped joints or broken pipe shall be subjected to point repairs so that the pipe is left in a clean smooth condition in all respects ready for lining, unless otherwise jointly determined by the Contractor and the OWNER that the defect will not compromise the integrity of the liner.
- B. If conditions such as broken pipe and major blockages are found that will prevent proper cleaning, or where additional damage would result if cleaning is attempted or continued, the CONTRACTOR, with the advance concurrence of the OWNER, shall perform the necessary point repair(s), and then complete the cleaning.

3.03 JOINT, CRACK, ANNULAR SPACE, AND LINER END CHEMICAL SEALING

- A. Prior to cured-in-place liner installation, all active leaks of a magnitude to compromise the integrity of the liner shall be stopped using chemical grout, at no additional cost to the OWNER.
- B. Materials used on this Project shall have the following properties: react quickly to form a permanent watertight seal; resultant seal shall be flexible and immune to the effects of wet/dry cycles; non-biodegradable and immune to the effects of acids, alkalis, and organics in sewage; component packaging and mixing compatible with field conditions and worker safety; extraneous sealant left inside pipe shall be readily removable; and shall be compatible with the CIPP liner resin system utilized. The chemical sealing materials shall be acrylic resin type and shall be furnished with activators, initiators, inhibitors and any other materials recommended by the manufacturer for a complete grout system. Sealing grout shall be furnished in liquid form in standard manufacturer's containers. Sealing grout shall be AV-100 manufactured by Avanti International, Houston, Texas (1-800-877-2570), or approved equal.
- C. The Contractor shall modify his equipment as necessary to seal the leaks, however both his equipment and sealing method must meet the approval of the OWNER prior to use. Extreme caution shall be utilized during leak sealing (pressure) operations in order to avoid damaging the already weakened sewer pipe. If any damage occurs, it shall be repaired at the CONTRACTOR's cost and to the satisfaction of the OWNER. Excessive pumping of grout which might plug a service lateral shall be avoided. Any service laterals blocked by the grouting operation shall be cleared immediately by the Contractor.

3.04 FLOW CONTROL

- A. Flow control shall be exercised as required to ensure that no flowing sewage comes into contact with sections of the sewer under repair. See Section 02750, "Wastewater Flow Control" for additional information.

3.05 LINER INSTALLATION FOR MAIN LINES AND LATERALS

- A. The pre-lining video of the prepared pipe shall be reviewed and be acceptable to the OWNER for cleanliness and smoothness before the CONTRACTOR begins to line the pipe.
- B. The CONTRACTOR shall present to the OWNER, for review, a description of his methods for avoiding liner stoppage due to conflict and friction with such points as the manhole entrance and the bend into the pipe entrance. He shall also present plans for dealing with a liner stopped by snagging within the pipe. This information shall be rendered to the OWNER in a timely fashion prior to the preconstruction conference.
- C. The CONTRACTOR shall immediately notify the OWNER of any construction delays taking place during the insertion operation. Such delays shall possibly require sampling and testing by an independent laboratory of portions of the cured liner at the OWNER's discretion. The cost of such test shall be born by the CONTRACTOR and no extra compensation will be allowed. Any failure of sample tests or a lack of immediate notification of delay shall be automatic cause for rejection of that part of the work at the OWNER's discretion.
- D. The CONTRACTOR shall designate a location where the tube will be impregnated with resin prior to installation. The CONTRACTOR shall allow the OWNER and/or OWNER to inspect the materials and the "wet-out" procedure.
- E. The CONTRACTOR shall submit construction schedules for advance approval by the OWNER. At no time will any service lateral remain inoperative for more than an eight (8)-hour period. Any service that will be out of service for more than eight (8) hours will be temporarily by-passed into a mainline sanitary sewer, at the CONTRACTOR's expense.
- F. The materials and processes must be reasonably available for pre-installation, installation and post-installation inspections. Areas which require inspection include, but are not limited to, the following:
 - 1. Product materials should exhibit sufficient transparency to visually verify the quality of resin impregnation.
 - 2. Temperature sensing devices, such as thermocouples, shall be located between the existing pipe and the CIPP to ensure the quality of the cure of the wall laminate.

3.06 LINER INSTALLATION FOR MAIN LINES

- A. After the inversion is complete, the CONTRACTOR shall supply a suitable heat source and water recirculation equipment to circulate heated water throughout the pipeline. The equipment shall be capable of delivering hot water throughout the pipeline to uniformly raise the water temperature to a level required to effectively cure the resin. The heat source shall

be fitted with suitable monitors to gauge the temperature of the incoming and outgoing water supply. Another such gage shall be placed between the tube and the host pipe at the termination end at or near the bottom to determine the temperatures during cure. Water temperature in the pipe during the cure period shall be as recommended by the resin manufacturer.

- B. Initial cure shall be deemed complete when the exposed portions of the tube appear to be hard and sound and the temperature sensor indicates that the temperature is of a magnitude to realize an exotherm. The cure period shall be of a duration recommended by the resin manufacturer and may require continuous recirculation of the water to maintain the temperature. The CONTRACTOR shall have on hand at all times, for use by his personnel and the OWNER, a digital thermometer or other means of accurately and quickly checking the temperature of exposed portions of the liner.
- C. CIPP installation shall be in accordance with ASTM F1216, Section 7, or ASTM F1743, Section 6, with modifications as listed herein.
- D. Resin Impregnation: The quantity of resin used for tube impregnation shall be sufficient to fill the volume of air voids in the tube with additional allowances for polymerization shrinkage and the loss of resin through cracks and irregularities in the original pipe wall. A vacuum impregnation process shall be used. To insure thorough resin saturation throughout the length of the felt tube, the point of vacuum shall be no further than 25 feet from the point of initial resin introduction. After vacuum in the tube is established, a vacuum point shall be no further than 75 feet from the leading edge of the resin. The leading edge of the resin slug shall be as near to perpendicular as possible. A roller system shall be used to uniformly distribute the resin throughout the tube. If the Installer uses an alternate method of resin impregnation, the method must produce the same results. Any alternate resin impregnation method must be proven.
- E. Tube Insertion: The wetout tube shall be positioned in the pipeline using either inversion or a pull-in method. If pulled into place, a power winch should be utilized and care should be exercised not to damage the tube as a result of pull-in friction. The tube should be pulled-in or inverted through an existing manhole or approved access point and fully extend to the next designated manhole or termination point.
- F. Temperature gauges shall be placed inside the tube at the invert level of each end to monitor the temperatures during the cure cycle.
- G. Curing shall be accomplished by utilizing hot water under hydrostatic pressure in accordance with the manufacturer's recommended cure schedule.
- H. Cooldown: The CONTRACTOR shall cool the hardened pipe to a temperature below 100 F before relieving the hydrostatic head. Cooldown may be accomplished by the introduction of cool water into the inversion standpipe to replace water being pumped out of the manhole. Care should be taken in release of static head so that vacuum will not be developed that could damage the newly installed liner.
- I. Finish: The new pipe shall be cut off in the manhole at a suitable location. The finished product shall be continuous over the length of pipe reconstructed and be free from dry spots, delamination and lifts. Should the liner not make a tight seal at the inside manhole wall, a watertight seal shall be made by use of extra polyester fiber felt and epoxy resin.

Pipe entries and exists shall be smooth, free of irregularities, and watertight. No visible leaks shall be present and the CONTRACTOR shall be responsible for grouting to remove leaks or fill voids between the host pipe and the liner. During the warranty period, any defects which will affect the integrity or strength of the product shall be repaired at the CONTRACTOR's expense, in a manner mutually agreed upon by the OWNER and the CONTRACTOR.

3.07 REINSTATEMENT OF SERVICE LATERALS, BRANCH CONNECTIONS, AND DROP MANHOLE CONNECTIONS

- A. After the pipe has been cured in place, the CONTRACTOR shall reconnect the existing service connections. This shall be done from the interior of the pipeline without excavation using a robotic cutter. Where holes are cut through the liner, they shall be neat and smooth in order to prevent blockage at the service connections. Cut-in service connections shall be opened to a minimum of 95 percent of the flow capacity of the building sewer. Cuts shall be wire-brushed to remove jagged edges. All coupons shall be recovered at the downstream manhole and removed. The CONTRACTOR shall stop all visible leaks, including at service connections as required. All reinstated service lateral connections (between the liner and the existing pipe) shall be grouted. The reinstatement of the service connections shall be a separate pay item.
- B. It is the intent of these specifications that service laterals be reopened without excavation, utilizing a remote controlled cutting device, monitored by a video TV camera. The Contractor shall certify he has a minimum of 2 complete working cutters plus spare key components on the site before each liner installation. No additional payment will be made for excavations for the purpose of reopening connections and the Contractor will be responsible for all costs and liability associated with such excavation and restoration work.
- C. Unless otherwise directed by the OWNER, all laterals will be reinstated. The OWNER will provide specific direction concerning any laterals that will be abandoned and will therefore not require reinstatement. The CONTRACTOR shall abandon a lateral by not reinstating the lateral only with the written consent of the OWNER.
- D. The language in this section applies equally to branch connections and drop manhole connections.

3.08 LINER INSTALLATION FOR SERVICE LATERALS

- A. The lateral CIPP usually requires an access point to be established at the reconstruction termination point remote from the mainline pipe. The authorization for the access point and required location and excavation shall be obtained and performed by the OWNER of the system. The OWNER may install a clean-out, if required. The clean-out will be constructed of a polyvinyl chloride fitting or its equivalent with a riser pipe of equal diameter to the service pipe. The riser will be extended to the existing grade elevation and capped.
- B. The lateral CIPP shall be installed to affect a bond with the mainline invert-and-cure pipe to substantially reduce or eliminate the infiltration into the mainline pipe. The mainline pipe opening shall be prepared to accept the lateral CIPP. The lateral CIPP will protrude into the mainline pipe and form a seal with the inside surface of the mainline invert-and-cure pipe surface. The bonding area of the lateral CIPP and the mainline invert-and-cure pipe shall be maximized to obtain the best possible bond. The protrusion shall not inhibit the closed

circuit television post video inspection of the mainline or service lateral pipes, inhibit flow, or encourage solids deposition.

3.09 ACCEPTANCE

- A. The finished liner shall be continuous over the entire length of the installation. The liner shall be free from visual defects, damage, deflection, holes, delamination, uncured resin, and the like. No pinholes, cracks, thin spots, dry spots, or other defects in the liner will be permitted. There shall be no visible infiltration through the liner or from behind the liner at manholes and service connections. Cut-ins and attachments at service connections shall be neat and smooth.
- B. Ridges or wrinkles in the installed liner shall be accepted or rejected at the sole discretion of the OWNER. If, in the opinion of the OWNER, such defects could cause structural weakening of the liner, impede the progress of a camera during internal television inspection, or encourage solids deposition and potential interruptions to flow, such defects shall be corrected at the CONTRACTOR's expense in a manner acceptable to the OWNER.

3.10 WET-OUT AND CURE REPORT

- A. The CONTRACTOR shall submit "wet out" and "cure" reports documenting the specific details of the liner's vacuum impregnation and saturation with resin and the CIPP installation of the liner. A copy of all "wet out" and "cure" records shall be made available to the OWNER upon request, and shall be turned over to the OWNER on a weekly basis and prior to request for payment. If the "wet out" and "cure" reports are not presented prior to a payment request for a repair work order, payment for the work will not be made and the request will be rejected. At a minimum, this report shall include, in addition to CONTRACTOR and Contract identification:
 - 1. Line identification and location
 - 2. Wet-out date
 - 3. Sample identification(s) and technician
 - 4. Installation (in sewer) date
 - 5. Host sewer pipe inside diameter
 - 6. Liner thickness
 - 7. Liner length
 - 8. Liner and resin batch numbers
 - 9. Resin type
 - 10. Wet out length
 - 11. Quantity of resin and catalyst utilized

12. Wet out technicians
13. Time wet out started and completed
14. Applicable remarks
15. Boiler and liner heating fluid pressure and temperature versus time log during cure period
16. Cool down report

3.11 CLEANUP

- A. After the liner installation has been completed and accepted, the CONTRACTOR shall cleanup the entire project area and return the ground cover to the original or better condition. All excess material and debris not incorporated into the permanent installation shall be disposed of by the CONTRACTOR.

3.12 TELEVISION SURVEY

- A. Television survey, including Preconstruction Survey, Post Construction Survey, and Warranty Survey, as indicated in Section 02752 "Television Survey", is required for all cured-in-place lining, including main lines and service laterals, and shall be completed within 2 weeks of liner installation.

3.13 PUBLIC NOTIFICATION

- A. The Contractor shall make every effort to maintain service usage throughout the duration of the project. In the event that a service will be out of service, the maximum amount of time of no service shall be 8 hours for any property served by the sewer. A public notification program shall be implemented, and shall as a minimum, require the Contractor to be responsible for contacting each home or business connected to the sanitary sewer and informing them of the work to be conducted, and when the sewer will be off-line. The Contractor shall also provide the following:
 1. Whether or not an interruption in service is expected, written notice to be delivered to each home or business the day prior to the beginning of work being conducted on the section, and a local telephone number of the Contractor the home or business can call to discuss the project or any problems which could arise.
 2. Personal contact with any home or business which cannot be reconnected within the time stated in the written notice.

3.14 WARRANTY

- A. The liner shall be certified by the manufacturer for specified material properties for a particular job. The manufacturer warrants the liner to be free from defects in raw materials for one year from the date of acceptance. During the warranty period, any defects which 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.

– END OF SECTION –

SECTION 02770
CURED-IN-PLACE T-LINER

PART 1 -- GENERAL

1.01 SCOPE

- A. The work specified in this section consists of providing for the reconstruction of a particular mainline section and the adjacent lateral sewer pipe without excavation while providing a one piece leak free connection at the interface of the mainline and lateral pipelines.

1.02 GENERAL

- A. The reconstruction will be accomplished using a non-woven fabric tube of particular length and a thermoset resin with physical and chemical properties appropriate for the application. The lateral tube within a translucent inversion bladder is vacuum impregnated with the resin then placed inside a protective carrying device. The mainline liner that is physically attached to the lateral tube is affixed around a rigid "T" launching device. The "T" launching device and protective carrying device are winched into the existing sewer. When the "T" launching device is properly positioned at the lateral connection, the mainline liner is inflated and the resin saturated tube is inverted up through the lateral pipe, using air or water pressure, by the action of the inversion bladder. Once the tube/resin composite is cured, the inversion bladder and launching/carrying devices are removed. The cured-in-place mainline/lateral connection repair system shall be "T-Liner" as manufactured by LMK Enterprises, Inc., or approved equal.

1.03 SUBMITTALS

- A. The CONTRACTOR shall submit shop drawings, samples of materials, and other information to the OWNER for review in accordance with Section 01300, "Submittals". Included shall be design calculations for the work.

1.04 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. Specialty technicians shall be certified by the equipment manufacturer and/or its authorized representative. Certifications shall be submitted to the OWNER.

5. The CONTRACTOR shall provide his references of previous project lists going back two years including his customers' names, addresses, and telephone numbers.
6. To be acceptable, a minimum of 400 T-Liner installations must be documented.
7. To be acceptable, the installer must have had a minimum of two (2) years active experience in the commercial installation of the product.

PART 2 -- PRODUCTS

2.01 GENERAL

- A. The finished liner shall be fabricated from material as specified in this section which when cured will be resistant to the corrosive effects of the raw sewage and hydrogen sulfide.

2.02 LINER SIZING

- A. The liner shall be fabricated to a size that when installed will neatly fit the internal circumference of the conduit to be repaired as specified by the OWNER.

2.03 LINER MATERIAL

- A. The liner shall be one piece and will consist of a lateral portion and the mainline portion with one or more layers of flexible needled felt or an equivalent non-woven material. The liner will be continuous in length and the wall thickness shall be uniform. No overlapping sections shall be allowed in the circumference or the length of the lateral liner. The tube will be capable of conforming to offset joints, bells, and disfigured pipe sections. The mainline liner will be flat with one end overlapping the second end and sized accordingly to create a circular lining equal to the diameter of the mainline pipe. The resin will be polyester or vinyl ester with proper catalysts as designed for the specific application. The cured-in-place pipe shall provide a smooth bore interior. Each installation shall have a design report documenting the design criteria for a fully deteriorated pipe section, relative to the hydrostatic pressures, depth of soil cover, and type of soil. The mainline sectional liner shall be a full-circle 16-inch long CIPP liner integrally manufactured to the lateral liner providing a seamless connection between the mainline pipe liner and the lateral liner. Installation will be accomplished remotely using air or water for inversion and curing. The cured pipe repair system shall be watertight and shall conform to the existing pipe and eliminate any leakage or connection to the outside of the host pipe/service.
- B. The composite of the materials above will, upon installation inside the host pipe, exceed the minimum test standards specified by the American Society for Testing Methods.

<u>Item</u>	<u>Test Value</u>	<u>Reference Standard</u>
Flexural Strength	4,500 psi	ASTM D 790
Flexural Modulus	250,000 psi	ASTM D 790

2.04 LINER DESIGN

- A. The minimum required structural CIPP wall thickness shall be based on the physical properties described above and in accordance with the design equations in the appendix of ASTM F 1216, and the following design parameters:

Design Safety Factor	2.0
Retention Factor for Long-Term Flexural Modulus to be used in Design	50 %
Ovality*	2 %
Groundwater Depth = Pipe Depth (above invert)*	ft.
Soil Depth (above crown)*	ft.
Soil Modulus	700 psi
Soil Density	120 pcf
Live Load	One H20 passing truck
Design Condition	Fully deteriorated
<i>*Denotes information which can be provided here or in inspection video tapes or project construction plans. Multiple line segments may require a table of values.</i>	

- B. The lining manufacturer shall submit to the OWNER for review complete design calculations for the liner, signed and sealed by a Professional Engineer registered in the State of Florida and certified by the manufacturer as to the compliance of his materials to the values used in the calculations. A safety factor of 2 shall be applied in the design calculation. The host pipe shall be considered fully deteriorated. The liner shall be designed to withstand a live load equivalent to one H-20 passing truck plus all pertinent dead loads, hydrostatic pressure and grout pressure (if any). For design purposes, the water table shall be considered at grade elevation. The liner shall be designed in accordance with ASTM F 1216. The buckling analysis shall account for the combination of dead load, live load, hydrostatic pressure and grout pressure (if any). The liner side support shall be considered as if provided by soil pressure against the liner. The existing pipe shall not be considered as providing any structural support. Modulus of soil reaction shall be 700, corresponding to a moderate degree of compaction of bedding and a fine-grained soil as shown in AWWA Manual M45, Fiberglass Pipe Design.
- C. Liner shall be neither accepted nor installed until design calculations are acceptable to the OWNER.

PART 3 -- EXECUTION

3.01 CLEANING SEWER LINES

- A. Prior to any lining of a pipe so designated, it shall be the responsibility of the CONTRACTOR to remove internal deposits from the pipeline in accordance with Section 02751 - Preparatory Cleaning and Root Removal. Both mainline and lateral line shall be cleaned.

3.02 TELEVISION SURVEY

- A. Television survey shall be performed in accordance with Section 02752 - Television Survey, including Preconstruction and Post Construction Surveys. Both main line and lateral line shall be televised.
- B. The interior of the pipeline shall be carefully surveyed to determine the locations and extent of any structural failures. The location of any conditions which may prevent proper installation of lining materials into the pipelines shall be noted so that these conditions can be corrected. A video tape and suitable log shall be kept and turned over to the OWNER.

3.03 FLOW BYPASSING

- A. The CONTRACTOR, when required, shall provide for the transfer of flow, through or around section or sections of pipe that are to be repaired. The proposed bypassing system shall be acceptable in advance by the OWNER. The acceptance of the bypassing system in advance by the OWNER shall in no way relieve the CONTRACTOR of his responsibility and/or public liability. The flow bypassing shall be done in accordance with Section 02750 - Wastewater Flow Control.

Note: If the repair can be made in a few hours, bypass pumping may not be required. The placement carriage shall be equipped with a bypass section to allow flow once liner is pressed into place.

3.04 LINE OBSTRUCTIONS

- A. It shall be the responsibility of the CONTRACTOR to clear the line of obstruction. If survey reveals an obstruction that cannot be removed by conventional cleaning equipment, the CONTRACTOR shall make a point repair excavation in accordance with Section 02757 - Point Repair of Sanitary Sewers to uncover and remove or repair the obstruction. Such excavation shall be accepted in writing by the OWNER prior to the commencement of the work.

3.05 LINER INSTALLATION

- A. The tube is inspected for tears and frayed sections. The tube, in good condition, will be vacuum impregnated with the thermostat resin. The resin will be introduced into the tube creating a slug of resin at the beginning of the tube. A calibration roller will assist the resin slug to move throughout the tube. All air in the tube shall be removed by vacuum allowing the resin to thoroughly impregnate the tube. All resin shall be contained to ensure no public property or persons are exposed to the liquid resin. The mainline liner will be saturated upon a wet-out platform. The resin impregnated sample (wick), shall be retained by the installer to provide verification of the curing process taking place in the host pipe.
- B. The saturated tube along with the inversion bladder will be inserted into the carrying device. The mainline liner is affixed on the "T" launching device. Both the launching and carrying device is pulled into the pipe using a cable winch. The pull is complete when the open port of the "T" launching device is aligned with the interface of the service connection and mainline pipe. The resin saturated lateral tube is completely protected during the pull. No resin shall be lost by contact with manhole walls or the pipe during the pull. The resin saturated mainline liner is supported upon the rigid "T" launcher that is elevated above the pipe invert by means of rotating skid system. The mainline liner should not be contaminated or diluted by exposure to dirt, debris, or water during the pull.

- C. The installer shall document the placement of the "T" Liner by internal video inspection with the camera being inserted from the lateral pipe down to the mainline pipe.
- D. The mainline liner is expanded against the mainline pipe and lateral tube is inverted out of the "T" launcher/carrying device by controlled air or water pressure. The installer shall be capable of viewing the lateral liner contacting the lateral pipe from the beginning to the end of the repair. The mainline liner and the lateral tube are held tightly in place against the wall of the host pipe by controlled pressure until the cure is complete.
- E. When the curing process is complete, the pressure will be released. The inversion bladder and launching device shall be removed from the host pipe with the winch. No barriers, coatings, or any material other than the cured tube/resin composite, specifically designed for desirable physical and chemical resistance properties, should ever be left in the host pipe. Any materials used in the installation other than the cured tube/resin composite are to be removed from the pipe by the installer.

3.06 ACCEPTANCE AND TESTING

- A. The finished liner shall be continuous over the entire length of the installation. The liner shall be free from visual defects, damage, deflection, holes, delamination, uncured resin, and the like. There shall be no visible infiltration through the liner or from behind the liner.
- B. Verification of a non-leaking lateral liner and service connection shall require an air test in accordance with the following specifications. Testing shall be performed at the OWNER'S discretion but at a frequency not to exceed one test for every ten T-liners installed. The cost for the test shall be included in the T-liner installation cost, and no separate payment shall be made.
 - 1. A camera shall be inserted into the lateral pipe via a clean-out upstream of the upper most portion of the cured in-place lateral liner. The camera is then moved through the lateral pipe until it becomes positioned at the lateral/main connection. The camera is utilized to assist in positioning and placing a pair of plugs in the mainline on either side of the lateral opening. A pair of test plugs with a minimum of a ten-inch clear separation shall be centered on the lateral opening and spanning the brim of the lined connection.
 - 2. Next, an air test plug shall be introduced into the lateral pipe by use of the clean-out opening. The test plug will be placed not more than five inches inside of the cured in-place lateral liner at its upper most portion. The test plug shall be inflated and sealed against the upper most portion of the cured in-place lateral liner.
 - 3. The pair of plugs within the mainline are then inflated and sealed across the service connection.
 - 4. Air-pressure not less than 4 PSI shall be introduced through the test plug. The void area between the three plugs shall be pressurized at 4 PSI, held for 3 minutes and during this time the pressure shall not drop below 3.5 PSI.
 - 5. If an installed cured in-place lateral liner fails the specified air test, the following corrective measures shall be taken.

- a. The cured in-place lateral liner shall be re-inspected by use of a closed circuit television camera in attempt to identify the defect.
 - b. Any repairs made shall consist of materials that are structural and meet or exceed the same criteria as the cured in-place lateral liner is required to meet in a domestic sewer collection system. Such materials shall have a minimum life expectancy of 50 years in accordance with ASTM F-1216-93 Appendix X1 Design Considerations and Appendix X2 Chemical-Resistance Test.
 - c. Once the defect has been corrected, the renewed lateral pipe shall be re-tested in accordance with the air test procedure as described above.
 - d. Any corrective measures shall be performed at the CONTRACTOR's expense.
6. If any of the air tests fail, the OWNER at its option may require the CONTRACTOR to test an additional lateral at no additional charge to the OWNER. If a second air test shall fail, the OWNER at its option may require the CONTRACTOR to test additional or all of the installed cured in-place lateral linings at no additional charge to the OWNER.

3.07 CLEANUP

- A. After the liner installation has been completed and accepted, the CONTRACTOR shall clean up the entire project area and return the ground cover to grade. All excess material and debris not incorporated into the permanent installation shall be disposed of by the CONTRACTOR.

3.08 WARRANTY

- A. The liner shall be certified by the manufacturer for specified material properties for a particular job. The manufacturer warrants the liner to be free from defects in raw materials for one year from the date of acceptance. During the warranty period, any defects which 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.

- END OF SECTION -

SECTION 02900

LANDSCAPING

Part 1 - GENERAL

1.01 THE REQUIREMENT

- A. Items specified in this Section include the installation of new landscaping, or repairs to existing landscaped and grassed areas that may be damaged or disturbed by CONTRACTOR activities.

1.02 RELATED WORK SPECIFIED ELSEWHERE

- A. Section 02510 - Asphaltic Concrete Pavement
- B. Section 02210 - Earth Excavation, Backfill, Fill and Grading
- C. Section 02930 - Sodding

1.03 SUBMITTALS

- A. The CONTRACTOR shall submit submittals for review in accordance with the Section 01300 - Submittals.

1.04 DEFINITIONS

- A. The phrase "DOT Specifications" shall refer to the Florida Department of Transportation Standard Specifications for Road and Bridge Construction. The DOT Specifications are referred to herein and are hereby made a part of this Contract to the extent of such references, and shall be as binding upon the Contract as though reproduced herein in their entirety.

1.05 PROTECTION OF EXISTING IMPROVEMENTS

- A. The CONTRACTOR shall be responsible for the protection of all pavements and other improvements within the work area. All damage to such improvements, as a result of the CONTRACTOR'S operations, beyond the limits of the work of pavement replacement shall be repaired by the CONTRACTOR at his expense.

1.06 GUARANTEE

- A. The CONTRACTOR shall guarantee all trees, ground cover or shrubs planted or replanted under this Contract for a period of one year beyond acceptance of the project. In the event that any new tree, plant or shrub dies within the guarantee period, the CONTRACTOR shall be responsible for replacement in kind. In the event that a transplanted (reused) tree dies within the guarantee period, the CONTRACTOR shall be responsible for replacement in kind,

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LANDSCAPING

except that the maximum height of any new tree shall be eight feet as measured from the ground surface, once planted, to the top of the tree.

Part 2 - PRODUCTS

2.01 REPLACEMENT TREES, GROUND COVER AND SHRUBS

- A. Replacement trees, ground cover and shrubs shall be of the same type and size and sound, healthy and vigorous, well branched and densely foliated when in leaf. They shall have healthy, well developed root systems and shall be free of disease and insect pests, eggs or larvae.

2.02 MULCH

- A. Mulch shall be windproof shredded eucalyptus, mulch shall be clean, fresh, free of branches and other foreign matter. Mulch shall be used around all shrubs, ground covers and tree trunks, and placed to a minimum depth of 2 inches extending from the tree trunk outward two feet. Mulch shall not be placed within 6 inches of tree trunks.

2.03 GRAVEL BEDS

- A. Filter Fabric: Filter fabric shall be nonwoven polyester material Trevia Type 1120 as manufactured by Hoechst Fibers Industries, or equal. Fabric weight shall be 6 ounces per square yard, puncture strength maximum 40 pounds, minimum Flux 240 gallons per minute per square foot. Fabric shall be installed in accordance with the manufacturer's recommendations, with precautions taken to avoid tearing the fabric. Fabric shall be laid in strips with a minimum overlap of one foot.
- B. Limerock: Limerock shall meet ASTM A57 standards and shall be prewashed. Maximum size shall be 3/4 inches. Limerock shall be carefully placed and spread on the fabric to a minimum depth of 6 inches. Final grades and locations shall be as designated on the Drawings.

Part 3 - EXECUTION

3.01 GRADING AND SODDING

- A. The CONTRACTOR shall re-grade the work areas disturbed by his construction activities to the existing grade prior to commencement of construction.
- B. Sodding shall be as required by Specification Section 02930, "Sodding".

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3.02 TREES, GROUND COVER AND SHRUBS

- A. Excavation and Plant Holes: Plant hole excavations shall be roughly cylindrical in shape, with the side approximately vertical. Plants shall be centered in the hole. Bottoms of the holes shall be loosened at least six inches deeper than the required depth of excavation.
- B. Holes for balled and burlaped plants shall be large enough to allow at least eight inches of backfill around the earth ball. For root balls over 18 inches in diameter, this dimension shall be increased to 12 inches. Where excess material has been excavated from the plant hole, the excavated material shall be disposed of as and where directed by the ENGINEER.
- C. Setting of Plants: When setting plants in holes the CONTRACTOR shall make sure that, when lowered into the hole, the plant shall:
 - 1. Rest on a prepared hole bottom such that the roots are level with, or slightly above, the level of their previous growth
 - 2. Be oriented such as to present the best appearance.
 - 3. Make allowances for any anticipated settling of plants.
- D. Palms of the Sabal species may be set deeper than the depth of their original growth, provided that the specified clear trunk height is attained.
- E. The backfill shall be made with planting mixture and shall be firmly rodded and watered-in, so that no air pockets remain. The quantity of water applied immediately upon planting shall be sufficient to thoroughly moisten all of the backfilled earth. Plants shall be kept in a moistened condition for the duration of the Contract.
- F. Staking and Guying: Plants shall be staked in accordance with the following provisions:
 - 1. Small Trees: For trees and shrubs of less than one-inch caliper, the size of stakes and the method of tying shall be such as to rigidly support the staked plant against damage caused by wind action or other effects. Trees larger than one inch and smaller than one and one-half inch caliper shall be staked with a two-inch stake, set at least 24 inches in the ground and extending to the crown of the plant. The plant shall be firmly fastened to the stake with two strands of 14 gauge soft wire, enclosed in rubber hose, or other approved covering. The wire shall then be nailed or stapled to the stake to prevent slippage.
 - 2. Medium Trees: All trees, other than palm trees, larger than one and one-half inch caliper and smaller than two and one-half inch caliper shall be staked with two or more, two-inch by two-inch stakes, eight feet long, set

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two feet in the ground. The tree shall be midway between the stakes and held firmly in place by two strands of 12-gauge wire, applied as specified above for single stakes. The wires shall be tightened and kept tight by twisting.

3. Large Trees: All trees, other than palm trees, larger than two and one-half inch caliper, shall be braced with three or more two-inch by four-inch wood braces, toenailed to cleats which are securely banded at two pints to the palm, at a point at least six feet above the ground. The trunk shall be padded with five layers of burlap under the cleats. Braces shall be approximately equidistantly spaced and secured underground with two-inch by four-inch by 24-inch stake pads. In firm rock soils, Number 4 steel reinforcing rods or one-half inch pipe is acceptable.
 4. Palm Trees: Palm trees shall be braced with three or more two-inch by four-inch wood braces, toenailed to cleats which are securely banded at two points to the palm, at a point at least six feet above the ground. The trunk shall be padded with five layers of burlap under the cleats. Braces shall be approximately equidistantly spaced and secured underground with two-inch by four-inch by 24-inch stake pads. In firm rock soils, Number 4 steel reinforcing rods or one-half inch pipe is acceptable.
- G. Pruning: All broken or damaged roots shall be cut off smoothly, and the tops of all trees shall be pruned in a manner complying with standard horticultural practice. At the time pruning is completed, all remaining wood shall be alive. All cut surfaces of one inch or more in diameter, above the ground, shall be treated with approved commercial tree paint.
- H. Maintenance: Maintenance shall begin immediately after each plant is planted and shall continue until all work under this Contract has been completed and accepted by the CITY. Plants shall be watered, mulched, weeded, pruned, sprayed, fertilized, cultivated and otherwise maintained and protected. Settled plants shall be reset to proper grade position, planting saucer restored and dead material removed. Guys shall be tightened and repaired.
- I. Defective work shall be corrected as soon as possible after it becomes apparent. Upon completion of planting, the CONTRACTOR shall remove excess soil and debris, and repair any damage to structures, etc., resulting from planting operations.

3.03 GRAVEL BEDS

- A. Clean, grade and place geotextile prior to placing gravel in gravel beds.

- END OF SECTION -

SECTION 02930

SODDING

Part 1 - GENERAL

1.01 SCOPE

- A. Provide all labor, materials and equipment necessary for the installation of new sodding, or complete sodding of existing grassed areas that may have been damaged or disturbed by CONTRACTOR activities. This shall include, but not be limited to: fertilizing, sodding, tests and all incidentals to make the work complete.

1.02 RELATED WORK SPECIFIED ELSEWHERE

- A. Section 02500 - Landscaping
- B. Section 02210 - Earth Excavation, Backfill, Fill and Grading
- C. Section 02260 - Finish Grading

1.03 WORK INCLUDED

- A. Testing of topsoil.
- B. Raking and leveling topsoil as required for sodding.
- C. Liming and fertilizing of topsoil.
- D. Laying and rolling of sod.
- E. Maintaining

1.04 SUBMITTALS

- A. Submit product source and information sheets in accordance with Section 01300, "Submittals".

Part 2 - PRODUCTS

2.01 MATERIALS

A. Fertilizer

1. Fertilizer shall be commercial fertilizer, as manufactured by International Chemical Company or equal.
2. Said fertilizer shall have a 10-20-6 N.P.K. content and contain a minimum of 60% of organic material.
3. It shall be delivered at the site in the original sealed containers.

B. Sod

1. Sod from right-of-way swales within the work area shall be Bahia sod or replaced in-kind, whichever is finer quality.
2. Sod shall be first quality Bahia sod of firm texture having a compacted growth and good root development.

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SODDING

3. Sod shall be absolutely true to varietal type, live, fresh and free from weeds or objectionable vegetation, fungus, insects and disease of any kind. Sod shall be kept moist from the time it is field cut until it is laid at the proposed site.
4. The sod shall be as grown by a certified turf nursery and CONTRACTOR shall inform ENGINEER as to the source of the sod to be utilized prior to ordering and delivery of sod.
5. Sod shall be furnished and installed in rectangular sod strips measuring 12 to 16-inches in width of standard lengths of not less than 2 feet and delivered on pallets.

Part 3 - EXECUTION

3.01 INSTALLATION

- A. Sod shall be placed on all grassed areas disturbed by construction activities, unless otherwise indicated on the Drawings. Sodding shall be in accordance with these specifications and Sections 575 and 981 of FDOT Specifications, whichever is more stringent.
- B. Lawn areas damaged by CONTRACTOR's operations shall be repaired at once by proper sod bed preparation, fertilization and re-sodding, in accordance with these specifications. Regardless of the condition of the lawn area (weed content etc.) prior to the CONTRACTOR working in the area, all repairs shall be made with sod.
- A. These areas shall be fine graded to achieve the finished subgrade after compaction which shall be obtained by rolling, dragging or by an approved method which obtains an equivalent compaction to that produced by a hand roller weighing from 75 to 100 pounds per foot of width. All depressions caused by settlement or rolling shall be filled with additional existing or furnished topsoil and re-graded and prepared as specified above until it presents a reasonably smooth and even finish at the required sod sub-grade.
- B. All sod furnished shall be living sod containing at least 70% of thickly matter grasses as specified and free from noxious weeds. All sod shall be certified free of fire ants.
- C. No broken pads or torn or uneven ends will be accepted. Standard size sections of sod shall be strong enough to support own weight and retain their size and shape when suspended vertically with a firm grasp on the upper 10% of the section. Sod shall not be harvested when its moisture content (excessively wet or dry) may adversely affect its survival.
- D. Sod shall be harvested, delivered, and installed within a period of 24 hours. Sod not installed within this time period shall be subject to inspection and rejection by ENGINEER, and shall be removed from the site and a fresh sod supply shall be furnished at no extra cost to CITY.

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SODDING

- E. The topsoil shall not be moist at time of installation; however, it shall contain sufficient moisture so as not be powdery or dusty, both as determined by the supplier's representative.
- F. The overlapping of existing lawn with new sod along limit of work lines will not be permitted. Sod shall be laid in strips, edge to edge, with the lateral joints staggered. All minor or unavoidable openings in the sod shall be closed with sod plugs or with topsoil, as directed by ENGINEER. However, sod laid with joints determined to be too large shall be lifted and re-laid as specified herein at no extra cost to CITY.
- G. Immediately after the sod is laid, the sod shall be watered thoroughly by hand or mechanical sprinkling until the sod and at least 2-inch of the top soil bed have been thoroughly moistened.
- H. Sufficient watering shall be done by the CONTRACTOR to maintain adequate moisture for optimum development of the sodded areas. Sodded areas shall receive no less than 1.5 inches of water per week.
- I. CONTRACTOR shall be responsible to furnish his own supply of water to the site at no extra cost. If possible, CITY shall furnish CONTRACTOR, upon request, with a source and supply of water. CONTRACTOR shall apply for temporary meter and pay CITY for water used at current utility billing rates. However, if CITY's water supply is not available or not functioning, CONTRACTOR shall be responsible to furnish adequate supplies at his own cost. All work injured or damaged due to the lack of, or the use of too much water, shall be CONTRACTOR's responsibility to correct.

5.02 MAINTENANCE

- A. Maintain the entire sodded areas at least a 30-day period or until final acceptance at the completion of the Contract, whichever is longer. Maintenance shall include watering as specified, weeding and removal of stones which may appear. All bare or dead spots which become apparent shall be properly prepared, limed and fertilized, and re-sodded at CONTRACTOR's expense as many times as necessary to secure a good growth. In the event that the sod installation is not accepted by ENGINEER, the entire area shall be maintained and cut by CONTRACTOR until final acceptance of the sod installation.
- B. Take whatever measures are necessary to protect the sod while it is developing. These measures shall include furnishing of warning signs, barriers, or any other necessary measures of protection.

- END OF SECTION -

SECTION 03305
CONCRETE AND GROUT

PART 1 -- GENERAL

1.01 THE REQUIREMENT

- A. The CONTRACTOR shall furnish all materials for concrete in accordance with the provisions of this Section and shall form, mix, place, cure, repair, finish, and do all other work as required to produce finished concrete, all in accordance with the requirements of the Contract Documents
- B. The following types of concrete shall be covered in this Section:
1. Structural Concrete: Concrete to be used in all cases except where noted otherwise in the Contract Documents.
 2. Sitework Concrete: Concrete to be used for curbs, gutters, catch basins, sidewalks, fence and guard post embedment, underground duct bank encasement and all other concrete appurtenant to electrical facilities unless otherwise shown or noted on the Drawings.
- C. The following types of grout are covered in this Section:
1. Non-Shrink Grout: This type of grout shall be used wherever grout or cementitious grout is called for in the Contract Documents, unless another type is specifically referenced.
 2. Epoxy Grout: This type of grout shall be used whenever epoxy grout is called for.

1.02 REFERENCE SPECIFICATIONS, CODES, AND STANDARDS

- A. Codes: Without limiting the generality of other requirements of these specifications, all work specified herein shall conform to or exceed the requirements of the South Florida Building Code and the applicable requirements of the following documents to the extent that the provisions of such documents are not in conflict with the requirements of this Section.
- B. Commercial Standards:

ACI 301	Specifications for Structural Concrete for Buildings.
ACI 315	Manual of Standard Practice for Detailing Reinforced Concrete Structures.
ACI 318	Building Code Requirements of Reinforced Concrete.
ACI 347	Recommended Practice for Concrete Formwork.
ASTM A 185	Specification for Steel Welded Wire, Fabric, Plain, for Concrete Reinforcement.
ASTM A 615	Specification for Deformed and Plain Billet-Steel Bars for Concrete Reinforcement.
ASTM C 31	Test Methods for Making and Curing Concrete Test Specimens in the Field.

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ASTM C 33	Specification for Concrete Aggregates.
ASTM C 39	Test Method for Compressive Strength of Cylindrical Concrete Specimens.
ASTM C 94	Specification for Ready-Mixed Concrete.
ASTM C 143	Test Method for Slump of Portland Cement Concrete.
ASTM C 150	Specification for Portland Cement.
ASTM C 260	Specification for Air-Entraining Admixtures for Concrete.
ASTM C 309	Specification for Liquid Membrane-Forming Compounds for Curing Concrete.
ASTM C 494	Specification for Chemical Admixtures for Concrete.
ASTM C 579	Test Methods for Compressive Strength of Chemical Resistant Mortars and Monolithic Surfacing.
ASTM C 827	Test Method for Early Volume Change of Cementitious Mixtures.
ASTM D 1751	Specification for Preformed Expansion Joint Fillers for Paving and Structural Construction (Non-extruding and Resilient Bituminous Types).
CRD C 621	Corps of Engineers Specification for Non-Shrink Grout
CRSI	Manual of Standard Practice.

1.03 SUBMITTALS

- A. General: The CONTRACTOR shall submit shop drawings and other information to the OWNER for review in accordance with Section 01300 - Submittals.
- B. Mix Designs: The CONTRACTOR shall submit shop drawings for review for proposed concrete mix designs which shall show the proportions and gradations of all materials proposed for each class and type of concrete specified herein. The mix design shall be checked by an independent testing laboratory acceptable to the OWNER. All costs related to such checking shall be borne by the CONTRACTOR.
- C. Grout: The CONTRACTOR shall submit shop drawings for all types of grout for use in this Project.
- D. Accessories: The CONTRACTOR shall submit shop drawings for all types of concrete accessories to be used for this project including, but not limited to, form ties, water stops, joint materials and curing agents.
- E. Delivery Tickets: Where ready-mix concrete is used, the CONTRACTOR shall submit delivery tickets at the time of delivery of each load of concrete. Each certificate shall show the State certified equipment used for measuring and the total quantities, by weight, of cement, sand, each class of aggregate, admixtures, and the amounts of water in the

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aggregate and added at the batching plant as well as the amount of water allowed to be added at the site for the specific design mix. Each certificate shall, in addition, state the mix number, total yield in cubic yards, and the time of day, to the nearest minute, corresponding to when the batch was dispatched, when it left the plant, when it arrived at the job, the time that unloading began, and the time that unloading was finished.

- F. Reinforcing Steel: The CONTRACTOR shall submit shop drawings of shop bending diagrams, placing lists, and Drawings of all reinforcing steel prior to fabrication.

1.04 QUALITY ASSURANCE

- A. Tests on component materials and for compressive strength of concrete will be performed as specified herein. Test for determining slump will be in accordance with the requirements of ASTM C 143.
- B. The cost of all laboratory tests on cement, aggregates, and concrete, will be borne by the OWNER. However, the CONTRACTOR shall be charged for the cost of any additional tests and investigation on work performed which does not meet the specifications.
- C. Concrete for testing shall be supplied by the CONTRACTOR at no cost to the OWNER, and the CONTRACTOR shall provide assistance to the OWNER in obtaining samples. The CONTRACTOR shall dispose of and clean up all excess material.
- D. Field Compression Tests: Compression test specimens shall be taken during construction from the first placement of each class of concrete specified herein and at intervals thereafter as selected by the OWNER to ensure continued compliance with these specifications. At least one set of test specimens shall be made for each 50 yards of concrete placed. Each set of test specimens shall be a minimum of 4 cylinders.
- E. Compression test specimens for concrete shall be made in accordance with ASTM C31. Specimens shall be 6-inch diameter by 12-inch high cylinders.
- F. Compression tests shall be performed in accordance with ASTM C 39. One test cylinder will be tested at 7 days and 2 at 28 days. The remaining cylinder will be held to verify test results, if needed.
- G. Evaluation and Acceptance of Concrete: Evaluation and acceptance of the compressive strength of concrete shall be according to the requirements of ACI 318, Chapter 5, "Concrete Quality", and as specified herein. If any concrete fails to meet these requirements, immediate corrective action shall be taken to increase the compressive strength for all subsequent batches of the type of concrete affected. All concrete which fails to meet the ACI requirements and these Specifications, is subject to removal and replacement at the cost of the CONTRACTOR.
- H. Construction Tolerances: The CONTRACTOR shall set and maintain concrete forms and perform finishing operations so as to ensure that the completed work is within the tolerances specified herein. Surface defects and irregularities are defined as finishes and are to be distinguished from tolerances. Tolerance is the specified permissible variation from lines, grades, or dimensions shown. Where tolerances are not stated in the Specifications, permissible deviations will be in accordance with ACI 347.

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PART 2 - PRODUCTS

2.01 FORMWORK

- A. Form Materials: Except as otherwise expressly accepted by the OWNER, all lumber for use as forms, shoring, or bracing shall be new material. Materials for concrete forms shall conform to the following requirements:
1. Form materials shall be metal, wood, plywood, or other acceptable material that will not adversely affect the concrete and will facilitate placement of concrete to the shape, form, line, and grade shown.
 2. Plywood for concrete formwork shall be new, waterproof, synthetic resin bonded, exterior type Douglas Fir or Southern Pine plywood manufactured especially for concrete formwork and shall conform to the requirements of PS 1 for Concrete Forms, Class 1, and shall be edge sealed. Wood forms for surfaces to be painted shall be Medium Density Overlaid plywood, MDO Exterior Grade.
- B. Unless otherwise shown, exterior corners in concrete members shall be provided with 3/4-inch chamfers or tooled to a 1/2-inch radius. Re-entrant corners in concrete members shall not have fillets unless otherwise shown.
- C. Form Ties: Form ties shall be provided with a plastic cone or other suitable means for forming a conical hole to ensure that the form tie may be broken off back of the face of the concrete. The maximum diameter of removable cones for rod ties, or of other removable form-tie fasteners having a circular cross-section, shall not exceed 1 1/2 inches; and all such fasteners shall be such as to leave holes of regular shape for reaming. Form Ties shall be Burke Penta-Tie System by The Burke Company, or equal.

2.02 CONCRETE MATERIALS

- A. Materials shall be delivered, stored, and handled so as to prevent damage by water or breakage. Only one brand of cement shall be used. Cement reclaimed from cleaning bags or leaking containers shall not be used. All cement shall be used in the sequence of receipt of shipments.
- B. All materials furnished for the work shall comply with the requirements of ACI 301, as applicable.
- C. Storage of materials shall conform to the requirements of ACI 301.
- D. Materials for concrete shall conform to the following requirements:
1. Cement shall be standard brand Portland cement conforming to ASTM C 150 Type II.
 2. Water shall be potable, clean, and free from objectionable quantities of silty organic matter, alkali, salts and other impurities.
 3. Aggregates shall be obtained from pits acceptable to the OWNER, shall be non-reactive, and shall conform to the SFBC and ASTM C 33. Maximum size of coarse aggregate shall be as specified herein.
 4. Ready-mix concrete shall conform to the requirements of ASTM C 94.

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5. Air-entraining Admixture meeting the requirements of ASTM C 260 shall be used. Sufficient air-entraining agent shall be used to provide a total air content of 3 to 5 percent. The OWNER reserves the right, at any time, to sample and test the air-entraining agent received on the job by the CONTRACTOR. The air-entraining agent shall be added to the batch in a portion of the mixing water. The solution shall be batched by means of a mechanical batcher capable of accurate measurement.
6. Water reducing and retarding admixtures shall be added to control the set, effect water reduction. The addition of the admixture shall be separate from the air entraining admixture and as recommended by the manufacturer. The admixture shall be completely compatible with and be manufactured by the same manufacturer as the air entraining admixture. The addition of the admixture shall be completed within one minute after addition of water to the cement has been completed, or prior to the beginning of the last three-quarters of the required mixing, whichever occurs first. Water reducing and set retarding admixtures shall be in conformance with ASTM C 494, Type D.

2.03 CURING MATERIALS

- A. Materials for curing concrete conform to ASTM C 309 and shall be Burke Spartan, Cote Cure-Seal Hardener (with red fugitive dye) as manufactured by the Burke Company, MB 429 as manufactured by Master Builders, or equal. The curing compound shall contain a fugitive dye so that areas of application will be readily distinguishable.
- B. Polyethylene sheet for use as a concrete curing blanket shall be white and have a nominal thickness of 6 mils.

2.04 JOINT MATERIALS

- A. Materials for joints in concrete above grade nonhydraulic structures shall conform to the following requirements:
 1. Preformed joint filler shall be a non-extruding, resilient, bituminous type conforming to the requirements of ASTM D 1751.
 2. Elastomeric joint sealer shall be a single component, pour grade, polyurethane sealant meeting FS TT-S-230A, Type 1. Materials shall attain Shore A Hardness of 40-45.
 3. Mastic joint sealer shall be a material that does not contain evaporating solvents; that will tenaciously adhere to concrete surfaces; that will remain permanently resilient and pliable; that will not be affected by continuous presence of water and will not in any way contaminate potable water; and that will effectively seal the joints against moisture inflation even when the joints are subject to movement due to expansion and contraction. The sealer shall be composed of special asphalts or similar materials blended with lubricating and plasticizing agents to form a tough, durable master substance containing no volatile oils or lubricants and shall be capable of meeting the test requirements set forth hereinafter, if testing is required by the OWNER.

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2.05 REINFORCING STEEL

- A. General: All reinforcing steel for all reinforced concrete construction shall conform to the following requirements:
1. Bar reinforcement shall conform to the requirements of ASTM A 615 for Grade 60 Billet Steel Reinforcement with supplementary requirement S-1, and shall be manufactured in the United States.
 2. Welded wire fabric reinforcement shall conform to the requirements of ASTM A185. All welded wire fabric reinforcement shall be galvanized.
- B. Accessories: Accessories shall include all necessary chairs, slab bolsters, concrete blocks, tie wires, dips, supports, spacers, and other devices to position reinforcement during concrete placement. Slab bolsters shall have gray plastic-coated legs.
- C. Concrete blocks (dobies), used to support and position reinforcement steel, shall have the same or higher compressive strength as specified for the concrete in which it is located. Where the concrete blocks are used on concrete surfaces exposed to view, the color and texture of the concrete blocks shall match that required for the finished surface. Wire ties shall be embedded in concrete block bar supports.

2.06 CONCRETE DESIGN REQUIREMENTS

- A. General: Concrete shall be composed of cement, admixtures, aggregates and water. These materials shall be of the quantities specified. In general, the mix shall be designed to produce a concrete capable of being deposited so as to obtain maximum density and minimum shrinkage and, where deposited in forms, to have good consolidation properties and maximum smoothness of surface. The aggregate gradations shall be formulated to provide fresh concrete that will not promote rock pockets around reinforcing steel or embedded items. The proportions shall be changed whenever necessary or desirable to meet the required results at no additional cost to the OWNER. All changes shall be subject to review by the OWNER.
- B. The CONTRACTOR is cautioned that the limiting parameters specified below are not design mixes. Additional cement or water reducing agent may be required to achieve workability demanded by the CONTRACTOR's construction methods. The CONTRACTOR is responsible for any costs associated with furnishing concrete with the required workability.
- C. Water-Cement Ratio and Compressive Strength: The minimum compressive strength and cement content shall be not less than specified as follows:

<u>Type of work</u>	Min. 28-Day Compressive Strength ____(psi)	Max. Size Aggregate ____(in.)	Min. Cement per cu yd <u>(sacks)</u>	Max. W/C Ratio <u>(by wt.)</u>
<u>Structural Concrete:</u>				
All reinforced concrete unless noted otherwise below.	4,000 (Class A)	1	6	0.45
<u>Sitework Concrete:</u>				
Concrete fill, pavement, curbs	3,000			

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and sidewalks. (Class B) 1 5.5 0.5

Note: One sack of cement equals 94 lbs.

- D. Consistency: The consistency of the concrete in successive batches shall be determined by slump tests in accordance with ASTM C 143. The slumps shall be as follows:

<u>Application</u>	<u>Slump</u>	<u>Variation</u>
Footings and Slabs	3"	± 1/2" to -1"
Mortar or grout for construction joints	8"	± 1 1/2"
All Other Applications	3"	± 1"

2.07 READY-MIXED CONCRETE

- A. Ready-mixed concrete shall conform to meeting the requirements as to materials, batching, mixing, transporting, and placing as specified herein and in accordance with ASTM C 94.
- B. Ready-mixed concrete shall be delivered to the site of the work, and discharge shall be completed within one and one half hour after the addition of the cement to the aggregates or before the drum has been revolved 250 revolutions, whichever is first. In hot weather, or under conditions contributing to quick stiffening of the concrete, or when the temperature of the concrete is 85 degrees F or above, the time between the introduction of the cement to the aggregates and discharge shall not exceed 60 minutes.

2.08 NONSHRINK GROUT

- A. Non-shrink grout shall be a prepackaged, inorganic, non-gas liberating, nonmetallic, cement-based grout requiring only the addition of water. Manufacturer's instructions shall be printed on each bag or other container in which the materials are packaged. The specific formulation for each class of non-shrink grout specified herein shall be that recommended by the manufacturer for the particular application.
- B. Non-shrink grouts shall have a minimum 28 day compressive strength of 5,000 psi and shall meet the requirements of CRD C 621.

2.09 EPOXY GROUT

- A. Epoxy grout shall be a pourable, non-shrink, 100 percent solids system. The epoxy grout system shall have three components: resin, hardener, and specially blended aggregate, all pre-measured and pre-packaged. The resin component shall not contain any non-reactive diluents. Resins contained butyl glycidyl ether (BGE) or other highly volatile and hazardous reactive diluents are not acceptable. Variation of component ratios is not permitted unless specifically recommended by the manufacturer. Manufacturer's instructions shall be printed on each container in which the materials are packaged.
- B. The chemical formulation of the epoxy grout shall be that recommended by the manufacturer for the particular application.
- C. The mixed epoxy grout system shall have a minimum working life of 45 minutes at 75 degrees F.

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- D. The epoxy grout shall develop a compressive strength of 5000 psi in 24 hours and 10,000 psi in seven days when tested in accordance with ASTM C 579, Method B. There shall be no shrinkage (0.0 percent) and a maximum 4.0 percent expansion when tested in accordance with ASTM C 827.

2.10 BONDING COMPOUND

- A. For bonding freshly-mixed, plastic concrete to hardened concrete, Sikadur 32 Hi-Mod Epoxy Adhesive, as manufactured by Sika Corporation; Coneresive Liquid (LPL), as manufactured by Master Builders; BurkEpoxy MV as manufactured by The Burk Company; or approved equal shall be used.

PART 3 -- EXECUTION

3.01 GENERAL FORMWORK REQUIREMENTS

- A. Forms to confine the concrete and shape it to the required lines shall be used wherever necessary. The CONTRACTOR shall assume full responsibility for the adequate design of all forms, and any forms which are unsafe or inadequate in any respect shall promptly be removed and replaced at the CONTRACTOR's expense. All design, construction, maintenance, preparation, and removal of forms shall be in accordance with the SFBC, ACI 347 and the requirements specified herein.
- B. All forms shall be true in every respect to the required shape and size, shall conform to the established alignment and grade, and shall be of sufficient strength and rigidity to maintain their position and shape under the loads and operations incident to placing and vibrating the concrete.

3.02 FORMWORK CONSTRUCTION

- A. Vertical Surfaces: All vertical surfaces of concrete members shall be formed, except where placement of the concrete against the ground is called for by the OWNER.
- B. Construction Joints: Concrete construction joints will not be permitted at locations other than those shown or specified, except as may be acceptable to the OWNER. When a second lift is placed on hardened concrete, special precautions shall be taken in the way of the number, location, and tightening of ties at the top of the old lift and bottom of the new to prevent any unsatisfactory effect whatsoever on the concrete.
- C. Form Ties: Wire ties for holding forms will not be permitted. No form-tying device or part thereof, other than metal, shall be left embedded in the concrete. Ties shall not be removed in such manner as to leave a hole extending through the interior of the concrete members. The use of snap-ties which cause spilling of the concrete upon form stripping or tie removal will not be permitted. If steel panel forms are used, rubber grommets shall be provided where the ties pass through the form in order to prevent loss of cement paste. Where metal rods extending through the concrete are used to support or to strengthen forms, the rods shall remain embedded and shall terminate not less than 1 inch back from the formed face or faces of the concrete.

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3.03 REUSE OF FORMS

- A. Forms may be reused only if in good condition and only if acceptable to the OWNER. Light sanding between uses will be required wherever necessary to obtain uniform surface texture on all exposed concrete surfaces. Exposed concrete surfaces are defined as surfaces which are permanently exposed to view.

3.04 REMOVAL OF FORMS

- A. Careful procedures for the removal of forms shall be strictly followed, and this work shall be done with care so as to avoid injury to the concrete. No heavy loading on green concrete will be permitted. Members which must support their own weight shall not have their forms removed until they have attained at least 75 percent of the 28-day strength of the concrete as specified herein. Forms for all vertical walls and columns shall remain in place at least 2 days after the concrete has been placed. Forms for all parts of the Work not specifically mentioned herein shall remain in place for periods of time as determined by the OWNER.

3.05 FABRICATION OF REINFORCING STEEL

- A. Reinforcing steel shall be accurately formed to the dimensions and shapes shown on the Drawings, and the fabricating details shall be prepared in accordance with ACI 315 and ACI 318, except as modified by the Drawings.
- B. Bending or Straightening: Reinforcement shall not be straightened or rebent in a manner which will injure the material. Bars with kinks or bends not shown shall not be used. All bars shall be bent cold, unless otherwise permitted by the OWNER. No bars partially embedded in concrete shall be field-bent except as shown or specifically permitted by the OWNER.

3.06 PLACING REINFORCING STEEL

- A. Reinforcing steel shall be accurately positioned as shown on the Drawings, and shall be supported and wired together to prevent displacement, using annealed iron wire ties or suitable clips at intersections. All reinforcing steel shall be supported by concrete, plastic or metal supports, spacers or metal hangers which are strong and rigid enough to prevent any displacement of the reinforcing steel. Where concrete is to be placed on the ground, supporting concrete blocks (or dobies) shall be used, in sufficient numbers to support the bars without settlement, but in no case shall such support be continuous. All concrete blocks used to support reinforcing steel shall be tied to the steel with wire ties which are embedded in the blocks. For concrete over formwork, the CONTRACTOR shall furnish concrete, metal, plastic, or other acceptable bar chairs and spacers.
- B. The portions of all accessories in contact with the formwork shall be made of concrete, plastic, or steel coated with a 1/8 inch minimum thickness of plastic which extends at least 1/2 inch from the concrete surface. Plastic shall be gray in color.
- C. Tie wires shall be bent away from the forms in order to provide the specified concrete coverage.
- D. Bars additional to those shown which may be found necessary or desirable by the CONTRACTOR for the purpose of securing reinforcement in position shall be provided by the CONTRACTOR at its own expense.
- E. Reinforcement placing tolerances shall be within the limits specified in ACI 318, unless otherwise directed by the OWNER.

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- F. Welded wire fabric reinforcement placed over horizontal forms shall be supported on slab bolsters having gray, plastic-coated standard type legs as specified herein. Slab bolsters shall be spaced not less than 30 inches on centers, shall extend continuously across the entire width of the reinforcing mat, and shall support the reinforcing mat in the plane shown.
- G. Welded wire fabric placed over the ground shall be supported on wired concrete blocks (dobies) spaced not more than 3 feet on centers in any direction. The construction practice of placing welded wire fabric on the ground and hooking into place in the freshly placed concrete shall not be used.

3.07 SPLICING

- A. Reinforcement bar splices shall only be used at locations shown. When it is necessary to splice reinforcement at points other than where shown, the character of the splice shall be as acceptable to the OWNER.
- B. Lap length for reinforcement bars shall be in a Class C Splice in accordance with ACI 318, unless otherwise shown. Laps of welded wire fabric shall be in accordance with the ACI 318.

3.08 CLEANING AND PROTECTION OF REINFORCING STEEL

- A. Reinforcing steel shall at all times be protected from conditions conducive to corrosion until concrete is placed around it.
- B. The surfaces of all reinforcing steel and other metalwork to be in contact with concrete shall be thoroughly cleaned of all dirt, grease, loose scale and rust, grout, mortar, and other foreign substances immediately before the concrete is placed. Where there is a delay in depositing concrete, reinforcing shall be reinspected and, if necessary, recleaned.

3.09 PREPARATION OF SURFACES FOR CONCRETING

- A. General: No concrete shall be placed until the reinforcement steel and formwork have been erected in a manner acceptable to the OWNER. The CONTRACTOR shall notify the OWNER not less than two working days prior to concrete placement, allowing for inspection and any corrective measures which are required. Earth surfaces shall be thoroughly wetted by sprinkling, prior to the placing of any concrete, and these surfaces shall be kept moist by frequent sprinkling up to the time of placing concrete thereon. The surface shall be free from standing water, mud, and debris at the time of placing concrete.
- B. Joints in Concrete: Concrete surfaces upon or against which concrete is to be placed, where the placement of the old concrete has been stopped or interrupted so that, as determined by the OWNER, the new concrete cannot be incorporated integrally with that previously placed, are defined as construction joints. The surfaces of horizontal joints shall be given a compacted, roughened surface for good bond. Except where the Drawings call for joint surfaces to be coated, the joint surfaces shall be cleaned of all laitance, loose or defective concrete, and foreign material. Such cleaning shall be accomplished by sandblasting, followed by thorough washing. All pools of water shall be removed from the surface of construction joints before the new concrete is placed.
- C. Existing concrete surfaces upon or against which concrete is to be placed shall be given a roughened surface for good bond. Joint surfaces shall be cleaned of all laitance, loose or

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defective concrete, and foreign material. Such cleaning shall be accomplished by hydroblasting. All pools of water shall be removed from the surface of construction joints before the new concrete is placed.

- D. Placing Interruptions: When placing of concrete is to be interrupted long enough for the concrete to take a set, the working face shall be given a shape by the use of forms or other means that will secure proper union with subsequent work, provided that construction joints shall be made only where acceptable to the OWNER.
 - E. Embedded Items: No concrete shall be placed until all formwork, installation of parts to be embedded, reinforcement steel, and preparation of surfaces involved in the placing have been completed and accepted by the OWNER at least 4 hours before placement of concrete. All surfaces of forms and embedded items that have become encrusted with dried grout from concrete previously placed shall be cleaned of all such grout before the surrounding or adjacent concrete is placed.
 - F. All reinforcement, anchor bolts, sleeves, inserts, and similar items shall be set and secured in the forms where shown on the Drawings or by shop drawings and shall be acceptable to the OWNER before any concrete is placed. Accuracy of placement is the responsibility of the CONTRACTOR.
 - G. Casting Against Old Concrete: Where concrete is to be cast against old concrete (any concrete which is greater than 60 days of age), the surface of the old concrete shall be thoroughly cleaned and roughened by hydro-blasting (exposing aggregate) prior to the application of an epoxy bonding agent. Application shall be according to the bonding agent manufacturer's instructions and recommendations.
 - H. No concrete shall be placed in any structure until all water entering the space to be filled with concrete has been properly cut off or has been diverted by pipes, or other means, and carried out of the forms, clear of the work. No concrete shall be deposited under water nor shall the CONTRACTOR allow still water to rise on any concrete until the concrete has attained its initial set. Water shall not be permitted to flow over the surface of any concrete in such manner and at such velocity as will injure the surface finish of the concrete. Pumping or other necessary dewatering operations for removing ground water, if required, will be subject to the review of the OWNER.
 - I. Openings for pipes, inserts for pipe hangers and brackets, and the setting of anchors shall, where practicable, be provided for during the placing of concrete.
 - J. Corrosion Protection: Pipe, conduit, dowels, and other ferrous items required to be embedded in concrete construction shall be so positioned and supported prior to placement of concrete that there will be a minimum of 2 inches clearance between said items, and any part of the concrete reinforcement will not be permitted.
 - K. Cleaning: The surfaces of all metalwork to be in contact with concrete shall be thoroughly cleaned of all dirt, grease, loose scale and rust, grout, mortar, and other foreign substances immediately before the concrete is placed.
- 3.10 MIXING, HANDLING, TRANSPORTING, AND PLACING
- A. General: Placing of concrete shall conform to the applicable requirements of Chapter 8 of ACI 301 and the requirements of this Section.

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- B. Mixing: Mixing of concrete shall conform to the requirements of Chapter 7 of ACI 301.
- C. Retempering: Retempering of concrete or mortar which has partially hardened will not be permitted.
- D. Non-Conforming Work or Materials: Concrete which upon or before placing is found not to conform to the requirements specified herein shall be rejected and immediately removed from the Work. Concrete which is not placed in accordance with these Specifications, or which is of inferior quality, shall be removed and replaced by and at the expense of the CONTRACTOR.
- E. Unauthorized Placement: No concrete shall be placed except in the presence of duly authorized representative of the OWNER. The CONTRACTOR shall notify the OWNER in writing at least 24 hours in advance of placement of any concrete.
- F. Placement in Slabs: Concrete placed in sloping slabs shall proceed uniformly from the bottom of the slab to the top, for the full width of the pour. As the work progresses, the concrete shall be vibrated and carefully worked around the slab reinforcement, and the surface of the slab shall be screened in an up-slope direction.
- G. Placement in Wall Forms: Concrete shall not be dropped through reinforcement steel or into any deep form, whether reinforcement is present or not, causing separation of the coarse aggregate from the mortar on account of repeatedly hitting rods or the sides of the form as it falls, nor shall concrete be placed in any form in such a manner as to leave accumulation of mortar on the form surfaces above the placed concrete. In such cases, some means such as the use of hoppers and, if necessary, vertical ducts of canvas, rubber, or metal shall be used for placing concrete in the forms in a manner that it may reach the place of final deposit without separation. In no case shall the free fall of concrete exceed 4 feet below the ends of ducts, chutes, or buggies. Concrete shall be uniformly distributed during the process of depositing, and in no case after depositing shall any portion be displaced in the forms more than 6 feet in horizontal direction. Concrete in forms shall be deposited in uniform horizontal layers not deeper than 2 feet; and care shall be taken to avoid inclined layers or inclined construction joints where such are required for sloping members. Each layer shall be placed while the previous layer is still soft. The rate of placing concrete in forms shall not exceed 5 feet of vertical rise per hour.
- H. The surface of the concrete -shall be level whenever a run of concrete is stopped. To insure a level, straight joint on the exposed surface of walls, a wood strip at least 3/4 inch thick shall be tacked to the forms on these surfaces. The concrete shall be carded about 1/2 inch above the underside of the strip. About one hour after the concrete is placed, the strip shall be removed and any irregularities in the edge formed by the strip shall be leveled with a trowel and all laitance shall be removed.
- I. Conveyor Belts and Chutes: All end of chutes, hopper gates and all other points of concrete discharge throughout the CONTRACTOR's conveying, hoisting and placing system shall be so designed and arranged that concrete passing from them will not fall separated into whatever receptacle immediately receives it. Conveyor belts, if used, shall be of a type acceptable to the OWNER. Chutes longer than 50 feet will not be permitted. Minimum slopes of chutes shall be such that concrete of the specified consistency will readily flow in them. If a conveyor belt is used, it shall be wiped clean by a device operated in such a manner that none of the mortar adhering to the belt will be wasted. All conveyor belts and chutes shall be covered. Sufficient illumination shall be provided in the interior of all forms so that the concrete, at the places of deposit, is visible from the deck or runway.

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- J. Temperature of Concrete: The temperature of concrete, when it is being placed, shall not be more than 90 degrees F nor less than 40 degrees F in moderate weather, and not less than 50 degrees F in whether during which the mean daily temperature drops below 40 degrees F. Concrete ingredients shall not be heated to a temperature higher than that necessarily to keep the temperature of the mixed concrete, as placed, from falling below the specified minimum temperature. If concrete is placed when the weather is such that the temperature of the concrete would exceed 90 degrees F, the CONTRACTOR shall employ effective means, such as precooling of aggregates and mixing water using ice or placing at night, as necessary to maintain the temperature of the concrete, as it is placed, below 90 degrees F. The CONTRACTOR shall be entitled to no additional compensation on account of the foregoing requirements.

3.11 PUMPING OF CONCRETE

- A. If the pumped concrete does not produce satisfactory end results, the CONTRACTOR shall discontinue the pumping operation and proceed with the placing of concrete using conventional methods.
- B. The minimum diameter of the hose (conduits) shall be 4 inches.
- C. Minimum compressive strength, cement content, and maximum size of aggregates shall be as specified herein. Gradation of coarse aggregates shall conform to ASTM C 33 and shall be as close to the middle range as possible. Gradation of fine aggregate shall conform to ASTM C 33, with 15 to 30 percent passing the number 50 screen and 5 to 10 percent passing the number 100 screen. The fineness modulus of sand shall not be over 3.00.

3.12 TAMPING AND VIBRATING

- A. As concrete is placed in the forms or in excavations, it shall be thoroughly settled and compacted, throughout the entire depth of the layer which is being consolidated, into a dense homogeneous mass, filling all corners and angles, thoroughly embedding the reinforcement, eliminating rock pockets, and bringing only a slight excess of water to the exposed surface of concrete during placement. Vibrators shall be high speed power vibrators (8,000 or 10,000 rpm) of an immersion type in sufficient number and with (at least one) standby units as required.
- B. Concrete in walls shall be internally vibrated and at the same time rammed, stirred, or worked with suitable appliances, tamping bars, shovels, or forked tools until it completely fills the forms or excavations and closes snugly against all surfaces. Subsequent layers of concrete shall not be placed until the layers previously placed have been worked thoroughly as specified. Vibrators shall be provided in sufficient numbers, with standby units as required, to accomplish the results herein specified with 15 minutes after concrete of the prescribed consistency is placed in the forms. The vibrating head shall be kept from contact with the surfaces of the forms. Care shall be taken not to vibrate concrete excessively or to work it in any manner that causes segregation of its constituents.

3.13 FINISHING CONCRETE SURFACES

- A. General: Surfaces shall be free from fins, bulges, ridges, offsets, honeycombing, or roughness of any kind, and shall present a finished, smooth, continuous hard surface. Allowable deviations from plumb or level and from the alignment, profiles, and dimensions

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shown on the Drawings are defined as tolerances and are specified herein. These tolerances are to be distinguished from irregularities in finish as described herein. Aluminum finishing tools shall not be used.

- B. Formed Surfaces: No treatment is required after form removal except for curing, repair of defective concrete, and treatment of surface defects. Where architectural finish is required, it shall be as specified or as shown on the Drawings.
- C. Unformed Surfaces: After proper and adequate vibration and tamping, all unformed top surfaces of slabs, floors, walls, and curbs shall be brought to a uniform surface with suitable tools. The classes of finish specified for unformed concrete surfaces are designated as follows:
1. Finish U1: Sufficient leveling and screeding to produce an even, uniform surface with surface irregularities not to exceed 3/8 inch. No further special finish is required.
 2. Finish U2: After sufficient stiffening of the screened concrete, surfaces shall be float finished with wood or metal floats or with a finished machine using flat blades. Excessive floating of surfaces while the concrete surface to absorb excess moisture will not be permitted. Floating shall be the minimum necessary to produce a surface that is free from screed marks and is uniform in texture. Surface irregularities shall not exceed 1/4 inch. Joints and edges shall be tooled where shown on the Drawings or as determined by the OWNER.
 3. Finish U3: After the floated surface (as specified for Finish U2) has hardened sufficiently to prevent excess of fine material from being drawn to the surface, steel troweling shall be performed with firm pressure such as will flatten the sandy texture of the floated surface and produce a dense, uniform surface free from blemishes, ripples and trowel marks. The finish shall be smooth and free of all irregularities.
 4. Finish U4: Steel trowel finish (as specified for Finish U3) without local depressions or high points. In addition, the surface shall be given a light hairbroom finish with brooming perpendicular to drainage unless otherwise shown. The resulting surface shall be rough enough to provide a nonskid finish.
- D. Uniformed surfaces shall be finished according to the following schedule:

UNFORMED SURFACE FINISH SCHEDULE

<u>Area</u>	<u>Finish</u>
Grade slabs and foundations to be covered with concrete or fill material	U1
Floors to be covered with topping grout	U2
Slabs to be covered with built-up roofing	U2
Slabs	U4

3.14 CURING AND DAMPPROOFING

- A. All concrete shall be cured for not less than 14 days after placing, in accordance with the methods specified herein for the different parts of the work, and described in detail in the following paragraphs.

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FINISH SCHEDULE

<u>Surface to be Cured or Dampproofed</u>	<u>Method</u>
Unstripped forms	1
Construction joints between footings and walls, and between floor slab and columns	2
Encasement concrete and thrust blocks	3
All concrete surfaces not specifically provided for elsewhere in this Paragraph	4

- B. Method 1: Wooden forms shall be wetted immediately after concrete has been placed and shall be kept wet with water until removed. If steel forms are used, the exposed concrete surfaces shall be kept continuously wet until the forms are removed. If forms are removed within 14 days of placing the concrete, curing shall be continued in accordance with Method 4.
- C. Method 2: The surface shall be covered With burlap mats which shall be kept wet with water for the duration of the curing period, until the concrete in the walls has been placed. No curing compound shall be applied to surfaces cured under Method 2.
- D. Method 3: The surface shall be covered with moist earth not less than 4 hours, nor more than 24 hours, after the concrete is placed. Earthwork operations that may damage the concrete shall not begin until at least 7 days after placement of concrete.
- E. Method 4: The surface shall be sprayed with a liquid curing compound. It shall be applied in accordance with the manufacturers printed instructions at a maximum coverage rate of 200 square feet per gallon and in such a manner as to cover the surface with a uniform film which will seal thoroughly.
- F. Care shall be exercised to avoid damage to the seal during the curing period. Should the seal be damaged or broken before the expiration of the curing period, the break shall be repaired immediately by the application of additional curing compound over the damaged portion.
- G. Wherever curing compound may have been applied by mistake to faces against which concrete subsequently is to be placed and to which it is to adhere, said compound shall be entirely removed by hydroblasting just prior to the placing of new concrete.
- H. Curing compound shall be applied as soon as the concrete has hardened enough to prevent marring on uniformed surfaces, and within 2 hours after removal of forms from contact with formed surfaces. Repairs required to be made to formed surfaces shall be made within the said 2-hour period; provided, however, that any such repairs which cannot be made within the said 2-hour period shall be delayed until after the curing compound has been applied. When repairs are to be made to an area on which curing compound has been applied, the area involved shall first be wet-sandblasted to remove the curing compound, following which repairs shall be made as provided herein.

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3.15 PROTECTION

- A. The CONTRACTOR shall protect all concrete against injury until final acceptance by the OWNER. Fresh concrete shall be protected from damage due to rain. The CONTRACTOR shall provide such protection while the concrete is still plastic and whenever such precipitation is imminent or occurring.

3.16 TREATMENT OF SURFACE DEFECTS

- A. As soon as forms are removed, all exposed surfaces shall be carefully examined and any irregularities shall be immediately rubbed or ground in a satisfactory manner in order to secure a smooth, uniform, and continuous surface. Plastering or coating of surfaces to secure a smooth, uniform, and continuous surface. Plastering or coating of surfaces to be smoothed will not be permitted. No repairs shall be made until after inspection by the OWNER. In no case will extensive patching of honeycombed concrete be permitted. Concrete containing minor voids, holes, honeycombing, or similar depression defects shall have them repaired as specified herein. Concrete containing extensive voids, holes, honeycombing, or similar depression defects, shall be completely removed and replaced. All repairs and replacements herein specified shall be promptly executed by the CONTRACTOR at its own expense.
- B. Defective surfaces to be repaired shall be cut back from trueline a minimum depth of 1/2 inch over the entire area. Feathered edges will not be permitted. Where chipping or cutting tools are not required in order to deepen the area properly, the surface shall be prepared for bonding by the removal of all laitance or soft material, and not less than 1/32 inch depth of the surface film from all hard portions, by means of an efficient sandblast. After cutting and sandblasting, the surface shall be wetted sufficiently in advance of shooting with shotcrete or with cement mortar so that while the repair material is being applied, the surfaces under repair will remain moist, but not so wet as to overcome the suction upon which a good bond depends. The material used for repair proposed shall consist of a mixture of one sack of cement to 3 cubic feet of sand. For exposed walls, the cement shall contain such a proportion of Atlas white Portland cement as is required to make the color of the patch match the color of the surrounding concrete.
- C. Holes left by tie-rod cones shall be reamed with suitable toothed reamers so as to leave the surfaces of the holes clean and rough. These holes then shall be repaired in an approved manner with dry-packed cement grout. Holes left by form-tying devices having a rectangular cross-section, and other imperfections having a depth greater than their least surface dimension, shall not be reamed, but shall be repaired in an approved manner with dry-packed cement grout.
- D. All repairs shall be built up and shaped in such a manner that the completed work will conform to the requirements of this Section, using approved methods which will not disturb the bond, cause sagging, or cause horizontal fractures. Surfaces of said repairs shall receive the same kind and amount of curing treatment as required for the concrete in the repaired section.

3.17 CARE AND REPAIR OF CONCRETE

- A. The CONTRACTOR shall protect all concrete against injury or damage from excessive heat, lack of moisture, overstress, or any other cause until final acceptance by the OWNER. Particular care shall be taken to prevent the drying of concrete and to avoid roughening or otherwise damaging the surface. Any concrete found to be damaged, or which may have

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been originally defective, or which becomes defective at anytime prior to the final acceptance of the completed work, or which departs from the established line or grade, or which, for any other reason, does not conform to the requirements of the Contract Documents, shall be satisfactorily repaired or removed and replaced with the acceptable concrete at the CONTRACTOR's expense.

3.18 GROUT INSTALLATION

- A. All surface preparation, curing, and protection of cement grout shall be as specified herein. The finish of the grout surface shall match that of the adjacent concrete.
- B. The CONTRACTOR through the manufacturer of nonshrink grout and epoxy grout shall provide on-site technical assistance upon request, at no additional cost to the OWNER.
- C. All mixing, surface preparation, handling, placing, consolidation, and other means of execution for prepackaged grouts shall be done according to the instructions and recommendations of the manufacturer.
- D. Grout shall be placed in such a manner, for the consistency necessary for each application, so as to assure that the space to be grouted is completely filled.

- END OF SECTION -

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PIPING GENERAL

Part 1 - GENERAL

1.01 THE REQUIREMENT

- A. The CONTRACTOR shall furnish and install to the required line and grade, all piping together with all fittings and appurtenances, required for a complete installation. All piping located outside the face of structures or building foundations and all piping embedded in concrete within a structure or foundation shall be considered exterior piping.
- B. The CONTRACTOR shall furnish and install fittings, couplings, connections, sleeves, adapters, harness rods and closure pieces as required to connect pipelines of dissimilar materials and/or sizes herein included under this Section and other concurrent contracts for a complete installation.
- C. The CONTRACTOR shall furnish all labor, materials, equipment, tools, and services required for the furnishing, installation and testing of all piping as shown on the Drawings, specified in this Section and required for the Work. Piping shall be furnished and installed of the material, sizes, classes, and at the locations shown on the Drawings and/or designated in this Section. Piping shall include all fittings, adapter pieces, couplings, closure pieces, joint restraints, harnessing rods, hardware, bolts, gaskets, wall sleeves, wall pipes, hangers, supports, and other associated appurtenances for required connections to equipment, valves, or structures for a complete installation.
- D. Piping assemblies under 4-inch size shall be generally supported on walls and ceilings, unless otherwise shown on the Drawings, Architectural Specifications or ordered by the ENGINEER, being kept clear of openings and positioned above "headroom" space. Where practical, such piping shall be run in neat clusters, plumb and level along walls, and parallel to overhead beams.
- E. The CONTRACTOR shall provide taps on piping where required or shown on the Drawings. Where pipe or fitting wall thicknesses are insufficient to provide the required number of threads, a boss or pipe saddle shall be installed.
- F. The work shall include, but not be limited to, the following:
 1. Connections to existing pipelines.
 2. Test excavations necessary to locate or verify existing pipe and appurtenances.
 3. Installation of all new pipe and materials required for a complete installation.
 4. Cleaning, testing and disinfecting as required.

1.02 RELATED WORK SPECIFIED ELSEWHERE

- A. Division 1, General Requirements
- B. Division 2, Sitework
- C. Division 9, Finishes
- D. Division 15, Mechanical Construction

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1.03 SUBMITTALS

- A. The CONTRACTOR shall submit complete shop drawings and certificates, test reports, affidavits of compliance, of all piping systems, in accordance with the requirements in Section 01300 – Submittals and as specified in the individual piping sections.
- B. Each shop drawing submittal shall be complete in all aspects incorporating all information and data listed herein and all additional information required to evaluate the proposed piping material's compliance with the Contract Documents. Partial or incomplete submissions will be returned to the CONTRACTOR without review.
- C. Data to be submitted shall include, but not be limited to:
 1. Catalog Data consisting of specifications, illustrations, and a parts schedule that identifies the materials to be used for the various piping components and accessories. The illustrations shall be in sufficient detail to serve as a guide for assembly and disassembly.
 2. Complete layout and installation drawings with clearly marked dimensions and elevations. Piece numbers which are coordinated with the tabulated pipe layout schedule shall be clearly marked. Piping layout drawings shall provide information on the following; pipe supports, location, support type, hanger rod size, insert type and the load on the hanger in pounds.
 3. Weight of all component parts.
 4. Design calculations specified above.
 5. Tabulated pipe layout schedule which shall include the following information for all pipe and fittings, service, pipe size, working pressure, wall thickness and piece number.
- D. Certifications: Prior to installation, the CONTRACTOR shall furnish an Affidavit of Compliance certified by the pipe manufacturer that the pipe, fittings and specials furnished under this Contract comply with all applicable provisions of AWWA and these specifications.

No pipe or fittings will be accepted for use in the Work on this project until the affidavits have been submitted and accepted in accordance with Section 01300 – Submittals.
- E. All expenses incurred in making samples for certification of tests shall be borne by the CONTRACTOR.

1.04 QUALITY ASSURANCE

- A. Tests: Except where otherwise specified, all materials used in the manufacture of the pipe shall be tested in accordance with the applicable Specifications and Standards.

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1.05 MANUFACTURER'S SERVICE REPRESENTATIVE

- A. Where the assistance of a manufacturer's service representative is advisable, in order to obtain correct pipe joints, supports, or special connections, the CONTRACTOR shall furnish such assistance at no additional cost to the CITY.

1.06 MATERIAL DELIVERY, STORAGE, AND PROTECTION

- A. All piping materials, fittings, valves, and accessories shall be delivered in a clean and undamaged condition and stored off the ground, to provide protection against oxidation caused by ground contact. Any materials susceptible to UV degradation shall be protected to eliminate exposure to sunlight. All defective or damaged materials shall be replaced with new materials. Storage shall conform with Section entitled "Site Access and Storage".

1.07 CLEANUP

- A. After completion of the work, all remaining pipe cuttings, joining and wrapping materials, and other scattered debris, shall be removed from the site. The entire piping system shall be handed over in a clean and functional condition.

Part 2 - PRODUCTS

2.01 GENERAL

- A. In accordance with the "Reduction of Lead in Drinking Water Act" (Act) enacted by the USEPA on January 4, 2011, effective January 4, 2014 all piping, fittings, fixtures, valves, and other appurtenances used in potable water supply and distribution systems shall be "lead free" as defined in Section 1417(d) of the Safe Drinking Water Act (SDWA). All requirements of the Act as it relates to the products under this section shall be strictly adhered to.
- B. All specials and every length of pipe shall be marked with the manufacturer's name or trademark, size, class, and the date of manufacture. Special care in handling shall be exercised during delivery, distribution, and storage of pipe to avoid damage and unnecessary stresses. Damaged pipe will be rejected and shall be replaced at the CONTRACTOR's expense. Pipe and specials stored prior to use shall be stored in such a manner as to keep the interior free from dirt and foreign matter.
- C. Testing of pipe before installation shall be as described in the corresponding ASTM or AWWA Specifications and in the applicable standard specifications listed in the following sections. Field testing after the pipe is installed shall be as specified in Section 15995 - Pipeline Testing and Disinfection.
- D. Joints in piping shall be of the type as specified in Section 15060, "Piping and Fittings".

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- E. Unless otherwise specified or shown on the drawings, all buried exterior piping shall have restrained joints for thrust protection, and all exposed exterior piping shall have flanged joints.
- F. The Drawings indicate work affecting existing piping and appurtenances. The CONTRACTOR shall excavate test pits as required of all connections and crossings which may affect the CONTRACTOR's work prior to ordering pipe and fittings to determine sufficient information for ordering materials. The CONTRACTOR shall take whatever measurements that are required to complete the work as shown or specified.
- G. Any ferrous metal pipes are required to be polywrapped, minimum 8 mil, with polywrap and secured with polutape. Polywrap and polytape to be approved by the City.

2.02 WALL PIPES

- A. Where wall sleeves or wall pipes occur in walls that are continuously wet on one or both sides, they shall have water stop flanges at the center of the casting or as shown on the Drawings. Ends of wall pipes shall be flange, mechanical joint, plain end, or bell as shown on the Drawings, or as required for connection to the piping. Wall pipes shall be of the same material as the piping that they are connected to. If welded waterstop flanges are employed, welds shall be 360 degree continuous on both sides of flange. Unless otherwise shown on the Drawings, waterstop flanges shall conform to the minimum dimensions shown below:

<u>Pipe Size</u>	<u>Waterstop Flange Diameter</u>	<u>Waterstop Flange Thickness</u>
4" - 12"	OD + 3.10"	0.50"
14" - 24"	OD + 4.15"	0.75"
30" - 36"	OD + 4.50"	1.00"
42" - 48"	OD + 5.00"	1.25"
54"	OD + 5.90"	1.50"
60" - 72"	OD + 6.00"	1.50"

2.03 SLEEVES

- A. Unless shown otherwise, all piping passing through walls and floors shall be installed in sleeves or wall castings accurately located before concrete is poured, or placed in position during construction of masonry walls. Sleeves passing through floors shall extend from the bottom of the floor to a point 3 inches above the finished floor, unless shown otherwise. Water stop flanges are required on all sleeves located in floors or walls which are continually wet or under hydrostatic pressure on one or both sides of the floor or wall.

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- B. Sleeves shall be ductile iron, black steel pipe, or fabricated steel in accordance with details shown on the Drawings. If not shown on the Drawings, the CONTRACTOR shall submit to the ENGINEER the details of sleeves he proposes to install; and no fabrication or installation thereof shall take place until the ENGINEER'S acceptance is obtained. Steel sleeves shall be fabricated of structural steel plate in accordance with the standards and procedures of AISC and AWS. Steel sleeve surfaces shall receive a commercial sandblast cleaning and then be shop painted in accordance with Section 09940 - Painting.
- C. When shown on the Drawings or otherwise required, the annular space between the installed piping and sleeve shall be completely sealed against a maximum hydrostatic pressure of 20 psig. Seals shall be mechanically interlocked, solid rubber links, trade name "Link-Seal", as manufactured by the Thunderline Corp., Wayne, Michigan, or equal. Rubber link, seal-type, size, and installation thereof, shall be in strict accordance with the manufacturer's recommendations. For non-fire rated walls and floors, pressure plate shall be glass reinforced nylon plastic with EPDM rubber seal and 304 stainless steel bolts and nuts. For fire rated walls and floors, two independent seals shall be provided consisting of low carbon steel, zinc galvanized pressure plates, silicon rubber seals and low carbon steel, zinc galvanized bolts and nuts.
- D. Ductile iron mechanical joint; adapter sleeves shall be Clow # 1429, as manufactured by the Clow Corp., or equal. Mechanical joint adapter sleeves shall be provided with suitable gasket, follower ring, and bolts to effect a proper seal. In general, sleeves installed in walls, floors, or roofs against one side of which will develop a hydrostatic pressure, or through which leakage of liquid will occur, shall be so sealed. If welded waterstop flanges are employed, welds shall be 360 degree continuous on both sides of flange.

2.04 SOLID SLEEVE COUPLINGS

- A. Solid sleeve couplings shall be used to connect buried service piping where shown on the Drawings. Solid sleeves shall be ductile iron, long body and shall conform to the requirements of ANSI A21.10 (AWWA C110). Unless otherwise shown or specified, solid sleeve couplings shall be Style A11760 as manufactured by American Cast Iron Pipe Co., or equal.

2.05 SLEEVE TYPE COUPLINGS (SEWER ONLY)

- A. Sleeve type, flexible couplings shall be furnished and installed where shown on the Drawings.
- B. Materials shall be of high strength steel and couplings shall be rated for the same pressures as the connecting piping.
- C. Gaskets shall be rubber. Bolts and nuts shall be hot dipped galvanized alloy steel.

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- D. Couplings shall be shop primed with a premium quality primer compatible with the painting system specified in Section 09940 - Painting. Interior surfaces (exposed to wastewater) shall receive the same coating as the pipe interior.
- E. Harnessing
 - 1. Harness couplings to adjacent flanges as shown, specified or otherwise required to restrain all pressure piping.
 - 2. Dimensions, sizes, spacing and materials for lugs, tie rods, washers, and nuts shall conform to the standards for the pipe size, and design pressure specified.
 - 3. No less than two bolts shall be furnished for each coupling.
 - 4. Tie bolts, nuts and washers shall be ASTM A 193, Grade B7 steel or better.
 - 5. Harness rods shall have lengths less than 10 feet between adjacent flanged joints on fittings and shall be coated in accordance with Section 09900 - Painting.
- F. All couplings shall be provided without interior pipe stop.
- G. Sleeve Type Coupling suppliers, or equal:
 - 1. Rockwell (Smith-Blair), Style 411 (2 ½" – 4").
 - 2. Dresser, Style 38.

2.06 MECHANICAL COUPLINGS

- A. Construction: Mechanical couplings shall be provided where shown on the Drawing, and shall be of similar material as the pipe, without pipe stop, and shall be of sizes to fit the pipe and fittings shown. The middle ring shall be not less than 1/4-inch in thickness and shall be either 5 or 7-inches long for standard steel couplings, and 16-inches long for long-sleeve couplings. The followers shall be single-piece contoured mill section welded and cold-expanded as required for the middle rings. They shall be of sufficient strength to accommodate the number of bolts necessary to obtain adequate gasket pressures without excessive rolling. The shape of the follower shall be of such design as to provide positive confinement of the gasket.
- B. Gaskets
 - 1. Gaskets for mechanical couplings shall be rubber-compound material that will not deteriorate from age or exposure to air under normal storage or use conditions. Gaskets for wastewater and sewerage applications shall be Buna "N", Grade 60, or equivalent suitable elastomer. The rubber in the gasket shall meet the following specifications:
 - (a) Color - Jet Black.
 - (b) Surface - Nonblooming.
 - (c) Durometer Hardness - 74 + 5.

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- (d) Tensile Strength - 1000 psi Minimum.
 - (e) Elongation - 175 percent Minimum.
2. The gaskets shall be immune to attack by the material which is being transported.
 3. Where couplings are used in water containing chloramines or other fluids which attack rubber materials, gasket material shall be compatible with the piping service and fluid utilized.
 4. Gasket materials used for potable water containing chloramines shall be EPDM.
- C. Bolts, nuts and washers shall be ASTM A193, Grade B7 for above-ground and buried applications west of U.S. 1. Buried applications east of U.S. 1 shall use 316 stainless steel hardware.
- D. All valve bolts shall be A-316 stainless steel
- E. Coatings: Couplings shall be shop primed with a primer compatible with the painting system specified in the Section 09940 – Painting.
- F. Harnessing: Where harnesses are required for mechanical couplings, they shall be in accordance with the requirements shown on the Drawings.
- G. Manufacturer shall be the following, or equal:
1. Rockwell (Smith-Blair), Style 411
 2. Dresser, Style 38
 3. Total Piping Solution, Inc. (TPS) -Hymax
 4. Ford Meter Box Co., Inc., Style FC1 or FC3.

2.07 FLANGED ADAPTERS

- A. Flanged adapters shall be furnished as required and as shown on the Drawings.
- B. All flanged adapters, 12 inches in diameter and smaller, except as shown on the Drawings or directed by the ENGINEER, shall be locking type flanged adapters.
- C. Pressure and service shall be the same as connected piping.
- D. Materials shall be cast iron for pipes up to 12-inch diameter and high strength steel for pipes larger than 12 inch diameter.
- E. Flanged adapters shall be shop primed with a premium quality primer compatible with the paint system specified in Section 09940 - Painting.
- F. Bolts and nuts shall be alloy steel, corrosion-resistant and prime coated.
- G. Flanged coupling adapters shall be harnessed by tying the adapter to the nearest pipe joint flange using threaded rods and rod tabs. The threaded rods and rod tabs shall be as shown on the Drawings.
- H. Flanged adapters shall be as manufactured by Dresser Industries, Style 127 or 128, Smith Blair Corporation, or equal.

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2.08 UNIONS

- A. For ductile iron and PVC piping, see Section 15060, "Piping and Fittings".
- B. For copper piping, unions shall have ground joints and conform to ANSI B16.18.

2.09 TAPPING SLEEVES AND TAPPING SADDLES

- A. Refer to Section 15102, "Tapping Sleeves and Tapping Valves"
- B. Refer to Section 15001, "Water Services and Miscellaneous Fittings".

Part 3 - EXECUTION

3.01 INSTALLATION

- A. All piping shall be installed by skilled workmen and in accordance with the best standard practice for piping installation as shown on the Drawings, specified or recommended by the pipe manufacturer. Proper tools and appliances for the safe and convenient handling and installing of the pipe and fittings shall be used. Great care shall be taken to prevent any pipe coating from being damaged on the inside or outside of the pipe and fittings. All pieces shall be carefully examined for defects, and no piece shall be installed which is known to be cracked, damaged, or otherwise defective. If any defective pieces should be discovered after having been installed, it shall be removed and replaced with a sound one in a satisfactory manner by the CONTRACTOR and at his own expense. Pipe and fittings shall be thoroughly cleaned before they are installed and shall be kept clean until they are accepted in the complete work. All piping connections to equipment shall be provided with unions or coupling flanges located so that piping may be readily dismantled from the equipment. At certain applications, Dresser, Victaulic, or equal, couplings may also be used. All piping shall be installed in such a manner that it will be free to expand and contract without injury to itself or to structures and equipment to which it is connected. All piping shall be erected to accurate lines and grades with no abrupt changes in line or grade and shall be supported and braced against movement, temporary, or permanent. All exposed piping shall be installed with vertical and horizontal angles properly related to adjoining surfaces or pipes to give the appearance of good workmanship. Unless otherwise shown or approved, provided a minimum headroom clearance under all piping of 7 feet 6 inches.
- B. Unless otherwise shown or specified, all waste and vent piping shall pitch uniformly at a 1/4-inch per foot grade and accessible cleanouts shall be furnished and installed as shown and as required by local building codes. Installed length of waste and vent piping shall be determined from field measurements in lieu of the Drawings.
- C. All excavation shall be made in such a manner and to such widths as will provide ample room for properly installing the pipe and permit thorough

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compaction of backfill around the pipe. The minimum trench widths shall be in strict accordance with the "Trench Width Excavation Limits" as shown on the Drawings. All excavation and trenching shall be done in strict accordance with these specifications and all applicable parts of the OSHA Regulations, 29CFR 1926, Subpart P.

- D. Enlargements of the trench shall be made as needed to give ample space for operations at pipe joints. The width of the trench shall be limited to the maximum dimensions shown on the Drawings, except where a wider trench is needed for the installation of and work within sheeting and bracing. Except where otherwise specified, excavation slopes shall be flat enough to avoid slides which will cause disturbance of the subgrade, damage to adjacent areas, or endanger the lives or safety of persons in the vicinity.
- E. Hand excavation shall be employed wherever, in the opinion of the ENGINEER, it is necessary for the protection of existing utilities, poles, trees, pavements, or obstructions.
- F. No greater length of trench in any location shall be left open, in advance of pipe laying, than shall be authorized or directed by the ENGINEER and, in general, such length shall be limited to approximately one hundred (100) feet. The CONTRACTOR shall excavate the trenches to the full depth, width and grade indicated on the Drawings including the relevant requirements for bedding. The trench bottoms shall then be examined by the ENGINEER as to the condition and bearing value before any pipe is laid or bedding is placed.
- G. No pipe trench shall be backfilled until required pressure testing has been performed. All testing shall be in accordance with Section 15995 – Pipeline Testing and Disinfection.
- H. All pipes passing through walls and/or floors shall be provided with wall pipes or sleeves in accordance with the specifications and the details shown on the Drawings. All wall pipes shall be of ductile iron and shall have a water stop located in the center of the wall. Each wall pipe shall be of the same class, thickness, and interior coating as the piping to which it is joined. All buried wall pipes shall have a coal tar outside coating on exposed surfaces. Joint deflection shall not exceed 75 percent of the manufacturer's recommended deflection. Excavation and backfilling shall conform to the requirements of Section 02222 – Excavation and Backfill for Utilities, and as specified herein. Maximum trench widths shall conform to the Trench Width Excavation Limits shown on the Drawings and also with the latest OSHA requirements. All exposed, submerged, and buried piping shall be adequately supported and braced by means of hangers, concrete piers, pipe supports, or otherwise as may be required by the location.
- I. Following proper preparation of the trench subgrade, pipe and fittings shall be carefully lowered into the trench so as to prevent dirt and other foreign substances from gaining entrance into the pipe and fittings. Proper facilities shall be provided for lowering sections of pipe into trenches. Under no circumstances shall any of the materials be dropped or dumped into the trench.

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- J. Water shall be kept out of the trench until jointing and backfilling are completed. When work is not in progress, open ends of pipe, fittings, and valves shall be securely closed so that no water, earth, or other substance will enter the pipes, fitting, or valves. Pipe ends left for future connections shall be valved, plugged, or capped, and anchored as required.
- K. All piping shall be installed in such a manner that it will be free to expand and/or contract without injury to itself or to structures and equipment to which it is connected. All piping shall be erected to accurate lines and grades with no abrupt changes in line or grade and shall be supported and braced against movement, temporary, or permanent. All exposed piping shall be installed with vertical and horizontal angles properly related to adjoining surfaces or pipes to give the appearance of good workmanship. Pipes crossing within a vertical distance of less than or equal to one (1) foot shall be encased and supported with concrete at the point of crossing to prevent damage to the adjacent pipes as shown on the Drawings.
- L. The full length of each section of pipe shall rest solidly upon the bed of the trench, with recesses excavated to accommodate bells, couplings, joints, and fittings. Before joints are made, each pipe shall be well bedded on a solid foundation; and no pipe shall be brought into position until the preceding length has been thoroughly bedded and secured in place. Pipe that has the grade or joint disturbed after laying shall be taken up and relaid by the CONTRACTOR at his own expense. Pipe shall not be laid in water or when trench conditions are unsuitable for work.
- M. Proper and suitable tools and appliances for the safe convenient handling and laying of pipe shall be used and shall in general agree with manufacturer's recommendations.
- N. At the close of each work day the end of the pipeline shall be tightly sealed with a cap or plug so that no water, dirt, or other foreign substance may enter the pipeline, and this plug shall be kept in place until pipe laying is resumed.
- O. During the laying of pipe, each pipe manufacturer shall provide his own supervisor to instruct the CONTRACTOR's pipe laying personnel in the correct procedure to be followed.
- P. All piping shall have bedding – refer to the Drawings and other Specification Sections.

3.02 JOINTS IN PIPING

- A. Restrained joints: shall be provided on all pipe joints as specified herein and shown on the Drawings. Restrained joints shall be made up similar to that for push-on joints.
- B. Push-on joints: include a single rubber gasket which fits into the bell end of the pipe. The gasket shall be wiped clean, flexed and then placed in the socket. Any bulges in the gasket which might interfere with the entry of the plain end of the pipe shall be removed. A thin film of lubricant shall be applied to the gasket surface which will come into contact with the spigot end of the pipe. The

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lubricant shall be furnished by the pipe manufacturer. The plain end of the pipe, which is tapered for ease of assembly, shall be wiped clean and a thick film of lubricant applied to the outside. The pipe shall be aligned and carefully entered into the socket until it just makes contact with the gasket. The joint assembly shall be completed by entering the pipe past the gasket until it makes contact with the bottom of the socket. The pipe shall be pulled "home" with an approved jack assembly as recommended by the pipe manufacturer. If assembly is not accomplished by reasonable force, the plain end shall be removed and the condition corrected.

- C. Mechanical joints: shall be made up with gaskets, glands and bolts. When a joint is to be made up, the bell or socket and plain end shall be cleaned and washed with a solution or mild soap in water; the gland and gasket shall be slid onto the plain end and the end then entered into the socket until it is fully "home" on the centering ring. The gasket shall then be painted with soapy water and slid into position, followed by the gland. All bolts shall be inserted and made up hand tight and then tightened alternately to bring the gland into position evenly. Excessive tightening of the bolts shall be avoided. All nuts shall be pulled up using a torque wrench which will not permit unequal stresses in the bolts. Torque shall not exceed the recommendations of the manufacturer of the pipe and bolts for the various sizes. Care shall be taken to assure that the pipe remains fully "home" while the joint is being made. Joints shall conform to the applicable AWWA Specifications.
- D. Threaded and/or screwed joints: shall have long tapered full depth threads to be made with the appropriate paste or jointing compound, depending on the type of fluid to be processed through the pipe. All pipe up to, and including 1-1/2-inches, shall be reamed to remove burrs and stood on end and well pounded to remove scale and dirt. Wrenches on valves and fittings shall be applied directly over the joint being tightened. Not more than three pipe threads shall be exposed at each connection. Pipe, in all lines subject to temperature changes shall be cut short and cold sprung into place to compensate for expansion when hot. Joints in all piping used for chlorine gas lines shall be made up with a glycerine and litharge cement. Joints in plastic piping (PVC/CPVC) shall be laid and joints made with compounds recommended by the manufacturer.

Installation shall conform to the requirements of ASTM D2774 and ASTM D2855. Unions required adjacent to valves and equipment.

- E. Solvent or adhesive welded joints: in plastic piping shall be accomplished in strict accordance with the pipe manufacturer's recommendations, including necessary field cuttings, sanding of pipe ends, joint support during setting period, etc. Care shall be taken that no droppings or deposits of adhesive or material remain inside the assembled piping. Solvent or adhesive material shall be compatible with the pipe itself, being a product approved by the pipe manufacturer. Unions are required adjacent to valves and equipment. Sleeve-type expansion joints shall be supplied in exposed piping to permit 1-inch minimum of expansion per 100 feet of pipe length.

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- F. Dielectric unions: shall be installed wherever dissimilar metals are connected except for bronze or brass valves in ferrous piping. Unions shall be provided downstream of each valve with screwed connections. The CONTRACTOR shall provide screwed or flanged unions at each piece of equipment, where shown, and where necessary to install or dismantle piping.
- G. Eccentric reducers: shall be installed where air or water pockets would otherwise occur in mains because of a reduction in pipe size.

3.03 TESTING

- A. All testing shall be in accordance with Section 15995 – Pipeline Testing and Disinfection

3.04 PAINTING

- A. All piping specified in this Section shall be painted in accordance with Section 09940 - Painting.

- END OF SECTION -

SECTION 15006

DUCTILE IRON PIPE AND FITTINGS

Part 1 - GENERAL

1.01 WORK INCLUDED

- A. The CONTRACTOR shall furnish and install ductile iron pipe and all appurtenant work, complete in place, all in accordance with the requirements of the Contract Documents.

1.02 RELATED WORK SPECIFIED ELSEWHERE

- A. Section 01300 - Submittals
- B. Section 09940 - Painting
- C. Section 15000 - Piping General

1.03 REFERENCED SPECIFICATIONS, CODES, AND STANDARDS

A. Commercial Standards:

1. ANSI/AWWA C110/A21.10 Ductile-Iron and Gray-Iron Fittings 3-inch through 60-inch for Water and Other Liquids
2. ANSI/AWWA C111/A21.11 Rubber-Gasket Joints for Ductile-Iron and Gray-Iron Pressure Pipe and Fittings
3. ANSI/AWWA C151/A21.51 Ductile-Iron Pipe, Centrifugally Cast in Metal Molds or Sand-Lined Molds, for Water or Other Liquids
4. ANSI/AWWA C600 Installation of Ductile-Iron Water Mains and Appurtenances

1.04 SUBMITTALS

- A. Shop Drawings: The CONTRACTOR shall submit Shop Drawings of pipe and fittings in accordance with the requirements set forth in Section 01300 – “Submittals”.

Part 2 - PRODUCTS

2.01 GENERAL

- A. Pipe shall be centrifugally cast in metal molds or sand lined molds in accordance with ANSI A21 .51 (AWWA C151) of grade 60-42-10 ductile iron. The above standard covers ductile iron pipe with nominal pipe sizes from three inches up to and including sixty-four inches in diameter. Working pressure shall be as specified herein, unless higher pressure is indicated on the Piping Schedule in Section 15000 - Piping General.

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DUCTILE IRON PIPE AND FITTINGS

B. Wall Thickness:

1. Buried push-on, mechanical, and restrained joint pipe shall have a wall thickness class in accordance with ANSI A21 .51 equal to or greater than classes indicated below, unless indicated to be otherwise in the Piping Schedule:

<u>Buried Pipe Size</u>	<u>Class</u>
4" - 12"	52
14" - 54"	52
60" - 64"	Pressure Class 150

2. All flanged, grooved pipe shall have a wall thickness class in accordance ANSI A21.15 (AWWA C115) and be rated at 250 psi working pressure. The nominal thickness of pipe 6-inch and larger shall not be less than those shown in Table 15.1 of ANSI C115. The nominal thickness of 4-inch pipe shall be ANSI C151 Class 54.

C. Joints:

1. Ductile iron pipe above grade shall be flanged. All pressurized ductile iron pipe below grade shall have thrust restrained joints. Thrust restrained push-on joint pipe shall be provided at grade where indicated on the Drawings and noted in the Piping Schedule.
2. Mechanical and push-on type joints shall be in accordance with ANSI/AWWA C153/A21 .53-00.
3. Flanges for flanged pipe shall be in accordance with ANSI A21 .15 (AWWA C1 15), shall be ductile iron, shall be manufactured in the United States, shall be rated at 250 psi maximum working pressure, and shall be similar to flange Class 125 per ANSI B 16.1. Where shown on the drawings, pipe and fittings shall be furnished with flanges similar to flange Class 250 per ANSI B1 6.1. Fittings shall be provided with flanges having a bolt circle and bolt pattern the same as the adjacent pipe and/or mechanical devices. Joint materials shall be ANSI sized and approved and shall consist of hot dip galvanized carbon steel bolts and nuts and full faced 1/8" thick neoprene gaskets.
4. No raised face flanges shall be used. The raised faces shall be milled flat.
5. Flange gaskets shall be full face neoprene rubber unless noted otherwise. Flange gaskets for potable water service shall be full face EPDM as manufactured by ACIPCO Toruseal or US Pipe Flange – Type Gasket.

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DUCTILE IRON PIPE AND FITTINGS

D. Restrained Push-on Joints (Single Gasket):

1. Restrained joints in pipe and fittings shall be of the single gasket push-on type, and shall conform to all applicable provisions of ANSI/AWWA Standard C111/A21.11, except that gaskets for pipe and fittings shall conform with Paragraph 2.01 C, and the following requirements:
 - (a) Thickness of the pipe barrel remaining at grooves cut, if required in the design of restrained end joints, shall not be less than the nominal wall thickness of equal sized non restrained pipe as specified in Item 2.01 B.
 - (b) Restrained joints using field welding, set screws or gaskets with expanding metal inserts will not be acceptable.
 - (c) The restraining components, when not cast integrally with the pipe and fittings, shall be ductile iron or a high strength non-corrosive alloy steel.
 - (d) Tee head bolts and hexagonal nuts for all restrained joints in pipe and fittings shall be of high strength cast iron with composition, dimensions and threading as specified in ANSI/AWWA Standard C11 1/A21 .11, except that the length of the bolts shall meet the requirements for the restrained joint design.
 - (e) The proper number of gaskets, bolts, nuts and all necessary joint material, plus one extra gasket for every 10 joints or fraction thereof, shall be furnished with each order. The gaskets and joint accessories shall be shipped in suitable protection containers.
 - (f) Each restrained joint, as well as the pipe and fitting of which it is part, shall be designed to withstand the axial thrust from an internal pipeline pressure of at least 150 psi at bulkhead conditions, regardless of its position in the pipeline, and without regard for external thrust block support.
 - (g) Restrained push-on joint pipe and fittings shall be capable of being deflected after assembly. During deflection, all components in the restrained system shall be in contact to provide an equal force on all contact areas.
 - (h) When restrained spigot ends are ordered the corresponding bell ends of the pipe are to be restrained.
2. Restrained push-on joints for ductile iron pipe and fittings shall be TR-FLEX as manufactured by U.S. Pipe and Foundry, Flex-Ring (4-inch to 36-inch) and Lok-Ring (42-inch to 64-inch) by the American Ductile Iron Pipe Co., or equal. The restraining components, when not cast integrally with the pipe and fittings, shall be ductile iron or a high strength noncorrosive alloy steel. For cut grooved retainers, the thickness of barrel left after grooving shall not be less than the nominal wall thickness of equal sized non-restrained pipe as specified herein above for the centrifugally cast ductile iron pipe.

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DUCTILE IRON PIPE AND FITTINGS

3. Restrained Mechanical Joint: Mechanical joints shall be restrained with Megalug Series 1100 as manufactured by EBAA Iron, Inc., or approved equal. Restrained mechanical joint pipe shall only be used in special cases when requested by the CONTRACTOR and acceptable to the ENGINEER. Tee head bolts and hexagonal nuts for all restrained joints in pipe and fittings shall be of high strength cast iron with composition, dimensions and threading as specified in ANSI/AWWA Standard C111 /A21 .1 1, except that the length of the bolts shall meet the requirements for the restrained joint design.

E. Fittings:

1. Shall be manufactured in accordance with ANSI A21.10 (AWWA C110) for nominal pipe sizes three inches to sixty-four inches, and shall be either flanged or mechanical joint. Any other fittings, not included in ANSI A21 .10 (AWWA C1 10) shall conform in design and performance to the requirements of this Standard.
2. Shall have a rated pressure equal to or greater than the specified working pressure for nominal pipe sizes of three inches to sixty-four inches (350 psi fittings available through and including twenty-four inches, only).
3. Grey iron fittings which conform to the specifications contained herein may be used with ductile iron pipe providing the piping systems minimum working pressure is met or exceeded.
4. Blind, filler, companion and reducing flanges shall conform to ANSI B16.1.

F. Pipe Coating General: All ductile iron pipe and fittings shall be supplied with the same coating material throughout the project. Coating shall be provided in the interior and exterior of the pipe as described hereinafter.

1. The standard asphaltic coating shall be applied prior to shipment to the exterior wall of buried pipe and fittings in accordance with ANSI A21.51 (AWWA C151).
2. A coating of rust inhibitive primer, compatible with the coating system specified in Section 09940 - Painting, shall be applied prior to shipment to all exposed and interior piping.
3. Cement-Mortar Lining: Pipe and fittings not for sewage and used when asked for on the Drawings shall be cement-lined and seal-coated in accordance with ANSI/AWWA Standard C1 04/A21.4-90, Cement-Mortar Lining for Ductile-Iron Pipe and Fittings for Water.
4. Where scheduled, the interior of all ductile iron pipe and fittings shall be lined with an epoxy lining. The epoxy lining shall be Protecto 401 Ceramic Epoxy as manufactured by the Protecto Division of Vulcan painters, Inc. All pipe and fittings shall be lined with a minimum dry film thickness of 40 mils, except for the gasket groove and spigot end up to six inches back from the

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DUCTILE IRON PIPE AND FITTINGS

end of the spigot which shall be lined with ten mils of the material. All ductile iron pipe and fittings shall be checked for dry film thickness in accordance with the SSPC-PA2. Each pipe joint and fitting shall be marked with the date of application of the lining system and with its numerical sequence of application on that date. The pipe CONTRACTOR shall furnish a certificate stating that lining applicator has complied with all specification requirements relative to the material, its application and inspection. Surface preparation, number of coats, application of the lining material and field touch-up shall be in strict accordance with the lining material manufacturer's recommendations. During the installation of the pipe, the lining material manufacturer shall provide the services of a field ENGINEER to instruct and demonstrate to the CONTRACTOR's personnel the procedure for the field touch-up of lining where field cuts and taps were required. Holiday inspection shall be conducted using test equipment described in American Water Works Association Standard, AWWA C210, Section 5.3.3.1. In accordance with coating manufacturer's recommendation, holiday testing may be conducted any time after the coating has reached sufficient cure.

5. Polyethylene Encasement: All ductile iron pipe, fittings and valves installed underground shall be encased with polyethylene film in accordance with ANSI Standard A21 .5, Method A or B at the CONTRACTOR's option. Encasement shall terminate 3-inches to 6-inches above ground where pipe is exposed.

Part 3 - EXECUTION

3.01 INSTALLATION

- A. The CONTRACTOR shall perform all earthwork including excavation, backfill, bedding, compaction, sheeting, shoring and bracing, dewatering and grading in accordance with Division 2 - Sitework.
- B. Unless otherwise directed, ductile iron pipe shall be laid with the bell ends facing upstream in the normal direction of flow and in the direction of laying.
- C. Thrust restrained and mechanical joints shall be made in accordance with the manufacturer's standards except as otherwise specified herein. Joints between mechanical joint pipe and/or fittings shall be made in accordance with ANSI/AWWA Standard C600, except that deflection at joints shall not exceed one-half of the manufacturer's recommended allowable deflection, or one-half of the allowable deflection specified in ANSI/AWWA C600, whichever is the lesser amount.
- D. Before laying thrust restrained and mechanical joint pipe and fittings, all lumps, blisters and excess bituminous coating shall be removed from the bell and spigot ends. The outside of each spigot and the inside of each bell shall be wire brushed, and wiped clean and dry. The entire gasket groove area shall be free

SECTION 15006

DUCTILE IRON PIPE AND FITTINGS

of bumps or any foreign matter which might displace the gasket. The cleaned spigot and gasket shall not be allowed to touch the trench walls or trench bottom at any time. Vegetable soap lubricant shall be applied in accordance with the pipe manufacturer's recommendations, to aid in making the joint. The workmen shall exercise caution to prevent damage to the gasket or the adherence of grease or particles of sand or dirt. Deflections shall only be made after the joint has been assembled.

- E. Prior to making up flanged joints in ductile iron pipe and fittings, the back of each flange under the bolt heads and the face of each flange shall have all lumps, blisters and excess bituminous coating removed and shall be wire brushed and wiped clean and dry. Flange faces shall be kept clean and dry when making up the joint, and the workmen shall exercise caution to prevent damage to the gasket or the adherence of grease or particles of sand or dirt. Bolts and nuts shall be tightened by opposites in order to keep flange faces square with each other, and to insure that bolt stresses are evenly distributed.
- F. Bolts and nuts in thrust restrained, mechanical and flanged joints shall be tightened in accordance with the recommendations of the pipe manufacturer for a leak-free joint. The mechanics shall exercise caution to prevent overstress. Torque wrenches shall be used until, in the opinion of the ENGINEER, the mechanics have become accustomed to the proper amount of pressure to apply on standard wrenches.
- G. Cutting of the ductile iron pipe for inserting valves, fittings, etc., shall be done by the CONTRACTOR in a neat and workmanlike manner without damage to the pipe, the lining, or the coating. Pipe 16 inches and larger in diameter shall be cut with a mechanical pipe saw. After cutting the pipe, the plain end shall be beveled with a heavy file or grinder to remove all sharp edges.
- H. Areas of loose or damaged lining associated with field cutting shall be repaired or replaced as recommended by the pipe manufacturer and required by the ENGINEER. Repair methods shall be as recommended by the manufacturer and shall be submitted to the ENGINEER for review.
- I. Any work within the pipe shall be performed with care to prevent damage to the lining. No cable, lifting arms or other devices shall be inserted into the pipe. All lifting, pulling or pushing mechanisms shall be applied to the exterior of the pipe barrel.
- J. Homing the pipe shall be accomplished by the use of a hydraulic or mechanical pulling device, unless otherwise accepted by the ENGINEER. No pipe shall be driven or struck in order to seat it home.
- K. Cleaning: Cleaning methods shall be acceptable to the ENGINEER, and must be sufficient to remove silt, rocks, or other debris which may have entered the pipeline during its installation and shall also follow the requirements of 15995 - Pipeline Testing and Disinfection.

- END OF SECTION -

SECTION 15008

PVC NON-PRESSURE PIPE

Part 1 - GENERAL

1.01 THE REQUIREMENT

This specification includes 4" through 15" unplasticized polyvinyl chloride (PVC) plastic non-pressure gravity sewer pipe with integral bell and spigot push-on gasket joints for the conveyance of domestic sanitary sewage.

1.02 RELATED WORK SPECIFIED ELSEWHERE

- A. Section 02222 - Excavation and Backfill for Utilities
- B. Section 02730 – Gravity Sanitary Sewers
- C. Section 15000 - Piping General
- D. Section 15007 – AWWA C900/C905 PVC Pipe
- E. Section 15009 – PVC Pressure Pipe
- F. Section 15995 - Pipeline Testing and Disinfection

1.03 REFERENCE SPECIFICATIONS, CODES, AND STANDARDS

A. Commercial Standards:

ASTM D 1784	Specification for Rigid Poly (Vinyl Chloride) (PVC) Compounds and Chlorinated Poly (Vinyl Chloride) (CPVC) Compounds.
ASTM D 2241	Specification for Poly (Vinyl Chloride) (PVC) Pressure Rated Pipe (SDR-Series).
ASTM D 2321	Recommended Practice for Underground Installation of flexible Thermoplastic Sewer Pipe.
ASTM D 3034	Specification for Type PSM Poly (Vinyl Chloride) (PVC) Sewer Pipe and Fittings.

1.04 SUBMITTALS

- A. Samples: The CONTRACTOR shall submit to the CITY for review, samples of all the materials proposed for use on the Work. The samples shall be clearly marked to show the manufacturer's name and product identification and shall be submitted along with the manufacturer's technical data and application instructions. All sample submittals shall conform to the requirements for "Samples" in Section 01300, "Submittals".
- B. Shop Drawings: The CONTRACTOR shall submit shop drawings and laying diagrams of all Pipe, joints, bends, special fittings, and piping appurtenances in accordance with Section 01300, "Submittals".
- C. Certificates: The CONTRACTOR shall provide manufacturer's certificates for all materials indicating conformance to the Contract Documents.

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PVC NON-PRESSURE PIPE

1.05 QUALITY ASSURANCE

- A. Testing: All materials testing will be based upon applicable ASTM Test Methods and AWWA Standards referenced herein for the materials specified.
- B. Certificates: Manufacturer's notarized certificates of compliance shall be furnished by the CONTRACTOR.
- C. The pipe shall be subjected to the specified hydrostatic strength tests, flexure tests, and crushing tests. The crushing tests shall be made on samples taken from the center of full-length sections of pipe.

1.06 CLEANUP

- A. In addition to the requirements of Section 01700, "Project Closeout", the CONTRACTOR, upon completion of backfilling and grading over trenches shall remove all excess materials and equipment from the site.

Part 2 - PRODUCTS

2.01 GENERAL

- A. All pipe and fittings shall meet the requirements of ASTM D3034 for 6" through 15" SDR 26 sewer pipe.
- B. The CONTRACTOR shall also require the manufacturer to mark the date of extrusion on the pipe. This dating shall be done in conjunction with records to be held by the manufacturer for 2 years, covering quality control tests, raw material batch number, and other information deemed necessary by the manufacturer.
- C. PVC pipe and fittings shall be homogenous throughout and free from cracks, holes, foreign inclusions or other injurious defects.
- D. PVC pipe and fittings showing signs of ultra-violet degradation will not be accepted.

2.02 PIPE

- A. All pipe shall have a dimension ratio (DR) of 26 and minimum pipe stiffness (PS) of 115 psi. It shall be made from quality PVC resin, compounded to provide physical and mechanical properties that equal or exceed cell class 12454 or 12364 as defined in ASTM D1784 (minimum tensile Modulus of 500,000 PSI).
- B. Pipe shall be fabricated in 20-foot lengths and shall be suitable for use as a gravity sewer conduit.
- C. The bell shall consist of an integral wall section with a solid cross section elastomeric gasket which meets the requirements of ASTM F477.
- D. All PVC pipe shall be uniform in color, opacity, density and other physical properties.

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PVC NON-PRESSURE PIPE

- E. All PVC pipe shall be continuously and permanently marked with the manufacturer's name, pipe size, the PVC cell classification and pressure rating in psi.

2.03 Joints

- A. Joints shall be integral bell push-on gasket joints designed for radial compression of the elastomeric gasket inside the bell on the pipe spigot to ensure a positive seal.
- B. Design joint to avoid displacement of the gasket when installed under provisions of the manufacturer's recommendation.
- C. The joint design shall meet the requirements of ASTM D3212 under both pressure and 22 in. Hg vacuum.
- D. Use lubricants to join pipe as recommended by the manufacturer.

2.04 Gaskets

- A. Provide solid cross section elastomeric gaskets which meets the requirements of ASTM F477, molded in a circular form or extruded to the proper section and then spliced into circular form, consisting of a properly vulcanized high-grade elastomeric compound.
- B. Gaskets shall be factory assembled and securely locked in place to prevent displacement during assembly. Provisions must be made for expansion and contraction at each joint with an elastomeric gasket.
- C. The basic polymer shall be natural rubber, synthetic elastomer or a blend of both.
- D. Gaskets shall be manufactured of materials resistant to domestic sewage.
- E. Apply an adequate compressive force to gasket to affect a positive seal under all combinations of joint tolerance.

2.05 FITTINGS

- A. All fittings for PVC pipe shall conform to the requirements of ASTM D 2241. The ring groove and gasket ring shall be compatible with PVC pipe ends. The flanged fittings shall be compatible with cast-iron or ductile iron pipe fittings.
- B. The strength class of the fittings shall be not less than the strength class of any adjoining pipe.
 - 1. Fittings Marking: Mark fittings with the following information
 - (a) Manufacturer's Name or Trademark.
 - (b) Nominal Size.
 - (c) The Material Designation "PVC" PSM.
- C. Service Plugs shall be flexible virgin polyvinyl chloride as manufactured by Fernco Joint Sealer Company, or approved equal.

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PVC NON-PRESSURE PIPE

D. Adapters: As required by the field conditions.

2.06 BEDDING MATERIAL

A. Unless otherwise specified or shown, all material used for pipe bedding shall conform to the requirements of Section 02222, "Excavation and Backfill for Utilities".

Part 3 - EXECUTION

3.01 GENERAL

- A. All laying, jointing, testing for defects and for leakage shall be performed in the presence of the CITY, and shall be subject to the CITY'S approval before acceptance. All material found during the progress to have defects will be rejected and the CONTRACTOR shall promptly remove such defective materials from the site of the Work.
- B. Installation shall conform to the requirements of ASTM D 2321 and to the supplementary requirements or modifications specified herein. Wherever the provisions of this Section and the requirements of ASTM D 2321 are in conflict, the more stringent provision shall apply.

3.02 TRENCHING AND BACKFILL

- A. Trench excavation and backfill shall conform to the requirements of Section 02222 - Excavation and Backfill for Utilities, and as specified herein.
- B. Unless otherwise specified or shown, the maximum width of trenches shall be as specified in said ASTM D 2321.

3.03 LAYING PIPE

- A. The pipe shall be installed in accordance with the requirements of ASTM D 2321 and as specified herein. Sections shall be closely jointed to form a smooth flow line. Immediately before placing each section of pipe in final position for joining, the bedding for the pipe shall be checked for firmness and uniformity of surface.
- B. Proper implements, tools, and facilities as recommended by the pipe manufacturer's standard printed installation instructions shall be provided and used by the CONTRACTOR for safe and efficient execution of the Work. All pipe, fittings, valves, and accessories shall be carefully lowered into the trench by means of backhoe, ropes, or other suitable equipment in such a manner as to prevent damage to pipe and fittings. Under no circumstances shall pipe or accessories be dropped or dumped into the trench.
- C. Cutting and machining of the pipe shall be accomplished in accordance with the pipe manufacturer's standard procedures for this operation. Pipe shall not be cut with a cold chisel, standard iron pipe cutter, nor any other method that may fracture the pipe or will produce ragged, uneven edges.

SECTION 15008

PVC NON-PRESSURE PIPE

- D. The pipe and accessories shall be inspected for defects prior to lowering into the trench. Any defective, damaged or unsound pipe shall be repaired or replaced. All foreign matter or dirt shall be removed from the interior of the pipe before lowering into position in the trench. Pipe shall be kept clean during and after laying. All openings in the pipe line shall be closed with water tight expandable type sewer plugs or PVC test plugs at the end of each day's operation or whenever the pipe openings are left unattended. The use of burlap, wood, or other similar temporary plugs will not be permitted.
- E. Adequate protection and maintenance of all underground and surface utility structures, drains, sewers, and other obstructions encountered in the progress of the Work shall be furnished by the CONTRACTOR.
- F. Where the grade or alignment of the pipe is obstructed by existing utility structures such as conduits, ducts, pipes, branch connections to main sewers, or main drains, the obstruction shall be permanently supported, relocated, removed, or reconstructed by the CONTRACTOR in cooperation with owners of such utility structures.

3.04 HANDLING

- A. Handling of the PVC pipe shall be done with care to insure that the pipe is not damaged in any manner during storage, transit, loading, unloading, and installation.
- B. Pipe shall be inspected both prior to and after installation in the ditch and all defective lengths shall be rejected and immediately removed from the working area.

3.05 FIELD JOINTING

- A. Each pipe compression type joint shall be joined with a lock-in rubber ring and a ring groove that is designed to resist displacement during pipe insertion.
- B. The ring and the ring seat inside the bell shall be wiped clean before the gasket is inserted. At this time a thin film of lubricant shall be applied to the exposed surface of the ring and to the outside of the clean pipe end. Lubricant other than that furnished with the pipe shall not be used. The end of the pipe shall be then forced into the ring to complete the joint.
- C. The pipe shall not be deflected either vertically or horizontally in excess of the printed recommendations of the manufacturer of the coupling.
- D. When pipe laying is not in progress, the open ends of the pipe shall be closed to prevent trench water from entering pipe. Adequate backfill shall be deposited on pipe to prevent floating of pipe. Any pipe which has floated shall be removed from the trench, cleaned, and relaid in an acceptable manner. No pipe shall be laid when, in the opinion of the OWNER, the trench conditions or weather are unsuitable for such Work.

3.06 INSTALLATION OF BENDS, TEES, AND REDUCERS

SECTION 15008

PVC NON-PRESSURE PIPE

- A. PVC fittings shall be installed utilizing standard installation procedures. Fittings shall be lowered into trench by means of rope, cable, chain, or other acceptable means without damage to the fittings. Cable, rope, or other devices used for lowering fitting into trench shall be attached around exterior of fitting for handling. Under no circumstances shall the cable, rope or other device be attached through the fitting's interior for handling. Fittings shall be carefully connected to pipe or other facility, and joint shall be checked to insure a sound and proper joint.

3.07 PIPE-TO-PIPE CONNECTIONS

- A. Pipe-to-pipe connections shall be made by using flexible banded, sheer reinforced couplings or adapter couplings, each with compression joints, in compliance with ASTM C 425.

3.08 PIPE-TO-PIPE MANHOLE CONNECTIONS

- A. When a sound pipe stub-out exists at a manhole to which connection is to be made, a pipe-to-pipe connection shall be made as described above. If a stub-out is not present or is faulty, an opening shall be cut in the manhole wall and the connection made. The connection shall consist of a pipe stub-out with elastomeric waterstop grouted into the opening with non-shrink grout. A flexible band coupling, as shown on the details for new manholes, shall join the pipe stub-out to the replacement pipe. The invert or floor inside the manhole shall be cut and reshaped as necessary.

3.09 GRAVITY SEWER SERVICE LATERALS

- A. Lateral sewers shall be installed in accordance with all the applicable requirements for pipe installation. Branch fittings shall be installed in the main line sewer as it is constructed, in the locations and configuration of the original laterals or as designated by the CITY.
- B. The existing laterals shall be hand excavated to a joint, saw cut, clean and square and the appropriate adapter installed to connect the replacement laterals. Care shall be taken to maintain the slopes of the existing laterals. The laterals shall be removed and replaced from the main line to a point along the existing lateral as determined by the CITY to be in acceptable condition.
- C. The CONTRACTOR shall not excavate trenches for laterals on both sides of the street at the same time unless written permission has been secured in advance to close the street.

3.10 TESTING

SECTION 15008

PVC NON-PRESSURE PIPE

- A. Field testing of gravity sewer pipe shall conform to the requirements of Section 15995 - Pipeline Testing and Disinfection.

- END OF SECTION -

SECTION 15019
MISCELLANEOUS PIPING

PART 1 - GENERAL

1.01 THE REQUIREMENT

- A. The Contractor shall furnish and install all exposed and buried mill piping as shown and specified, complete, including polyethylene tubing, copper tubing, solvent-welded PVC pipe, fittings, gaskets, bolts, insulating connections, and such other specialties as required for a complete and operable piping system in accordance with the requirements of the Contract Documents.

1.02 RELATED WORK SPECIFIED ELSEWHERE

- A. Excavation and Backfill for Utilities
- B. Piping, General.
- C. Pipeline Testing and Disinfection

1.03 REFERENCE SPECIFICATIONS, CODES AND STANDARDS

A. Commercial Standards:

ANSI/ASME B1.20 1	Pipe Threads, General Purpose (inch)
ASTM B 62	Specification for Composition Bronze or Ounce Metal Castings
ASTM B 584	Specification for Copper Alloy Sand Castings for General Applications
ASTM D 2000	Classification System for Rubber Products in Automotive Applications
ASTM D-1248	Polyethylene Plastics Molding and Extrusion Materials
AWWA C 901	Polyethylene (PE) Pressure Pipe and tubing, ½" through 3" for Water Service

1.04 SUBMITTALS

- A. For the materials and equipment items supplied under the provisions of this Section, the Contractor shall submit copies of the manufacturer's product specifications and performance details according to the requirements of Section entitled "Submittals."

1.05 QUALITY ASSURANCE

- A. Tests: Except where otherwise specified, all material used in the manufacture of the pipe shall be tested in accordance with the applicable Specifications and Standards.
- B. Certificates: Manufacturer's notarized certificates of compliance shall be furnished by the Contractor.

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- C. The pipe shall be subjected to the specified hydrostatic strength tests, flexure tests, and crushing tests. The crushing tests shall be made on samples taken from the center of full-length sections of pipe.

1.06 CLEANUP

- A. In addition to the requirements of Section entitled "Project Closeout", the Contractor, upon completion of backfilling and grading over trenches shall remove all excess materials and equipment from the site.

PART 2 - PRODUCTS

2.01 COPPER TUBING

- A. Copper tubing shall conform to the requirements of ASTM B 88 and shall be Type K, soft temper for buried tubing and hard-drawn for above-ground application. Fittings shall be soldered or sweated on and shall be of wrought copper to ANSI B16.22. Soldered joints shall contain 95-percent tin and 5-percent antimony. No solders or fluxes containing more than 0.2 percent of lead shall be used.

2.02 PVC (POLYVINYL CHLORIDE) PRESSURE PIPE, SOLVENT-WELDED

- A. PVC pipe shall be made from all new rigid unplasticized polyvinyl chloride and shall be Normal Impact Class 12454-B, Schedule 80 to conform to ASTM D 1785, unless otherwise shown. Schedule 40 PVC pipe shall be used for piping sleeves under pavement, as shown on the drawings. Elbows and tees shall be of the same material as the pipe. Unless otherwise shown, joint design shall be for solvent-welded construction.

2.03 COMPRESSIONS COUPLINGS

- A. Compression couplings shall be provided for connections of the new service connection piping at the corporation stop, angle key meter valve branch assembly, pipe joints, and the service meter. The compression couplings shall be of similar material to the meter or pipe and shall be of the sizes to fit the pipe and fittings. The compression coupling shall have stainless steel clamp or set screws, pack joint nut with beveled gasket and a gap for adjustability. Compression couplings shall be Pack Joint Couplings as manufactured by Ford Meter Box Company or equal. Meter couplings shall be model C38-23-2.5 as manufactured by Ford Meter Box Company, or equal.

2.04 PIPE THREADS

- A. All pipe threads shall be in accordance with ANSI/ASME B1.20.

2.05 POLYETHYLENE TUBING

- A. The polyethylene compound from which the tubing is made shall be an ethylene hexene copolymer and shall comply with the applicable requirements as specified in ASTM D3350 providing a cell classification of 355434C and simultaneously be as specified in ASTM D1248 for Type 111 Category 5, Grade P34, Class C., PE3408 very high molecular weight, high density polyethylene plastic material.
- B. Polyethylene tubing shall have a working pressure at 200 PSI at 73.4 degrees F.

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- C. All tubing furnished under these specifications shall conform to the following standards:
 - 1. AWWA C-901, ASTM D2239, ASTM D2737, ASTM D3350, ASTM D1248, ASTM F1248, ASTM D1693, ASTM D2837, and ASTM D3140.
- D. Tubing dimensions and tolerances shall conform to the following requirements:
 - 1. Polyethylene tubing surfaces shall be mirror smooth, and shall be free from bumps and irregularities. Materials must be completely homogenous and uniform in appearance.
- E. Tubing dimensions and tolerances shall correspond with the values listed in AWWA C901 with a dimension ratio (DR) of 9.
- F. Tubing shall be fully labeled at intervals of not more than 5 feet with brand name and manufacturer, the nominal size, PE 3408, the word "Tubing" and DR9, PC200, AWWA C901, and the seal, or mark, of the testing agency.

2.06 HIGH DENSITY POLYETHYLENE PIPE

- A. General: High density polyethylene pipe shall be used for sewer replacement by pipe bursting.
- B. The materials of the replacement pipe shall be PE 3408 High Density Polyethylene (HDPE) pipe and conform to requirements of ASTM F714 Polyethylene (PE) Plastic Pipe (SDR-PR) based on outside diameter, ASTM D1248, ASTM D3350 - Cell Classification PE 345434C. Sizes of the insertions to be used shall be such to increase to or renew as indicated on the Drawings. All pipe shall be made of virgin material. No rework except that obtained from the manufacturer's own production of the same formulation shall be used. The pipe shall be homogenous throughout and shall be free of visible cracks, holes, foreign material, blisters, or other deleterious faults. The minimum wall thickness of the polyethylene pipe shall have SDR 17 for gravity sewer installation and SDR 11 for force main installation, or as directed otherwise by the ENGINEER.
- C. The replacement pipe shall be 1100 Series Driscopipe, SDR17 with 100 psi pressure rating for gravity sewer, and 1000 Series Driscopipe, SDR 11 with 160 psi pressure rating for force main, as manufactured by Philips 66, or equal.
- D. The inside diameter of the replacement pipe for gravity sewer shall be color coded and equivalent to the soft white Driscopipe Opticore pipe, or equal.

PART 3 -- EXECUTION

3.01 INSTALLATION

- A. Couplings: Pipe couplings shall be installed in strict accordance with the manufacturer's printed recommendations, using the correct style coupling and gasket for any given application.

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- B. Plastic Pipe: PVC pipe joints shall be solvent-welded in accordance with the manufacturer's instructions. Expansion joints or pipe bends shall be provided to absorb pipe expansion over a temperature range of 100 degrees F, unless otherwise shown. Care shall be taken to provide sufficient supports, anchors, and guides, to avoid stress on the piping. The Contractor shall obtain the services of the pipe supplier, to instruct the pipe fitters in the correct way of making solvent welded joints. Only clean, fresh solvent shall be used at any time.

- END OF SECTION -

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PIPE SUPPORT

Part 1 - GENERAL

1.01 DESCRIPTION

- A. Design, and provide a complete system of pipe supports with inserts, bolts, nuts, restraining and hanger rods, washers, miscellaneous steel, sliding Teflon plates, and accessories as indicated and specified. The term pipe support includes hangers, guides, restraints, anchors and saddles.
- B. Provide all support systems and the design of all support systems for all piping as specified herein. The Contractor shall provide pipe support locations, configurations and details through accepted shop drawing submittals stamped by a Registered Professional Engineer as specified herein.
- C. The Contractor shall be responsible for the proper design, fabrication, location, shop drawings and installation of all pipe supports in accordance with the specified requirements.
- D. Pipe support locations and types for piping 12 in. and larger shall be determined by the Contractor using the guidelines for support spacing specified herein and other criteria contained in this pipe support specification. Guidelines for pipe supports may need to be adjusted based upon field coordination, field routing, or other considerations outlined herein such as structural load limits. The Contractor may revise the pipe support locations and details through accepted shop drawing submittals stamped by a Registered Professional Engineer as specified herein. The Contractor is responsible for the proper design, installation and fabrication of all pipe supports in accordance with the specified requirements. For pipe supports 2 in. and larger pipe support shop drawings together with a marked up piping drawing showing support number, location and typical type shall be submitted by the Contractor for acceptance.
 - 1. The Contractor shall be responsible for coordinating all pipe support designs for all trades to ensure compliance with all of the requirements of this specification, including but not limited to the total limitations specified herein.
- E. Design and provide all temporary pipe supports required during installation and testing.

1.02 RELATED WORK

- A. Division 1: General Requirements
- B. Section 03300, "Cast-in-place Concrete, Reinforcing and Formwork"

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PIPING AND FITTINGS

Part 1 - GENERAL

1.01 SCOPE

- A. The work included in this section consists of furnishing all material, equipment and labor, and performing all operations necessary for the complete installation of all piping, fittings and accessories within the limits of work, as shown on the drawings and specified herein.
- B. Where references are made to other standards or codes, unless specific date references are indicated the latest edition of said standard or code shall govern.

1.02 WORK NOT INCLUDED UNDER THIS SECTION

- A. Piping installation for various types of piping systems is specified within various other sections herein. Installations specified in this section are supplementary to those sections and in the case of conflict the more stringent condition shall prevail.

1.03 RELATED SECTIONS

- A. Section 01300 - Submittals
- B. Section 15000 – Piping General
- C. Section 15001 – Service and Miscellaneous Fittings
- D. Section 15070 - Jacking and Boring
- E. Section 15075 - Aerial Crossings
- F. Section 15995 - Pipeline Testing and Disinfection
- G. All sections specifying various types of valves.

1.04 PIPING LAYOUT

Field-verify dimensions prior to preparation of layout and shop drawings. Obtain shop drawing approval prior to fabrication of piping. All items not specifically mentioned in the Specifications or noted on the approved Plans, but which are obviously necessary to make a complete working installation shall be included.

1.05 DELIVERY, STORAGE AND HANDLING

- A. During shipping, delivery and installation of pipe and accessories, handle in a manner as to ensure a sound undamaged condition.
- B. Exercise particular care not to injure pipe coatings.

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Part 3 - PRODUCTS

3.01 PIPE AND FITTINGS: DUCTILE IRON

A. GENERAL

1. In accordance with the "Reduction of Lead in Drinking Water Act" (Act) enacted by the USEPA on January 4, 2011, effective January 4, 2014 all piping, fittings, fixtures, valves, and other appurtenances used in potable water supply and distribution systems shall be "lead free" as defined in Section 1417(d) of the Safe Drinking Water Act (SDWA). All requirements of the Act as it relates to the products under this section shall be strictly adhered to.
2. As used herein, "ANSI" denotes the American National Standards Institute, "AWWA" denotes the American Water Works Association, and "ASTM" denotes the American Society for Testing and Materials.
3. All pipe and fittings to be furnished hereunder shall be manufactured in the United States, and shall conform to the referenced ANSI and/or AWWA Standard as modified herein, as appearing in the following sections.
4. All markings required on pipe and fittings, shall be clearly legible and located such that they will not be hidden or destroyed when assembled into the intended system.

B. PIPE

1. All pipe shall be ductile iron pipe conforming to ANSI/AWWA Standard C151/A21.51, "Ductile-Iron Pipe, Centrifugally Cast, for Water". All pipe and fittings for water applications shall be in full compliance with ANSI/NSF 61, "Drinking Water System Components-Health Effects". Manufacturers shall maintain their NSF certification for the duration of the Contract and any extensions thereof.
2. Wall Thickness:
 - (a) Buried push-on, mechanical, and restrained joint pipe shall have a wall thickness class in accordance with ANSI A21 .51 equal to or greater than classes indicated below

<u>Buried Pipe Size</u>	<u>Class</u>
4" - 12"	52
14" - 54"	52
60" - 64"	Pressure Class 150

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3. All flanged, grooved pipe shall have a wall thickness class in accordance ANSI A21.15 (AWWA C115) and be rated at 250 psi working pressure. The nominal thickness of pipe 6-inch and larger shall not be less than those shown in Table 15.1 of ANSI C115. The nominal thickness of 4-inch pipe shall be ANSI C151 Class 54.
4. For restrained joint pipe, the thickness of the pipe barrel remaining after grooves are cut, if required in the design of restrained end joints, shall not be less than the nominal wall thickness of equal sized non-restrained joint pipe as shown above.
5. Each piece of pipe shall be marked as required in Subsection 4.7 of AWWA C151-02. Letters and numerals on pipe sizes 12-inch and smaller shall be not less than 3/8-inch.
6. The Department of Public Utilities absolutely reserves the right to require the use of higher thickness or pressure class pipe in applications where in the opinion of the Engineer (i.e., the Director of the Department of Public Utilities or his representative) such use is in the best interest of the City. The Engineer's decision in this regard shall be final.
7. A sufficient quantity of non-toxic vegetable soap lubricant shall be supplied with each shipment of pipe. The soap lubricant shall be suitable for use in subaqueous trench conditions.
8. For flanged ductile-iron pipe with integrally cast flanges or threaded flanges, the nominal wall thickness of the pipe barrel shall be as specified in Section D, "Joints and Accessories", under "Flanged Joints", herein below.
9. The single gasket push-on pipe shall be shipped in standard 18-foot or 20-foot lengths, but not both. The restrained single-gasket push-on joint pipe shall be shipped in standard 18 or 20-foot lengths as specified above or fabricated lengths as noted in each order. At least two lengths of each size of single gasket push-on pipe furnished under each order shall be tested with circumferential gauges to insure that the pipe may be cut at any point along its length and have an outside diameter which will be within the manufacturer's standard design dimensions and tolerances for plain pipe. These lengths shall be identified with an easily distinguished, painted marking, longitudinally along the full length of the pipe.

C. FITTINGS

1. Fittings Conforming with ANSI/AWWA C110/A21.10-12 (Water & Sewer Use) - Restrained push-on joint fittings shall be cast ductile iron for use with ductile-iron pipe as specified above. Standard mechanical joint, push-on joint and flanged joint fittings shall also be ductile iron for use with

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ductile iron pipe as specified above. Cast ductile iron fittings in the 3-inch through 24-inch size range shall be pressure rated at 350 psi, minimum; (except flange-joint fittings shall be rated at 250 psi, minimum); and in the 30-inch through 48-inch size range shall be pressure rated at 250 psi, minimum. All fittings with mechanical joints, flange joints and push-on joints shall conform to ANSI/AWWA Standard C110/A21.10-98, "Ductile Iron and Gray Iron Fittings, 3-inch Through 48-inch, for Water and Other Liquids". In addition, fittings with mechanical joints and push-on joints shall conform to ANSI/AWWA Standard C111/A21.11-00, "Rubber-Gasket Joints for Ductile Iron Pipe and Fittings".

The weight of fittings shall be as given in ANSI/AWWA C110/A21.11-98 for ductile-iron fittings. The weight of mechanical joint fittings shall be as established in Tables 3 through 12. The weight of flanged joint fittings shall as established in Tables 13 through 20.

2. Fittings Conforming with ANSI/AWWA C153/A21.53-00 (Water & Sewer Use) - All fittings shall be cast ductile-iron for use with ductile-iron pipe as specified above. Fittings in the 3-inch through 24-inch size range shall be pressure rated at 350 psi minimum; 30-inch through 48-inch size range shall be pressure rated at 250 psi minimum; and in the 54-inch through 64-inch size range shall be pressure rated at 150 psi minimum (except for those fittings such as plugs, caps and sleeves which are normally rated at a higher pressure). No flanged fittings or mixtures of flanged with other end type fittings will be allowed in the range of 3-inch through 48-inch since they are not covered in the AWWA Standard. Flanged fittings conforming with and covered by this standard are allowed in sizes 54, 60 and 64-inch. In conformance with the standard, 54, 60 and 64-inch flanged tees, crosses and reducers with outlets of smaller dimension as listed in ANSI/AWWA C153/A21.53-00 are permitted. All fittings with mechanical joints, flange joints and push-on joints shall conform to ANSI/AWWA Standard C153/A21.53-00, "Ductile-Iron Compact Fittings for Water Service". In addition, fittings with mechanical joints and push-on joints shall conform to ANSI/AWWA Standard C111/A21.11-00, "Rubber-Gasket Joints for Ductile-Iron Pressure Pipe and Fittings" except as otherwise allowed in C153. Mechanical joint glands shall be ductile-iron only.

Since the C153 Standard provides only minimum dimensions, fully detailed drawings of all fittings proposed shall be supplied by the manufacturer with his bid. The tabulated nominal weight of each size and

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type of fitting shall also be supplied by the manufacturer for all items proposed. This weight shall be that of the bare casting prior to application of any lining or coating. The weight of a fitting supplied under the contract shall not be less than ninety-five (95) percent of the tabulated nominal weight supplied by the manufacturer's catalog literature for that fitting. Further, the weight of fittings supplied shall not be more than five (5) percent above the same tabulated nominal weight.

D. JOINTS AND ACCESSORIES

1. Push-On Type Joints (Single Gasket and Single Gasket with Gasket Restraint) - Push-on joints shall conform to ANSI/AWWA Standard C111/A21.11-12, except that the gaskets for pipe and fittings shall be neoprene where so specified.

The required number of gaskets for each push-on joint pipe plus one extra for every 50 joints or fraction thereof, shall be furnished with each order. The gaskets shall be shipped in suitable protective containers. All single-gasket pipe shall be as manufactured by United States Pipe and Foundry Company (Tyton), by the American Cast Iron Pipe Company (Fastite), by McWane, Inc. (Mix of Tyton and Fastite), Tyler/Union (Tyton) or approved equal.

Push-on joints together with both their regular and gasket-restraint gaskets shall be of the design, dimensions and tolerances of either those provided by American Cast Iron Pipe Company (Fastite/Fast-Grip) or those provided by United States Pipe and Foundry Company (Tyton/Field Lok). No other designs shall be acceptable. If required by the City of Hollywood Department of Public Utilities, the Vendor shall supply complete design drawings with dimensions, tolerances and materials of the joint and gasket being supplied within fourteen (14) calendar days of the date of receipt of the letter, fax or E-mail requiring said submission. If so required by the Department of Public Utilities, this submission shall be signed, sealed and dated by an Engineer registered to practice in the State where the manufacturer is located.

2. Mechanical Joints - Mechanical joints for fittings shall conform to ANSI/AWWA Standard C111/A21.11-12, except that the gaskets for each fitting under Groups D and D1 shall be neoprene. Bolt holes for mechanical joints shall be equally spaced, and shall straddle the vertical

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centerline. Tee head bolts and hexagonal nuts for all mechanical joints in fittings shall be of high strength low-alloy steel with composition, dimensions and threading as specified in ANSI/AWWA Standard C111/A21.11-00. Glands shall be of ductile-iron construction for ductile iron fittings, and cast gray iron or ductile iron for cast gray-iron fittings.

The proper number of gaskets, glands, bolts and nuts, all conforming to ANSI/AWWA Standard C111/A21.11-00, plus one extra gasket for every 10 joints or fraction thereof, shall be furnished with each order. The gaskets and joint accessories shall be shipped in suitable protective containers. Follower glands held in place with set screws will not be acceptable. Segmented glands will not be acceptable.

3. Mechanical Joint and Push-on Joint "Megalug®"-type Restraining Systems
Use of this type of restraint is restricted to underground mechanical joint or push-on joint applications, and in general may not be used above grade or as a substitute for flanged joints. Any above grade applications will require submission of shop drawings of the piping system where they are utilized and may require design by a Florida registered Professional Engineer.

This type of restraint may be utilized as dictated by design and/or field conditions in any mechanical joint or push-on joint underground piping system of 30-inch nominal diameter and smaller. The prior written permission of the Engineer is required for diameters of 36, 42 and 48-inch. In instances where written permission cannot be immediately obtained, verbal permission will be allowed but is to be confirmed in writing on the first business day following the substitution. If this type of restraint is used without permission or if permission is denied, the Contractor making the substitution shall be solely responsible for all costs, both direct and indirect, of immediately correcting the restraint system to the satisfaction of the Engineer.

It is recognized that flange adapters of this type form a useful tool for adjusting lengths of flanged pipe runs in instances such as runs with a large number of deflections where it is almost impossible to predict all lengths correctly. Therefore, a very restricted number of these joints will be allowed in instances where it can be clearly shown to the satisfaction of the Engineer that they are necessary. This application is restricted to 20-inch nominal diameter and below. Further, this use shall be designed in and shall not be made as a field substitution. In all instances flange

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adapters shall be rated for a minimum working pressure of 250 psi with a minimum safety factor of 2:1. In no case will these flange adapters be used as a general substitute for standard flanged joints.

The Department of Public Utilities absolutely reserves the right to require other forms of restraint and/or thrust anchoring where, in the opinion of the Engineer, the use of this form of restraint is not in the best interest of the City. In this regard, the Engineer's decision shall be final.

The "Megalug®" joint-restraint systems manufactured by EBAA Iron, Inc., of Eastland Texas, will be considered the standard of quality for the purpose of evaluating substitute systems. Any entity offering a substitute system for consideration shall demonstrate to the complete satisfaction of the Engineer that their restraint system has been in use for a minimum of three years in the United States, and shall bear the entire burden of providing all material, documentation and performance testing data to prove substantial equivalence of their restraint system to the "Megalug®" system.

Each thrust-resistant mechanical joint or push on joint made up with this type of restraint and the pipe and fitting of which it is a part, shall be designed to withstand an axial thrust from an internal pipeline pressure of at least 150 psi at bulkhead conditions without reduction because of its position in the pipeline nor for support from external thrust blocks.

This type of joint restraint shall not be used above grade except as previously specified nor shall it be used as a carrier pipe within a casing. This type of restraint shall not be used with tape wrapped pipe or with too great a coating thickness on the exterior of the pipe.

4. Restrained Push-on Joints (Single Gasket Non-Gasket Restrained) - Restrained joints in pipe and fittings shall be of the single gasket push-on type, and shall conform to all applicable provisions of ANSI/AWWA Standard C111/A21.11-12, except that gaskets for pipe and fittings shall be neoprene, where so specified, and the following requirements:
 - (a) Thickness of the pipe barrel remaining at grooves cut, if required in the design of restrained end joints, shall not be less than the nominal wall thickness of equal sized non-restrained pipe as specified in Section B above.

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- (b) Restrained joints using field welding, set screws, or gaskets with expanding metal inserts will not be acceptable.
 - (c) The restraining components, when not cast integrally with the pipe and fittings, shall be ductile iron or a high strength non-corrosive alloy steel.
 - (d) Tee head bolts and hexagonal nuts for all restrained joints in pipe and fittings shall be of high strength low-alloy steel with composition, dimensions and threading as specified in ANSI/AWWA Standard C111/A21.11-12, except that the length of the bolts shall meet the requirements for the restrained joint design.
 - (e) The proper number of gaskets, bolts, nuts and all necessary joint material, plus one extra gasket for every 10 joints or fraction thereof, shall be furnished with each order. The gaskets and joint accessories shall be shipped in suitable protection containers.
 - (f) Each thrust-resistant joint, and the pipe and fitting of which it is a part, shall be designed to withstand the axial thrust from an internal pipeline pressure of at least 150 psi at bulkhead conditions regardless of its position in the pipeline and regardless of it being supported by external thrust blocks.
 - (g) Restrained push-on joint pipe and fittings shall be capable of being deflected after assembly. During deflection, all components in the restrained system shall be in contact to provide an equal force on all contact areas.
 - (h) When restrained spigot ends are ordered for items of Group A, the corresponding bell ends of the pipe to be restrained (also within Group A), shall be furnished with the required matching restraining features at no additional cost other than the price bid per foot of pipe.
5. Flanged Joints - Connecting pieces with one end flanged and the other end either plain-end or mechanical joint, shall conform to ANSI/AWWA Standard C110/A21.10-12. Joint material for both the flanged end and the mechanical joint accessories for connecting pieces with a mechanical joint end shall be furnished as specified.

Flange adapters shall be used only on a restricted basis and shall not be used as a general substitute for regular flanged joints. Further, the Department of Public Utilities absolutely reserves the right to require regular flanged or other types of joints when it is considered in the City's best interest. The decision of the Engineer shall be final in such situation.

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Flanges shall be made of ductile iron conforming to ASTM 536. Flange shall be restrained by a number of individual gripping wedges operated by torque-limiting actuating screws. Each flange adapter shall have a permanently cast in identification number allowing tracing of the date, foundry and pour that fabricated the unit together with all test data for the material of the pour. Records for this purpose shall be retained by the foundry for a minimum of two years after the pour date and shall be supplied to the City within no more than two weeks after request. Factor of safety shall be a minimum of 2 to 1.

Other types of flanged fittings and flanged-joint pipe shall conform to the following requirements unless otherwise stated in the order:

- (a) Flanged fittings shall conform to ANSI/AWWA Standard C110/A21.10-12, as specified hereinabove.
- (b) Flanged ductile-iron pipe with integrally cast flanges shall be manufactured in accordance with ANSI/AWWA Standard C151/A21.51-09, and with provisions contained hereinabove for centrifugally cast ductile iron pipe, and shall be furnished with ANSI Standard Class 125 flanges, plain-faced and drilled, conforming to ANSI Standard B16.1, "Cast Iron Pipe Flanges and Flanged Fittings", latest revision. Hollow back flanges are not acceptable.
- (c) Flanged ductile-iron pipe with threaded flanges shall be manufactured in accordance with ANSI/AWWA Standard C115/A21.15-11, "Flanged Ductile-Iron Pipe With Ductile-Iron or Gray-Iron Threaded Flanges", and shall be rated for a working pressure of 250 psi, minimum. The nominal thickness of flanged ductile-iron pipe 6-inch diameter and larger shall not be less than those shown in Table 1 of ANSI/AWWA Standard C115/A21.15-11. The nominal thickness of 4-inch diameter flanged ductile-iron pipe shall be Class 54 (min.) conforming to Tables 3 and 4 of ANSI/AWWA Standard C151/A21.51-02. The pipe shall be furnished with ANSI Standard Class 125 flanges, plain-faced and drilled, conforming to ANSI Standard B16.1, latest revision. Hollow back flanges and grey-iron flanges shall not be acceptable for use as threaded flanges. Threaded flanges shall be individually fitted and machine tightened on the threaded pipe by the manufacturer, and shall not be interchangeable in the field. Pipe lengths shall be as ordered. Removal of flanges, cutting and re-threading the pipe, and re-installing the flanges will not be permitted in any case.
- (d) All flanges on ductile-iron pipe and fittings shall be of ductile iron. All joint materials for flanged pipe and fittings shall be supplied with all

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pipe or fittings ordered. Bolts and nuts shall comply with all requirements of Appendix Section A.1 of ANSI/AWWA Standard C115/A21.15-99, except that both shall be stainless steel. Unless ring gaskets are specifically called for in the order, gaskets shall be full-faced and 1/8-inch thick. Gaskets shall fully conform to the requirements of ANSI/AWWA Standard C115/A21.15-99, Appendix Section A.2, except that gaskets shall be SBR for water and neoprene for sewer usages.

E. LININGS AND COATINGS

Asphaltic Coating

All ductile iron pipe and fittings shall be outside-coated with an asphaltic material applied by means of the airless spray method. The exterior coating shall meet AWWA Specifications for this type of coating, shall be smooth without pinholes, thin, bare or overly thick areas. Smoothness shall be such that when hand rubbed, no "sand paper" feeling will be experienced and such that the spigot area will readily slide through the gasket without pulling, tearing, rolling or otherwise disturbing the sealing capabilities of the gasket. Spigot ends shall be beveled prior to painting and to an extent that will permit ready insertion of the spigot through the gasket area.

Cement-Mortar Lining

Ductile iron pipe and fittings where so specified shall be cement-lined and seal-coated in accordance with ANSI/AWWA Standard C104/A21.4-13, "Cement-Mortar Lining for Ductile-Iron Pipe and Fittings for Water".

Ceramic Epoxy Lining and Polyethylene Lining

Pipe and fittings where so specified shall be lined with either ceramic epoxy or virgin polyethylene. A Vendor may supply one or the other material but not both in the same order.

All sewer pipe and fittings of 4-inch nominal diameter and above, except for riser pipe for valves, shall be lined with either ceramic epoxy lining or virgin polyethylene. Polyethylene shall be compounded with carbon black to resist exposure to ultraviolet rays during open-air storage, and shall comply with ASTM Standard ASTM D4976-12a, "Polyethylene Plastics Molding and

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Extrusion Materials". Ceramic epoxy shall contain pigmentation to resist ultraviolet exposure under the same conditions.

Ceramic Epoxy Lining

1. All ductile iron pipe and fittings shall be delivered to the application facility without asphalt, cement lining or other lining on the interior surface or the first 6 inches on the spigot end of the pipe exterior.
2. The only ceramic epoxy material approved by the Department of Public Utilities at this time is Protecto 401™ Ceramic Epoxy, manufactured by Induron Coatings, Inc., of Birmingham, Alabama. Any request for substitution must be accompanied by:
 - (a) A successful history of lining pipe and fittings for sewer service
 - (b) A statement from the manufacturer concerning recoatability and repair to the lining
 - (c) A test report verifying the following properties and a certification of the test results:
 - (1) Permeability rating of 0.00 when tested according to Method A of ASTM E96-66, "Test Method for Water Vapor Transmission of Materials", Procedure A with a test duration of 30 days.
 - (2) The material shall be an amine cured novolac epoxy containing at least 20% by volume of ceramic quartz pigment.
 - (3) An abrasion resistance of no more than 3 mils (.075 mm) loss after one million cycles using European Standard EN 598 (1994), Section 7.8, "Abrasion Resistance".
 - (4) The following tests must be performed on coupons from factory-lined ductile iron pipe:
 - i) ASTM B-117 Salt Spray (scribed panel) - Results to equal no more than 0.0 undercutting after two years.
 - ii) ASTM G95 Cathodic Disbondment 1.5 volts @ 77°F - Results to equal no more than 0.5mm undercutting after 30 days.
 - iii) Immersion testing rated using ASTM D714-87
 - a. 20% Sulfuric Acid - No effect after two years.
 - b. 140°F 25% Sodium Hydroxide - No effect after two years.
 - c. 160°F Distilled Water - No effect after two years.
 - d. 120°F Tap Water (scribed panel) - 0.0 undercutting after two years with no effect.

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- iv) ASTM G-22 90 - Standard practice for determining resistance of synthetic polymeric materials to bacteria. The test should determine the resistance to growth of Acidithiobacillus Bacteria and should be conducted at 30°C for a period of seven days on a minimum of 4 panels. The growth must be limited only to trace amounts of bacteria.
3. Application - Ceramic epoxy lining shall be applied by a competent firm with a successful history of applying linings to the interior of ductile iron pipe and fittings, following the following procedures:
 - (a) Surface Preparation - Prior to abrasive blasting, the entire area which will receive the protective compound shall be inspected for oil, grease, etc. Any areas where oil, grease or any substance which can be removed by solvent is present shall be solvent cleaned using the guidelines outlined in SSPC-1 Solvent Cleaning. After the surface has been made free of grease, oil or other substances, all areas to receive the protective compounds shall be abrasive blasted using compressed air nozzles with sand or grit abrasive media. The entire surface to be lined shall be struck with the blast media so that all rust, loose oxides, etc., are removed from the surface. Only slight stains and tightly adhering annealing oxide may be left on the surface. Any area where rust reappears before coating must be re-blasted to remove all rust.
 - (b) Lining - After the surface preparation and within 8 hours of surface preparation, the interior of pipe and fittings shall receive a minimum forty (40) mils dry film thickness of the protective lining. No lining shall take place when the substrate or ambient temperature is below 40°F. The surface also must be dry and dust free. If flange ends are included in the Project, the linings must not be used on the face of the flange; however, full face gaskets must be used to protect the ends of the pipe. The 40-mil system shall not be applied in the gasket grooves.
 - (c) Coating of Gasket and Spigot Ends - Due to the tolerances involved, the gasket area and exterior of the spigot end up to 6 inches back from the end of the spigot must be coated with Protecto Joint Compound of six 6-mil minimum, 10-mil maximum. This coating shall be applied by brush to ensure coverage. Care should be taken that the coating is smooth without excess buildup in the gasket groove or on the spigot end. All material for the gasket groove and spigot end

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shall be applied after the application of the lining as specified in the preceding paragraph.

- (d) Number of Coats - The number of coats of lining material applied shall be as recommended by the lining manufacturer. However, in no case shall this material be applied above the dry thickness per coat recommended by the lining manufacturer in printed literature. The time between coats shall never exceed that time recommended by the lining material manufacturer. No material shall be used for lining which is not indefinitely recoatable with itself without roughening the surface.
 - (e) Touch-Up and Repair - Protecto Joint Compound shall be used for touch-up or repair. Procedures shall be in accordance with manufacturer's recommendations.
4. Sealing Cut Ends and Repairing Field Damaged Areas:
- (a) Remove burrs caused by field cutting of ends or handling damage and smooth out the edge of the lining if rough.
 - (b) Remove all traces of oil, grease, asphalt, dust, dirt, etc.
 - (c) Areas of loose or damaged lining associated with field cutting the pipe shall be repaired, if approved by the Engineer, as recommended by the pipe manufacturer. The damaged area shall be stripped back by chiseling or scraping about 1 to 2 inches into the well-adhered lining before patching.
 - (d) The exposed metal and the 1 to 2-inch lining overlap shall be roughened with a coarse grade of emery cloth (#40 grit), rasp or small chisel. Avoid wire brushing or similar buffing since these tend to make the surface too smooth for good adhesion.
 - (e) With the area to be sealed or repaired absolutely, clean and suitably roughened, apply a coat of Protecto Joint Compound by brush in accordance with the manufacturer's recommendations.
5. Inspection and Certification
- (a) Inspection:
 - (1) All ductile iron pipe and fitting linings shall be checked for thickness using a magnetic film thickness gauge. The thickness testing shall be done using the method outlined in SSPC- PC-2 Film Thickness Rating.

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- (2) The interior lining of all pipe and fittings shall be tested for pinholes with a nondestructive 2,500 volt test.
- (3) Each pipe joint and fitting shall be marked with the date of application of the lining system and with its numerical sequence of application on the date.

(b) Certification

The pipe or fitting manufacturer must supply a certificate attesting to the fact that the applicator met the requirements of this specification, and that the material used was as specified, and that the material was applied as required by the specification.

Polyethylene Lining

1. The polyethylene shall be fused to the pipe and fittings with heat to form a tightly bonded uniform lining 40 mils thick, minimum, extending from the spigot end to the gasket seat in the bell of push-on, restrained push-on and mechanical type joints.
2. Prior to preheating the pipe, 75% or more of the high-temperature oxide film shall be removed through proper preparation of pipe interior surface. Fittings shall be sand blasted. Pipe and fittings shall be uniformly preheated to a temperature adequate to provide uniform fusing of the polyethylene powders and proper bonding to the interior of the pipe and fittings.
3. The lining at the ends (spigot and bell) shall be hermetically sealed with a coal-tar epoxy. This epoxy shall coat the inside of the bell of both pipe and fitting as well as the last six inches on the inside of the spigot end of the pipe and two to three inches on the outside of the spigot end.
4. The lining of all pipe and fittings shall be subjected to and pass a test for pinholes, bare spots, metal particles, insufficient lining thickness and other defects by a method conforming to ASTM Standard G62-87 (1998), "Holiday Detection in Pipeline Coatings", Method B (high voltage). Other test methods may be submitted to the City for approval, but no approval will be granted unless it is clearly shown to the satisfaction of the City that the method is equivalent to the specified tests insofar as detecting defects and insufficient lining thickness.
5. The manufacturer shall provide certifications on the "Holiday" test as well as certifications on a uniform (spigot end to gasket seat in bell) minimum 40-mil-thick lining.

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F. QUALITY ASSURANCE

1. All piping, fittings and other materials supplied under this contract shall be subject to inspection while still on the delivery truck. It is the sole responsibility of the vendor and supplier to make prior contact with the Department of Public Utilities and provide a minimum of 48-hours prior notice of delivery. When so notified, the City will make arrangements for inspection of the material upon arrival or within a reasonable time thereafter. Material will not be unloaded without inspection taking place either prior to, or if necessary for examination, during the unloading procedure. The City will not be responsible for any delays or additional costs created by non-compliance with the requirement for prior notification or the requirement for thorough inspection.
2. Materials shall be delivered in complete compliance with the AWWA Standards as modified herein, without damage, and shall match or exceed the quality of any samples supplied. The City absolutely reserves the right to require samples of any material supplied and to perform whatever tests considered by the Engineer, whose decision shall be final, to be in the City's best interest on said samples. Where such tests are of a destructive nature, the sample, if it passes the test will be paid for (at cost as shown by invoice) by the City. Samples failing will be immediately replaced with suitable material at the supplier's/contractor's expense. Samples required prior to order as a condition for purchase or as a materials submittal for approval will be at the supplier's/contractor's expense but, if approved and not used for destructive tests, may be used in the work with permission from the Engineer.
3. Materials found to be defective, not in strict compliance with the quality standards of samples supplied or these specifications shall be immediately returned to the vendor at his expense. If defects are discovered at a later time, the vendor shall be required to remove said items and shall bare all costs for so doing together with any replacement costs. Rejection of items may subject the vendor to liquidated and/or actual damages as specified elsewhere herein.
4. Foundries supplying materials shall maintain their metallurgical records for a minimum period of two years after fabrication and firms not doing so may be found in default.
5. Flaws which provide cause for rejection include but are not limited to:
 - (a) Incorrect metallurgy or metallurgy which cannot be verified to the complete satisfaction of the Engineer

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- (b) Foundry identification/location, size, pressure and material identification information lost, removed, non-existent, or not visible when assembled
- (c) Not in complete compliance with all applicable AWWA and NSF standards and requirements as modified herein and/or these specifications
- (d) Not in complete compliance with approved shop drawings
- (e) Incorrect, rough, chipped, cracked, scratched, flawed or otherwise damaged interior or exterior coatings or linings
- (f) interior or exterior coatings which are too thin, or too thick to allow proper assembly, or too thick to allow proper grip by restraining gaskets or other restraining elements
- (g) Pin holes or honey combing of pipe
- (h) Weld spatter or excess metal in gasket grooves or the whole of the bell area
- (i) Bell areas which are distorted or otherwise improperly cast
- (j) Spigots which are out of round, not of proper dimension, or not beveled to an extent that will allow easy assembly of the pipe joint
- (k) Gaskets which are defective or of the wrong material
- (l) Lack of joint materials, improper or defective joint materials
- (m) Bolting of the wrong material or size
- (n) Electro-galvanizing or other exterior plating when hot-dip galvanizing is required
- (o) Non-timely or non-submittal of all required certifications, incorrect/incomplete certifications, or certifications lacking the signature, date and seal of a professional engineer when so required
- (p) Flanges which are too thin, not a right angles to the pipe centerline, or otherwise distorted
- (q) All other flaws or defects which, in the opinion of the Engineer who's decision shall be final, adversely affect the assembly and/or function of the piping system as intended.

3.02 PIPE AND FITTINGS: POLY VINYL CHLORIDE (PVC)

A. TYPE PSM SDR-35 and SDR-26 PVC SEWER PIPE AND FITTINGS

1. Type PSM SDR-35 and SDR-26 PVC Sewer Pipe

- (a) Type PSM SDR-35 and SDR-26 PVC Sewer Pipe for sewer mains and laterals shall conform to ASTM Standard D3034, "Standard

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Specification for Type PSM Poly(Vinyl Chloride) (PVC) Sewer Pipe and Fittings", except as modified below.

- (b) Pipe shall be made of PVC plastic having a cell classification of 12454-B, 12364-B, 12364-C or 13364-B as defined in ASTM Standard D1784, "Specification for Rigid Poly (Vinyl Chloride) (PVC) Compounds and Chlorinated Poly (Vinyl Chloride) (CPVC) Compounds".
- (c) The PVC compounds used in the manufacture of the gravity sewer pipe shall be as listed in the Plastic Pipe Institute (PPI) Technical Report TR-4.
- (d) The PVC pipe shall be push-on type, with bells, spigots and elastomeric gaskets, in accordance with ASTM Standard D3034, and in accordance with ASTM Standard D3212, "Specification for Joints for Drain and Sewer Plastic Pipes Using Flexible Elastomeric Seals", except as otherwise modified herein. The gaskets shall be the sole element depended upon to make the joint flexible and watertight. Joints using solvent cement will not be permitted. The pipe bells shall have an annular recess or race to seat and retain the gasket, and the gaskets may be either prepositioned by the manufacturer, or shipped separately in suitable protective containers. Pipe spigots shall be beveled. Pipe bells shall be extruded integral with the pipe barrel with a thickness equal to or greater than that of the barrel.
- (e) The gaskets shall be fabricated from a high-grade elastomer compound in accordance with ASTM Standard F477, "Specification for Elastomeric Seals (Gaskets) for Joining Plastic Pipe", except as otherwise modified herein. The basic polymer for the gaskets shall be synthetic rubber. Natural rubber gaskets or gaskets with both natural and synthetic rubbers will not be permitted. Gaskets shall be continuous, elastomeric, rubber ring type.
- (f) Nominal laid length of Type PSM SDR-35 and SDR-26 PVC sewer pipe shall be 13 feet.
- (g) Type PSM SDR-35 and SDR-26 PVC sewer pipe shall be double labeled (180 degrees apart) as follows at intervals of five (5) feet or less:

Date of manufacture - Manufacturer's name & Code
- Nominal size - Cell classification - "Type PSM
SDR-35 or SDR-26 PVC Sewer Pipe" - "Specification D3034"

2. Type PSM SDR-35 and SDR-26 PVC Sewer Fittings

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- (a) Type PSM SDR-35 and SDR-26 PVC Sewer Fittings shall conform to ASTM Standard D3034, "Standard Specification for Type PSM Poly (Vinyl Chloride) (PVC) Sewer Pipe and Fittings", and to the specifications for Type PSM SDR-35 and SDR-26 PVC sewer pipe herein, except as modified below.
- (b) The waterway and bell wall thickness shall be equal to or greater than that specified for pipe, except that for reducing fittings or those with smaller inlets, the wall thickness of each inlet shall be no less than the minimum wall thickness for that size pipe.

B. AWWA C900 AND C905 PVC (CI) PIPE AND FITTINGS

1. TYPE C900 and C905 PVC PIPE

- (a) AWWA C900 Pipe for water and sewer mains and laterals shall conform to ANSI/AWWA C900, "(PVC) Pressure Pipe and Fabricated Fittings", for 4-inch through 12-inch PVC pressure pipe and fabricated fittings with cast-iron-pipe-equivalent (CI) outside diameter (OD) dimensions and with wall-thickness-dimension ratios (DRs) 14, 18, and 25, except as otherwise modified herein.
- (b) AWWA C905 pipe for water and sewer mains and laterals shall conform to ANSI/AWWA C905, "Polyvinyl Chloride (PVC) Pressure Pipe and Fabricated Fittings, 14-inch Through 48-inch for Water Transmission and Distribution", for 14-inch through 48-inch PVC pressure pipe and fabricated fittings with cast-iron-pipe-equivalent (CI) and steel-pipe-equivalent (IPS) outside diameter (OD) dimensions and wall thickness dimension ratios (DRs) of 14, 18, 21, 25, 26, 32.5, 41, and 51, except as otherwise modified herein.
 - (1) AWWA C900 and C905 pipe shall be made from PVC thermoplastic having physical and chemical properties which meet or exceed a cell classification of 12454-A or 12454-B virgin compounds as defined in ASTM Standard D 1784.
 - (2) The AWWA C900 and C905 pipe shall be push-on type, with bells, spigots and elastomeric gaskets in accordance with ASTM Standard D 3139, "Standard Specification for Joints for Plastic Pressure Pipes Using Flexible Elastomeric Seals ". The gaskets shall conform to ASTM Standard F477 and shall be synthetic rubber. One gasket shall be furnished with each length of elastomeric-gasket bell-end pipe. Pipe spigots shall be beveled.

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Pipe bells shall be extruded integral with the pipe barrel with a thickness equal to or greater than that of the barrel.

- (3) Nominal laid length of AWWA C900 and C905 PVC (CI) pipe shall be 20 feet.
- (4) The C900 and C905 pipe shall be labeled with the following at intervals of not more than five (5) feet:

Date of manufacture - Manufacturer's Name & Code
- Nominal size - "(CI)" - DR number – Pressure Class – Test Pressure for Hydro Tested or “NOT HYDROSTATIC PROOF TESTED” – AWWA designation number – Manufacturer’s name or trade mark and production run or lot code – Seal (Mark) of the testing agency verifying suitability of material for potable water service (must be NSF).

- (5) Couplings and fabricated fittings shall be marked with:

Nominal Size – “(CI)” – Deflection angle, if applicable – “PVC” – AWWA Pressure Class – AWWA designation number of the applicable standard (C900 or C905) – Manufacturer’s name or trademark - Seal (Mark) of the testing agency verifying suitability of material for potable water service (must be NSF).

2. TYPE C900 and C905 PVC FITTINGS

- (a) Fittings for AWWA C900 and C905, PVC (CI) shall conform to the requirements of ASTM Standard D1784 and the specifications for AWWA C900 and C905, PVC (CI) pipe herein, except as modified below.
- (b) All fittings for C900 pipe shall be manufactured from PVC compound conforming to ASTM Standard D 1784-11. Fittings shall conform to the thickness requirements of DR18. All fittings, except wye branches, shall be Class 235 and shall be manufactured to withstand 755 psi quick burst pressure tested in accordance with ASTM Standard D 1599-99, "Standard Test Method for Resistance to Short-Time Hydraulic Pressure of Plastic Pipe, Tubing, and Fittings", and withstand 500 psi for a minimum of 1,000 hours tested in accordance with ASTM Standard D1598-02, "Test Method for Time-to-Failure of Plastic Pipe Under Constant Internal Pressure".

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- (c) All fittings for C905 pipe shall be manufactured from PVC compound conforming to ASTM Standard D1784-11. Fittings shall conform to the thickness requirements of DR18 for sizes 14 through 30-inch and DR25 for 36 through 48-inch. All fittings, except wye branches, shall be Class 235 for sizes 14 through 30-inch and Class 165 for 36 through 48-inch. Fittings 14 through 30-inch shall be manufactured to withstand 755 psi quick burst pressure tested in accordance with ASTM Standard D1599-99, "Test Method for Short-Time Hydraulic Failure of Plastic Pipe, Tubing, and Fittings" and withstand 500 psi for a minimum of 1,000 hours tested in accordance with ASTM Standard D1598-02, "Test Method for Time-to-Failure of Plastic Pipe Under Constant Internal Pressure". Fittings 36 through 48-inch shall be manufactured to withstand 535 psi quick burst pressure tested in accordance with ASTM Standard D1599-99, "Test Method for Short-Time Hydraulic Failure of Plastic Pipe, Tubing, and Fittings" and withstand 350 psi for a minimum of 1,000 hours tested in accordance with ASTM Standard D 1598-02, "Test Method for Time-to-Failure of Plastic Pipe Under Constant Internal Pressure".

3. JOINT RESTRAINTS FOR C900 AND C905 PVC PRESSURE PIPE

For restraining C900 and C905 PVC pressure pipe and fittings, refer to Section 2.01.D.3, "Mechanical Joint and Push-on Joint "Megalug®"-type Restraining Systems", elsewhere in this specification..

C. MANHOLE COUPLINGS FOR TYPE PSM SDR-35 PVC SEWER PIPE

1. Manhole couplings for Type PSM SDR-35 PVC sewer pipe shall conform to the requirements specified herein for type PSM SDR-35 PVC sewer fittings and shall be completely coated on the exterior with fine aggregate bonded to the PVC surface.

D. MANHOLE COUPLINGS FOR AWWA C900 and C905, PVC (CI) PIPE

1. Manhole couplings for AWWA C900 and C905 PVC (CI) pipe shall conform to the requirements specified hereinbefore for AWWA C900 and C905, PVC (CI) fittings, and shall be completely coated on the exterior with fine aggregate bonded into/to the PVC surface.

E. ADAPTER COUPLINGS

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1. Adapter couplings shall have adjustable stainless steel shear rings. Insert shall be provided with coupling. Clamps shall be all stainless steel.

F. SMALL DIAMETER PVC PIPE AND FITTINGS (SCHEDULES 40 AND 80)

1. Poly (Vinyl Chloride) (PVC) pipe and fittings specified herein are small diameter PVC with threaded, flanged and solvent cemented joints. All PVC pipe and fittings shall be made from high impact, rigid poly vinyl chloride compounds. Pipe and fittings shall be marked indicating size, type and schedule, ASTM Designation, manufacturer or trade mark, and shall bear the NSF (National Sanitation Foundation) seal of approval. Wherever the abbreviation PVC is used in these Specifications in relation to pipe and fittings, it shall mean poly (vinyl chloride) plastic pipe and fittings as specified herein.
2. PVC pipe shall be Schedule 80 as called for on the Plans or by the Engineer, Type I, Grade I, or Class 12454B with socket ends, and shall comply with ASTM Standard D1785, "Poly (Vinyl Chloride) (PVC) Plastic Pipe, Schedules 40, 80 and 120".
3. Schedule 80 socket-type fittings shall comply with ASTM Standard D2467, "Socket-Type Poly (Vinyl Chloride) (PVC) Plastic Pipe Fittings, Schedule 80" and D2464 "Specification for Threaded Poly (Vinyl Chloride) (PVC) Plastic Pipe Fittings, Schedule 80, for threaded fittings.
4. Joining cement for PVC pipe and fittings shall comply with ASTM Standard D2564, "Solvent Cements for Poly (Vinyl Chloride) (PVC) Plastic Pipe and Fittings". Cemented joints shall be made in accordance with ASTM Standard D2855, "Recommended Practice for Making Solvent-Cemented Joints with Poly (Vinyl Chloride) (PVC) Pipe and Fittings".
5. Flanges: One piece molded hub type flat face flanges, 125 pound standard as specified under fittings hereinbefore.
6. Gaskets: Full faced, 1/8-inch thick, neoprene (for sewer) or SBR (for water).
7. AISI Type 316 stainless steel, ASTM A193, Grade B8M hex bolts and ASTM A194 Grade E8 hex head nuts. Bolts shall be fabricated in accordance with ANSI B 1812 and provided with washers of the same materials as the bolts.

G. CERTIFICATION

1. The Contractor shall provide the City with notarized Certifications, signed by an authorized agent of the manufacturer, that the material was manufactured, sampled, tested, and inspected in accordance with these

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specifications, and has been found to meet the requirements. A report of said test results shall be furnished.

2. No pipe or fitting will be accepted for use in the project until the Certifications have been sub-mitted to and approved by the City.

H. HANDLING AND STORING PVC PIPE AND FITTINGS

1. Pipe and fittings shall at all times be handled with great care to avoid damage. In loading or unloading operations, the manufacturer's unitized package of pipe and/or fittings shall be lifted with a forklift or other suitable equipment in such a manner as to prevent damage. Pipe may be unloaded by individual lengths. However, each length shall be slid or rolled on skidways in such a manner that the pipe is not dropped, and to avoid any shock. Under no circumstances shall pipe and/or fittings be dropped or allowed to roll or slide against obstructions.
2. Pipe and/or fittings having ultraviolet degradation, warpage, impact damage, abrasion damage, or gouges or cuts will not be accepted. Bell ends showing compression set, damage or deformation will not be acceptable.
3. Gaskets, if not prepositioned in the bell ends, shall be stored and shipped in suitable protective containers. Gaskets shall not be exposed to excessive heat, direct sunlight, oil or grease.
4. Pipe and fittings shall be stored in a manner that will prevent warpage or other damage as previously specified.
5. If the pipe and/or fittings are to be stored for any period in excess of six months in direct sunlight the items shall be covered with an opaque material. The cover shall be placed in such a manner that will permit air circulation above and around the items being covered to prevent excessive heat accumulation.
6. Pipe and fittings shall be manually or mechanically lowered into the trench for installation, and shall not be thrown, dropped or pushed in the trench.

3.03 PIPE AND FITTINGS: COPPER

- A. Pipe: Copper pipe shall be Type K for interior piping and Type K Soft Temper for exterior piping, both conforming to ASTM B88, seamless, round, drawn tubing.
- B. Fittings: Solder joint fittings shall be wrought copper and bronze fittings conforming to ANSI B16.22 or cast brass fittings conforming to ANSI Standard B16.18. Fittings for use with copper tubing shall be one of the following:

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1. Cast Bronze Solder-Joint Fittings: Solder joint fittings of this type shall be cast bronze fittings conforming to ANSI B16.18, "Cast Brass Solder-Joint Fittings", and ASTM Standard B62, "Composition Bronze or Ounce Metal Castings", as manufactured by Chase Brass and Copper Co., Stanley G. Flagg & Co., Inc., or approved equal.
 2. Wrought Copper Solder-Joint Fittings: Solder joint fittings of this type shall be wrought copper fittings in accordance with ANSI B16.22, "Wrought Copper and Bronze Solder-Joint Pressure Fittings".
- C. Solder: Solder shall consist of 95 percent tin and 5 percent antimony. Soldering shall be in conformance with Section 3 of the Copper and Brass Research Association Copper Tube Handbook.
- D. Connection of copper pipe or fittings with galvanized pipe or fittings shall be made with dielectric fittings.

3.04 PIPE AND FITTINGS: GALVANIZED STEEL

- A. Steel pipe, except as otherwise specified below, shall be Schedule 40, galvanized, seam-less steel pipe, conforming to ASTM Standard A53, "Pipe, Steel Black and Hot-Dipped, Zinc-Coated Welded and Seamless", Type S, Grade A or B. Black steel pipe may be used in fabricating items which are to be hot-dip galvanized after fabrication.
- B. Screwed fittings, except as otherwise specified, shall be 150 psi galvanized malleable iron. Screwed unions shall be galvanized malleable iron with ground brass seats. Pipe threads shall be American Standard B2.1 NPT. Joint compound shall be used on all threaded joints, applied to the male threads only.
- C. Furnish data certified by the manufacturer that the pipe and fittings are of the material specified. No piping will be accepted or used in construction until certificates have been submitted to and approved by the Engineer of Record.

3.05 PIPE AND FITTINGS: VITRIFIED CLAY

- A. Vitrified clay pipe and fittings for gravity sewers shall be extra-strength, non-perforated. Pipe and fittings shall conform to the latest edition of ASTM Standard C700, "Vitrified Clay Pipe, Extra Strength, Standard Strength, and Perforated", and the following requirements.
- B. A single fracture or crack passing through socket of the pipe bell and exceeding a length of one-half ($\frac{1}{2}$) inch in any direction shall be cause for rejection of the pipe. This requirement supersedes the portion of the ASTM Specifications cited above in conflict herewith.

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- C. The Contractor shall furnish certification from the manufacturer that the pipe and fittings used meet the requirements of ASTM Specifications C700.
- D. The manufacturer shall furnish certification that the pipe and fittings supplied meet the requirements of ASTM Standard C700, latest edition. The Contractor shall be prepared to produce said certification when requested by the City.
- E. Only factory bonded joints will be permitted for all vitrified clay pipe. The joints shall have rubber "O" ring type compression seals conforming to "Standard Specification for Compression Joints for Vitrified Clay Pipe and Fittings", ASTM C425, latest edition.
- F. City approved pipe joints are Polyester Ring-Type joints as manufactured by Logan Clay Products Company under the trade name of "Logan-O-Ring", Can-Tex Industries under the trade name of "Can-O-Lock," or approved equal.
- G. Where cast iron soil pipe or ductile iron pipe laterals are used with vitrified clay mains, the wye or tee shall be vitrified clay. For the joint between the vitrified clay wye or tee and the lateral pipe use FERNCO "Donut" No. 6-10-601 with E.H.C.I. soil pipe and "Donut" No. 6-08-607 with ductile iron laterals, or approved equals. When using E.H.C.I. soil pipe with ductile iron tees or wyes, use transition gasket by Romac or approved equal.

3.06 HIGH DENSITY POLYETHYLENE (HDPE) PIPE

- A. Smooth wall high density polyethylene pipe shall be a Type III, Class C, Category 5, Grade P34; PE 3408; as defined in ASTM D1248. Minimum classification, as given by ASTM D3350, shall be PE 335434C. Pipe shall meet the standards of ASTM F714, as modified herein, including the "Government/Military Procurement" sections. Minimum hydrostatic design basis shall be 1600 psi. In all cases, hydrostatic design basis and pressure rating shall be as determined using the methods of ASTM F714. Pipe of this type shall be butt-fusion welded at joints. All welding of joints shall be in strict conformity with the recommendations of the pipe manufacturer and by a firm or individual recommended to the Engineer of Record in writing by the manufacturer.
- B. As a part of the shop drawing submittals under Section 01300, "Submittals", the Contractor shall furnish the following signed by a Florida Registered Engineer, all calculations to determine, the pipe thickness, SDR rating, allowable stresses, in accordance with ASME B31.8 -1992, Table A842.22 and recommended coating, as required by the pipe manufacturer.

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3.07 HIGH DENSITY POLYETHYLENE (HDPE) FOR USE IN POTABLE WATER SERVICES 2-INCH NOMINAL DIAMETER AND LESS

A. HDPE PIPE FOR WATER SERVICES:

1. All 2-inch high density polyethylene pipe used for services shall be IPS-OD-controlled with Standard Outside Dimension Ratio (SODR) of 9, pressure rating of 200 psi, nominal outside diameter of 2.375-inches, minimum wall thickness of 0.264-inches, PE 3408, all in conformance with ASTM D3035-95 "Polyethylene (PE) Plastic Pipe (DR-PR) Based on Controlled Outside Diameter".
2. Pipe shall conform with ANSI/AWWA C901-96 "Polyethylene (PE) Pressure Pipe and Tubing, ½ In. (13 mm) Through 3 In. (76 mm), for Water Service" as modified herein.
3. Pipe shall have a (natural) inner core with a blue colored outer shell.
4. Pipe shall have footage marks at a maximum interval of every two feet.
5. Polyethylene material shall have a minimum cell classification in accordance with ASTM D3350-00 "Polyethylene Plastics Pipe and Fitting Materials" of 345444D for the core, which shall be 100% virgin material, and 345444E for the outer shell. Note that both of these materials are UV stabilized as signified by the "D" for natural colored and "E" for the colored shell.
6. Pipe shall conform with NSF 61 or 14.
7. Manufacturer shall supply certification of compliance with all of the above requirements. Certification shall ship with the pipe on material sold to the City and shall always be submitted with shop drawings and catalogue cuts. When required by the Director of the Department of Public Utilities or his designee, certification shall be signed and sealed by a professional engineer licensed to practice in the state in which the manufacturer is located or in the State of Florida.

B. HDPE TUBING FOR WATER SERVICES:

1. All 1-inch high density polyethylene tubing used for services shall be CTS-OD-controlled with Standard Outside Dimension Ratio (SODR) of 9, pressure rating of 200 psi, nominal outside diameter of 1.125-inches, minimum wall thickness of 0.125-inches, PE 3408, all in conformance with ASTM D2737-99 "Polyethylene (PE) Plastic Tubing".
2. Tubing shall conform with ANSI/AWWA C901 "Polyethylene (PE) Pressure Pipe and Tubing, ½ In. (13 mm) Through 3 In. (76 mm), for Water Service" as modified herein.

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3. Tubing shall have a (natural) inner core with a blue colored outer shell.
4. Tubing shall have footage marks at a maximum interval of every two feet.
5. Polyethylene material shall have a minimum cell classification in accordance with ASTM D3350-00 "Polyethylene Plastics Pipe and Fitting Materials" of 345444D for the core, which shall be 100% virgin material, and 345444E for the outer shell. Note that both of these materials are UV stabilized as signified by the "D" for natural colored and "E" for the colored shell.
6. Tubing shall conform with NSF 61 or 14.
7. Manufacturer shall supply certification of compliance with all of the above requirements. Certification shall ship with the tubing on material sold to the City and shall always be submitted with shop drawings and catalogue cuts. When required by the Director of the Department of Public Utilities or his designee, certification shall be signed and sealed by a professional engineer licensed to practice in the state in which the manufacturer is located or in the State of Florida.

C. MECHANICAL FITTINGS UTILIZED WITH HDPE PIPE AND TUBING WATER SERVICES

1. Mechanical fittings utilized with HDPE pipe and tubing for water services shall conform with ANSI/AWWA C800, "Underground Service Line Valves and Fittings", as modified here-in.
2. Fittings shall utilize AWWA Standard (Mueller) threads on tapped pipe and tapping saddles
3. Fittings shall be designed and manufactured to withstand a sustained working pressure of 150 psi and to restrain the pipe against pull-out under loading beyond that causing tensile yield in the HDPE pipe or tubing connected.
4. The manufacturer shall supply certification of these capabilities and fittings shall not be accepted or installed without said certification. If fittings are being supplied to the City, the certification shall ship with the fittings and payment will not be made without this certification. At the discretion of the Engineer, this certification may be required to be signed and sealed by a professional engineer licensed to practice in the state where the supplying firm is located or in the State of Florida. His decision in this regard shall be final.
5. In all cases, fittings shall be installed in strict accordance with the manufacturer's instructions.

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3.08 WALL SLEEVES, PIPES AND CASTINGS

- Wall Sleeves: Wall sleeves shall be of cast iron, ductile iron or carbon steel with steel galvanized after fabrication as specified in Section 15000, Piping General, under wall pipe. Sleeves shall be provided with seals and shall be oversized as required for the installation of seals. Sleeves shall terminate flush with finished surfaces of walls and ceilings, and shall extend 2-inches above the finished floor. Escutcheons shall be provided at walls and floor to completely conceal the sleeves smaller than 3-inches. Escutcheons shall be brass or cast iron, nickel plated split-type.
- Interior: Wall sleeves shall be installed for all piping passing through interior walls and floors, except where noted on the Drawings. Sleeves shall be of sufficient size to pass the pipe without binding.
- A. Wall Sleeve Seals: Wall sleeve seals shall be modular mechanical type consisting of interlocking synthetic rubber links shaped to continuously fill the annular space between the pipe and wall sleeve. Links shall be loosely assembled with bolts to form a continuous rubber belt around the pipe with a pressure plate under each bolt head and nut. After the seal assembly is positioned in the sleeve, tightening of the bolts shall cause the rubber sealing elements to expand and provide an absolutely water-tight seal between the pipe and wall sleeve. The synthetic rubber shall be suitable for exposure to treated sewage effluent and groundwater. Bolts, nuts and hardware shall be 18-8 stainless steel. The seals shall be Link Seal as manufactured by Thunderline Corporation or equal, and the wall sleeve and seal shall be sized as recommended by the seal manufacturer.
- B. All piping passing through exterior walls and base slabs shall be provided with wall pipes. All wall pipes shall be of ductile iron and shall have an intermediate flange or waterstop located in the center of the wall. Each wall pipe shall be of the same grade, thickness and interior coating as the piping to which it is joined. Those portions of the wall pipes that are buried shall have a coal tar outside coating.

3.09 STEEL CASING (JACKING AND BORING)

See Section 15070, "Jacking and Boring"

3.10 STEEL PIPE (AERIAL CROSSING)

See Section 15075, "Aerial Crossings"

Part 4 - EXECUTION

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4.01 GENERAL:

- A. The Contractor shall provide all barricades and/or flashing warning lights necessary to warn of the construction throughout the Project.
- B. Pipe and fittings shall at all times be handled with great care to avoid damage. In loading and unloading, they shall be lifted with cranes or hoists or slid or rolled on skidways in such manner as to avoid shock. Under no circumstances shall this material be dropped or allowed to roll or slide against obstructions.
- C. All work shall be performed by skilled workmen experienced in similar installations. All pipe and fittings shall be adequately supported by clamps, brackets, straps, concrete supports, rollers or other devices as shown and/or specified. Supports or hangers shall be spaced so that maximum deflection between supports or hangers shall not exceed 0.050 inch for pipe filled with liquid, but shall not be further than 6 feet apart, whichever is closer, unless otherwise shown. All pipe supports shall be secured to structures by approved inserts or expansion shields and bolts.
- D. All pipe shall be thoroughly cleaned internally before being installed. All pipes, except oxygen service, air and gas, shall be flushed with water and swabbed to assure removal of all foreign matter before installation. Air and gas piping shall be tapped with a hammer to loosen scale or other foreign matter that might be within the pipe, then thoroughly blown with a high pressure air hose. Air shall be from the Contractor's air compressor.
- E. Whenever possible, the pipe will be installed with minimum 48-inches of cover, however, due to the numerous utilities in the area, this burial could change substantially.
- F. At all horizontal or vertical pipe deviation, the Contractor shall install both restrained pipe and thrust blocks. Joints may only be opened to adjust alignment by half of the AWWA or manufacturer's recommended opening (which is smaller).
- G. Pipe Sleeves and Wall Castings: Pipe sleeves and wall castings shall be provided at the locations called for on the Drawings and/or specified herein. These units shall be as detailed and of the material as noted on the Drawings and/or specified herein. They shall be accurately set in the concrete or masonry to the elevations shown. All wall sleeves and castings required in the walls shall be in place when the walls are poured. Ends of all wall castings and wall sleeves shall be of a type consistent with the piping to be connected to them.
- H. Tie Rods: Unless otherwise indicated on the Drawings, the size and number of tie rods for a joint or installation shall be as recommended by the manufacturer's design chart for a working pressure of 150 psi. Tie rods shall be installed as recommended by the manufacturer.

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4.02 EXCAVATION FOR PIPING

- A. The Contractor shall make all excavation necessary for the construction of the pipelines, connections, valves and appurtenances, to the lines and grades shown on the Plans.
- B. The trench shall be excavated at least 6 inches below pipe laying grade as shown on the Plans. All sheeting and shoring shall be installed at the Contractor's expense where it is necessary for pipe installation and property protection or required by the Trench Safety Act. The cost of dewatering any excavation shall be at the Contractor's expense. The disposal of water removed from an excavation shall be in a manner which will not create a hazard, or be detrimental to the public health or to public or private property.
- C. The Contractor shall obtain all necessary permits approving the location and proposed method of disposal before discharging water from any excavation into any portion of the public right-of-way or into any existing drainage structure or facility. All construction signs required shall be provided by the Contractor.

4.03 INSTALLATION OF PIPE, FITTINGS AND VALVES

A. GENERAL:

1. The design Drawings are in some cases diagrammatic. They may not show every bend, off-set, elbow or other fitting which may be required in the piping for installation in the space allotted. Careful coordination of the work of this Section with that of Division 2 and 16 is necessary to avoid conflicts. Install gravity lines at uniform grade to low point after field verification of low point invert.
2. The centerline of the pipe shall not vary by more than 2 inches from the location shown on the Plans and the top of the pipe shall not vary by more than 2 inches from the established grade, except at points where this tolerance must be changed to clear obstructions, or make connections. Deviation from this location will be permitted only upon written instructions from the Engineer.
3. Sandbags may be used to support the pipe in the ditch but no pipe shall be laid on blocks, except by the written permission of the Engineer of Record. The trench shall be dewatered to the extent that all poured lead joints in cast iron pipe and fittings may be made perfectly dry. Flanged joints, mechanical joints and push-on joints in cast iron pipe and fittings may be made under water.

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B. INSTALLATION OF DUCTILE IRON PIPE

1. All bends, tees, and plugs, unless otherwise specified, shall be backed with concrete to undisturbed ground. Provision shall be made to prevent concrete from adhering to plugs or bolts.
2. Bolts, nuts and rubber gaskets for use in flanged and mechanical joints shall be stored under cover. Gaskets shall not be exposed to heat, light or any petroleum products, shall be kept clean and shall not be handled with greasy or dirty hands.
3. Before making up flanged joints in cast iron pipe and fittings, the back of each flange under the bolt heads, and the face of each flange shall have all lumps, blisters and excess bituminous coating removed and shall be wire brushed and wiped clean and dry.
4. Before laying the ductile iron pipe, all lumps, blisters and excess coal-tar coating shall be removed from the bell and spigot ends of each pipe and the outside of the spigot and the inside of the bell wire brushed and wiped clean and dry. The entire gasket groove area shall be free of bumps or any foreign matter which might displace the gasket. The cleaned spigot and gasket shall not be allowed to touch the trench walls or trench bottom at any time. Vegetable soap lubricant shall be applied in accordance with the pipe manufacturer's recommendations, to aid in making the joint. The workmen shall exercise caution to prevent damage to the gasket or the adherence of grease or particles of sand or dirt. Deflections shall be made only after the joint has been assembled.
5. Cutting of ductile iron pipe for inserting valves, fittings, etc., shall be done by the Contractor with a mechanical pipe saw in a neat and workmanlike manner without damage to the pipe, the lining, or the coating.
6. Unless otherwise directed, ductile iron pipe shall be laid with the bell ends facing in the direction of laying; and for lines on an appreciable slope, the bells shall, at the discretion of the Engineer, face upgrade.
7. Push-on and mechanical joints in ductile iron pipe and fittings shall be made in accordance with the manufacturer's standards except as otherwise specified herein. Joints between push-on and mechanical joint pipe and/or fittings shall be made in accordance with AWWA Standard Specification C600, "Installation of Ductile Iron Water Mains and their Appurtenances, except that deflection at joints shall not exceed one-half of the manufacturer's recommended allowable deflection, or one-half of the allowable deflection specified in AWWA C600, whichever is the lesser amount.
8. Flanged joints shall be used only where indicated on the Plans. Before making up flanged joints in the pipeline, the back of each flange under the

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bolt heads and the face of each flange shall have all lumps, blisters and excess bituminous coating re-moved and shall be wire brushed and wiped clean and dry. Flange faces shall be kept clean and dry when making up the joint, and the workmen shall exercise caution to prevent damage to the gasket or the adherence of grease or particles of sand or dirt. Bolts and nuts shall be tightened by opposites in order to keep flange faces square with each other, and to insure that bolt stresses are evenly distributed.

9. Bolts and nuts in flanged and mechanical joints shall be tightened in accordance with the recommendations of the pipe manufacturer for a leak-free joint. The workmen shall exercise caution to prevent overstress. Torque wrenches shall be used until, in the opinion of the Engineer, the workmen have become accustomed to the proper amount of pressure to apply on standard wrenches.

C. INSTALLATION OF PVC PIPE:

1. In the installation of glue joint PVC pipe, the pipe shall first be cut square and smooth. Wipe all surfaces to be connected with a cloth moistened with an appropriate solvent and remove any foreign matter from socket of fitting. Using an ordinary paint brush of width about equal to the nominal pipe size, apply a generous coat of cement to inside and shoulder of socket, flowing on but not brushing out. A similar coat shall then be applied to the end of the pipe for at least the same distance on the pipe as the depth of socket, and to the cut end. Pipe and fittings shall then be pressed firmly together and the pipe turned a quarter to a half turn to evenly distribute the cement. The cementing and joining operation must not exceed one minute. Allow 24 hours setup time before applying pressure. Sand shall be used as backfill material around pipe installed underground.
2. Thread Sealant: Teflon tape.
3. All rigid PVC pipe shall be cut, made up, and installed in accordance with the pipe manufacturer's recommendations. Plastic pipe shall be laid by snaking the pipe from one side of the trench to the other. Offset shall be as recommended by the manufacturer for the maximum temperature variation between time of solvent welding and during operation.
4. Schedule 80 pipe shall not be threaded. Use Schedule 80 threaded nipple where necessary to connect to threaded valve or fitting.
5. Only strap wrenches shall be used for tightening threaded plastic joints, and care shall be taken not to over tighten these fittings.
6. Provide adequate ventilation when working with pipe joint solvent cement.

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7. Testing: All lines shall be hydrostatically tested at the pressures specified elsewhere herein or at the design pressures.
8. Supports and Hangers: In accordance with the manufacturer's recommendations.

D. INSTALLATION OF COPPER PIPE:

1. Tubing above ground shall, whenever possible, be run in full lengths between fittings, valves and connections, and joints shall be kept to a minimum.
2. All connections shall be made without sharp bends or kinks in the tubing.
3. Above ground tubing shall be supported at short intervals to prevent sagging and vibration.
4. All copper pipe shall be reamed to full diameter before joining. The ends of pipe and the inside of fittings shall be cleaned and flux applied to the entire area of pipe to be soldered.

E. JOINT PIPE:

1. Threaded Pipe: Ream all pipe after cutting and before threading. Use non-hardening pipe compound "Tite-Seal" (or approved equal) on male threads only.
2. Provide nipples of same material and weight as pipe used. Provide extra strong nipples when length of unthreaded part of nipple is less than 1-1/2".
3. Provide reducing fittings rather than bushings where changes in pipe sizes occur.
4. Provide dielectric unions or flanges between copper and steel piping and between brassware and steel. Do not use steel and copper piping in the same system without such isolation.

F. UNIONS:

Provide unions or flanges in all domestic water service lines at each piece of equipment, specialty valves or at other locations required for ready disconnect.

G. PIPE PROTECTION:

1. Paint all uninsulated metal (ductile iron or steel) piping underground with two coats of asphaltic paint.
2. Wrap soil pipe that touches metal or is exposed to masonry with a layer of 6 mil polyethylene.

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3. Spirally-wrap all pipe lines embedded in concrete with two layers of 30 lb. felt.
4. Coat all exposed threads on galvanized steel pipe after assembly with two coats of zinc chromate.

H. CLEANING AND TESTING:

All of the piping installed under this project shall be tested as follows and as directed by the Engineer:

1. With exceptions as noted below, all ductile iron piping installed under this Contract shall be cleaned and tested according to Section 15995, "Pipeline Testing and Disinfection", and as modified below:
 - (a) Only potable water piping shall be disinfected.
 - (b) No leakage shall be permitted for any flanged-joint, or above ground piping.
2. Unless otherwise specified elsewhere herein, all PVC pressure system bushings and galvanized steel piping shall be tested at 150 psig. No leakage will be permitted.

I. INSTALLATION OF ABOVEGROUND AND EXPOSED PIPING:

1. Aboveground and exposed pipe fittings, valves and accessories shall be installed as shown or indicated on the Drawings.
2. Piping shall be cut accurately to measurements established at the job site and shall be worked into place without springing or forcing, properly clearing all equipment access areas and openings. Changes in sizes shall be made with appropriate reducing fittings rather than bushings. Pipe connections shall be made in accordance with the details shown and manufacturer's recommendations. Open ends of pipe lines shall be properly capped or plugged during installation to keep dirt and other foreign material out of the system. Pipe supports and hangers shall be provided where indicated and as required to insure adequate support of the piping.
3. Welded connections shall be made in conformity with the requirements of AWWA Standard C 206 and shall be done only by qualified welders. The Engineer may, at his option, require certificates that welders employed on the work are qualified in conformity with the requirements of this standard and/or sample welds to verify the qualifications of the welders. Before

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testing, field-welded joints shall be coated with the same material used to coat the pipe in accordance with the requirements of AWWA.

4. Flanged joints shall be made up by installing the gasket between the flanges. The threads of the bolts and the faces of the gaskets shall be coated with a suitable lubricant immediately before installation.
5. Joints using Dresser couplings shall be made up as recommended by the manufacturer.
6. Use of perforated band iron (plumber's strap), wire or chain as pipe hangers will not be acceptable. Supports for pipe less than 1-1/2 inches nominal size shall not be more than 8-feet on centers and pipe 2-inches nominal size and larger shall be supported at not more than 10 feet on centers, unless otherwise indicated. Supports for PVC pipe shall be spaced one-half the distance specified above unless otherwise indicated. Any noticeable sagging shall be corrected by the addition of extra supports at the Contractor's expense.

J. INSTALLATION OF HDPE SERVICES

All HDPE services require the use of a 10-gauge stranded copper blue tracer wire.

4.04 FIELD QUALITY CONTROL

- A. All water mains shall be flushed to remove all sand, debris, rock and other foreign matter. Dispose of the flushing water without causing a nuisance or property damage.
- B. Pressure and leakage testing shall follow the requirements of Section 15995, "Pipeline Testing and Disinfection".
 1. Where infiltration or exfiltration exceeds the allowable limits specified herein, the defective pipe, joints, or other faulty construction shall be located and repaired by the Contractor at no additional cost or time impact to the Contract.
 2. The Contractor shall provide all labor, equipment and materials, and shall conduct all testing required under the direction of the Engineer of Record. No separate payment will be made for this work and the cost for this work shall be included in the prices quoted in the Proposal.
 3. The Contractor shall locate and repair all leaks until the leakage is reduced to the limits specified. Any observed leaks or obviously defective joints or pipes shall be repaired or replaced as directed by the Engineer of Record, even though the total leakage is below that specified above.

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- END OF SECTION -

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PIPE SUPPORT

1.03 REFERENCES:

- A. American Institute of Steel Construction (AISC) Manual of Steel Construction.
- B. American Society for Testing and Materials (ASTM) Publications:
 - 1. A36: Specification for Structural Steel.
 - 2. A500: Cold formed welded and seamless carbon steel structural tubing.
 - 3. E165: Practice for Liquid Penetrant Inspection Method.
 - 4. E709: Practice for Magnetic Particle Examination.
 - 5. A307: Specification for Carbon Steel Bolts and studs, 60,000 psi Tensile.
 - 6. A3 12: Seamless and welded austenitic stainless steel pipe.
 - 7. A572: Specification for Steel Plate.
- C. American National Standards Institute (ANSI):
 - 1. ASME/ANSI B3 1.1: Power Piping Code.
- D. American Welding Society (AWS) Code: 1. Structural Welding Code D1. 1.
- E. Manufacturers' Standardization Society (MSS):
 - 1. MSS SP-58: Pipe Hangers and Supports - Materials and Design.
 - (a) MSS SP-69: Pipe Hangers and Supports - Selection and Application.
 - (b) MSS SP-89: Pipe Hangers and Supports - Fabrication and Installation Practices.
 - (c) MSS SP-90: Guidelines on Terminology for Pipe Hangers and Supports
- F. National Association of Expansion Joint Manufacturers: Standards of the Expansion Joint Manufacturers Association, Inc.
- G. OSHA 1.04 SEISMIC DESIGN REQUIREMENTS:
- H. It shall be the responsibility of the Contractor to conform to the seismic design requirements for this project and for the work of this specification section.
- I. Provide all pipe supports designed in accordance with the seismic requirements indicated and specified.
- J. Additionally, provide with the Certificate Design, certification signed by a registered structural engineer stating that computations were performed and that all components have been sized for the seismic forces specified and indicated.

1.04 SUBMITTALS:

- A. Shop Drawings: Submit the following in accordance with Section 01300 – Submittals:

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1. Pipe support drawings specified in paragraph 1.01 and including data for accessory items for acceptance prior to fabrication. The Contractor shall submit pipe support coordination drawings including all piping and pipe supports for all trades.
 - (a) Detailed drawing of the device with dimensions.
 - (b) A table of applied forces and moments.
 - (c) A complete bill of materials.
 - (d) A unique identification and revision level.
 - (e) Stamp of a Registered Professional Engineer, registered in the state where this project is being constructed, experienced in pipe support design and pipe stress analysis as specified in paragraph. 1.06 E.
 - (f) Detailed connections to existing structure.
 - (g) Indicate all welds, both shop and field, by Standard Units of Measurement as specified in AWS D1.1-1.7.
 2. Welding Procedure: Submit description as required to illustrate each welding procedure to be performed in the specified work.
 3. Welding Equipment: Submit descriptive data for welding equipment, including type, voltage and amperage.
 4. Qualification for Welders: Provide certification that welders to be employed in work have satisfactorily passed AWS or ASME qualification tests. If recertification of welders is required, retesting is the Contractor's responsibility at no additional cost to the Owner.
- B. Pipe support manufacturers' qualifications as specified in paragraph 1.06.E.
- (a) List of at least five (5) successful pipe support projects and current addresses and telephone numbers of persons in charge of representing the owner or the owner of those construction projects during the time of pipe support design, fabrication and installation.
 - (b) Qualification of manufacturers' Registered Professional Engineer, registered in the state where this project is being constructed, who stamps and seals shop drawings and designs.
- C. Coordination drawings for pipe supports shall include as a minimum the following information.
- (a) These coordination drawings will be used by the Contractor to ensure that the pipe supports do not obstruct access, access for equipment operation or removal including all mechanical and electrical equipment, panels, valves, gauges, and instrumentation.

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- (b) The Contractor shall be responsible for including and coordinating the work of all subcontractors into the coordination drawings.
 - (c) Prepare reproducible coordination drawings, indicating equipment, piping, valves, expansion joints, ductwork, conduit, cable trays, junction boxes, lighting fixtures, sleeves, inserts, embedments, supports, hangers and appurtenances at not less than 1/4 inch scale. Drawings shall show beams, columns, ceiling heights, wall, floors, partitions and structural features as indicated on the contract drawings. Individual pipes and conduit 2-in. or less in diameter that will be field routed need not be shown on coordination drawings.
 - (d) Coordination drawings shall include large-scale details as well as cross and longitudinal sections as required to fully delineate all conditions. Particular attention shall be given to the location, size, and clearance dimensions of equipment items, shafts, operators and necessary maintenance access.
 - (e) Make all minor changes in duct, pipe or conduit routings that do not affect the intended function, but items may not be resized or exposed items relocated without the approval of the Owner. No changes shall be made in any wall locations, ceiling heights, door swings or locations, window or other openings or other features affecting the function or aesthetic effect of the building. If conflicts or interferences cannot be resolved, the Owner shall be notified. Any problems of coordination that require architectural or structural changes of design shall be submitted to the Owner for resolution.
 - (f) After the reproducible drawings have been coordinated and all changes have been made, the drawings shall be signed by the Contractor and all subcontractors indicating that all work on that drawing has been coordinated with all associated vendors and subcontractors and all conflicts have been resolved.
 - (g) Relocation of any duct, pipe, conduit or other material that has been installed without proper coordination among all trades shall be performed at no additional cost to the Owner.
- D. Written notification of any deviations from the requirements of this specification.
- E. Support documentation and justification as specified.
- F. Certificates of Design signed by a Registered Professional Engineer for all pipe supports. See Section 01300 for form.

1.05 QUALITY ASSURANCE

- A. Provide in accordance with Section 01400 and as specified herein.

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- B. Pipe supports: All supports and parts shall conform to the latest requirements of the Code for Pressure Piping ASME/ANSI B3 1.1 and Manufactures Standardization Society (MSS) Standard Practice SP-58, SP-69, SP-89 and SP-90 except as supplemented or modified by the requirements of this specification.
- C. Structural Concrete: Conform to the requirements of Section 03300, "Cast-in-place Concrete, Reinforcing and Formwork". Concrete strength: 4,000 PSI unless noted otherwise.
- D. Conform to the requirements of the latest edition of the AISC Manual of Steel Construction for miscellaneous and supplementary steel. Tube steels are ASTM A500 Grade B, structural shapes A36, plates A-572 or equal. Stainless steel structural members shall conform to ASTM requirement Type 31 6L.
- E. Pipe Support Manufacturer Qualifications:
 - 1. Must possess a written quality assurance program.
 - 2. Have a minimum of 5 years experience in the design and fabrication of pipe supports.
 - 3. Have completed the design and fabrication of at least 5 successful pipe support projects of equal size, complexity, and systems as this project within the past 10 years.
 - 4. Retains the services of a Registered Professional Engineer, registered in the state where this project is being constructed, with a minimum of ten years experience in the design of piping systems and pipe supports.
 - 5. Manufacturers' Standardization Society (MSS) Member.
 - 6. Have a field service technician on staff with at least 5 years experience in resolving field installation, interference and interface problems associated with the design, installation and manufacture of pipe supporting components.
 - 7. Hanger inspections shall be performed in accordance with MSS-SP-89 and ASME B3 1.1.

1.06 DELIVERY, STORAGE, AND HANDLING:

- A. Materials shall be stored as to ensure the preservation of their quality and fitness for the work. When considered necessary they shall be placed on wooden platforms or other hard, clean surfaces, and not on the ground.
- B. Shipping:
 - 1. Ship equipment, material and spare parts complete except where partial disassembly is required by transportation regulations or for protection of components.

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C. Receiving:

1. Inspection and inventory items upon delivery to site.
2. Store and safeguard material in accordance with manufacturers' written instructions.

1.07 SPECIAL REQUIREMENTS

A. Refer to applicable specification sections of Division 1 and provide the following.

1. Foundations, Installations and Grouting.
2. Bolts, Anchor Bolts, and Nuts.
3. Sleeves and inserts.
4. Protection against electrolysis.

Part 2 - PRODUCTS

2.01 MANUFACTURERS:

- A. Carpenter & Paterson.
- B. Grinnell Corporation.
- C. Basic Engineers Inc.
- D. Or acceptable equivalent

2.02 MATERIALS:

- A. Provide materials used in pipe supports, which are compatible with the pipes to which they are attached. Provide Type 31 6L stainless steel supports for all stainless steel piping. Copper plated pipe supports are not acceptable.
- B. Allowable materials: As indicated in ANSI B31.1 Appendix A and MSS-SP-58 Table 2.
- C. Provide Type 31 6L stainless steel for pipe supports, hangers, guides, restraints, and anchors that are exterior or interior submerged, in potentially wetted areas in wet wells, channels, screening and grit removal areas and in chemically corrosive atmospheres.
- D. Provide only new material. Previously used and/or scrap material is not acceptable.
- E. Provide tube steels that are ASTM A500 Grade B, Structural shapes A-36, plates A-572 or equal.
- F. Provide sliding Teflon plates as required. The sliding surfaces shall be a nominal 3/8 in. glass filled Teflon bonded to stainless steel backup plate with a 10 gauge minimum thickness. The bearing pad upper and lower units shall be as follows:

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Conslide Type CSA elements as manufactured by Con-Serv. Inc., Balco TFE Slide Bearing Plates 10N-CS as manufactured by Balco Inc., or Dynalon Slide Bearings as manufactured by JVI, Inc. or acceptable equivalent product.

1. The blended TFE material used for this bearing shall be composed of virgin (unreprocessed) TFE resin tested per ASTM D1457 and reinforcing agents milled glass fibers. This structural material shall have the following representative mechanical and physical properties:
2. Tensile strength - 2,000. psi
3. Elongation - 225%
4. Specific Gravity - 2.17 to 2.22
5. The coefficient of friction shall average 0.06 under compressive load of 2,000 psi.
6. The compressive creep shall be a minimum of 2% at 2,000 psi and 70 degrees F.
7. The elements shall be flat, clean and prepared for installation in the structure. Slots and holes shall be fabricated in the bearing manufacturer's plant.
8. Concrete anchor bolts - Hilti Kwik-Bolt II Stud Anchors, Rawl Bolt, Phillips Wedge Anchors, or equal.

2.03 DESIGN, LOCATION, AND TYPE OF PIPE SUPPORTS

- A. Design and provide pipe supports for piping 1/2 in. and larger to include the following loads:
 1. Gravity Force: This force includes the weight of pipe, pipe contents (hydro load as required), valves, in-line equipment, insulation and any other weight imposed on the piping and/or pipe support.
 2. Thermal Expansion Force: This force is developed by the restraint of free end displacement of the piping due to thermal growth.
 3. Hydrostatic/Dynamic Forces: These forces are developed due to the internal pressure (positive and negative) during operation of the piping system. These forces include the forces due to water hammer, pressure pulses due to rapid valve closure, fluid discharge resulting from pump startup, operation of positive displacement pumps, etc.
 4. Wind Loadings: Wind loadings.
- B. Provide supports, guides, anchors, flexible couplings and expansion joints in accordance with the coupling and joint manufacturers' specifications and requirements.

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- C. For all pump suction and discharge nozzles provide an anchor located between the pump nozzles and the nearest expansion joint or non-rigid coupling.
- D. Where possible, provide pipe supports, which are the manufacturers' standard products.
 - 1. Provide pipe supports with individual means of adjustment for alignment.
 - 2. Provide pipe supports complete with appurtenances including locking and adjusting nuts.
 - 3. Hanger rods shall be subjected to tension only.
 - 4. Where lateral or axial pipe movement occurs, provide hangers for the necessary swing without exceeding 4 degrees. Provide base supports designed using pipe slides. The bearing surfaces: 0.06 coefficient of friction or less.
 - 5. Provide concrete inserts capable of supporting the design loads.
 - 6. Metal framing systems will be acceptable to support piping 2 in. and smaller.
 - 7. Provide insulated piping supported using rigid load bearing insulation (baton board type) with 16 gauge shields to fit between the insulation and the support. Shields to encompass a minimum 1/3 of the pipe circumference and be 12 in. in length.
 - 8. Provide load-bearing insulation capable of supporting the load, as a minimum on the bottom 60 degrees of the pipe support. Cope insulation and adjust to avoid interference of steel structures.
 - 9. Provide supplementary steel as needed.
 - 10. Do not support pipes from other pipe, conduits or metal stairs.
 - 11. Chain, strap, T-bar, perforated bar and/or wire hangers are not acceptable.
 - 12. Contact between piping and dissimilar metals such as hangers, building structural work or equipment subject to galvanic action is not acceptable.
 - 13. All pipe supports located in fluid flow shall be supplied with double nutting.
- E. Provide thrust anchors to resist thrust where required. Wall pipes may be used as thrust anchors if so designed. Welded attachments shall be of material comparable to that of the piping and designed in accordance with governing codes.
- F. Provide expansion joints where indicated and where required based on Contractor's design of the pipe support system. Indicate expansion joints on submittal drawings.
- G. Pipe supports connected to structural framing and slabs are subject to the following limitations:
 - 1. Less than 100 lb horizontal load per support.
 - 2. Vertical loads not to exceed a maximum load per hanger of 1000 lbs.

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3. For a maximum of one pipe support per foot of slab width perpendicular to the span.
- H. All outside above ground supports shall be Type 31 6L stainless steel as specified in paragraph 2.02(C).
- I. Provide pipe supports that do not overload or over stress the piping, equipment, or structure that they are supporting or to which they are attached. Allowable pipe stress to be within ANSI B3 1.1 code allowable.
- J. The Contractor shall provide the services of a field service technician (preferably from the pipe support manufacturer) to field coordinate the locations of supports and resolve interferences and conflicts encountered during installation.

2.04 FABRICATION:

- A. Provide pipe supports formed in accordance with paragraph 5.1 of MSS-SP-58.
- B. Providing welding in accordance with Structural Welding Code.
- C. Provide dimensional tolerances as specified in MSS-SP-89.
- D. Provide threading and tapping in accordance with MSS-SP-89.

2.05 SHOP PAINTING

- A. Primer and Finish Paint: Shop apply to all exterior ferrous surfaces, minimum of two (2) coats of manufacturers standard high solids epoxy paint (min. 60% solids).
 1. Color: As specified for piping system of same service or as selected by the Engineer.
 2. Provide similar additional paint for touch-up after installation.
- B. Surface preparation, mixing and application and safety requirements shall be in accordance with the paint manufacturer's printed instructions.
- C. Ferrous surfaces which are not to be painted shall be given a shop applied coat of grease or rust resistant coating.

Part 3 - EXECUTION

3.01 GENERAL

- A. Install items in accordance with manufacturers' printed instructions and as indicated and specified herein.
- B. Perform welding in accordance with Structural Welding Code:

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1. Visually inspect welding while the operators are making the welds and again after the work is completed in accordance with AWS D1. 1 Section 6.0. After the welding is completed, hand or power wire brush welds, and clean them before the Qualified Inspector makes the check inspection. The Qualified Inspector shall inspect welds with magnifiers under light for surface cracking, porosity, and slag inclusions; excessive roughness; unfilled craters; gas pockets; undercuts; overlaps; size and insufficient throat and concavity. The Qualified Inspector shall inspect the preparation of groove welds for throat opening and for snug positioning for back-up bars.
 2. Nondestructive evaluation of welds connecting structural steel members subjected to critical stresses: Perform in accordance with the weld quality and standards of acceptance in AWS D1.1.
 3. Magnetic Particle Inspection: Perform in accordance with ASTM E 709.
 4. Liquid Penetrant Inspection: Perform in accordance with ASTM E 165.
 5. For weld areas containing defects exceeding the standards of acceptance in accordance with AWS D1.1, Section 3.7. Provide additional testing of the repaired area at no additional cost to the Owner.
 6. Test Locations: As selected by the Owner.
 7. Correct any deficiencies detected as directed by the Engineer at no additional cost to the Owner.
- C. Proceed with the installation of the pipe supports only after required building structural work has been completed and concrete support structure has reached its 28-day compressive strength as specified in Section 03300, "Cast-in-place Concrete, Reinforcing and Formwork".
- D. Install pipe supports to comply with MSS-SP-89. Group parallel runs of horizontal piping to be supported together on trapeze type hangers. Install pipe supports to provide indicated pipe slopes. Do not exceed maximum pipe deflection allowed by ANSI B3 1.1.
- E. For exposed continuous pipe runs, install pipe supports of same type and style as installed for adjacent similar piping.
- F. Install pipe supports to allow controlled movement of piping systems. Permit freedom of movement between pipe anchors, and facilitate action of expansion joints, expansion loops, expansion bends, and similar units.
- G. Piping to be free to move when it expands or contracts except where fixed anchors are indicated or as required by the Contractor's pipe support systems. Where hanger rod swing length cannot be provided or where pipe movement based on expansion of 1 in/ 100 ft, for each 100 deg. F change in temperature exceed 1/2 in., provide sliding supports.

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- H. Prevent contact between dissimilar metals. Where concrete or metal support is used, place 1/8 in. thick Teflon, neoprene rubber, or plastic strip under piping at point of bearing. Cut to fit entire area of contact between pipe and pipe support.
- I. Prevent electrolysis in support of copper tubing by use of pipe supports which are plastic coated. Electrician's tape is not an acceptable isolation method.
- J. Apply an anti-seize compound to nuts and bolts on all pipe supports.
- K. Locate reinforcing steel in concrete structure with x-ray prior to drilling for embedment plates and anchor bolts. Avoid contact or interference with reinforcing steel.

3.02 INSTALLATION OF BUILDING ATTACHMENTS

- A. Support piping from structural framing, unless otherwise indicated.
- B. Concrete Inserts:
 - 1. Use existing embedded concrete items whenever possible.
 - 2. Use expansion anchors only when existing embedded attachment points are not available or unsuitable. Attach to hardened concrete or completed masonry.

3.03 THRUST ANCHORS AND GUIDES:

- A. Thrust Anchors:
 - 1. Center thrust anchors between expansion joints and between elbows and expansion joints for suspended piping. Anchors must hold pipe rigid to force expansion and contraction movement to take place at expansion joints and/or elbows and to preclude separation of joints.
 - 2. Restraining rod size and number shall be as indicated and adhere to manufacturers recommendations as a minimum.
- B. Pipe guides: Provide adjacent to sliding expansion joints in accordance with recommendations of the National Association of Expansion Joint Manufacturers and the specific joint manufacturer.

3.04 PIPE SUPPORTS:

- A. Where piping of various sizes is to be supported together, space supports for the largest pipe size and install intermediate supports for smaller diameter pipes.
- B. Provide minimum of two pipe supports for each pipe piece unless approved by Engineer.

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- C. Where pipe connects to equipment, support pipe independently from the equipment. Do not use equipment to support piping.
- D. Provide pipe supports so that there is no interference with maintenance or removal of equipment.
- E. Unless otherwise indicated or authorized by the Engineer, place piping running parallel to walls approximately 1-1/2 in. out from face of wall and at least 3 in. below ceiling.
- F. Pedestal pipe supports: adjustable with stanchion, saddle, and anchoring flange. Provide grout between base plate and floor.
- G. Piping supports for vertical piping passing through floor sleeves: use hot dipped galvanized steel riser clamps.
- H. Support piping to prevent strain on valves, fittings, and equipment. Provide pipe supports at changes in direction or elevation, adjacent to flexible couplings, adjacent to non-rigid joints, and where otherwise indicated. Do not install pipe supports in equipment access areas or bridge crane runs.
- I. Stacked horizontal runs of piping along walls may be supported by metal framing system attached to concrete insert channels.
- J. Do not support piping from other piping.
- K. Designs generally accepted as exemplifying good engineering practice, using stock or production parts, shall be utilized whenever possible.
- L. Whenever possible, pipe attachments for horizontal piping shall be pipe clamps.
- M. All rigid rod hangers shall provide a means of vertical adjustment after erection.
- N. Where the piping system is subjected to shock loads, such as disturbances due to pump discharge or thrust due to actuation of safety valves, hanger design shall include provisions for rigid restraints or shock absorbing devices.
- O. Hanger rods shall be subject to tensile loading only. At hanger locations where lateral or axial movement is anticipated suitable linkage shall be provided to permit rod swing.
- P. Hanger spacing shall not exceed the spacing listed below:
 - 1. In the case of concentrated loads the supports shall be placed as close as possible to the load to reduce the bending stress.
 - 2. Where changes in direction of the piping system occur between supports, the total length between supports shall be kept to less than three-fourths of the full span. When practical, a support shall be placed immediately adjacent to any change in direction of the piping system.
- Q. Where practical, riser piping shall be supported independently of the connected horizontal piping. Pipe support attachments to the riser piping shall be riser clamp shear lugs. Welded attachments shall be of material comparable to that of the piping, and designed in accordance with governing codes. If friction is

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relied upon to support riser piping proper justification and documentation shall be submitted to ensure that enough friction force is provided to resist the applied loading.

- R. Hanger components shall not be used for purposes other than for which they were designed. They shall not be used for rigging and erection purposes.
- S. All threads shall be UNC unless otherwise specified.
- T. TFE slide bearing plates with steel backup plates shall be stitch weld attachments to the structure. A 1/8 in. fillet weld, 1/2 in. long every 3 inches on center each side of an element shall be used unless otherwise indicated or specified by the manufacturers' written recommendations. Bearing elements with slots or holes shall be stitch welded in place for location. The TFE surfaces of the bearings shall be maintained clean and free from grit, dirt or grease.

3.05 INSULATED PIPING

- A. Attach clamps, including spacers (if any), to piping with clamps projecting through insulation; do not exceed allowable pipe stresses.
- B. Where vapor barriers are indicated on water piping, install coated protective shields.

3.06 FIELD PAINTING

- A. Pipe supports and accessories painted in accordance with Section 09940 – Painting.

3.07 CONTRACT CLOSEOUT

- A. Provide in accordance with Section 01700.

- END OF SECTION -

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PIPING AND FITTINGS

Part 1 - GENERAL

1.01 SCOPE

- A. The work included in this section consists of furnishing all material, equipment and labor, and performing all operations necessary for the complete installation of all piping, fittings and accessories within the limits of work, as shown on the drawings and specified herein.
- B. Where references are made to other standards or codes, unless specific date references are indicated the latest edition of said standard or code shall govern.

1.02 WORK NOT INCLUDED UNDER THIS SECTION

- A. Piping installation for various types of piping systems is specified within various other sections herein. Installations specified in this section are supplementary to those sections and in the case of conflict the more stringent condition shall prevail.

1.03 RELATED SECTIONS

- A. Section 01300 - Submittals
- B. Section 15000 – Piping General
- C. Section 15001 – Service and Miscellaneous Fittings
- D. Section 15070 - Jacking and Boring
- E. Section 15075 - Aerial Crossings
- F. Section 15995 - Pipeline Testing and Disinfection
- G. All sections specifying various types of valves.

1.04 PIPING LAYOUT

Field-verify dimensions prior to preparation of layout and shop drawings. Obtain shop drawing approval prior to fabrication of piping. All items not specifically mentioned in the Specifications or noted on the approved Plans, but which are obviously necessary to make a complete working installation shall be included.

1.05 DELIVERY, STORAGE AND HANDLING

- A. During shipping, delivery and installation of pipe and accessories, handle in a manner as to ensure a sound undamaged condition.
- B. Exercise particular care not to injure pipe coatings.

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Part 3 - PRODUCTS

3.01 PIPE AND FITTINGS: DUCTILE IRON

A. GENERAL

1. In accordance with the "Reduction of Lead in Drinking Water Act" (Act) enacted by the USEPA on January 4, 2011, effective January 4, 2014 all piping, fittings, fixtures, valves, and other appurtenances used in potable water supply and distribution systems shall be "lead free" as defined in Section 1417(d) of the Safe Drinking Water Act (SDWA). All requirements of the Act as it relates to the products under this section shall be strictly adhered to.
2. As used herein, "ANSI" denotes the American National Standards Institute, "AWWA" denotes the American Water Works Association, and "ASTM" denotes the American Society for Testing and Materials.
3. All pipe and fittings to be furnished hereunder shall be manufactured in the United States, and shall conform to the referenced ANSI and/or AWWA Standard as modified herein, as appearing in the following sections.
4. All markings required on pipe and fittings, shall be clearly legible and located such that they will not be hidden or destroyed when assembled into the intended system.

B. PIPE

1. All pipe shall be ductile iron pipe conforming to ANSI/AWWA Standard C151/A21.51, "Ductile-Iron Pipe, Centrifugally Cast, for Water". All pipe and fittings for water applications shall be in full compliance with ANSI/NSF 61, "Drinking Water System Components-Health Effects". Manufacturers shall maintain their NSF certification for the duration of the Contract and any extensions thereof.
2. Wall Thickness:
 - (a) Buried push-on, mechanical, and restrained joint pipe shall have a wall thickness class in accordance with ANSI A21 .51 equal to or greater than classes indicated below

<u>Buried Pipe Size</u>	<u>Class</u>
4" - 12"	52
14" - 54"	52
60" - 64"	Pressure Class 150

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3. All flanged, grooved pipe shall have a wall thickness class in accordance ANSI A21.15 (AWWA C115) and be rated at 250 psi working pressure. The nominal thickness of pipe 6-inch and larger shall not be less than those shown in Table 15.1 of ANSI C115. The nominal thickness of 4-inch pipe shall be ANSI C151 Class 54.
4. For restrained joint pipe, the thickness of the pipe barrel remaining after grooves are cut, if required in the design of restrained end joints, shall not be less than the nominal wall thickness of equal sized non-restrained joint pipe as shown above.
5. Each piece of pipe shall be marked as required in Subsection 4.7 of AWWA C151-02. Letters and numerals on pipe sizes 12-inch and smaller shall be not less than 3/8-inch.
6. The Department of Public Utilities absolutely reserves the right to require the use of higher thickness or pressure class pipe in applications where in the opinion of the Engineer (i.e., the Director of the Department of Public Utilities or his representative) such use is in the best interest of the City. The Engineer's decision in this regard shall be final.
7. A sufficient quantity of non-toxic vegetable soap lubricant shall be supplied with each shipment of pipe. The soap lubricant shall be suitable for use in subaqueous trench conditions.
8. For flanged ductile-iron pipe with integrally cast flanges or threaded flanges, the nominal wall thickness of the pipe barrel shall be as specified in Section D, "Joints and Accessories", under "Flanged Joints", herein below.
9. The single gasket push-on pipe shall be shipped in standard 18-foot or 20-foot lengths, but not both. The restrained single-gasket push-on joint pipe shall be shipped in standard 18 or 20-foot lengths as specified above or fabricated lengths as noted in each order. At least two lengths of each size of single gasket push-on pipe furnished under each order shall be tested with circumferential gauges to insure that the pipe may be cut at any point along its length and have an outside diameter which will be within the manufacturer's standard design dimensions and tolerances for plain pipe. These lengths shall be identified with an easily distinguished, painted marking, longitudinally along the full length of the pipe.

C. FITTINGS

1. Fittings Conforming with ANSI/AWWA C110/A21.10-12 (Water & Sewer Use) - Restrained push-on joint fittings shall be cast ductile iron for use with ductile-iron pipe as specified above. Standard mechanical joint, push-on joint and flanged joint fittings shall also be ductile iron for use with

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ductile iron pipe as specified above. Cast ductile iron fittings in the 3-inch through 24-inch size range shall be pressure rated at 350 psi, minimum; (except flange-joint fittings shall be rated at 250 psi, minimum); and in the 30-inch through 48-inch size range shall be pressure rated at 250 psi, minimum. All fittings with mechanical joints, flange joints and push-on joints shall conform to ANSI/AWWA Standard C110/A21.10-98, "Ductile Iron and Gray Iron Fittings, 3-inch Through 48-inch, for Water and Other Liquids". In addition, fittings with mechanical joints and push-on joints shall conform to ANSI/AWWA Standard C111/A21.11-00, "Rubber-Gasket Joints for Ductile Iron Pipe and Fittings".

The weight of fittings shall be as given in ANSI/AWWA C110/A21.11-98 for ductile-iron fittings. The weight of mechanical joint fittings shall be as established in Tables 3 through 12. The weight of flanged joint fittings shall as established in Tables 13 through 20.

2. Fittings Conforming with ANSI/AWWA C153/A21.53-00 (Water & Sewer Use) - All fittings shall be cast ductile-iron for use with ductile-iron pipe as specified above. Fittings in the 3-inch through 24-inch size range shall be pressure rated at 350 psi minimum; 30-inch through 48-inch size range shall be pressure rated at 250 psi minimum; and in the 54-inch through 64-inch size range shall be pressure rated at 150 psi minimum (except for those fittings such as plugs, caps and sleeves which are normally rated at a higher pressure). No flanged fittings or mixtures of flanged with other end type fittings will be allowed in the range of 3-inch through 48-inch since they are not covered in the AWWA Standard. Flanged fittings conforming with and covered by this standard are allowed in sizes 54, 60 and 64-inch. In conformance with the standard, 54, 60 and 64-inch flanged tees, crosses and reducers with outlets of smaller dimension as listed in ANSI/AWWA C153/A21.53-00 are permitted. All fittings with mechanical joints, flange joints and push-on joints shall conform to ANSI/AWWA Standard C153/A21.53-00, "Ductile-Iron Compact Fittings for Water Service". In addition, fittings with mechanical joints and push-on joints shall conform to ANSI/AWWA Standard C111/A21.11-00, "Rubber-Gasket Joints for Ductile-Iron Pressure Pipe and Fittings" except as otherwise allowed in C153. Mechanical joint glands shall be ductile-iron only.

Since the C153 Standard provides only minimum dimensions, fully detailed drawings of all fittings proposed shall be supplied by the manufacturer with his bid. The tabulated nominal weight of each size and

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type of fitting shall also be supplied by the manufacturer for all items proposed. This weight shall be that of the bare casting prior to application of any lining or coating. The weight of a fitting supplied under the contract shall not be less than ninety-five (95) percent of the tabulated nominal weight supplied by the manufacturer's catalog literature for that fitting. Further, the weight of fittings supplied shall not be more than five (5) percent above the same tabulated nominal weight.

D. JOINTS AND ACCESSORIES

1. Push-On Type Joints (Single Gasket and Single Gasket with Gasket Restraint) - Push-on joints shall conform to ANSI/AWWA Standard C111/A21.11-12, except that the gaskets for pipe and fittings shall be neoprene where so specified.

The required number of gaskets for each push-on joint pipe plus one extra for every 50 joints or fraction thereof, shall be furnished with each order. The gaskets shall be shipped in suitable protective containers. All single-gasket pipe shall be as manufactured by United States Pipe and Foundry Company (Tyton), by the American Cast Iron Pipe Company (Fastite), by McWane, Inc. (Mix of Tyton and Fastite), Tyler/Union (Tyton) or approved equal.

Push-on joints together with both their regular and gasket-restraint gaskets shall be of the design, dimensions and tolerances of either those provided by American Cast Iron Pipe Company (Fastite/Fast-Grip) or those provided by United States Pipe and Foundry Company (Tyton/Field Lok). No other designs shall be acceptable. If required by the City of Hollywood Department of Public Utilities, the Vendor shall supply complete design drawings with dimensions, tolerances and materials of the joint and gasket being supplied within fourteen (14) calendar days of the date of receipt of the letter, fax or E-mail requiring said submission. If so required by the Department of Public Utilities, this submission shall be signed, sealed and dated by an Engineer registered to practice in the State where the manufacturer is located.

2. Mechanical Joints - Mechanical joints for fittings shall conform to ANSI/AWWA Standard C111/A21.11-12, except that the gaskets for each fitting under Groups D and D1 shall be neoprene. Bolt holes for mechanical joints shall be equally spaced, and shall straddle the vertical

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centerline. Tee head bolts and hexagonal nuts for all mechanical joints in fittings shall be of high strength low-alloy steel with composition, dimensions and threading as specified in ANSI/AWWA Standard C111/A21.11-00. Glands shall be of ductile-iron construction for ductile iron fittings, and cast gray iron or ductile iron for cast gray-iron fittings.

The proper number of gaskets, glands, bolts and nuts, all conforming to ANSI/AWWA Standard C111/A21.11-00, plus one extra gasket for every 10 joints or fraction thereof, shall be furnished with each order. The gaskets and joint accessories shall be shipped in suitable protective containers. Follower glands held in place with set screws will not be acceptable. Segmented glands will not be acceptable.

3. Mechanical Joint and Push-on Joint "Megalug®"-type Restraining Systems
Use of this type of restraint is restricted to underground mechanical joint or push-on joint applications, and in general may not be used above grade or as a substitute for flanged joints. Any above grade applications will require submission of shop drawings of the piping system where they are utilized and may require design by a Florida registered Professional Engineer.

This type of restraint may be utilized as dictated by design and/or field conditions in any mechanical joint or push-on joint underground piping system of 30-inch nominal diameter and smaller. The prior written permission of the Engineer is required for diameters of 36, 42 and 48-inch. In instances where written permission cannot be immediately obtained, verbal permission will be allowed but is to be confirmed in writing on the first business day following the substitution. If this type of restraint is used without permission or if permission is denied, the Contractor making the substitution shall be solely responsible for all costs, both direct and indirect, of immediately correcting the restraint system to the satisfaction of the Engineer.

It is recognized that flange adapters of this type form a useful tool for adjusting lengths of flanged pipe runs in instances such as runs with a large number of deflections where it is almost impossible to predict all lengths correctly. Therefore, a very restricted number of these joints will be allowed in instances where it can be clearly shown to the satisfaction of the Engineer that they are necessary. This application is restricted to 20-inch nominal diameter and below. Further, this use shall be designed in and shall not be made as a field substitution. In all instances flange

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adapters shall be rated for a minimum working pressure of 250 psi with a minimum safety factor of 2:1. In no case will these flange adapters be used as a general substitute for standard flanged joints.

The Department of Public Utilities absolutely reserves the right to require other forms of restraint and/or thrust anchoring where, in the opinion of the Engineer, the use of this form of restraint is not in the best interest of the City. In this regard, the Engineer's decision shall be final.

The "Megalug®" joint-restraint systems manufactured by EBAA Iron, Inc., of Eastland Texas, will be considered the standard of quality for the purpose of evaluating substitute systems. Any entity offering a substitute system for consideration shall demonstrate to the complete satisfaction of the Engineer that their restraint system has been in use for a minimum of three years in the United States, and shall bear the entire burden of providing all material, documentation and performance testing data to prove substantial equivalence of their restraint system to the "Megalug®" system.

Each thrust-resistant mechanical joint or push on joint made up with this type of restraint and the pipe and fitting of which it is a part, shall be designed to withstand an axial thrust from an internal pipeline pressure of at least 150 psi at bulkhead conditions without reduction because of its position in the pipeline nor for support from external thrust blocks.

This type of joint restraint shall not be used above grade except as previously specified nor shall it be used as a carrier pipe within a casing. This type of restraint shall not be used with tape wrapped pipe or with too great a coating thickness on the exterior of the pipe.

4. Restrained Push-on Joints (Single Gasket Non-Gasket Restrained) - Restrained joints in pipe and fittings shall be of the single gasket push-on type, and shall conform to all applicable provisions of ANSI/AWWA Standard C111/A21.11-12, except that gaskets for pipe and fittings shall be neoprene, where so specified, and the following requirements:
 - (a) Thickness of the pipe barrel remaining at grooves cut, if required in the design of restrained end joints, shall not be less than the nominal wall thickness of equal sized non-restrained pipe as specified in Section B above.

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- (b) Restrained joints using field welding, set screws, or gaskets with expanding metal inserts will not be acceptable.
 - (c) The restraining components, when not cast integrally with the pipe and fittings, shall be ductile iron or a high strength non-corrosive alloy steel.
 - (d) Tee head bolts and hexagonal nuts for all restrained joints in pipe and fittings shall be of high strength low-alloy steel with composition, dimensions and threading as specified in ANSI/AWWA Standard C111/A21.11-12, except that the length of the bolts shall meet the requirements for the restrained joint design.
 - (e) The proper number of gaskets, bolts, nuts and all necessary joint material, plus one extra gasket for every 10 joints or fraction thereof, shall be furnished with each order. The gaskets and joint accessories shall be shipped in suitable protection containers.
 - (f) Each thrust-resistant joint, and the pipe and fitting of which it is a part, shall be designed to withstand the axial thrust from an internal pipeline pressure of at least 150 psi at bulkhead conditions regardless of its position in the pipeline and regardless of it being supported by external thrust blocks.
 - (g) Restrained push-on joint pipe and fittings shall be capable of being deflected after assembly. During deflection, all components in the restrained system shall be in contact to provide an equal force on all contact areas.
 - (h) When restrained spigot ends are ordered for items of Group A, the corresponding bell ends of the pipe to be restrained (also within Group A), shall be furnished with the required matching restraining features at no additional cost other than the price bid per foot of pipe.
5. Flanged Joints - Connecting pieces with one end flanged and the other end either plain-end or mechanical joint, shall conform to ANSI/AWWA Standard C110/A21.10-12. Joint material for both the flanged end and the mechanical joint accessories for connecting pieces with a mechanical joint end shall be furnished as specified.

Flange adapters shall be used only on a restricted basis and shall not be used as a general substitute for regular flanged joints. Further, the Department of Public Utilities absolutely reserves the right to require regular flanged or other types of joints when it is considered in the City's best interest. The decision of the Engineer shall be final in such situation.

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Flanges shall be made of ductile iron conforming to ASTM 536. Flange shall be restrained by a number of individual gripping wedges operated by torque-limiting actuating screws. Each flange adapter shall have a permanently cast in identification number allowing tracing of the date, foundry and pour that fabricated the unit together with all test data for the material of the pour. Records for this purpose shall be retained by the foundry for a minimum of two years after the pour date and shall be supplied to the City within no more than two weeks after request. Factor of safety shall be a minimum of 2 to 1.

Other types of flanged fittings and flanged-joint pipe shall conform to the following requirements unless otherwise stated in the order:

- (a) Flanged fittings shall conform to ANSI/AWWA Standard C110/A21.10-12, as specified hereinabove.
- (b) Flanged ductile-iron pipe with integrally cast flanges shall be manufactured in accordance with ANSI/AWWA Standard C151/A21.51-09, and with provisions contained hereinabove for centrifugally cast ductile iron pipe, and shall be furnished with ANSI Standard Class 125 flanges, plain-faced and drilled, conforming to ANSI Standard B16.1, "Cast Iron Pipe Flanges and Flanged Fittings", latest revision. Hollow back flanges are not acceptable.
- (c) Flanged ductile-iron pipe with threaded flanges shall be manufactured in accordance with ANSI/AWWA Standard C115/A21.15-11, "Flanged Ductile-Iron Pipe With Ductile-Iron or Gray-Iron Threaded Flanges", and shall be rated for a working pressure of 250 psi, minimum. The nominal thickness of flanged ductile-iron pipe 6-inch diameter and larger shall not be less than those shown in Table 1 of ANSI/AWWA Standard C115/A21.15-11. The nominal thickness of 4-inch diameter flanged ductile-iron pipe shall be Class 54 (min.) conforming to Tables 3 and 4 of ANSI/AWWA Standard C151/A21.51-02. The pipe shall be furnished with ANSI Standard Class 125 flanges, plain-faced and drilled, conforming to ANSI Standard B16.1, latest revision. Hollow back flanges and grey-iron flanges shall not be acceptable for use as threaded flanges. Threaded flanges shall be individually fitted and machine tightened on the threaded pipe by the manufacturer, and shall not be interchangeable in the field. Pipe lengths shall be as ordered. Removal of flanges, cutting and re-threading the pipe, and re-installing the flanges will not be permitted in any case.
- (d) All flanges on ductile-iron pipe and fittings shall be of ductile iron. All joint materials for flanged pipe and fittings shall be supplied with all

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pipe or fittings ordered. Bolts and nuts shall comply with all requirements of Appendix Section A.1 of ANSI/AWWA Standard C115/A21.15-99, except that both shall be stainless steel. Unless ring gaskets are specifically called for in the order, gaskets shall be full-faced and 1/8-inch thick. Gaskets shall fully conform to the requirements of ANSI/AWWA Standard C115/A21.15-99, Appendix Section A.2, except that gaskets shall be SBR for water and neoprene for sewer usages.

E. LININGS AND COATINGS

Asphaltic Coating

All ductile iron pipe and fittings shall be outside-coated with an asphaltic material applied by means of the airless spray method. The exterior coating shall meet AWWA Specifications for this type of coating, shall be smooth without pinholes, thin, bare or overly thick areas. Smoothness shall be such that when hand rubbed, no "sand paper" feeling will be experienced and such that the spigot area will readily slide through the gasket without pulling, tearing, rolling or otherwise disturbing the sealing capabilities of the gasket. Spigot ends shall be beveled prior to painting and to an extent that will permit ready insertion of the spigot through the gasket area.

Cement-Mortar Lining

Ductile iron pipe and fittings where so specified shall be cement-lined and seal-coated in accordance with ANSI/AWWA Standard C104/A21.4-13, "Cement-Mortar Lining for Ductile-Iron Pipe and Fittings for Water".

Ceramic Epoxy Lining and Polyethylene Lining

Pipe and fittings where so specified shall be lined with either ceramic epoxy or virgin polyethylene. A Vendor may supply one or the other material but not both in the same order.

All sewer pipe and fittings of 4-inch nominal diameter and above, except for riser pipe for valves, shall be lined with either ceramic epoxy lining or virgin polyethylene. Polyethylene shall be compounded with carbon black to resist exposure to ultraviolet rays during open-air storage, and shall comply with ASTM Standard ASTM D4976-12a, "Polyethylene Plastics Molding and

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Extrusion Materials". Ceramic epoxy shall contain pigmentation to resist ultraviolet exposure under the same conditions.

Ceramic Epoxy Lining

1. All ductile iron pipe and fittings shall be delivered to the application facility without asphalt, cement lining or other lining on the interior surface or the first 6 inches on the spigot end of the pipe exterior.
2. The only ceramic epoxy material approved by the Department of Public Utilities at this time is Protecto 401™ Ceramic Epoxy, manufactured by Induron Coatings, Inc., of Birmingham, Alabama. Any request for substitution must be accompanied by:
 - (a) A successful history of lining pipe and fittings for sewer service
 - (b) A statement from the manufacturer concerning recoatability and repair to the lining
 - (c) A test report verifying the following properties and a certification of the test results:
 - (1) Permeability rating of 0.00 when tested according to Method A of ASTM E96-66, "Test Method for Water Vapor Transmission of Materials", Procedure A with a test duration of 30 days.
 - (2) The material shall be an amine cured novolac epoxy containing at least 20% by volume of ceramic quartz pigment.
 - (3) An abrasion resistance of no more than 3 mils (.075 mm) loss after one million cycles using European Standard EN 598 (1994), Section 7.8, "Abrasion Resistance".
 - (4) The following tests must be performed on coupons from factory-lined ductile iron pipe:
 - i) ASTM B-117 Salt Spray (scribed panel) - Results to equal no more than 0.0 undercutting after two years.
 - ii) ASTM G95 Cathodic Disbondment 1.5 volts @ 77°F - Results to equal no more than 0.5mm undercutting after 30 days.
 - iii) Immersion testing rated using ASTM D714-87
 - a. 20% Sulfuric Acid - No effect after two years.
 - b. 140°F 25% Sodium Hydroxide - No effect after two years.
 - c. 160°F Distilled Water - No effect after two years.
 - d. 120°F Tap Water (scribed panel) - 0.0 undercutting after two years with no effect.

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- iv) ASTM G-22 90 - Standard practice for determining resistance of synthetic polymeric materials to bacteria. The test should determine the resistance to growth of Acidithiobacillus Bacteria and should be conducted at 30°C for a period of seven days on a minimum of 4 panels. The growth must be limited only to trace amounts of bacteria.
3. Application - Ceramic epoxy lining shall be applied by a competent firm with a successful history of applying linings to the interior of ductile iron pipe and fittings, following the following procedures:
- (a) Surface Preparation - Prior to abrasive blasting, the entire area which will receive the protective compound shall be inspected for oil, grease, etc. Any areas where oil, grease or any substance which can be removed by solvent is present shall be solvent cleaned using the guidelines outlined in SSPC-1 Solvent Cleaning. After the surface has been made free of grease, oil or other substances, all areas to receive the protective compounds shall be abrasive blasted using compressed air nozzles with sand or grit abrasive media. The entire surface to be lined shall be struck with the blast media so that all rust, loose oxides, etc., are removed from the surface. Only slight stains and tightly adhering annealing oxide may be left on the surface. Any area where rust reappears before coating must be re-blasted to remove all rust.
 - (b) Lining - After the surface preparation and within 8 hours of surface preparation, the interior of pipe and fittings shall receive a minimum forty (40) mils dry film thickness of the protective lining. No lining shall take place when the substrate or ambient temperature is below 40°F. The surface also must be dry and dust free. If flange ends are included in the Project, the linings must not be used on the face of the flange; however, full face gaskets must be used to protect the ends of the pipe. The 40-mil system shall not be applied in the gasket grooves.
 - (c) Coating of Gasket and Spigot Ends - Due to the tolerances involved, the gasket area and exterior of the spigot end up to 6 inches back from the end of the spigot must be coated with Protecto Joint Compound of six 6-mil minimum, 10-mil maximum. This coating shall be applied by brush to ensure coverage. Care should be taken that the coating is smooth without excess buildup in the gasket groove or on the spigot end. All material for the gasket groove and spigot end

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shall be applied after the application of the lining as specified in the preceding paragraph.

- (d) Number of Coats - The number of coats of lining material applied shall be as recommended by the lining manufacturer. However, in no case shall this material be applied above the dry thickness per coat recommended by the lining manufacturer in printed literature. The time between coats shall never exceed that time recommended by the lining material manufacturer. No material shall be used for lining which is not indefinitely recoatable with itself without roughening the surface.
 - (e) Touch-Up and Repair - Protecto Joint Compound shall be used for touch-up or repair. Procedures shall be in accordance with manufacturer's recommendations.
4. Sealing Cut Ends and Repairing Field Damaged Areas:
- (a) Remove burrs caused by field cutting of ends or handling damage and smooth out the edge of the lining if rough.
 - (b) Remove all traces of oil, grease, asphalt, dust, dirt, etc.
 - (c) Areas of loose or damaged lining associated with field cutting the pipe shall be repaired, if approved by the Engineer, as recommended by the pipe manufacturer. The damaged area shall be stripped back by chiseling or scraping about 1 to 2 inches into the well-adhered lining before patching.
 - (d) The exposed metal and the 1 to 2-inch lining overlap shall be roughened with a coarse grade of emery cloth (#40 grit), rasp or small chisel. Avoid wire brushing or similar buffing since these tend to make the surface too smooth for good adhesion.
 - (e) With the area to be sealed or repaired absolutely, clean and suitably roughened, apply a coat of Protecto Joint Compound by brush in accordance with the manufacturer's recommendations.
5. Inspection and Certification
- (a) Inspection:
 - (1) All ductile iron pipe and fitting linings shall be checked for thickness using a magnetic film thickness gauge. The thickness testing shall be done using the method outlined in SSPC- PC-2 Film Thickness Rating.

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- (2) The interior lining of all pipe and fittings shall be tested for pinholes with a nondestructive 2,500 volt test.
- (3) Each pipe joint and fitting shall be marked with the date of application of the lining system and with its numerical sequence of application on the date.

(b) Certification

The pipe or fitting manufacturer must supply a certificate attesting to the fact that the applicator met the requirements of this specification, and that the material used was as specified, and that the material was applied as required by the specification.

Polyethylene Lining

1. The polyethylene shall be fused to the pipe and fittings with heat to form a tightly bonded uniform lining 40 mils thick, minimum, extending from the spigot end to the gasket seat in the bell of push-on, restrained push-on and mechanical type joints.
2. Prior to preheating the pipe, 75% or more of the high-temperature oxide film shall be removed through proper preparation of pipe interior surface. Fittings shall be sand blasted. Pipe and fittings shall be uniformly preheated to a temperature adequate to provide uniform fusing of the polyethylene powders and proper bonding to the interior of the pipe and fittings.
3. The lining at the ends (spigot and bell) shall be hermetically sealed with a coal-tar epoxy. This epoxy shall coat the inside of the bell of both pipe and fitting as well as the last six inches on the inside of the spigot end of the pipe and two to three inches on the outside of the spigot end.
4. The lining of all pipe and fittings shall be subjected to and pass a test for pinholes, bare spots, metal particles, insufficient lining thickness and other defects by a method conforming to ASTM Standard G62-87 (1998), "Holiday Detection in Pipeline Coatings", Method B (high voltage). Other test methods may be submitted to the City for approval, but no approval will be granted unless it is clearly shown to the satisfaction of the City that the method is equivalent to the specified tests insofar as detecting defects and insufficient lining thickness.
5. The manufacturer shall provide certifications on the "Holiday" test as well as certifications on a uniform (spigot end to gasket seat in bell) minimum 40-mil-thick lining.

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F. QUALITY ASSURANCE

1. All piping, fittings and other materials supplied under this contract shall be subject to inspection while still on the delivery truck. It is the sole responsibility of the vendor and supplier to make prior contact with the Department of Public Utilities and provide a minimum of 48-hours prior notice of delivery. When so notified, the City will make arrangements for inspection of the material upon arrival or within a reasonable time thereafter. Material will not be unloaded without inspection taking place either prior to, or if necessary for examination, during the unloading procedure. The City will not be responsible for any delays or additional costs created by non-compliance with the requirement for prior notification or the requirement for thorough inspection.
2. Materials shall be delivered in complete compliance with the AWWA Standards as modified herein, without damage, and shall match or exceed the quality of any samples supplied. The City absolutely reserves the right to require samples of any material supplied and to perform whatever tests considered by the Engineer, whose decision shall be final, to be in the City's best interest on said samples. Where such tests are of a destructive nature, the sample, if it passes the test will be paid for (at cost as shown by invoice) by the City. Samples failing will be immediately replaced with suitable material at the supplier's/contractor's expense. Samples required prior to order as a condition for purchase or as a materials submittal for approval will be at the supplier's/contractor's expense but, if approved and not used for destructive tests, may be used in the work with permission from the Engineer.
3. Materials found to be defective, not in strict compliance with the quality standards of samples supplied or these specifications shall be immediately returned to the vendor at his expense. If defects are discovered at a later time, the vendor shall be required to remove said items and shall bare all costs for so doing together with any replacement costs. Rejection of items may subject the vendor to liquidated and/or actual damages as specified elsewhere herein.
4. Foundries supplying materials shall maintain their metallurgical records for a minimum period of two years after fabrication and firms not doing so may be found in default.
5. Flaws which provide cause for rejection include but are not limited to:
 - (a) Incorrect metallurgy or metallurgy which cannot be verified to the complete satisfaction of the Engineer

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- (b) Foundry identification/location, size, pressure and material identification information lost, removed, non-existent, or not visible when assembled
- (c) Not in complete compliance with all applicable AWWA and NSF standards and requirements as modified herein and/or these specifications
- (d) Not in complete compliance with approved shop drawings
- (e) Incorrect, rough, chipped, cracked, scratched, flawed or otherwise damaged interior or exterior coatings or linings
- (f) interior or exterior coatings which are too thin, or too thick to allow proper assembly, or too thick to allow proper grip by restraining gaskets or other restraining elements
- (g) Pin holes or honey combing of pipe
- (h) Weld spatter or excess metal in gasket grooves or the whole of the bell area
- (i) Bell areas which are distorted or otherwise improperly cast
- (j) Spigots which are out of round, not of proper dimension, or not beveled to an extent that will allow easy assembly of the pipe joint
- (k) Gaskets which are defective or of the wrong material
- (l) Lack of joint materials, improper or defective joint materials
- (m) Bolting of the wrong material or size
- (n) Electro-galvanizing or other exterior plating when hot-dip galvanizing is required
- (o) Non-timely or non-submittal of all required certifications, incorrect/incomplete certifications, or certifications lacking the signature, date and seal of a professional engineer when so required
- (p) Flanges which are too thin, not a right angles to the pipe centerline, or otherwise distorted
- (q) All other flaws or defects which, in the opinion of the Engineer who's decision shall be final, adversely affect the assembly and/or function of the piping system as intended.

3.02 PIPE AND FITTINGS: POLY VINYL CHLORIDE (PVC)

A. TYPE PSM SDR-35 and SDR-26 PVC SEWER PIPE AND FITTINGS

1. Type PSM SDR-35 and SDR-26 PVC Sewer Pipe

- (a) Type PSM SDR-35 and SDR-26 PVC Sewer Pipe for sewer mains and laterals shall conform to ASTM Standard D3034, "Standard

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Specification for Type PSM Poly(Vinyl Chloride) (PVC) Sewer Pipe and Fittings", except as modified below.

- (b) Pipe shall be made of PVC plastic having a cell classification of 12454-B, 12364-B, 12364-C or 13364-B as defined in ASTM Standard D1784, "Specification for Rigid Poly (Vinyl Chloride) (PVC) Compounds and Chlorinated Poly (Vinyl Chloride) (CPVC) Compounds".
- (c) The PVC compounds used in the manufacture of the gravity sewer pipe shall be as listed in the Plastic Pipe Institute (PPI) Technical Report TR-4.
- (d) The PVC pipe shall be push-on type, with bells, spigots and elastomeric gaskets, in accordance with ASTM Standard D3034, and in accordance with ASTM Standard D3212, "Specification for Joints for Drain and Sewer Plastic Pipes Using Flexible Elastomeric Seals", except as otherwise modified herein. The gaskets shall be the sole element depended upon to make the joint flexible and watertight. Joints using solvent cement will not be permitted. The pipe bells shall have an annular recess or race to seat and retain the gasket, and the gaskets may be either prepositioned by the manufacturer, or shipped separately in suitable protective containers. Pipe spigots shall be beveled. Pipe bells shall be extruded integral with the pipe barrel with a thickness equal to or greater than that of the barrel.
- (e) The gaskets shall be fabricated from a high-grade elastomer compound in accordance with ASTM Standard F477, "Specification for Elastomeric Seals (Gaskets) for Joining Plastic Pipe", except as otherwise modified herein. The basic polymer for the gaskets shall be synthetic rubber. Natural rubber gaskets or gaskets with both natural and synthetic rubbers will not be permitted. Gaskets shall be continuous, elastomeric, rubber ring type.
- (f) Nominal laid length of Type PSM SDR-35 and SDR-26 PVC sewer pipe shall be 13 feet.
- (g) Type PSM SDR-35 and SDR-26 PVC sewer pipe shall be double labeled (180 degrees apart) as follows at intervals of five (5) feet or less:

Date of manufacture - Manufacturer's name & Code
- Nominal size - Cell classification - "Type PSM
SDR-35 or SDR-26 PVC Sewer Pipe" - "Specification D3034"

2. Type PSM SDR-35 and SDR-26 PVC Sewer Fittings

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- (a) Type PSM SDR-35 and SDR-26 PVC Sewer Fittings shall conform to ASTM Standard D3034, "Standard Specification for Type PSM Poly (Vinyl Chloride) (PVC) Sewer Pipe and Fittings", and to the specifications for Type PSM SDR-35 and SDR-26 PVC sewer pipe herein, except as modified below.
- (b) The waterway and bell wall thickness shall be equal to or greater than that specified for pipe, except that for reducing fittings or those with smaller inlets, the wall thickness of each inlet shall be no less than the minimum wall thickness for that size pipe.

B. AWWA C900 AND C905 PVC (CI) PIPE AND FITTINGS

1. TYPE C900 and C905 PVC PIPE

- (a) AWWA C900 Pipe for water and sewer mains and laterals shall conform to ANSI/AWWA C900, "(PVC) Pressure Pipe and Fabricated Fittings", for 4-inch through 12-inch PVC pressure pipe and fabricated fittings with cast-iron-pipe-equivalent (CI) outside diameter (OD) dimensions and with wall-thickness-dimension ratios (DRs) 14, 18, and 25, except as otherwise modified herein.
- (b) AWWA C905 pipe for water and sewer mains and laterals shall conform to ANSI/AWWA C905, "Polyvinyl Chloride (PVC) Pressure Pipe and Fabricated Fittings, 14-inch Through 48-inch for Water Transmission and Distribution", for 14-inch through 48-inch PVC pressure pipe and fabricated fittings with cast-iron-pipe-equivalent (CI) and steel-pipe-equivalent (IPS) outside diameter (OD) dimensions and wall thickness dimension ratios (DRs) of 14, 18, 21, 25, 26, 32.5, 41, and 51, except as otherwise modified herein.
 - (1) AWWA C900 and C905 pipe shall be made from PVC thermoplastic having physical and chemical properties which meet or exceed a cell classification of 12454-A or 12454-B virgin compounds as defined in ASTM Standard D 1784.
 - (2) The AWWA C900 and C905 pipe shall be push-on type, with bells, spigots and elastomeric gaskets in accordance with ASTM Standard D 3139, "Standard Specification for Joints for Plastic Pressure Pipes Using Flexible Elastomeric Seals ". The gaskets shall conform to ASTM Standard F477 and shall be synthetic rubber. One gasket shall be furnished with each length of elastomeric-gasket bell-end pipe. Pipe spigots shall be beveled.

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Pipe bells shall be extruded integral with the pipe barrel with a thickness equal to or greater than that of the barrel.

- (3) Nominal laid length of AWWA C900 and C905 PVC (CI) pipe shall be 20 feet.
- (4) The C900 and C905 pipe shall be labeled with the following at intervals of not more than five (5) feet:

Date of manufacture - Manufacturer's Name & Code
- Nominal size - "(CI)" - DR number – Pressure Class – Test Pressure for Hydro Tested or “NOT HYDROSTATIC PROOF TESTED” – AWWA designation number – Manufacturer’s name or trade mark and production run or lot code – Seal (Mark) of the testing agency verifying suitability of material for potable water service (must be NSF).

- (5) Couplings and fabricated fittings shall be marked with:

Nominal Size – “(CI)” – Deflection angle, if applicable – “PVC” – AWWA Pressure Class – AWWA designation number of the applicable standard (C900 or C905) – Manufacturer’s name or trademark - Seal (Mark) of the testing agency verifying suitability of material for potable water service (must be NSF).

2. TYPE C900 and C905 PVC FITTINGS

- (a) Fittings for AWWA C900 and C905, PVC (CI) shall conform to the requirements of ASTM Standard D1784 and the specifications for AWWA C900 and C905, PVC (CI) pipe herein, except as modified below.
- (b) All fittings for C900 pipe shall be manufactured from PVC compound conforming to ASTM Standard D 1784-11. Fittings shall conform to the thickness requirements of DR18. All fittings, except wye branches, shall be Class 235 and shall be manufactured to withstand 755 psi quick burst pressure tested in accordance with ASTM Standard D 1599-99, "Standard Test Method for Resistance to Short-Time Hydraulic Pressure of Plastic Pipe, Tubing, and Fittings", and withstand 500 psi for a minimum of 1,000 hours tested in accordance with ASTM Standard D1598-02, "Test Method for Time-to-Failure of Plastic Pipe Under Constant Internal Pressure".

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- (c) All fittings for C905 pipe shall be manufactured from PVC compound conforming to ASTM Standard D1784-11. Fittings shall conform to the thickness requirements of DR18 for sizes 14 through 30-inch and DR25 for 36 through 48-inch. All fittings, except wye branches, shall be Class 235 for sizes 14 through 30-inch and Class 165 for 36 through 48-inch. Fittings 14 through 30-inch shall be manufactured to withstand 755 psi quick burst pressure tested in accordance with ASTM Standard D1599-99, "Test Method for Short-Time Hydraulic Failure of Plastic Pipe, Tubing, and Fittings" and withstand 500 psi for a minimum of 1,000 hours tested in accordance with ASTM Standard D1598-02, "Test Method for Time-to-Failure of Plastic Pipe Under Constant Internal Pressure". Fittings 36 through 48-inch shall be manufactured to withstand 535 psi quick burst pressure tested in accordance with ASTM Standard D1599-99, "Test Method for Short-Time Hydraulic Failure of Plastic Pipe, Tubing, and Fittings" and withstand 350 psi for a minimum of 1,000 hours tested in accordance with ASTM Standard D 1598-02, "Test Method for Time-to-Failure of Plastic Pipe Under Constant Internal Pressure".

3. JOINT RESTRAINTS FOR C900 AND C905 PVC PRESSURE PIPE

For restraining C900 and C905 PVC pressure pipe and fittings, refer to Section 2.01.D.3, "Mechanical Joint and Push-on Joint "Megalug®"-type Restraining Systems", elsewhere in this specification..

C. MANHOLE COUPLINGS FOR TYPE PSM SDR-35 PVC SEWER PIPE

1. Manhole couplings for Type PSM SDR-35 PVC sewer pipe shall conform to the requirements specified herein for type PSM SDR-35 PVC sewer fittings and shall be completely coated on the exterior with fine aggregate bonded to the PVC surface.

D. MANHOLE COUPLINGS FOR AWWA C900 and C905, PVC (CI) PIPE

1. Manhole couplings for AWWA C900 and C905 PVC (CI) pipe shall conform to the requirements specified hereinbefore for AWWA C900 and C905, PVC (CI) fittings, and shall be completely coated on the exterior with fine aggregate bonded into/to the PVC surface.

E. ADAPTER COUPLINGS

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1. Adapter couplings shall have adjustable stainless steel shear rings. Insert shall be provided with coupling. Clamps shall be all stainless steel.

F. SMALL DIAMETER PVC PIPE AND FITTINGS (SCHEDULES 40 AND 80)

1. Poly (Vinyl Chloride) (PVC) pipe and fittings specified herein are small diameter PVC with threaded, flanged and solvent cemented joints. All PVC pipe and fittings shall be made from high impact, rigid poly vinyl chloride compounds. Pipe and fittings shall be marked indicating size, type and schedule, ASTM Designation, manufacturer or trade mark, and shall bear the NSF (National Sanitation Foundation) seal of approval. Wherever the abbreviation PVC is used in these Specifications in relation to pipe and fittings, it shall mean poly (vinyl chloride) plastic pipe and fittings as specified herein.
2. PVC pipe shall be Schedule 80 as called for on the Plans or by the Engineer, Type I, Grade I, or Class 12454B with socket ends, and shall comply with ASTM Standard D1785, "Poly (Vinyl Chloride) (PVC) Plastic Pipe, Schedules 40, 80 and 120".
3. Schedule 80 socket-type fittings shall comply with ASTM Standard D2467, "Socket-Type Poly (Vinyl Chloride) (PVC) Plastic Pipe Fittings, Schedule 80" and D2464 "Specification for Threaded Poly (Vinyl Chloride) (PVC) Plastic Pipe Fittings, Schedule 80, for threaded fittings.
4. Joining cement for PVC pipe and fittings shall comply with ASTM Standard D2564, "Solvent Cements for Poly (Vinyl Chloride) (PVC) Plastic Pipe and Fittings". Cemented joints shall be made in accordance with ASTM Standard D2855, "Recommended Practice for Making Solvent-Cemented Joints with Poly (Vinyl Chloride) (PVC) Pipe and Fittings".
5. Flanges: One piece molded hub type flat face flanges, 125 pound standard as specified under fittings hereinbefore.
6. Gaskets: Full faced, 1/8-inch thick, neoprene (for sewer) or SBR (for water).
7. AISI Type 316 stainless steel, ASTM A193, Grade B8M hex bolts and ASTM A194 Grade E8 hex head nuts. Bolts shall be fabricated in accordance with ANSI B 1812 and provided with washers of the same materials as the bolts.

G. CERTIFICATION

1. The Contractor shall provide the City with notarized Certifications, signed by an authorized agent of the manufacturer, that the material was manufactured, sampled, tested, and inspected in accordance with these

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specifications, and has been found to meet the requirements. A report of said test results shall be furnished.

2. No pipe or fitting will be accepted for use in the project until the Certifications have been sub-mitted to and approved by the City.

H. HANDLING AND STORING PVC PIPE AND FITTINGS

1. Pipe and fittings shall at all times be handled with great care to avoid damage. In loading or unloading operations, the manufacturer's unitized package of pipe and/or fittings shall be lifted with a forklift or other suitable equipment in such a manner as to prevent damage. Pipe may be unloaded by individual lengths. However, each length shall be slid or rolled on skidways in such a manner that the pipe is not dropped, and to avoid any shock. Under no circumstances shall pipe and/or fittings be dropped or allowed to roll or slide against obstructions.
2. Pipe and/or fittings having ultraviolet degradation, warpage, impact damage, abrasion damage, or gouges or cuts will not be accepted. Bell ends showing compression set, damage or deformation will not be acceptable.
3. Gaskets, if not prepositioned in the bell ends, shall be stored and shipped in suitable protective containers. Gaskets shall not be exposed to excessive heat, direct sunlight, oil or grease.
4. Pipe and fittings shall be stored in a manner that will prevent warpage or other damage as previously specified.
5. If the pipe and/or fittings are to be stored for any period in excess of six months in direct sunlight the items shall be covered with an opaque material. The cover shall be placed in such a manner that will permit air circulation above and around the items being covered to prevent excessive heat accumulation.
6. Pipe and fittings shall be manually or mechanically lowered into the trench for installation, and shall not be thrown, dropped or pushed in the trench.

3.03 PIPE AND FITTINGS: COPPER

- A. Pipe: Copper pipe shall be Type K for interior piping and Type K Soft Temper for exterior piping, both conforming to ASTM B88, seamless, round, drawn tubing.
- B. Fittings: Solder joint fittings shall be wrought copper and bronze fittings conforming to ANSI B16.22 or cast brass fittings conforming to ANSI Standard B16.18. Fittings for use with copper tubing shall be one of the following:

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1. Cast Bronze Solder-Joint Fittings: Solder joint fittings of this type shall be cast bronze fittings conforming to ANSI B16.18, "Cast Brass Solder-Joint Fittings", and ASTM Standard B62, "Composition Bronze or Ounce Metal Castings", as manufactured by Chase Brass and Copper Co., Stanley G. Flagg & Co., Inc., or approved equal.
 2. Wrought Copper Solder-Joint Fittings: Solder joint fittings of this type shall be wrought copper fittings in accordance with ASNI B16.22, "Wrought Copper and Bronze Sold-er-Joint Pressure Fittings".
- C. Solder: Solder shall consist of 95 percent tin and 5 percent antimony. Soldering shall be in conformance with Section 3 of the Copper and Brass Research Association Copper Tube Handbook.
- D. Connection of copper pipe or fittings with galvanized pipe or fittings shall be made with dielectric fittings.

3.04 PIPE AND FITTINGS: GALVANIZED STEEL

- A. Steel pipe, except as otherwise specified below, shall be Schedule 40, galvanized, seam-less steel pipe, conforming to ASTM Standard A53, "Pipe, Steel Black and Hot-Dipped, Zinc-Coated Welded and Seamless", Type S, Grade A or B. Black steel pipe may be used in fabricating items which are to be hot-dip galvanized after fabrication.
- B. Screwed fittings, except as otherwise specified, shall be 150 psi galvanized malleable iron. Screwed unions shall be galvanized malleable iron with ground brass seats. Pipe threads shall be American Standard B2.1 NPT. Joint compound shall be used on all threaded joints, applied to the male threads only.
- C. Furnish data certified by the manufacturer that the pipe and fittings are of the material specified. No piping will be accepted or used in construction until certificates have been submitted to and approved by the Engineer of Record.

3.05 PIPE AND FITTINGS: VITRIFIED CLAY

- A. Vitrified clay pipe and fittings for gravity sewers shall be extra-strength, non-perforated. Pipe and fittings shall conform to the latest edition of ASTM Standard C700, "Vitrified Clay Pipe, Extra Strength, Standard Strength, and Perforated", and the following requirements.
- B. A single fracture or crack passing through socket of the pipe bell and exceeding a length of one-half ($\frac{1}{2}$) inch in any direction shall be cause for rejection of the pipe. This requirement supersedes the portion of the ASTM Specifications cited above in conflict herewith.

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- C. The Contractor shall furnish certification from the manufacturer that the pipe and fittings used meet the requirements of ASTM Specifications C700.
- D. The manufacturer shall furnish certification that the pipe and fittings supplied meet the requirements of ASTM Standard C700, latest edition. The Contractor shall be prepared to produce said certification when requested by the City.
- E. Only factory bonded joints will be permitted for all vitrified clay pipe. The joints shall have rubber "O" ring type compression seals conforming to "Standard Specification for Compression Joints for Vitrified Clay Pipe and Fittings", ASTM C425, latest edition.
- F. City approved pipe joints are Polyester Ring-Type joints as manufactured by Logan Clay Products Company under the trade name of "Logan-O-Ring", Can-Tex Industries under the trade name of "Can-O-Lock," or approved equal.
- G. Where cast iron soil pipe or ductile iron pipe laterals are used with vitrified clay mains, the wye or tee shall be vitrified clay. For the joint between the vitrified clay wye or tee and the lateral pipe use FERNCO "Donut" No. 6-10-601 with E.H.C.I. soil pipe and "Donut" No. 6-08-607 with ductile iron laterals, or approved equals. When using E.H.C.I. soil pipe with ductile iron tees or wyes, use transition gasket by Romac or approved equal.

3.06 HIGH DENSITY POLYETHYLENE (HDPE) PIPE

- A. Smooth wall high density polyethylene pipe shall be a Type III, Class C, Category 5, Grade P34; PE 3408; as defined in ASTM D1248. Minimum classification, as given by ASTM D3350, shall be PE 335434C. Pipe shall meet the standards of ASTM F714, as modified herein, including the "Government/Military Procurement" sections. Minimum hydrostatic design basis shall be 1600 psi. In all cases, hydrostatic design basis and pressure rating shall be as determined using the methods of ASTM F714. Pipe of this type shall be butt-fusion welded at joints. All welding of joints shall be in strict conformity with the recommendations of the pipe manufacturer and by a firm or individual recommended to the Engineer of Record in writing by the manufacturer.
- B. As a part of the shop drawing submittals under Section 01300, "Submittals", the Contractor shall furnish the following signed by a Florida Registered Engineer, all calculations to determine, the pipe thickness, SDR rating, allowable stresses, in accordance with ASME B31.8 -1992, Table A842.22 and recommended coating, as required by the pipe manufacturer.

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3.07 HIGH DENSITY POLYETHYLENE (HDPE) FOR USE IN POTABLE WATER SERVICES 2-INCH NOMINAL DIAMETER AND LESS

A. HDPE PIPE FOR WATER SERVICES:

1. All 2-inch high density polyethylene pipe used for services shall be IPS-OD-controlled with Standard Outside Dimension Ratio (SODR) of 9, pressure rating of 200 psi, nominal outside diameter of 2.375-inches, minimum wall thickness of 0.264-inches, PE 3408, all in conformance with ASTM D3035-95 "Polyethylene (PE) Plastic Pipe (DR-PR) Based on Controlled Outside Diameter".
2. Pipe shall conform with ANSI/AWWA C901-96 "Polyethylene (PE) Pressure Pipe and Tubing, ½ In. (13 mm) Through 3 In. (76 mm), for Water Service" as modified herein.
3. Pipe shall have a (natural) inner core with a blue colored outer shell.
4. Pipe shall have footage marks at a maximum interval of every two feet.
5. Polyethylene material shall have a minimum cell classification in accordance with ASTM D3350-00 "Polyethylene Plastics Pipe and Fitting Materials" of 345444D for the core, which shall be 100% virgin material, and 345444E for the outer shell. Note that both of these materials are UV stabilized as signified by the "D" for natural colored and "E" for the colored shell.
6. Pipe shall conform with NSF 61 or 14.
7. Manufacturer shall supply certification of compliance with all of the above requirements. Certification shall ship with the pipe on material sold to the City and shall always be submitted with shop drawings and catalogue cuts. When required by the Director of the Department of Public Utilities or his designee, certification shall be signed and sealed by a professional engineer licensed to practice in the state in which the manufacturer is located or in the State of Florida.

B. HDPE TUBING FOR WATER SERVICES:

1. All 1-inch high density polyethylene tubing used for services shall be CTS-OD-controlled with Standard Outside Dimension Ratio (SODR) of 9, pressure rating of 200 psi, nominal outside diameter of 1.125-inches, minimum wall thickness of 0.125-inches, PE 3408, all in conformance with ASTM D2737-99 "Polyethylene (PE) Plastic Tubing".
2. Tubing shall conform with ANSI/AWWA C901 "Polyethylene (PE) Pressure Pipe and Tubing, ½ In. (13 mm) Through 3 In. (76 mm), for Water Service" as modified herein.

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3. Tubing shall have a (natural) inner core with a blue colored outer shell.
4. Tubing shall have footage marks at a maximum interval of every two feet.
5. Polyethylene material shall have a minimum cell classification in accordance with ASTM D3350-00 "Polyethylene Plastics Pipe and Fitting Materials" of 345444D for the core, which shall be 100% virgin material, and 345444E for the outer shell. Note that both of these materials are UV stabilized as signified by the "D" for natural colored and "E" for the colored shell.
6. Tubing shall conform with NSF 61 or 14.
7. Manufacturer shall supply certification of compliance with all of the above requirements. Certification shall ship with the tubing on material sold to the City and shall always be submitted with shop drawings and catalogue cuts. When required by the Director of the Department of Public Utilities or his designee, certification shall be signed and sealed by a professional engineer licensed to practice in the state in which the manufacturer is located or in the State of Florida.

C. MECHANICAL FITTINGS UTILIZED WITH HDPE PIPE AND TUBING WATER SERVICES

1. Mechanical fittings utilized with HDPE pipe and tubing for water services shall conform with ANSI/AWWA C800, "Underground Service Line Valves and Fittings", as modified here-in.
2. Fittings shall utilize AWWA Standard (Mueller) threads on tapped pipe and tapping saddles
3. Fittings shall be designed and manufactured to withstand a sustained working pressure of 150 psi and to restrain the pipe against pull-out under loading beyond that causing tensile yield in the HDPE pipe or tubing connected.
4. The manufacturer shall supply certification of these capabilities and fittings shall not be accepted or installed without said certification. If fittings are being supplied to the City, the certification shall ship with the fittings and payment will not be made without this certification. At the discretion of the Engineer, this certification may be required to be signed and sealed by a professional engineer licensed to practice in the state where the supplying firm is located or in the State of Florida. His decision in this regard shall be final.
5. In all cases, fittings shall be installed in strict accordance with the manufacturer's instructions.

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3.08 WALL SLEEVES, PIPES AND CASTINGS

- Wall Sleeves: Wall sleeves shall be of cast iron, ductile iron or carbon steel with steel galvanized after fabrication as specified in Section 15000, Piping General, under wall pipe. Sleeves shall be provided with seals and shall be oversized as required for the installation of seals. Sleeves shall terminate flush with finished surfaces of walls and ceilings, and shall extend 2-inches above the finished floor. Escutcheons shall be provided at walls and floor to completely conceal the sleeves smaller than 3-inches. Escutcheons shall be brass or cast iron, nickel plated split-type.
- Interior: Wall sleeves shall be installed for all piping passing through interior walls and floors, except where noted on the Drawings. Sleeves shall be of sufficient size to pass the pipe without binding.
- A. Wall Sleeve Seals: Wall sleeve seals shall be modular mechanical type consisting of interlocking synthetic rubber links shaped to continuously fill the annular space between the pipe and wall sleeve. Links shall be loosely assembled with bolts to form a continuous rubber belt around the pipe with a pressure plate under each bolt head and nut. After the seal assembly is positioned in the sleeve, tightening of the bolts shall cause the rubber sealing elements to expand and provide an absolutely water-tight seal between the pipe and wall sleeve. The synthetic rubber shall be suitable for exposure to treated sewage effluent and groundwater. Bolts, nuts and hardware shall be 18-8 stainless steel. The seals shall be Link Seal as manufactured by Thunderline Corporation or equal, and the wall sleeve and seal shall be sized as recommended by the seal manufacturer.
- B. All piping passing through exterior walls and base slabs shall be provided with wall pipes. All wall pipes shall be of ductile iron and shall have an intermediate flange or waterstop located in the center of the wall. Each wall pipe shall be of the same grade, thickness and interior coating as the piping to which it is joined. Those portions of the wall pipes that are buried shall have a coal tar outside coating.

3.09 STEEL CASING (JACKING AND BORING)

See Section 15070, "Jacking and Boring"

3.10 STEEL PIPE (AERIAL CROSSING)

See Section 15075, "Aerial Crossings"

Part 4 - EXECUTION

SECTION 15060

PIPING AND FITTINGS

4.01 GENERAL:

- A. The Contractor shall provide all barricades and/or flashing warning lights necessary to warn of the construction throughout the Project.
- B. Pipe and fittings shall at all times be handled with great care to avoid damage. In loading and unloading, they shall be lifted with cranes or hoists or slid or rolled on skidways in such manner as to avoid shock. Under no circumstances shall this material be dropped or allowed to roll or slide against obstructions.
- C. All work shall be performed by skilled workmen experienced in similar installations. All pipe and fittings shall be adequately supported by clamps, brackets, straps, concrete supports, rollers or other devices as shown and/or specified. Supports or hangers shall be spaced so that maximum deflection between supports or hangers shall not exceed 0.050 inch for pipe filled with liquid, but shall not be further than 6 feet apart, whichever is closer, unless otherwise shown. All pipe supports shall be secured to structures by approved inserts or expansion shields and bolts.
- D. All pipe shall be thoroughly cleaned internally before being installed. All pipes, except oxygen service, air and gas, shall be flushed with water and swabbed to assure removal of all foreign matter before installation. Air and gas piping shall be tapped with a hammer to loosen scale or other foreign matter that might be within the pipe, then thoroughly blown with a high pressure air hose. Air shall be from the Contractor's air compressor.
- E. Whenever possible, the pipe will be installed with minimum 48-inches of cover, however, due to the numerous utilities in the area, this burial could change substantially.
- F. At all horizontal or vertical pipe deviation, the Contractor shall install both restrained pipe and thrust blocks. Joints may only be opened to adjust alignment by half of the AWWA or manufacturer's recommended opening (which is smaller).
- G. Pipe Sleeves and Wall Castings: Pipe sleeves and wall castings shall be provided at the locations called for on the Drawings and/or specified herein. These units shall be as detailed and of the material as noted on the Drawings and/or specified herein. They shall be accurately set in the concrete or masonry to the elevations shown. All wall sleeves and castings required in the walls shall be in place when the walls are poured. Ends of all wall castings and wall sleeves shall be of a type consistent with the piping to be connected to them.
- H. Tie Rods: Unless otherwise indicated on the Drawings, the size and number of tie rods for a joint or installation shall be as recommended by the manufacturer's design chart for a working pressure of 150 psi. Tie rods shall be installed as recommended by the manufacturer.

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4.02 EXCAVATION FOR PIPING

- A. The Contractor shall make all excavation necessary for the construction of the pipelines, connections, valves and appurtenances, to the lines and grades shown on the Plans.
- B. The trench shall be excavated at least 6 inches below pipe laying grade as shown on the Plans. All sheeting and shoring shall be installed at the Contractor's expense where it is necessary for pipe installation and property protection or required by the Trench Safety Act. The cost of dewatering any excavation shall be at the Contractor's expense. The disposal of water removed from an excavation shall be in a manner which will not create a hazard, or be detrimental to the public health or to public or private property.
- C. The Contractor shall obtain all necessary permits approving the location and proposed method of disposal before discharging water from any excavation into any portion of the public right-of-way or into any existing drainage structure or facility. All construction signs required shall be provided by the Contractor.

4.03 INSTALLATION OF PIPE, FITTINGS AND VALVES

A. GENERAL:

1. The design Drawings are in some cases diagrammatic. They may not show every bend, off-set, elbow or other fitting which may be required in the piping for installation in the space allotted. Careful coordination of the work of this Section with that of Division 2 and 16 is necessary to avoid conflicts. Install gravity lines at uniform grade to low point after field verification of low point invert.
2. The centerline of the pipe shall not vary by more than 2 inches from the location shown on the Plans and the top of the pipe shall not vary by more than 2 inches from the established grade, except at points where this tolerance must be changed to clear obstructions, or make connections. Deviation from this location will be permitted only upon written instructions from the Engineer.
3. Sandbags may be used to support the pipe in the ditch but no pipe shall be laid on blocks, except by the written permission of the Engineer of Record. The trench shall be dewatered to the extent that all poured lead joints in cast iron pipe and fittings may be made perfectly dry. Flanged joints, mechanical joints and push-on joints in cast iron pipe and fittings may be made under water.

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B. INSTALLATION OF DUCTILE IRON PIPE

1. All bends, tees, and plugs, unless otherwise specified, shall be backed with concrete to undisturbed ground. Provision shall be made to prevent concrete from adhering to plugs or bolts.
2. Bolts, nuts and rubber gaskets for use in flanged and mechanical joints shall be stored under cover. Gaskets shall not be exposed to heat, light or any petroleum products, shall be kept clean and shall not be handled with greasy or dirty hands.
3. Before making up flanged joints in cast iron pipe and fittings, the back of each flange under the bolt heads, and the face of each flange shall have all lumps, blisters and excess bituminous coating removed and shall be wire brushed and wiped clean and dry.
4. Before laying the ductile iron pipe, all lumps, blisters and excess coal-tar coating shall be removed from the bell and spigot ends of each pipe and the outside of the spigot and the inside of the bell wire brushed and wiped clean and dry. The entire gasket groove area shall be free of bumps or any foreign matter which might displace the gasket. The cleaned spigot and gasket shall not be allowed to touch the trench walls or trench bottom at any time. Vegetable soap lubricant shall be applied in accordance with the pipe manufacturer's recommendations, to aid in making the joint. The workmen shall exercise caution to prevent damage to the gasket or the adherence of grease or particles of sand or dirt. Deflections shall be made only after the joint has been assembled.
5. Cutting of ductile iron pipe for inserting valves, fittings, etc., shall be done by the Contractor with a mechanical pipe saw in a neat and workmanlike manner without damage to the pipe, the lining, or the coating.
6. Unless otherwise directed, ductile iron pipe shall be laid with the bell ends facing in the direction of laying; and for lines on an appreciable slope, the bells shall, at the discretion of the Engineer, face upgrade.
7. Push-on and mechanical joints in ductile iron pipe and fittings shall be made in accordance with the manufacturer's standards except as otherwise specified herein. Joints between push-on and mechanical joint pipe and/or fittings shall be made in accordance with AWWA Standard Specification C600, "Installation of Ductile Iron Water Mains and their Appurtenances, except that deflection at joints shall not exceed one-half of the manufacturer's recommended allowable deflection, or one-half of the allowable deflection specified in AWWA C600, whichever is the lesser amount.
8. Flanged joints shall be used only where indicated on the Plans. Before making up flanged joints in the pipeline, the back of each flange under the

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bolt heads and the face of each flange shall have all lumps, blisters and excess bituminous coating re-moved and shall be wire brushed and wiped clean and dry. Flange faces shall be kept clean and dry when making up the joint, and the workmen shall exercise caution to prevent damage to the gasket or the adherence of grease or particles of sand or dirt. Bolts and nuts shall be tightened by opposites in order to keep flange faces square with each other, and to insure that bolt stresses are evenly distributed.

9. Bolts and nuts in flanged and mechanical joints shall be tightened in accordance with the recommendations of the pipe manufacturer for a leak-free joint. The workmen shall exercise caution to prevent overstress. Torque wrenches shall be used until, in the opinion of the Engineer, the workmen have become accustomed to the proper amount of pressure to apply on standard wrenches.

C. INSTALLATION OF PVC PIPE:

1. In the installation of glue joint PVC pipe, the pipe shall first be cut square and smooth. Wipe all surfaces to be connected with a cloth moistened with an appropriate solvent and remove any foreign matter from socket of fitting. Using an ordinary paint brush of width about equal to the nominal pipe size, apply a generous coat of cement to inside and shoulder of socket, flowing on but not brushing out. A similar coat shall then be applied to the end of the pipe for at least the same distance on the pipe as the depth of socket, and to the cut end. Pipe and fittings shall then be pressed firmly together and the pipe turned a quarter to a half turn to evenly distribute the cement. The cementing and joining operation must not exceed one minute. Allow 24 hours setup time before applying pressure. Sand shall be used as backfill material around pipe installed underground.
2. Thread Sealant: Teflon tape.
3. All rigid PVC pipe shall be cut, made up, and installed in accordance with the pipe manufacturer's recommendations. Plastic pipe shall be laid by snaking the pipe from one side of the trench to the other. Offset shall be as recommended by the manufacturer for the maximum temperature variation between time of solvent welding and during operation.
4. Schedule 80 pipe shall not be threaded. Use Schedule 80 threaded nipple where necessary to connect to threaded valve or fitting.
5. Only strap wrenches shall be used for tightening threaded plastic joints, and care shall be taken not to over tighten these fittings.
6. Provide adequate ventilation when working with pipe joint solvent cement.

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7. Testing: All lines shall be hydrostatically tested at the pressures specified elsewhere herein or at the design pressures.
8. Supports and Hangers: In accordance with the manufacturer's recommendations.

D. INSTALLATION OF COPPER PIPE:

1. Tubing above ground shall, whenever possible, be run in full lengths between fittings, valves and connections, and joints shall be kept to a minimum.
2. All connections shall be made without sharp bends or kinks in the tubing.
3. Above ground tubing shall be supported at short intervals to prevent sagging and vibration.
4. All copper pipe shall be reamed to full diameter before joining. The ends of pipe and the inside of fittings shall be cleaned and flux applied to the entire area of pipe to be soldered.

E. JOINT PIPE:

1. Threaded Pipe: Ream all pipe after cutting and before threading. Use non-hardening pipe compound "Tite-Seal" (or approved equal) on male threads only.
2. Provide nipples of same material and weight as pipe used. Provide extra strong nipples when length of unthreaded part of nipple is less than 1-1/2".
3. Provide reducing fittings rather than bushings where changes in pipe sizes occur.
4. Provide dielectric unions or flanges between copper and steel piping and between brassware and steel. Do not use steel and copper piping in the same system without such isolation.

F. UNIONS:

Provide unions or flanges in all domestic water service lines at each piece of equipment, specialty valves or at other locations required for ready disconnect.

G. PIPE PROTECTION:

1. Paint all uninsulated metal (ductile iron or steel) piping underground with two coats of asphaltic paint.
2. Wrap soil pipe that touches metal or is exposed to masonry with a layer of 6 mil polyethylene.

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3. Spirally-wrap all pipe lines embedded in concrete with two layers of 30 lb. felt.
4. Coat all exposed threads on galvanized steel pipe after assembly with two coats of zinc chromate.

H. CLEANING AND TESTING:

All of the piping installed under this project shall be tested as follows and as directed by the Engineer:

1. With exceptions as noted below, all ductile iron piping installed under this Contract shall be cleaned and tested according to Section 15995, "Pipeline Testing and Disinfection", and as modified below:
 - (a) Only potable water piping shall be disinfected.
 - (b) No leakage shall be permitted for any flanged-joint, or above ground piping.
2. Unless otherwise specified elsewhere herein, all PVC pressure system bushings and galvanized steel piping shall be tested at 150 psig. No leakage will be permitted.

I. INSTALLATION OF ABOVEGROUND AND EXPOSED PIPING:

1. Aboveground and exposed pipe fittings, valves and accessories shall be installed as shown or indicated on the Drawings.
2. Piping shall be cut accurately to measurements established at the job site and shall be worked into place without springing or forcing, properly clearing all equipment access areas and openings. Changes in sizes shall be made with appropriate reducing fittings rather than bushings. Pipe connections shall be made in accordance with the details shown and manufacturer's recommendations. Open ends of pipe lines shall be properly capped or plugged during installation to keep dirt and other foreign material out of the system. Pipe supports and hangers shall be provided where indicated and as required to insure adequate support of the piping.
3. Welded connections shall be made in conformity with the requirements of AWWA Standard C 206 and shall be done only by qualified welders. The Engineer may, at his option, require certificates that welders employed on the work are qualified in conformity with the requirements of this standard and/or sample welds to verify the qualifications of the welders. Before

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testing, field-welded joints shall be coated with the same material used to coat the pipe in accordance with the requirements of AWWA.

4. Flanged joints shall be made up by installing the gasket between the flanges. The threads of the bolts and the faces of the gaskets shall be coated with a suitable lubricant immediately before installation.
5. Joints using Dresser couplings shall be made up as recommended by the manufacturer.
6. Use of perforated band iron (plumber's strap), wire or chain as pipe hangers will not be acceptable. Supports for pipe less than 1-1/2 inches nominal size shall not be more than 8-feet on centers and pipe 2-inches nominal size and larger shall be supported at not more than 10 feet on centers, unless otherwise indicated. Supports for PVC pipe shall be spaced one-half the distance specified above unless otherwise indicated. Any noticeable sagging shall be corrected by the addition of extra supports at the Contractor's expense.

J. INSTALLATION OF HDPE SERVICES

All HDPE services require the use of a 10-gauge stranded copper blue tracer wire.

4.04 FIELD QUALITY CONTROL

- A. All water mains shall be flushed to remove all sand, debris, rock and other foreign matter. Dispose of the flushing water without causing a nuisance or property damage.
- B. Pressure and leakage testing shall follow the requirements of Section 15995, "Pipeline Testing and Disinfection".
 1. Where infiltration or exfiltration exceeds the allowable limits specified herein, the defective pipe, joints, or other faulty construction shall be located and repaired by the Contractor at no additional cost or time impact to the Contract.
 2. The Contractor shall provide all labor, equipment and materials, and shall conduct all testing required under the direction of the Engineer of Record. No separate payment will be made for this work and the cost for this work shall be included in the prices quoted in the Proposal.
 3. The Contractor shall locate and repair all leaks until the leakage is reduced to the limits specified. Any observed leaks or obviously defective joints or pipes shall be repaired or replaced as directed by the Engineer of Record, even though the total leakage is below that specified above.

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PIPING AND FITTINGS

- END OF SECTION -

SECTION 15100
VALVES, GENERAL

Part 1 - GENERAL

1.01 WORK INCLUDED

- A. The CONTRACTOR shall provide all tools, supplies, materials, equipment, and labor necessary for furnishing, epoxy coating, installing, adjusting, and testing of all valves and appurtenant work, complete and operable, in accordance with the requirements of the Contract Documents. Where buried valves are shown, the CONTRACTOR shall furnish and install valve boxes to grade, with covers, extensions, and position indicators.
- B. The provisions of this Section shall apply to all valves and valve operators specified in the various Sections and Division 2 of these Specifications except where otherwise specified in the Contract Documents. Valves and operators in particular locations may require a combination of units, sensors, limit switches, and controls specified in other Sections of these Specifications.

1.02 RELATED WORK

- A. Section 02000 - Water Distribution System
- B. Section 02222 - Excavation and Backfill for Utilities
- C. Section 15000 - Piping General

1.03 REFERENCE STANDARDS

- A. Codes: All codes, as referenced herein, are specified in Section 01090
- B. Commercial Standards:

ANSI B16.5	Pipe Flanges and Flanged Fittings, Steel Nickel Alloy and Other Special Alloys
ANSI/ASME B31.1	Power Piping
ASTM A 36	Specification for Structural Steel
ASTM A 48	Specification for Gray Iron Castings
ASTM A 126	Specification for Gray Iron Castings for Valves, Flanges, and Pipe Fittings
ASTM A 536	Specification for Ductile Iron Castings
ASTM B 61	Specification for Steam or Valve Bronze Castings
ASTM B 62	Specification for Composition Bronze or Ounce Metal Castings
ASTM B 148	Specification for Aluminum-Bronze Castings

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ASTM B 584	Specification for Copper Alloy Sand Castings for General Applications
ANSI/AWWA C500	Gate Valves for Water and Sewerage Systems
ANSI/AWWA C502	Dry-Barrel Fire Hydrants
ANSI/AWWA C503	Wet-Barrel Fire Hydrants
ANSI/AWWA C504	Rubber-Seated Butterfly Valves
ANSI/AWWA C507	Ball Valves 6 Inches Through 48 Inches
AWWA C508	Swing-Check Valves for Waterwork Service, 2 Inches Through 24 Inches NPS
ANSI/AWWA C509	Resilient-Seated Gate Valves for Water and Sewage Systems
ANSI/AWWA C511	Reduced-Pressure Principle Backflow-Prevention Assembly
AWWA C550	Protective Interior Coatings for Valves and Hydrants
SSPC-SP-2	Hand Tool Cleaning
SSPC-SP-5	White Metal Blast Cleaning

1.04 SUBMITTALS

- A. Shop Drawings: Shop drawings of all valves and operators including associated wiring diagrams and electrical data, shall be furnished as specified in Section 01300, "Submittals".
- B. Valve Labeling: The CONTRACTOR shall submit a schedule of valves to be labeled indicating in each case the valve location and the proposed wording for the label.

1.05 QUALITY ASSURANCE

- A. In accordance with the "Reduction of Lead in Drinking Water Act" (Act) enacted by the USEPA on January 4, 2011, effective January 4, 2014 all piping, fittings, fixtures, valves, and other appurtenances used in potable water supply and distribution systems shall be "lead free" as defined in Section 1417(d) of the Safe Drinking Water Act (SDWA). All requirements of the Act as it relates to the products under this section shall be strictly adhered to.
- B. All valves and related appurtenances shall be manufactured in the United States.
- C. Bolts on valve flanges shall be A-316 stainless steel.

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VALVES, GENERAL

- D. Valve Testing: Unless otherwise specified, each valve body shall be tested under a test pressure equal to twice its design water-working pressure.
- E. Bronze Parts: Unless otherwise specified, all interior bronze parts of valves shall conform to the requirements of ASTM B 62, or where not subject to dezincification, to ASTM B 584.
- F. Certification: Prior to shipment, the CONTRACTOR shall submit for all valves over 12 inches in size, certified, notarized copies of the hydrostatic factory tests, showing compliance with the applicable standards of AWWA, ANSI, ASTM, etc.

Part 2 - PRODUCTS

2.01 GENERAL

- A. The Contractor shall furnish all valves, gates, valve operating units, stem extensions, operators and other accessories as shown or specified. All valves and gates shall be new and of current manufacture. All non-buried valves, 6-inch and larger, shall have operators with position indicators. Where buried, these valves shall be provided with valve boxes, covers and valve extensions. Valves mounted higher than 6-feet above working level shall be provided with chain operators. All valve boxes shall have a minimum design pressure rating of 150 psi unless otherwise specified elsewhere herein. If two (2") or smaller valves are needed, Nibco T-113-LF shall be used.
- B. Ductile iron parts of valves shall meet the requirements of ASTM A126, "Standard Specifications for Gray Iron Castings for Valves, Flanges and Pipe Fittings, Class 'B'." Flanged ends shall be flat-faced and have bolt circle and bolt patterns conforming to ANSI B16.1 Class 125.
- C. All castings shall be clean and sound, without defects of any kind and no plugging, welding or repairing of defects will be permitted. All bolt heads and nuts shall be hexagonal conforming to ANSI B18.2. Gaskets shall be full-face and made of synthetic elastomers in conformance with ANSI B16.21 suitable for the service characteristics, especially chemical compatibility and temperature. Non-ferrous alloys of various types shall be used for parts of valves as specified. Where no definite specification is given, the material shall be the recognized acceptable standard for that particular application.
- D. All buried valves shall be provided with cast-iron valve boxes unless otherwise indicated. The boxes shall conform to City Standards and be installed perpendicularly, centered around and covering the upper portions of the valve operator. The top of each valve box shall be placed flush with finish

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VALVES, GENERAL

grade unless otherwise indicated on the Drawings. Valve boxes shall be as specified elsewhere in this Section.

- E. All buried valves and other valves located below a concrete operating deck or level, specified or noted to be key operated, shall have an operator to finish grade or deck level, non-rising stem, a 2-inch square AWWA nut with skirt, and cover or box and cover, as may be required.
- F. Extension Shafts:
 - 1. A one-piece extension shaft with an AWWA 2-inch square operator nut pinned at the top end and coupling shear pin shall be furnished with valves, where applicable, as shown in the Plans or Standard Details. Extension shafts shall be designed and furnished by the valve manufacturer and shall each be complete with coupling, standard AWWA 2-inch square operating nut with skirt, shear pins and centering-identification plate, for connection to the valve operator (or input) shaft as specified herein below. Shafts shall be of solid section. Hollow shafting is not acceptable.
 - 2. All operator components between the operating nut and the adjustable stops shall be designed to withstand, without damage, an input torque of 300 ft. lbs. The shaft shall be furnished with an AWWA 2-inch square operating nut with skirt, mounted and pinned to the top of the shaft. A coupling shall be provided for the bottom of the shaft to connect the extension to the valve operator (or input) shaft.
 - 3. The coupling shall be welded to the bottom end of the extension shaft after the exact required length of the shaft has been determined by field measurement during the valve installation and cut to size. The weld shall be wire brushed and painted with Kop-Coat Super Hi-Gard 891 or approved equal. The sized extension shaft with welded coupling shall be installed to the valve operator shaft and pinned with the coupling shear pin. The welding of the coupling to the extension shaft shall be performed by operators who are certified. The welding shall conform to all of the applicable recommendations of the American Welding Society and the American Institute of Steel Construction.
 - 4. The pin through the coupling and valve operator (or input) shaft shall be of a larger diameter than the pin through the top nut and extension shaft, so that if torque exceeds the designed limits, the pin through the nut will shear first. Pins shall be either force fit or mechanically locked. Mechanical locking shall be by lock washers, lock nuts, force fit or other sturdy and corrosion resistant means. No roll pins will be allowed. Riveted or welded type pins will not be allowed.

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5. The extension shaft shall also be equipped with a combination centering-identification plate. The combination centering-identification plate, with a drilled or punched center hole, will be slipped onto the shaft prior to welding the shaft's bottom coupling as specified above. The center hole in the plate shall be 1/4 inch larger in diameter than the shaft, maximum. The plate shall be 1/8-inch thick AISI Type 316 stainless steel with an outside diameter of 6-3/4 inches. The top of the plate shall be buffed to remove mill scale, and the following information shall be stamped into the top of the plate in letters and numerals not less than 3/8 inch in height; valve manufacturer; valve type, size and class; direction to open; and number of turns to fully open from a fully closed position. The valves shall open by turning the operating nuts counterclockwise.
- G. Valve Flanges: The flanges of valves shall be in accordance with Section 15000 - Piping General.
- H. Gate Valve Stems: Gate valve stems shall be of bronze conforming to ASTM B62, containing not more than 5 percent of zinc or more than 2 percent of aluminum. Gate valve stems shall have a minimum tensile strength of 60,000 psi, a minimum yield strength of 40,000 psi, and an elongation of at least 10 percent in 2 inches, as determined by a test coupon poured from the same ladle from which the valve stems to be furnished are poured. Where dezincification is not a problem, bronze conforming to ASTM B 584 may be used.
- I. Protective Coating: Except where otherwise specified, ferrous surfaces, exclusive of stainless steel surfaces, in the fluid passages of all valves 4-inch and larger shall receive an epoxy coating in accordance with AWWA C550. Flange faces of valves shall not be epoxy coated. The valve manufacturer shall certify in writing that such coating has been applied and tested in the manufacturing plant prior to shipment, in accordance with these Specifications. Exterior coating shall be asphalt varnish conforming to Federal Specification TT-C-494A.
- J. Nuts and Bolts: All nuts and bolts on valve flanges and supports shall be in accordance with manufacturer's recommendations. Where submerged or buried, all nuts, bolts and washers on valve flanges and valve bodies shall be A-316 stainless steel. Nuts, bolts and washers shall be of different grades of stainless steel to prevent galling.
- K. Valve Labeling: A label shall be provided on all shut-off valves exclusive of hose bibs and chlorine cylinder valves. The label shall be of 1/16-inch brass or stainless steel, minimum 2 inches by 4 inches in size, and shall be permanently attached to the valve or on the wall adjacent to the valve or as indicated by the City.

SECTION 15100

VALVES, GENERAL

L. Valve Operators

1. General

- (a) All butterfly valves, plug valves over 8-inch size and gate valves installed horizontally shall be furnished with geared operators, provided by the manufacturer. All valves of a particular size and pressure rating by a given manufacturer shall be supplied with the same operator. No variation will be permitted during the contract. All valve operators, regardless of type, shall be installed, adjusted, and tested by the valve manufacturer at the manufacturing plant. Operator orientation shall be verified with the City prior to fabrication. If this requirement is not met, changes to orientation shall be made at no cost the City.
- (b) All operators shall turn counter-clockwise to open. Operators shall have the open direction clearly and permanently marked. Field adjustment and testing of the operators and valves to ensure proper installation and operation shall be the responsibility of the Contractor.

2. Manual Operators

- (a) All manual operators shall be equipped with AWWA square nuts, handwheels or chain drives as appropriate. Some small (6-inch or less) valves may be lever operated if so specified elsewhere herein. Where buried, the valves shall have extensions with square nuts or floor stands as indicated on the Drawings. Valves mounted higher than 6 feet above floor or operating level shall have chain operators with chain terminating 4 feet above operating level.
- (b) Operation of valves and gates shall be designed so that the effort required to operate the handwheel, lever or chain shall not exceed 40 pounds applied at the extremity of the wheel or lever. The handwheels on valves 14 inches and smaller shall not be less than 8 inches in diameter, and on valves larger than 14 inches the handwheel shall not be less than 12 inches in diameter.
- (c) Chainwheel operator shall be fabricated of malleable iron with pocketed type chainwheels with chain guards and guides. Chainwheel operators shall be marked with an arrow and the word "open" indicating direction to open. The operators shall have galvanized smooth welded link type chain. Chain that is crimped or has links with exposed ends is not acceptable.

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3. Electric Motor Operators

- (a) All motorized valves shall be furnished by the CONTRACTOR through the valve manufacturers as a complete package. Motor driven valve operators shall be furnished and installed in accordance with the applicable requirements shown on the process and instrumentation diagrams and electrical elementary diagrams. Operators shall comply with AWWA requirements for electrical operators.
- (b) Electric operators including the motor, all required gearing, integral continuous duty rated reversing starter, AC line surge suppressors, controls and switches shall be as manufactured by Rotork, Limatorque, EIM; or equal. The motorized operators for modulating service shall be furnished with an integral position indicator/transmitter/controller. The above unit shall be internally powered, factory calibrated and furnished with adjustable zero, span, gain and deadband controls.
- (c) The position indicator/transmitter shall provide a linear, isolated, 4-20 mA, 24 VDC output to remote instrumentation and controls proportional to 0-100 percent travel span. An external DC power source shall not be required.
- (d) The position controller shall accept a linear 4-20 mA, 24 VDC input signal proportional to 0-100 percent travel span and shall generate appropriate outputs to the reversing starter to open/close the valve until the desired portion has been reached as determined by the position feedback signal to the position controller. Input signal isolation shall be provided.
- (e) The controller shall be furnished with circuitry to "lock in the last position" upon loss of control signal. CONTRACTOR shall be responsible for proper transmitter/controller calibration in accordance with the manufacturer's recommendations.
- (f) Operator capacity shall be adequate to continuously operate the valve under all operating conditions. Unless otherwise indicated, or specified, motor operators shall be furnished complete with motors, limit switch operating mechanisms, travel limit switches, torque switches, transmitters, controllers, starters, lighting and surge suppression, terminal blocks, gear reducers, handwheel, gearing, necessary components, and incidental accessories as follows:
 - All phases of the power supply shall be monitored. The contractor shall open de-energizing the motor upon detection of single phasing.

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- Logic circuits shall be protected against spurious voltage spikes, using opto-isolators in circuits connected to any remote input or output signals.
- (g) Enclosure: The starter for 240 volt single phase motor operators and all local devices shall be mounted on a common NEMA 4 and PVC coated cast aluminum enclosure. The enclosure shall be permanently affixed to the valve operator housing.
- (h) Valve Stops: Valve stops for the operators shall be positive in action. Closing shall be complete, and opening full. Stops shall be field adjustable to the required settings. The torque switches shall prevent any excessive mechanical stress or electrical overloading any direction of travel.
- (i) Limit switches and gearing shall be an integral part of the motorized valve operator. The limit switch gearing shall be of the intermittent type, totally enclosed in its own gear case, grease lubricated to prevent direct and foreign matter from entering the gear train and shall be made of bronze or stainless steel. Limit switches shall be of the adjustable type capable of being adjusted to trip at any point between the normal position (full open, or full closed) and 75 percent of the travel to the opposite position.
- (j) Local (Motor) Devices: Local devices shall include, but not be limited to the following:
- Torque Switches: Torque switches, responsive to high torque encountered in either direction of travel. A torque switch which has tripped due to mechanical load shall not reset when the operator motor has come to a halt.
 - Limit Switches: Travel limit switches, for opening and closing direction of travel. Contract operations shall be as indicated on the Drawings. If not shown on the Drawings, the operator shall be furnished with a minimum of two DPDT switches. All switches shall be furnished with 5 ampere contacts. Switches shall be connected such that when the valve is fully open, or fully closed, the "open" or "close" light shall be illuminated. All limit switch contacts shall be wired out to a terminal strip so that the electrician in the field does not have to connect to the switches.
 - Local/remote selector switch with phase motor relay and auxiliary to provide dry contacts for collective indication of placement in the "remote" operating mode, the unit is powered, and that all safety/overload interlocks are satisfied to provide

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the above signal. For further requirements refer to electrical elementary control schematic.

- Open/close push-button for local manual operation (modulating service).
 - Position indicator calibrated to 0-100 percent travel span.
 - Terminals for remote indication of full open, full closed and overload (torque).
- (k) Operating Unit Gearing: The actuator shall be double reaction unit with the capability of quickly changing the output speed with a gear change. The power gearing shall consist of generated spur or helical gears of heat-treated steel, and worm gearing where required by the type of operator. Quarter turn or traveling unit operators do not specifically require worm gearing. The worm shall be of hardened alloy steel and the worm gear shall be of alloy bronze. All power gearing shall be grease-lubricated. Ball or roller bearings shall be used throughout for all motor operators. A mechanical dial position indicator to display valve position in percent of valve opening shall be provided. The gearing shall comply with AWWA requirements.
- (l) Stem Nuts: The actuator for other than quarter turn valves shall have a stem nut of high tensile bronze or other material compatible with the valve stem and suited to the application. The nut arrangement, where possible, shall be of the two-piece type to simplify field replacement. The stem nut for rising stem valves must be capable of being removed from the top of the actuator without removing the actuator from the valve, disconnecting the electrical wiring, or disassembling any of the gearing within the actuator.
- (m) A handwheel shall be provided for manual operation. The handwheel shall not relocate during hand operation nor shall a fused motor prevent manual operation.
- (n) When in manual operating position, the volt motor driven unit will remain in this position until motor is energized at which time the valve operator will automatically return to electric operation and shall remain in motor position until handwheel operation is desired. This movement from motor operation to handwheel operation shall be accomplished by a positive declutching knob or lever which will disengage the motor and motor gearing mechanically not electrically. Hand operation must be reasonable fast and require no more than 100 lbs. of rim effort at the maximum required torque. It

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shall not be possible for the unit to be simultaneously in manual and motor operation.

- (o) 240 Volt Single Phase Motors: All motors on valves shall be designed for 240 volts 1-phase 60 Hz power. The motor shall be specifically designed for valve actuator service and shall be of high torque, squirrel cage reversible, totally enclosed, non-ventilated construction, with motor leads brought into the limit switch compartment without having external piping or conduit box. Motor insulation shall be NEMA Class B with maximum continuous temperature rating of 120° C (rise + ambient). Motors shall be sized to have a rated running time at the rated running torque of 15 minutes without exceeding the temperature rating of the insulation system. Running load torque shall be not more than 20 percent of the rated seating/unseating torque.
- (p) Speed-torque curves for the motors and torque calculations for seating, unseating, and running conditions shall be submitted. The maximum valve torque (seating/unseating) shall be less than 50 percent of stall torque or starting torque potential of the motor whichever is greater.
- (q) Operator Type:

Type A: Remote set-point using a 4-20 mable analog signal

Local Operation

- LOCAL/REMOTE selector
- OPEN/CLOSE push-buttons
- Position set-point potentiometer/indicator
- LOCAL accepts local position set-point
- OPEN/CLOSE indication
- Fault (torque) indication

Remote operation

- REMOTE - accept a remote 4-20 mA position set-point
- Position transmitter 4-20mA signal to RTU (Remote Transmitter Unit)
- Available Ready of Auto to RTU
- Fault torque status to RTU

- (r) Valve Closure Time shall be 1 minute

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(s) Spare Parts:

The CONTRACTOR shall furnish loose, one unit valve operator, complete with all the devices specified herein and with all the features and characteristics similar to the equipment supplied in this Contract. The spare operator shall be delivered to the CITY still in crates.

M. TORQUE LIMITING DEVICE

1. Each valve shall be provided with a torque limiting device designed to protect the actuator and valve parts. The device shall consist of an overtorque protection mechanism enclosed in a hermetically sealed cast iron housing. The mechanism shall be permanently lubricated and factory set to trip between 200 and 220 ft. lbs. of applied torque. The housing shall have integrally cast, 2-inch AWWA operating nut and matching socket to operate and to fit over the actuator or extension shaft nuts, respectively. The socket shall be provided with a set screw to fit the device. The direction of rotation shall be permanently shown with word and arrow next to the operating nut. The entire device shall be coated inside and out with a 2-part epoxy. The torque limiting device shall be as manufactured by Annspace Controls Company of St. Louis, Missouri, or approved equal.

N. FLOOR STANDS

1. Floor stands shall be cast iron, non-rising stem type with lockable hand wheel operator, valve position indicator and stainless steel or bronze extension stem. Hand wheel shall be lockable in the full open and full closed positions. The floor stand shall be furnished with an armored padlock and six keys. Lock shall be as manufactured by Master, Schlage or equal. Floor stand shall be standard pattern type as manufactured by Clow Corporation, or equal.

O. END CONNECTIONS:

1. The dimensions of end connections shall conform to AWWA Standard C111-85. The end flanges of flanged valves shall conform in dimensions and drilling to ANSI Standard B16.1 for cast iron flanges and flanged fittings, Class 125, unless specifically provided otherwise. The bolt holes shall straddle the vertical center-line.

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2.02 PLUG VALVES

- A. Plug valves shall be of the non-lubricated, eccentric type with resilient faced plugs. Port areas shall be at least 80 percent of full pipe area. Bodies shall be semi steel with raised seats. Seats shall have a welded in overlay of high nickel content on all surfaces contacting the plug face. Valves shall have permanently lubricated, stainless steel bearings in the upper and lower plug stem journals. All valves shall be of the bolted bonnet design.
- B. Valves shall be designed so that they can be repacked without removing the bonnet from the valve and the packing shall be adjustable. All nuts, bolts, springs and washers shall be cadmium plated.
- C. Valves shall be suitable for underground service and designed for working pressure of 150 P.S.I. The valve and actuator shall be capable of satisfactory operation in either direction of flow against pressure drops to and including 100 P.S.I.
- D. The exterior valve surfaces shall be shop painted with two coats of asphalt varnish conforming to Federal Specifications TT-V-51C.
- E. The valves shall be tested in accordance with ANSI/AWWA C504. The CONTRACTOR shall furnish certified copies of reports with every valve stating that the valve has met the requirements of the tests.
- F. Plug valve shall be Model 100 Series as manufactured by DeZurik Company, or equal.

2.03 GATE VALVES LESS THAN THREE INCH (3") IPS, BRONZED:

- A. Gate valves for use with pipe less than three inches (3") in diameter shall be rated for two hundred (200) psi working pressure, non-shock, block pattern, screwed bonnet, non-rising stem, brass body, and solid wedge. They shall be standard threaded for PVC pipe and have a malleable iron handwheel. Gate valves less than three inches (3") in diameter shall be NIBCO T-113-LF with no substitutions allowed.

2.04 GATE VALVES THREE INCH (3") TO TWELVE INCH (12"):

- A. The valves shall be resilient seated and shall conform in design, material, and workmanship to the standards of AWWA C509. Gate valves shall open counterclockwise and shall be of iron body, non-rising stem, and mechanical cut-in joint ends. All resilient seat valves must be bi-directional.
- B. Valves shall be coated with a two-part thermosetting epoxy coating on inside of valve and on valve disc. The coating shall conform to the requirements of AWWA C-550. After the factory test and inspection, all ferrous parts of the

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valves except finished or bearing surfaces shall be painted with two (2) coats of asphalt varnish, Federal Specification TT-V-51A or approved equal.

- C. Gate valves four inches (4") through twelve inches (12") in diameter shall be American Flow Control Series 2500, or U.S. Pipe A-USP1 Resilient Wedge Gate Valves. No Substitutions.

2.05 BUTTERFLY VALVES:

- A. Valves shall conform to all requirements of AWWA C504 Standard Class 150B. Valves shall have mechanical - joint-type ends conforming to AWWA C111 and cast iron body conforming to ASTM A126 Class B standards.
- B. Valve bodies shall have two shaft bearing hubs cast integrally with the valve bodies. Valve bearings shall be sleeve type bearings with nylon bearings that are self-lubricating and do not have a harmful effect on water. Valve disc shall be cast iron conforming to ASTM A-126 Class B with 316 stainless steel disc edge.
- C. Valves shall be Mueller 3211-20, Clow F-5370, American Flow Control, or City of Hollywood approved equal.

2.06 TERMINAL BLOW-OFF VALVES:

- A. The terminal blow-off valve assemblies shall be installed in accordance with the details shown in the City of Hollywood Standard Details. The following products shall be used to construct the assemblies:
- B. Angle Valves (for terminal blow-off): 2-inch threaded valves with handwheel, bronze body and composition disc. 2-inch angle valves for terminal blow-off shall be NIBCO T311 or ITT Grinnell Fig. No. 3220
- C. After the tap has been made and the corporation stop has been installed on a pipe conveying potable water, the exposed exterior surfaces of the stop shall be heavily coated with Kop-Coat Super Hi-Gard 891 White 1898, or approved equal. Where taps are made in a pipe conveying sewerage, the Contractor shall heavily coat the inside of the pipe around the stop and the exposed exterior surfaces of the stop with Bitumastic 300M, by Kop-Coat Co., or Protector 401 for sewer applications.
- D. The installation of the terminal blow-off outlet shall include excavation; cutting, threading and installing PVC and galvanized pipe and fittings; tapping the ductile iron plug; concrete thrust block; furnishing and installing angle valve; cutting and placing cast iron riser pipe complete with valve boxes and cover, set in concrete; backfilling and compaction; and all other appurtenant items and work.

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2.08 ECCENTRIC PLUG VALVES

- A. Equipment Requirements: Plug valves shall be on the non-lubricated, eccentric type with resilient faced plugs, port areas for valves 20 inches and smaller shall be at least 80% of full pipe area. Port area of valves 24 inches and larger shall be at least 70% of full pipe area. The body shall be of semi-steel (ASTM A-126 C1.B) and shall have bolted bonnet which gives access to the intervals of the valve. Seats shall be welded overlay of high nickel content or a stainless steel plate locked in the body cavity. If a plate is used, it shall be replaceable through the bonnet access. Bearings shall be permanently lubricated of stainless steel, bronze or teflon lined, fiber glass backed duralon. Bearing areas shall be isolated from the flow with grit seals. Valves shall have packing bonnets where the shaft protrudes from the grit seals. Valves shall have packing bonnets where the shaft protruded from the valve and the packing shall be self-adjusting chevron type which can be replaced without removing the bonnet. All nuts, bolts, springs and washers shall be stainless steel.
- B. Valves shall be designed for a working pressure of 150 PSI CWP. The valve and actuator shall be capable of satisfactory operation in either direction of flow against pressure drops up to and including 100 PSI (for plug valves over 12 inches in diameter). Valves shall be bubble tight in both directions at 100 psi differential.
- C. Plug valves over 12" in diameter shall have worm gear operators. The operating mechanism shall be for buried service with a 2 inch square operating nut.
- D. Plug valves are to be installed with the sear pointed towards the upstream flow, when specified.
- E. Manufacturers or Equal:
1. Clow Valve Co.;
 2. DeZurik Corporation;
 3. U.S. Pipe.

2.09 BALL VALVES (4-INCH AND SMALLER)

- A. General Requirements: Unless otherwise specified or shown, general purpose ball valves in size up to 4-inch shall have manual operators with lever or handwheel. Ferrous surface of 4-inch valves, which will be in contact with water shall be epoxy-coated. All ball valves shall be of best commercial quality, heavy duty construction.

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- B. Body: All ball valves up to 1-1/2 inch (incl.) in size shall have bronze or forged brass 2 or 3 piece bodies with screwed ends for a pressure rating of not less than 300 psi WOG. Valves 2-inch to 4-inch in size shall have bronze forged brass or steel 2 or 3 piece bodies with flanged ends for a pressure rating of 150 psi.
- C. Balls: The balls shall be solid brass or chrome plated bronze, or stainless steel, with large or full openings.
- D. Stems: The valves seats shall be of Teflon or Buna N or equal, for bi-directional service and easy replacement.
- E. Ball Valve Manufacturers or Equal:
 - 1. Jamesbury Corporation;
 - 2. Jenkins Bros.;
 - 3. Lunkenheimer Flow Control;
 - 4. Wm. Powell Company;
 - 5. Worcester Controls;
 - 6. Valve Primer Corporation.

2.10 CHECK VALVES

Refer to Section 15115, "Check Valves".

2.11 AIR-VACUUM AND AIR-RELEASE VALVES

- A. Air and Vacuum Valves: Air and vacuum valves shall be capable of venting large quantities of air while pipelines are being filled, and allowing air to re-enter while pipelines are being drained. They shall be of the size shown, with flanged or screwed ends to match piping. Bodies shall be of high-strength cast iron. The float, seat, and all moving parts shall be constructed of Type 316 stainless steel. Seat washers and gaskets shall be of a material insuring water tightness with a minimum of maintenance. Valves shall be designed for minimum 150 psi water-working pressure, unless otherwise shown.
- B. Air-Release Valves: Air-release valves shall vent accumulating air while system is in service and under pressure and be of the size shown and shall meet the same general requirements as specified for air and vacuum valves except that the vacuum feature will not be required. They shall be designed for a minimum water-working pressure of 150 psi, unless otherwise shown.
Combination Air Valves: Combination air valves shall combine the characteristics of air and vacuum valves and air release valves by exhausting accumulated air in systems under pressure and releasing or re-admitting large quantities of air while a system is being filled or drained, respectively. They shall have the same general requirements as specified for air and vacuum valves.

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C. Air Vacuum and Release Manufacturers or Equal:

1. APCO (Valve and Primer Corporation);
2. Golden-Anderson Valve Division (GA Industries, Inc);
3. Val-Matic (Valve and Manufacturing Corporation).

2.12 BEARINGS:

A. Valve bearings shall be the sleeve type.

1. 100% nylon or Teflon for valves 20 inches and smaller.
2. Bearings shall be Teflon with fiberglass backing for valves 24 inches and larger.
3. Bearings shall be self-lubricating and bearing load shall not exceed 1/5 of the compressive strength of the bearing or shaft material.

B. Valve Discs:

1. Discs shall operate through a 90 degree angle from fully closed to fully open.
2. Valve discs shall be cast iron alloy ASTM A436 Type 1, ASTM A48 or ASTM A126 for valves 20 inches and smaller and ASTM A48 cast iron or ASTM A536 ductile iron for valves 24 inches and larger.
3. Valve discs shall have a Type 316 stainless steel seating edge and shall not have any hollow chambers.

C. Shafts and Seals

1. Valve shafts shall be Type 316 stainless steel meeting the minimum requirements of AWWA C504.
2. Valve shafts shall be one piece for valves 20 inches and smaller and two piece for valves 24 inches and larger.
3. Shaft seals shall be self-compensating, split V type and shall be adjustable and replaceable without removing the operator and/or the shaft, except for buried applications.
4. Shaft seals shall be Buna-N unless otherwise specified.

D. Valves for buried service shall be totally enclosed, fully gasketed, grease packed and designed to operate indefinitely when submerged under a minimum 20 feet of water.

E. Manufacturers: Valmatic – American BFV, Pratt – Groundhog, or Dezurik – BAW.

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2.13 CORPORATION STOPS (Ball Valve Type)

- A. Unless otherwise shown, corporation stops shall be made of brass alloy for key operation, with screwed ends with corporation thread or iron pipe thread, as required. AWWA taper thread for inlet thread and compression type fittings for outlet.
- B. Corporation Stops shall be as manufactured by or the Ford Meter Box Company or approved equal.

2.14 TAPPING VALVES AND TAPPING SLEEVES:

- A. Tapping Sleeves - See Section 15102 – Tapping Sleeves and Tapping Valve.
- B. Tapping Valves – Refer to Gate Valves in Section 2.04.C above.

2.15 VALVE BOXES AND COVERS

- A. Valve boxes and covers for all size valves shall be of cast iron construction and adjustable screw-on type. The lid shall have cast in the metal the word "WATER" for the water lines, or "SEWER" for sewage force mains. All valve boxes shall be six-inch (6") nominal diameter and shall be suitable for depths of the particular valve. The stem of the buried valve shall be within twenty-four inches (24") of the finished grade unless otherwise approved by the ENGINEER. Valve boxes for 3" through 20" valves shall be Tyler Union model 6860 Cast Iron screw-type valve box with 5- $\frac{1}{4}$ " locking lid, or approved equal.
- B. Cast iron valve box shall not rest directly upon the body of the valve or upon the pipe. The box shall be placed in proper alignment and to such an elevation that its top will be at the final grade. Backfilling around both units shall be placed and compacted to the satisfaction of the ENGINEER.

Part 3 - EXECUTION

3.01 VALVE INSTALLATION

- A. General: All work shall be performed by skilled workmen experienced in similar installations. All valves shall be adequately supported by clamps, brackets, straps, concrete supports or other devices as shown or specified. All supports shall be secured to structures by approved inserts or expansion shields and bolts.
- B. All valves shall be thoroughly cleaned internally before being installed. Installation of valves shall be done in accordance with this section.
- C. All valves, gates, operating units, stem extensions, valve boxes, and accessories shall be installed in accordance with the manufacturer's written

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instructions and as shown and specified. All gates shall be adequately braced to prevent warpage and bending under the intended use. Valves shall be firmly supported to avoid undue stresses on the pipe. Install valves so that they are easily accessible for operation, visual inspection and preventive maintenance.

- D. Location of valves and chain operators: Install valves so as to be accessible for operation and free from interferences when operated. Position so that leakage will not contact any electrical equipment that may be located below.
- E. The installation of all underground valves shall include a valve box and riser in accordance with the Details shown on the Plans or in the Standard Details for the various sizes and types of valves to be installed. Riser pipes and valve boxes shall be carefully centered and set flush with the finished grade if in paving, or with the top of the ground if out of paved areas. All valve boxes shall be held in position with concrete as shown on the Plans or in the Standard Details.
- F. Upon completion of the Project, but prior to final acceptance, the Contractor in the presence of the Engineer, shall fully open each valve installed by him, except at connections to existing City mains. For valves 16-inch and larger, the Contractor, shall count the number of turns required to operate each valve from a completely closed to a fully opened position, and shall paint the number on the bottom of the valve box lid or manhole cover. Valves at connections to existing City mains shall only be operated by City forces.
- G. Valve Accessories: Where combinations of valves, sensors, switches, and controls are specified, it shall be the responsibility of the CONTRACTOR to properly assemble and install these various items so that all systems are compatible and operating properly. The relationship between interrelated items shall be clearly noted on shop drawing submittals.
- H. Flange Ends:
 - 1. Flanged valve boltholes shall straddle vertical centerline of pipe.
 - 2. Clean flanged faces, insert gasket and bolts, and tighten nuts progressively and uniformly.
- I. Screwed Ends:
 - 1. Clean threads by wire brushing or swabbing.
 - 2. Apply joint compound.

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J. Valve Orientation:

1. Install operating stem vertical when valve is installed in horizontal runs of pipe having centerline elevations 4 feet 6 inches or less above finished floor, unless otherwise shown.
2. Install operating stem horizontal in horizontal runs of pipe having centerline elevations between 4 feet 6 inches and 6 feet 9 inches above finish floor, unless otherwise shown.
3. Orient butterfly valve shaft so that unbalanced flows or eddies are equally divided to each half of the disc, i.e., shaft is in the plane of rotation of the eddy.
4. If no plug valve seat position is shown, locate as follows:
 - (a) Horizontal Flow: The flow shall produce an "unseating" pressure, and the plug shall open into the top half of valve.
 - (b) Vertical Flow: Install seat in the highest portion of the valve.

K. Install a line size ball valve and union upstream of each solenoid valve, in-line flow switch, or other in-line electrical device, excluding magnetic flowmeters, for isolation during maintenance.

L. Locate valve to provide accessibility for control and maintenance. Install access doors in finished walls and plaster ceilings for valve access.

M. Extension Stem for Operator: Where the depth of the valve is such that its centerline is more than 3 feet below grade, furnish an operating extension stem with 2-inch operating nut to bring the operating nut to a point 6 inches below the surface of the ground and/or box cover.

N. Torque Tube: Where operator for quarter-turn valve is located on floor stand, furnish extension stem torque tube of a type properly sized for maximum torque capacity of the valve.

3.02 VALVE CUT-INS ON WATER MAINS

A. Water system shall be maintained under pressure during entire construction. All valve additions shall be performed while the system is in service. No line shall be shut down during construction by CONTRACTOR or others unless approved by the OWNER.

B. Valve Accessories: Where combinations of valves, sensors, switches, and controls are specified, it shall be the responsibility of the CONTRACTOR to properly assemble and install these various items so that all systems are compatible and operating properly. The relationship between interrelated items shall be clearly noted on shop drawing submittals.

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3.03 TESTS AND INSPECTION

- A. Valve may be either tested while testing pipelines, or as a separate step.
- B. Test that valves open and close smoothly with operating pressure on one side and atmospheric pressure on the other, in both directions for two-way valve and applications.
- C. Inspect air and vacuum valves as pipe is being filled to verify venting and seating is fully functional.
- D. Count and record number of turns to open and close valve; account for any discrepancies with manufacturer's data.
- E. Set, verify, and record set pressures for all relief and regulating valves.
- F. Test hydrostatic relief valve seating; record leakage. Adjust and retest to maximum leakage of 0.1 gpm per foot of seat periphery.

- END OF SECTION -