

MS WRF Chlorine Contact Chamber (18-0060-UT)

CONTRACT DOCUMENTS & SPECIFICATIONS

Prepared for



Bid Set

December 2020



CLEARWATER
BRIGHT AND BEAUTIFUL • BAY TO BEACH

CITY OF CLEARWATER

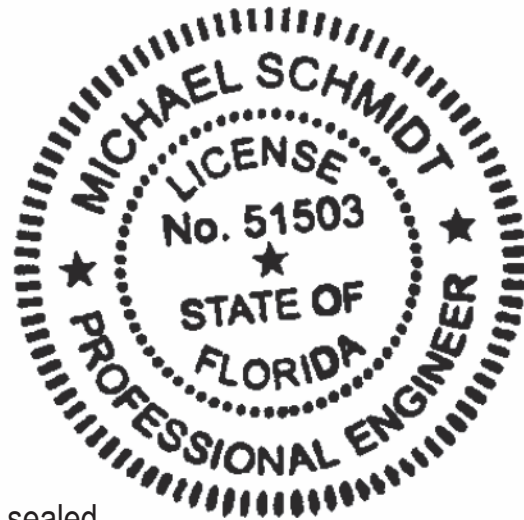
MS WRF Chlorine Contact Chamber (18-0060-UT)

PROFESSIONAL CERTIFICATIONS

The following individual is responsible for included specifications:

Michael Schmidt Digitally signed by
Michael Schmidt
Date: 2020.12.03
13:05:31 -05'00'

Michael Schmidt, P.E.
FL PE License No. 51503



This item has been electronically signed and sealed by Michael Schmidt, PE on the date adjacent to the seal using a SHA authentication code. Printed copies of this document are not considered signed and sealed and the SHA authentication code must be verified on any electronic copies.

City of Clearwater, Florida
MS WRF Chlorine Contact Chamber
(18-0060-UT)

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Prepared in the Office of the City Engineer

SECTION 1

INVITATION TO BID NOTICE TO CONTRACTORS

MS WRF Chlorine Contact Chamber

Documents and plans for Project #[18-0060-UT]
are available at www.myclearwater.com/bid.

The work includes:

The City operates two (2) chlorine contact chambers (CCCs) at the Marshall Street Water Reclamation Facility (WRF). The inner CCC needs repair at the weir wall before the de-chlorination tank as it may be the source of external seepage during operation. Phase 1 will include crack injections and waterproofing expansion joints along the weir wall. Phase 2 includes lining a portion of the inner CCC with a coating system. A Phase 3 additive alternative is also proposed to waterproof the Outer CCC expansion joint at the weir wall if Phase 1&2 repairs fail to stop the external seepage.

Pre-Bid Conference: (On site and Virtual)

Wednesday, January 27, 2021 1:00 – 2:00 PM at Marshall Street WRF

Virtual Pre-Bid Meeting: details will be posted at

<https://www.myclearwater.com/business/engineering-construction-bids>

Pre-qualification Submittal DEADLINE: Friday, January 29, 2021

Category: Wastewater Treatment Facility

Pre-Qualification Amount: \$110,000

Bids Due (Virtual Meeting): Thursday, February 18, 2021 2:00 PM

Virtual Bid Opening Meeting: details will be posted at:

<https://www.myclearwater.com/business/engineering-construction-bids>

Mail or Drop Bid Off:

City of Clearwater, Project # [18-0060-UT]

Procurement Office, 3rd Floor

Attn: Lori Vogel

100 S. Myrtle Ave, Clearwater, FL 33756-5520

Issued by: Lori Vogel CPPB, Procurement Manager

For additional information contact Engineering Dept.:

727-562-4750

SECTION II

INSTRUCTIONS TO BIDDERS

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1. COPIES OF BIDDING DOCUMENTS

- 1.1. Complete sets of the Bidding Documents are accessible through the City of Clearwater website at address: www.myclearwater.com/bid. Bidding Documents may include, but are not limited to, plans, specifications, bond forms, contract form, affidavits, bid/proposal form, and addendums.
- 1.2. Complete sets of Bidding Documents must be used in preparing bids. Neither the City nor the Engineer shall be liable for errors or misinterpretations resulting from the use of incomplete sets of Bidding Documents, by Bidders, sub-bidders, or others.

2. QUALIFICATION OF BIDDERS

- 2.1. Each prospective Bidder must pre-qualify to demonstrate, to the complete satisfaction of the City of Clearwater, that the Bidder has the necessary facilities, equipment, ability, financial resources and experience to perform the work in a satisfactory manner. An application package for pre-qualification may be obtained by contacting the City of Clearwater, Engineering Department, P.O. Box 4748, Clearwater, Florida 33758-4748 (mailing address); 100 South Myrtle Avenue, Clearwater, Florida 33756-5520 (street address) or by phone at (727) 562-4750. Pre-qualification requirement information is also available on the City of Clearwater Website at address:

www.myclearwater.com/government/city-departments/engineering/construction-management.

Contractors wanting to pre-qualify to bid on a project as a General Contractor must do so two weeks (ten workdays) prior to the bid opening date. Bidders currently pre-qualified by the City do not have to make reapplication. It is the Contractor's responsibility to confirm pre-qualification status before a Bid Opening.

The Contractor shall provide copies of the current Contractor License/Registration with the State of Florida and Pinellas County in the bid response.

3. EXAMINATION OF CONTRACT DOCUMENTS AND SITE

- 3.1. It is the responsibility of each Bidder, before submitting a Bid, to (a) examine the Contract Documents thoroughly; (b) visit the site to become familiar with local conditions that may in any manner affect cost, progress, performance or furnishing of the work; (c) consider and abide by all applicable federal, state and local laws, ordinances, rules and regulations; and (d) study and carefully correlate Bidder's observations with the Contract Documents, and notify Engineer in writing of all conflicts, errors or discrepancies in the Contract Documents.
- 3.2. For the purposes of bidding or construction, bidder may rely upon the accuracy of the technical data contained in reports of explorations and tests of subsurface conditions at the site which have been utilized by the Engineer in the preparation of the Contract Documents, but not upon non-technical data, interpretations or opinions contained therein or for the completeness thereof. Drawings relating to physical conditions of existing surface and subsurface conditions (except Underground Facilities) which are at or contiguous to the site and which have been utilized by the Engineer in preparation of the Contract Documents, may be relied upon by Bidder for accuracy of the technical data contained in such drawings but not upon the completeness thereof for the purposes of bidding or construction.

- 3.3. Information and data reflected in the Contract Documents with respect to Underground Facilities at or contiguous to the site are based upon information and data furnished to the City and Engineer by owners of such Underground Facilities or others, and the City does not assume responsibility for the accuracy or completeness thereof unless expressly provided in the Contract Documents.
- 3.4. Provisions concerning responsibilities for the adequacy of data furnished to prospective Bidders on subsurface conditions, Underground Facilities, other physical conditions, possible conditions, and possible changes in the Contract Documents due to differing conditions appear in the General Conditions.
- 3.5. Before submitting a Bid, each Bidder shall, at Bidder's own expense, make or obtain any additional examinations, investigations, explorations, tests and studies and obtain any additional information and data which pertain to the physical conditions (surface, subsurface and Underground Facilities) at or contiguous to the site or otherwise which may affect cost, progress, performance or furnishing the work in accordance with the time, price and other terms and conditions of the Contract Documents.
- 3.6. On request in advance, City will provide each Bidder access to the site to conduct such explorations and tests at Bidder's own expense as each Bidder deems necessary for submission of a Bid. Bidder shall fill all holes and clean up and restore the site to its former condition upon completion of such explorations and tests.
- 3.7. The lands upon which the Work is to be performed, rights-of-way and easements for access thereto and other lands designated for use by the Contractor in performing the Work are identified in the Contract Documents. All additional lands and access thereto required for temporary construction facilities or storage of materials and equipment are to be provided by the Contractor. Easements for permanent structures or permanent changes in existing structures are to be obtained and paid for by the City unless otherwise provided in the Contract Documents.
- 3.8. The submission of a Bid will constitute an unequivocal representation by the Bidder that the Bidder has complied with every requirement of these Instructions to Bidders and that, without exception, the Bid is premised upon performing and furnishing the Work required by the Contract Documents by such means, methods, techniques, sequences or procedures of construction as may be indicated in or required by the Contract Documents, and that the Contract Documents are sufficient in scope and detail to indicate and convey understanding of all terms and conditions of performance and furnishing of the work.

4. INTERPRETATIONS AND ADDENDA

- 4.1. All questions as to the meaning or intent of the Contract Documents are to be directed in writing to the Engineer. Interpretations or clarifications considered necessary by the Engineer in response to such questions will be issued by Addenda, via the Jiffy Reprographics Plan Room to all parties recorded by the Plan Room as plan holders having received the Bidding Documents. Questions received after the time frame specified on the pre-bid meeting agenda, prior to the date for opening of Bids, may not be answered. Only information provided by formal written Addenda will be binding. Oral and other interpretations of clarifications will be without legal effect.
- 4.2. Addenda may also be issued to modify the Bidding Documents as deemed advisable by the City or Engineer.

5. BID SECURITY OR BID BOND

- 5.1. Each Bid must be accompanied by Bid Security made payable to the City of Clearwater in an amount equal to ten percent (10%) of the Bidder's maximum Bid price and in the form of a certified or cashier's check or a Proposal/Bid Bond (on form provided in Section V) issued by a surety meeting the requirements of the General Conditions.
- 5.2. The Bid Security of the Successful Bidder will be retained until such Bidder has executed the Agreement and furnished the required Payment and Performance bonds, whereupon the Bid Security will be returned. If the Successful Bidder fails to execute, deliver the Agreement and furnish the required Bonds within ten (10) days after the award of contract by the City Council, the City may annul the bid and the Bid Security of the Bidder will be forfeited. The Bid Security of any Bidder whom the City believes to have a reasonable chance of receiving the award may be retained by the City until the successful execution of the agreement with the successful Bidder or for a period up to ninety (90) days following bid opening. Security of other Bidders will be returned approximately fourteen (14) days after the Bid Opening.
- 5.3. The Bid Bond shall be issued in the favor of the City of Clearwater by a surety company qualified to do business in, and having a registered agent in, the State of Florida.

6. CONTRACT TIME

- 6.1. The number of consecutive calendar days within which the work is to be completed is set forth in the Technical Specifications.

7. LIQUIDATED DAMAGES

- 7.1. Provisions for liquidated damages are set forth in the Contract Agreement, Section V.

8. SUBSTITUTE MATERIAL AND EQUIPMENT

- 8.1. The contract, if awarded, will be on the basis of material and equipment described in the Drawings or specified in the Specifications without consideration of possible substitute or "or equal" items. Whenever it is indicated in the Drawings or specified in the Specifications that a substitute or "or equal" item may be furnished or used, application for its acceptance will not be considered by the Engineer until after the effective date of the Contract Agreement. The procedure for submittal of any such application is described in the General Conditions and as supplemented in the Technical Specifications.

9. SUBCONTRACTORS

- 9.1. If requested by the City or Engineer, the Successful Bidder, and any other Bidder so requested, shall, within seven (7) days after the date of the request, submit to the Engineer an experience statement with pertinent information as to similar projects and other evidence of qualification for each Subcontractor, supplier, person and organization to be used by the Contractor in the completion of the Work. The amount of subcontract work shall not exceed fifty percent (50%) of the Work except as may be specifically approved by the Engineer. If the Engineer, after due investigation, has reasonable objection to any proposed Subcontractor, supplier, other person or organization, he may, before recommending award of the Contract to the City Council, request the Successful Bidder to submit an acceptable substitute without an increase in Contract Price or Contract Time. If the Successful Bidder declines to make any such substitution, the City may award the contract to the next lowest and most responsive Bidder

that proposes to use acceptable Subcontractors, Suppliers, and other persons and organizations. Declining to make requested substitutions will not constitute grounds for sacrificing the Bid Security to the City of any Bidder. Any Subcontractor, supplier, other person or organization listed by the Contractor and to whom the Engineer does not make written objection prior to the recommendation of award to the City Council will be deemed acceptable to the City subject to revocation of such acceptance after the Effective Date of the Contract Agreement as provided in the General Conditions.

- 9.2. No Contractor shall be required to employ any Subcontractor, supplier, person, or organization against whom he has reasonable objection.

10. BID/PROPOSAL FORM

- 10.1. The Bid/Proposal Form is included with the Contract Documents and shall be printed in ink or typewritten. All blanks on the Bid/Proposal Forms must be completed. Unit Prices shall be to no more than two decimal points in dollars and cents. The Bidder must state in the Bid/Proposal Form in words and numerals without delineation's, alterations or erasures, the price for which they will perform the work as required by the Contract Documents. Bidders are required to bid on all items in the Bid/Proposal form. The lump sum for each section or item shall be for furnishing all equipment, materials, and labor for completing the section or item as per the plans and contract specifications. Should it be found that quantities or amounts shown on the plans or in the proposal, for any part of the work, are exceeded or should they be found to be less after the actual construction of the work, the amount bid for each section or item will be increased or decreased in direct proportion to the unit prices bid for the listed individual items.
- 10.2. Bids by corporations shall be executed in the corporate name by the president or a vice-president (or other corporate officer accompanied by evidence of authority to sign) and the corporate seal shall be affixed. The corporate address and state of incorporation shall be shown below the Signature. If requested, the person signing a Bid for a corporation or partnership shall produce evidence satisfactory to the City of the person's authority to bind the corporation or partnership.
- 10.3. Bids by partnerships shall be executed in the partnership name and signed by a general partner, whose title shall appear under the signature and the official address of the partnership shall be shown below the signature.
- 10.4. All names shall be typed or printed below the signature.

11. SUBMISSION OF BIDS

- 11.1. Sealed Bids shall be submitted at or before the time and at the place indicated in the Advertisement for Bids and shall be submitted in a sealed envelope with the project name and number on the bottom left hand corner. If forwarded by mail, the Bid shall be enclosed in another envelope with the notation "Bid Enclosed" on the face thereof and addressed to the City of Clearwater, attention Purchasing Manager. Bids will be received at the office indicated in the Advertisement until the time and date specified. Bids in any other form will not be accepted.
- 11.2. The sealed bid envelope shall contain, but not be limited to, the Proposal/Bid Bond and corresponding Power of Attorney, Affidavit, Non Collusion Affidavit, Proposal (pages one

and two), Addendum Sheet, Bidder's Proposal, and Scrutinized Companies and Business Operations with Cuba and Syria Certification Form.

12. MODIFICATION AND WITHDRAWAL OF BIDS

- 12.1. Bids may be modified or withdrawn by an appropriate document duly executed (in the manner that a Bid must be executed) and delivered as described in the Advertisement of Bids. A request for withdrawal or a modification shall be in writing and signed by a person duly authorized to do so. Withdrawal of a Bid will not prejudice the rights of a Bidder to submit a new Bid prior to the Bid Date and Time. After expiration of the period for receiving Bids, no Bid may be withdrawn or modified.
- 12.2. After a bid is received by the City, the bidder may request to modify the bid for typographical or scrivener's errors only. The bidder must state in writing to the City that a typographical or scrivener's error has been made by the bidder, the nature of the error, the requested correction of the error, and what the adjusted bid amount will be if the correction is accepted by the City. The City reserves the right at its sole discretion to accept, reject, or modify any bid.

13. REJECTION OF BIDS

- 13.1. To the extent permitted by applicable State and Federal laws and regulations, the City reserves the right to reject any, and all Bids, and to waive any, and all informalities. Grounds for the rejection of a bid include but are not limited to a material omission, unauthorized alteration of form, unauthorized alternate bids, incomplete or unbalanced unit prices, or irregularities of any kind. Also, the City reserves the right to reject any Bid if the City believes that it would not be in the best interest of the public to make an award to that Bidder, whether because the Bid is not responsive or the Bidder is unqualified or of doubtful financial ability or fails to meet any other pertinent standard or criteria established by the City. The City reserves the right to decide which bid is deemed to be the lowest and best in the interest of the public.

14. DISQUALIFICATION OF BIDDER

- 14.1. Any or all bids will be rejected if there is any reason for believing that collusion exists among the bidders, the participants in such collusion will not be considered in future proposals for the same work. Each bidder shall execute the Non-Collusion Affidavit contained in the Contract Documents.

15. OPENING OF BIDS

- 15.1. Bids will be opened and read publicly at the location and time stated in the Advertisement for Bids. Bidders are invited to be present at the opening of bids.

16. LICENSES, PERMITS, ROYALTY FEES AND TAXES

- 16.1. The Contractor shall secure all licenses and permits (and shall pay all permit fees) except as specifically stated otherwise in the Technical Specifications. The Contractor shall comply with all Federal and State Laws, County and Municipal Ordinances and regulations, which in any manner effect the prosecution of the work. City of Clearwater building permit fees and impact fees will be waived except as specifically stated otherwise in the Technical Specifications.

- 16.2. The Contractor shall assume all liability for the payment of royalty fees due to the use of any construction or operation process, which is protected by patent rights except as specifically stated otherwise in the Technical Specifications. The amount of royalty fee, if any, shall be stated by the Contractor.
- 16.3. The Contractor shall pay all applicable sales, consumer, use, and other taxes required by law. The Contractor is responsible for reviewing the pertinent State Statutes involving the sales tax and sales tax exemptions and complying with all requirements.
- 16.4. The City of Clearwater is exempt from state sales tax on materials purchased by the City and incorporated into the WORK. The City of Clearwater reserves the right to implement the Owner Direct Purchase (ODP) Option, as may be indicated in the Scope of Work Description in Section IV – Technical Specifications and as defined in Section III – General Conditions.

17. IDENTICAL TIE BIDS/VENDOR DRUG FREE WORKPLACE

- 17.1. In accordance with the requirements of Section 287.087 Florida Statutes regarding a Vendor Drug Free Workplace, in the event of identical tie bids, preference shall be given to bidders with drug-free workplace programs. Whenever two or more bids which are equal with respect to price, quality, and service are received by the City 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 or all of the tied bidders have a drug-free workplace program. In order to have a drug-free workplace program, a contractor shall supply the City with a certificate containing the following six statements and the accompanying certification statement:
 - (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 as to 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 employees 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 of any state, for a violation occurring in the workplace no later than five (5) days after such conviction.
 - (5) Impose a sanction on or require the satisfactory participation in a drug abuse assistance or rehabilitation program if such is available in the employee's community, by any employee who is so convicted.
 - (6) Make a good faith effort to continue to maintain a drug-free workplace through implementation of this section.

I certify that this firm does/does not (select only one) fully comply with the above requirements.

18. AWARD OF CONTRACT

- 18.1. Discrepancies between words and figures will be resolved in favor of words. Discrepancies in the multiplication of units of work and unit prices will be resolved in favor of the unit prices. Discrepancies between the indicated sum of any column of figures and the correct sum thereof will be resolved in favor of the correct sum.
- 18.2. In evaluating the Bids, the City will consider the qualifications of the Bidders, whether the Bids comply or not with the prescribed requirements, unit prices, and other data as may be requested in the Bid/Proposal form. The City may consider the qualifications and experience of Subcontractors, suppliers and other persons and organizations proposed by the Contractor for the Work. The City may conduct such investigations as the City deems necessary to assist in the evaluation of any Bid and to establish the responsibility, qualifications and financial ability of Bidders, proposed Subcontractors, Suppliers and other persons, and organizations to perform and furnish the Work in accordance with the Contract Documents to the City's satisfaction within the prescribed time.
- 18.3. If the Contract is to be awarded, it will be awarded to the lowest responsible, responsive Bidder whose evaluation by the City indicates to the City that the award will be in the best interest of the City.
- 18.4. Award of contract will be made for that combination of base bid and alternate bid items in the best interest of the City, however, unless otherwise specified all work awarded will be awarded to only one Contractor.
- 18.5. The successful bidder/contractor will be required to comply with Section 119.0701, Florida Statutes (2014), specifically to:
 - (a) Keep and maintain public records that ordinarily and necessarily would be required by the City of Clearwater in order to perform the service;
 - (b) Provide the public with access to public records on the same terms and conditions that the City of Clearwater would provide the records and at a cost that does not exceed the cost provided in this chapter or as otherwise provided by law;
 - (c) Ensure that public records that are exempt or confidential and exempt from public records disclosure requirements are not disclosed except as authorized by law; and
 - (d) Meet all requirements for retaining public records and transfer, at no cost, to the City of Clearwater all public records in possession of the contractor upon termination of the contract and destroy any duplicate public records that are exempt or confidential and exempt from public records disclosure requirements. All records stored electronically must be provided to the public agency in a format that is compatible with the information technology systems of the City of Clearwater.

19. BID PROTEST

19.1. RIGHT TO PROTEST:

Any actual bidder who is aggrieved in connection with the solicitation or award of a contract may seek resolution of his/her complaints initially with the Purchasing Manager, and if not satisfied, with the City Manager, in accordance with protest procedures set forth in this section.

19.2. PROTEST PROCEDURE:

- A. A protest with respect to the specifications of an invitation for bid or request for proposal shall be submitted in writing a minimum of five (5) work days prior to the opening of the bid or due date of the request for proposals, unless the aggrieved person could not have been reasonably expected to have knowledge of the facts giving rise to such protest prior to the bid opening or the closing date for proposals. Opening dates for bids or due dates for requests for proposal will be printed on the bid/request document itself.
- B. Protests in respect to award of contract shall be submitted in writing a maximum of five (5) workdays after notice of intent to award is posted, or is mailed to each bidder, whichever is earlier. Notice of intent to award will be forwarded to bidders upon telephonic or written request. Protests of recommended award should cite specific portions of the City of Clearwater Code of Ordinances that have allegedly been violated.
- C. Exceptions to the five (5) day requirements noted in both A and B above may be granted if the aggrieved person could have not been reasonably expected to have knowledge of the facts giving rise to such protest prior to the bid opening, posting of intent to award, or due date for requests for proposals. Request for exceptions should be made in writing, stating reasons for the exception.
- D. The Purchasing Manager shall respond to the formal written protest within five (5) workdays of receipt. The Purchasing Manager's response will be fully coordinated with the appropriate Department Director and the Assistant City Manager.
- E. If the protestor is not satisfied with the response from the Purchasing Manager, he/she may then submit in writing within five (5) work days of receipt of that response his/her reason for dissatisfaction, along with copies of his/her original formal protest letter and the response from the Purchasing Manager, to the City Manager.
- F. The City Manager as Purchasing Agent for the City has the final authority in the matter of protests. The City Manager will respond to the protestor within ten (10) workdays of receipt of the appeal.

19.3. PROTEST FEE:

When filing a formal protest, the protesting vendor must include a fee in the amount of 5% of the selected vendor's total bid to offset the City's additional expenses related to the protest. This fee shall not exceed \$2,500 nor be less than \$50. If either the Purchasing Manager or the City Manager upholds the protest, the City will refund 100% of the fee paid.

19.4. STAY OF PROCUREMENT DURING PROTEST:

In the event of a timely protest, the Purchasing Manager shall not proceed with the solicitation or award of contract until all administrative remedies have been exhausted or until the City Manager makes written determination that the award of contract without delay is necessary to protect the best interest of the City.

20. TRENCH SAFETY ACT

- 20.1. The Bidder shall comply with the provisions of the City of Clearwater's Ordinance related to trench digging (Ordinance No. 7918-08) along with the Florida Trench Safety Act (Sections 553.60-553.64, Florida Statutes) and the provisions of the Occupational Safety and Health Administration's (OSHA) excavation safety standards, 29 C.F.R.s 1926.650 Subparagraph P, or current revisions of these laws.

21. CONSTRUCTION SITE EROSION AND SEDIMENT CONTROL MANAGEMENT MEASURES

- 21.1. The Bidder shall comply with the provisions of the Environmental Protection Agency (EPA) National Pollution Discharge Elimination System (NPDES) stormwater permit and implement stormwater pollution prevention plans (SWPPP's) or stormwater management programs (both using best management practices (BMPs) that effectively reduce or prevent the discharge of pollutants into receiving waters.
- A. The control of construction-related sediment loadings is critical to maintaining water quality. The implementation of proper erosion and sediment control practices during the construction stage can significantly reduce sediment loadings to surface waters.
 - B. Prior to land disturbance, prepare and implement an approved erosion and sediment control plan or similar administrative document that contains erosion and sediment control provisions.

NPDES Management Measures available at City of Clearwater Engineering Environmental Division and EPA websites to help address construction-related Best Management Practices.

SECTION III

GENERAL CONDITIONS

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1. DEFINITIONS

Addenda

Written or graphic instruments issued prior to the opening of Bids which clarify, correct or change the Bidding Requirements or the contract documents.

Agent

Architect, engineer or other outside agency, consultant or person acting on behalf of the City.

Agreement

The written contract between Owner and Contractor covering the Work to be performed; other Contract Documents are attached to the Agreement and made a part thereof as provided therein.

Application for Payment

The form accepted by Engineer which is to be used by Contractor in requesting progress or final payments and which is to be accompanied by such supporting documentation as is required by the Contract Documents.

Approve

The word approve is defined to mean satisfactory review of the material, equipment or methods for general compliance with the design concepts and with the information given in the Contract Documents. It does not imply a responsibility on the part of the Engineer to verify in every detail conformance with the Drawings and Specifications.

Bid

The offer or proposal of the bidder submitted on the prescribed form setting forth the prices for the work to be performed.

Bidding Documents

The advertisement or invitation to Bid, instructions to bidders, the Bid form, and the proposed Contract Documents (including all Addenda issued prior to receipt of Bids).

Bonds

Performance and payment bonds and other instruments of security.

Change Order

A written order to Contractor signed by Owner and Contractor authorizing an addition, deletion or revision in the Work, or an adjustment in the Contract Price or the Contract Time issued on or after the effective date of the Agreement.

City

The City of Clearwater, Pinellas County, Florida.

Construction Inspector

A person who is the authorized representative of the Construction Manager and inspects City construction projects in order to insure the Contractor's work complies with the intent of the Contract Documents.

Construction Manager

The person who is typically in responsible charge of City construction projects. The Construction Manager assumes responsibility for the management of construction contracts at the Preconstruction Conference. The Construction Manager chairs the

Preconstruction Conference and is the authority on any disputes or decisions regarding contract administration and performance. The Construction Manager typically acts as the Owner's Representative during construction.

Contract Documents

The Agreement, Addenda (which pertain to the Contract Documents), Contractor's Bid (including documentation accompanying the bid and any post-Bid documentation submitted prior to the execution of the Agreement) when attached as an exhibit to the Agreement, the Bonds, Instructions to Bidders, these General Conditions, any Supplementary Conditions, the Specifications and the Drawings, any other exhibits identified in the Agreement, together with all Modifications issued after the execution of the Agreement.

Contract Price

The Contract price constitutes the total compensation (subject to authorized adjustments) payable by Owner to Contractor for performing the Work.

Contract Time

The number of days or the date stated in the Agreement for the completion of the Work.

Contractor

The Person with whom the Owner has entered into the Agreement. For the purposes of this contract, the person, firm or corporation with whom this contract or agreement has been made by the City of Clearwater or its duly authorized representative.

Critical Path Method Construction Schedule—CPM

A graphic format construction schedule that displays construction activities as they relate to one another for the purpose of identifying the most efficient way to perform the work in a timely manner. The critical path identifies which activity is critical to the execution of the schedule.

Day

A calendar day of twenty-four (24) hours measured from midnight to the next midnight.

Defective

An adjective which when modifying the word Work refers to Work that is unsatisfactory, faulty or deficient, or does not conform to the Contract Documents or does not meet the requirements of any inspection, reference standard, test or approval referred to in the Contract Documents, or has been damaged prior to Engineers recommendation of final payment.

Drawings

The drawings, which will be identified in Technical Specifications or the Agreement, which show the character and scope of the Work to be performed and which have been prepared or approved by Engineer and are referred to in the contract documents. Shop drawings are not Drawings as so defined.

Engineer

The duly appointed representative of the City Manager of the City of Clearwater. For the purposes of this contract, the City Engineer of the City of Clearwater, Pinellas County, Florida, or his authorized representative. For certain projects, the Engineer may serve as the Owner's Representative during construction.

Engineer's Consultant

A Person having a contract with Engineer to furnish services as Engineer's independent professional associate or consultant with respect to the Project and who is identified as such in the Supplementary Conditions.

F.D.O.T Specifications

The Standard Specifications for Road and Bridge Construction as issued by the Florida Department of Transportation (latest English edition).

Furnish

The words "furnish", "furnish and install", "install", and "provide" or words of similar meaning shall be interpreted, unless otherwise specifically stated, to mean "furnish and install complete in place and ready for service".

Inspection

The term "inspection" and the act of inspecting means examination of construction to ensure that it conforms to the design concept expressed in the Drawings and Specifications. These terms shall not be construed to mean supervision, superintending or overseeing.

Laws and Regulations

Any and all applicable laws, rules, regulations, ordinances, codes and orders of any kind of governmental bodies, agencies, authorities and courts having jurisdiction.

Liens

Liens, charges, security interests or encumbrances upon real property or personal property.

Milestone

A principal event specified in the contract Documents relating to an intermediate completion date or time prior to the final completion date.

Notice to Proceed (NTP)

A written notice given by the Owner to the Contractor fixing the date on which the Contract Time will commence to run and on which Contractor shall start to perform his obligations under the Contract Documents.

Owner

The City of Clearwater, Florida. For the purposes of this contract, the person who is the City's authorized representative from the City's Department with whom will be responsible for the maintenance and operation of the Work once the Work is completed. For certain projects, a designee of the Owner may serve as the Owner's Representative during construction.

Owner's Representative

Designee of the Owner with authority to act on behalf of the Owner during construction.

Person

A natural person, or a corporation, partnership, firm, organization, or other artificial entity.

Project

The total construction of which the Work to be provided under the Contract Documents may be the whole or a part as indicated elsewhere in the Contract Documents.

Partial Utilization

Use by Owner of a substantially completed part of the Work for the purpose for which is intended (or a related purpose) prior to Final Completion of all the Work.

Representative of Contractor

The Contractor shall assign a responsible person or persons, one of whom shall be at the construction site at all times that work is progressing. The names and positions of these persons shall be submitted to the City Engineer at the time of the pre-construction conference. This person or persons shall not be changed without written approval of City Engineer.

Request for Information (RFI)

An official written request for clarification of the intent of the contract documents from the Contractor to the Engineer.

Shop Drawing

All drawings, diagrams, illustrations, schedules and other data which are specifically prepared by or for Contractor to illustrate some portion of the Work and all illustrations, brochures, standard schedules, performance charts, instructions, diagrams and other information prepared by a supplier and submitted by Contractor to illustrate material or equipment for some portion of the Work.

Specifications

Those portions of the Contract Documents consisting of written technical descriptions of materials, equipment, construction systems, standards and workmanship as applied to the Work and certain administrative details applicable thereto.

Subcontractor

A person having a direct contract with Contractor or with any other Subcontractor for the performance of a part of the Work at the site.

Substantial Completion

The Work (or a specified part thereof) which has progressed to the point where, in the opinion of Engineer, as evidenced by Engineer's definitive certificate of Substantial Completion, it is sufficiently complete, in accordance with the Contract documents, so that the Work (or specified part) can be utilized for the purposes for which it is intended; or if no such certificate is issued, when the Work is complete and ready for final payment as evidenced by the Engineer's recommendation of final payment. The terms "substantially complete" and "substantially completed" as applied to all or part of the Work refer to Substantial Completion thereof.

Supplementary Conditions

The part of the Contract which amends or supplements these General Conditions.

Supplier

A manufacturer, fabricator, supplier, distributor, material man or vendor having a direct contract with Contractor or with any Subcontractor to furnish materials or equipment to be incorporated in the Work by the Contractor.

Surety

Any person, firm or corporation which is bound with Contractor and which engages to be responsible for Contractor and his acceptable performance of the Work by a Bid, Performance or Payment Bond.

Underground Facilities

All pipelines, conduits, ducts, cables, wires manholes, vaults, tanks, tunnels or other such facilities or attachments, and any encasements containing such facilities which have been

installed underground to furnish any of the following services or materials: electricity, gases, steam, liquid petroleum products, telephone or other communications, cable television, sewage and drainage removal or treatment, traffic or other control systems or water.

Unit Price Work

Work to be paid for on the basis of unit prices.

Work

The entire completed construction or the various separately identifiable parts thereof required to be furnished under the Contract Documents. Work includes and is the result of performing or furnishing labor and incorporating materials and equipment into the construction, and performing or furnishing services and furnishing documents, all as required by the Contract Documents.

Work Change Directive

A written directive to Contractor, issued on or after the Effective Date of the Agreement and signed by the Engineer, ordering an addition, deletion, or revision in the Work, or responding to differing or unforeseen physical conditions under which the Work is to be performed or emergencies. Work Change Directive will not change the Contract Price or Contract Time but is evidence that the parties expect that the change directed or documented by a Work Change Directive will be incorporated in a subsequently issued Change Order following negotiations by the parties as to its effect, if any, on the Contract Price or Contract Times.

2. PRELIMINARY MATTERS

2.1. DELIVERY OF BONDS AND CERTIFICATES OF INSURANCE

When Contractor delivers the executed Agreements to the Owner, Contractor shall also deliver to the Owner such Bonds and Certificates of Insurance as Contractor may be required to furnish by this contract.

2.2. COPIES OF DOCUMENTS

Engineer shall furnish to Contractor one (1) copy of Contract Documents for execution. Additional copies will be furnished, upon request, at the cost of reproduction.

2.3. COMMENCEMENT OF CONTRACT TIME/NOTICE TO PROCEED; STARTING THE PROJECT

The Contract Time will commence on the day indicated in the Notice to Proceed. Contractor shall start to perform the work on the date the Contract Time commences to run. No work shall be done at the site prior to the date that the Contract Time commences to run. Pursuant to Section 255.05(1)(b), Florida Statutes, the Notice to Proceed cannot be issued until Contractor provides City with a certified copy of the recorded bond issued by the Pinellas County Clerk of Court.

2.4. BEFORE STARTING CONSTRUCTION

Before undertaking each part of the Work, Contractor shall carefully study and compare the Contract Documents and check and verify pertinent figures shown thereon and all applicable field measurements. Contractor shall promptly report in writing to Engineer any conflict, error or discrepancy which Contractor may discover; and shall obtain a written interpretation or clarification from Engineer before proceeding with any work effected thereby; however, Contractor shall not be liable to the Owner for failure to report any conflict, error or discrepancy in the Drawings or Specifications, unless Contractor had actual knowledge thereof or should reasonably have known thereof.

No verbal agreement or conversation with any officer, Agent or employee of the Owner or Engineer's Consultant, either before or after the execution of this Contract, shall affect or modify any of the terms or obligations herein contained. Contractor shall not commence any work at any time without approved insurance required by these General Conditions. Failure to obtain this insurance will be the sole responsibility of the Contractor.

2.5. PRECONSTRUCTION CONFERENCE

After Contract has been fully executed and before the start of the Work, the Owner's Representative shall schedule a preconstruction conference to be attended by Contractor, Engineer, Owner and others as appropriate to establish a working understanding among the parties as to the Work and to discuss the schedule of the Work and general Contract procedures.

The Contractor shall submit to the Owner's Representative prior to the Notice to Proceed, a color Critical Path Method (CPM) Construction Schedule. This is to be a sequence of events including submittal review and procurement. Notice to Proceed is usually established at the preconstruction conference and such date can be inserted into the schedule at that time. The Contractor shall also submit a Submittal Schedule for review by the Engineer. This is to make sure that the list is complete, and this schedule shall be the basis of a Submittal Log.

The Contractor shall submit to the Owner's Representative prior to the Notice to Proceed, a completed Emergency Call List, a completed Authorized Signature List, and Verification of Illegal Discharge Construction Site Training.

2.6. PROGRESS MEETINGS

The Contractor is required to attend Progress Meetings. These meetings will be scheduled on a weekly, bi-weekly, or monthly basis depending on the needs of the project. The Contractor shall bring to each meeting an updated submittal log, an updated request for information (RFI) log, a look-ahead schedule to cover the project activity from the current meeting to the next meeting, and all material test reports generated in the same time period.

3. CONTRACT DOCUMENTS, INTENT

3.1. INTENT

The Contract Documents comprise the entire Agreement between Owner and the Contractor concerning the Work. They may be altered only by written agreement. 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 to describe a functionally complete project (or part thereof) to be

constructed in accordance with the Contract Documents. Any Work, materials or equipment which may reasonably be inferred from the Contract Documents or from prevailing custom or from trade usage as being required to produce the intended result will be furnished and performed whether or not specifically called for. When words or phrases, which have a well-known technical or construction industry or trade meaning, are used to describe Work, materials or equipment, such words or phrases shall be interpreted in accordance with that meaning. Clarifications and interpretations of the Contract Documents shall be issued by the Owner's Representative. Reference to standards, specifications, manuals or codes of any technical society, organization or association, or to the code, Laws or Regulation of any governmental authority, whether such reference be specific or by implication, shall mean the latest standard specification, manual or code, or Laws or Regulations in effect at the time of opening of Bids except as may be otherwise specifically stated in the Contract Documents. However, no provision of any referenced standard specification, manual or code, whether or not specially incorporated by reference in the responsibilities of Owner or Contractor as set forth in the Contract Documents, shall change the duties and responsibilities of Owner, Contractor, Engineer or Owner's Representative, or any of their Agents or employees from those set forth in the Contract Documents. Clarifications and interpretations of the Contract shall be issued by the Owner's Representative. Each and every provision of law and clause required by law to be inserted in these Contract documents shall be deemed to be inserted herein, and they shall be read and enforced as through it were included herein, and if through mistake or otherwise, any such provision is not inserted, or if not correctly inserted, then upon the application of either party, the Contract Documents shall forthwith be physically amended to make such insertion.

3.2. REPORTING AND RESOLVING DISCREPANCIES

If, during the performance of the Work, Contractor discovers any conflict, error, ambiguity or discrepancy within the Contract Documents or between the Contract Documents and any provision of any such Law or Regulation applicable to the performance of the Work or of any such standard, specification, manual or code or of any instruction of any Supplier, Contractor shall report it to the Owner's Representative in writing at once, and Contractor shall not proceed with the Work affected thereby (except in an emergency) until an amendment or supplement to Contract Documents has been issued by one of the methods provided in these General Specifications, provided however, that Contractor shall not be liable to Owner, or Owner's Representative for failure to report any such conflict, error, ambiguity or discrepancy unless Contractor knew or reasonably should have known thereof.

4. AVAILABILITY OF LANDS; SUBSURFACE AND PHYSICAL CONDITIONS; REFERENCE POINTS

4.1. AVAILABILITY OF LANDS

The Owner shall furnish, as indicated in the Contract Documents, the lands upon which the Work is to be Performed, rights-of-way, easements, rights of entry for access thereto, and such other lands which are designated for the use of contractor. The Owner shall identify any encumbrances or restrictions not of general application but specifically related to use of lands so furnished with which contractor will have to comply in performing the Work. Easements for permanent structures or permanent changes in existing facilities will be obtained and paid for by the Owner, unless otherwise provided in the Contract Documents.

4.2. INVESTIGATIONS AND REPORTS

Reference is made to the Supplementary Conditions and Technical Specifications for identification of those reports of investigations and tests of subsurface and latent physical conditions at the site or otherwise affecting cost, progress or performance of the Work which have been relied upon by Engineer in preparation of the Drawings and Specifications. Such reports are not guaranteed as to accuracy or completeness and are not part of the Contract Documents. Contractor shall promptly notify the Owner's Representative in writing of any subsurface or latent physical conditions at the site, or in an existing structure, differing materially from those indicated or referred to in the Contract Documents. Engineer will promptly review those conditions and advise if further investigation or tests are necessary. Owner or Engineer shall obtain the necessary additional investigations and tests and furnish copies to the Engineer and Contractor. If Engineer finds that the results of such investigations or tests indicate that there are subsurface or latent physical conditions, which differ materially from those, indicated in the contract Documents, and which could not reasonably have been anticipated by Contractor, a work change, or Change Order will be issued incorporating the necessary revisions.

4.3. PHYSICAL CONDITIONS, UNDERGROUND FACILITIES

The information and data shown or indicated in the Contract Documents with respect to existing Underground Facilities at or contiguous to the site is based on information and data furnished to Owner or Engineer by the owners of such Underground Facilities or by others. Unless otherwise expressly provided in the Contract Documents, Owner and Engineer shall not be responsible for the accuracy or completeness of any such information or data; and the cost of all the following will be included in the Contract Price and contractor shall have full responsibility for: (i) reviewing and checking all such information and data, (ii) locating all Underground Facilities shown or indicated in the Contract Documents, (iii) coordination of the Work with the owners of such Underground Facilities during construction, and (iv) the safety and protection of all such Underground Facilities and repairing any damage thereto resulting from the Work. The Contractor is required to call the Sunshine State One Call of Florida prior to any excavation per State regulations and to notify any utility owners who are not a member of the Sunshine State One Call of Florida prior to any excavation. The Sunshine State One Call of Florida is an agency for the protection and location of utilities prior to any excavation and contact number is available in local telephone directory.

4.4. REFERENCE POINTS

Engineer shall provide engineering surveys to establish reference points for construction, which in Engineer's judgment are necessary to enable Contractor to proceed with the Work. Contractor shall be responsible for laying out the Work, unless otherwise noted in the Contract, shall protect and preserve the established reference points and shall make no changes or relocations without the prior written approval of the Owner and Engineer. Contractor shall report to Engineer whenever any reference point is lost or destroyed or requires relocation because of necessary changes in grades or locations and shall be responsible for the accurate replacement or relocation of such reference points by a surveyor licensed in the State of Florida. The Contractor is referred to the Technical Specifications for more specific information regarding the provision of construction surveys. If a City survey crew is assigned to the project and there is excessive stake replacement caused by negligence of Contractor's forces after initial line and grade have been set, as determined by the Engineer, the Contractor will be charged at the rate of \$100.00 per hour. Time shall be computed for actual time on the project. All time shall be computed in one-hour increments with a minimum charge of one hour.

5. BONDS AND INSURANCE

5.1. PERFORMANCE AND PAYMENT BOND/CONTRACT BOND

Contractor shall furnish a Performance and Payment Bond pursuant to Section 255.05, Florida Statutes in an amount equal to the Contract Price as security for the faithful performance and payment of all Contractor's obligations under the Contract Documents. This bond shall remain in effect at least one year after the date when final payment becomes due, unless a longer period of time is prescribed by laws and regulations or by the Contract Documents. Contractor shall also furnish such other Bonds as are required by the Supplementary Conditions. All Bonds shall be in the form prescribed by the Contract Documents in Section V and shall be executed by such sureties as are named in the current list of "Companies Holding Certificates of Authority as Acceptable Sureties on Federal Bonds and as Acceptable Reinsuring Companies" as published in Circular 570 (amended) by the Audit Staff, Bureau of Government Financial Operations, U.S. Treasury Department. All bonds signed by an agent must be accompanied by a certified copy of such agents' authority to act. All bonds shall be deemed to contain all of the Conditions of Section 255.05, Florida Statutes, even if such language is not directly contained within the bond and the Surety shall be licensed and qualified to do business in the State of Florida. Owner reserves the right to reject any surety. If the Surety on any Bond furnished by the Contractor is declared bankrupt or becomes insolvent or its right to do business is terminated in any state where any part of the Project is located or it ceases to meet the requirements of these Contract Documents, the Contractor shall within five days after notice thereof substitute another Bond and surety, both of which must be acceptable to Owner.

5.2. INSURANCE REQUIREMENTS

The Contractor shall, at its own cost and expense, acquire and maintain (and cause any sub-contractors, representatives or agents to acquire and maintain) during the term with the City, sufficient insurance to adequately protect the respective interest of the parties. Coverage shall be obtained with a carrier having an AM Best Rating of A-VII or better. In addition, the City has the right to review the Contractor's deductible or self-insured retention and to require that it be reduced or eliminated.

Specifically, the Contractor must carry the following minimum types and amounts of insurance on an occurrence basis or in the case of coverage that cannot be obtained on an occurrence basis, then coverage can be obtained on a claims-made basis with a minimum four (4) year tail following the termination or expiration of this Agreement:

The following insurance limits may be achieved by a combination of primary and umbrella/excess liability policies.

5.2.1. COMMERCIAL GENERAL LIABILITY INSURANCE

Commercial General Liability Insurance coverage, including but not limited to, premises operations, products/completed operations, products liability, contractual liability, advertising injury, personal injury, death, and property damage in the minimum amount of \$1,000,000 (one million dollars) per occurrence and \$2,000,000 (two million dollars) general aggregate.

5.2.2. COMMERCIAL AUTOMOBILE LIABILITY INSURANCE

Commercial Automobile Liability Insurance coverage for any owned, non-owned, hired or borrowed automobile is required in the minimum amount of \$1,000,000 (one million dollars) combined single limit.

5.2.3. WORKERS' COMPENSATION AND EMPLOYER'S LIABILITY INSURANCE

Statutory Workers' Compensation Insurance coverage in accordance with the laws of the State of Florida, and Employer's Liability Insurance in the minimum amount of \$100,000 (one hundred thousand dollars) each employee each accident, \$100,000 (one hundred thousand dollars) each employee by disease and \$500,000 (five hundred thousand dollars) aggregate by disease with benefits afforded under the laws of the State of Florida. Coverage should include Voluntary Compensation, Jones Act, and U.S. Longshoremen's and Harbor Worker's Act coverage where applicable. Coverage must be applicable to employees, contractors, subcontractors, and volunteers, if any.

5.2.4. PROFESSIONAL LIABILITY/MALPRACTICE/ERRORS OR OMISSIONS INSURANCE

Professional Liability/Malpractice/Errors or Omissions Insurance coverage appropriate for the type of business engaged in by the Contractor with minimum limits of \$1,000,000 (one million dollars) per occurrence. If a claims-made form of coverage is provided, the retroactive date of coverage shall be no later than the inception date of claims-made coverage, unless prior policy was extended indefinitely to cover prior acts. Coverage shall be extended beyond the policy year either by a supplemental extended reporting period (ERP) of as great a duration as available, and with no less coverage and with reinstated aggregate limits, or by requiring that any new policy provide a retroactive date no later than the inception date of claims-made coverage.

5.2.5. CONTRACTOR'S EQUIPMENT/INLAND MARINE/PROPERTY INSURANCE

If Contractor is using its own property in connection with the performance of its obligations under this Agreement, then Contractor's Equipment-Inland Marine Insurance and/or Property Insurance on an "All Risks" basis with replacement cost coverage for property and equipment in the care, custody and control of others is recommended. City is not responsible for Contractor's (or any sub-contractors, representatives, or agents) equipment or property.

5.2.6. BUILDER'S RISK INSURANCE

The City will provide at its expense, Builder's Risk Insurance for the project to cover all risks of loss in the complete and full value of the project. Contractor agrees to cooperate in a timely manner with providing any information or documentation required for the application and by the carrier as the project proceeds.

5.3. OTHER INSURANCE PROVISIONS

Upon approval of this Agreement by City Council, and then annually upon the anniversary date(s) of the insurance policy's renewal date(s) for as long as this Agreement remains in effect, the Contractor will furnish the City with a Certificate of Insurance(s) (using appropriate ACORD

certificate, SIGNED by the Issuer, and with applicable endorsements) evidencing all of the coverage set forth above and naming the City as an “Additional Insured.” In addition when requested in writing from the City, Contractor will provide the City with certified copies of all applicable policies. The address where such certificates and certified policies shall be sent or delivered is as follows:

City of Clearwater
Engineering Department
Attn: Construction Office Specialist
P.O. Box 4748
Clearwater, FL 33758-4748

1. The **Description** (of Operations/Locations/Vehicles) should specify Project Name and Project Number.
2. Contractor shall provide thirty (30) days written notice of any cancellation, non-renewal, termination, material change or reduction in coverage.
3. Contractor’s insurance as outlined above shall be primary and non-contributory coverage for Contractor’s negligence.
4. Contractor reserves the right to appoint legal counsel to provide for the Contractor’s defense, for any and all claims that may arise related to Agreement, work performed under this Agreement, or to Contractor’s design, equipment, or service. Contractor agrees that the City shall not be liable to reimburse Contractor for any legal fees or costs as a result of Contractor providing its defense as contemplated herein.

The stipulated limits of coverage above shall not be construed as a limitation of any potential liability to the City, and the City’s failure to request evidence of this insurance shall not be construed as a waiver of Contractor’s (or sub-contractors, representatives, or agents) obligation to provide the insurance coverage specified.

5.4. WAIVER OF RIGHTS

The Owner and Contractor intend that all policies purchased in accordance with Article on Insurance will protect the Owner, Contractor, Subcontractors, Engineer, Engineer's Consultants and all other persons or entities identified in the Supplementary Conditions to be listed as insured or additional insured in such policies and will provide primary coverage for all losses and damages caused by the perils covered thereby. All such policies shall contain provisions to the effect that in the event of payment of any loss or damage the insurers will have no rights of recovery against any of the insured or additional insured thereunder, the Owner and Contractor waive all rights against each other and their respective officers, directors, employees and agents for all losses and damages caused by, arising out of or resulting from any of the perils covered by such policies and any other property insurance applicable to the work; and, in addition, waive all such rights against Sub-contractors, Engineer, Engineer's Consultants and all other persons or entities identified in the Supplementary Conditions to be listed as insured or additional insured under such policies for losses and damages so caused. None of the above waivers shall extend to the rights that any party making such waiver may have to the proceeds of insurance otherwise payable under any policy so issued. In addition, the Owner waives all rights against Contractor, Subcontractors, Engineer, Engineer's Consultant and the officers, directors, employees and agents of any of them for: (i) loss due to business interruption, loss of use or other consequential loss extending beyond direct physical loss or damage to the Owner property or the Work caused by, arising out of or resulting from fire or other peril, whether or not insured by the Owner and; (ii) loss or damage to the completed Project or part thereof caused by, arising out of or resulting from fire or other insured

peril covered by any property insurance maintained on the completed Project or part thereof by the Owner during partial utilization, after substantial completion or after final payment.

6. CONTRACTORS RESPONSIBILITIES

6.1. SUPERVISION AND SUPERINTENDENCE

Contractor shall supervise, inspect 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. Contractor shall be solely responsible for the means, methods, techniques, sequences and procedures of construction. Contractor shall not be responsible for the negligence of others in the design or specification of a specific means, method, technique, sequence or procedure of construction which is shown or indicated in and expressly required by the Contract Documents.

Contractor shall be responsible to see that the completed work complies accurately with the Contract Documents. Contractor shall keep on the work at all times during its progress a competent resident superintendent, who shall not be replaced without notice to the Owner's Representative except under extraordinary circumstances. The superintendent will be Contractor's representative at the site and shall have authority to act on behalf of Contractor. All communications to the superintendent shall be as binding as if given to Contractor. The Contractor's superintendent shall keep a mobile cell phone on his person, so he can be contacted whenever necessary.

Contractor shall employ only competent persons to do the work and whenever the Owner's Representative shall notify Contractor, in writing, that any person on the work appears to be incompetent, unfaithful, disorderly, disrespectful or otherwise unsatisfactory, such person shall be removed from the project and shall not again be employed on it except with the written consent of the Owner's Representative. Contractor represents the City of Clearwater and shall conduct themselves in a professional manner to the public at all times.

Contractor shall reimburse Owner for additional engineering and inspection costs incurred as a result of overtime work in excess of the regular working hours or on the Owner normally approved holidays. At such times when Inspector overtime is required, the Contractor shall sign an overtime slip documenting such hours and the Contractor shall be provided a copy for his records. At the end of the project and prior to payment of withheld retainage funds, the Contractor shall deliver to the Owner a check made out to the Owner of Clearwater for full reimbursement of all Inspector overtime hours. Withheld retainage shall not be released until the Owner has received this check. Minimum number of chargeable hours for inspection costs on weekends or holidays shall be four hours. The cost of overtime inspection per hour shall be \$80.00 per hour.

Contractor shall provide and maintain in a neat and sanitary condition, such sanitary accommodations for the use of Contractor's employees as may be necessary to comply with the requirements of Laws and Regulations and the Engineer.

6.2. LABOR, MATERIALS AND EQUIPMENT

Contractor shall provide competent, suitably qualified personnel to survey, lay out and construct the work as required by the Contract Documents. Contractor shall at all times maintain good discipline and order at the site. Except as otherwise required for the safety or protection of persons or the work or property at the site or adjacent thereto, and except as otherwise indicated in the Contract Documents, all work at the site shall be performed during regular working hours.

Contractor shall adhere to the Community Development Code, Section 3-1508 regarding noise restrictions from 6:00 p.m. to 7:00 a.m. any day and all day Sunday. Contractor will not permit overtime work or the performance of work on Saturday, Sunday, or any legal holiday without Owner consent given after prior notice to Engineer.

Unless otherwise specified in the General Requirements, Contractor shall furnish and assume full responsibility for all materials, equipment, labor, transportation, construction equipment and machinery, tools, appliances, fuel, power, light, heat, telephone, water, sanitary facilities, temporary facilities, and all other facilities and incidentals necessary for the furnishing, performance, testing, start-up and completion of the Work.

All materials and equipment installed in the Work shall be of good quality and new, except as otherwise provided in the Contract Documents. If required by Engineer, Contractors shall furnish satisfactory evidence (including reports of required tests) as to the quality of materials and equipment. The Contractor shall provide suitable and secure storage for all materials to be used in the Work so that their quality shall not be impaired or injured. Materials that are improperly stored, may be rejected by the Engineer without testing.

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.

The City of Clearwater, at its sole discretion, reserves the right to purchase major equipment or materials to be incorporated into the Work under the Owner Direct Purchase (ODP) Option, per Section III, Article 21. In such event, the Contractor shall cooperate and assist the Owner of Clearwater, at no additional cost, to implement the ODP documents and procedures.

6.3. SUBSTITUTES AND "OR EQUAL" ITEMS

Whenever an item of material or equipment is specified or described in the Contract Documents by using the name of a proprietary item or the name of a particular Supplier, the specification or description is intended to establish the type, function and quality required. Unless the specification or description contains or is followed by words reading that no like, equivalent or "or equal" item or no substitution is permitted, other items of material or equipment or material or equipment of other Suppliers may be accepted by Engineer. If in Engineer's sole discretion an item of material or equipment proposed by Contractor is functionally equal to that named and sufficiently similar so that no change in related Work will be required, it may be considered by Engineer for approval. If in the Engineer's sole discretion an item of material or equipment proposed by Contractor does not qualify as an "or equal" item, it may be considered as a proposed substitute item. Contractor shall submit sufficient information as required by the Engineer to allow the Engineer to determine that the item of material or equipment proposed is essentially equivalent to that named and is an acceptable substitute therefore. Request for review of proposed substitute and "or equal" will be not be accepted by Engineer from anyone other than Contractor.

Request for substitute and "or equal" items by Contractor must be submitted in writing to Owner's Representative and will contain all information as Engineer deems necessary to make a determination. Request for substitute shall identify why a substitute is submitted and include advantages to the Owner. All data provided by Contractor in support of any proposed substitute or "or equal" item will be at Contractor's expense. Engineer will be allowed a reasonable time to evaluate each proposal or submittal made per this paragraph. Engineer will be sole judge of acceptability.

6.4. SUBCONTRACTORS, SUPPLIERS AND OTHERS

The Contractor shall deliver to the Owner's Representative before or at the preconstruction conference a list of all Subcontractors, suppliers and other persons and organizations proposed by the Contractor for Work to be performed on the Project. The Contractor shall include with this list the qualifications and references for each Subcontractor, supplier or other person and organization for review and approval. Any changes to this list must be submitted to the Owner's Representative for approval prior to the substitution of any Subcontractors, suppliers or other persons and organizations before performing any Work on the Project for the Contractor.

Contractor shall be fully responsible to Owner and Engineer for all acts and omissions of the Subcontractors, Suppliers and other persons performing or furnishing any of the work under a direct or indirect contract with Contractor just as Contractor is responsible for Contractor's own acts and omissions. Nothing in the Contract Documents shall create for the benefit of any such Subcontractor, Supplier or other person any contractual relationship between Owner or Engineer and any Subcontractor, Supplier or other person, nor shall it create any obligation on the part of Owner or Engineer to pay or to see to the payment of any moneys due any such Subcontractor, Supplier or other person. Contractor shall be solely responsible for scheduling and coordinating the work of Subcontractors, Suppliers and other persons performing or furnishing any of the work under a direct or indirect contract with Contractor. Contractor shall require all Subcontractors, Suppliers and such other persons performing or furnishing any of the work to communicate with the Engineer through Contractor.

The divisions and sections of the Specifications and the identifications of any Drawings shall not control Contractor in dividing the work among Subcontractors or Suppliers or delineating the work to be performed by any specific trade.

All work performed for Contractor by a Subcontractor or Supplier will be pursuant to an appropriate agreement between Contractor and the Subcontractor or Supplier which specifically binds the Subcontractor or Supplier to the applicable terms and conditions of the Contract Documents for the benefit of Owner and Engineer.

Contractor shall not pay or employ any Subcontractor, Supplier or other person or organization whether initially or as a substitute, against whom Owner or Engineer may have reasonable objection. Contractor shall not be required to employ any Subcontractor, Supplier or other person or organization to furnish or perform any of the work against whom Contractor has reasonable objection.

Owner or Engineer will not undertake to settle any differences between Contractor and his Subcontractors or between Subcontractors.

6.5. USE OF PREMISES

Contractor shall confine construction equipment, the storage of materials and equipment and the operations of works to the site and land areas identified in and permitted by the Contract Documents on other land areas permitted by Laws and Regulations, right-of-way, permits and easements, and shall not unreasonably encumber the premises with construction equipment or other materials or equipment. Contractor shall assume full responsibility for any damage to any such land or area, or to the owner or occupant thereof or of any adjacent land or areas, resulting from the performance of the Work. Should any claim be made by any such owner or occupant because of the performance of the Work, Contractor shall promptly settle with such other party by negotiation or otherwise resolve the claim by arbitration or other dispute resolution proceed in or

at law. Contractor shall, to the fullest extent permitted by Laws and Regulations, indemnify and hold harmless Owner, Engineer, Engineer's Consultant and their officials, directors, employees and agents from and against all claims, costs, losses and damages arising out of or resulting from any claim or action, legal or equitable, brought by any such owner or occupant against Owner, Engineer or any other party indemnified hereunder to the extent caused by or based upon Contractor's performance of the Work.

During the progress of the Work, 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 or at intervals established by the Engineer, 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. Contractor shall restore to original condition all property not designated for alteration by the Contract Documents.

6.5.1. STAGING AREAS

The Contractor shall obtain and deliver to the City written permission for the use of all staging and storage areas outside of the Limits of Construction. Use of right of way within the limits of construction must be approved by the City. All applicable erosion control, tree barricade and restoration, including time limits, specifications, etc., must be followed.

6.5.2. RESTORATION TIME LIMITS

The timely restoration of all impacted areas, especially right-of-ways, is very important to the Citizens of Clearwater therefore, these time limits are imposed:

- Debris piles shall be removed within five (5) consecutive calendar days.
- Concrete driveways and sidewalks shall be replaced within ten (10) consecutive calendar days of removal. Resident access shall be maintained at all times.
- All arterial and collector roadways shall be restored ASAP.
- Local streets and asphalt driveways shall be restored as soon as a sufficient quantity is generated, however, this is never to exceed fifteen (15) consecutive calendar days. Local and resident access shall be maintained at all times.
- Any irrigation systems or components damaged or impacted by construction activities shall be repaired or replaced "in-kind" within forty-eight (48) hours to minimize the loss of turfgrass or landscape plantings, particularly during periods of drought.
- Sod must be restored "in-kind" within fourteen (14) consecutive calendar days of a successful pipe pressure test, removal of concrete forms, backfill of excavations, replacement of driveways or sidewalks or another project specific milestone. It must be watered for a period of thirty (30) days after it is placed. Erosion control and dust control of denuded areas must be maintained at all times.

If the project or a portion of it does not involve right-of ways, then a different schedule of sod restoration may be considered.

6.6. LICENSE AND PATENT FEES, ROYALTIES AND TAXES

Contractor shall pay all license fees and royalties and assume all costs incident to the use in the performance of the work or the incorporation in the Work of any invention, design, process, product or device which is the subject of patent rights or copyrights held by others. If a particular invention, design, process, product or device is specified in the Contract Documents for use in the

performance of the work and if to the actual knowledge of Owner or Engineer its use is subject to patent rights or copyrights calling for the payment of any license fee or royalty to others, the existence of such rights shall be disclosed by Owner or Engineer in the Contract Documents.

To the fullest extent permitted by Laws and Regulations, Contractor shall indemnify and hold harmless Owner, Engineer, Engineer's Consultants and the officers, directors, employees, agents and other consultants of each and any of them from and against all claims, costs, losses and damages arising out of or resulting from any infringement of patent rights or copyrights incident to the use in the performance of the Work or resulting from the incorporation in the Work of any invention, design, process, product or device not specified in the Contract Documents, and shall defend all such claims in connection with any alleged infringement of such rights.

Contractor shall pay all sales, consumer, use and other taxes required to be paid by Contractor in accordance with the Laws and Regulations of the State of Florida and other governmental agencies, which are applicable during the performance of the work.

6.7. LAWS AND REGULATIONS

Contractor shall give all notices and comply with all Laws and Regulations applicable to furnishing and performance of the Work. Except where otherwise expressly required by applicable Laws and Regulations, neither Owner nor Owner's Representative shall be responsible for monitoring Contractor's compliance with any Laws or Regulations. If Contractor performs any work knowing or having reason to know that it is contrary to Laws or Regulations, Contractor shall bear all claims, costs, losses and damages caused by or arising out of such work; however, it shall not be Contractor's primary responsibility to make certain that the Specifications and Drawings are in accordance with Laws and Regulations, but this shall not relieve Contractor of Contractor's obligations to the Owner to report and resolve discrepancies as described above.

6.7.1. E-VERIFY

When City projects include Federal or State funding, the requirements of Executive Order 11-02 shall be adhered to utilizing the Homeland Security E-Verify System to verify employment eligibility.

Contractor and its Subcontractors shall register with and use the E-Verify system to verify the work authorization status of all newly hired employees. Contractor will not enter into a contract with any Subcontractor unless each party to the contract registers with and uses the E-Verify system. Subcontractor must provide Contractor with an affidavit stating that Subcontractor does not employ, contract with, or subcontract with an unauthorized alien. Contractor shall maintain a copy of such affidavit.

The City may terminate this Contract on the good faith belief that Contractor or its Subcontractors knowingly violated Florida Statutes 448.09(1) or 448.095(2)(c). If this Contract is terminated pursuant to Florida Statute 448.095(2)(c), Contractor may not be awarded a public contract for at least 1 year after the date of which this Contract was terminated. Contractor is liable for any additional costs incurred by the City as a result of the termination of this Contract.

See Section 448.095, Florida Statutes (2020).

See "VERIFICATION OF EMPLOYMENT ELIGIBILITY FORM" in Appendix.

6.8. PERMITS

Unless otherwise provided in the Supplementary Conditions, Contractor shall obtain and pay for all construction permits and licenses. The Owner shall assist Contractor, when necessary, in obtaining such permits and licenses. Contractor shall pay all governmental charges and inspection fees necessary for the prosecution of the Work, which are applicable at the time of opening of Bids. Contractor shall pay all charges of utility owners for connections to the work, and the Owner shall pay all charges of such utility owners for capital costs related thereto such as plant investment fees.

Unless otherwise stated in the Contract Documents, Clearwater Building Permit Fees will be waived.

6.9. SAFETY AND PROTECTION

Contractor shall be responsible for initiating, maintaining and supervising all safety precautions and programs in connection with the Work. Contractor shall take all necessary precautions for the safety of, and shall provide the necessary protection to prevent damage, injury or loss to: (i) all persons on the work site or who may be affected by the work, (ii) all the Work and materials and equipment to be incorporated therein, whether in storage on or off the site; and (iii) other property at the site or adjacent thereto, including trees, shrubs, lawns, walks, pavements, roadways, structures, utilities and Underground Facilities not designated for removal, relocation or replacement in the course of construction. In the event of temporary suspension of the work, or during inclement weather, or whenever Owner's Representative may direct; Contractor shall, and shall cause Subcontractors, to protect carefully the Work and materials against damage or injury from the weather. If, in the opinion of the Owner's Representative, any portion of Work or materials shall have been damaged or injured by reason of failure on the part of the Contractor or any Subcontractors to so protect the Work, such Work and materials shall be removed and replaced at the expense of Contractor. The Contractor shall initiate and maintain an accident prevention program which shall include but shall not be limited to the establishment and supervision of programs for the education and training of employees in the recognition, avoidance and prevention of unsafe conditions and acts. Contractor shall provide first aid services and medical care to his employees. The Contractor shall develop and maintain an effective fire protection and prevention program and good housekeeping practices at the site of contract performance throughout all phases of construction, repair, alteration or demolition. Contractor shall require appropriate personal protective equipment in all operations where there is exposure to hazardous conditions. The Engineer may order that the work stop if a condition of immediate danger to the Owner's employees, equipment or if property damage exists. This provision shall not shift responsibility or risk of loss for injuries of damage sustained from the Contractor to Owner, and the Contractor shall remain solely responsible for compliance with all safety requirements and for the safety of all persons and property at the site of Contract performance. The Contractor shall instruct his employees required to handle or use toxic materials or other harmful substances regarding their safe handling and use. The Contractor shall take the necessary precautions to protect pedestrians and motorists from harm, and to prevent disruptions of such traffic due to construction activity.

Contractor shall comply with all applicable Laws and Regulations of any public body having jurisdiction for safety of persons or property and to protect them from damage, injury or loss; and shall erect and maintain all necessary safeguards for such safety and protection. Contractor shall notify owners of adjacent property and of Underground Facilities and utility owners when execution of the work may affect them, and shall cooperate with them in the protection, removal,

relocation and replacement of their property. All damage, injury or loss to any property caused, directly or indirectly, in whole or part, by Contractor, any Subcontractor, Supplier or any other person or organization directly or indirectly employed by any of them to perform or furnish any of the work or anyone for whose acts any of them may be liable, shall be remedied by Contractor. Contractor's duties and responsibilities for safety and for protection of the Work shall continue until such time as all the Work is completed and Engineer has issued a notice to Owner and Contractor that the Work is acceptable.

6.10. EMERGENCIES

In emergencies affecting the safety or protection of persons or the Work or property at the site or adjacent thereto, Contractor, with or without special instruction or authorization from Owner or the Owner's Representative, is obligated to act to prevent damage, injury or loss. Contractor shall give Engineer prompt written notice if Contractor believes that any significant changes in the Work or variations from the Contract Documents have been caused thereby. If the Owner's Representative determines that a change in the Contract Documents is required because of the action taken by Contractor in response to such an emergency, a Work Change Directive or Change Order will be issued to document the consequences of such action.

6.11. DRAWINGS

6.11.1. SHOP DRAWINGS, SAMPLES, RFIs, AND SUBMITTAL REVIEW

Contractor shall submit Shop Drawings to Engineer for review and approval as called for in the Technical Specifications or required by the Engineer. The data shown on the Shop Drawings will be complete with respect to quantities, dimensions, specified performance and design criteria, materials and similar data to show Engineer the materials and equipment Contractor proposes to provide and to enable Engineer to review the information. Contractor shall also submit Samples to Engineer for review and approval. Before submitting each Shop Drawing or Sample, Contractor shall have determined and verified: (i) all field measurements, quantities, dimensions, specified performance criteria, installation requirements, materials, catalog numbers and similar information with respect thereto, (ii) all materials with respect to intended use, fabrication, shipping, handling, storage, assembly and installation pertaining to the performance of the Work, and (iii) all information relative to Contractor's sole responsibilities in respect to means, methods, techniques, sequences and procedures of construction and safety precautions and programs incident thereto. Contractor shall also have reviewed and coordinated each Shop Drawing or Sample with other Shop Drawings and Samples with the requirements of the Work and the Contract Documents. Each submittal will have a transmittal cover sheet identifying the shop drawing name, number, and technical specification reference; will 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 that submittal. At the time of submission, Contractor shall give Engineer specific written notice of such variations, if any, that the Shop Drawing or Sample submitted may have from the requirements of the Contract Documents, such notice to be in a written communication separate from the submittal; and, in addition, shall cause a specific notation to be made on each Shop Drawing and Sample submitted to Engineer for review and approval of each such variation.

The Contractor shall maintain a submittal log as mentioned in Article 2.5. The Engineer shall receive updated copies at each progress meeting, and the Engineer shall respond to each submittal

within fourteen (14) consecutive calendar days. The Contractor shall maintain a request for information (RFI) log as mentioned in Article 2.5. The Engineer shall receive updated copies at each progress meeting, and the Engineer shall respond to each RFI within fourteen (14) consecutive calendar days. The untimely submission of Submittal or RFIs shall not be grounds for a delay claim from the Contractor.

Engineer's review and approval of Shop Drawings and Samples will be only to determine if the items covered by the submittals will, after installation or incorporation in the Work, conform to the information given in the Contract Documents and be compatible with the design concept of the completed Project as a functioning whole as indicated the Contract Documents. Engineer's review and approval will not extend to means, methods, techniques, sequences or procedures of construction (except where a particular means method, technique, sequence or procedure of construction is specifically and expressly called for by the Contract Documents) or to safety precautions or programs incident thereto. The review and approval of a separate item as such will not indicate approval of the assembly in which the item functions. Contractor shall make corrections required by Engineer and shall return the required number of corrected copies of Shop Drawings and submit as required new Samples for review and approval. Contractor shall direct specific attention in writing to revisions other than the corrections called for by Engineer on previous submittals.

Engineer's review and approval of Shop Drawings or Samples shall not relieve Contractor from responsibility for any variation from the requirements of the Contract Documents unless Contractor has in writing called Engineer's attention to each such variation at the time of submission and Engineer has given written approval of each such variation by specific written notation thereof incorporated in or accompanying the Shop Drawing or Sample approval; nor will any approval by the Engineer relieve the Contractor from responsibility for complying with the requirements of paragraph above discussing field measurements by the Contractor.

Contractor shall furnish required submittals with complete information and accuracy in order to achieve required approval of an item within two (2) submittals. Owner's Representative reserves the right to backcharge Contractor, for Engineer's costs for resubmittals that account for a number greater than twenty percent (20%) of the total number of first time submittals, per the approved initial submittal log. Owner's Representative reserves the right to backcharge Contractor for all third submittals. The number of first-time submittals shall be equal to the number of submittals agreed to by Engineer and Contractor. All costs to Engineer involved with subsequent submittal of Shop Drawings, Samples or other items requiring approval will be backcharged to Contractor at the rate of 3.0 times direct technical labor cost by deducting such costs from payments due Contractor for Work completed. In the event that Contractor requests a substitution for a previously approved item, all of Engineer's costs in the reviewing and approval of the substitution will be backcharged to Contractor, unless the need for such substitution is beyond the control of Contractor.

6.11.2. AS-BUILT DRAWINGS

The Contractor shall keep and maintain one set of blueprints, As-Built Drawings, in good order and legible condition to be continuously marked-up at the job site. The Contractor shall mark and annotate neatly and clearly all project conditions, locations, configurations and any other changes or deviations which may vary from the details represented on the original Contract Plans, including revisions made necessary by Addenda, Shop Drawings, and Change Orders during the construction process. The Contractor shall record the horizontal and vertical locations, in the plan and profile, of all buried utilities that differ from the locations indicated or which were not indicated on the

Contract Plans and buried (or concealed), construction and utility features which are revealed during the construction period.

The As-Built Drawings shall be available for inspection by the Engineer, Engineer's Consultant, and the Owner's Representative at all times during the progress of the Project.

The As-Built Drawings shall be reviewed by the Owner's Representative, or his designee, for accuracy and compliance with the requirements of "As-Built Drawings" prior to submittal of the monthly pay requests. The pay requests shall be rejected if the marked-up redline prints do not conform to the "As-Built Drawings" requirements. As-Built Drawings shall be submitted to the Owner Inspector for approval upon completion of the project and prior to acceptance of final pay request. Final pay request shall not be processed until As-Built Drawings have been reviewed by the Engineer or the Engineer's Consultant for accuracy and completeness.

Prior to placing new potable water mains in service, the Contractor shall provide the Engineer intersection drawings, as specified for the water mains.

The Owner's acceptance of the "As-Built Drawings" does not relieve the Contractor of the sole responsibility for the accuracy and completeness of the As-Built Drawings.

6.11.2.1. General

The Contractor shall prepare an "AS-BUILT SURVEY" per chapter 5J-17.052, Florida Administrative Code (see definition below), signed and sealed by a Florida registered land surveyor. The contractor will deliver to the Owner two hard copies of signed and sealed As-Built Drawings and an AutoCAD file.

5J-17.050 Definition: (10)(a) *As-Built Survey: a survey performed to obtain horizontal and/or vertical dimensional data so that constructed improvements may be located and delineated: also known as Record Survey.*

This survey shall be clearly titled "As-Built Survey" and shall be signed and sealed by a Florida registered land surveyor. The survey must be delivered to the Owner of Clearwater Construction Division upon substantial completion of the project. If this condition is not met, the Owner will procure the services of a Professional Surveyor and Mapper registered in the State of Florida and will back charge the contractor a fee of \$1,800 per day or any portion thereof to provide the Owner with the required As-Built Survey.

6.11.2.2. Sanitary and Storm Sewer Piping Systems

1. Manholes and inlets shall be located by survey coordinates (northing, easting and elevation) based on the approved horizontal and vertical datum or utilize the stationing supplied on the construction plans. New and replaced service connections shall be dimensioned to the nearest downstream manhole. All manholes, cleanouts and catch basin invert and rim elevations, manhole and catch basin dimensions, pipe sizes, and pipe material shall also be noted on the plan view and also on the profile if one exists. The terminal ends of all subdrains, inverts of all pipe in structures, and the flow line of inlets shall also be noted on the plan view and also on the profile if one exists.
2. Pipe materials and areas of special construction shall be noted.

6.11.2.3. Pressure Pipe construction (Water, Reclaimed Water, Forcemain)

All pipes shall be located by survey coordinates (northing, easting and elevation) based on the approved horizontal and vertical datum or utilize the stationing supplied on the construction plans. Coordinates shall be at all pipe bends, tees, valves, reducers, and deflections. Also, all new and replaced service connections for potable and reclaimed water will be located as described above. Additionally, there must be survey coordinates no further than 100 feet apart on linear type construction and shall denote top of pipe elevation at those points.

6.11.2.4. Electrical and Control Wiring

The as-built drawings shall include all changes to the original Contract Plans. The as-built drawings shall also include the size, color, and number of wires and conduit. For projects where this information is too voluminous to be contained on the blue-line prints, the Contractor shall prepare supplemental drawings, on same size sheets as the blue-line prints, showing the additional conduit runs, 1-line diagrams, ladder diagrams, and other information. The wiring schematic diagrams shall show termination location and wiring identification at each point on the ladder diagram.

6.11.2.5. Horizontal and Vertical Control

The As-Built survey shall be based on the original datum used for the construction design plans or if required by the Owner the datum shall be referenced to the North American Datum of 1983/90 (horizontal) and the North American Vertical Datum of 1988. The unit of measurement shall be the United States Foot. Any deviation or use of any other datum, (horizontal and or vertical), must be approved by the Owner of Clearwater Engineering Department.

6.11.2.6. Standards

The As-Built survey shall meet the Minimum Technical Standards per Chapter 5J-17 and the Clearwater CAD STANDARDS set forth below. In addition to locating all improvements that pertain to the as-built survey it is the requirement of the Owner to have minimum location points at every change in direction and no more than 100 feet apart on all pressure pipes.

6.11.2.7. Other

The As-Built drawings shall reflect any differences from the original Contract Plans, in the same level of detail and units of dimensions as the Plans.

6.11.3. CAD STANDARDS

6.11.3.1. Layer Naming

6.11.3.1.1. Prefixes and Suffixes

DI	prefix denotes digitized or scanned entities
EP	prefix denotes existing points - field collected
EX	prefix denotes existing entities - line work and symbols
PR	prefix denotes proposed entities - line work and symbols

FU	prefix denotes future entities (proposed but not part of this contract) - line work and symbols
TX	suffix denotes text – use for all text, no matter the prefix

6.11.3.1.2. Layer Naming Definitions:

GAS	gas lines and appurtenances
ELEC	power lines and appurtenances
PHONE	telephone lines and appurtenances
CABLE	cable TV lines and appurtenances
BOC	curbs
WALK	sidewalk
WATER	water lines and appurtenances, sprinklers
STORM	storm lines and appurtenances
TREES	trees, bushes, planters
SANITARY	sanitary lines and appurtenances
FENCE	all fences
BLDG	buildings, sheds, finished floor elevation
DRIVE	driveways
EOP	edge of pavement without curbs
TRAFFIC	signal poles, control boxes
TOPBANK	top of bank
TOESLOPE	toe of slope
TOPBERM	top of berm
TOEBERM	toe of berm
SEAWALL	seawall
CONCSLAB	concrete slabs
WALL	walls, except seawall
SHORE	shoreline, water elevation
CL	centerline of road
CLD	centerline of ditch
CLS	centerline of swale
CORNER	property corners, monumentation
BENCH	benchmark, temporary benchmarks

Other layers may be created as required, using above format.

6.11.3.2. Layer Properties

All layers will use standard AutoCAD linetypes, bylayer.

All layers will use standard AutoCAD colors, bylayer.

All text will use standard AutoCAD fonts.

6.11.3.3. Text Styles

Text style for EX layers will use the simplex font, oblique angle of 0°, and a text height of .008 times the plot scale.

Text style for PR and FU layers will use the simplex font, oblique angle of 22.5°, and a text height of .010 times the plot scale.

6.11.4. DELIVERABLES

The as-built survey shall be produced on bond material, 24" x 36" at a scale of 1"=20' unless approved otherwise. The consultant shall deliver two hard copies and one digital copy of all drawings. Requested file formats are: Autodesk DWG and Adobe PDF files.

Please address any questions regarding format to Mr. Tom Mahony, at (727) 562-4762 or e-mail address Thomas.Mahony@myClearwater.com.

6.12. CONTRACTOR'S GENERAL WARRANTY AND GUARANTEE

Contractor warrants and guarantees to Owner, Engineer and Engineer's Consultants that all Work will be in accordance with the Contract Documents and will not be defective. Contractor's warranty and guarantee hereunder includes defects or damage caused by abuse, vandalism, modification or operation by persons other than Contractor, Subcontractors or Suppliers. Until the acceptance of the Work by the Owner, the Work shall be under the charge and care of the Contractor, and he shall take every necessary precaution against injury or damage to any part thereof by action of the elements, or from any other cause whatsoever, arising from the execution or non-execution of the Work. The Contractor shall rebuild, repair and make good, at his own expense, all injuries or damages to any portion of the Work occasioned by any cause before its completion and final acceptance by the Owner. In addition, "the Contractor shall remedy any defects in the work at his own expense and pay for any damage to other work resulting therefrom which appear within a period of one year from the date of final acceptance".

Contractor's warranty and guarantee hereunder excludes improper maintenance and operation by Owner's employees and normal wear and tear under normal usage for any portion of the Work, which has been partially accepted by the Owner for operation prior to final acceptance by the Owner. Contractor's obligation to perform and complete the Work in accordance with the Contract Documents shall be absolute. None of the following will constitute an acceptance of Work that is not in accordance with the Contract Documents or a release of Contractor's obligation to perform the Work in accordance with the Contract Documents: (i) observations by Owner's Representative, (ii) recommendation of any progress or final payment by Owner's Representative, (iii) the issuance of a certificate of Substantial Completion or any payment by the Owner to contractor under the Contract Documents, (iv) use or occupancy of the Work or any part thereof by Owner, (v) any acceptance by Owner or any failure to do so, (vi) any review and approval of a Shop Drawing or Sample submittal or the issuance of a notice of Acceptance by the Engineer.

6.13. CONTINUING THE WORK

Contractor shall carry on the work and adhere to the progress schedule during all disputes or disagreements with the Owner. No work shall be delayed or postponed pending resolution of any disputes or disagreements, except as the Owner or Contractor may otherwise agree in writing.

6.14. INDEMNIFICATION

To the fullest extent permitted by law, Contractor agrees to defend, indemnify, and hold the City, its officers, agents, and employees, harmless from and against any and all liabilities, demands, claims, suits, losses, damages, causes of action, fines or judgments, including costs, attorneys', witnesses', and expert witnesses' fees, and expenses incident thereto, relating to, arising out of, or resulting from: (i) the services provided by Contractor personnel under this Agreement; (ii) any negligent acts, errors, mistakes or omissions by Contractor or Contractor personnel; and (iii) Contractor or Contractor personnel's failure to comply with or fulfill the obligations established by this Agreement.

Contractor will update the City during the course of the litigation to timely notify the City of any issues that may involve the independent negligence of the City that is not covered by this indemnification.

The City assumes no liability for actions of Contractor and will not indemnify or hold Contractor or any third party harmless for claims based on this Agreement or use of Contractor-provided supplies or services.

Notwithstanding anything contained herein to the contrary, this indemnification provision shall not be construed as a waiver of any immunity to which Owner is entitled or the extent of any limitation of liability pursuant to § 768.28, Florida Statutes. Furthermore, this provision is not intended to nor shall be interpreted as limiting or in any way affecting any defense Owner may have under § 768.28, Florida Statutes or as consent to be sued by third parties.

6.15. CHANGES IN COMPANY CONTACT INFORMATION

Contractor shall notify Owner by US mail addressed to the City Engineer of any changes in company contact information. This includes contact phone, address, project manager, email addresses, etc.

6.16. PUBLIC RECORDS

The CONTRACTOR will be required to comply with Section 119.0701, Florida Statutes.

IF THE CONTRACTOR HAS QUESTIONS REGARDING THE APPLICATION OF CHAPTER 119, FLORIDA STATUTES, TO THE CONTRACTOR'S DUTY TO PROVIDE PUBLIC RECORDS RELATING TO THIS CONTRACT, CONTACT THE CUSTODIAN OF PUBLIC RECORDS, Rosemarie Call, phone: 727-562-4092 or Rosemarie.Call@myclearwater.com, 600 Cleveland Street, Suite 600, Clearwater, FL 33755.

The Contractor's duty to comply with public records law applies specifically to:

- a) Keep and maintain public records required by the City of Clearwater (hereinafter “public agency”) to perform the service being provided by the contractor hereunder.
- b) Upon request from the public agency’s custodian of public records, provide the public agency 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 for in Chapter 119, Florida Statutes, as may be amended from time to time, 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 for the duration of the contract term and following completion of the contract if the contractor does not transfer the records to the public agency.
- d) Upon completion of the contract, transfer, at no cost, to the public agency all public records in possession of the contractor or keep and maintain public records required by the public agency to perform the service. If the contractor transfers all public records to the public agency upon completion of the contract, the contractor shall destroy any public records that are exempt or confidential and exempt from public records disclosure requirements. If the contractor keeps and maintains public records upon completion of the contract, the contractor shall meet all applicable requirements for the retaining public records. All records stored electronically must be provided to the public agency, upon request from the public agency’s custodian of public records in a format that is compatible with the information technology systems of the public agency.
- e) A request to inspect or copy public records relating to a public agency’s contract for services must be made directly to the public agency. If the public agency does not possess the requested records, the public agency shall immediately notify the contractor of the request and the contractor must provide the records to the public agency or allow the records to be inspected or copied within a reasonable time.
- f) The Contractor hereby acknowledges and agrees that if the Contractor does not comply with the public agency’s request for records, the public agency shall enforce the contract provisions in accordance with the contract.
- g) A contractor who fails to provide the public records to the public agency within a reasonable time may be subject to penalties under Section 119.10, Florida Statutes.
- h) If a civil action is filed against a contractor to compel production of public records relating to a public agency’s contract for services, the court shall assess and award against the contractor the reasonable costs of enforcement, including reasonable attorney fees, if:
 - 1. The court determines that the contractor unlawfully refused to comply with the public records request within a reasonable time; and
 - 2. At least 8 business days before filing the action, the plaintiff provided written notice of the public request, including a statement that the contractor has not complied with the request, to the public agency and to the contractor.
- i) A notice complies with subparagraph (h)2. if it is sent to the public agency’s custodian of public records and to the contractor at the contractor’s address listed on its contract with the public agency or to the contractor’s registered agent. Global Express Guaranteed, or certified mail, with postage or shipping paid by the sender and with evidence of delivery, which may be in an electronic format.
- j) A contractor who complies with a public records request within 8 business days after the notice is sent is not liable for the reasonable costs of enforcement.

7. OTHER WORK

7.1. RELATED WORK AT SITE

The City reserves the right to have its own forces enter the construction site at any time and perform work as necessary in order to perform infrastructure repair or maintenance, whether related to the project or not. The Contractor will allow complete access to all utility owners for these purposes.

The City may have its own forces perform new work related to the project, however, this work will be identified in the Contract Scope of Work and coordination will be such that this activity is denoted in the Contractor's CPM Schedule so as not to cause any delays or interference with the Contractor's work or schedule.

7.2. COORDINATION

If the Owner contracts with others for the performance of other work on the Project at the site, the following will be set forth in the Scope of Work: (i) the person who will have authority and responsibility for coordination of the activities among the various prime contractors will be identified; (ii) the specific matters to be covered by such authority and responsibility will be itemized; and (iii) the extent of such authority and responsibilities will be provided. Unless otherwise provided in the Supplementary Conditions, the Owner shall have sole authority and responsibility in respect of such coordination.

8. OWNERS RESPONSIBILITY

Except as otherwise provided in these General Conditions, the Owner shall issue all communications from the Owner to the Contractor through Owner's Representative.

The Owner shall furnish the data required of the Owner under the Contract Documents promptly and shall make payments to Contractor promptly when they are due as provided in these General Conditions.

The Owner is obligated to execute Change Orders as indicated in the Article on Changes In The Work.

The Owner's responsibility in respect of certain inspections, tests, and approvals is set forth in the Article on Tests and Inspections.

In connection with the Owner's right to stop work or suspend work, see the Article on Engineer may Stop the Work. The Article on Suspension of Work and Termination deals with the Owner's right to terminate services of Contractor under certain circumstances.

Owner shall not supervise, direct or have control or authority over, nor be responsible for, Contractor's means, methods, techniques, sequences or procedures of construction or the safety precautions and programs incident thereto, or for any failure of Contractor to comply with Laws and Regulations applicable to the furnishing or performance of the Work. The Owner will not be responsible for Contractor's failure to perform or furnish the Work in accordance with the Contract Documents.

9. OWNER REPRESENTATIVE'S STATUS DURING CONSTRUCTION

9.1. OWNERS REPRESENTATIVE

Dependent of the project type, the Owner's Representative during the construction period will either be the Construction Manager, the Engineer, or a designee of the Project's Owner. The duties, responsibilities and the limitations of authority of Owner's Representative during construction are set forth in the Contract Documents and shall not be extended without written consent of Owner and Engineer.

9.2. CLARIFICATIONS AND INTERPRETATIONS

Engineer will issue with reasonable promptness such written clarifications or interpretations of the requirements of the Contract Documents regarding design issues only, in the form of Submittal responses, RFI responses, Drawings or otherwise, as Engineer may determine necessary, which shall be consistent with the intent of and reasonably inferable from Contract Documents. All other clarifications and interpretations of the Contract Documents shall be issued from the Owner's Representative. Such written clarifications and interpretations will be binding on the Owner and Contractor. If Contractor believes that a written clarification or interpretation justifies an adjustment in the Contract Price or the Contract Time and the parties are unable to agree to the amount or extent thereof, if any, Contractor may make a written claim therefore as provided in the Articles for Change of Work and Change of Contract Time.

9.3. REJECTING OF DEFECTIVE WORK

The Owner's Representative or the Engineer will have authority to disapprove or reject Work which Owner's Representative or the Engineer believes to be defective, or that Owner's Representative or the Engineer believes will not produce a completed Project that conforms to the Contract Documents or that will prejudice the integrity of the design concept of the completed Project as a functioning whole as indicated by the Contract Documents. The Owner's Representative or the Engineer will also have authority to require special inspection or testing of the Work whether or not the Work is fabricated, installed or completed.

9.4. SHOP DRAWINGS, CHANGE ORDERS, AND PAYMENTS

In connection with Engineer's authority as to Shop Drawings and Samples, see articles on Shop Drawings and Samples. In connection with Owner's Representative authority as to Change Orders, see the articles on Changes of Work, Contract Price and Contract Time. In connection with Owner's Representative authority as to Applications for Payment, see the articles on Payments to Contractor and Completion.

9.5. DECISIONS ON DISPUTES

The Owner's Representative will be the initial interpreter of the requirements of the Contract Documents and judge of the acceptability of the work thereunder. Claims, disputes and other matters relating to the acceptability of the work or the interpretation of the requirements of the Contract Documents pertaining to the performance and furnishing of the work and Claims under the Articles for Changes of Work, Changes of Contract Time and Changes of Contract Price will be referred initially to Owner's Representative in writing with a request for a formal decision in

accordance with this paragraph. Written notice of each such claim, dispute or other matter will be delivered by the claimant to Owner's Representative and the other party to the Agreement promptly, but in no event later than thirty (30) days, after the start of the occurrence or event giving rise thereto, and written supporting data will be submitted to Owner's Representative and the other party within sixty (60) days after the start of such occurrence or event unless Owner's Representative allows an additional period of time for the submission of additional or more accurate data in support of such claim, dispute or other matter. The opposing party shall submit any response to Owner's Representative and the claimant within thirty (30) days after receipt of the claimant's last submittal, unless Owner's Representative allows additional time. Owner's Representative will render a formal decision in writing within thirty (30) days after receipt of the opposing party's submittal, if any, in accordance with this paragraph. Owner Representative's written decision on such claim, dispute or other matter will be final and binding upon the Owner and Contractor unless (i) an appeal from Owner Representative's decision is taken within thirty (30) days of the Owner Representative's decision, or the appeal time which may be stated in a Dispute Resolution Agreement between Owner and Contractor for the settlement of disputes or (ii) if no such Dispute Resolution Agreement has been entered into, a written notice of intention to appeal from Owner Representative's written decision is delivered by the Owner or Contractor to the other and to Owner's Representative within thirty (30) days after the date of such decision and a formal proceeding is instituted by the appealing party in a forum of competent jurisdiction to exercise such rights or remedies as the appealing party may have with respect to such claim, dispute or other matter in accordance with applicable Laws and Regulations within sixty (60) days of the date of such decision, unless otherwise agreed in writing by the Owner and Contractor.

When functioning as interpreter and judge, Owner's Representative will not show partiality to the Owner or Contractor and will not be liable in connection with any interpretation or decision rendered in good faith in such capacity. The rendering of a decision by Owner's Representative with respect to any such claim, dispute or other matter will be a condition precedent to any exercise by the Owner or Contractor of such rights or remedies as either may otherwise have under the Contract Documents or by Laws or Regulations in respect of any such claim, dispute or other matter pursuant the Article on Dispute Resolution.

9.6. LIMITATIONS ON OWNER REPRESENTATIVE'S RESPONSIBILITIES

Neither Owner Representative's authority or responsibility under this paragraph or under any other provision of the Contract Documents nor any decision made by Owner's Representative in good faith either to exercise or not exercise such authority or responsibility or the undertaking, exercise or performance of any authority or responsibility by Owner's Representative shall create, impose or give rise to any duty owed by Owner's Representative to Contractor, any Subcontractor, any Supplier, any other person or organization or to any surety for or employee or agent of any of them.

Owner's Representative will not supervise, direct, control or have authority over or be responsible for Contractor's means, methods, techniques, sequences or procedures of construction, or the safety precautions and programs incident thereto, or for any failure of Contractor to comply with Laws and Regulations applicable to the furnishing or performance of the work. Owner's Representative will not be responsible for Contractor's failure to perform or furnish the work in accordance with the Contract Documents.

Owner's Representative will not be responsible for the acts or omissions of Contractor or of any Subcontractor, any Supplier, or of any other person or organization performing or furnishing any of the work.

Owner Representative's review of the final Application for Payment and accompanying documentation and all maintenance and operating instructions, schedules, guarantees, bonds and certificates of inspection, tests and approvals and other documentation required to be delivered by the Contractor will only be to determine generally that their content complies with the requirements of the Contract Documents and, in the case of certificates of inspections, tests and approvals that the results certified indicate compliance with the Contract Documents.

The limitations upon authority and responsibility set forth in this paragraph shall also apply to Owner Representative's CEI, the Engineer's Consultants, and assistants.

10. CHANGES IN THE WORK

Without invalidating the Agreement and without notice to any surety, the Owner may, at any time or from time to time, order additions, deletions or revisions in the Work. Such additions, deletions or revisions will be authorized by a Written Amendment, a Change Order, or a Work Change Directive. Upon receipt of any such document, Contractor shall promptly proceed with the Work involved which will be performed under the applicable conditions of the Contract Documents (except as may otherwise be specifically provided).

If the Owner and Contractor are unable to agree as to the extent, if any, of an adjustment in the Contract Price or an adjustment of the Contract Time that should be allowed as a result of a Work Change Directive, a claim may be made therefore as provided in these General Conditions.

Contractor shall not be entitled to an increase in the Contract Price or an extension of the Contract Time with respect to any Work performed that is not required by the Contract Documents as amended, modified and supplemented as provided in these General Conditions except in the case of an emergency as provided or in the case of uncovering work as provided in article for Uncovering Work.

The Owner and Contractor shall execute appropriate Change Orders or Written Amendments recommended by Owner's Representative covering:

- changes in the work which are (i) ordered by the Owner (ii) required because of acceptance of defective work under the article for Acceptance of Defective Work or correcting defective Work under the article for Owner May Correct Defective Work or (iii) agreed to by the parties;
- changes in the Contract Price or Contract Time which are agreed to by the parties; and
- changes in the Contract Price or Contract Time which embody the substance of any written decision rendered by Owner's Representative pursuant to the article for Decisions on Disputes;
- provided that, in lieu of executing any such Change Order, an appeal may be taken from any such decision in accordance with the provisions of the Contract Documents and applicable Laws and Regulations, but during any such appeal, Contractor shall carry on the Work and adhere to the progress schedule as provided in the article for Continuing the Work.

If notice of any change affecting the general scope of the work or the provisions of the Contract Documents (including, but not limited to, Contract Price or Contract Time) is required by the

provisions of any Bond to be given to a surety, the giving of any such notice will be Contractor's responsibility, and the amount of each applicable Bond will be adjusted accordingly.

11. CHANGES IN THE CONTRACT PRICE

11.1. CHANGES IN THE CONTRACT PRICE

The Contract Price constitutes the total compensation (subject to authorized adjustments) payable to Contractor for performing the Work. All duties, responsibilities and obligations assigned to or undertaken by Contractor shall be at Contractor's expense without change in the Contract Price. The Contract Price may only be adjusted by a Change Order or by a Written Amendment. Any claim for an adjustment in the Contract Price shall be based on a written notice of claim stating the general nature of the claim, to be delivered by the party making the claim to the other party and to Owner's Representative or promptly (but in no event later than thirty days) after the start of the occurrence or event giving rise to the claim. Notice of the amount of the claim with supporting data shall be delivered within sixty (60) days after the start of such occurrence or event, unless Owner's Representative allows additional time for claimant to submit additional or more accurate data in support of the claim, and shall be accompanied by claimant's written statement that the claimed adjustment covers all known amounts to which the claimant is entitled as a result of said occurrence or event. No claim for an adjustment in the Contract Price will be valid if not submitted in accordance with this paragraph. The value of any Work covered by a Change Order or of any claim for an adjustment in the Contract Price will be determined as follows: (i) where the Work involved is covered by unit prices contained in the Contract Documents, by application of such unit prices to the quantities of the items involved (ii) where the Work involved is not covered by unit prices contained in the Contract Documents, by a mutually agreed lump sum (which may include an allowance for overhead and profit), (iii) where the Work is not covered by unit prices contained in the Contract Documents and agreement is reached to establish unit prices for the Work.

Where the work involved is not covered by unit prices contained in the Contract Documents and where the Owner's Representative, the Owner, the Engineer, the Engineer's Consultant, and Contractor cannot mutually agree on a lump sum price, the City of Clearwater shall pay for directed changes in the Work, on "COST REIMBURSEMENT" basis. The Contractor shall apply for compensation, detailing Contractor's forces, materials, equipment, subcontractors, and other items of direct costs required for the directed work.

The application for Cost Reimbursement shall be limited to the following items:

1. Labor, including foremen, for those hours associated with the direct work (actual payroll cost, including wages, fringe benefits, labor insurance and labor taxes established by law). Expressly excluded from this item are all costs associated with negotiating the subject change.
2. Materials associated with the change, including sales tax. The costs of materials shall be substantiated through vendors' invoices.
3. Rental or equivalent rental costs of equipment, including necessary transportation costs if specifically used for the Work. The rental rates shall not exceed the current rental rates prevailing in the locality or as defined in the rental Rate Blue Book for Construction Equipment (a.k.a. DataQuest Blue Book). The rental rate is defined as the full-unadjusted base rental rate for the appropriate item of construction equipment and

shall cover the costs of all fuel, supplies, repairs, insurance, and other costs associated with supplying the equipment for work ordered. Contractor-owned equipment will be paid for the duration of time required to complete the work. Utilize lowest cost combination of hourly, daily, weekly, or monthly rates. Do not exceed estimated operating costs given in Blue Book. Operating costs will not be allowed for equipment on stand-by.

4. Additional costs for Bonds, Insurance if required by the City of Clearwater.

The following fixed fees shall be added to the costs of the directed work performed by the Contractor or Subcontractor.

- A. A fixed fee of fifteen percent (15%) shall be added to the costs of Item 1 above. If work is performed by a subcontractor, the Contractor's fee shall not exceed five percent (5%), and the subcontractor's fee shall not exceed ten percent (10%).
- B. A fixed fee of ten percent (10%) shall be added to the costs of Item 2 above.
- C. No markup shall be added to the costs of Items 3 and 4.

The fixed fees shall be considered the full compensation for all cost of general supervision, overhead, profit, and other general expense.

11.2. ALLOWANCES AND FINAL CONTRACT PRICE ADJUSTMENT

It is understood that Contractor has included in the Contract Price all allowances so named in the Contract Documents and shall cause the Work so covered to be furnished and performed for such sums as may be acceptable to Owner and Engineer. Contractor agrees that: (i) the allowances include the cost to Contractor (less any applicable trade discounts) of materials and equipment required by the allowances to be delivered at the Site, and all applicable taxes; and (ii) Contractor's costs for unloading and handling on the site, labor, installation costs, overhead, profit and other expenses contemplated for the allowances have been included in the Contract Price and not in the allowances and no demand for additional payment on account of any of the foregoing will be valid.

Prior to final payment, an appropriate Change Order will be issued as recommended by Owner's Representative to reflect actual amounts due Contractor on account of Work covered by allowances and all the Work actually performed by the Contractor, and the Contract Price shall be correspondingly adjusted.

11.3. UNIT PRICE WORK

Where the Contract Documents provide that all or part of the Work is to be Unit Price Work, initially the Contract Price will be deemed to include for all Unit Price Work an amount equal to the sum of the established unit price for each separately identified item of unit price work times the estimated quantity of each item as indicated in the Agreement. The estimated quantities of items of Unit Price Work are not guaranteed and are solely for the purpose of comparison of Bids and determining an initial Contract Price. Determinations of the actual quantities and classifications of Unit Price Work performed by Contractor will be made by Owner's Representative. Each unit price will be deemed to include an amount considered by Contractor to be adequate to cover Contractor's overhead and profit for each separately identified item. The Owner or Contractor may make a claim for an adjustment in the Contract Price if: (i) the quantity of any item of Unit Price Work performed by Contractor differs materially and significantly from

the estimated quantity of such item indicated in the Contract Documents; and (ii) there is no corresponding adjustment with respect to any other item of Work; and (iii) if Contractor believes that Contractor is entitled to an increase in Contract Price as a result of having incurred additional expense or the Owner believes that the Owner is entitled to a decrease in Contract Price and the parties are unable to agree as to the amount of any such increase or decrease. On unit price contracts, Owner endeavors to provide adequate unit quantities to satisfactorily complete the construction of the project. It is expected that in the normal course of project construction and completion that not all unit quantities will be used in their entirety and that a finalizing change order which adjusts contract unit quantities to those unit quantities actually used in the construction of the project will result in a net decrease from the original Contract Price. Such reasonable deduction of final Contract Price should be anticipated by the Contractor in his original bid.

12. CHANGES IN THE CONTRACT TIME

The Contract Time (or Milestones) may only be changed by a Change Order or a Written Amendment. Any claim for an adjustment of the Contract Time (or Milestones) shall be based on written notice delivered by the party making the claim to the other party and to Owner's Representative promptly, but in no event later than thirty (30) days, after the occurrence of the event giving rise to the claim and stating the general nature of the claim. Notice of the extent of the claim with supporting data shall be delivered within sixty (60) days after such occurrence, unless Owner's Representative allows an additional period of time to ascertain more accurate data in support of the claim, and shall be accompanied by the claimant's written statement that the adjustment claimed is the entire adjustment to which the claimant has reason to believe it is entitled as a result of the occurrence of said event. All claims for adjustment in the Contract Time (or Milestones) shall be determined by Owner's Representative. No claim for an adjustment in the Contract Time (or Milestones) will be valid if not submitted in accordance with the requirements of this paragraph.

All time limits stated in the Contract Documents are of the essence of the Agreement.

Where Contractor is prevented from completing any part of the work within the Contract Time (or Milestones) due to delay beyond the control of Contractor, the Contract Time (or Milestones) may be extended in an amount equal to the time lost due to such delay if a claim is made therefore as provided in the article for Changes in the

Work. Delays beyond the control of Contractor shall include, but not be limited to, acts by the Owner, acts of utility owners or other contractors performing other work as contemplated by the article for Other Work, fires, floods, epidemics, abnormal weather conditions or acts of God. Delays attributable to and within the control of a Subcontractor or Supplier shall be deemed to be delays within the control of Contractor.

Where Contractor is prevented from completing any part of the Work within the Contract Times (or Milestones) due to delay beyond the control of both the Owner and Contractor, an extension of the Contract Time (or Milestones) in an amount equal to the time lost due to such delay shall be Contractor's sole and exclusive remedy for such delay. In no event shall the Owner be liable to Contractor, any Subcontractor, any Supplier, any other person, or to any surety for or employee or agent of any of them, for damages arising out of or resulting from (i) delays caused by or within the control of Contractor, or (ii) delays beyond the control of both parties including but not limited to fires, floods, epidemics, abnormal weather conditions, acts of God or acts by utility owners or other contractors performing other work as contemplated by paragraph for Other Work.

13. TESTS AND INSPECTIONS, CORRECTION, REMOVAL OR ACCEPTANCE OF DEFECTIVE WORK

13.1. TESTS AND INSPECTION

Contractor shall give Owner's Representative and Engineer timely notice of readiness of the Work for all required inspections, tests or approvals, and shall cooperate with inspection and testing personnel to facilitate required inspections or tests.

Contractor shall employ and pay for the services of an independent testing laboratory to perform all inspections, tests, or approvals required by the Contract Documents. The costs for these inspections, tests or approvals shall be borne by the Contractor except as otherwise provided in the Contract Documents.

If Laws or Regulations of any public body having jurisdiction require any Work (or part thereof) specifically to be inspected, tested or approved by an employee or other representative of such public body including all Owner Building Departments and Owner Utility Departments, Contractor shall assume full responsibility for arranging and obtaining such inspections, tests or approvals, pay all costs in connection therewith, and furnish Owner's Representative the required certificates of inspection or approval. Unless otherwise stated in the Contract Documents, Owner permit and impact fees will be waived. Contractor shall also be responsible for arranging and obtaining and shall pay all costs in connection with any inspections, tests or approvals required for Owner's and Engineer's acceptance of materials or equipment to be incorporated in the Work, or of materials, mix designs, or equipment submitted for approval prior to Contractor's purchase thereof for incorporation of the Work.

If any Work (or the work of others) that is to be inspected tested or approved is covered by Contractor without written concurrence of Owner's Representative, it must, if requested by Owner's Representative, be uncovered for observation. Uncovering Work as provided in this paragraph shall be at Contractor's expense unless Contractor has given Owner's Representative and Engineer timely notice of Contractor's intention to cover the same and Owner's Representative has not acted with reasonable promptness in response to such notice.

13.2. UNCOVERING THE WORK

If any Work is covered contrary to the written request of Owner's Representative, it must, if requested by Owner's Representative, be uncovered for Owner Representative's observation and replaced at Contractor's expense.

If Owner's Representative considers it necessary or advisable that covered Work be observed by Owner's Representative or inspected or tested by others, Contractor, at Owner Representative's request, shall uncover, expose or otherwise make available for observation, inspection or testing as Engineer or Owner's Representative 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, Contractor shall pay all claims, costs, losses and damages caused by, arising out of or resulting from such uncovering, exposure, observation, inspection and testing and of satisfactory replacement or reconstruction (including but not limited to all costs of repair or replacement of work of others); and the Owner shall be entitled to an appropriate decrease in the Contract Price for the costs of the investigation, and, if the parties are unable to agree as to the amount thereof, may make a claim therefore as provided in the article for Change in Contract Price. If, however, such Work is not found to be defective, Contractor shall be allowed an increase in the Contract

Price or an extension of the Contract Time (or Milestones), or both, directly attributable to such uncovering, exposure, observation, inspection, testing, replacement and reconstruction; and, if the parties are unable to agree as to the amount or extent thereof, Contractor may make a claim therefore as provided the article for Change in Contract Price and Change of Contract Time.

13.3. OWNER'S REPRESENTATIVE MAY STOP THE WORK

If the Work is defective, or Contractor fails to supply sufficient skilled workers or suitable materials or equipment, or fails to furnish or perform the Work in such a way that the completed Work will conform to the Contract Documents, Engineer or Owner's Representative may order Contractor to stop the Work, or any portion thereof, until the cause for such order has been eliminated; however, this right of Owner's Representative to stop the Work shall not give rise to any duty on the part of Owner's Representative or Owner to exercise this right for the benefit of Contractor or any surety or other party. If the Owner's Representative stops Work under this paragraph, Contractor shall be entitled to no extension of Contract Time or increase in Contract Price.

13.4. CORRECTION OR REMOVAL OF DEFECTIVE WORK

If required by Engineer or Owner's Representative, Contractor shall promptly, as directed, either correct all defective Work, whether or not fabricated, installed or completed, or, if the Work has been rejected by Engineer or Owner's Representative, remove it from the site and replace it with Work that is not defective. Contractor shall pay all claims, costs, losses and damages caused by or resulting from such correction or removal (including but not limited to all costs of repair or replacement of work of others).

13.5. WARRANTY/CORRECTION PERIOD

If within one year after the date of Substantial Completion or such longer period of time as may be prescribed by Laws or Regulations or 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, Contractor shall promptly, without cost to the Owner and in accordance with the Owner's written instructions; (i) correct such defective Work, or, if it has been rejected by the Owner, remove it from the site and replace it with Work that is not defective and (ii) satisfactorily correct or remove and replace any damage to other Work or the work of others resulting therefrom. If 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 Owner may have the defective Work corrected or the rejected. Work removed and replaced, and all claims, costs, losses and damages caused by or resulting from such removal and replacement (including but not limited to all costs of repair or replacement of work of others) will be paid by Contractor.

In special circumstances where a particular item of equipment is placed in continuous service before Final Completion of all the Work, the correction period for that item may start to run from an earlier date if specifically, and expressly so provided in the Specifications or by Written Amendment.

Where defective Work (and damage to other Work resulting therefrom) has been corrected, removed or replaced under this paragraph the correction period hereunder with respect to such Work will be extended for an additional period of one year after such correction or removal and replacement has been satisfactorily completed.

13.6. ACCEPTANCE OF DEFECTIVE WORK

If, instead of requiring correction or removal and replacement of defective Work, the Owner prefers to accept it, the Owner may do so.

Contractor shall pay all claims, costs, losses and damages attributable to the Owner's evaluation of and determination to accept such defective Work such costs to be approved by Owner's Representative as to reasonableness. If any such acceptance occurs prior to Owner Representative's recommendation of final payment, a Change Order will be issued incorporating the necessary revisions in the Contract Documents with respect to the Work; and the Owner shall be entitled to an appropriate decrease in the Contract Price, and, if the parties are unable to agree as to the amount thereof, the Owner may make a claim therefore as provided in article for Change of Contract Price. If the acceptance occurs after the Owner Representative's recommendation for final payment an appropriate amount will be paid by Contractor to the Owner.

13.7. OWNER MAY CORRECT DEFECTIVE WORK

If Contractor fails within a reasonable time after written notice from Owner's Representative to correct defective Work or to remove and replace rejected Work as required by Owner's Representative in accordance with the article for Correction and Removal of Defective Work or if Contractor fails to perform the Work in accordance with the Contract Documents, or if Contractor fails to comply with any other provision of the Contract Documents, the Owner may, after seven days' written notice to Contractor, correct and remedy any such deficiency. In exercising the rights and remedies under this paragraph the Owner shall proceed expeditiously. In connection with such corrective and remedial action, the Owner may exclude Contractor from all or part of the site, take possession of all or part of the Work, and suspend Contractor's services related thereto, and incorporate in the Work all materials and equipment stored at the site or for which the Owner has paid Contractor but which are stored elsewhere. Contractor shall allow Owner, Owner's Representatives, Agents and employees, the Owner's other contractors, and Owner's Representative, Engineer, and Engineer's Consultants access to the site to enable the Owner to exercise the rights and remedies under this paragraph. All claims, costs, losses and damages incurred or sustained by the Owner in exercising such rights and remedies will be charged against Contractor and a Change Order will be issued incorporating the necessary revisions in the Contract Documents with respect to the Work; and the Owner shall be entitled to an appropriate decrease in the Contract Price, and, if the parties are unable to agree as to the amount thereof, the Owner may make a claim therefore as provided in the article for Change of Contract Price. Such claims, costs, losses and damages will include but not be limited to all costs of repair or replacement of work of others destroyed or damaged by correction, removal or replacement of Contractor's defective Work. Contractor shall not be allowed an extension of the Contract Time (or Milestones) because of any delay in the performance of the Work attributable to the exercise by the Owner of the Owner's rights and remedies hereunder.

14. PAYMENTS TO CONTRACTOR AND COMPLETION

Requests for payment shall be processed in accordance with F.S. 218.735 and as described herein. Progress payments on account of Unit Price Work will be based on the number of units completed.

14.1. APPLICATION FOR PROGRESS PAYMENT

Contractor shall submit (not more often than once a month) to Owner's Representative for review an Application for Payment filled out and signed by Contractor covering the Work completed once each month and accompanied by such supporting documentation as is required by the Owner's Representative and the Contract Documents. Unless otherwise stated in the Contract Documents, payment will not be made for materials and equipment not incorporated in the Work. Payment will only be made for that portion of the Work, which is fully installed including all materials, labor and equipment. A retainage of not less than five (5%) of the amount of each Application for Payment for the total of all Work, including as-built survey and Inspector overtime reimbursement, completed to date will be held until final completion and acceptance of the Work covered in the Contract Documents. No progress payment shall be construed to be acceptance of any portion of the Work under contract.

The Contractor shall review with the Engineer or the Construction Inspector all quantities and work for which payment is being applied for and reach agreement prior to submittal of an Official Pay Request. The Engineer or the Construction Inspector will verify that the on-site marked up as-built drawings are up to date with the work and are in compliance with the Contract Documents.

In addition to all other payment provisions set out in this contract, the Owner's Representative may require the Contractor to produce for Owner, within fifteen (15) days of the approval of any progress payment, evidence and/or payment affidavit that all subcontractors and suppliers have been paid any sum or sums then due. A failure on the part of the contractor to provide the report as required herein shall result in further progress or partial payments being withheld until the report is provided.

14.2. CONTRACTOR'S WARRANTY OF TITLE

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 Owner no later than the time of payment, free and clear of liens. No materials or supplies for the Work shall be purchased by Contractor or Subcontractor subject to any chattel mortgage or under a conditional sale contract or other agreement by which an interest is retained by the seller. Contractor warrants that he has good title to all materials and supplies used by him in the Work, free from all liens, claims or encumbrances. Contractor shall indemnify and save the Owner harmless from all claims growing out of the lawful demands of Subcontractors, laborers, workmen, mechanics, materialmen, and furnishers of machinery and parts thereof, equipment, power tools, and all supplies incurred in the furtherance of the performance of this Contract. Contractor shall at the Owner's request, furnish satisfactory evidence that all obligations of nature hereinabove designated have been paid, discharged, or waived. If Contractor fails to do so, then the Owner may, after having served written notice on said Contractor either pay unpaid bills, of which the Owner has written notice, or withhold from the Contractor's unpaid compensation a sum of money deemed reasonably sufficient to pay any and all such lawful claims until satisfactory evidence is furnished that all liabilities have been fully discharged, whereupon payment to Contractor shall be resumed in accordance with the terms of this Contract, but in no event shall the provisions of this sentence be construed to impose any obligations upon the Owner to the Contractor or the Surety. In paying any unpaid bills of the Contractor, the Owner shall be deemed the agent of Contractor and any payment so made by the Owner shall be considered as payment made under the Contract by the Owner to Contractor, and the Owner shall not be liable to Contractor for any such payment made in good faith.

14.3. REVIEW OF APPLICATIONS FOR PROGRESS PAYMENTS

The Owner's Representative will within twenty (20) business days after receipt authorize and process payment by the Owner a properly submitted and documented Application for payment, unless the application requires review by an Agent. If the Application for payment requires review and approval by an Agent, properly submitted and documented Applications for payment will be paid by the Owner within twenty-five (25) business days. If an Application for payment is rejected, notice shall be given within twenty (20) business days of receipt indicating the reasons for refusing payment. The reasons for rejecting an Application will be submitted in writing, specifying deficiencies and identifying actions that would make the Application proper. In the latter case, Contractor may make the necessary corrections and resubmit the Application. The Owner's Representative or Agent may refuse to recommend the whole or any part of any payment to Owner. Owner's Representative or Agent may also refuse to recommend any such payment, or, because of subsequently discovered evidence or the results of subsequent inspections or test, nullify any such payment previously recommended, to such extent as may be necessary in Owner Representative's or Agent's opinion to protect the Owner from loss because: (i) the Work is defective, or completed Work has been damaged requiring correction or replacement, (ii) the Contract Price has been reduced by amendment or Change Order, (iii) the Owner has been required to correct defective Work or complete Work, or (iv) Owner's Representative or Agent has actual knowledge of the occurrence of any of the events enumerated in the article on Suspension of Work and Termination.

The Owner may refuse to make payment of the full amount recommended by the Owner's Representative or Agent because: (i) claims have been made against the Owner on account of Contractor's performance or furnishing of the Work, (ii) Liens have been filed in connection with the Work, except where Contractor has delivered a specific Bond satisfactory to the Owner to secure the satisfaction and discharge of such Liens, (iii) there are other items entitling the Owner to a set-off against the amount recommended, or (iv) the Owner has actual knowledge of any of the events described in this paragraph. The Owner shall give Contractor notice of refusal to pay in accordance with the time constraints of this section with a copy to the Owner's Representative or Agent, stating the reasons for such actions, and Owner shall promptly pay Contractor the amount so withheld, or any adjustment thereto agreed to by the Owner and Contractor, when Contractor corrects to the Owner's satisfaction the reasons for such action.

14.4. PARTIAL UTILIZATION

Use by the Owner at the Owner's option of any substantially completed part of the Work which (i) has specifically been identified in the Contract Documents, or (ii) Owner, Engineer, Owner's Representative, and Contractor agree constitutes a separately functioning and usable part of the Work that can be used by the Owner for its intended purpose without significant interference with Contractor's performance of the remainder of the Work, may be accomplished prior to Final Completion of all the Work subject to the following:

The Owner at any time may request Contractor in writing to permit the Owner to use any such part of the Work which the Owner believes to be ready for its intended use and substantially complete. If Contractor agrees that such part of the Work is substantially complete, Contractor will certify to Owner, Owner's Representative, and Engineer that such part of the Work is substantially complete and request Owner's Representative to issue a certificate of Substantial Completion for that part of the Work. Contractor at any time may notify Owner, Owner's Representative, and Engineer in writing that Contractor considers any such part of the Work ready for its intended use and

substantially complete and request Owner's Representative to issue a certificate of Substantial Completion for that part of the Work. Within a reasonable time after either such request, Owner, Contractor, Owner's Representative, and Engineer shall make an inspection of that part of the Work to determine its status of completion. If Engineer does not consider that part of the Work to be substantially complete, Engineer will notify Owner, Owner's Representative, and Contractor in writing giving the reasons therefore. If Engineer considers that part of the Work to be substantially complete, the provisions of the articles for Substantial Completion and Partial Utilization will apply with respect to certification of Substantial Completion of that part of the Work and the division of responsibility in respect thereof and access thereto.

14.5. FINAL INSPECTION

Upon written notice from Contractor that the entire Work or an agreed portion thereof is complete, Owner's Representative will make a final inspection with Engineer, Owner and Contractor and will within thirty (30) days notify Contractor in writing of particulars in which this inspection reveals that the Work is incomplete or defective. The Owner's Representative will produce a final punch list, deliver it to the Contractor within five (5) days of completion and assign a date for this work to be completed not less than thirty (30) days from delivery of the list. Failure to include any corrective work or pending items does not alter the responsibility of the contractor to complete all the construction services purchased pursuant to the contract. Contractor shall immediately take such measures as are necessary to complete such Work or remedy such deficiencies.

14.6. FINAL APPLICATION FOR PAYMENT

After Contractor has completed all such corrections to the satisfaction of Owner's Representative and has delivered in accordance with the Contract Documents all maintenance and operating instructions, As-built/Record Drawings, schedules, guarantees, Bonds, certificates or other evidence of insurance required by the paragraph for Bonds and Insurance, certificates of inspection, Inspector overtime reimbursement as required in the Contract Documents and other documents, Contractor may make application for final payment following the procedure for progress payments. The final Application for Payment shall be accompanied (except as previously delivered) by: (i) all documentation called for in the Contract Documents, including but not limited to the evidence of insurance required by paragraph for Bonds and Insurance, and (ii) executed consent of the surety to final payment using the form contained in Section V of the Contract Documents.

Prior to application for final payment, Contractor shall clean and remove from the premises all surplus and discarded materials, rubbish, and temporary structures, and shall 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 Work in a neat and presentable condition.

14.7. FINAL PAYMENT AND ACCEPTANCE

If through no fault of Contractor, final completion of the Work is significantly delayed and if Owner's Representative so confirms, the Owner shall, upon receipt of Contractor's final Application for payment and recommendation of Owner's Representative, and without terminating the Agreement, make payment of the balance due for that portion of the Work fully completed and accepted. If the remaining balance to be held by the Owner 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 paragraph for Bonds and Insurance, 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 Contractor to Owner's Representative with the Application for such payment. Such payment shall be made under the terms and conditions governing final payment, except that such payment shall not constitute a waiver of claims.

If on the basis of Owner Representative's observation of the Work during construction and final inspection, and Owner Representative's review of the final Application for Payment and accompanying documentation, all as required by the Contract Documents, Owner's Representative is satisfied that the Work has been completed and Contractor's other obligations under the Contract Documents have been fulfilled, Owner's Representative will indicate in writing his recommendation of payment and present the Application to Owner for payment. Thereupon, Owner's Representative will give written notice to Owner and Contractor that the Work is acceptable subject to the provisions of this article. Otherwise, Owner's Representative will return the Application to Contractor, indicating in writing the reasons for refusing to recommend final payment, in which case Contractor shall make the necessary corrections and resubmit the Application. If the Application and accompanying documentation are appropriate as to form and substance, the Owner shall, within twenty (20) days after receipt thereof pay contractor the amount recommended by Owner's Representative.

14.8. WAIVER OF CLAIMS

The making and acceptance of final payment will constitute: a waiver of all claims by the Owner against Contractor, except claims arising from unsettled Liens, from defective Work appearing after final inspection, from failure to comply with the Contract Documents or the terms of any special guarantees specified therein, or from Contractor's continuing obligations under the Contract Documents; and a waiver of all claims by Contractor against the Owner other than those previously made in writing and still unsettled.

15. SUSPENSION OF WORK AND TERMINATION

15.1. OWNER MAY SUSPEND THE WORK

At any time and without cause, Owner's Representative may suspend the Work or any portion thereof for a period of not more than ninety (90) days by notice in writing to Contractor, which will fix the date on which Work will be resumed. Contractor shall resume the Work on the date so fixed. Contractor shall be allowed an adjustment in the Contract Price or an extension of the Contract Times, or both, directly attributable to any such suspension if Contractor makes an approved claim therefore as provided in the articles for Change of Contract Price and Change of Contract Time.

15.2. OWNER MAY TERMINATE

Upon the occurrence of any one or more of the following events:

Contractor persistently fails to perform the work in accordance with the Contract Documents (including, but not limited to, failure to supply sufficient skilled workers or suitable materials or equipment or failure to adhere to the progress schedule as adjusted from time to time);

Contractor disregards Laws and Regulations of any public body having jurisdiction;

Contractor violates Article 6.7.1 of this Section III;

Contractor disregards the authority of Owner's Representative;

Contractor otherwise violates in any substantial way any provisions of the Contract Documents; or if the Work to be done under this Contract is abandoned, or if this Contract or any part thereof is sublet, without the previous written consent of the Owner, or if the Contract or any claim thereunder is assigned by Contractor otherwise than as herein specified, or at any time Owner's Representative certifies in writing to the Owner that the rate of progress of the Work or any part thereof is unsatisfactory or that the work or any part thereof is unnecessarily or unreasonably delayed;

Lack of funding. The City's performance and obligation to pay under this Contract is contingent upon an annual appropriation by the Clearwater City Council.

The Owner may, after giving Contractor (and the surety, if any), seven days' written notice and, to the extent permitted by Laws and Regulations, terminate the services of Contractor, exclude Contractor from the site and take possession of the Work and of all Contractor's tools, appliances, construction equipment and machinery at the site and use the same to the full extent they could be used by Contractor (without liability to Contractor for trespass or conversion), incorporate in the Work all materials and equipment stored at the site or for which the Owner has paid Contractor but which are stored elsewhere, and finish the Work as the Owner may deem expedient. In such case Contractor shall not be entitled to receive any further payment until the Work is finished. If the unpaid balance of the Contract Price exceeds all claims, costs, losses and damages sustained by the Owner arising out of or resulting from completing the Work such excess will be paid to Contractor.

If such claims, costs, losses and damages exceed such unpaid balance, Contractor shall pay the difference to the Owner. Such claims, costs, losses and damages incurred by the Owner will be reviewed by Owner's Representative as to their reasonableness and when so approved by Owner's Representative incorporated in a Change Order, provided that when exercising any rights or remedies under this paragraph the Owner shall not be required to obtain the lowest price for the Work performed.

Where Contractor's services have been so terminated by the Owner, the termination will not affect any rights or remedies of the Owner against Contractor then existing or which may thereafter accrue. Any retention or payment of moneys due Contractor by the Owner will not release Contractor from liability.

Upon seven (7) days' written notice to Contractor and Owner's Representative, the Owner may, without cause and without prejudice to any other right or remedy of the Owner, elect to terminate the Agreement. In such case, Contractor shall be paid (without duplication of any items):

- for completed and acceptable Work executed in accordance with the Contract Documents prior to the effective date of termination, including fair and reasonable sums for overhead and profit on such Work;

- for expenses sustained prior to the effective date of termination in performing services and furnishing labor, materials or equipment as required by the Contract Documents in connection with uncompleted Work, plus fair and reasonable sums for overhead and profit on such expenses;

- for all claims, costs, losses and damages incurred in settlement of terminated contracts with Subcontractors, Suppliers and others; and for reasonable expenses directly attributable to termination.

Contractor shall not be paid on account of loss of anticipated profits or revenue or other economic loss arising out of or resulting from such termination.

15.3. CONTRACTOR MAY STOP WORK OR TERMINATE

If, through no act or fault of Contractor, the Work is suspended for a period of more than ninety (90) days by the Owner or under an order of court or other public authority, or the Owner's Representative fails to act on any Application for Payment within thirty (30) days after it is submitted or the Owner fails for thirty (30) days to pay Contractor any sum finally determined to be due, then Contractor may, upon seven (7) days' written notice to the Owner and Owner's Representative, and provided the Owner or Owner's Representative does not remedy such suspension or failure within that time, terminate the Agreement and recover from the Owner payment on the same terms as provided in the article for the Owner May Terminate. However, if the Work is suspended under an order of court through no fault of Owner, the Contractor shall not be entitled to payment except as the Court may direct. In lieu of terminating the Agreement and without prejudice to any other right or remedy, if Owner's Representative has failed to act on an Application for Payment within thirty (30) days after it is submitted, or the Owner has failed for thirty (30) days to pay Contractor any sum finally determined to be due, Contractor may upon seven (7) days' written notice to the Owner and Owner's Representative stop the Work until payment of all such amounts due Contractor. The provisions of this article are not intended to preclude Contractor from making claim under paragraphs for Change of Contract Price or Change of Contract Time or otherwise for expenses or damage directly attributable to Contractor's stopping Work as permitted by this article.

16. DISPUTE RESOLUTION

If and to the extent that the Owner and Contractor have agreed on the method and procedure for resolving disputes between them that may arise under this Agreement, such dispute resolution method and procedure will proceed. If no such agreement on the method and procedure for resolving such disputes has been reached, subject to the provisions of the article for Decisions on Disputes, the Owner and Contractor may exercise such rights or remedies as either may otherwise have under the Contract Documents or by Laws or Regulations in respect of any dispute provided, however, that nothing herein shall require a dispute to be submitted to binding arbitration.

17. MISCELLANEOUS

17.1. SUBMITTAL AND DOCUMENT FORMS

The form of all submittals, notices, change orders, pay applications, logs, schedules and other documents permitted or required to be used or transmitted under the Contract Documents shall be determined by the Owner's Representative subject to the approval of Owner.

17.2. GIVING NOTICE

Whenever any provision of the Contract Documents requires the giving of written notice, notice will 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 or sent by registered or certified mail, postage prepaid, to the last business address known to the giver of the notice.

17.3. NOTICE OF CLAIM

Should the Owner or Contractor suffer injury or damage to person or property because of any error, omission or any act of the other party or of any of the other party's officers, employees or agents or others for whose acts the other party is legally liable, claim will be made in writing to the other party within a reasonable time of the first observance of such injury or damage. The provisions of this paragraph shall not be construed as a substitute for or a waiver of the provisions of any applicable statute of limitations or repose.

17.4. PROFESSIONAL FEES AND COURT COSTS INCLUDED

Whenever reference is made to "claims, costs, losses and damages," the phrase shall include in each case, but not be limited to, all fees and charges of engineers, architects, attorneys and other professionals and all court or other dispute resolution costs.

17.5. ASSIGNMENT OF CONTRACT

The Contractor shall not assign this contract or any part thereof or any rights thereunder without the approval of Owner, nor without the consent of surety unless the surety has waived its rights to notice of assignment.

17.6. RENEWAL OPTION

Annual Contracts issued through the Engineering Department may be renewed for up to three (3) years, upon mutual consent of both the Owner and the Contractor/Vendor. All terms, conditions and unit prices shall remain constant unless otherwise specified in the contract specifications or in the Invitation to bid. Renewals shall be made at the sole discretion of the Owner and must be agreed to in writing by both parties. All renewals are contingent upon the availability of funds, and the satisfactory performance of the Contractor as determined by the Construction Department.

17.7. ROLL-OFF CONTAINERS AND/OR DUMPSTERS

All City construction projects shall utilize City of Clearwater Solid Waste roll-off containers and/or dumpsters for their disposal and hauling needs. For availability or pricing contact William Buzzell, at the City of Clearwater, Solid Waste Department, by phone: (727) 562-4929 or email: William.Buzzell@myClearwater.com.

18. ORDER AND LOCATION OF THE WORK

The City reserves the right to accept and use any portion of the work whenever it is considered to the public interest to do so. The Engineer shall have the power to direct on what line or street the Contractor shall work and order thereof.

19. MATERIAL USED

All material incorporated into the final work shall be new material unless otherwise approved by the Engineer. If requested by the Engineer, the Contractor shall furnish purchase receipts of all materials.

20. CONFLICT BETWEEN PLANS AND SPECIFICATIONS

The various Contract Documents shall be given precedence, in case of conflict, error or discrepancy, as follows: Modifications, Contract Agreement, Addenda, Supplementary General Conditions, General Conditions, Supplementary Technical Specifications and Technical Specifications. In a series of Modifications or Addenda the latest will govern. In the case of an inconsistency between Drawings and Specifications or within either Document not clarified by addendum, the better quality, more stringent or greater quantity of Work shall be provided in accordance with the Engineer/Architect's interpretation.

21. OWNER DIRECT PURCHASE (ODP)

21.1. SALES TAX SAVINGS

The Owner reserves the right to purchase certain portions of the materials or equipment for the Project directly in order to save applicable sales tax in compliance with Florida Law since owner is exempt from the payment of sales tax. The contract price includes Florida sales and other applicable taxes for materials, supplies, and equipment which will be a part of the Contractor's Work. Owner-purchasing of construction materials or equipment, if selected, will be administered on a deductive Change Order basis. The contract price shall be reduced by the actual cost of the materials or equipment purchased by owner plus the normally applicable sales tax, even if the actual cost is in excess of the cost for the materials or equipment as-bid by the Contractor. For purposes of calculating engineering fees, contractor fees, architects' fees, and any other amounts that are based on the contract amount, however, the original, as-bid contract amount shall be used.

Direct purchase shall be considered for single items or materials that exceed \$10,000 in value and/or items identified in Section V, Bidders Proposal. The Contractor shall provide the Owner an ODP Summary of all intended suppliers, vendors, equipment and materials for consideration as ODP materials or equipment (refer to ODP Instructions in Contract Appendix).

21.2. TITLE AND OWNER RISK

Owner will issue Purchase Orders and provide a copy of Owner's Florida Consumer Certification of Tax Exemption and Certificate of Entitlement directly to the Vendor for ODP materials or equipment. Invoices for ODP materials or equipment shall be issued to the Owner, and a copy sent to the Contractor.

Notwithstanding the transfer of ODP materials or equipment by the Owner to the Contractor's possession, the Owner shall retain legal and equitable title to any and all ODP materials or equipment; therefore, the owner assumes the risk of damage or loss at the time of purchase or delivery of items, unless material is damaged as the result of negligence by the Contractor.

21.3. CONTRACTOR'S RECEIPT OF MATERIALS

The Contractor shall be fully responsible for all matters relating to the receipt of materials or equipment furnished to the Owner including, but not limited to, verifying correct quantities, verifying documents of orders in a timely manner, coordinating purchases, providing and obtaining all warranties and guarantees required by the Contract Documents, and inspection and acceptance of the goods at the time of delivery. The Owner shall coordinate with Contractor and Vendor delivery schedules, sequence of delivery, loading orientation, and other arrangements normally

required by the Contractor for the particular materials or equipment furnished. The Contractor shall provide all services required for the unloading and handling of materials or equipment. The Contractor agrees to indemnify and hold harmless the Owner from any and all claims of whatever nature resulting from non-payment of goods to suppliers arising from the action of the Contractor.

As ODP materials or equipment are delivered to the job site, the Contractor shall visually inspect all shipments from the suppliers and approve the vendor's invoice for items delivered. The Contractor shall assure that each delivery of ODP materials or equipment is accompanied by documentation adequate to identify the Purchase Order against which the purchase is made. This documentation may consist of a delivery ticket and/or an invoice from the supplier conforming to the Purchase Order together with such additional information as the Owner may require. The Contractor will then forward an electronic copy of the invoice and supporting documentation to the Owner for payment within fourteen (14) calendar days of receipt of said goods or materials. Such payment shall be directly from public funds, from Owner to Vendor.

The Contractor shall insure that ODP materials or equipment conform to the Specifications and determine prior to acceptance of goods at time of delivery if such materials or equipment are patently defective, and whether such materials or equipment are identical to the materials or equipment ordered and match the description on the bill of lading. If the Contractor discovers defective or non-conformities in ODP materials or equipment upon such visual inspection, the Contractor shall not utilize such nonconforming or defective materials or equipment in the Contractor's Work and instead shall properly notify the Owner of the defective or nonconforming condition so that repair or replacement of those materials or equipment can occur without undue delay or interruption to the Project. If the Contractor fails to perform such inspection and otherwise incorporates into the Contractor's Work such defective or nonconforming ODP materials or equipment, the condition of which it either knew or should have known by performance of an inspection, Contractor shall be responsible for all damages to the Owner, resulting from Contractor's incorporation of such materials or equipment into the Project, including liquidated damages.

21.4. ODP RECORDS, WARRANTIES AND INDEMNIFICATION

The Contractor shall maintain records of all ODP materials or equipment it incorporates into Contractor's Work from the stock of ODP materials or equipment in its possession. The Contractor shall account monthly to the Owner for any ODP materials or equipment delivered into the Contractor's possession, indicating portions of all such materials or equipment which have been incorporated in the Contractor's Work.

The Contractor shall be responsible for obtaining and managing all warranties and guarantees for all materials, equipment and products as required by the Contract Documents. All repair, maintenance, or damage-repair calls shall be forwarded to the Contractor for resolution with the appropriate supplier, vendor, or subcontractor.

The Owner shall indemnify and hold Contractor harmless from any sales tax (and interest and penalties incurred in connection therewith) in the event there is a final determination that purchases made by Owner, which Owner treats as being exempt from sales tax, are subject to sales tax. "Final determination" shall mean an assessment by the Department of Revenue that is no longer subject to protest, or a determination of a court having jurisdiction over such matters that is final and not subject to appeal. Contractor agrees to promptly notify owner of any audit, assessment, proposed assessment or notice of deficiency issued with regard to the Project and relating to ODP materials or equipment. ODP Purchase Orders must be closed out prior to closing out the contract/Contractor

Purchase Order. If material costs needed for project exceed the ODP Purchase Order amount, the ODP Purchase Order will not be increased. Amounts in excess of the ODP Purchase Order will be paid for by the Contractor.


22. RESIDENT NOTIFICATION OF START OF CONSTRUCTION

22.1. GENERAL

The Contractor shall notify all residents along the construction route or within a 500-foot radius, unless stated otherwise in the Contract Documents, with a printed door hanger notice indicating the following information about the proposed construction work and the Contractor performing the work: City seal or logo; the scheduled date for the start of construction; the type of construction; general sequence and scheduling of construction events; possibility of water service disruption and/or colored water due to construction efforts; Contractor's name, the Superintendent's name, Contractor address and telephone number; Contractor's company logo (optional); requirement for residents to remove landscaping and/or other private appurtenances which are in conflict with the proposed construction; and other language as appropriate to the scope of Contract work. Sample door hanger including proposed language shall be approved by the City prior to the start of construction. Notification shall be printed on brightly colored and durable card stock and shall be a minimum of 4-1/4 by 11 inches in size. Notification (door hanger) shall be posted to residences and businesses directly affected by the Contractor's activities no later than seven (7) days prior to the start of construction activity. Directly affected by the Contractor's activities shall mean all Contractor operations including staging areas, equipment and material storage, principal access routes across private property, etc. Contractor cannot start without proper seven (7) day notice period to residents. Contractor is required to maintain sufficient staff to answer citizen inquiries during normal business hours and to maintain appropriate message recording equipment to receive citizen inquiries after business hours.

Resident notification by the Contractor is a non-specific pay item to be included in the bid items provided in the contract proposal.

22.2. EXAMPLE



CLEARWATER
BRIGHT AND BEAUTIFUL • BAY TO BEACH

NOTICE OF CONSTRUCTION
TODAY'S DATE: ____/____/____
PLEASE EXCUSE US FOR ANY INCONVENIENCE

We are the construction contractor performing the *(state project name)* for the City of Clearwater in your area. The work will be performed in the public right-of-way adjacent to your property. This notice is placed a minimum of seven (7) days in advance of construction to notify property owners of the pending start of construction.

(Brief description of the construction process to be expected by the property owners)

The construction process may necessitate the removal of certain items from the right-of-way. Typical items such as sprinklers, grass, and postal approved mailboxes will be replaced by the contractor within a reasonably short period of time. The replacement of driveways and sidewalks will be made using standard asphalt or concrete materials. The property owner is responsible for the expense and coordination to replace driveways and sidewalks which have customized colors, textures and/or materials. Small trees, shrubs, landscaping materials, unauthorized mailboxes or structures within the right-of-way which must be removed due to the construction process will not be replaced. The property owner is responsible to relocate any such items which the property owner wishes to save prior to the start of construction. Vehicles parked on the streets or within the right-of-way may be required to be placed elsewhere.

We are available to answer any questions you may have regarding the construction process or any particular item that must be relocated. Please contact our Construction Manager _____ at (727) _____. We will be more than happy to assist you.

Construction is anticipated to begin on: _____.

Company Name
Company Address
Contractor Phone Number

23. PROJECT INFORMATION SIGNS

23.1. SCOPE AND PURPOSE

The Owner desires to inform the general public on the Owner's use and expenditure of public funding for general capital improvement and maintenance projects. To help accomplish this purpose, the Contractor is required to prepare and display public project information signs during the full course of the contract period. These signs will be displayed at all location(s) of active work. Payment to Contractor for the preparation, installation and management of project sign(s) shall be

included in the cost of the work. The number of and type of signs will be stated in SECTION IV, SCOPE OF WORK.

23.2. PROJECT SIGN, FIXED OR PORTABLE

Sign type shall be "fixed" on stationary projects and "portable" on projects which have extended locations or various locations. The particular wording to be used on the signs will be determined after contract award has been approved. Contractor will be provided the wording to be used on sign at the preconstruction conference.

23.3. FIXED SIGN

Fixed sign shall be 4-foot by 6-foot (4'x6') in size and painted on a sheet of exterior grade plywood of the same size and a minimum thickness of 1/2-inches. Sign shall be attached to a minimum of two (2) 4-inch by 4-inch (4"x4") below grade pressure treated (P.T.) wooden posts and braced as necessary for high winds. Posts shall be long enough to provide secure anchoring in the ground. Bottom of sign must be a minimum of 24-inches above the ground. Alternate mounting system or attachment to fencing or other fixed structure can be considered for approval. Sign shall be painted white on both sides with exterior rated paint.

23.4. PORTABLE SIGNS

Portable sign shall be a minimum of 24-inches by 30-inches (24"x30") in size and will be attached to a standard sized portable traffic barricade. Sign material shall be aluminum, 0.080-inches or thicker, background of white reflective sheeting, and shall be silkscreen or vinyl lettering. Portable sign shall be two signs located and attached to each side of the traffic barricade.

23.5. SIGN COLORING

Background shall be white. Project Descriptive Name shall be in blue lettering. All other lettering shall be black. Basic lettering on sign shall be in all capital letters, of size proportional to the sign itself. Each sign shall depict the City's logo. The Project Manager/City Representative shall provide the appropriate electronic logo file(s) to the Contractor.

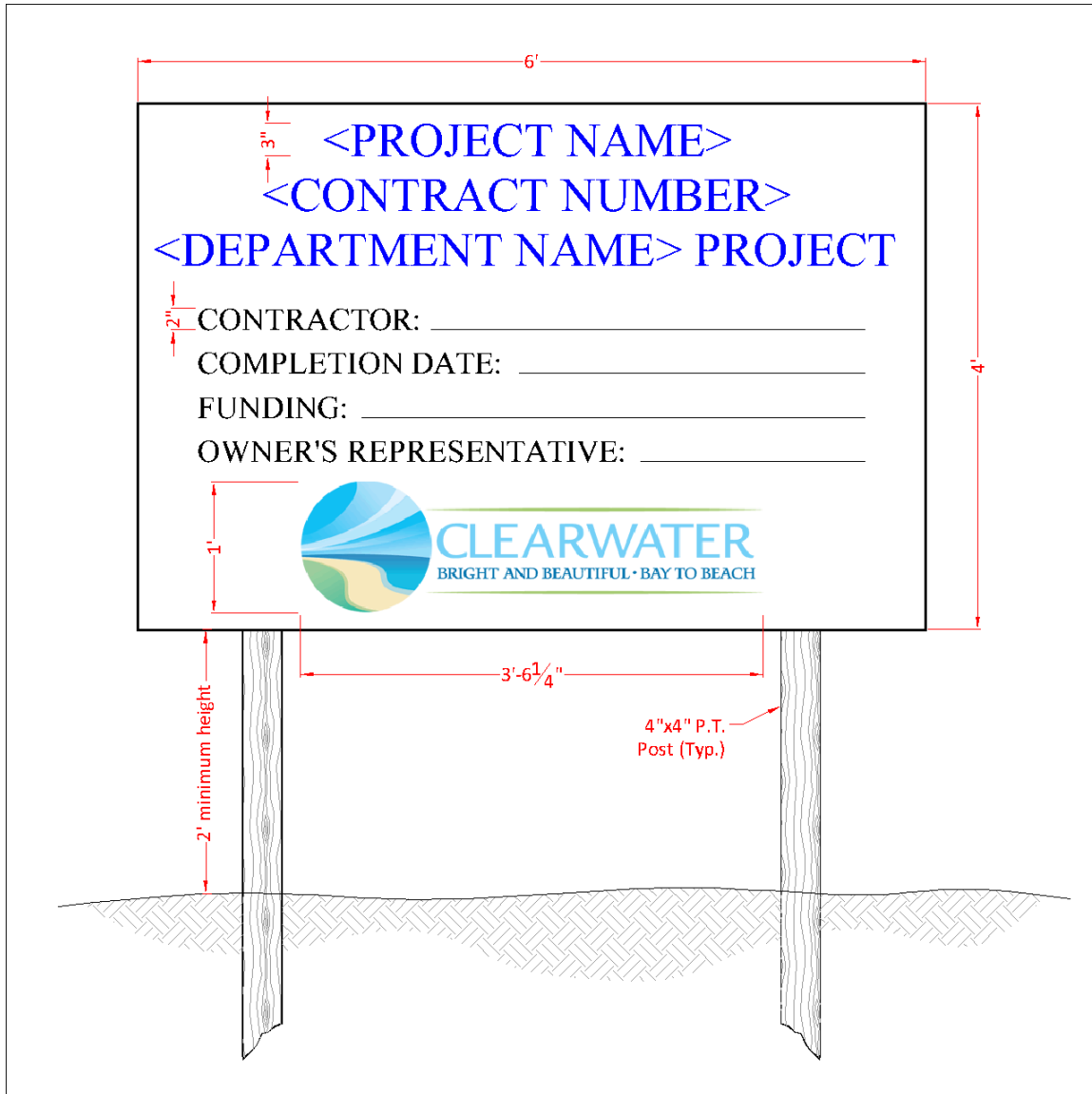
23.6. SIGN PLACEMENT

Signs shall be placed where they are readily visible by the general public which pass by the project site. Signs are not to be placed where they may become a hazard or impediment to either pedestrian or vehicular traffic. For construction projects outside of the Owner's right-of-way, the signs will be placed on the project site. For projects constructed inside of the Owner's right-of-way, the signs will be placed in the right-of-way. Portable signs are to be moved to the locations of active work on the project. Multiple portable signs will be necessary where work is ongoing in several locations at the same time. Fixed signs are to be placed at the start of construction and will remain in place until the request for final payment.

23.7. SIGN MAINTENANCE

The Contractor is responsible for preparation, installation, movement, maintenance, replacement, removal and disposal of all project signs during the full course of the contract period. The Contractor will place and secure portable signs from dislocation by wind or other actions. Signs are to be cleaned as necessary to maintain legibility and immediately replaced if defaced.

23.8. TYPICAL PROJECT SIGN



24. AWARD OF CONTRACT, WORK SCHEDULE AND GUARANTEE

It will be required that the work will commence not later than five (5) calendar days after the Engineer gives written Notice to Proceed (NTP), which notice shall be given as outlined in Article 2 of these General Conditions.

It is further required that all work within this contract be completed within the indicated number of consecutive calendar days as determined in Section IV, Scope of Work. Contract Time to commence at start date noted on the Notice to Proceed. If the Contractor fails to complete the work within the stipulated time, the City will retain the amount stated in the Contract, per calendar day, for each day that the contract remains incomplete. The work shall be discontinued on Saturdays, Sundays, and approved Holidays. If it becomes necessary for the Contractor to perform work on Saturdays, Sundays, and approved City of Clearwater Employee Holidays, that in the opinion of the Engineer, will require the presence of Inspectors, the Contractor shall pay the City of

Clearwater, Florida, the amount of Four Hundred Eighty Dollars (\$480.00) per each eight-hour (8) day for each Inspector given such assignment.

The Contractor shall remedy any defects in the work at his own expense and pay for any damage to other work resulting therefrom which appear within a period of one (1) year from the date of final acceptance.

25. SCRUTINIZED COMPANIES AND BUSINESS OPERATIONS WITH CUBA AND SYRIA CERTIFICATION FORM AND ISRAEL CERTIFICATION FORM

Pursuant to Section 287.135, Florida Statutes, any vendor, company, individual, principal, subsidiary, affiliate, or owner on the Scrutinized Companies with Activities in Sudan List, the Scrutinized Companies with Activities in the Iran Petroleum Energy Sector List, or is engaged in business operations in Cuba or Syria, is ineligible for, and may not bid on, submit a proposal for, or enter into or renew a contract with the City of Clearwater for goods or services for an amount equal to or greater than one million (\$1,000,000.00) dollars. Any vendor, company, individual, principal, subsidiary, affiliate, or owner on the Scrutinized Companies that Boycott Israel List, or is engaged in a boycott of Israel, is ineligible for, and may not bid on, submit a proposal for, or enter into or renew a contract with the City of Clearwater for goods or services for ANY amount.

Each entity submitting a bid, proposal, or response to a solicitation must certify to the City of Clearwater that it is not on the aforementioned lists, or engaged in business operations in Cuba or Syria, or engaged in a boycott of Israel at the time of submitting a bid, proposal or response, in accordance with Section 287.135, Florida Statutes. Business Operations means, for purposes specifically related to Cuba or Syria, engaging in commerce in any form in Cuba or Syria, including, but not limited to, acquiring, developing, maintaining, owning, selling, possessing, leasing or operating equipment, facilities, personnel, products, services, personal property, real property, military equipment, or any other apparatus of business or commerce. Boycott Israel or boycott of Israel means refusing to deal, terminating business activities, or taking other actions to limit commercial relations with Israel, or persons or entities doing business in Israel or in Israeli-controlled territories, in a discriminatory manner. A statement by a company that it is participating in a boycott of Israel, or that it has initiated a boycott in response to a request for a boycott of Israel or in compliance with, or in furtherance of, calls for a boycott of Israel, may be considered as evidence that a company is participating in a boycott of Israel.

The certification forms (the Certification) are attached hereto, and must be submitted, along with all other relevant contract documents, at the time of submitting a bid, proposal, or response. Failure to provide the Certification may deem the entity's submittal non-responsive. If the City of Clearwater determines that an entity has submitted a false certification form, 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 the Scrutinized Companies that Boycott Israel List, or engaged in business operations in Cuba or Syria, or engaged in a boycott of Israel, then the contract may be terminated at the option of the City of Clearwater. Other than the submission of a false certification, the City of Clearwater, on a case-by-case basis and in its sole discretion, may allow a company to bid on, submit a proposal for, or enter into or renew a contract for goods or services, if the conditions set forth in Section 287.135, Florida Statutes, apply.

The City retains the right to pursue civil penalties and any other applicable rights and remedies as provided by law for the false submission of the attached certification forms.

SECTION III – General Conditions

See Section V of the Contract for Certification Forms to be executed and submitted with the Bid/Proposal Form.

SECTION IV

TECHNICAL SPECIFICATIONS

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100 SERIES: GENERAL

101. SCOPE OF WORK

Project Name: MS WRF Chlorine Contact Chamber
Project Number: 18-0060-UT

Scope of Work:

The City operates two (2) chlorine contact chambers (CCCs) at the Marshall Street Water Reclamation Facility (WRF). The inner CCC needs repair at the weir wall before the de-chlorination tank as it may be the source of external seepage during operation. Phase 1 will include crack injections and waterproofing expansion joints along the weir wall. Phase 2 includes lining a portion of the inner CCC with a coating system. A Phase 3 additive alternative is also proposed to waterproof the Outer CCC expansion joint at the weir wall, if Phase 1&2 repairs fail to stop the external seepage.

The Contractor shall provide copies of a current Contractor License/Registration with the state of Florida and Pinellas County in the bid response.

The Contractor shall provide 1 Fixed project signs as described in SECTION III, ARTICLE 23 of the Contract Documents. The final number of project signs will be determined at the beginning of the project based on the Contractor's schedule of work submitted for approval. Additional project signs may be required at no additional cost to the Owner due to the Contractor's schedule of work.

Contract Period: 180 Consecutive Calendar Days

102. FIELD ENGINEERING

102-1. LINE AND GRADE PERFORMED BY THE CONTRACTOR

Unless otherwise specified, the Contractor shall provide and pay for field engineering service required for the project. Such work shall include survey work to establish lines and levels and to locate and lay out site improvements, structures, and controlling lines and levels required for the construction of the work. Also included are such Engineering services as are specified or required to execute the Contractor's construction methods. Engineers and Surveyors shall be licensed professionals under the laws of the State of Florida. The Contractor shall provide three (3) complete sets of As-built Surveys to the Engineer prior to final payment being made as outlined in Section III (General Conditions), Article 6.11.2 of these Contract Documents.

102-1.1. GRADES, LINES AND LEVELS

Existing basic horizontal and vertical control points for the project are those designated on the Drawings or provided by the City. Control points (for alignment only) shall be established by the Engineer. The Contractor shall locate and protect control points prior to starting site work and shall preserve all permanent reference points during construction. In working near any permanent

property corners or reference markers, the Contractor shall use care not to remove or disturb any such markers. In the event that markers must be removed or are disturbed due to the proximity of construction work, the Contractor shall have them referenced and reset by a Professional Land Surveyor licensed in the State of Florida.

102-1.2. LAYOUT DATA

The Contractor shall layout the work at the location and to the lines and grades shown on the Drawings. Survey notes indicating the information and measurements used in establishing locations and grades shall be kept in notebooks and furnished to the Engineer with the record drawings for the project.

102-2. LINE AND GRADE PERFORMED BY THE CITY

If line and grade is supplied by the City, at the completion of all work the Contractor shall be responsible to have furnished to the project inspector a replacement of the wooden lath and stakes used in the construction of this project. Excessive stake replacement caused by negligence of Contractor's forces, after initial line and grade have been set, as determined by the City Engineer, will be charged to the Contractor at the rate of \$100.00 per hour. Time shall be computed for actual time on the project. All time shall be computed in one-hour increments. Minimum charge is \$100.00. The Contractor shall provide three (3) complete sets of As-built Surveys to the Engineer prior to final payment being made as outlined in Section III (General Conditions), Article 6.11.2 of these Contract Documents.

103. DEFINITION OF TERMS

For the Purpose of these Technical Specifications, the Definition of Terms from Section III, Article 1 - Definitions of these Contract Documents shall apply.

For the purpose of the Estimated Quantities, the Contractor's attention is called to the fact that the estimate of quantities as shown on the Proposal is approximate and is given only as a basis of calculation upon which the award of the contract is to be made. The City does not assume any responsibility that the final quantities will remain in strict accordance with estimated quantities nor shall the Contractor plead misunderstandings or deception because of such estimate of quantities or of the character or location of the work or of other conditions or situations pertaining thereto.

103-1. REFERENCE STANDARDS

Reference to the standards of any technical society, organization, or associate, or to codes of local or state authorities, shall mean the latest standard, code, specification, or tentative standard adopted and published at the date of receipt of bids, unless specifically stated otherwise.

The most stringent specification prevails in the case where more than one specification is referenced for the same task.

Contractor shall utilize applicable FDOT Standards and Specifications for tasks that are not covered by City's Standards and Specifications.

104. STREET CROSSINGS, ETC.

At such crossings, and other points as may be directed by the Engineer, trenches shall be bridged in an open and secure manner, so as to prevent any serious interruption of travel upon the roadway or sidewalk, and also to afford necessary access to public or private premises. The material used, and the mode of constructing said bridges, and the approaches, thereto, must be satisfactory to the Engineer.

The cost of all such work must be included in the cost of the trench excavation.

105. AUDIO/VIDEO RECORDING OF WORK AREAS

105-1. CONTRACTOR TO PREPARE AUDIO/VIDEO RECORDING

Prior to commencing work, the Contractor shall have a continuous color audio/video recording taken along the entire length of the Project including all affected project areas. Streets, easements, rights-of-way, lots or construction sites within the Project must be recorded to serve as a record of pre-construction conditions.

105-2. SCHEDULING OF AUDIO/VIDEO RECORDING

The video recordings shall not be made more than twenty-one (21) days prior to construction in any area.

105-3. PROFESSIONAL VIDEOGRAPHERS

The Contractor shall engage the services of a professional videographer. The color audio/video recording shall be prepared by a responsible commercial firm known to be skilled and regularly engaged in the business of pre-construction color audio/video recording documentation.

105-4. EQUIPMENT

All equipment, accessories, materials and labor to perform this service shall be furnished by the Contractor. 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, clarity and be free from distortion and interruptions. In some instances, audio/video coverage may be required in areas not accessible by conventional wheeled vehicles. Such coverage shall be obtained by walking.

105-5. RECORDED AUDIO INFORMATION

Each recording shall begin with the current date, project name and be followed by the general location, i.e., viewing side and direction of progress. Accompanying the video recording of each video shall be a corresponding and simultaneously recorded audio recording. This audio recording, exclusively containing the commentary of the camera operator or aide, shall assist in viewer orientation and in any needed identification, differentiation, clarification, or objective description

of the features being shown in the video portion of the recording. The audio recording shall also be free from any conversations.

105-6. RECORDED VIDEO INFORMATION

All video recordings must continuously display transparent digital information to include the date and time of recording. The date information shall contain the month, day and year. The time information shall contain the hour, minutes and seconds. Additional information shall be displayed periodically. Such information shall include, but not be limited to, project name, contract number, direction of travel and the viewing side. This transparent information shall appear on the extreme upper left hand third of the screen. Camera pan, tilt, zoom-in and zoom out rates shall be sufficiently controlled such that recorded objects will be clearly viewed during video playback. In addition, all other camera and recording system controls, such as lens focus and aperture, video level, pedestal, chrome, white balance, and electrical focus shall be properly controlled or adjusted to maximize picture quality.

105-7. VIEWER ORIENTATION

The audio and video portions of the recording shall maintain viewer orientation. To this end, overall establishing views of all visible house and business addresses shall be utilized. In areas where the proposed construction location will not be readily apparent to the video viewer, highly visible yellow flags shall be placed by the Contractor in such a fashion as to clearly indicate the proposed centerline of construction. When conventional wheeled vehicles are used as conveyances for the recording system, the vertical distance between the camera lens and the ground shall not exceed ten feet (10'). The camera shall be firmly mounted such that transport of the camera during the recording process will not cause an unsteady picture.

105-8. LIGHTING

All recording shall be done during time of good visibility. No videoing 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 recording and to produce bright, sharp video recordings of those subjects.

105-9. SPEED OF TRAVEL

The average rate of travel during a particular segment of coverage shall be directly proportional to the number, size and value of the surface features within the construction area's zone of influence. The rate of speed in the general direction of travel of the vehicle used during videoing shall not exceed forty-four (44) feet per minute.

105-10. VIDEO LOG/INDEX

All videos shall be permanently labeled and shall be properly identified by video number and project title. Each video shall have a log of that video's contents. The log shall describe the various segments of coverage contained on the video in terms of the names of the streets or location of easements, coverage beginning and end, directions of coverage, video unit counter numbers, engineering survey or coordinate values (if reasonably available) and the date.

105-11. AREA OF COVERAGE

Video 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 driveways, sidewalks, curbs, pavements, drainage system features, mailboxes, landscaping, culverts, fences, signs, Contractor staging areas, adjacent structures, etc., within the area covered by the project. Of particular concern shall be the existence of any faults, fractures, or defects. Taped coverage shall be limited to one side of the Site, street, easement or right of way at any one time.

105-12. COSTS OF VIDEO SERVICES

The cost to complete the requirements under this section shall be included in the contract items provided in the proposal sheet. There is no separate pay item for this work.

106. STREET SIGNS

The removal, covering or relocation of street signs by the Contractor is prohibited.

All street signs shall be removed, covered or relocated by the City's Traffic Engineering Division in accordance with Sections 700, 994, 995, and 996 of FDOT's Standard Specifications.

The Contractor shall notify the City's Traffic Engineering Division a minimum of twenty-four (24) hours in advance of the proposed sign relocation, covering or removal.

107. WORK ZONE TRAFFIC CONTROL

107-1. CONTRACTOR RESPONSIBLE FOR WORK ZONE TRAFFIC CONTROL

The Contractor shall be responsible to furnish, operate, maintain and remove all work zone traffic control associated with the Project, including detours, advance warnings, channelization, hazard warnings and any other necessary features, both at the immediate work site and as may be necessary at outlying points.

107-2. WORK ZONE TRAFFIC CONTROL PLAN

The Contractor shall prepare a detailed traffic control plan designed to accomplish the level of performance outlined in the Scope of the Work and/or as may be required by construction permits issued by Pinellas County and/or the Florida Department of Transportation for the Project, incorporating the methods and criteria contained in Part VI, Standards and Guides for Traffic Controls for Street and Highway Construction, Maintenance, Utility and Incident Management Operations in the Manual on Uniform Traffic Control Devices published by the U.S. Department of Transportation and adopted as amended by the Florida Department of Transportation, or most recent addition. This plan shall be reviewed and approved by City Traffic Operations personnel regardless if MOT plan details are included in the contract plans.

107-2.1. WORK ZONE SAFETY

The general objectives of a program of work zone safety are to protect workers, pedestrians, bicyclists and motorists during construction and maintenance operations. This general objective may be achieved by meeting the following specific objectives:

- Provide adequate advance warning and information regarding upcoming work zones.
- Provide the driver clear directions to understanding the situation they will be facing as the driver proceeds through or around the work zone.
- Reduce the consequences of an out of control vehicle.
- Provide safe access and storage for equipment and material.
- Promote speedy completion of projects (including thorough cleanup of the site).
- Promote use of the appropriate traffic control and protection devices.
- Provide safe passageways for pedestrians through, in, and/or around construction or maintenance work zones.

Per the 2014 Design Standards (DS), Index 600 or latest revision:

“When an existing pedestrian way or bicycle way is located within a traffic control work zone, accommodation must be maintained and provision for the disabled must be provided. Only approved pedestrian longitudinal channelizing devices may be used to delineate a temporary traffic control zone pedestrian walkway. Advanced notification of sidewalk closures and marked detours shall be provided by appropriate signs.”

Per the 2014 Standard Specifications for Road and Bridge Construction or latest revision

FDOT Design Standards (DS): 102-5 Traffic Control, 102-5.1 Standards, are the minimum standards for the use in the development of all traffic control plans.

107-3. ROADWAY CLOSURE GUIDELINES

Roadway types: Major Arterials, Minor Arterials, Local Collectors, and Local

Following are typical requirements to be accomplished prior to closure. The number of requirements increases with traffic volume and the importance of access. Road closures affecting business or sole access routes will increase in process requirements as appropriate. For all but local streets, no road or lane closures are allowed during the Christmas holiday season and the designated “Spring Break” season without prior approval by the City Engineer.

107-3.1. ALL ROADWAYS

Obtain permits for Pinellas County or Florida Department of Transportation roadways.

Traffic control devices conform to national and state standards.

107-3.1.1. PUBLIC NOTIFICATION

Standard property owner notification prior to start of construction for properties directly affected by the construction process.

107-3.2. MAJOR ARTERIALS, MINOR ARTERIALS, LOCAL COLLECTORS

Consult with City Traffic Division staff for preliminary traffic control options.

Develop Formal Traffic Control Plan for Permit Submittal to Regulatory Agency as necessary.

107-3.2.1. PUBLIC NOTIFICATION

Message Board Display, Minimum of seven (7) day notice period prior to road closure and potentially longer for larger highway. The message board is to be provided by the Contractor.

107-3.3. MAJOR ARTERIALS, MINOR ARTERIALS

107-3.3.1. PUBLIC NOTIFICATION

C-View Release

107-3.4. MAJOR ARTERIALS

107-3.4.1. PUBLIC NOTIFICATION

News Release

The Message Board may need to be displayed for a period longer than seven (7) days.

107-4. APPROVAL OF WORK ZONE TRAFFIC CONTROL PLAN

The Contractor is invited and encouraged to confer in advance of bidding, and is required, as a specification of the work, to confer in advance of beginning any work on the Project, with the Traffic Operations Division, Municipal Services Building, 100 South Myrtle Avenue, telephone (727) 562-4747, for the purpose of approval of the Contractor's proposed detailed traffic control plan. All maintenance of traffic (MOT) plans shall be signed and sealed by a Professional Engineer or an individual who is certified in the preparation of MOT plans in the State of Florida.

107-5. INSPECTION OF WORK ZONE TRAFFIC CONTROL OPERATION

The Traffic Operations Division may inspect and monitor the traffic control plan and traffic control devices of the Contractor. The City's Construction Inspector assigned to the project, may make known requirements for any alterations or adjustments to the traffic control devices. The Contractor shall take direction from the Project Engineer or Project Inspector.

107-6. PAYMENT FOR WORK ZONE TRAFFIC CONTROL

Payment for work zone traffic control is a non-specific pay item to be included in the construction costs associated with other specific pay items unless specifically stated otherwise.

107-7. CERTIFICATION OF WORK ZONE TRAFFIC CONTROL SUPERVISOR

The City may require that the Supervisor or Foreman controlling the work for the Contractor on the Project have a current International Municipal Signal Association, Work Zone Traffic Control Safety Certification or Worksite Traffic Supervisor Certification from the American Traffic Safety Association with additional current Certification from the Florida Department of Transportation. This requirement for Certification will be noted in the Scope of Work and/or sections of these Technical Specifications. When the certified supervisor is required for the Project, the supervisor will be on the Project site at all times while work is being conducted.

The Worksite Traffic Supervisor shall be available on a twenty-four (24) hour per day basis and shall review the project on a day-to-day basis as well as being involved in all changes to traffic control. The Worksite Traffic Supervisor shall have access to all equipment and materials needed to maintain traffic control and handle traffic related situations. The Worksite Traffic Supervisor shall ensure that routine deficiencies are corrected within a twenty-four (24) hour period.

The Worksite Traffic Supervisor shall be available on the site within 45 minutes after notification of an emergency situation, prepared to positively respond to repair the work zone traffic control or to provide alternate traffic arrangements.

Failure of the Worksite Traffic Supervisor to comply with the provisions of this Subarticle may be grounds for decertification or removal from the project or both. Failure to maintain a designated Worksite Traffic Supervisor or failure to comply with these provisions will result in temporary suspension of all activities except traffic and erosion control and such other activities deemed to be necessary for project maintenance and safety.

108. OVERHEAD ELECTRIC LINE CLEARANCE

108-1. CLEARANCE OPTIONS

When working in the vicinity of overhead power lines, the Contractor shall utilize one of the following options:

- Option 1 - Having the power lines de-energized and visibly grounded.
- Option 2 - Maintaining a minimum distance of twenty feet (20') of clearance for voltages up to 350 kV and fifty feet (50') of clearance for voltages more than 350 kV.
- Option 3 - Determine the line voltage and provide clearance in accordance with the following table.

108-2. REQUIRED MINIMUM CLEARANCE DISTANCES

VOLTAGE (nominal, kV, alternating current)	MINIMUM CLEARANCE DISTANCE (feet)
Up to 50	10
Over 50 to 200	15

Over 200 to 350	20
Over 350 to 500	25
Over 500 to 750	35
Over 750 to 1,000	45
Over 1,000	(as established by the utility owner/operator or registered professional engineer who is a qualified person with respect to electric power transmission and distribution)

Note: The value that follows “to” is up to and includes that value. For example, over 50 to 200 means up to and including 200kV.

109. PROJECT WEB PAGES

109-1. WEB PAGES DESIGN

If requested by the City, Engineer shall design the Project Web Site in accordance with the current City Web Site standards and styles. Project Web Site should include general project information as: Project Name & Number, Scope description, Location, Schedule, and Project Contacts.

Note: Occasionally City modifies the general design of the City’s Web Site, and the Engineer shall consult the City Webmaster for the current requirements, before designing or updating the Project Web Pages.

109-2. WEB ACCESSIBILITY GUIDELINES

Project Web Pages should conform to the W3C Web Accessibility Guidelines and US Section 508 guidelines whenever possible:

<http://www.w3.org/TR/1999/WAI-WEBCONTENT-19990505/>

<http://www.section508.gov/>

In particular, use of variable-width tables, user-adjustable/relative font sizes, ALT text for images, CSS whenever possible, etc. Accessibility should be a priority over design/aesthetics.

109-3. THE “BRIGHT & BEAUTIFUL” LOGO AND ITS USE

The City’s “Bright & Beautiful” logo should be used for everyday business, on all print and electronic material. It should be used on all internal correspondence, brochures, advertising, vehicles, apparel and signage. It should be used only in the manner presented here, in the proportion shown here, with no alterations. It should not be condensed, lengthened, or otherwise distorted to fit a space. The logo is approved for use by City departments and is not to be used by outside vendors without the permission of the City Manager, Assistant City Manager or Public Communications office. Electronic versions of the logo should be obtained from Public Communications.

109-4. MAPS AND GRAPHICS

Use of maps and graphics is recommended to illustrate the project; only approved graphics should be posted to the Project Web Pages.

109-5. INTERACTIVE FORMS

The site should also include an interactive form or other options to allow the Public's input sent back to the City regarding the Project.

109-6. POSTING

The site should be presented to the City's Webmaster for review and posting to the City's Web Server. Posting of the Project Web Pages to a different server than City's Web server, if approved, should be coordinated with the City's Webmaster for resolving all accessibility and conformity issues.

109-7. WEB PAGES UPDATES

Unless otherwise specified and agreed, Engineer is responsible for keeping the posted Web Pages up-to-date, by sending revisions and updates through the City Project Manager to the City's Webmaster for posting.

200 SERIES: SITEWORK

201. EXCAVATION FOR UNDERGROUND WORK

The Contractor is responsible to take all necessary steps to conduct all excavation in a manner which provides for the successful completion of the proposed work while at all times maintaining the safety of the workmen, the general public and both public and private property. The Contractor's methods of work will be consistent with the standard practices and requirements of all appropriate Safety Regulatory Agencies, particularly the Occupational Safety and Health Administration (OSHA) requirements for excavation. Unless otherwise specifically stated in these plans and specifications, the methods of safety control and compliance with regulatory agency safety requirements are the full and complete responsibility of the Contractor.

For the purposes of the Contractor's safety planning in the bidding process, the contractor is to consider all excavation to be done in the performance of this contract to be in soil classified as OSHA "Type C". The Contractor's attention is called to specific requirements of OSHA for excavation shoring, employee entry, location of excavated material adjacent to excavation, the removal of water from the excavation, surface encumbrances and in particular the requirement of a "Competent Person" to control safety operations. The Contractor will identify their Competent Person to City staff at the start of construction.

City staff is required from time to time to perform inspections, tests, survey location work, or other similar activity in an excavation prepared by the Contractor. City staff, in conformance with the OSHA Excavation Safety Requirements, is to only enter an excavation in compliance with these OSHA standards. The City's staff reserve the option to refuse entry into the Contractor's excavation if, in the opinion of the City's staff, the entry into the Contractor's excavation is unsafe or does not conform to OSHA requirements. If this circumstance occurs, the Contractor must either provide the necessary safety requirements or provide alternate means for the accomplishment of the City's work at the Contractor's expense.

The construction quantities, if any, contained in the bid proposal for this contract do not contain sufficient quantities to allow the Contractor to perform excavation work using strictly the "open cut" method whereby no shoring systems are used and trench side slopes are cut to conform to OSHA safety requirements without a shoring system. In addition to safety reasons, the Contractor is required to use excavation and trench-shoring methods in compliance with all safety requirements which allow the Contractor to control the amount of restoration work necessary to complete the project.

Not more than four hundred feet (400') of trench shall be opened at one time in advance of the completed work unless written permission is received from the Engineer for the distance specified. For pipe installation projects, the trench shall be a minimum of six inches (6") wider on each side than the greatest external horizontal width of the pipe or conduit, including hubs, intended to be laid in them. The bottom of the trench under each pipe joint shall be slightly hollowed, to allow the body of the pipe to rest throughout its length. In case a trench is excavated at any place, excepting at joints, below the grade of its bottom as given, or directed by the Engineer, the filling and compaction to grade shall be done in such manner as the Engineer shall direct, without compensation.

202. OBSTRUCTIONS

Any pipes, conduits, wires, mains, footings, driveways, or other structures encountered shall be carefully protected from injury or displacement. Any damage thereto shall be fully, promptly, and properly repaired by the Contractor to the satisfaction of the Engineer and the owner thereof. Any survey monument or benchmark which must be disturbed shall be carefully referenced before removal, and unless otherwise provided for, shall be replaced upon completion of the work by a registered land surveyor. Any concrete removed due to construction requirements shall be removed to the nearest expansion joint or by saw cut. Contractor shall consult Inspector for the approved means.

203. DEWATERING

203-1. GENERAL

Unless specifically authorized by the Engineer, all pipe, except subdrains, shall be laid "in the dry". The Contractor shall dewater trench excavation as required for the proper execution of the work, using one or more of the following approved methods: well point system, trenched gravity underdrain system, or sumps with pumps.

Well point systems must be efficient enough to lower the water level in advance of the excavation and maintain it continuously in order that the trench bottom and sides shall remain firm and reasonably dry. The well points shall be designed especially for this type of service, and the pumping unit used shall be capable of maintaining a high vacuum, and at the same time, of handling large volumes of air as well as of water.

The Contractor shall be responsible for disposing of all water resulting from trench dewatering operations and shall dispose of the water without damage or undue inconvenience to the work, the surrounding area, or the general public. Contractor shall not dam, divert, or cause water to flow in excess in existing gutters, pavements or other structures: and to do this Contractor may be required to divert the water to a suitable place of discharge as may be determined by the Engineer. Where possible, Contractor may contain produced groundwater on the project site, a dewatering plan must be submitted to the City for approval if a discharge permit is not obtained or required.

The cost of dewatering shall be included in the unit price bid per linear foot of pipe, or, in the case of other underground structures, in the cost of such structures.

203-2. PERMIT REQUIREMENTS

203-2.1. DEWATERING DISCHARGE

The Contractor shall be responsible for submitting the Notice of Intent to use the Generic Permit for the Discharge of Groundwater from Dewatering Operations and associated fee in accordance with Florida DEP Requirements, F.A.C. 62-621.300(2)(b) prior to discharging of produced groundwater into the City's streets, storm sewers or waterways.

Prior to construction, a dewatering plan must be prepared and submitted to the City for review. It shall include site-specific notes and details presenting the Contractor's proposed dewatering and disposal methods. The City will field-inspect the dewatering operation throughout construction.

204. UNSUITABLE MATERIAL REMOVAL

All unsuitable material, such as muck, clay, rock, etc., shall be excavated from under pipes, structures and roadways and removed from the site. All material removed is property of the Contractor, who shall dispose of said material off-site at their expense. The limits and depths of the excavation shall be determined in the field by the Engineer.

204-1. BASIS OF MEASUREMENT

The basis of measurement shall be the number of cubic yards of clean fill placed as determined by either cross sections of the excavation, truck measure, or lump sum as specified in the Scope of Work and Contract Proposal. Included in the cost of cubic yards of suitable material placed is the removal, hauling and disposal of unsuitable material.

204-2. BASIS OF PAYMENT

The unit price for the removal of unsuitable material shall include: all materials, equipment, tools, labor, disposal, hauling, excavating, dredging, placing, compaction, dressing surface and incidentals necessary to complete the work. If no pay item is given, the removal of unsuitable material shall be included in the most appropriate bid item.

205. UTILITY TIE IN LOCATION MARKING

The tie in locations for utility laterals of water, sanitary sewer, and gas shall be plainly marked on the back of the curb. Marking placed on the curb shall be perpendicular with respect to the curb of the tie in location on the utility lateral. Marks shall not be placed on the curb where laterals cross diagonally under the curb. The tie in location shall be the end of the utility lateral prior to service connection.

Markings shall be uniform in size and shape and colors in conformance with the code adopted by the American Public Works Association as follows:

SAFETY RED	Electric power, distribution & transmission Municipal Electric Systems
HIGH VISIBILITY SAFETY YELLOW	Gas Distribution and Transmission Oil Distribution and Transmission Dangerous Materials, Produce Lines, Steam Lines
SAFETY ALERT ORANGE	Telephone and Telegraph Systems Police and Fire Communications Cable Television
SAFETY PRECAUTION BLUE	Water Systems, Slurry Pipe Lines and Potable Water
SAFETY GREEN	Sewer Systems
LAVENDER	Reclaimed Water, Irrigation and Slurry Lines

WHITE	Proposed Excavation
PINK	Temporary Survey Markings

Marks placed on curbs shall be rectangular in shape and placed with the long dimension perpendicular to the flow line of the curb. Marks placed on valley gutter and modified curb shall be six inch (6") x three inch (3") and placed at the back of the curb. Marks placed on State Road and vertical curb shall be four inch (4") x two inch (2") and be placed on the curb face.

206. CLEARING AND GRUBBING

The work included in this specification includes the removal and disposal of all structures, appurtenances, asphalt, concrete, curbs, walls, trees, roots, vegetation, boulders, conduits, poles, posts, pipes, inlets, brush, stumps, debris and other obstructions resting on or protruding through the ground surface necessary to prepare the area for construction.

Clearing and grubbing shall be performed in accordance with Section 110 of FDOT's Standard Specifications. Unless otherwise specified in the contract documents, the Contractor shall take ownership of all removed material and dispose of them off-site in accordance with all Local, State and Federal Requirements.

206-1. BASIS OF MEASUREMENT

The basis of measurement shall be either a lump sum quantity or the number of acres cleared and grubbed as specified on the plans or directed by the Engineer.

206-2. BASIS OF PAYMENT

The pay item for clearing and grubbing shall include: all removal and disposal of materials and structures as well as all materials, hauling, equipment, tools, labor, leveling of terrain, landscape trimming and all incidentals necessary to complete the work.

207. EROSION AND SEDIMENT CONTROL

207-1. GENERAL

Erosion and sediment control shall conform to the requirements of the FDOT Standard Specifications for Prevention, Control, and Abatement of Erosion and Water Pollution. Contractor shall use temporary erosion and sediment control features found in the State of Florida Erosion and Sediment Control Designer and Reviewer Manual (E&SC Manual) or the City of Clearwater Standard Indices.

207-2. TRAINING OF PERSONNEL

The City may require that the Supervisor or Foreman controlling the work for the Contractor on the Project have a current Florida Department of Environmental Protection (FDEP) Florida Stormwater, Erosion, and Sedimentation Control Inspector Training & Certification. All personnel working on the Project shall complete illicit discharge training once per calendar year. Contractor shall provide documentation to the City prior to Notice To Proceed. Example of training and

training sign-in sheet will be provided by the City to the Contractor at the Pre-Construction Meeting.

207-3. STABILIZATION OF DENUDED AREAS

No disturbed area may be denuded for more than thirty (30) calendar days unless otherwise authorized by the City Engineer. During construction, denuded areas shall be covered by mulches such as straw, hay, filter fabric, seed and mulch, sod, or some other temporary vegetation. Within sixty (60) calendar days after final grade is established on any portion of a project site, that portion of the site shall be provided with established permanent soil stabilization measures per the original site plan, whether by impervious surface or landscaping.

207-4. PROTECTION AND STABILIZATION OF SOIL STOCKPILES

Fill material stockpiles shall be protected at all times by on-site drainage controls which prevent erosion of the stockpiled material. Control of dust from such stockpiles may be required, depending upon their location and the expected length of time the stockpiles will be present. In no case shall an unstabilized stockpile remain after thirty (30) calendar days.

207-5. PROTECTION OF EXISTING STORM SEWER SYSTEMS

During construction, all storm sewer inlets in the vicinity of the project shall be protected by temporary erosion and sediment control features found in the State of Florida Erosion and Sediment Control Designer and Reviewer Manual (E&SC Manual) or the City of Clearwater Standard Indices, or equals approved by the City Engineer before installation.

207-6. SWALES, DITCHES AND CHANNELS

All swales, ditches and channels leading from the site shall be sodded within three (3) days of excavation. All other interior swales, etc., including detention areas will be sodded prior to issuance of a Certificate of Occupancy.

207-7. UNDERGROUND UTILITY CONSTRUCTION

The construction of underground utility lines and other structures shall be done in accordance with the following standards: no more than 400 linear feet of trench shall be open at any one time; and, wherever consistent with safety and space consideration, excavated material shall be cast to the uphill side of trenches. Trench material shall not be cast into or onto the slope of any stream, channel, road ditch or waterway.

207-8. MAINTENANCE

All erosion and siltation control devices shall be checked regularly, especially after each rainfall and will be cleaned out and/or repaired as required.

207-9. COMPLIANCE

Failure to comply with the aforementioned requirements may result in a fine and/or more stringent enforcement procedures such as (but not limited to) issuance of a "Stop Work Order".

208. CONSTRUCTION AND REPAIR OF SEAWALLS AND OTHER BEACH EROSION CONTROL STRUCTURES.

Other beach erosion control structures, accompanied by a certified survey showing the location of the groin or other beach erosion control structure and adjoining groins or other beach erosion control structures, shall be presented to the city council for final approval. Where steps are necessary to provide access along the beach to the public, then such steps shall be shown as part of the plan for groin construction prior to issuance of the permit, and such steps shall be constructed and maintained in a safe condition at all times.

208-1. EXISTING SEAWALLS AND REVETMENTS

Existing seawalls and revetments on natural waterbodies may be replaced with a revetment or with a vertical seawall with the provision of rip rap placed at the base of the wall up to the mean high water line for the entire length of the seawall. Revetments and seawalls may be replaced with a vertical seawall in manmade waterbodies, provided that the seawall is within the property line and maintains the established shoreline.

208-2. TOP OF CAP ELEVATION

The top of cap elevation for all replacement and new seawalls and seawall caps shall not exceed 4.8 feet N.A.V.D. If the top of a seawall cap is constructed at an elevation differing from the adjacent property owner top of cap elevation by greater than one foot, then a return wall is required to sufficiently provide for the break in grade at the property line. Seawalls exceeding 4.8 feet N.A.V.D. in height prior to the effective date of this article may be maintained, repaired and replaced to their current height.

208-3. SEAWALLS AND REVETMENTS LOCATED SEAWARD OF THE CCL

Seawalls and revetments located seaward of the coastal construction setback line are controlled by regulations of the Division of Beaches and Shores of the Florida Department of Environmental Protection. Replacement of a seawall or revetment that is located seaward of the coastal construction setback line necessitates submission of a permit application to the state department of environmental protection.

208-4. PLACEMENT OF NEW SEAWALL

The placement of a new seawall waterward of an existing seawall is permitted, subject to the following conditions:

- (a) A Florida registered professional engineer must certify the new seawall design.
- (b) The new seawall shall not extend more than 18 inches from the waterward face of the original alignment of the existing vertical seawall location.

- (c) The new seawall shall be placed vertically plumb.
- (d) Placing a seawall in front of an existing seawall shall only be permitted once unless the seawall behind the new seawall is removed.
- (e) Existing seawall sections that interfere with new seawall location shall be removed.
- (f) The new seawall shall include an adequate closure of gaps at each property line.
- (g) For zoning purposes, the setbacks for the property will be measured from either the property line or the waterside of the original seawall slab, whichever is more restrictive, and will not be adjusted to accommodate the new seawall addition. For purposes of pier construction, the shore normal dimensions will be measured from the waterside of the original seawall slab.

208-5. POST CONSTRUCTION SURVEY

Prior to final inspection and approval of a new or replacement seawall or seawall cap, a post-construction survey shall be required. Repairs of existing seawalls and seawall caps which do not alter the height or location shall not be subject to this requirement.

208-6. RIP-RAP

On all-natural waterways, an apron of rip-rap shall be placed at the base of all new and repaired seawalls up to the mean high water line for the entire length of the seawall to absorb the wave energy and protect the underlying soft earth or sand from being carried away, as well as to provide habitat for desirable marine species. This rip-rap shall be required at the base of all new seawalls and at the time that an existing seawall is repaired where the replacement constitutes greater than 50 percent of the entire length of the seawall or includes the replacement of a panel.

208-7. RETAINING WALL IN LIEU OF VERTICAL SEAWALL

A retaining wall may be built as an alternative to a vertical seawall, provided that all activities, including dredging, filling, slope grading, or equipment access and similar activities and all portions of the wall are located landward of the mean high water line.

300 SERIES: MATERIALS

301. CONCRETE

The Contractor shall notify the Construction Inspector or City a minimum of twenty-four (24) hours in advance of all concrete placement.

Unless otherwise noted elsewhere or directed, the following requirements shall be adhered to:

All concrete work shall be performed in accordance with the latest editions of the Design and Control of Concrete Mixtures by the Portland Cement Association, the American Concrete Institute, and FDOT's Standard Specifications. Unless otherwise specified, all concrete shall have fiber mesh reinforcing and have a minimum compressive strength of 3000 psi at twenty-eight (28) days. The cement type shall be Type I and shall conform to AASHTO M-85. The aggregate shall conform to ASTM C-33. All ready-mix concrete shall conform to ASTM C-94. The slump for all concrete shall be in the range of three inches (3") to five inches (5"), except when admixtures or special placement considerations are required.

All concrete shall be tested in the following manner:

Placement of less than five cubic yards (5 cy) shall be tested at the Engineer's discretion. Otherwise, for each class, for each day, for every 50 cy or part thereof exceeding five cubic yards (5 cy), one set of three (3) compressive strength cylinders will be required (1 at 7 days and 2 at 28 days). At the discretion of the Engineer, unacceptable test results may require the Contractor to provide further tests, as determined by the Engineer, to determine product acceptability, or need for removal, and compensation or denial thereof.

302. EXCAVATION AND FORMS FOR CONCRETE WORK

302-1. EXCAVATION

Excavating for concrete work shall be made to the required depth of the subgrade or base upon which the concrete is to be placed. The base or subgrade shall be thoroughly compacted to a point six inches (6") outside said concrete work before the forms are placed.

302-2. FORMS

Forms for concrete work shall be either wood or metal, except curbs. Curb forms shall be metal only, unless at radius, intermittent sections less than ten (10) linear feet or by written permission from Engineer. They shall be free from warps or bends, shall have a depth equal to the dimensions required for the depth of the concrete deposited against them and shall be of sufficient strength when staked to resist the pressure of concrete without moving or springing.

303. REINFORCEMENT

When required, reinforcement shall be placed in the concrete work. Bar reinforcement shall be deformed: ASTM A 615, steel shall be billet Intermediate or Hard Grade: Rail Steel A.A.S.H.T.O. M42. Twisted Bars shall not be used, Fabric Reinforcement shall conform to the requirements of AASHTO M55 (ASTM A185). Welded deformed steel wire fabric for Concrete reinforcement shall meet the requirements of AASHTO M 221 (ASTM A497). Welded wires shall

be elevated by the use of chairs. Epoxy coated reinforcing Steel Bars shall meet ASTM A775/A77 requirements.

303-1. BASIS OF PAYMENT

Reinforcement shall not be paid for separately. The cost of such work shall be included in the contract unit price for the item of work specified.

304. BACKFILL

304-1. MATERIALS AND GENERAL

Material for backfill other than under Gabion mattress shall be carefully selected from the excavated material or from other sources as may be required by the Engineer. Such material shall be granular, free from clay, muck, organic matter or debris, contain no rocks or other hard fragments greater than three inches (3") in the largest dimension and all fill shall be similar material.

Material for backfill under Gabion mattress shall be an A-1 soil meeting AASHTO M145.

Backfill shall be carried up evenly in layer not exceeding eight inches (8") in thickness and shall be compacted into place by mechanical tamping before the next layer is applied. A hydro-hammer shall not be used for compaction. Backfill placed around pipes shall be carefully placed around the sides and top of pipe by hand shovels and thoroughly compacted to twelve inches (12") above the pipe by tamping or other suitable means.

For backfill in small areas that do not permit any type of tamping, Contractor may use flowable fill to achieve required density. Flowable fill shall adhere to Section 121 of FDOT specifications.

Where wet conditions are such that dewatering by normal pumping methods would not be effective, as determined by the Engineer, Contractor may use #57 stone (meeting FDOT's specifications) and hand tamping until backfill has reached an elevation and condition such as to make the use of the mechanical tampers practical. Fully wrap the stones with a layer of Type D filter fabric of FDOT Index 199. Do not place stones within four feet (4') of the ends of trench or ditch; use normally accepted backfill material at the ends.

Where new cast-in-place concrete work is performed, do not place backfill until the specified twenty-eight (28) days compressive strength occurs.

Do not allow heavy construction equipment to cross over pipes or culverts until placing and compacting backfill material to the finished earthwork grade or to an elevation of at least four feet (4') above the top of the pipe or culvert.

The cost of backfill, flowable fill, alternative approved material for wet conditions, and extra dewatering effort to achieve required density, etc., shall be included in the contract unit price or lump sum price for the item of the work specified.

304-2. TESTING AND INSPECTION

Contractor shall employ and pay for the services of an independent testing laboratory, approved by the Owner, to perform density testing on backfilled material. All testing shall be witnessed by

the Owner's Representative. The test shall be repeated until satisfactory results are obtained. The Contractor shall be charged for all retests and re-inspection services.

Backfill under all type of impervious areas and around structures: Backfill in these areas shall be compacted to a minimum of 98% Modified Proctor Test in accordance with ASTM D 1557 or ASSHTO T 180. Tests shall be performed up to the proposed bottom of pavement elevation.

Backfill outside of impervious areas: Backfill in these areas shall be compacted to a minimum of 95% Standard Proctor Test in accordance with ASTM D-698 or AASHTO T-99. Tests shall be performed up to the proposed finished grade.

Backfill Testing: The Contractor shall demonstrate the adequacy of backfill compaction by performing density testing. For each test location, density testing shall be performed at eight inch (8") lifts. The character of the backfill material will be observed during the excavation for density testing to determine conformance with the specifications. Density testing shall be performed using nuclear field density equipment or conventional weight-volume methods. If the weight-volume method is used, volume shall be determined by using the sand replacement test (ASTM D 1556) or liquid displacement methods (ASTM D 2167). If nuclear methods are used, the trench correction effect shall be accounted for by recalibrating the nuclear gauge on its calibration block at the location of each test prior to taking the density measurement. The Contractor shall furnish all equipment, tools, and labor to prepare the test site for testing.

Normal Testing Frequency: One test shall be performed for each one hundred feet (100') of backfill or fraction thereof or for each single run of pipe/culvert connecting two (2) successive structures whichever is less. The location of the test within each section shall be selected by the Owner's Representative. Testing shall progress as each one hundred foot (100') section is completed. Four (4) tests equally spaced around each structure shall be performed on each eight inch (8") lift. Testing which indicates that unacceptable material has been incorporated into the backfill, or that insufficient compaction is being obtained shall be followed by expanded testing to determine the limits of the unacceptable backfill.

Expanded Testing Requirements: If normal testing within a testing section indicates unacceptable backfill, the Owner's Representative may require additional testing within the same test section to determine the limits of unacceptable backfill. Additional testing required by the Owner's Representative shall be paid for by the Contractor and shall not exceed testing of four (4) additional locations within the test section. Unacceptable backfill within the limits established by the testing shall be removed and replaced by the Contractor at no additional cost to the Owner. Additional testing beyond that required may be performed by the Contractor at his expense to further delineate limits of unacceptable backfill.

305. RIPRAP

The work included in this specification includes the construction of riprap as shown on the plans. The riprap shall be constructed per Section 530 of FDOT's Standard Specifications.

305-1. BASIS OF MEASUREMENT

The basis of measurement for riprap shall be the dry weight in tons.

305-2. BASIS OF PAYMENT

The pay item for sand-cement riprap shall include: all materials, testing, labor, grout, hauling, equipment, excavation, backfill, dressing and shaping for placement of sand-cement and all incidentals necessary to complete the work.

The pay item for rubble riprap shall include: all materials, required bedding stone, dressing and shaping for placement of bedding stone, filter fabric, testing, hauling, excavating, backfill, dressing and shaping for placement of rubble, and all incidentals necessary to complete the work. No payment will be granted if concrete or stone that exists on-site is used as rubble riprap.

400 SERIES: SANITARY SEWER

401. SANITARY MANHOLES

401-1. BUILT UP TYPE

Manholes shall be constructed of brick with cast iron frames and covers as shown on the drawings. Invert channels shall be constructed smooth and semicircular in shape conforming to inside of adjacent sewer section. Changes in direction of flow shall be made in a smooth curve of as large a radius as possible. Changes in size and grade of channels shall be made gradually and evenly. Invert channels shall be formed by one of the following methods: form directly into concrete manhole base, build up with brick and mortar, lay half tile in concrete, or lay full section of sewer pipe through manhole and break out top half of pipe.

The manhole floor outside of channels shall be made smooth and sloped toward channels.

Free drop in manholes from inlet pipe invert to top of floor outside the channels shall not exceed twenty four inches (24").

Standard Drop Manholes shall be constructed wherever free drop exceeds twenty four inches (24").

Manhole steps shall not be provided. Joints shall be completely filled, and the mortar shall be smoothed from inside of manholes.

The entire interior and exterior of brick manholes shall be plastered with one half inch (1/2") of mortar.

Brick used may be solid only. Brick shall be laid radially with every sixth course being a stretcher course.

401-2. PRECAST TYPE

Precast Sanitary Manholes shall conform to this specification unless otherwise approved by the City Engineer.

AASHTO M 85 Type II cement shall be used throughout with a minimum wall thickness of five inches (5"). The precast sections shall conform to ASTM C 478 latest revision. Section joints shall be a tongue and groove with "ram neck" gasket or "O" ring to provide a watertight joint. Minimum concrete strength shall be 4000 psi at 28 days.

Three sets of shop drawings and location inventory shall be submitted to the City Engineer for approval. Approval of shop drawings does not relieve Contractor of responsibility for compliance to these specifications unless letter from Contractor requesting specific variance is approved by the City Engineer.

Location inventory submitted with shop drawing shall detail parts of manhole per manhole as numbered on the construction plans. All manhole parts shall be numbered or lettered before being sent to the job site to permit proper construction placement. A plan or list of the numbering system shall be present on the job site when manhole components are delivered.

Precast manhole dimensions, drop entry, grout flow of channel, etc., shall be as shown on City of Clearwater Engineering Index #302 Sheets 1 and 2 of 2.

Manhole sections shall be rejected if abused during shipping or placement and if pipe openings are not properly aligned. The "break in" to precast manholes for pipe entry will not be allowed.

The manhole base shall be set on a pad of A 1 or A 2 Classification soil approximately five inches (5") thick to secure proper seating and bearing.

401-2.1. MANHOLE ADJUSTMENT RINGS (GRADE RINGS)

Between the top of the manhole cone and the manhole cover frame, a manhole adjustment ring shall be installed. The intent of the manhole adjustment ring is to accommodate future grade changes without disturbing the manhole. See Section IV, Article 703-7, Asphaltic Concrete – Adjustment of Manholes.

401-3. DROP MANHOLES

Standard drop inlets to manholes shall be constructed of commercial pipe, fittings and specials as detailed on the drawings.

401-4. FRAMES AND COVERS

Manhole frames and covers shall be set in a full bed of mortar with the top of the cover flush with or higher than finished grade as directed. Refer to Index 301.

401-5. MANHOLE COATINGS

The exterior and interior of all built up manholes shall be coated with two (2) coats of Type II Asphalt emulsion, moisture and damp proof (Specification ASTM D 1227 Type II Class I) as manufactured by W.R. Meadows Sealtite or approved equal.

The exterior of all precast manholes shall have a 15 mil dry thickness of Sherwin Williams Targuard® Coal Tar Epoxy or approved equal. The interior shall be AGRU SUREGRIP HDPE or PP-R Liner with a minimum thickness of two millimeters (2 mm).

401-6. CONNECTIONS TO MANHOLES

Connections to existing sanitary manholes using approved PVC sewer main shall be made with a manhole adapter coupling by NPC Kor-N-Seal® or approved water stop coupling.

402. RAISING OR LOWERING OF SANITARY SEWER STRUCTURES

Sanitary Sewer Structures shall be raised or lowered as indicated on the plans or as indicated by the Engineer.

402-1. BASIS OF PAYMENT

Payment, unless covered by a bid item, shall be included in the cost of the work.

403. SANITARY SEWERS AND FORCE MAINS

403-1. MATERIALS

403-1.1. GRAVITY SEWER PIPE

GRAVITY SEWER PIPE SHALL BE POLYVINYL CHLORIDE OR DUCTILE IRON. Polyvinyl chloride pipe and fittings shall conform to ASTM specification D 3034 for S.D.R. 35. Sewer pipe with more than ten feet (10') of cover shall be SDR 26. The pipe shall be plainly marked with the above ASTM designation. The bell end of joints and fittings shall have a rubber sealing ring to provide a tight flexible seal in conformance with ASTM D 3212. The laying length of pipe joints shall be a maximum of twenty feet (20').

Unless otherwise noted in these specifications or construction plans, Ductile Iron pipe and fittings for gravity sewer shall conform to Article 501 of these Technical Specifications for DIP water main except pipe shall be interior Protecto 401 ceramic epoxy lined in accordance with manufacturer's recommendations. Where sanitary sewer main is to be placed between building lots in a sideline easement, the sewer main shall, insofar as possible, be constructed without manholes or lateral connections within the side easement. The pipe material in the side easement between streets shall be C 900, SDR 18 polyvinyl chloride water main pipe as described in these Technical Specifications Article 501. A two-way cleanout shall be installed on each lateral at the property line.

403-1.2. FORCE MAIN PIPE

FORCE MAIN PIPE SHALL BE POLYVINYL CHLORIDE OR DUCTILE IRON. Unless otherwise noted in the specifications or construction plans, both polyvinyl chloride and ductile iron force main pipe and fittings shall conform to Article 501 of these Technical Specifications for water main pipe except that DIP shall be Protecto 401 ceramic epoxy lined in accordance with manufacturer's recommendations.

All polyvinyl chloride pipe which has become deteriorated due to exposure to ultra violet radiation shall be rejected.

403-2. INSTALLATION

403-2.1. GRAVITY SEWER PIPE

Installation of Thermoplastic gravity sewer pipe shall be in conformance with recommended practices contained in ASTM D 2321.

The bottom trench width in an unsupported trench shall be limited to the minimum practicable width (typically pipe OD plus eight inches (8") to twelve inches (12") on each side) allowing working space to place and compact the haunching material. The use of trench boxes and movable sheeting shall be performed in such a manner that removal, backfill and compaction will not disturb compacted haunching material or pipe alignment.

Dewatering of the trench bottom shall be accomplished using adequate means to allow preparation of bedding, placement of the haunching material and pipe in the trench without standing water.

Dewatering shall continue until sufficient backfill is placed above the pipe to prevent flotation or misalignment.

Where pipe bedding is insufficient to adequately support pipe, the Contractor will be required to remove unsuitable material and bed pipe in Class I material (one half inch (1/2") diameter aggregate) to provide firm support of pipe.

Connections to manholes with sanitary pipe shall use a joint two (2) feet in length and shall use an approved water stop around pipe joint entry.

The laterals shown on the plans do not necessarily reflect exact locations. The Contractor is required to locate all existing laterals for reconnection and to coordinate with the construction inspector the location of all new laterals.

403-2.2. FORCE MAIN PIPE

Installation of force main pipe shall be in conformance with Article 501 of these Technical Specifications for water main pipe.

403-3. TESTING

403-3.1. TESTING OF GRAVITY SEWERS

The Contractor shall take all precautions to secure a perfectly water tight sewer under all conditions. The water tightness of a sewer which has a crown lying below groundwater level may be tested by measuring infiltration. The water tightness of sewers having crowns lying above groundwater level may be tested by filling the pipe with water so as to produce a hydrostatic head of two feet or more above the crown of the sewer at the upper end of the test section or the water table outside of the sewer, whichever is higher, and then measuring the exfiltration. In no case shall the infiltration or exfiltration exceed fifty (50) gallons per inch of diameter per mile per day. The Contractor shall furnish all labor, materials and equipment to test the amount of infiltration or exfiltration under the Engineer's direction. Where the infiltration or exfiltration is excessive, the Contractor at their own expense shall take the necessary steps to remedy such conditions by uncovering the sewer, remaking the joints or by replacing the entire length of sewer as required by the Engineer. No such repaired joints may be backfilled until after they have been tested and found to be acceptable. Care shall be taken to avoid flotation. The Contractor shall TV inspect all mains to verify the true and uniform grade and the absence of bellies or dropped joints prior to acceptance. Any dips or sags of more than five percent (5%) of the inside pipe diameter dimension shall be cause for rejection. The above tests shall be performed at the discretion of the Engineer on any or all sections of the line.

403-3.2. TESTING OF FORCE MAINS

Force mains shall be tested under a hydrostatic pressure of 150 psi for two (2) hours, as described in Article 501 of these Technical Specifications for the testing of water mains.

403-4. BASIS OF PAYMENT

403-4.1. GRAVITY SEWER PIPE

Payment for in place sanitary sewer gravity main pipe shall be the unit price per linear foot per appropriate range of depth of cut as contained in the contract proposal. Measurement for payment shall be along the centerline of the sewer main from center to center of manholes.

Payment for laterals shall be the unit price per linear foot of pipe as measured from the centerline of the sewer main pipe to the terminal end of the lateral pipe including a two-way cleanout at the property line.

Payment for sewer pipe shall include all labor, equipment and materials necessary to complete the installation. This shall include clearing and grubbing, excavation, shoring and dewatering, backfill and grading.

403-4.2. FORCE MAIN PIPE

Payment and measurement of force main pipe shall be the same as described in Article 501 of these Technical Specifications for water main pipe.

404. HDPE DEFORMED - REFORMED PIPE LINING

404-1. INTENT

It is the intention of this specification to provide for the trenchless restoration of eight inch (8") to twelve inch (12") sanitary sewers by the installation of a high density polyethylene, jointless, continuous, fold and form pipe liner which is watertight and chemically resistant to withstand exposure to domestic sewage including all labor, materials and equipment to provide for a complete, fully restored and functioning installation.

404-2. PRODUCT AND CONTRACTOR/INSTALLER ACCEPTABILITY

The City requires that all contractors be prequalified. See General Conditions regarding contractor prequalification. In addition, the City requires a proven extensive track record for the fold and form liner system to be used in this project. All contractors submitting for prequalification approval for this project must exhibit extensive satisfactory experience in the installation of the proposed liner system and satisfactory evidence that the proposed liner system has been extensively and successfully installed in the United States and the State of Florida. The installer must be certified by the liner system manufacturer for installation of the liner system. The City reserves full and complete authority to approve the satisfactory nature of the both the liner system and the installer.

404-3. MATERIALS

Pipe shall be made from P. E. 3408 polyethylene resins complying with ASTM D 3350, cell classification: P.E. 345434 D for High Density. It shall be Type 3, Grade 4, Class D, according to ASTM D 1248. The Contractor shall provide certified test results for review by the Engineer, from the manufacturer, that the material conforms with the applicable requirements. Material shall have

a minimum thickness of SDR 32.5. Pipe specimens shall comply with the minimum property values shown below with the applicable ASTM requirements:

<u>Material</u>	<u>Property</u>	<u>ASTM Method</u>	<u>Value</u>
HDPE	Tensile Strength	D 638	3,300 psi
HDPE	Elasticity Modulus		E=113,000 psi
	Impact Strength	D 256 A	3.0 ft-lb/in
	Flexure Modulus		E=136,000 psi
	Expansion Coeff.		c=0.009 in/in/deg F

At the time of manufacture, each lot of liner shall be reviewed for defects and tested in accordance with ASTM D 2837 and D 1693. At the time of delivery, the liner shall be homogeneous throughout, uniform in color, free of cracks, holes, foreign materials, blisters, or deleterious faults. The Contractor shall provide, as requested, certified test results for review by the Engineer, from the manufacturer, that the material conforms with the applicable requirements. The Engineer may at any time request the Contractor provide test results from field samples to the above requirements.

Liner shall be marked at five (5) foot intervals or less with a coded number, which identifies the manufacturer, SDR, size, material, date, and shift on which the liner was extruded.

Lining manufacturer shall submit to the Engineer for approval as requested, complete design calculations for the liner thickness. The criteria for liner design shall be HS-20 traffic loading, water table to the ground surface, minimum expected lifetime of fifty (50) years, and no structural strength retained from the existing pipe. Any liner system must be approved by the Engineer prior to receiving bids. Request for contractor prequalification and/or liner system approval must be received by the Engineer no later than fourteen (14) days prior to the date for receiving bids.

404-4. CLEANING/SURFACE PREPARATION

It shall be the responsibility of the Contractor to clean and prepare the existing pipes for rehabilitation. The Contractor will thoroughly clean the interior of the sewers to produce a clean interior surface free of all coatings, sand, rock, roots, sludge, or other deleterious materials prior to liner insertion. Bypass pumping will be provided by the Contractor as part of the unit cost of restoration. Bypass operations are to be so arranged as to cause minimum disruptions to local traffic, residents and particularly to commercial facilities. During the cleaning and preparation operations all necessary precautions shall be taken to protect the public, all property and the sewer from damage.

All material removed from the sewers shall be the Contractor's responsibility for prompt disposal in accordance with all regulatory agency requirements. The Contractor may be required to control the rate of sewer cleaning in the sanitary system to avoid heavy pollution loads at the City's treatment plants.

404-5. TELEVISION INSPECTION

After cleaning, and again after the rehabilitation work on each section of the project is completed, all pipe sections shall be visually inspected with a digital camera and recorded in DVD format as specified below.

404-5.1. VIDEO, PHOTO CAPTURE AND DATA COLLECTION REQUIREMENTS FOR MANHOLE AND PIPELINE INSPECTION

This section describes the requirements of the Contractor in providing the following minimum requirements for Video, Photo Capture and Database structure to the City. The City is currently using CUES Granite XP video and data collection software. The Contractor shall provide the TV Inspections in the same Granite XP database, photo and video capture format. The Contractor-provided TV Inspections, Database, DVDs, Photos and related files shall have the ability to direct synchronize to the City's existing Granite XP database.

404-5.2. IMAGE (PHOTOS) CAPTURE FORMAT AND REQUIREMENTS

The Inspection image files (pictures) shall have the ability to export to Industry Standard Formats to include JPEG, BMP, and TIFF formats and be transferable by disk, DVD and/or external hard drive to an external personal computer utilizing standard viewers and printers.

404-5.3. DIGITAL VIDEO FORMAT AND REQUIREMENTS

Digital video files (Inspection Videos) shall be captured and/or recorded in the MPEG 1, 2 or 4 format or as specified by the City. The Video capture files shall be in MPEG format with data linking (Inspection Observations) to the database file(s). The "Link" of the video capture file to the database observation file is required. The inspection observation(s) shall link to the video record in real-time.

The accompanying database shall support the following code systems: WRc, PACP, CUES standard, or current code system being utilized by the City. The Database and Software program (Granite XP V2.X) shall be able to import asset data from an ArcGIS (City current version) geo-database file utilizing the network features to associate Sewer Mains with corresponding Sewer Nodes.

The database structure shall retain information on the various structures found within a sewer or storm system. It is important that the structures, nodes, manholes and pipe identifiers and related attribute information be retained as separate tables from the Inspection allowing import of existing data from multiple sources. The data structure allows different projects to reside within a single database. Information gathered in projects shall be available to view by project or by system. Data gathered during project inspection shall be available to view by the selected structure. Therefore, all inspections can be viewed on a structure even if gathered in different projects.

404-5.4. SYNCHRONIZATION

The database shall have the ability to synch assets and inspections from replicated databases. The synch process should have built-in error checking for duplicates, updates and any modifications to

the data being synched. This allows for multiple sources of data to be effectively consolidated into a single unitary database for analysis and evaluation.

404-6. LINER INSTALLATION

Liner shall be sized to field measurements obtained by the Contractor to provide a tight fit to the full interior circumference of the existing sanitary sewer and shall be a continuous, jointless liner product from inside of manhole to inside of manhole. Contractor shall use installation methods approved by the liner manufacturer including liner placement, reforming to fit existing pipe, pressure and heat requirements and reconnection of laterals. The Contractor shall immediately notify the Engineer of any construction delays taking place during the insertion operation. Contractor shall maintain a reasonable backup system for bypass pumping should delays or problems with pumping systems develop. Liner entries at manholes shall be smooth, free of irregularities, and watertight. No pinholes, tears, cracks, thin spots, or other defects in the liner shall be permitted. Such defects shall be removed and replaced by the Contractor at their expense. OSHA requirements for installation procedures, in particular, confined spaces are to be met.

404-7. LATERAL RECONNECTION

Sanitary laterals shall be reconnected as soon as possible to renew service. Laterals are to be reconnected by means of robotics, by internally cutting out the liner to 100% of the area of the original opening. All lateral reconnections are to be grouted to prevent leakage. Grouting method and material is to be approved by the Engineer.

Any reconnections to laterals and connections to manholes which are observed to leak shall be resealed by the Contractor. All laterals discovered during the lining process are to be reconnected unless specifically directed otherwise by the City. Contractor shall notify all local system users when the sanitary system will not be available for normal usage by the delivery of door hangers with appropriate information regarding the construction project.

404-8. TIME OF CONSTRUCTION

Construction schedules will be submitted by the Contractor and approved by the Engineer. At no time will any sanitary sewer service connection remain inoperative for more than an eight (8) hour period without a service bypass being operated by the Contractor. In the event that sewage backup occurs and enters buildings, the Contractor shall be responsible for cleanup, repair and property damage costs and claims.

404-9. PAYMENT

Payment for sanitary sewer restoration shall be made per linear foot including all preparation, bypass pumping, equipment, labor, materials, operations, restoration, etc., to provide a fully completed and operational sewer. Payment shall be measured from center of manhole to center of manhole for the sanitary systems and from end of pipe to end of pipe for storm systems.

405. SANITARY MANHOLE LINER RESTORATION

405-1. SCOPE AND INTENT

It is the intent of this portion of the specification to provide for the structural rehabilitation of manhole walls and bases with solid preformed liners and made-in-place liner systems used in accordance with the manufacturer's recommendations and these specifications. In addition to these specifications, the Contractor shall comply with manufacturer's instructions and recommendations for work. Purpose of work is to eliminate infiltration, provide corrosion protection, repair voids and to restore the structural integrity of the manhole. For any particular system the Contractor will submit manufacturer's technical data and application instructions. All OSHA regulations shall be met.

405-2. PAYMENT

Payment for liners shall be per vertical foot of liner installed from the base to the top of the installed liner. Liners will generally be installed to the top of existing or new corbels. No separate payment will be made for the following items: Bypass pumping; Traffic Control; Debris Disposal; Excavation, including necessary pavement removal; Shoring and/or dewatering; Structural fill; Backfill and compaction; Grout and mortar; Brick; Resetting of the manhole ring and cover; Pipe extensions and connectors necessary to the installation; Replacement of unpaved roadway and grass or shrubbery plot; Replacement of roadway base and asphalt surface; and Appurtenant work as required for a complete and operable system. The cost of such work shall be included in the pay item, per linear foot of liner.

405-3. FIBERGLASS LINER PRODUCTS

405-3.1. MATERIALS

405-3.1.1. LINERS

Liners shall be fiberglass engineered to meet or exceed AASHTO H 20 loading of 16,000 pound vertical wheel load. Manhole liners are to be of the integral corbel design unless otherwise stipulated. Manhole liners are to be as large in diameter as will fit into the existing manhole. The Contractor shall measure the existing manhole immediately prior to ordering materials and is solely responsible for the fitting of the liner. Contractor will be required to submit factory certification for fiberglass liners. The manhole liner shall meet all requirements of ASTM D 3753.

405-3.1.2. MORTAR

Mortar shall be composed of one part Portland Cement Type I and between two (2) and three (3) parts clean, well graded sand, 100% of which shall pass a No. 8 sieve.

405-3.1.3. GROUTING

Grouting shall be a concrete slurry of four (4) bags of Portland Cement Type II per cubic yard of clean, well graded sand.

405-3.2. INSTALLATION AND EXECUTION

Excavate an area around the top of the existing manhole sufficiently wide and deep for the removal of the manhole ring and corbel section.

Remove the frame and cover and corbel section without damaging the existing manhole walls. Care is to be taken not to allow brick or soil to fall into the existing manhole.

Remove or reinsert loose brick which protrude more than one inch from the interior wall of the manhole and which could interfere with the insertion of the fiberglass liner.

If the shelf of the manhole invert is not level around the perimeter, form a flat shelf with mortar.

Cut the liner to the proper length. Cutouts in the manhole shall be made to accommodate existing inlet and outlet pipes, drops and cleanouts.

Lower the liner into the existing manhole and set the bottom of the liner into quick setting grout. Obtain a good bottom seal to prevent the loss of grout from the annular space between the outside of the liner and the inside wall of the existing manhole. Set the liner as nearly vertical as possible. Pour six inches (6") of quick setting grout above the initial bottom seal in the annular void to insure an adequate bottom seal.

Bridge the gap from drops, laterals, force mains, cleanouts and all existing piping between the existing manhole wall and the new manhole liner with P.V.C. pipe. Use quick setting mortar to seal the area around the manhole liner and piping.

Fill the annular space between the manhole liner and the existing manhole interior walls with grout. Care must be taken not to deflect the manhole liner due to head pressure.

Set the existing manhole ring and cover using brick to make elevation adjustments as needed.

Observe water tightness and repair any visible leakage.

Backfill around the new liner and compact the backfill. Sod the disturbed area. Match existing sod.

Where manholes fall in paved areas, refer to Standard Detail Index 104, "Street and Driveway Replacement for Concrete and Asphaltic Concrete Surfaces".

405-4. STRONG SEAL MS-2 LINER PRODUCT SYSTEM

This specification shall govern all work to spray apply a monolithic fiber reinforced cementitious liner to the wall and bench surfaces of brick, concrete or any other construction material; Strong Seal MS 2 product.

Described are procedures for manhole preparation, cleaning, application and testing. The applicator must be approved, trained and certified as having successfully completed factory training. The applicator/contractor shall furnish all labor, equipment and materials for applying the Strong Seal MS 2 product directly to the contour of the manhole to form a structural cementitious liner of a minimum one half inch (1/2") thickness using a machine specially designed for the application. All aspects of the installation shall be in accordance with the manufacturer's recommendations and with the following specifications which includes:

1. The elimination of active infiltration prior to making the application.
2. The removal of any loose and unsound material.

3. The spray application of a pre blended cementitious mix to form a monolithic liner in a two (2) coat application.

405-4.1. MATERIALS

405-4.1.1. PATCHING MIX

Strong Seal shall be used as a patching mix according to the manufacturer's recommendations and shall have the following minimum requirements:

- | | | |
|--------------------------------------|-------------------|-------------------|
| 1. Compressive Strength (ASTM C-109) | 15 min., 200 psi | 6 hrs., 1,400 psi |
| 2. Shrinkage (ASTM C-596) | 28 days, 150 psi | |
| 3. Bond (ASTM C-952) | 28 days, 150 psi | |
| 4. Cement | Sulfate resistant | |
| 5. Density, when applied | 105 +/- 5 pcf | |

405-5. INFILTRATION CONTROL

Strong Plug shall be used to stop minor water infiltration according to the manufacturer's recommendations and shall have the following minimum requirements:

1. Compressive strength (ASTM C-109) - 600 psi, 1 hr.; 1000 psi 24 hrs.
2. Bond (ASTM C-952) - 30 psi, 1 hr.; 80 psi, 24 hrs.

405-6. GROUTING MIX

Strong-Seal Grout shall be used for stopping very active infiltration and filling voids according to the manufacturer's recommendations. The grout shall be volume stable and have a minimum twenty-eight (28) day compressive strength of 250 psi and a one (1) day strength of 50 psi.

405-7. LINER MIX

Strong Seal MS 2 shall be used to form the monolithic liner covering all interior manhole surfaces and shall have the following minimum requirements at twenty-eight (28) days:

- | | |
|--------------------------------------|----------------|
| 1. Compressive strength (ASTM C 109) | 3,000 psi |
| 2. Tensile strength (ASTM C 496) | 300 psi |
| 3. Flexural strength (ASTM C 78) | 600 psi |
| 4. Shrinkage (ASTM C 596) | 0% at 90% R.H. |
| 5. Bond (ASTM C 952) | 130 psi |
| 6. Density, when applied | 105 + pcf |

Product must be factory blended requiring only the addition of water at the Project site. Bag weight shall be 50 to 51 pounds and contents shall have dry bulk density of 54 to 56 pounds per cubic foot. Fiberglass rods which are contained in the product shall be alkaline resistant and shall be one-

half inch (1/2") to five-eighths inch (5/8") long with a diameter of 635 to 640 microns. Products shall, in the unmixed state, have a lead content not greater than two percent (2%) by weight.

Strong Seal MS 2C shall be made with Calcium Aluminate Cement and shall be used according to the manufacturer's recommendations in applications where there is evidence of severe sulfide conditions.

Product must be factory blended requiring only the addition of water at job site.

Bag weight shall be 50 to 51 pounds and contents must have a dry bulk density of 50 to 56 pounds per cubic foot.

Cement content must be 65% to 75% of total weight of bag.

One bag of product when mixed with correct amount of water must have a wet density of 95 to 108 pounds per cubic foot and must yield a minimum of 0.67 cubic foot of volume.

Fiberglass rods must be alkaline resistant with rod lengths not less than one-half inch (1/2") in length nor greater than five-eighths inch (5/8") in height.

Product shall not include any basic ingredient that exceeds maximum allowable EPA limit for any heavy metal.

Manufacturer must provide MSDS sheets for product(s) to be used in reconstruction process.

A two (2) coat application of liner material will be required (no exceptions) with the first coat rough troweled to force materials into cracks and crevices to set the bond. The second coat to be spray applied to assure a minimum of one-half inch (1/2") thickness after troweling or brush finishing to a relatively smooth finish.

405-8. WATER

Shall be clean and potable.

405-9. OTHER MATERIALS

No other material shall be used with the mixes previously described without prior approval or recommendation from the manufacturer.

405-10. EQUIPMENT

A specially designed machine consisting of an optimized progressive cavity pump capable of producing a minimum of 250 psi pumping pressure, contra blend mixer with twin ribbon paddles with discharge, and an air system for spray application of product. Equipment must be complete with water storage and metering system. Mixer and pump is to be hydraulically powered. Equipment is to be mounted to heavy duty construction tandem axle road worthy trailer complete with electric brakes and running lights. Internal combustion engine must be included to power the hydraulic system and air compressor.

405-11. INSTALLATION AND EXECUTION

405-11.1. PREPARATION

1. Place boards over inverts to prevent extraneous material from entering the sewer lines and to prevent up stream line from flooding the manhole.
2. All foreign material shall be removed from the manhole wall and bench using a high pressure water spray (minimum 1,200 psi). Loose and protruding brick, mortar and concrete shall be removed using a mason's hammer and chisel and/or scraper. Fill any large voids with quick setting patching mix.
3. Active leaks shall be stopped using quick setting specially formulated mixes according to the manufacturer's recommendations. Some leaks may require weep holes to localize the infiltration during the application after which the weep holes shall be plugged with the quick setting mix prior to the final liner application. When severe infiltration is present, drilling may be required in order to pressure grout using a cementitious grout. Manufacturer's recommendations shall be followed when pressure grouting is required.
4. Any bench, invert or service line repairs shall be made at this time using the quick setting mix and following the manufacturer's recommendations.
5. After all preparation has been completed, remove all loose material.

405-11.2. MIXING

For each bag of product, use the amount of water specified by the manufacturer and mix using the Spray Mate Model 35C or 35D equipment for thirty (30) seconds to one (1) minute after all materials have been placed in the mixing hopper. Place the mix into the holding hopper and prepare another batch with timing such that the nozzleman can spray in a continuous manner without interruption until each application is complete.

405-11.3. SPRAYING

The surface, prior to spraying, shall be damp without noticeable free water droplets or running water. Materials shall be sprayed, applied to a minimum uniform thickness to insure that all cracks, crevices and voids are filled and a somewhat smooth surface remains after light troweling. The light troweling is performed to compact the material into voids and to set the bond. Not before the first application has begun to take an initial set (disappearance of surface sheen which could be fifteen (15) minutes to one (1) hour depending upon ambient conditions) is the second application made to assure a minimum total finished thickness of one-half inch (1/2"). The surface is then troweled to a smooth finish being careful not to over trowel so as to bring additional water to the surface and weaken it. A brush finish may be applied to the finished coat to remove trowel marks. Manufacturer's recommendation shall be followed whenever more than twenty-four (24) hours have elapsed between applications. The wooden bench covers shall be removed, and the bench is sprayed such that a gradual slope is produced from the walls to the invert with the thickness at the edge of the invert being no less than one-half inch (1/2"). The wall bench intersection shall be rounded to a uniform radius, the full circumference of the intersection. The final application shall have a minimum of four (4) hours cure time before being subjected to active flow.

405-11.4. PRODUCT TESTING

At some point during the application, at least four (4) two inch (2") cubes may be prepared each day or from every fifty (50) bags of product used, identified and sent, in accordance with the Owner's or Manufacturer's directions, for compression strength testing as described in ASTM C 109.

405-11.5. CURING

Ambient manhole conditions are adequate for curing so long as the manhole is covered. It is imperative that the manhole be covered as soon as possible after the application has been completed.

405-11.6. MANHOLE TESTING AND ACCEPTANCE

Manhole may be vacuum tested from the top of manhole frame to the manhole base. All pipes entering the manhole shall be plugged, taking care to securely place the plug from being drawn into the manhole. The test head shall be placed, and the seal inflated in accordance with the manufacturers' recommendations. A vacuum pump of ten inches (10") of mercury shall be drawn and the vacuum pump shut off. With the valves closed, the time shall be measured for the vacuum to drop to nine inches (9"). The manhole shall pass if the time is greater than sixty (60) seconds for forty-eight inch (48") diameter, seventy five (75) seconds for sixty inch diameter (60"), and ninety (90) seconds for seventy-two inch (72") diameter manholes. If the manhole fails the initial test, necessary repairs shall be made. Retesting shall proceed until a satisfactory test is obtained. Tests shall be performed by the Contractor under the direction of the Project Engineer.

405-12. INNERLINE ENVIRONMENTAL SERVICES LINER PRODUCT SYSTEM

405-12.1. SCOPE

Materials and application procedures for manhole rehabilitation for the purpose of restoring structural integrity, providing corrosion resistance, and stopping infiltration by means of:

1. Hydraulic grouting, where required, as a preliminary measure to stop high volume infiltration.
2. Hydrophilic grouting (positive side waterproofing), where required, as follows:
 - a. Hydrophilic foam-injected through wall of manhole to fill voids, and/or
 - b. Hydrophilic gel-injected through wall of manhole to stop active leaks
3. Cementitious waterproofing with crystallization (negative side waterproofing)
4. Calcium aluminate cement lining, minimum of one-half inch (1/2")
5. Epoxy coating, minimum of thirty (30) dry mils

405-12.2. MATERIALS

405-12.2.1. REPAIRING CEMENT

A quick setting hydraulic cement compound shall be used to plug all visible minor leaks and to instantly stop major leaks, so that further waterproofing processes may proceed unhindered. The repairing cement shall be nonshrinking, nonmetallic, and noncorrosive. The compound shall have the following properties:

Set Time	1-3 minutes
Tensile Strength	1 day 510 psi
ASTM C 307	3 days 745 psi 28 days 855 psi
Compressive Strength	1 day 3,125 psi
ASTM -C 109	7 days 7,808 psi 28 days 9,543 psi
Flexural Strength ASTM C 78	1 day 410 psi 3 days 855 psi 28 days 1,245 psi

405-12.2.2. HYDROPHILIC GROUTING

Based on conditions found in and around the manhole, the applicator shall pressure inject either one or both of the following materials:

1. An expansive foam grout shall be used to stop major intrusion of water and fill cracks and voids behind the structure's surface. Physical properties are as follows:

Tensile Strength	380 psi	ASTM D 3574-86
Elongation	400%	ASTM D 3574-86
Bonding Strength	250-300 psi	

2. A hydrophilic gel grout shall be used for soil stabilization behind the manhole to prevent seepage, to provide a damming effect, and to place a hydrostatic barrier around exterior of manhole. Physical properties are as follows:

Density	8.75-9.17 lbs/gal	ASTM D-3574
Tensile Strength	150 psi	ASTM D- 412
Elongation	250%	ASTM D-3574
Shrinkage	Less than 4%	ASTM D-1042
Toxicity	Non Toxic	

405-12.2.3. WATERPROOFING

A waterproofing component based on the crystallization process shall be applied. The system combines cementitious and silicate based materials that are applied to negative side surfaces to seal and stop leakage caused by hydrostatic pressure. A combination of five coats (using three components-two powders and a special liquid) react with moisture and the constituents of the substrate to form the crystalline structure. It becomes an integral part of the structure and blocks the passage of water. With moisture present, the crystallization process will continue for

approximately six (6) months. Upon completion, the color will be light grey. Physical properties are as follows:

Slant/Shear bond Strength to Calcium Aluminate Cement		
ASTM C882 Modified	1,200 1,800 psi	
Tensile Strength	380 psi (2.62 MPa)	at 100% RH
(7 day cure)	325 psi (2.24 MPa)	at 50% RH
ASTM C 190		
Permeability	8.1x10 ⁻¹⁰ cm/sec to	
(3 day cure)	7.6x10 ⁻¹¹ cm/sec	
CRD 48 55		

405-12.2.4. CEMENT LINING

A self-bonding calcium aluminate cement shall be applied to restore structural integrity and provide corrosion resistance qualities. The cement (before adding fibers) shall have the following properties:

Calcium Aluminate Cement		12 Hrs	24 Hrs	7 Days	28 Days
Astm C 495	Compressive Strength, Psi	7000	11000	12000	13000
Astm C 293	Flexural Strength, Psi	1000	1500	1800	2000
Astm C 596	Shrinkage At 90% Humidity	--	<0.04	<0.06	<0.08
Astm C 666	Freeze-Thaw Aft 300 Cycle	No Damage			
Astm C 990	Pull - Out Strength	200 - 230 Psi Tensile			
Astm C 457	Air Void Content (7 Days)	3%			
Astm C 497	Porosity/Adsorption Test	4 - 5%			

Modules of Elasticity: 7.10 X 10 PSI after twenty-four (24) hours moist curing at 68 degrees Fahrenheit.

The calcium aluminate cement shall be reinforced with inert fibers which comply with ASTM C 1116 and ASTM C 1018, added at the rate of one (1) pound per cubic yard of concrete. The mixture shall be applied to a thickness of at least one half inch (1/2"), but no greater than two inches (2"). It will have a dark grey color.

405-12.2.5. EPOXY COATING

A high build, flexible waterproofing epoxy shall be applied to a minimum of thirty (30) dry mils. This epoxy will seal structure from moisture and provide protective qualities to the surface, including excellent resistance to chemical attack and abrasion. The epoxy shall be 100% solids, can be applied to damp surfaces, cures to a tile like finish, is easy to clean, and has no toxic fumes. Its uses include sewage treatment plants and other sewer structures. The epoxy shall have the following properties at 75 degrees Fahrenheit:

Mixing Ratio (Parts A:B), by volume	1:1
Color (other colors available on request)	Light Gray

Pot Life, hrs	1
Tensile Strength, psi, min	2,000
Tensile Elongation, %	10 –20
Water Extractable Substances, mg./sq. in., max	5
Bond Strength to Cement (ASTM 882) psi	1,800

405-12.2.6. CHEMICAL RESISTANCE

The sanitary sewer liner shall be resistant to: Alcohols, Trichloroethylene, Nitric Acid (3%), Jet Fuels, Water, Sulfuric Acid (3% 10%), MEK, Wine, Butyl Acetate, Beer, Lactic Acid (3%), Gasoline, Corn Oil, Aluminum Sulfate, Paraffin Oil, Vegetable Juice, Sodium Chloride, Motor Oil, Hydrochloric Acid (3%), and many others.

405-12.3. INSTALLATION AND EXECUTION

405-12.3.1. PROCEDURAL OVERVIEW

Work shall proceed as follows:

1. Remove rungs (steps), if desired by client.
2. Clean manhole and remove debris.
 - a. Plug lines and/or screen out displaced debris.
 - b. Apply acid wash, if necessary, to clean and degrease.
 - c. Hydroblast and/or sand blast structure.
 - d. Remove debris from work area.
3. Repair minor defects in walls, benches, and inverts, as required, with repairing cement. (Note: Major structural repairs, such as rebuilding of benches, will also be made as required by client.)
4. Inject hydrophilic grout through all surfaces, as needed, to eliminate infiltration.
5. Apply cementitious/crystallization waterproofing agents to all surfaces, repeating steps as needed.
6. Spray and/or hand apply calcium aluminate cement lining to all surfaces.
7. Spray apply epoxy coating to all surfaces.

NOTE: Steps 1-5 shall be executed consecutively with minimal delays; calcium aluminate (Step 6) shall require a cure time of at least twenty-four (24) hours for needed adhesion of epoxy (Step 7) to cement lining.

405-12.3.2. PREPARATION

An acid wash shall be used (if needed) to clean and degrease. Then, if the client desires, the rungs shall be removed. Next, the entire structure is thoroughly water and/or sand blasted to remove any loose or deteriorated material. Care shall be taken to prevent any loose material from entering lines and other areas by either plugging the lines (where feasible) or inserting protective screens.

405-12.3.3. STRUCTURAL REPAIR

Hand place or spray apply hydraulic cement material as necessary to prepared surface to fill cracks and voids in structure. Allow twenty (20) minutes before applying waterproofing/crystallization.

405-12.3.4. INFILTRATION CONTROL

Pressure injection of hydrophilic gel and hydrophilic foam.

1. Drill five-eighths inch (5/8") holes through active leaking surface.
2. Install all zert fittings, as recommended by manufacturer.
3. Inject material until water flow stops.
4. Remove fittings (if necessary).

405-12.3.5. WATERPROOFING/CRYSTALLIZATION PROCESS

1. Apply a slurry coat of powder #1 to moist wall using a stiff brush, forming an undercoat.
2. Apply dry powder #2 to slurry coat by hand.
3. Brush or spray on sealing liquid during the application to penetrate and initiate the crystal forming process.
4. Repeat steps 2 and 3, until there are no visible leaks.
5. Apply powder #1 as an overcoat.
6. Allow one (1) hour to cure before applying cement lining.

405-12.3.6. CEMENT LINING

1. Dampen surface.
2. Mix material in mixer as recommended for spray or hand trowel application.
3. Apply cement until required build up of at least one half inch (1/2") (and no more than two inches (2")) has been achieved.
4. Trowel to smooth finish, restoring contours of manhole.
5. Texture brush surface to prepare for epoxy finish.
6. Allow for a twenty-four (24) hour cure time prior to epoxy coating.

NOTE: If conditions of heavy humidity prevail, a dry air blower shall be used to facilitate curing times.

405-12.3.7. EPOXY COATING

Spray apply epoxy coating using airless spraying equipment until surface is visibly covered and a thickness of at least thirty (30) mils has been achieved. Manhole may be safely entered after six (6) hours, as epoxy will be hardened. Full cure strength will be achieved at forty eight (48) hours.

405-12.3.8. CLEAN UP

The work crew shall remove all debris and clean work area.

405-12.3.9. MANHOLE TESTING AND ACCEPTANCE

Manhole may be vacuum tested from the top of manhole frame to the manhole base. All pipes entering the manhole shall be plugged, taking care to securely place the plug from being drawn into the manhole. The test head shall be placed, and the seal inflated in accordance with the manufacturer's recommendations. A vacuum pump of ten inches (10") of mercury shall be drawn and the vacuum pump shut off. With the valves closed, the time shall be measured for the vacuum to drop to nine inches (9"). The manhole shall pass if the time is greater than sixty (60) seconds for a forty eight inch (48") diameter, seventy five (75) seconds for sixty (60) inches, and ninety (90) seconds for seventy-two inch (72") diameter manholes. If the manhole fails the initial test, necessary repairs shall be made. Retesting shall proceed until a satisfactory test is obtained. Tests shall be performed by the Contractor under the direction of the Project Engineer.

405-12.3.10. WARRANTY

All materials and workmanship shall be warranted to the Owner for a period of five (5) years, provided that all the above mentioned repair steps are used.

500 SERIES: POTABLE AND RECLAIMED WATER MAINS, FIRE LINES AND APPURTENANCES

501. SCOPE

The Contractor shall furnish all plant, labor, materials and equipment to perform all operations in connection with the construction of potable water mains, fire lines, reclaimed water mains and appurtenances including clearing, excavation, trenching, backfilling and clean up.

502. MATERIALS

502-1. GENERAL

Materials, equipment and supplies furnished and permanently incorporated into the project shall be of first quality in every respect and shall be constructed and finished to high standards of workmanship. Materials shall be suitable for service intended, shall reflect modern design and engineering and shall be fabricated in a first class workmanlike manner. All materials, equipment and supplies shall be new and shall have not been in service at any time previous to installation, except as required in tests or incident to installation. Machined metal surfaces, exposed bearings and glands shall be protected against grit, dirt, chemical corrosion and other damaging effects during shipment and construction.

502-2. PIPE MATERIALS AND FITTINGS

502-2.1. DUCTILE IRON PIPE

Ductile Iron Pipe shall be in accordance with ANSI/AWWA C151/A21.51 81 or latest revision. Pipe thickness class, wall thickness and working pressure shall conform to the following table:

Size	Class	Thickness (In.)	Rated Water Working Pressure (PSI)
4"	51	0.26	350
6"	50	0.25	350
8"	50	0.27	350
12"	50	0.31	350

The trench laying condition shall be Type 2, Flat bottom trench backfill lightly consolidated to centerline of pipe.

Pipe shall be manufactured in accordance with ANSI/AWWA C151/A21.51 81 or latest revision.

Pipe shall be asphalt coated on the outside and standard cement lined and sealed coated with approved bituminous seal coat in accordance with ANSI/AWWA C104/A21.4 80 or latest revision.

Ductile iron pipe shall be used for all hydrant installations and for fire line installations from the main to the backflow preventer.

502-2.2. POLYVINYL CHLORIDE (PVC) PIPE

Polyvinyl Chloride (PVC) Pipe four inch (4”) through eight inch (8”) shall be in accordance with ANSI/AWWA C900 or latest revision and the American Society for Testing Materials (ASTM) Standard D 2241 and PVC Resin Compound conforming to ASTM Specification D 1784.

Polyvinyl Chloride Pipe shall have the same O.D. as Cast and Ductile Iron Pipe and be compatible for use without special adapters with Cast Iron Fittings.

Pipe dimension ratio, working pressure and laying length shall conform to the following table:

Size	Dimension Ratio (OD/Thick.)	Rated Water Working Pressure (PSI)	Laying Length (Ft)
4	18	150	20
6	18	150	20
8	18	150	20

Pipe larger than eight inch (8”) shall be ductile iron. The City Engineer reserves the right to require the use of ductile iron in sizes four inch (4”) through eight inch (8”) when needed due to laying conditions or usage.

The bell of four inch (4”) and larger PVC pipe shall consist of an integral wall section with a solid cross section elastomeric ring which meets the requirements of ASTM D 1869.

Each length of pipe shall bear identification that will remain legible during normal handling, storage and installation and so designate the testing agency that verified the suitability of the pipe material for potable water service.

All polyvinyl chloride pipe shall be laid with two (2) strands of insulated twelve (12) gauge A.W.G. solid strand copper wire taped to the top of each joint of pipe with about eighteen inches (18”) between each piece of tape. It is to be installed at every valve box through a two inch (2”) PVC pipe to twelve inches (12”) minimum above the top of the concrete slab. The two inch (2”) PVC pipe shall be the same length as the adjustable valve box, and the two inch (2”) PVC pipe shall be plugged with a two inch (2”) removable brass plug with recessed nut. This wire is to be continuous with splices made only by direct bury 3M brand splice kit approved by the Engineer. This wire is to be secured to all valves, tees and elbows.

502-2.3. FITTINGS AND JOINTS

Fitting from four inch (4”) through sixteen inch (16”) in size will be compact ductile iron cast in accordance with ANSI/AWWA C153/A 21.53 with mechanical joint bells. Bolts, nuts and gaskets shall be in accordance with requirements of ANSI/AWWA C153/A 21.53. The working pressure rating shall be 350 psi. Ductile iron fittings shall be coated and lined in accordance with requirements of ANSI/AWWA C104/A21.4. Mechanical joint glands shall be ductile iron in accordance with ANSI/AWWA C111/A 21.11. When reference is made to ANSI/AWWA

Standards, the latest revisions apply. Only those fittings and accessories that are of domestic (USA) manufacture will be acceptable.

502-2.4. RESTRAINT

Restraint of plugs, caps, tees, bends, etc., shall be accomplished by the use of approved mechanical restraining rings or glands installed per manufacturer's recommendations. Hydrants shall be restrained by the use of swivel connecting joints. Restraining mechanical joint glands on hydrants shall be used only where hydrant runout length precludes the use of swivel joint connectors.

502-2.5. PIPE WITHIN CASING

All pipe placed within casings shall be slip joint ductile iron restrained by the use of restraining gaskets designed for use with the particular joint being installed and have properly sized casing spacers (Cascade Series) installed on the pipe so that the pipe will be centered within the casing. Each end of the casing shall be properly sealed to prevent the intrusion of soil, water, or debris within the casing itself. It shall be sealed by brick and mortar, cement or any approved method by the Engineer.

502-3. GATE VALVES

Discs of valves shall be operated by methods which will allow operation in any position with respect to the vertical. Gate valves for interior piping or exposed above grade outside structures, shall be hand wheel operated with rising stems. Valves four inches (4") and larger, buried in earth shall be equipped with two inch (2") square operating nuts, valve boxes and covers. Valves shall be fitted with joints suitable for the pipe with which they are to be used. The direction of opening for all valves shall be to the left (counter clockwise).

Unless otherwise shown or specified, valves for high pressure service shall be rated at not less than 150 psi cold water, non-shock.

The manufacturer's name and pressure rating shall be cast in raised letters on the valve body.

Installation shall be in accordance with good standard practice. Exposed pipelines shall be so supported that their weight is not carried through valves.

Two Inch (2") diameter and smaller are not allowed. These should be approved ball valves.

Three Inch (3") diameter are not allowed.

Gate Valves, four inch (4") to sixteen inch (16") diameter, inclusive, shall be resilient seated gate valves encapsulated with EPDM Rubber in conformance with ANSI/A.W.W.A. Standard Specification C509-515 latest revision. These valves shall include the following features consistent with C509-515, full opening unobstructed waterway, zero leakage at 200 psi differential pressure, all internal parts removable from bonnet without removing body from pressure main, corrosion resistant bronze or stainless steel nonrising stem with O-ring bonnet seal with epoxy coated inside and outside cast iron or ductile iron valve body.

Gate valves larger than sixteen inches (16") shall be suitable for the service intended and shall be resilient seated gate valves encapsulated with EPDM rubber in conformance with ANSI/AWWA. These valves shall include the following features consistent with C509-80, full opening unobstructed waterway, zero leakage at 200 psi differential pressure. All valves shall be equipped

with steel cut bevel gears, extended type gear case and rollers, bronze or babbitt tracks and scrapers and valved by-pass.

502-4. VALVE BOXES

Valve boxes shall be of standard extension design and manufacture and shall be made of cast iron. No PVC Risers or Derisers are allowed as part of a valve box assembly. They are to be three-piece valve box assemblies. The lower part of the assembly can be ordered in various heights to accommodate different depths. Suitable sizes of valve boxes and extension pieces shall be provided where shown. The valve box cover shall be of cast iron. Valve boxes and their installation shall be included in the bid price for valves. Refer to City Index No. 402; Sheet 1 of 5 & Sheet 2 of 5 for potable water valve pad detail, and City Index No. 502; Sheet 1 of 2 & Sheet 2 of 2 for reclaimed water valve boxes and pad detail.

502-5. HYDRANTS

No other hydrants, other than those listed below, may be used in extension to or replacement of the City of Clearwater potable water system:

- Kennedy Guardian #K 8ID Fire Hydrant,
- Mueller Super Centurion 25 Fire Hydrant
- AVK Nostalgic 2780.
- American Darling B-84-B.

No substitutions shall be allowed without the approval of the City of Clearwater.

Above hydrants shall be in accordance with the latest revision of the AWWA Specification C 502 and include the following modifications:

1. All shipments to be palletized and tailgate delivery.
2. Hydrants shall conform to A.W.W.A. Standard C-502 latest revision and must be UL/FM listed.
3. Hydrants shall be of the compression type, closing with line pressure.
4. The operating threads will be contained in an operating chamber sealed at the top and bottom with an O-ring seal. The chamber will contain a lubricating grease or oil.
5. Hydrants shall be of the traffic model breakaway type, with the barrel made in two sections with the break flange located approximately two inches (2") above the ground line. Breakaway bolts are not allowed.
6. Operating nut shall be of one-piece bronze or ductile iron construction.
7. A dirt shield shall be provided to protect the operating mechanism from grit buildup and corrosion due to moisture.
8. A thrust washer shall be supplied between the operating nut and stem lock nut to facilitate operation.
9. Operating nut shall be a #7 one and a half inch (1-1/2") pentagon nut.

10. Nozzles shall be of the tamper resistant, one quarter (1/4) turn type with O-ring seals or threaded into upper barrel. Nozzles shall be retained with a stainless steel locking device.
11. The main valve shall be of EPDM solid rubber.
12. The seat shall be of a bronze ring threaded to a bronze insert in the hydrant shoe, with O-rings to seal the barrel from leakage of water in the shoe.
13. The main valve stem will be 304 or higher grade stainless steel and made in two sections with a breakable coupling.
14. Hydrant shall have a six inch (6") Mechanical Joint epoxy lined elbow, less accessories.
15. Hydrant shall have a five and one quarter inch (5-1/4") valve opening, and shall be a left hand operation to open.
16. Hydrant shall be without drains.
17. Hydrant shall have two (2) two and one half inch (2-1/2") hose nozzles and one (1) four and one half inch (4-1/2") pumper nozzle. Threads shall be in accordance with the National Standard Hose Coupling Thread Specifications.
18. Hydrant body shall have a factory finish of yellow paint. All paints shall comply with AWWA standard C-502-85 or latest revision.

All hydrants will be shop tested in accordance with the latest AWWA Specification C 502.

Restrained joint assemblies shall be used which have bolted mechanical and swivel joints from the hydrant tee through to the hydrant. Restrained joints shall absorb all thrust and prevent movement of the hydrant.

All hydrants shall be provided with an auxiliary gate valve so that the water to the hydrant may be shut off without the necessity of closing any other valve in the distribution system.

No hydrants shall be installed on the reclaimed water system unless approved by the City of Clearwater's Engineering Department.

502-6. SERVICE SADDLES

Service saddles shall be used on all service taps to four inch (4") P.V.C. water main. The largest service connection allowable on four inch (4") main shall be one and one half inch (1-1/2"). Service saddles shall be used on all two inch (2") service connections to six inch (6") and larger mains. Service saddles (JCM 406 series or Ford FC 202 series) shall be wide bodied ductile iron with epoxy or nylon coating and shall have stainless steel straps.

502-7. TESTS, INSPECTION AND REPAIRS

1. All materials shall be tested in accordance with the applicable Federal, ASTM or AWWA Specification and basis of rejection shall be as specified therein. Certified copies of the tests shall be submitted with each shipment of materials.
2. All materials will be subject to inspection and approved by the Engineer after delivery; and no broken, cracked, misshapen, imperfectly coated or otherwise damaged or unsatisfactory material shall be used.

3. All material found during the progress of the work to have cracks, flaws, or other defects shall be rejected and promptly removed from the site.
4. If damage occurs to any pipe, fittings, valves, hydrants or water main accessories in handling, the damage shall be immediately brought to the Engineer's attention. The Engineer shall prescribe corrective repairs or rejection of the damaged items.

502-8. BACKFLOW PREVENTERS

The City of Clearwater owns and maintains all backflow prevention devices that are installed within their system. Therefore, any and all devices must be purchased from the City and installed by City work forces.

Backflow prevention devices installed on customer's service lines at the point of delivery (service connection) shall be of a type in accordance with AWWA specification C506 or latest revision.

Two (2) different types of backflow prevention devices are allowed. Type of device, and when required, is determined by the degree of hazard presented to the municipal water system from possible backflow of water within the customer's private system. The types of devices allowed are:

1. Double Check Valve Assembly - a device composed of two (2) single, independently acting, approved check valves, including tightly closing shutoff valves located at each end of the assembly and suitable connections for testing the water tightness of each check valve.
2. Reduced pressure principle backflow prevention device - a device containing a minimum of two (2) independently acting, approved check valves, together with an automatically operated pressure differential relief valve located between the two check valves. The unit must include tightly closing shutoff valves located at each end of the device, and each device shall be fitted with properly located test cocks.

502-9. TAPPING SLEEVES

Steel body tapping sleeves shall be JCM Industries Inc., JCM 412 or Smith-Blair 622. All steel body tapping sleeves shall have heavy welded ASTM A 285, Grade C steel body, stainless steel bolts, manufacturer's epoxy coated body, and three-quarter inch (3/4") bronze test plug.

502-10. BLOW OFF HYDRANTS

Blow offs are not allowed.

503. CONSTRUCTION

503-1. MATERIAL HANDLING

1. Pipe, fittings, valves, hydrants and accessories shall be loaded and unloaded by lifting with hoists or skidding so as to avoid shock or damage. Under no circumstances shall such materials be dropped. Pipe handled on skidways shall not be skidded or rolled against pipe already on the ground.

2. Pipe shall be so handled that the coating and lining will not be damaged. If, however, any part of the coating or lining is damaged, the repair shall be made by the Contractor at their expense in a manner satisfactory to the Engineer.
3. In distributing the material at the site of the work, each piece shall be unloaded opposite or near the place where it is to be laid in the trench.

503-2. PIPE LAYING

503-2.1. ALIGNMENT AND GRADE

The pipe shall be laid and maintained to the required lines and grades with fittings, valves and hydrants at the required locations, spigots centered in bells; and all valves and hydrant stems plumb. All pipe installed shall be pigged and properly blown off before any pressure testing and sterilization of the pipe can be completed.

The depth of cover over the water main shall be a minimum of thirty inches (30") and a maximum of forty-two inches (42") below finished grade, except where approved by the Engineer to avoid conflicts and obstructions. Whenever obstructions not shown on the plans are encountered during the progress of the work and interfere to such an extent that an alteration of the plans is required, the Engineer shall have the authority to change the plans and order a deviation from the line and grade or arrange with the Owners of the structures for the removal, relocation, or reconstruction of the obstructions.

503-2.2. INSTALLATION

Proper implements, tools, and facilities satisfactory to the Engineer shall be provided and used by the Contractor for the safe and convenient performance of the work. All pipe, fittings, valves and hydrants shall be carefully lowered into the trench piece by piece by means of a derrick, ropes, or other suitable tools or equipment in such a manner as to prevent damage to materials and protective coatings and linings. Under no circumstances shall materials be dropped or dumped in the trench.

If damage occurs to any pipe, fittings, valves, hydrants or accessories in handling, the damage shall be immediately brought to the Engineer's attention. The Engineer shall prescribe corrective repairs or rejection of the damaged items.

All pipe and fittings shall be carefully examined for cracks and other defects while suspended above the trench immediately before installation in final position. Spigot ends shall be examined with particular care as this area is the most vulnerable to damage from handling. Defective pipe or fittings shall be laid aside for inspection by the Engineer who will prescribe corrective repairs or rejection.

All lumps, blisters, and excess coating shall be removed from the bell and spigot end of each pipe, and the outside of the spigot and the inside of the bell shall be wire brushed and wiped clean and dry and free from oil and grease before the pipe is laid. Pipe joints shall be made up in accordance with the manufacturer's recommendations.

Every precaution shall be taken to prevent foreign material from entering the pipe while it is being placed in the line. If the pipe laying crew cannot put the pipe into the trench and in place without getting earth into the pipe, the Engineer may require that, before lowering the pipe into the trench, a heavy, woven canvas bag of suitable size shall be placed over each end and left there until the

connection is to be made to the adjacent pipe. During laying operation, no debris, tools, clothing or other materials shall be placed in the pipe.

As each length of pipe is placed in the trench, the spigot end shall be centered in the bell and the pipe forced home and brought to correct line and grade. The pipe shall be secured in place with approved backfill material tamped under it except at the bells. Precautions shall be taken to prevent dirt from entering the joint space.

At times when pipe laying is not in progress, the open ends of pipe shall be closed by a watertight plug or other means approved by the Engineer.

The cutting of pipe for inserting valves, fittings, or closure pieces shall be done in a neat and workmanlike manner without damage to the pipe or cement lining and so as to leave a smooth end at right angles to the axis of the pipe.

Pipe shall be laid with bell ends facing in the direction of laying unless directed otherwise by the Engineer. Where pipe is laid on the grade of ten percent (10%) or greater, the laying shall start at bottom and shall proceed upward with the bell ends of the pipe up grade.

Wherever it is necessary to deflect pipe from a straight line, either in the vertical or horizontal plane to avoid obstructions or to plumb stems, or where long radius curves are permitted, the amount of deflection allowed shall not exceed that allowed under the latest edition of ANSI/AWWA C600-82 and C900 81 or latest revisions.

No pipe shall be laid when, in the opinion of the Engineer, trench conditions are unsuitable.

503-3. SETTING OF VALVES, HYDRANTS AND FITTINGS

503-3.1. GENERAL

Valves, hydrants, fittings, plugs and caps shall be set and joined to pipe in the manner specified above for installation of pipe.

503-3.2. VALVES

Valves in water mains shall, where possible, be located on the street property lines extended unless shown otherwise on the plans. All valves shall be installed at the tee in all cases, not to exceed eighteen inches (18") from the main line.

The valve box shall not transmit any shock or stress to the valve and shall be centered and plumb over the wrench nut of the valve, with the box cover flush with the surface of the finished pavement or such other level as may be directed. Refer to City Index No. 402; Sheet 1 of 5 & Sheet 2 of 5 for potable water valve pad detail, and City Index No. 502; Sheet 1 of 2 & Sheet 2 of 2 for reclaimed water valve box and pad detail.

503-3.3. HYDRANTS

Hydrants shall be located as shown or as directed so as to provide complete accessibility and minimize the possibility of damage from vehicles or injury to pedestrians. All hydrants located ten feet (10') or more from the main shall have a gate valve at the main and another gate valve at the hydrant location. No valve can be located anywhere in the hydrant run to circumvent the use of two valves. Refer to City Index No. 402; Sheet 4 of 4 for potable water hydrants. No hydrants shall

be installed on the reclaimed water system unless approved by the City of Clearwater's Engineering Department.

All hydrants shall stand plumb and shall have their nozzles parallel with, or at right angles to, the curb, with the pumper nozzle facing the curb. Hydrants shall be set to the established grade, with nozzles as shown or as directed by the Engineer.

Each hydrant shall be connected to the main with a six inch (6") ductile iron branch controlled by an independent six inch (6") gate valve. If hydrant is placed greater than ten feet (10') from the main, an additional valve shall be installed at the hydrant and shall be included in the hydrant assembly cost.

503-3.4. ANCHORAGE

Movement of all plugs, caps, tees, bends, etc., unless otherwise specified shall be prevented by attaching approved mechanical restraining rings or glands and installed per manufacturer's recommendations. Hydrants shall be held in place with restrained swivel joints. Restraining mechanical joint glands on hydrants may be used where hydrant run out length precludes the use of hydrant connecting swivel joints.

Where special anchorage is required, such anchorage shall be in accordance with details shown on the plans.

503-4. CONNECTIONS TO EXISTING LINES

Where shown on the plans or directed by the Engineer, the water lines constructed under this contract shall be connected to the existing lines now in place. No such connection shall be made until all requirements of the specifications as to tests, flushing, and sterilization have been met and the plan of the cut in to the existing line has been approved by the Engineer.

Where connections are made between new work and existing work, the connections shall be made in a thorough and workmanlike manner using proper materials and fittings to suit the actual conditions. All fittings shall be properly sterilized, and pipe will be properly swabbed before connections to existing facilities. All connections to existing facilities will be completed under the supervision of the City of Clearwater.

504. TESTS

504-1. HYDROSTATIC TESTS

After installation of water mains, complete with all associated appurtenances including service taps, all sections of newly laid main shall be subject to a hydrostatic pressure test of 150 pounds per square inch for a period of two (2) hours and shall conform to AWWA C600 latest revision. All mains shall be pigged and flushed to remove all sand and other foreign matter before any hydrostatic test can or will be performed. The pressure test shall be applied by means of a pump connected to the pipe in a manner satisfactory to the Engineer. The pump, pipe connection and all necessary apparatus, together with operating personnel, shall be furnished by the Contractor at their expense.

The Contractor shall make all necessary taps into the pipe line. The Owner will furnish the water for the test. Before applying the test pressure, all air shall be expelled from the pipe line.

504-2. NOTICE OF TEST

The Contractor shall give the City of Clearwater's Owner Representative forty-eight (48) hours advance notice of the time when the installation is ready for hydrostatic testing.

505. STERILIZATION

Before the system is put into operation, all water mains and appurtenances and any item of new construction with which the water comes in contact, shall be thoroughly sterilized in accordance with AWWA C651.

505-1. STERILIZING AGENT

The sterilizing agent shall be liquid chlorine, sodium hypochlorite solution conforming to Federal Specification O-S-602B, Grade D, or dry hypochlorite, commonly known as "HTH" or "Perchloron".

505-2. FLUSHING SYSTEM

Prior to the application of the sterilization agent, all mains shall be thoroughly flushed. Flushing shall continue until a clean, clear stream of water flows from the hydrants. Where hydrants are not available for flushing, such flushing shall be accomplished at the installed blow off devices generally at the ends of the lines.

505-3. STERILIZATION PROCEDURE

All piping, valves, fittings and all other appurtenances shall be sterilized with water containing a minimum chlorine concentration of 75 ppm at any point in the system. This solution shall then remain in the distribution system for a minimum contact period of eight (8) hours and never more than twenty-four (24) hours before it is flushed out. All valves in the lines being sterilized shall be opened and closed several times during the contact period.

505-4. RESIDUAL CHLORINE TESTS

After the sterilization outlined above has been accomplished, flushing shall continue until free residual chlorine tests not less than 0.2 ppm nor more than 3.0 ppm. Residual chlorine test shall be in accordance with standard methods using a standard DPD test set.

505-5. BACTERIAL TESTS

After the water system has been sterilized and thoroughly flushed as specified herein, City of Clearwater Water Division or the Owner's Representative personnel shall take samples of water from remote points of the distribution system in suitable sterilized containers. The City shall forward the samples to a laboratory certified by the Florida State Board of Health for bacterial examination in accordance with AWWA C651. If tests of such samples indicate the presence of coliform organisms, the sterilization as outlined above shall be repeated until tests indicate the absence of such pollution. The bacterial tests shall be satisfactorily completed before the system is placed in operation and it shall be the Contractor's responsibility to perform the sterilization as outlined above.

If methods of sterilization differ materially from those outlined above, such methods shall be in accordance with directives of the Florida State Board of Health and all methods employed shall have the approval of that agency. Definite instructions as to the collection and shipment of samples shall be secured from the laboratory prior to sterilization and shall be followed in all respects. The City of Clearwater shall secure clearance of the water main from the Florida Department of Environmental Protection before the water distribution system is put into operation.

506. MEASUREMENT AND PAYMENT

506-1. GENERAL

Bids must include all sections and items as specified herein and as listed on the Bid Form. Payment for the work of constructing the project will be made at the unit price or lump sum payment for the items of work as set forth in the Bid, which payment will constitute full compensation for all labor, equipment, and materials required to complete the work. No separate payment will be made for the following items and the cost of such work shall be included in the applicable pay items of work:

- Clearing and grubbing
- Excavation, including necessary pavement removal
- Shoring and/or dewatering
- Structural fill
- Backfill
- Grading
- Tracer wire
- Refill materials
- Joint materials
- Tests and sterilization
- Appurtenant work as required for a complete and operable system.

506-2. FURNISH AND INSTALL WATER MAINS

506-2.1. MEASUREMENT

The quantity for payment shall be the actual number of feet of pipe of each size and type satisfactorily furnished and laid, as measured along the centerline of the completed pipe line, including the length of valves and fittings.

506-2.2. PAYMENT

Payment of the applicable unit price shall be full compensation for furnishing all plant, labor, materials and equipment, and constructing the water mains completely and ready for operation.

506-3. FURNISH AND INSTALL FITTINGS

506-3.1. MEASUREMENT

The quantity for payment will be the number of tons, or decimal part thereof, of ductile iron fittings satisfactorily furnished and installed. Fitting weights shall be based on weights stamped on the body of the fitting, provided such weights do not exceed the theoretical weights by more than the tolerances permitted in ANSI/AWWA C110/A 21.10 82, latest revision, in which case, the weight will be based upon the theoretical weight plus the maximum tolerance.

506-3.2. PAYMENT

Payment of the applicable unit price shall be full compensation for furnishing all plant, labor, materials, and equipment required to furnish and install ductile iron fittings.

506-4. FURNISH AND INSTALL GATE VALVES COMPLETE WITH BOXES AND COVERS

506-4.1. MEASUREMENT

The quantity for payment shall be the number of gate valves of each size satisfactorily furnished and installed.

506-4.2. PAYMENT

Payment of the applicable unit price for each size shall be full compensation for furnishing all plant, labor, material and equipment and installing the valve complete with box and cover.

506-5. FURNISH AND INSTALL FIRE HYDRANTS

506-5.1. MEASUREMENT

The quantity for payment shall be the number of fire hydrants satisfactorily furnished and installed. The only hydrants allowed to be installed in the City of Clearwater utilities system are listed in Article 501-2.5 of these Technical Specifications. No exceptions.

506-5.2. PAYMENT

Payment of the applicable unit price shall be full compensation for furnishing all plant, labor, material and equipment and installing the fire hydrant completely including necessary thrust anchorage, six inch (6") pipe between the main and the hydrant and gate valve and valve box on the hydrant lead.

600 SERIES: STORMWATER

601. RAISING OR LOWERING OF STORM DRAINAGE STRUCTURES

Storm Drainage Structures shall be raised or lowered as indicated on the plans or as indicated by the Engineer.

601-1. BASIS OF PAYMENT

Payment, unless covered by a bid item, shall be included in the cost of the work.

602. UNDERDRAINS

The Contractor shall construct sub-surface drainage pipe as directed in the Scope of Work and detail drawings contained in the Project construction plans. In general, underdrain pipe shall be embedded in a bed of #6 FDOT aggregate, located behind the back of curb and aggregate surface covered with a non-degradable fibrous type filter material. A #57 aggregate may be used in lieu of #6 if it is washed and screened to remove fines. The aggregate may be stone, slag or crushed gravel. Unless otherwise noted on the plans, underdrain pipe shall be eight inches (8") in diameter, polyvinyl chloride pipe, in conformance with ASTM F-758 "Standard Specification For Smooth Wall PVC Underdrain Systems for Highways" latest revision, minimum stiffness of 46 in conformance with ASTM D2412, perforations in conformance with AASHTO M-189 described in FDOT Section 948-1.5 or latest revision and in conformance with ASTM D3034 - SDR 35.

Alternate acceptable underdrain pipe material is Contech A-2000 which is a rigid PVC pipe that exceeds ASTM Specifications D1784, minimum cell classification of 12454B or 12454C, manufactured per ASTM F949-93a, minimum pipe stiffness of 50 psi, with no evidence of splitting, cracking or breaking when pipe is tested in accordance with ASTM D2412 at 60% flattening and with a double gasket joint.

Underdrain pipe placed beneath existing driveways and roadways shall be non-perforated pipe with compacted backfill. All poly-chloride pipe which has become deteriorated due to exposure to ultra violet radiation shall be rejected. Where ductile iron pipe is specified, pipe material shall be the same as specified for potable water pipe in these technical specifications. All underdrain aggregate shall be fully encased in a polyester filter fabric "sock" (Mirafi 140-N or approved equal) per the construction detail drawings.

Filter aggregate for underdrains shall be as specified in the FDOT Standard Specifications, Section 901 – Course Aggregate, and shall be either #6 or #57. If #57 is used, it must be washed and screened to remove fines. The aggregate may be stone, slag, or crushed gravel.

602-1. BASIS OF MEASUREMENT

Measurement shall be the number of linear feet of eight inch (8") Sub-drain in place and accepted.

602-2. BASIS OF PAYMENT

Payment shall be based upon the unit price per linear foot for underdrain as measured above, which shall be full compensation for all work described in this section of the specifications and shall include all materials, equipment, and labor necessary to construct the underdrain (specifically underdrain pipe, aggregate and filter fabric). Underdrain clean-outs, sod, driveway, road and sidewalk restoration shall be paid by a separate bid item.

603. STORM SEWERS

All storm drain pipe installed within the City of Clearwater shall be steel reinforced concrete unless otherwise approved by the City Engineer. Said pipe shall comply with Section 430 of FDOT Standard Specifications.

All reinforced concrete pipe joints shall be wrapped with Mirafi 140N filter fabric or equivalent (as approved by the City Engineer). The cost for all pipe joint wraps shall be included in the unit price for the pipe.

All pipe, just before being lowered into a trench, is to be inspected and cleaned. If any difficulty is found in fitting the pieces together, this fitting is to be done on the surface of the street before laying the pipe, and the tops plainly marked in the order in which they are to be laid. No pipe is to be trimmed or chipped to fit. Each piece of pipe is to be solidly and evenly bedded, and not simply wedged up. Before finishing each joint, some suitable device is to be used to find that the inverts coincide and pipe is clear throughout.

603-1. TESTING AND INSPECTION

The Contractor shall take all precautions to secure a watertight sewer under all conditions.

The work under this Article shall include the internal video recording of new stormwater drainage pipes and drainage structures. The Contractor shall provide the City with a video of the completed stormwater drainage system, and a written report. The Contractor shall pump down and clean the pipes and drainage structures, to the satisfaction of the City, prior to video recording. The video shall be of the standard DVD format, in color, with all the pertinent data and observations recorded as audio on the DVD. The data should include:

- 1) An accurate recorded footage of the pipe lengths.
- 2) The drainage structure number and pipe size.
- 3) The run of the pipe and direction of flow (i.e. from S-1 to S-2).
- 4) Details of structural defects, broken pipes, sags, dips, misalignments, obstructions and infiltration.

The written report shall include the four (4) items listed previously.

All visual and video recording inspections shall be completed by the Contractor and be in accordance with Section 430-4.8 of FDOT Standard Specifications. Any deficient or damaged pipe discovered during the video recording process shall be the responsibility of the Contractor to repair or replace at their own expense within the contractual duration.

As a complement to the video report, the Contractor shall also provide digital photos of areas of concern in electronic (computer CD/DVD) and hard copy form (in color).

All known pipe breaks or those breaks discovered after the video inspection shall be repaired by the Contractor regardless of the test allowances. Faulty sections of drainage pipes or drainage structures rejected by the Engineer shall be removed and re-laid by the Contractor. Sections of pipe that are repaired, re-laid or replaced shall be accompanied with a corresponding post construction video inspection at the Contractor's expense. In all cases that a leak is found, re-inspection shall be required at the Contractor's expense, to confirm that the problem has been resolved.

603-2. BASIS OF PAYMENT

Payment shall be the unit price per linear foot for storm sewer pipe in place and accepted, measured along the centerline of the storm sewer pipe to the inside face of exterior walls of storm manholes or drainage structures and to the outside face of endwalls. Said unit price includes all work required to install the pipe (i.e. all materials, equipment, filter fabric wrap, gravel bedding if needed for stabilization, labor and incidentals, etc.).

604. STORM MANHOLES, INLETS, CATCH BASINS OR OTHER STORM STRUCTURES

For details on specific design of a type of storm structure refer to Index Numbers 201 to 231.

When required, inlets, catch basins or other structures shall be constructed according to the plans and applicable parts of the specifications, Articles 301, 302, 303 and 202, and as approved by the Engineer. Said structures shall be protected from damage by the elements or other causes until acceptance of the work.

604-1. BUILT UP TYPE STRUCTURES

Built up type manholes shall be constructed of brick with cast iron frames and covers as shown on Index Numbers 201. Invert channels shall be constructed smooth and semi circular in shape conforming to inside of adjacent sewer section. Changes in direction of flow shall be made in a smooth curve of as large a radius as possible. Changes in size and grade of channels shall be made gradually and evenly. Invert channels shall be built up with grout.

The storm structure floor outside of channels shall be made smooth and sloped toward channels.

Manhole steps shall not be provided. Joints shall be completely filled and the mortar shall be smoothed from inside of the manholes.

The entire exterior of brick manholes shall be plastered with a skim coat of one half inch (1/2") of mortar.

Brick shall be laid radially with every sixth course being a stretcher course.

In cases where a storm pipe extends inside a structure, the excess pipe will be cut off with a concrete saw and shall not be removed with a sledge hammer.

604-2. PRECAST TYPE

Precast manholes shall be constructed as shown on Index 202. The manhole base shall be set on a pad of dry native sand approximately five inches (5”) thick to secure proper seating and bearing.

Precast Manholes and Junction Boxes: The Contractor may substitute precast manholes and junction boxes in lieu of cast in place units unless otherwise shown on the plans. Precast Inlets will not be acceptable. When precast units are substituted, the construction of such units must be in accordance with ASTM C 478, or the standard specifications at the manufacturer’s option.

Precast structures must also meet the requirement that on the lateral faces, either inside or outside, the distance between precast openings for pipe or precast opening and top edge of precast structure be no less than wall thickness. A minimum of four courses of brick will be provided under manhole ring so that future adjustment of manhole lid can be accommodated. Manhole steps shall not be provided.

604-3. BASIS OF PAYMENT

Payment for Junction Boxes, Manholes or other structures shall be on a unit basis.

605. GABIONS AND MATTRESSES

605-1. MATERIAL

605-1.1. PVC COATED WIRE MESH GABIONS & MATTRESSES

605-1.1.1. GABION & MATTRESS BASKETS

Gabion and mattress baskets units shall conform to ASTM A975, be of non-raveling construction and fabricated from a double twist by twisting each pair of wires through three half turns developing the appearance of a triple twist. The galvanized wire core shall have a diameter of 0.106 inches.

605-1.1.2. PVC (POLYVINYL CHLORIDE) COATING

The coating shall be gray in color and shall have a nominal thickness of 0.0216 inches but not less than 0.015 inches in thickness. The protective PVC plastic shall be suitable to resist deleterious effects from exposure to light, immersion in salt or polluted water and shall not show any material difference in its initial compound properties. The PVC compound is also resistant to attack from acids and resistant to abrasion.

The PVC coating shall be extruded and adhere to the wire core prior to weaving. The PVC coated wire shall be woven into a double twisted hexagonal mesh having uniform openings of 3 1/4 inches by 4 1/2 inches. The overall diameter of the mesh wire (galvanized wire core plus PVC coating) shall be 0.146 inches. Selvedge and reinforcing wire shall be of heavily galvanized wire core, 0.134 inches in diameter, coated with PVC and having an overall diameter (galvanized wire core plus PVC coating) of 0.174 inches. Lacing and connecting wire shall be of soft tensile strength (75,000 PSI max), heavily galvanized wire core, 0.087 inches in diameter, coated with PVC and having an overall diameter (galvanized wire core plus PVC coating) of 0.127 inches. The use of alternate wire fasteners shall be permitted in lieu of tie wire providing the alternate fastener

produces a four (4) wire selvedge joint with a strength of 1200 lbs. per linear foot while remaining in a locked and closed condition. Properly formed interlocking fasteners shall be spaced from 4 to 6 inches and have a minimum 3/4 square inch inside area to properly confine the required selvedge wires.

605-1.1.3. GABION AND MATTRESS FILLER MATERIAL:

The filler stone shall be from a source approved by the Engineer before delivery is started. Representative preliminary samples of the stone shall be submitted by the contractor or supplier for examination and testing by the Engineer. The stone shall have a minimum specific gravity of 2.3 and be of a quality and durability sufficient to insure permanency in the structure. The individual stones shall be free of cracks, seams, and other defects that would tend to promote deterioration from natural causes, or which might reduce the stones to sizes that could not be retained in the gabion or mattress baskets.

All filler material shall be uniformly graded between 4 inch and 8 inch (equivalent spherical diameter) and shall be angular in form. Rounded stones shall not exceed 10% of the stone, by weight and 70% of the stone, by weight, shall exceed the largest dimension of the mesh opening. Crushed concrete shall not be used for filler material.

605-1.1.4. GEOTEXTILE FABRIC

Fabric shall conform to FDOT Standard Specifications, Section 985.

605-2. PERFORMANCE

Gabions and Reno Mattresses shall be installed according to the manufacturer's recommendations and as shown on the Drawings. Fabrication of gabion baskets shall be in such a manner that the sides, ends, lid and diaphragms can be assembled at the construction site into rectangular baskets of the sizes specified and shown on the Drawings. Gabions and mattresses shall be of single unit construction; the base, lid ends and sides shall be either woven into a single unit or one edge of these members connected to the base section of the gabion in such a manner that the strength and flexibility at the connecting point is at least equal to that of the mesh. Where the length of the gabion and mattress exceeds one and one-half its horizontal width, they shall be equally divided by diaphragms of the same mesh and gauge as the mattresses shall be furnished with the necessary diaphragms secured in proper position on the base so that no additional tying is required at this juncture. The wire mesh is to be fabricated so that it will not ravel. This is defined as the ability to resist pulling apart at any of the twists or connections forming the mesh when a single wire strand in a section of mesh is cut.

Each gabion or mattress shall be assembled by tying all untied edges with binding wire. The binding wire shall be tightly looped around every other mesh opening along seams so that single and double loops are alternated.

A line of empty gabions shall be placed into position according to the contract drawings and binding wire shall be used to securely tie each unit to the adjoining one along the vertical reinforced edges and the top selvedges. The base of the empty gabions placed on top of a filled line of gabions shall be tightly wire to the latter at front and back.

To achieve better alignment and finish in retaining walls, gabion stretching is recommended.

Connecting wires shall be inserted during the filling operation in the following manner: Gabions shall be filled to one third full and one connecting wire in each direction shall be tightly tied to opposite faces of each cell at one third height. The gabion shall then be filled to two thirds full and one connecting wire in each direction shall be tightly tied to opposite face of each cell at one two third height. The cell shall then be filled to the top.

Filler stone shall not be dropped more than twelve inches (12") into the gabions and mattresses.

Geotextile fabric shall be installed at locations shown in the Drawings. The surface to receive the cloth shall be prepared to a relatively smooth condition free of obstructions which may tear or cut the cloth. The panel shall be overlapped a minimum of 30 inches and secured against movement. Cloth damaged or displaced during installation, gabion work, or backfill shall be replaced or repaired to the satisfaction of the Engineer at the contractor's expense. The work shall be scheduled so that the fabric is not exposed to ultraviolet light more than the manufacturer's recommendations or five days, whichever is less.

In wet conditions, a base shall be established by spreading and compacting #57 stone prior to placement of geotextile fabric and gabions or mattresses.

700 SERIES: STREETS AND SIDEWALKS

701. RESTORATION OR REPLACEMENT OF DRIVEWAYS, CURBS, SIDEWALKS AND STREET PAVEMENT

Driveways, sidewalks, and curbs destroyed or damaged during construction shall be replaced and shall be the same type of material as destroyed or damaged, or to existing City Standards, whichever provides the stronger repair. All street pavement destroyed or damaged shall be replaced with the same type of material, to existing City Standards, unless the existing base is unsuitable as determined by the Engineer, then the base shall be replaced with City approved material. All replaced base shall be a minimum eight inches (8") compacted thickness, or same thickness as base destroyed plus two inches (2"), if over six inches (6"), and compacted to 98% of maximum density per AASHTO T-180.

Unless called for in the proposal as separate bid items, cost of the above work including labor, materials and equipment required shall be included in the bid price per linear foot of main or square yard of base.

The bid price for street pavement, restoration or replacement when called for in the proposals, shall include all materials, labor and equipment required to complete the work, and shall be paid for on a square yard basis. When replacement is over a trench for utilities, the area of replacement shall be limited to twice the depth of the cut plus twice the inside diameter of the pipe. All necessary restoration exceeding this footprint will be at the Contractor's expense.

The bid price for restoration or placement of driveways, curbs and sidewalks, when called for in the proposals, shall include all materials, labor and equipment required to complete the work and shall be paid for on the basis of the following units: Driveways, plant mix - per square yard: concrete - per square foot; curbs - per linear foot; sidewalk four inches (4") or six inches (6") thick - per square foot. Concrete walks at drives shall be a minimum of six inches (6") thick and be reinforced with 6/6 X 10/10 welded wire mesh (also see Articles 303 and 707). The Contractor shall notify the Project Inspector a minimum of twenty-four (24) hours in advance of all driveway, curb, sidewalk and street restoration and replacement work.

702. ROADWAY BASE AND SUBGRADE

702-1. BASE

This specification describes the construction of roadway base and subgrade. The Contractor shall refer to Section IV, Article 101 "Scope of Work" of the City's Contract Specifications for additional roadway base and subgrade items.

Roadway base shall be eight inches (8") compacted minimum thickness unless otherwise noted on the plans or directed by the Engineer. The subgrade shall be twelve inches (12") compacted minimum thickness with a minimum Limerock Bearing Ratio (LBR) of 40 unless otherwise noted on the plans or directed by the Engineer. The Contractor shall obtain from an independent testing laboratory a Proctor and an LBR for each type material. The Contractor shall also have an independent testing laboratory perform all required density testing. Where unsuitable material is

found within the limits of the base, Section IV, Article 204 (Unsuitable Material Removal) of the City's Technical Specifications will apply.

Once the roadway base is completed, it shall be primed that same day (unless otherwise directed by the Engineer) per Section 300 of FDOT's Standard Specifications. Repairs required to the base that result from a failure to place the prime in a timely manner shall be done to the City's satisfaction, and at the Contractor's expense. No paving of the exposed base can commence until the City approves the repaired base. The cost for placement of prime material shall be included in the bid item for base.

The Contractor shall notify the Project Inspector a minimum of twenty-four (24) hours in advance of all base and subgrade placement or reworking.

The following base materials are acceptable:

1. **Shell Base:** Shell base shall be constructed in accordance with Sections 200 and 913 of FDOT's Standard Specifications and shall have a minimum compacted thickness as shown on the plans. The shell shall be FDOT approved. The cost of the prime coat shall be included in the bid item price for base.
2. **Limerock Base:** Limerock base shall be constructed in accordance with Sections 200 and 911 of FDOT's Standard Specifications and shall have a minimum compacted thickness as shown on the plans. The limerock shall be from a FDOT approved certified pit. The cost of the prime coat shall be included in the bid item price for base.
3. **Crushed Concrete Base:** Crushed concrete base shall be constructed in accordance with Sections 204 and 901 of FDOT's Standard Specifications and shall have a minimum compacted thickness as shown on the plans. The crushed concrete material shall be FDOT approved. The Contractor shall provide certified laboratory tests on gradation to confirm that the crushed concrete base material conforms to the above specifications. The LBR shall be a minimum of 100. LBR and gradation tests shall be provided to the City by the Contractor once a week for continuous operations, or every 1000 tons of material, unless requested more frequently by the City Engineer or designee. The cost of the prime coat shall be included in the bid item price for base.
4. **Superpave Asphalt Base:** Full depth asphalt base shall be constructed in accordance with Section 234 of FDOT's Standard Specifications and shall have a minimum compacted thickness as shown on the plans. The cost for preparation, placement, and compaction shall be included in the per ton unit cost for asphalt unless otherwise noted in the project scope and plans. The cost of the tack coat shall be included in the bid item price for asphalt or base.
5. **Reclaimed Asphalt Pavement Base:** Reclaimed asphalt pavement base shall be constructed in accordance with Section 283 of FDOT's Standard Specifications and shall have a minimum compacted thickness as shown on the plans. As per FDOT Section 283, RAP material shall be used as a base course only on non-limited access paved shoulders, shared use paths, or other non-traffic bearing applications. The cost for preparation, placement, and compaction shall be included in the per ton unit cost for asphalt unless otherwise noted in the project scope and plans. The cost of the tack coat shall be included in the bid item price for asphalt or base.

702-1.1. BASIS OF MEASUREMENT FOR BASE AND REWORKED BASE

The basis of measurement shall be the number of square yards of base in place and accepted as called for on the plans. The maximum allowable deficiency shall be a half-inch (1/2"). Areas deficient in thickness shall either be fixed by the Contractor to within acceptable tolerance, or if so approved in writing by the City Engineer, may be left in place. No payment, however, will be made for such deficient areas that are left in place.

702-1.2. BASIS OF PAYMENT FOR BASE AND REWORKED BASE

The unit price for base shall include: all materials, roadbed preparation, placement, spreading, compaction, finishing, prime, base, subgrade (unless the plans specify a separate pay item), stabilization, mixing, testing, equipment, tools, hauling, labor, and all incidentals necessary to complete the work. Payment for asphalt base shall be included in the per ton unit cost for asphalt unless otherwise noted in the project scope and plans.

702-2. SUBGRADE

All subgrade shall be stabilized and constructed in accordance with Sections 160 and 914 of FDOT's Standard Specifications unless otherwise noted herein. All subgrade shall have a minimum compacted thickness of 12" unless otherwise shown on the plans or directed by the Engineer. If limerock is used, it shall also meet the requirements of Section 911 of FDOT's Standard Specifications. Where unsuitable material is found within the limits of the subgrade, Section IV, Article 204 (Unsuitable Material Removal) of the City's Contract Specifications will apply. The extent of said removal shall be determined by the Engineer in accordance with accepted construction practices. The Contractor is responsible for clearing, grading, filling, and removing any trees or vegetation in the roadbed below the subgrade to prepare it per the plans. The cost of this work shall be included in the unit price for base or subgrade. The Contractor shall obtain from an independent testing laboratory the bearing value of the subgrade after the materials are mixed for the stabilized subgrade.

702-2.1. BASIS OF MEASUREMENT

The basis of measurement shall be the number of square yards of stabilized subgrade in place and accepted as called for on the plans. The maximum allowable deficiency for mixing depth shall be per Section 161-6.4 of FDOT's Standard Specifications. Acceptable bearing values shall be per Section 160-7.2 of FDOT's Standard Specifications. Areas deficient in thickness or bearing values shall either be corrected by the Contractor to within acceptable tolerance, or if so approved in writing by the City Engineer, may be left in place. No payment, however, will be made for such deficient areas that are left in place.

702-2.2. BASIS OF PAYMENT

The unit price for subgrade shall include roadbed preparation, placement, spreading, compaction, finishing, testing, stabilizing, mixing, materials, hauling, labor, equipment and all incidentals necessary to complete the work. If no pay item is given, subgrade shall be included in the bid item for base.

703. ASPHALTIC CONCRETE MATERIALS

This specification is for the preparation and application of all asphaltic concrete materials on roadway surfaces unless otherwise noted.

703-1. ASPHALTIC CONCRETE

703-1.1. AGGREGATE

All aggregates shall be obtained from an approved FDOT source and shall conform to Sections 901 through 915 of FDOT's Standard Specifications.

703-1.2. BITUMINOUS MATERIALS

All bituminous materials shall conform to Section 916 of FDOT's Standard Specifications.

703-2. HOT BITUMINOUS MIXTURES – PLANT, METHODS, EQUIPMENT & QUALITY ASSURANCE

The plant and methods of operation used to prepare all asphaltic concrete and bituminous materials shall conform to the requirements of Section 320 of FDOT's Standard Specifications. Unless otherwise noted, all acceptance procedures and quality control/assurance procedures shall conform to the requirements of Section 330 of FDOT's Standard Specifications.

The City shall have the right to have an independent testing laboratory select, test, and analyze, at the expense of the City, test specimens of any or all materials to be used. The results of such tests and analyses shall be considered, along with the tests or analyses made by the Contractor, to determine compliance with the applicable specifications for the materials so tested or analyzed. The Contractor hereby understands and accepts that wherever any portion of the work is discovered, as a result of such independent testing or investigation by the City, which fails to meet the requirements of the Contract documents, all costs of such independent inspection and investigation as well as all costs of removal, correction, reconstruction, or repair of any such work shall be borne solely by the Contractor.

Payment reductions for asphalt related items shall be determined by the following:

1. Density per FDOT's Standard Specifications.
2. Final surface or friction course tolerances per FDOT's Standard Specifications.
3. Thickness will be determined from core borings. Deficiencies of 1/4" or greater shall be corrected by the Contractor, without compensation, by either replacing the full thickness for a length extending at least twenty-five feet (25') from each end of the deficient area, or when the Engineer allows for an overlay per FDOT's Standard Specifications. In addition, for excesses of one-quarter inch (1/4") or greater, the Engineer will determine if the excess area shall be removed and replaced at no compensation, or if the pavement in question can remain with payment to be made based on the thickness specified in the contract.

The Contractor shall notify the Project Inspector a minimum of twenty-four (24) hours in advance of the placement of all asphalt.

703-3. ASPHALT MIX DESIGNS AND TYPES

All asphalt mix designs, acceptance procedures and quality control/assurance procedures shall conform to the requirements of Sections 330 and 334 of FDOT Standard Specifications. All asphalt mix designs shall be approved by the Engineer prior to the commencement of the paving operation. Reclaimed asphalt pavement (RAP) material may be substituted for aggregate in the asphaltic concrete mixes up to 25% by weight.

703-4. ASPHALT PAVEMENT DESIGNS AND LAYER THICKNESS

All asphalt pavement designs shall conform to the following requirements:

Type SP/Spec 334-1

Type FC/Spec 337-8

Type B/Spec 234-8

ATPB/287-8

703-5. GENERAL CONSTRUCTION REQUIREMENTS

The general construction requirements for all hot bituminous pavements (including limitations of operations, preparation of mixture, preparation of surface, placement and compaction of mixture, surface requirements, correction of unacceptable pavement, Quality Control Testing, etc.) shall be in accordance with Section 330 of FDOT's Standard Specifications.

703-6. CRACKS AND POTHOLE PREPARATION

703-6.1. CRACKS

Cracks in roadway pavement shall be repaired prior to the application of asphaltic concrete by the following steps:

1. All debris to be removed from cracks by compressed air or other suitable method.
2. Apply a multiple layered application of bituminous binder and fine aggregate, as appropriate to the depth of the crack until the void of the crack is completely filled to the level of the surrounding roadway surface.
3. If application of asphaltic concrete is not to begin immediately after crack repair, cracks are to be sanded to prevent vehicular tracking.
4. Payment for crack filling shall be included in the unit price for asphaltic concrete.

703-6.2. POTHoles

Potholes shall be repaired prior to the application of asphaltic concrete by the following steps:

1. All debris is to be removed from potholes by hand, sweeping, or other suitable method.
2. A tack coat is to be applied to the interior surface of the pothole.
3. The pothole is to be completely filled with asphaltic concrete, and thoroughly compacted.

4. Payment for pothole preparation shall be included in the unit price for asphaltic concrete.

703-7. ADJUSTMENT OF MANHOLES

The necessary adjustments of sanitary sewer and storm drain manholes and appurtenances shall be accomplished by the Contractor. The Contractor shall be paid on a per unit basis for each item.

The use of manhole adjustment risers is acceptable under the following conditions:

The riser shall meet or exceed all FDOT material, weld, and construction requirements. The riser shall consist of an A-36 hot rolled steel meeting or exceeding the minimum requirements of A.S.T.M. A-36. The riser shall be a single piece with a stainless steel adjustment stud and shall have a rust resistant finish. The use of cast iron, plastic, or fiberglass risers is not permitted. In addition, the installation of each riser shall be per manufacturer's specifications. Each manhole shall be individually measured, and each riser shall be physically marked to ensure that the proper riser is used. Also, the ring section shall be cleaned, and a bead of chemically resistant epoxy applied to the original casting, prior to installation of the riser. It is the Contractor's responsibility to ensure that the manholes are measured, the risers are physically marked, the ring sections are thoroughly cleaned, and that the epoxy is properly applied prior to installation of each riser.

If risers are not used, the adjustment of manholes shall be accomplished by the removal of pavement around manhole, grade adjustment of ring and cover, and acceptable replacement and compaction of roadway materials prior to paving. A full depth backfill using asphalt is acceptable. The use of Portland cement for backfill is not acceptable.

All manhole and valve adjustments shall be accomplished prior to the application of final asphaltic concrete surface. Unless otherwise noted in the specs or on the plans, the paving operation shall occur within seven (7) calendar days from the completion of the adjustment. On arterial roadways, the manholes are to be ramped with asphalt during the time period between initial adjustment and final resurfacing. Water and gas valves, sewer cleanouts, valve boxes, tree aeration vents, etc., will be adjusted by the Contractor with the cost for this work to be included in the unit cost of the asphalt. Care must be taken around said appurtenances to ensure that they are not paved over. It is the Contractor's responsibility to inform the owners of all utilities of impending work and coordinate their adjustments, so they are completed prior to the scheduled paving.

703-8. ADDITIONAL ASPHALT REQUIREMENTS

1. All impacted radius returns within project limits shall be paved unless otherwise directed by the Construction Inspector or Engineer, with payment to be included in the per ton bid item for asphalt.
2. All pavement markings impacted by placement of asphalt shall be replaced prior to the road being open to traffic unless otherwise noted in the contract scope and plans.
3. All project related debris shall be hauled off the job site by the Contractor in a timely manner and at their own expense in conformance with all regulatory requirements.
4. The Contractor shall pay particular attention to sweeping when paving. Prior to paving, all construction areas shall be swept with a Municipal type sweeper (either vacuum or mechanical type) that picks up and hauls off, dust and dirt. The sweeper must be equipped

with its own water supply for pre-wetting to minimize dust. Moreover, the Contractor shall sweep debris off of sidewalks, driveways, curbs and roadways each day before leaving the job site.

5. The application of tack and prime coats (either required or placed at the Engineer's discretion) shall be placed per Section 300 of FDOT's Standard Specifications. Tack shall also be applied to the face of all curbs and driveways. The cost (including heating, hauling and applying) shall be included in the per ton bid item for asphalt, unless otherwise noted in the project scope and plans.
6. Leveling course and spot patching shall be applied to sections of the road as noted on the plans, or as directed by the Engineer, per Section 330 of FDOT's Standard Specifications. The cost shall be included in the per ton unit cost for asphalt, unless otherwise noted in the project scope and plans.
7. If an asphalt rubber binder is required, it shall conform to the requirements of Section 336 of FDOT's Standard Specifications.
8. On all streets with curb and gutter, the final compacted asphalt shall be one-quarter inch (¼") above the lip or face of said curb per City Index 101.

703-9. BASIS OF MEASUREMENT

Basis of measurement will be the number of tons of asphaltic concrete completed, in place and accepted. Truck scale weights will be required for all asphaltic concrete used.

703-10. BASIS OF PAYMENT

Payment shall be made at the contract unit price for asphaltic concrete surface as specified and measured above. This price shall include all materials, preparation, hauling, placement, tack and/or prime coat either required or placed at Engineer's discretion, leveling, spot patching, filling of cracks, pothole repair, sweeping, debris removal, labor, equipment, tools, and incidentals necessary to complete the asphalt work in accordance with the plans and specifications.

704. ADJUSTMENT TO THE UNIT BID PRICE FOR ASPHALT

When this Article applies to the contract, the unit bid price for asphalt will be adjusted in accordance with the following provisions:

1. Price adjustment for asphalt shall only be made when the current FDOT Asphalt Price Index varies more than ten percent (10%) from the bid price at the time of the bid opening.
2. The Bituminous Material Payment Adjustment Index published monthly by the FDOT shall be used for the adjustment of unit prices. This report is available on FDOT's internet site. The address is: <http://www.dot.state.fl.us/construction/fuel&bit/fuel&bit.shtm>. For additional information, call FDOT at (850) 414-4252.
3. The FDOT Payment Adjustment Index in effect at the time of the bid opening will be used for the initial determination of the asphalt price.
4. The FDOT Payment Adjustment Index in effect at the time of placement of the asphalt will be used for payment calculation.

5. The monthly billing period for contract payment will be the same as the monthly period for the FDOT Payment Adjustment Index.
6. No adjustment in bid prices will be made for either tack coat or prime coat.
7. No price adjustment reflecting any further increases in the cost of asphalt will be made for any month after the expiration of the allowable contract time.
8. The City reserves the right to make adjustments for decreases in the cost of asphalt.

705. ASPHALT DRIVEWAYS

New driveways or existing asphalt driveways that must be altered for project construction shall be constructed or replaced in accordance with the specifications for paving the street with the exception that the base shall be six inches (6"). Remove only enough to allow adequate grade for access to the street. Use Article 703 Asphaltic Concrete, of these Technical Specifications, as specified for the street paving.

When the finished surface of the existing drive is gravel, replacement shall be of like material. Payment shall be the same as Asphalt Driveways.

705-1. BASIS OF MEASUREMENT

Measurement shall be the number of square yard of Asphalt Driveways in place and accepted.

705-2. BASIS OF PAYMENT

Payment shall be the unit price per square yard for Asphalt Driveways as measured above, which price shall be full compensation for all work described in this section of the specifications and shall include all materials, equipment, tools, labor and incidentals necessary to complete the work.

706. CONCRETE CURBS

Concrete Curbs shall be constructed to the line, grade and dimensions as shown on the plans. Unless otherwise noted, all concrete curbs shall have fiber mesh reinforcement and have a minimum strength of 3000 psi at 28 days. Expansion joints shall be placed at intervals not to exceed 100 feet, and scored joints shall be placed at intervals not to exceed ten feet (10'). In addition, all the requirements of City Articles 301, 302 and 303 shall also apply. The Contractor shall notify the Project Inspector a minimum of twenty-four (24) hours in advance of the placement of all concrete curbs.

706-1. BASIS OF MEASUREMENT

The basis of measurement shall be linear feet of curb in place and accepted.

706-2. BASIS OF PAYMENT

Payment shall be the unit price per linear foot of curb, which price shall be full compensation for all work described in this and other applicable parts of the specifications and shall include all materials, equipment, tools, labor and incidentals necessary to complete the work.

707. CONCRETE SIDEWALKS AND DRIVEWAYS

707-1. CONCRETE SIDEWALKS

Concrete sidewalks shall be constructed to the line, grade and dimensions as shown on the plans or herein specified. Unless otherwise noted, all concrete sidewalks shall have fiber mesh reinforcement and have a minimum strength of 3000 psi at 28 days. Unless otherwise specified, all concrete sidewalks shall have a minimum width of four feet (4'). Concrete sidewalks shall have a minimum thickness of four inches (4"), except at driveway crossings where a minimum thickness of six inches (6") is required. Also, 6/6 X 10/10 welded wire mesh reinforcement is required for all sidewalk that crosses driveways. The welded wire mesh shall be positioned in the middle to upper third of the placement. No compensation shall be given if the welded wire mesh is not properly placed. Expansion joints shall be placed at intervals of not more than 100 hundred feet, and scoring marks shall be made every five feet (5'). Concrete shall be poured only on compacted subgrade. In addition, all the requirements of Articles 301, 302 and 303 of these Technical Specifications shall also apply.

707-2. CONCRETE DRIVEWAYS

Concrete driveways, whether new construction or replacement, shall be a minimum of six inches (6') in thickness with 6/6 x 10/10 welded wire mesh reinforcement and a minimum horizontal distance between expansion joints of no less than four feet (4') measured in any direction. The welded wire mesh shall be positioned in the middle to upper third of the placement. No compensation shall be given if the welded wire mesh is not properly placed. Concrete shall be poured only on compacted subgrade. In addition, all the requirements of Articles 301, 302 and 303 of these Technical Specifications shall also apply.

The Contractor shall notify the Project Inspector a minimum of twenty-four (24) hours in advance of the placement of all concrete sidewalks and driveways.

707-3. CONCRETE CURB RAMPS

The contractor is responsible for constructing ADA compliant concrete curb ramps per the plans and installing detectable warning surfaces on said ramps as called for in the plan set. Concrete curb ramps and detectable warning surfaces are to be constructed per FDOT Standards and Specifications.

707-4. BASIS OF MEASUREMENT

The basis of measurement shall be the number of square feet of four inch (4") concrete sidewalk, six inch (6") concrete sidewalk, and six inch (6") concrete driveways in place and accepted.

707-5. BASIS OF PAYMENT

Payment shall be the unit price per square foot for each item as measured above, which shall be full compensation for all work described in this section and other applicable parts of the specifications and shall include all materials, equipment, tools, welded wire mesh where required, labor and incidentals necessary to complete the work.

708. MILLING OPERATIONS

708-1. EQUIPMENT, CONSTRUCTION & MILLED SURFACE

Unless otherwise noted in the specs, plans or this Article, the milling operation shall be performed in accordance with Section 327 of FDOT's Standard Specifications. The Contractor shall notify the City of Clearwater Project Representative a minimum of twenty-four (24) hours in advance of all milling.

708-2. ADDITIONAL MILLING REQUIREMENTS

1. If the milling machine is equipped with preheating devices, the Contractor is responsible to secure any necessary permits, and for complying with all local, state and federal environmental regulations governing operation of this type of equipment.
2. All milled surfaces must be repaved within seven (7) days from the time it was milled, unless otherwise noted in the contract documents.
3. Prior to paving, all milled areas shall be swept with a Municipal type sweeper either of the vacuum or the mechanical type that picks up and hauls off, dust and dirt. The sweeper must be equipped with its own water supply for pre-wetting to minimize dust. Moreover, the Contractor shall sweep debris off of sidewalks, driveways and curbs in addition to the roadways before leaving the job site.
4. In cases where concrete valley swales are present, the adjoining pavement shall be milled to allow for the new asphalt grade to be flush with the concrete surface.
5. The Contractor shall be responsible for removing any asphalt that remains in the curb line and/or median curbs after the milling operation of a street is complete. The cost of this removal shall be included in the bid item for milling.
6. All radius returns on streets to be milled shall also be milled unless otherwise directed by the Engineer, with payment to be included in the bid item for milling.
7. Any leveling or base replacement required after milling shall be applied to sections of the road as noted on the plans, or directed by the Engineer, per Section 330 of FDOT's Standard Specifications. The cost shall be included in the per ton unit cost for asphalt, unless otherwise noted in the project scope and plans.
8. Any roadway base material exposed as a result of the milling operation shall be primed that same day (unless otherwise directed by the Engineer) per Section 300 of FDOT's Standard Specifications. Repairs required to said base that result from a failure to place the prime in a timely manner shall be done to the City's satisfaction, and at the Contractor's expense. No paving of the exposed base can commence until the City approves the repaired base. The cost of said prime shall be included in the bid item for milling.
9. Prior to the placement of asphalt, the face of all curbs and driveways shall be tacked after the milling operation is complete.

708-3. SALVAGEABLE MATERIALS

Unless otherwise specified, all salvageable materials resulting from milling operations shall remain the property of the City. The transporting and stockpiling of salvageable materials shall be performed by the Contractor. The Contractor shall contact the City Project Representative to schedule delivery of material at least 48 hours prior to starting work.

708-4. DISPOSABLE MATERIALS

All surplus materials not claimed by the City shall become the responsibility of the Contractor. The Contractor shall dispose of the material in a timely manner and in accordance with all regulatory requirements in areas provided by the Contractor at no additional expense to the City.

708-5. ADJUSTMENT AND LOCATION OF UNDERGROUND UTILITIES

All private utilities and related structures requiring adjustment shall be located and adjusted by their owners at the owner's expense. City-owned utilities and structures shall be located by the Owner/City and adjusted by the contractor. The Contractor shall arrange their schedule to allow utility owners the time required for such adjustments (minimum 48 hours' notice per State Statute). All utility adjustments shall be completed prior to the commencement of milling and resurfacing operations.

708-6. ADJUSTMENT OF UTILITY MANHOLES

The necessary adjustments of sanitary sewer and stormwater utility manholes and appurtenances shall be accomplished by the Contractor in accordance with Section IV, Article 703-7 of the City's Technical Specifications.

708-7. TYPES OF MILLING

There are two types of milling used by the City:

- A. Wedge – This will consist of milling a six foot (6') wide strip along the curb line of the pavement adjacent to the curb so the new asphalt will align with the original curb height and pavement cross section.
- B. Full Width – This will consist of milling the entire roadway (i.e. curb line/edge of pavement to curb line/edge of pavement). All existing horizontal and vertical geometry shall remain unless otherwise indicated or approved by the Engineer.

708-8. MILLING OF INTERSECTIONS

Intersections, as well as other areas (including radius returns) are to be milled and repaved to restore and/or improve the original drainage characteristics. Said work should extend approximately fifty (50) to one hundred (100) feet in both directions from the low point of the existing swale.

708-9. BASIS OF MEASUREMENT

The quantity to be paid for will be the area milled, in square yards, completed and accepted.

708-10. BASIS OF PAYMENT

The unit price for milling shall include: all materials, preparation, hauling, transporting and stockpiling of salvageable materials, disposal of all surplus material, any required milling of radius returns and intersections, prime and/or tack coat either required or placed at Engineer's discretion, removal of asphalt from curbs, sweeping, labor, equipment, and all incidentals necessary to complete the milling in accordance with the plans and specifications.

800 SERIES: TRAFFIC SIGNALS, SIGNS AND MARKINGS

801. TRAFFIC SIGNAL EQUIPMENT AND MATERIALS

All traffic signal work shall be performed per FDOT's Standard Specifications (Sections 603 through 699), unless otherwise specified in the contract documents and plans.

This specification includes, but is not limited to, the following items: all necessary equipment, materials, guarantees, acceptance procedures, signal timings, field tests, grounding, conduit, signal and interconnect cable, span wire assemblies, pull and junction boxes, electrical power service assemblies, poles, signal assemblies, pedestrian assemblies, inductive loop detectors, pedestrian detectors, traffic controller assemblies, controller cabinets and accessories, removal of existing traffic signal equipment, and internally illuminated signs.

All traffic signal installations shall be mast arms and conform to the requirements of FDOT's Mast Arm Assembly standard and shall be signed and sealed by a professional engineer registered in the State of Florida. All mast arm calculations, as well as the geotechnical report, shall also be signed and sealed by a professional engineer registered in the State of Florida. All mast arm colors shall be determined and approved by the City prior to ordering from the manufacturer.

All traffic signal indicators for vehicles and pedestrians shall be LEDs and, approved by both the City and FDOT. In addition to this, all pedestrian signal indicators shall utilize countdown features.

Contractor changes to the operation of an existing signal is prohibited unless directed by the City's Traffic Engineering Division.

All damaged inductive loop detectors shall be restored by the contractor per FDOT Index 17781.

801-1. BASIS OF MEASUREMENT AND PAYMENT

The basis of measurement and payment shall be specified in the contract documents and/or plans and shall include all equipment, preparation, materials, testing and incidentals required to complete the work per the plans.

802. SIGNING AND MARKING

All signing and marking work shall be performed per FDOT's Standard Specifications, unless otherwise specified in the contract documents and plans.

This specification includes the following work: RPM's (Section 706), painted traffic stripes and markings (Section 710), thermoplastic stripes and markings (Section 711) and tubular delineators/flex posts (Sections 705 and 972).

The Contractor is responsible to ensure that striping is correctly placed. Errors in striping or markings shall be "blacked-out" with paint, unless otherwise directed by the Engineer. No payment will be made for these incorrect or "blacked-out" areas. Omissions in striping or markings shall be corrected to the City's satisfaction prior to any payment being made.

The Contractor is responsible for restoring all striping in paint and reflective beading per the FDOT indices mentioned above. The City's Traffic Engineering department shall follow up with thermoplastic striping at a later date unless otherwise specified.

802-1. BASIS OF MEASUREMENT AND PAYMENT

The basis of measurement and payment shall be specified in the contract documents and/or plans and shall include all equipment, preparation, materials and incidentals required to complete the work per the plans.

803. ROADWAY LIGHTING

All roadway lighting shall be constructed per Sections 715 and 992 of FDOT's Standard Specifications, unless otherwise specified in the contract documents and plans.

803-1. BASIS OF MEASUREMENT AND PAYMENT

The basis of measurement and payment shall be specified in the contract documents and/or plans and shall include all equipment, materials, testing and incidentals required to complete the work per the plans.

900 SERIES: LANDSCAPING/RESTORATION

901. WORK IN EASEMENTS OR PARKWAYS

Restoration is an important phase of construction, particularly to residents affected by the construction progress.

The Contractor will be expected to complete restoration activities within a reasonable time following primary construction activity. Failure by the Contractor to accomplish restoration within a reasonable time shall be justification for a temporary stop on primary construction activity or a delay in approval of partial payment requests.

Reasonable care shall be taken for existing shrubbery. Contractor shall replace all shrubbery removed or disturbed during construction. No separate payment shall be made for this work.

The Contractor shall make provision and be responsible for the supply of all water, if needed, on any and all phases of the contract work. The Contractor shall not obtain water from local residents or businesses except as the Contractor shall obtain written permission.

Reuse water is available for the Contractor's use without charge from the City's Water Reclamation Facilities, provided the water is used on City of Clearwater contractual work. Details for Contractor to obtain and reuse water from the Water Reclamation Facilities will be coordinated at the pre-construction conference. The Contractor's use of reuse water must conform to all regulatory requirements.

902. GENERAL PLANTING SPECIFICATIONS

902-1. IRRIGATION

902-1.1. DESCRIPTION

- A. The work specified in this Section consists of the installation of an automatic underground irrigation system as shown or noted in the plans. Provide all labor, materials, equipment, services and facilities required to perform all work in connection with the underground sprinkler irrigation system, complete, as indicated on the drawings and/or specified. Work noted as “NIC”, “existing”, or “by others” is not included in this pay item.
- B. The irrigation plans are schematic in nature. Valves and pipes shall be located in the turf/landscape areas except at road/paving crossings. All piping under paving shall be sleeved. Changes in the irrigation system layout shall be modified with the approval of the Engineer.

902-1.1.1. QUALITY ASSURANCE

- A. The irrigation work shall be installed by qualified personnel or a qualified irrigation subcontracting company that has experience in irrigation systems of similar size, scope, mainline, system pressure, controls, etc.
- B. All applicable ANSI, ASTM, FED.SPEC. Standards and Specifications, and all applicable building codes and other public agencies having jurisdiction upon the work shall apply.

- C. Workmanship: All work shall be installed in a neat, orderly and responsible manner with the recognized standards of workmanship. The Engineer reserves the right to reject material or work which does not conform to the contract documents. Rejected work shall be removed or corrected at the earliest possible time at the Contractor's expense.
- D. Operation and Maintenance Manuals: The Contractor shall prepare and deliver to the Engineer within ten (10) calendar days prior to completion of construction a minimum of three (3) hard cover binders, with three rings, containing the following information:
 - 1. Index sheet stating the Contractor's address and business telephone number, twenty-four (24) hour emergency phone number, person to contact, list of equipment with name(s) and address(es) of local manufacturer's representative(s) and local supplier where replacement equipment can be purchased.
 - 2. Catalog and part sheet on every material and equipment installed under this contract.
 - 3. Complete operating and maintenance instructions on all major equipment.
 - 4. Provide the Engineer and the City of Clearwater maintenance staff with written and "hands on" instructions for major equipment and show evidence in writing to the Engineer at the conclusion of the project that this service has been rendered.
 - a. Four-hour instruction (minimum) for the Drip Emitter equipment operation and maintenance.
 - b. Two-hour instruction (minimum) for automatic control valve operation and maintenance.

902-1.1.2. PROJECT CONDITIONS

- A. The Contractor shall coordinate the work with all other trades, all underground improvements, the location and planting of trees and all other planting. Verify planting requiring excavation of twenty-four inch (24") diameter and larger with the Engineer prior to installation of main lines.
- B. Provide temporary irrigation at all times to maintain plant materials.
- C. The Contractor is responsible to maintain the work area and equipment until final acceptance by the Engineer. Repairs and replacement of equipment broken, stolen, or missing as well as regular maintenance operations shall be the obligation of the Contractor.
- D. The Contractor shall submit a traffic control plan (per FDOT specifications) to the Engineer prior to initiating construction on the site. The Contractor shall be responsible for the maintenance of traffic signs, barriers, and any additional equipment to comply with the FDOT standards and to ensure the safety of its employees and the public.

902-1.1.3. WARRANTY

- A. The Manufacturer(s) shall warrant the irrigation system components to give satisfactory service for one (1) year period from the date of acceptance by the Engineer and the City of Clearwater. Should any problems develop within the warranty period due to inferior or faulty materials, they shall be corrected at no expense to the City of Clearwater.

902-1.2. PRODUCTS

902-1.2.1. GENERAL

- A. All materials throughout the system shall be new and in perfect condition. No deviations from the specifications shall be allowed except as noted.

902-1.2.2. PIPING

- A. The irrigation system pipe shall be as stated herein and shall be furnished, installed and tested in accordance with these specifications.
- B. All pipe is herein specified to be Polyvinyl Chloride (PVC) Pipe, 1120, Schedule 40, conforming to ASTM D2665 and D1785.
- C. All nipples, pipe connections, bushings, swing joints, connecting equipment to the mainline is required to be threaded Polyvinyl Chloride (PVC) Pipe, Schedule 80.

902-1.2.3. PIPE FITTINGS

- A. All pipe fittings for Schedule 40 PVC pipe shall be as follows: Fittings shall conform to the requirements of ASTM D2466, Standard Specification for Polyvinyl Chloride (PVC) Plastic Pipe Fittings, Schedule 80. All fittings shall bear the manufacturer's name or trademark, material designation, size, applicable IPS schedule and NSF seal of approval. The connection of mainline pipe to the automatic control valve shall be assembled with threaded Schedule 80 fittings and threaded Schedule 80 nipples.

902-1.2.4. PVC PIPE CEMENT AND PRIMER

- A. Provide solvent cement and primer for PVC solvent weld pipe and fittings as recommended by the manufacturer. Pipe joints for solvent weld pipe to be belled end.
- B. Purple primer shall be applied after the pipe and fittings has been cut and cleaned. The Primer shall be of contrasting color and be easily recognizable against PVC pipe.

902-1.2.5. THREADED CONNECTIONS

- A. Threaded PVC connections shall be made using Teflon tape or Teflon pipe sealant.

902-1.2.6. GATE VALVES

902-1.2.6.1. MANUAL GATE VALVES TWO INCHES (2") AND SMALLER

- A. Provide the following, unless otherwise noted on Drawings:
 - 1. 200-250 psi Ball Valve
 - 2. PVC body - with Teflon Ball Seals
 - 3. Threaded-Dual end Union Connectors
 - 4. Non-Shock Safe-T-Shear Stem
 - 5. Safe-T-Shear True Union Ball Valve as manufactured by Spears Manufacturing Company, Sylmer, California, or approved equal.

902-1.2.6.2. GATE VALVES TWO AND A HALF INCHES (2½") AND LARGER

- A. Provide the following, unless otherwise noted on Drawings:
 - 1. AWWA-C-509
 - 2. 200 lb. O.W.G.
 - 3. Cast Iron body - ASTM A 126 Class B
 - 4. Deep socket joints
 - 5. Rising stem
 - 6. Bolted bonnet
 - 7. Double disc
 - 8. Equipped with two inch (2") square operating key with tee handle
- B. Provide two (2) operating keys for gate valve three inches (3") and larger. The "street key" shall be five feet (5') long with a two inch (2") square operating nut.

902-1.2.7. SLEEVES

- A. Sleeves: (Existing by City of Clearwater)

902-1.2.8. REMOTE CONTROL VALVES

- A. The remote control valve shall be a solenoid actuated, balance-pressure across-the diaphragm type capable of having a flow rate of 25-30 gallons per minute (GPM) with a pressure loss not to exceed 6.1 pounds per square inch (PSI). The valve pressure rating shall not be less than 150 psi.
- B. The valve body and bonnet shall be constructed of high impact weather resistant plastic, stainless steel and other chemical/UV resistant materials. The valve's one-piece diaphragm shall be of durable santoprene material with a clog resistant metering orifice.
- C. The valve body shall have a one inch (1") (FNPT) inlet and outlet or a one inch (1") slip by slip inlet and outlet for solvent weld pipe connections.
- D. The valve construction shall be as such to provide for all internal parts to be removable from the top of the valve without disturbing the valve installation.
- E. The valve shall be as manufactured by Rain Bird Sprinkler Mfg. Corp., Glendora, California, or approved equal.
- F. Identify all control valves using metal I.D. tags numbered to match drawings.

902-1.2.9. VALVE BOXES

- A. For remote control drip valve assembly and UNIK control timer use a Brooks #36 concrete valve box with #36-T cast iron traffic bearing cover or approved equal.
- B. For flush valve assembly use an Ametek #181014 ten inch (10") circular valve box with #181015 cover comparable to Brooks, or approved equal.

- C. For air relief assembly use an Ametek #182001 (6") economy turf box with #182002 cover comparable to Brooks or approved equal.

902-1.2.10. DRIP IRRIGATION

902-1.2.10.1.CONSTRUCTION

- A. Techline shall consist of nominal sized one-half inch (1/2") low-density linear polyethylene tubing with internal pressure compensating, continuously self-cleaning, integral drippers at a specified spacing (12", 18", or 24" centers). The tubing shall be brown in color and conform to an outside diameter (O.D.) of 0.67 inches and an inside diameter (I.D.) of 0.57 inches. Individual pressure compensating drippers shall be welded to the inside wall of the tubing as an integral part of the tubing assembly. These drippers shall be constructed of plastic with a hard plastic diaphragm retainer and a self-flushing/cleaning elastomer diaphragm extending the full length of the dripper.

902-1.2.10.2. OPERATION

- A. The drippers shall have the ability to independently regulate discharge rates, with an inlet pressure of seven to seventy (7-70) pounds per square inch (PSI), at a constant flow and with a manufacturer's coefficient of variability (Cv) of 0.03. Recommended operating pressure shall be between 15-45 PSI. The dripper discharge rate shall be 0.4, 0.6, or 0.9 gallons per hour (GPH) utilizing a combination turbulent flow/reduced pressure compensation cell mechanism and a diaphragm to maintain uniform discharge rates. The drippers shall continuously clean themselves while in operation. The dripperline shall be available in 12", 18" and 24" spacing between drippers unless otherwise specified. Techline pipe depth shall be under mulch unless otherwise specified on Plans. Maximum system pressure shall be 45 PSC. Filtration shall be 120 mesh or finer. Bending radius shall be seven inch (7").
- B. For on-surface or under mulch installations, six inch (6") metal wire staples (TLS6) shall be installed three feet (3') to five feet (5') on center, and two staples installed at every change of direction.

902-1.2.10.3.LINE FLUSHING VALVES

- A. The sub-surface system shall utilize Automatic Line Flush Valves at the end of each independent zone area. This valve shall be capable of flushing one gallon at the beginning of each irrigation cycle. The valves shall match the dripline manufacturer and connect directly to the dripline.

902-1.2.10.4.AIR/VACUUM RELIEF VALVE

- A. Each independent irrigation zone shall utilize an Air/Vacuum Relief Valve at its high point(s). The air and vacuum relief valve shall seal effectively from 2 to 110 psi.

902-1.2.10.5.PRESSURE REGULATORS

- A. The pressure regulator shall be designed to handle steady inlet pressures over 150 pounds per square inch (psi) and maintain a constant outlet pressure of 25 psi. Regulating accuracy shall be within +/-6%. The pressure regulator shall be manufactured from high-impact

engineering grade thermoplastics. Regulation shall be accomplished by a fixed stainless steel compression spring which shall be enclosed in a chamber separate from the water passage.

902-1.2.10.6. FILTERS

- A. The filter shall be a multiple disc type filter with notation indicating the minimum partial size to travel through or the mesh size of the element being used. The discs shall be constructed of chemical resistant thermoplastic for corrosion resistance.

902-1.2.10.7. FITTINGS

- A. All connections shall be made with barb or compression type fitting connections. Fittings and dripline shall be as manufactured by the manufacturer of the dripline to ensure the integrity of the subsurface irrigation system.

902-1.2.11. AUTOMATIC CONTROL TIMER

- A. The irrigation controller (control module) shall be programmable by a separate transmitter device only. The program shall be communicated to the Control Module from the Field Transmitter via an infrared connection. The controller shall be of a module type which may be installed in a valve box underground. The controller shall function normally if submerged in water and the communication from the transmitter shall function if submerged in water.
- B. The control module shall be housed in an ABS plastic cabinet and shall be potted to insure waterproof operation. The control module shall have two mounting slots for screws allowing the module to be securely mounted inside a valve box.
- C. The controller shall operate on one nine volt (9V) alkaline battery for one full year regardless of the number of stations utilized. The controller shall operate 1, 2, or 4 stations either sequentially or independently.
- D. The controller shall have three (3) independent programs with eight (8) start times each, station run time capability from one (1) minute to twelve (12) hours in one (1) minute increments, and a seven (7) day calendar. The controller shall turn on stations via latching solenoids installed on the valves. Manual operations shall be initiated by attaching the Field Transmitter to the Control Module and programming a manual start. The controller shall be capable of manual single station or manual program operation.
- E. The controller shall be as manufactured by Rain Bird Sprinkler Mfg. Corp., Glendora, California USA.

902-1.2.12. FIELD TRANSMITTER

- A. The irrigation controller shall be programmable by a separate transmitter device (Field Transmitter) only. The Field Transmitter shall communicate to the Control Module via an infrared connection. The Field Transmitter shall be water resistant and housed in ABS plastic and have a removable, reversible protective sheath. The Field Transmitter shall operate on one nine volt (9V) alkaline battery.

- B. The Field Transmitter shall have a large LCD screen and a seven-key programming pad. A beep sound shall confirm every key stroke. The screen shall automatically turn off after one minute when not in use.
- C. The Field Transmitter shall be capable of programming an unlimited number of UNIK Control Modules.
- D. The Field Transmitter shall be as manufactured by Rain Bird Sprinkler Mfg. Corp., Glendora, California USA.

902-1.2.13. LATCHING SOLENOID

- A. The Latching Solenoid shall be supplied with an installed, filtered adapter allowing installation of the solenoid onto any Rain Bird DV, PGA, PEB, PES-B, GB, of EFB series valve.
- B. The Latching Solenoid shall be as manufactured by Rain Bird Sprinkler Mfg. Corp., Glendora, California USA.

902-1.3. EXECUTION

902-1.3.1. GENERAL INSTALLATION REQUIREMENTS

- A. Before work is commenced, hold a conference with the Engineer to discuss general details of the work.
- B. Verify dimensions and grades at job site before work is commenced.
- C. During the progress of the work, a competent superintendent and any assistants necessary shall be on site, all satisfactory to the Engineer. This superintendent shall not be changed, except with the consent of the Engineer. The superintendent shall represent the Contractor in Contractor's absence and all directions given to the superintendent shall be as binding as if given to the Contractor.
- D. Obtain and pay for all irrigation and plumbing permits and all inspections required by outside authorities.
- E. All work indicated or notes on the Drawings shall be provided whether or not specifically mentioned in these Technical Specifications.
- F. If there are ambiguities between the Drawings and Specifications, and specific interpretation or clarification is not issued prior to bidding, the interpretation or clarification will be made only by the Engineer, and the Contractor shall comply with the decisions. In the event the installation contradicts the directions given, the installation shall be corrected by the Contractor at no additional cost.
- G. Layout of sprinkler lines shown on the Drawing is diagrammatic only. Location of sprinkler equipment is contingent upon and subject to integration with all other underground utilities. Contractor shall employ all data contained in the contract Documents and shall verify this information at the construction site to confirm the manner by which it relates to the installation.

- H. Do not proceed with the installation of the sprinkler system when it is apparent that obstructions or grade differences exist or if conflicts in construction details, legend, or specific notes are discovered. All such obstructions, conflicts, or discrepancies shall be brought to the attention of the Engineer.
- I. The disturbance of existing paving will not be permitted. Install all required sleeving prior to roadway base.

902-1.3.2. EXCAVATING AND BACKFILLING

902-1.3.2.1. TRENCHING - GENERAL

- A. Dig sides of trenches straight. Provide continuous support for pipe on bottom of trenches. Lay pipe to uniform grade. Trenching excavation shall follow layout indicated on Drawings.
- B. Maintain six inch (6") horizontal and minimum clearance between sprinkler lines and between all lines of other trades.
- C. Do not install sprinkler lines directly above another line of any kind.
- D. Maintain six inch (6") vertical minimum between sprinkler lines which cross at angles of 45 degrees to 90 degrees.
- E. Exercise care when excavating, trenching and working near existing utilities.

902-1.3.2.2. BACKFILLING

- A. All pressure supply lines (mainline) shall have eighteen inches (18") of fill placed over the pipe.
- B. Initial backfill on all lines shall be of a fine granular material with no foreign matter larger than one half inch (1/2").
- C. Compact backfill according to Section 125 of FDOT Standard Specifications.
- D. Do not, under any circumstances, use equipment or vehicle wheels for compacting soil.
- E. Restore grades and repair damages where settling occurs.
- F. Compact each layer of fill with approved equipment to achieve a maximum density per AASHTO T 180. Under landscaped area, compaction shall not exceed 95% of maximum density.
- G. Compaction shall be obtained by the use of mechanical tampers or approved hand tampers. When hand tampers are used, the materials shall be deposited in layers not more than six inches (6") thick. The hand tampers shall be suitable for this purpose and shall have a face area of not more than 100 square inches. Special precautions shall be taken to prevent damage to the irrigation system piping and adjacent utilities.

902-1.3.2.3. ROUTING OF PIPING:

- A. Routing of pressure and non-pressure piping lines are indicated diagrammatically on Drawings.

- B. Coordinate specimen trees and shrubs with routing of lines.
 - 1. Planting locations shall take precedence over sprinkler and piping locations.
 - 2. Report to Owner any major deviation from routing indicated.
- C. Conform to Drawings layout without offsetting the various assemblies from the pressure supply line.
- D. Layout drip tube and make any minor adjustments required due to differences between site and Drawings. Any such deviations in layout shall be within the intent of the original Drawings, and without additional cost.
- E. Layout all systems using an approved staking method and maintain the staking of approved layout.

902-1.3.3. INSTALLATION

902-1.3.3.1. WATER SUPPLY

- A. Connections to the water sources shall be at the approximate locations indicated on the Drawings. Make minor changes caused by actual site conditions without additional cost to the Owner.

902-1.3.3.2. ASSEMBLIES

- A. Routing or pressure supply lines as indicated on Drawings is diagrammatic only. Install lines and required assemblies in accordance with details on Drawings.
- B. Do not install multiple assemblies on plastic lines. Provide each assembly with its own outlet. When used, the pressure relief valve shall be the last assembly.
- C. Install all assemblies in accord with the respective detail Drawings and these Technical Specifications.
- D. Plastic pipe and threaded fittings shall be assembled using Teflon tape, applied to the male threads only.

902-1.3.3.3. SLEEVES: (EXISTING BY CITY OF CLEARWATER)

- A. The Contractor shall verify the location of all existing sleeves as shown on the roadway, utility and/or irrigation plans and notify the Engineer of any discrepancies.

902-1.3.3.4. PLASTIC PIPE

- A. Install plastic pipe in accord with manufacturer's recommendations.
- B. Prepare all welded joints with manufacturer's cleaner prior to applying solvent.
 - 1. Allow welded joints as least fifteen (15) minutes setup/curing time before moving or handling.
 - 2. Partially center load pipe in trenches to prevent arching and shifting when water pressure is on.

3. Do not permit water in pipe until a period of at least four (4) hours has elapsed for solvent weld setting and curing, unless recommended otherwise by solvent manufacturer.

C. Curing

1. When the temperature is above 80 degrees F., allow soluble weld joints at least twenty-four (24) hours curing time before water is introduced under pressure.

D. Flushing the system:

1. After all sprinkler pipe lines and risers are in place and connected, open the control valves and flush out the system with a full head of water.

E. Installing piping under existing pavement:

1. Piping under existing pavement may be installed by jacking & boring.
2. Secure permission from the Engineer before cutting or breaking any existing pavement. All repairs and replacements shall be approved by Engineer and shall be accomplished at no additional cost.

902-1.3.3.5. CONTROLLERS

A. Install all automatic controllers as shown in the plans.

1. The location of all controllers shall be approved by the Engineer's representative prior to installation.

902-1.3.3.6. REMOTE CONTROL VALVES

- A. Install at sufficient depth to provide not more than six inches (6"), nor less than four inches (4") cover from the top of the valve to finish grade.
- B. Install valves in a plumb position with twenty-four inch (24") minimum maintenance clearance from other equipment, three feet (3') minimum from edges of sidewalks, buildings, and walls, and no closer than seven feet (7') from the back of curb or edge of pavement along roadways.
- C. Contractor shall adjust the valve to provide the proper flow rate or operating pressure for each sprinkler zone.

902-1.3.3.7. GATE VALVES

- A. Install where indicated and with sufficient clearance from other materials for proper maintenance.
- B. Check and tighten valve bonnet packing before backfill.

902-2. LANDSCAPE

902-2.1. GENERAL

902-2.1.1. REQUIREMENTS OF REGULATORY AGENCIES

- A. Comply with Federal, State, Local, and other duly constituted authorities and regulatory agencies, without additional cost to the Owner in matters pertaining to codes, safety, and environmental matters.
- B. Any permits for the installation or construction of any of the work included under the contract, which are required by any of the legally constituted authorities having jurisdiction, shall be arranged for by the Contractor and paid for directly by the Contractor, unless otherwise agreed upon in writing.

902-2.1.2. SCOPE OF WORK

- A. All provisions of Contract, including General and Special Provisions and Plans, apply to the work specified in this Article. The Scope of Work includes everything for and incidental to executing and completing all landscape work shown on the Plans, Schedules, Notes and as specified herein.
- B. Furnish and provide all labor, plants and materials tools and equipment necessary to prepare the soil for plantings, to install and care for all plant materials (including finish grading if necessary); to remove and/or transplant existing plants if indicated; to furnish, plant, fertilize, guy and brace, water, mulch and prune all new plant materials; and to execute all other Work as described herein or indicated on the Plans.
- C. Work under this Article shall include labor and materials for final grading and raking to prepare the site for sodding, sprigging, or seeding, so finished lawn or playing field will appear even and uniform, will drain adequately, and will comply with the intent of the landscape drawings.
- D. Initial maintenance of landscape materials as specified in this document.

902-2.1.3. QUALITY ASSURANCE

- A. Landscape work shall be contracted to a single firm specializing in landscape work, who shall in turn subcontract no more than 40% of the work specified. All subcontractors under the control of the Contractor involved in the completion of the landscape work, shall be made known to the Owner and the Landscape Architect prior to their commencement of work on the project.
- B. All work of this Article shall conform to the highest standard of landscape practices.
- C. The Plant Material Schedule included with these Plans is provided only for the Contractor's convenience; it shall not be construed as to conflict or predominate over the Plans. If conflict between the Plans and Specifications exists, the Plans shall predominate and be considered the controlling document.
- D. During this work, the Contractor shall be responsible for maintaining safety among persons in their employ in accordance with the standards set by The Occupational Safety and Health

Act of 1970 (and all subsequent amendments). Owner and Landscape Architect shall be held harmless from any accident, injury or any other incident resulting from compliance or non-compliance with these standards.

- E. The Contractor shall cooperate with and coordinate with all other trades whose work is built into or affects the work in this Article.
- F. All appropriate utility companies and agencies shall be contacted 72 hours prior to excavation. Call “One Call”/“Sunshine 811” at 8-1-1; “Sunshine 811” administrative offices may be reached at (800) 638-4097.
- G. The Contractor shall carefully examine the site and all existing conditions affecting the work, such as: soil, obstructions, existing trees, utilities, etc. Report any conditions in conflict with the work to the Landscape Architect.

902-2.1.4. SUBMITTALS

- A. The Contractor is required to submit prior to the expiration of the required maintenance period, two (2) copies of typewritten instructions recommending procedures to be established by the Owner for maintenance of landscape work for a period of one (1) year.
- B. Furnish unit prices for all plant materials and inert materials, including labor for all specified work.

902-2.1.5. ALTERNATES, ADDITIONS, DELETIONS, SUBSTITUTIONS

- A. If there are additions/alternates included in these Plans and Specifications, the Contractor must propose prices to accomplish the work stated as additions/alternates at the time of bidding.
- B. The Owner, through their Project Representative, reserves the right to add or deduct any of the work stated herein without rendering the Contract void.
- C. The Contractor must have written approval by the Project Representative for any substitutions not previously agreed to in the purchase agreement: installation without approval is entirely at the Contractor’s risk.
- D. All material acquired through additions or substitutions shall be subject to all conditions and warranties stated herein.

902-2.1.6. ABBREVIATIONS/DEFINITIONS

- O.A. or HT.:* The over-all height of the plant measured from the ground to the natural, untied state of the majority of the foliage, not including extreme leaves, branches or fronds.
- C.T.:* Clear trunk is measured from the ground to the bottom of the first leaf or frond stem with no foliage from ground to specified height. For example, on Canary Island Date Palms or similar, the clear trunk measurement includes the “nut” at the base of the fronds.
- C.W.:* Clear wood is measured from the ground to the bottom of the base of the lowest leaf sheath or boot, trimmed in a natural manner. For example, on Canary Island Date Palms or similar, the clear wood measurement does not include the “nut” at the base of the fronds.

SPR.: Spread, branches measured in natural untied position to the average crown diameter, not including extreme leaves, branches or fronds.

ST.TR.: Straight trunk.

MIN.: Minimum.

GAL.: Gallon container size, i.e., 1 gallon, 3 gallon, 7 gallon, etc.

O.C.: On center, distance between plant centers.

DIA.: Diameter.

LVS.: Leaves.

D.B.H.: Diameter or caliper of main trunk of tree as measured at breast height at 4-1/2 feet above grade.

CAL.: Caliper, the outside diameter of up to a four inch tree is measured six inches above grade, larger trees are measured at 12 inches above grade.

B&B: Balled and burlapped in accordance with horticultural standards of the American Association of Nurserymen.

PPP: Plants per pot.

FG: Field grown.

STD.: Standard, single, straight trunk.

Owner: To be known as that entity which holds title or control to the premises on which the work is performed.

Owner's Representative: Owner's on-site representative shall be responsible for approval of quantity and quality of *materials specified and execution of installation*.

Contractor: Shall refer to that person or enterprise commonly known as the Landscape Contractor.

Landscape Architect: This person or firm is the responsible representative of the Owner who produces the landscape Plans and Specifications.

902-2.1.7. PRODUCT DELIVERY, STORAGE, AND HANDLING

902-2.1.7.1. PLANT MATERIALS

- A. Provide container-grown or, if appropriate, freshly dug trees and shrubs. Do not prune prior to delivery. Do not bend or bind trees or shrubs in such a manner as to damage bark, break branches or destroy natural shape. Provide protective covering during delivery. If plant delivery is made in open vehicles, the entire load shall be suitably covered.
- B. All plants are to be handled at all times so that roots or root balls are adequately protected from sun, cold, or drying winds. No root balls for trees and container plants that have been cracked or broken shall be planted except upon special approval. Plants shall not be pulled by the tops or stems, nor handled in a rough or careless manner at any time.

- C. Balled and burlapped (“B & B”) plants shall be moved with firm, natural, balls of soil, not less than one foot (1’) diameter of ball to every one inch (1”) caliper of trunk; root ball depth shall not be less than two-thirds (2/3) of root ball diameter. B & B plants which cannot be planted upon delivery shall have their root balls covered with moist soil or mulch.
- D. Trees shall be dug with adequate balls, burlapped, and wire bound if needed. Root pruning to be done a minimum of four (4) weeks before removal from the field and planting at the site. Root balls may not be encased in “grow bags” or other synthetic material, except plastic shrink wrap for transport only.
- E. Remove all fronds from sabal palms prior to planting, but leave a minimum of twelve inches (12”) of new frond growth above the bud. Do not damage bud. On all other palms, only a minimum of palm fronds shall be removed from crown to facilitate moving and handling. Clear trunk shall be determined after minimum fronds have been removed. Boots shall be removed from trunk unless otherwise specified. Palms shall be planted within twenty-four (24) hours of delivery.
- F. Deliver trees and shrubs after preparations for planting have been completed and plant immediately. If planting is delayed more than 6 hours after delivery, set trees and shrubs in shade, protect from weather and mechanical damage, and cover to keep the roots moist.
- G. Label at least one tree and one shrub of each variety with a securely attached waterproof tag bearing legible designation of botanical and common name.
- H. Time delivery so that sod will be placed within twenty-four (24) hours after stripping. Protect sod against drying and breaking by covering palettes of sod or placing in a shaded area.

902-2.1.8. JOB CONDITIONS

902-2.1.8.1. ACCEPTANCE OF JOB CONDITIONS.

- A. The Contractor shall examine the sub-grade, verify elevations, observe the conditions under which work is to be performed and notify the Landscape Architect or Project Representative in writing of unsatisfactory conditions prior to beginning work. Do not proceed with the work until unsatisfactory conditions have been corrected in a manner acceptable to the Landscape Architect. Start of work shall indicate acceptance of conditions and full responsibility for the completed work.
- B. Proceed with and complete the landscape work as rapidly as portions of the site become available, working within the seasonal limitations for each kind of landscape work and following the approved schedule. If seasonal limitations apply, notify the Landscape Architect for adjustments to the Schedule.
- C. Determine locations of all underground utilities and review for conflicts with planting procedures.
- D. When adverse conditions to plant growth are encountered, such as rubble fill, drainage conditions or obstruction, the Contractor shall notify the Landscape Architect in writing prior to planting.

- E. Plant trees and shrubs after final grades are established and prior to sod installation or seeding lawns. Protect existing lawn, trees, and promptly repair damages from planting operations.

902-2.1.8.2. SCHEDULING OF WORK

- A. The work shall be carried out to completion with the utmost speed. Immediately upon award of contract, the Contractor shall prepare a construction schedule and furnish a copy to the Owner's Representative and/or the Landscape Architect for approval. The Contractor shall carry out the work in accordance with the approved schedule.
- B. If the Contractor incurs unforeseen costs, such as overtime hours, holidays, etc., in order to complete the work within the time stated in the Contract, and/or to maintain the progress schedule, all said costs shall be borne by the Contractor at no additional cost to the Owner.
- C. The Owner's Representatives may request work stoppage in writing. Upon written request from the Owner's Representative, the Landscape Contractor shall suspend delivery of material and stop all work for such a period as deemed necessary by the Owner, the Owner's Representative, or the General Contractor, with respect to any additional costs which may result from work stoppage.

902-2.1.8.3. UTILITIES

- A. The Contractor shall perform work in a manner which will avoid conflicts with utilities. Hand excavate, as required, to minimize possibility of damage to underground utilities. Maintain grade stakes set by others until removal is mutually agreed upon by all parties concerned.

902-2.2. PRODUCTS

902-2.2.1. MATERIALS

902-2.2.1.1. PLANT MATERIALS: NOMENCLATURE

- A. Plant species, sizes, etc., shall be per Plans and Specifications on Plant Material Schedule. Nomenclature is per Manual of Cultivated Plant, Standard Encyclopedia of Horticulture, L.H. Bailey, or Standardized Plant Names Dictionary, American Joint Committee on Horticultural Nomenclature (latest editions) or conforms with names accepted in the nursery trade.

902-2.2.1.2. PLANT MATERIALS: QUALITY ASSURANCE

- A. Provide healthy, vigorous stock grown under climatic conditions similar to conditions in the locality of the project. Plants shall have a habit of growth that is normal for the species and be sound, healthy, vigorous and free from insects, pests or their eggs, plant diseases, defects and injuries. Plants shall be well branched and densely foliated when in leaf and shall have healthy, well-developed root systems.
- B. Trees shall be heavily branched or, in the case of palms, be heavily leafed. Some plant materials may be collected stock with the approval of the Landscape Architect. Provided

tree species that have a single main trunk (central leader), unless otherwise stated. Trees that have the main trunk forming a “Y” shape or parallel branching are not acceptable.

- C. Plant materials shall be specified and shall be Florida #1 or better as to shape and quality for the species as outlined in Grades and Standards for Nursery Plants Part I and II, Florida Department of Agriculture and Consumer Services (latest edition).
- D. The Owner or Landscape Architect reserves the right to inspect plant materials either at the place of growth or at the project site prior to planting for compliance with requirements for name, variety, size, quality, or designated area.
- E. Landscape materials shall be shipped with certificates of inspection as required by governmental authorities. The Contractor shall comply with all governing regulations that are applicable to landscape materials.
- F. Do not make substitutions. If specified landscape material is not available, submit to the Landscape Architect proof of it being non-available. In such event, if the Landscape Architect designates an available source, such shall be acquired from designated source. When authorized, a written change order for substitute material will be made by adjustment to Contract amount.
- G. Height and/or width of trees shall be measured from ground up; width measurement shall be normal crown spread of branches with plants in the normal position. This measurement shall not include immediate terminal growth. All measurements shall be taken after pruning for specified sizes. All trees and shrubs shall conform to measurements specified in the plant material schedule, except that plant material larger than specified may be used with the approval of the Owner or Landscape Architect, with no increase to the Contract price. Plant materials shall not be pruned prior to delivery.
- H. Plant Material shall be symmetrical, typical for variety and species. Plants used where symmetry is required shall be matched as nearly as possible.
- I. Balled and burlapped plants shall have firm, natural balls of earth of sufficient diameter and depth to encompass the feeding root system necessary for full development of the plant and to conform with the standards of the American Association of Nurserymen. Root balls and tree trunks shall not be damaged by improper binding and B & B procedures.
- J. Container-grown plants may be substituted for balled and burlapped plants or vice-versa provided the quality is equal or better than specified and the Landscape Architect approves the substitution.
- K. Container-grown stock shall have been grown in containers for at least four months, but not over two years. If requested, samples must be shown to prove no root bound condition exists.

902-2.2.1.3. GRASSES: SOD OR SEED

- A. Sod or seed (as/if specified) shall be a species as stated on the Plan. Solid sod shall be of even thickness and with a good root structure, 95% free of noxious weed, freshly mowed before cutting, and in healthy condition when laid. It must not be stacked more than twenty-four (24) hours before laying and it must be grown in soil compatible to that in which it will be installed. Sod must be kept moist prior to and after installation.

- B. Seed shall be delivered to the site in unopened bags with certification tags in place. Purity, germination and weed content shall be as certification requirements.

902-2.2.1.4. MULCH

- A. Mulch shall be as specified in the plans or by the project manager.
- B. Install mulch to an even depth of three inches (3") before compaction, as shown in the PLANTING DETAILS in the plans.

902-2.2.1.5. FERTILIZER

- A. Granular fertilizer shall be uniform in composition; free flowing and suitable for application with approved equipment; received at the site in full, labeled, unopened bags bearing the name, trade name or trademark and warranty of the producer; fully conforming to State of Florida fertilizer laws.
- B. All fertilizer shall bear the manufacturer's statement of analysis and shall contain the appropriate minimum amounts of elements for the type of use specified herein.
- C. Agriform 20-10-5 fertilizer tablets or approved equal, shall be placed in planting pit for all plant materials at time of installation and prior to completion of pit backfilling.
- D. Ground cover and annual areas shall receive fertilization with Osmocote Time Release Fertilizer according to product instructions and rate.
- E. For sod and seeded areas, fertilize with a complete granular fertilizer on Bahia and St. Augustine grasses at the rate of one pound (1 lb.) of nitrogen per one thousand square feet (1000 sq ft). Fertilizer shall be commercial grade, mixed granules, with 30% to 50% of the nitrogen being in slow or controlled release form. The ratio of nitrogen to potash will be 1:1 or 2:1 for complete fertilizer formulations. Phosphorus shall be no more than one-fourth (¼) the nitrogen level. They shall also contain magnesium and micronutrients (i.e. manganese, iron, zinc, copper, etc.).

902-2.2.1.6. STAKES AND GUYS

- A. For trees, approved plastic or rubber guys shall be used between the stakes and the tree trunk. Galvanized steel guy wire shall not be used.
- B. Stakes shall be cut from 2" x 4" pressure treated (p.t.) stock for trees over two inch (2") caliper. Stakes shall be 2" x 2" pressure treated (p.t.) stock for trees two inch (2") caliper and under. A minimum of two (2) stakes per tree or an optional three (3) stakes per tree shall be used.
- C. For single trunk palms, stakes shall be cut from 2" x 4" pressure treated (p.t.) stock, with a minimum of three (3) stakes per palm. Batten consisting of 5 layers of burlap and 5 - 2" x 4" by 16" wood connected with two – three-quarter inch (¾") steel bands shall be used around the palm trunk.
- D. Other tree staking systems may be acceptable if approved.

902-2.2.1.7. PLANTING SOIL

- A. Unless stated on the plans or in the specifications, install plant material in tilled and loosened native soil backfill. It is the responsibility of the Landscape Contractor to test, prior to planting and at no additional cost to the City, any soils which may be unsuitable for the vigorous growth of plants. Unsuitable conditions shall be reported to the Landscape Architect immediately in writing.
- B. When required, planting soil media shall be provided by the Contractor and shall consist of one-third (1/3) peat and two-thirds (2/3) sandy loam, with no lumps over one inch (1").
- C. Backfill and clean fill dirt provided by the Contractor shall be in a loose, friable soil. There must be slight acid reaction to the soil (about 6.0 – 6.5 pH) with no excess of calcium or carbonate, and it shall be free from excess weeds, clay lumps, stones, stumps, roots and toxic substances or any other materials that might be harmful to plant growth or a hindrance to grading, planting, and maintenance procedures and operations. No heavily organic soil, such as muck or peat shall be used as fill dirt.
- D. Bed preparation for annual beds under one (1) gallon container size shall consist of three inches (3") of Florida peat or other approved organic soil amendment spread over full length and width of planting area. Rototill organic layer six inches (6") to eight inches (8") into native soil.

902-2.2.1.8. SOIL AMENDMENTS

- A. Terra-Sorb AG or approved equal, soil amendment shall be mixed with native or planting soil for all trees, shrubs, ground cover, and annuals according to manufacturer's recommended application rates and methods, if specified on the Plans.

902-2.2.1.9. TREE PROTECTION

- A. Wood fencing shall be 2" x 4" pressure treated (p.t.) stock with flagging on horizontal members. Space vertical members six feet (6') to eight feet (8') on center. The barricade shall be placed so as to protect the critical protection zone area, which is the area surrounding a tree within a circle described by a radius of one foot (1') for each inch of the tree's diameter at breast height DBH (four and one half feet') above grade.

902-2.2.1.10. ROOT BARRIER SYSTEM

- A. Root barrier fabric shall be installed when specified in the plans and/or specifications for protection of adjacent paved surfaces according to specific product name or equal. Install as directed by the manufacturer.

902-2.2.1.11. PACKAGED MATERIALS

- A. Deliver packaged materials in containers showing weight, analysis and name of manufacturer. Protect materials from deterioration during delivery and while stored at the site.

902-2.2.1.12. PESTICIDES

- A. Pesticides shall be only approved, safe brands applied according to manufacturer's directions.

902-2.3. EXECUTION

902-2.3.1. PREPARATION

902-2.3.1.1. OBSTRUCTIONS BELOW GROUND

- A. It shall be the responsibility of the Contractor to locate and mark all underground utilities, irrigation lines and wiring prior to commencement of the work.
- B. If underground construction, utilities or other obstructions are encountered in excavation of planting areas or pits, the Landscape Architect shall be immediately notified to select a relocated position for any materials necessary.

902-2.3.1.2. GRADING AND PREPARATION FOR PLANT MATERIALS

- A. All proposed landscape areas containing existing turf grass or weeds shall be treated with Monsanto's "Round-Up" per manufacturer's specifications. All proposed landscape areas adjacent to water bodies shall be treated with "Rodeo" per the manufacturer's specifications.
- B. New plant materials will not be installed until a 98% weed/turf eradication has been achieved. More than one application may be required to produce an acceptable planting bed.
- C. Pre-emergent herbicides are not a substitute for spray treatment of "Round-Up" or "Rodeo" and may be used only with the written approval of the Landscape Architect.
- D. Should any plant material in the same or adjacent beds be damaged by these chemicals, the same size, quantity and quality of plants shall be immediately replaced by the Contractor at no cost to the Owner.
- E. Any necessary corrections or repairs to the finish grades shall be accomplished by the Contractor. All planting areas shall be carefully graded and raked to smooth, even finish grade, free from depressions, lumps, stones, sticks or other debris and such that they will conform to the required finish grades and provide uniform and satisfactory surface drainage without puddling.
- F. The Contractor shall remove debris (sticks, stones, rubbish) over one and one half inches (1½") in any dimension from individual tree, shrub and hedge pits and dispose of the excavated material off the site.

902-2.3.1.3. PREPARATION FOR ANNUAL BED PLANTING

- A. Prepare native subgrade by rototilling or loosening by hand methods. Spread three inches (3") of one-third (1/3) Florida peat and two-thirds (2/3) sandy, or other approved organic soil amendment over the full length and width of planting area for annuals. Rototill organic layer six inches (6") to eight inches (8") into the native soil. Grade the planting bed by "crowning" to ensure that surface drainage, percolation, and aeration occur at rapid rates. Add Osmocote time release fertilizer according to product instructions and rate.

902-2.3.1.4. PREPARATION FOR SEEDING AND SOD AREAS

- A. All proposed sod areas containing existing turf grass or weeds shall be treated with Monsanto's "Round-Up" per manufacturer's specifications. All proposed sod areas adjacent to water bodies shall be treated with "Rodeo" per the Manufacturer's Specifications.
- B. Limit preparation to areas which will be planted promptly after preparation. Loosen sub-grade of seed and sod areas to a minimum depth of four inches (4").
- C. Immediately prior to any turf work, the Contractor shall finish grade the soil to a smooth, even surface assuring positive drainage away from buildings and the subsequent turf flush to the tops of adjacent curbs and sidewalks. The surface shall be sloped to existing yard drains.
- D. A complete fertilizer shall be applied to St. Augustine or Bahia grass at a rate of one pound (1 lb.) of nitrogen per one thousand square feet (1000 sq ft). Fertilizer shall be commercial grade, mixed granules, with 30% to 50% of the nitrogen being in slow or controlled release form. Thoroughly work fertilizer into the top four inches (4") of soil.
- E. Moisten prepared seed and sod areas before planting if soil is dry. Water thoroughly and allow surface moisture to dry before planting lawns. Do not create a muddy soil condition.

902-2.3.2. INSTALLATION

902-2.3.2.1. BERM CONSTRUCTION (IF SPECIFIED)

- A. Install berms at location and design shown on Plans and at the height and slope indicated. Height stated is for finished berm with soil at natural compaction.
- B. Exact location and configuration of berms may require modification to allow proper drainage; such changes will be coordinated with the Landscape Architect.
- C. If shown on the Plan, construct berms using clean sandy loam fill dirt which is well-drained, free of rocks, roots, or other debris, with a soil pH of an acid Nature (about 6.0 - 6.5). No heavily organic soil, such as muck or peat shall be used in berm construction.

902-2.3.2.2. LAYOUT OF PLANT MATERIALS

- A. Unless otherwise stipulated, plant materials shall be approximately located per the plans by scale measurements using established building, columns, curbs, screen walls, etc., as the measuring reference point. Slight shifting may be required to clear wires, prevent blockage of signage, etc.
- B. Shrubs and ground covers shall be located and spaced as noted on the plant material schedule (if provided), otherwise plants will be placed in the planting beds at the normally accepted spacing for each species.
- C. Leave an eighteen inch (18") (450 millimeters) border of mulched space between outer leaves of installed plant material and the bed line, curb, or building foundation wall for all plant sizes.
- D. Any necessary "minor" adjustments in the layout of planting shall be made by the Contractor with the approval of the Landscape Architect in order to conform as nearly as possible to the intent of the Plans.

902-2.3.2.3. PLANTING PROCEDURES

- A. All shrubs, trees and ground covers or vines shall be planted in pits having vertical sides and being circular in outline. Planting pit shall be three (3) to five (5) times the width of the root ball.
- B. Plants shall be set straight or plumb, in the locations shown, at such level that after settlement normal or natural relationship of the top of the root ball with the ground surface will be established. With regards to proper nursery practices, plants under certain conditions (i.e. low and wet areas) will benefit from being planted “high” with the root ball about one inch (1”) higher than the surrounding grade.
- C. All plant materials shall be fertilized with Agriform 20-10-5 planting tablets, or approved equal, at time of installation and prior to completion of pit backfilling. Agriform planting tablets shall be placed uniformly around the root mass at a depth that is between the middle and the bottom of the root mass.

Application rate:

1 gallon	1 - 21 gram tablet
3 gallon	2 - 21 gram tablet
5 gallon	3 - 21 gram tablet
7 gallon	4 - 21 gram tablet
Trees	3 tablets each ½” (12 millimeters) caliper
Palms	7 - 21 gram tablets

- D. Native soil shall be used in back-filling plant pits or as specified. The Contractor shall be responsible for providing additional soil for building tree saucers.
- E. When balled and burlapped plants are set, undisturbed native soil shall be left under the base of the root ball to prevent voids. Backfill tilled and loosened native soil around the sides of the root ball. Remove the top 4 four inches (4”) (100 millimeters) of burlap wire, and all tie-down material from the root ball. Do not remove these materials from the bottom of the root ball. Thoroughly water-in before bringing the back-fill up to the proper grade. Roots of bare plants shall be properly spread out, and planting soil carefully worked in among them. Failure to comply is cause for rejection.
- F. Containerized plants shall be installed with undisturbed native soil left under the base of the root ball to prevent voids. Planting pit shall be three (3) to five (5) times the width of the root ball. Backfill tilled and loosened native soil around the sides of the root ball. Thoroughly water-in before bringing the backfill up to the proper grade.
- G. Plant spacing shall be “on center” and varies with the different plant species. Space each variety of plant equally in the planting areas. Shrubs and ground covers adjacent to straight or curved edges shall be triangular - spaced in rows parallel to those edges. Plant a minimum of eighteen inches (18”) from the back of the curb to the outside edge of the plant.
- H. All azaleas shall be placed into a prepared bed of amended soil containing 50% weed-free Florida peat or approved equivalent. Root balls shall be scarified vertically at 120 degree angles in a triangular pattern.
- I. Sabal palms may be planted deeper than normal if conditions warrant and if approved.

902-2.3.2.4. SODDING

- A. During periods of drought, sod shall be watered sufficiently at its origin to moisten the soil adequately to the depth to which it is to be cut.
- B. An application of 6-6-6, 40% organic, slow or controlled release fertilizer shall be made to all lawn areas just prior to the laying of the sod at a rate of one pound (1 lb.) of nitrogen per one thousand square feet (1000 sq ft). The ground shall be moistened before the sod is laid in place.
- C. Solid sod shall be laid tightly with closely abutting staggered joints with an even surface edge and sod edge, in a neat and clean manner to the edge of all the paving and shrub areas. Cut down soil level to one inch (1") to one and one half inches (1-1/2") below top of walks prior to laying sod.
- D. Within two (2) hours after installing sod and prior to rolling, irrigate the sod. Sufficient water shall be applied to wet the sod thoroughly and to wet the sod to a depth of two inches (2") (50 millimeters). Watering shall be done in a manner that will avoid erosion due to the application of excessive quantities, and the watering equipment shall be a type that will prevent damage to the finished sod surface. Watering shall be repeated as necessary to keep sod moist until rooted to subgrade.
- E. The sod shall be pressed firmly into contact with the sod bed using a turf roller or other approved equipment so as to eliminate air pockets, provide a true and even surface and insure knitting without any displacement of the sod or deformation of the surfaces of sodded areas. After the sodding operation has been completed, the edges of the area shall be smooth and shall conform to the grades indicated.
- F. If, in the opinion of the Landscape Architect, top dressing is necessary after rolling, clean silica sand shall be used to fill voids. Evenly apply sand over the entire surface to be leveled, filling-in dips and voids and thoroughly washing into the sod areas.
- G. On slopes 3:1 or steeper, and as required, a geotextile fabric shall be installed per manufacturer's specifications prior to placing sod. The sod shall be fastened in place with suitable wooden pins or by other approved method.

902-2.3.2.5. SEEDING

- A. Seed shall be installed per the specifications of the State of Florida Department of Transportation. See plan for type of seed.

902-2.3.2.6. TREE GUYING, BRACING AND STAKING

- A. Tree guying, staking and bracing shall be the responsibility of the Contractor per sound nursery practices, and shall be done per details shown on the Plans. For trees, a minimum of two (2) stakes per tree or an optional three (3) stakes per tree at 120 degree spacing shall be used. Stakes shall be driven in at an angle, then tightened to vertical supported by approved plastic or rubber guys. Trees shall be staked with a minimum of four feet (4') height of stake above grade and a minimum of thirty inches (30") of stake below grade.
- B. For single trunk palms, a minimum of three (3) stakes per palm at 120 degree spacing shall be used. Toenail the stakes to batten consisting of five (5) layers of burlap and five (5) - 2

inch x 4 inch x 16 inch wood connected with two (2) three-quarter inch (3/4") steel bands. Palms shall be staked with a minimum of five feet (5') of stake above grade.

- C. Contractor shall remove all tree guying, staking, and bracing from trees six (6) months after the date of final acceptance of the landscape work.
- D. Stake only trees that require support to maintain a plumb position or are in potentially hazardous areas.

902-2.3.2.7. MULCHING

- A. All planting beds shall be weed-free prior to mulching.
- B. All curb, roadway, and bed line edges will be "trenched" to help contain the applied mulch. Mulch should be below top of curb and resistant to washout from stormwater run-off.
- C. All plant beds and tree rings shall be mulched evenly with a three inch (3") layer (before compaction) of 100% Grade B recycled cypress bark mulch, or other mulch as specified on the Plans or General Notes.
- D. Mulch shall not be placed against the trunks of plant materials or foundations of buildings. Maintain a minimum three inch (3") clearance for trees and shrub trunks and a minimum six inch (6") clearance for the walls of buildings.
- E. For beds of annual flowers, a 12 inch wide x 3 inch deep band of mulch shall be installed in front of the first row of annuals. Maintain a minimum six inches (6") of non-mulched clearance from the outside edge of annuals.

902-2.3.2.8. PRUNING

- A. Pruning shall be done by an experienced certified Arborist to maintain the natural shape and form of the plant.
- B. Upon acceptance by the Owner, prune any broken branches, remove crossed branches, and branches hanging below the clear trunk of the tree.

902-2.3.2.9. CLEAN-UP

- A. During landscape work, store materials and equipment where directed by the Owner.
- B. The Contractor shall promptly remove any materials and equipment used on the job, keeping the area neat at all times. Upon completion of all planting, dispose of all excess soil and debris leaving pavements and work areas in safe and orderly condition.
- C. The clean-up of the site shall include the removal and proper disposal of the tree guying, staking, and bracing materials as described in specifications.

902-2.3.2.10. PROTECTION

- A. The Contractor shall provide safeguards for the protection of workmen and others on, about, or adjacent to the work, as required under the parameters of the Occupational Safety and Health Administration (O.S.H.A.) standards.
- B. The Contractor shall protect the Owner's and adjacent property from damage.

- C. The Contractor shall protect the landscape work and materials from damage due to landscape operations. Maintain protection during installation and maintenance periods.
- D. The Contractor shall provide protection (tree barricades) for all existing trees and palms as specified.

902-2.3.2.11. REPAIR OF DAMAGES

- E. The Contractor shall repair all damage caused by their operations to other materials, property, or trades to a level equal in quality to the existing condition prior to damage.
- F. The Contractor shall be held responsible for all damage done by their work or employees to other materials or trades' work. Patching and replacement of damaged work may be done by others, at the Owner's direction, but the cost of same shall be paid by the Contractor who is responsible for the damage.

902-2.3.3. MAINTENANCE

- A. The Contractor shall maintain all plant materials in a first class condition from the beginning of landscape construction until Final Acceptance.
- B. Operations:
 - 1. Maintenance shall include, but not be limited to, watering of turf and planting beds, mowing, fertilizing, cultivation, weeding, pruning, disease and pest control, replacement of dead materials, straightening, turf or planter settlement corrections, replacement of rejected materials, staking and guying repair and tightening, wash-out repairs and regrading, and any other procedures consistent with the good horticultural practice necessary to insure normal, vigorous and healthy growth of all work under the Contract. Mowing shall be consistent with the recommended height per the University of Florida Cooperative Extension Service.
 - 2. Within the warranty period, the Contractor shall notify the Owner of any maintenance practices being followed or omitted which would be detrimental to the healthy, vigorous growth of the landscape.
 - 3. The Contractor shall be responsible for the final watering of not less than one inch (1") of water for all planted materials before leaving the site.

902-2.3.4. INSPECTION, REJECTION, AND ACCEPTANCE

902-2.3.4.1. INSPECTION

- A. Upon completion of the installation, the Contractor will notify the Owner or the Owner's Representative that the job is ready for inspection. Within fifteen (15) days of notifications, the installation will be inspected by the Landscape Architect. A written and/or graphic inspection report will be sent to the Owner and/or Landscape Contractor.

902-2.3.4.2. REJECTION AND REPLACEMENT

- A. The Landscape Architect shall be final judge as to the suitability and acceptability of any part of the work. Plant material will be rejected if it does not meet the requirements set forth in the Plans and Specifications.

- B. Replace any rejected materials immediately or within fifteen (15) days and notify the Landscape Architect that the correction has been made.

902-2.3.4.3. ACCEPTANCE

- A. After replacement of rejected plant material, if any, have been made, and completion of all other correction items, the Owner or Project Representative will accept the project in writing.
- B. Upon Final Acceptance, the Owner assumes responsibility for maintenance within the terms of the Contract. Acceptance will in no way invalidate the Contractor's warranty period.
- C. The Contractor's warranty period will begin after final acceptance of the project by the Owner.
 - 1. If evidence exists of any lien or claim arising out of or in connection with default in performance of this Contract, the Owner shall have the right to retain any payment sufficient to discharge such claim and all costs in connection with discharging such claim.
 - 2. Where the Specifications call for any stipulated item or an "approved equivalent", or in words to that effect, the Contractor shall indicate the price of the type and species specified in the proposal, giving the price to be added or deducted from their Contract price. The final selection rests with the Owner or their representative.
 - 3. Where plants installed do not meet specifications, the Owner reserves the right to request plant replacement or an appropriate deduction from the Contract amount to compensate for the value not received from the under-specified plant materials. No additional compensation will be made to the Contractor for plants installed that exceed specifications.

902-2.3.5. WARRANTY

- A. The Contractor shall warranty all palms and trees furnished under this contract for a period of one (1) year and all shrubs for a period of six (6) months. Material which is either dead or in poor health during this period or at completion will be replaced at no charge to the Owner. Should any of the plant materials show 50% or more defoliation during the warranty period, due to the Contractor's use of poor quality or improper materials or workmanship, the Contractor upon notice, shall replace without delay same with no additional cost to the Owner. Should any plant require replacing, the new plant shall be given the equal amount of warranty.

903. SODDING

Unless otherwise noted herein, the Contractor shall place all sod, either shown on the plans or at the direction of the Engineer, in conformance with Sections 575, 981, 982 and 983 of FDOT's Standard Specifications. The area for sod application shall be loosened and excavated to a suitable depth and finished to a grade compatible with existing grass and structures. Sod shall be placed with edges in close contact and shall be compacted to uniform finished grade with a sod roller immediately after placement. In sloped areas, the sod shall be graded and placed so as to prohibit

erosion and undermining of the adjacent sidewalk. No sod that has been cut for more than seventy-two (72) hours can be used unless authorized by the Engineer in advance. The sod shall be thoroughly watered immediately after placement. The Contractor shall continue to water sod as needed and/or directed by the Engineer as indicated by sun exposure, soil, heat and rain conditions, to establish and assure growth, until termination of the contract. Dead sod, or sod not acceptable to the Engineer, shall be removed and replaced by the Contractor at no additional compensation. Any questions concerning the type of existing sod shall be determined by the Engineer.

Unless otherwise noted on the plans, payment for sod (including labor, equipment, materials, placement, rolling, watering, etc.) shall be included in other bid items. Payment for these associated bid items may be withheld until the Contractor provides the City a healthy, properly placed stand of grass. When this work is given as a separate bid item, it shall cover all labor, equipment and materials, (including water) required for this work and shall be paid for on the basis of each square foot in place and accepted. No payment for sod shall be made until the Contractor provides the City a healthy, properly placed stand of grass.

904. SEEDING

Seed, or seed and mulch, shall only be used when specified for certain demolition projects. The seed and/or mulch shall be placed as called for on the plans in the following manner. The area to be seeded shall be brought to the required line and grade, fertilized and seeded in basic conformance with FDOT's Standard Specifications Sections 570, 981, 982 and 983. However, no wildflower seed shall be used, and Argentine Bahia Seed shall be used instead of Pensacola Bahia. No sprigging will be required. Also, the addition of 20 lb. of Rye Seed (to total 60 lb. of seed per acre) will be required during the stated periods. It is also required that the Contractor maintain said seed until growth is assured.

When this work is given as a bid item, the item shall cover all labor, material, equipment (including water), required for this work, and shall be paid for on the basis of each square yard in place and accepted. If called for on the plans, but not shown as a bid item, then the cost of such work as stated above shall be included in the cost of other work.

905. LAWN MAINTENANCE SPECIFICATIONS

905-1. SCOPE

To remove trash and debris from landscape and paved area; maintenance and fertilization of plant beds and landscape materials; maintenance, repair, and operation of irrigation systems; ornamental pest control; palm pruning; maintenance of traffic; and the cleaning of hard surfaces at designated areas. The Contractor is to work with the City in coordinating maintenance activities and reporting irregularities in the work zone.

The Contractor(s) will provide the labor and materials required to maintain the specified landscaped street areas including:

- Traffic safety and Maintenance of Traffic;
- Trash and debris removal from the job site;
- Removal of weeds in landscaped areas and hard surfaces;
- Proper trimming and pruning of landscape plants and palms;

- Proper fertilization and pest control of landscape and palms (may be subcontracted);
- Irrigation service and repair;
- Mulch replacement;
- Cleaning of hard surfaces; and the
- Reporting of irregularities at the job site.

905-2. SCHEDULING OF WORK

The Contractor(s) shall accomplish all landscape maintenance required under the contract between the hours of 7:00 a.m. and 6:00 p.m. Monday through Saturday, excluding observed holidays. The City may grant, on an individual basis, permission to perform contract maintenance at other hours.

All work shall be completed in a continuous manner, such as cleanup, weeding, trimming, etc., be completed before leaving the job site.

905-3. WORK METHODS

905-3.1. MAINTENANCE SCHEDULING

The Contractor(s) will adhere to a work schedule provided by the City (see Level of Service). Any variations to that schedule, requested by either party, must be approved, either verbally or in writing by an authorized representative of the other party.

905-3.2. DUTIES PER SERVICE VISIT

The Contractor(s) shall provide the following service at each scheduled visit to the designated location:

905-3.2.1. LITTER AND DEBRIS

Remove trash and debris from the project site. Proper disposal of collected trash and debris is the Contractor's responsibility. Extraordinary amounts of debris caused by hurricanes, tornadoes, vandalism, etc., would be the responsibility of the City to clean up. The Contractor should report such accumulations of debris when they are encountered. Bids for the extraordinary cleanup from the Contractor would be considered. Work sites should be left in a clean and neat appearance upon completion. All debris from pruning process is to be removed from the job site and disposed of by the Contractor.

905-3.2.2. VISUAL CHECK

The site should be checked for irregularities, such as irrigation leaks, vehicle damage, dead or damaged plant material, vandalism, etc., which should be reported to the City within twenty-four (24) hours after providing the service.

905-3.2.3. PLANT TRIMMING AND PALM PRUNING

All plant material should be trimmed in a manner that promotes the natural shape and mature size of the particular species. Trimming should be performed at intervals that will maintain plants in a neat appearance. Trimming should be performed to promote fullness of the plants, while

maintaining height restrictions in Clear Sight Zones as established on the landscape plans. Plants shall be kept trimmed to the back of curb. Brown foliage shall be removed from Liriope.

Palm pruning to be performed at least once per year, preferably in late June or July following flower formation, consistent with the following specification:

905-3.2.3.1. PHOENIX SPECIES (CANARY DATE, INDIA DATE, PYGMY DATE, ETC.)

Remove all descending fronds, to the base of the frond; all parallel and ascending fronds are to remain in order to leave a full, rounded head; seed heads may remain, but remove old faded heads that are encountered in the pruning process; and remove loose frond boots; remove vegetation, such as strangler figs, Brazilian Pepper, Asparagus fern, etc., growing in the frond boots or on the trunk. Provide the rounded, classic cut on all Medjool palm boots. No climbing spikes allowed on palms.

905-3.2.3.2. TRAFFIC CONTROL

Proper and safe work zones in vehicular traffic areas are to be set up and maintained by the Contractor, according to the approved Maintenance of Traffic specifications.

905-3.2.3.3. PEDESTRIAN SAFETY

Contractor is responsible for maintaining safe work zones in areas where pedestrian and park users are present. The City reserves the right to limit the hours of operation in certain high pedestrian use areas.

905-3.2.4. PLANT FERTILIZATION

All tree and plant material should be fertilized with the appropriate amount of 20-6-12 sulfur coated, slow release, ornamental fertilizer, three times per year. Applications should be made in mid-February, early June, and mid-September, for the first two years. Fertilizer types and amounts will change with requirements of maturing landscape materials.

905-3.2.5. WEED REMOVAL IN LANDSCAPED AREA

Weeds should be removed on a regular basis in order to keep them from being visibly noticeable. Weed control with the use of appropriate herbicides is allowable, given they are properly applied by a certified applicator. Herbicide damage to landscape material will be remedied by Contractor at their expense.

905-3.2.6. MULCH CONDITION

Should be maintained at a thickness that will discourage weed growth as well as help retain soil moisture, usually three inches (3").

905-3.2.7. IRRIGATION SERVICE AND REPAIR

Should be performed at each visit to assure the system's proper operation and timing. Drip tubing should be kept covered with mulch. Timer should be checked for proper time of day and operating schedule. Leaks or breaks in the system should be repaired before the next scheduled system running time.

905-3.2.8. LAWN AND ORNAMENTAL PEST CONTROL

Should be performed by a properly licensed and certified applicator to keep pest populations at a less than damaging level. Landscape materials lost to or extensively damaged by pests will be replaced by the Contractor at the Contractor's expense. Diazinon products are not to be used on City properties.

905-3.2.9. PALM FERTILIZATION

Apply three (3) pounds of Magnesium sulfate and one pound of Potassium evenly, per tree, across the root zone (typically within the dripline), annually in early February.

905-3.2.10. FREEZE PROTECTION

The City will provide a freeze/frost protection fabric for the Contractor to install over freeze/frost sensitive plants (Lantana and Pentas). The covering material will be stored at a City facility. Contractor will remove the covering material from storage and install over the sensitive plants, securely fastening edges of the material to the ground per manufacturer's directions. The City will furnish metal pins needed for securing fabric to the ground. The City will notify the Contractor one (1) day or twenty-four (24) hours minimum prior to the need to protect plant material. After uses, the Contractor will prepare the fabric for storage and return it to the designated City facility. Protective covering shall be removed the following afternoon or remain in place as directed by the City. The City shall notify the Contractor by 11:00 a.m. about removing the cover or keeping it in place due to continued freezing temperatures. The City may cancel the freeze protection event at any time prior to the end of the scheduled installation day (5:00 p.m.) The Contractor will be compensated for the number of hours mobilization or on-site work at the contracted rate per man-hour unit price. The Contractor shall provide a unit price for the installation and removal of the covering fabric on a per event basis, as well as an hourly rate per employee required. The City and Contractor will coordinate appropriate irrigation operations with weather conditions. Should freeze/frost damage occur, the Contractor shall perform remedial work as per unit basis, as directed by the City.

906. LEVEL OF SERVICE

The Project Site is to be serviced weekly. Repairs to damage or vandalism to be made within seven (7) working days of reported irregularity. Weekly visits should occur no closer than six (6) and no further than ten (10) calendar days apart.

907. COMPLETION OF WORK

Within twenty-four (24) hours of completing work the City either in person or by phone of said completion. It is acceptable to leave a phone message.

908. INSPECTION AND APPROVAL

Upon receiving notification from the Contractor, the City shall inspect the serviced location the following business day. If, upon inspection, the work specified has not been completed, the City shall contact the Contractor to indicate the necessary corrective measures. The Contractor will be

given forty-eight (48) hours from this notification to make appropriate corrections. If the work has been completed successfully then the City will pay for services billed.

909. SPECIAL CONDITIONS

1. This location will be newly installed and under warranty by the installer for a twelve (12) month period on plants, trees and palms. Landscape installer will coordinate irrigation operation with the Maintenance contractor to assure adequate irrigation to the landscape materials. Installer will also be responsible for the untying of palm heads/fronds as they feel appropriate.
2. All listed acreage or square footage figures are estimates.
3. All work shall be performed in a good and workmanlike manner, consistent with trade practices and standards which prevail in the industry.
4. The Contractor shall be responsible for damage to any plant material or site feature caused by the Contractor or their employees. The Contractor shall be notified in writing of the specific nature of the damage and cost of repair. The City shall, at its option, invoice the Contractor for the payment, or reduce by the amount of the repairs on the next regular payment to the Contractor.
5. Occasionally circumstances (standing water, prolonged inclement weather, parked vehicles, etc.) may make all or portions of a location unserviceable during the regular schedule. The Contractor shall notify the City Supervisor of such occurrences and shall schedule to perform the required work to the location as soon as the pertaining circumstances are relieved.

910. TREE PROTECTION

910-1. TREE BARRICADES

- A. A protective barrier shall be placed around all protected trees and palms prior to land preparation or construction activities within or adjacent to the work zone, including all staging and/or lay down areas. Protective barriers shall be installed as follows:
 1. At or greater than the full dripline of all species of Mangroves and Cabbage Palms.
 2. At or greater than the full dripline of all protected native pine trees and other conifer species.
 3. At or greater than two-thirds (2/3) of the dripline of all other protected species
 4. At or greater than the full dripline of trees within a specimen tree stand.
- B. Protective barriers are to be constructed using no less than two inch (2") lumber for upright posts. Upright posts are to be at least four feet (4') in length with a minimum of one foot (1') anchored in the ground. Upright posts are to be placed at a maximum distance of eight feet (8') apart. Horizontal rails are to be constructed using no less than one inch (1") by four-inch (4") lumber and shall be securely attached to the top of the upright post. The City's representative must approve any variation from the above requirements.

- C. Whenever a protective barrier is required, it shall be in place until all construction activity is terminated. The area within the barrier limits shall remain undisturbed by any activity during construction. Native ground cover and understory vegetation existing within the barriers shall remain throughout construction. Exotic plant species may only be removed by manual labor utilizing hand tools or by other means if authorized in writing by the City's representative.
- D. Prior to the erection of any required protective barrier, all surface foreign material, trash or debris shall be removed from the area enclosed by the barrier, and after erection of the barrier no such material or litter shall be permitted to remain within the protected area. No equipment, chemicals, soil deposits or construction materials shall be placed within such protective barriers.
- E. No signs, building permits, wires, or other attachments of any kind shall be attached to any protected tree or palm.
- F. At all times, due care shall be taken to protect the critical root zone of trees protected by this section, and root pruning requirements shall apply to such trees.

910-2. ROOT PRUNING

- A. Where proposed construction improvements involve excavation and/or impacts to the critical root zone of protected trees, the Contractor shall be required to have an International Society of Arboriculture (ISA) certified arborist perform, or directly supervise root pruning to reduce the impacts of construction. The critical root zone is equivalent to the tree's dripline. Prior to any clearing, grubbing or excavation activities, the affected roots must be severed by clean pruning cuts at the point where grubbing or excavation impacts the root system. Roots can be pruned utilizing specified root pruning equipment designed for that purpose or by hand digging a trench and pruning roots with a pruning saw, chain saw or other equipment designed for tree pruning. Root pruning by trenching equipment or excavation equipment is strictly prohibited. Roots located in the critical root zone that will be impacted by construction activities shall be pruned to a minimum depth of eighteen inches (18") below existing grade or to the depth of the proposed impact if less than eighteen inches (18") from existing grade. The City's Representative on Engineering Department projects for Root Pruning issues is the Senior Landscape Architect and can be reached at (727) 562-4747, or through the construction inspector assigned to the project.
- B. Root pruning shall only be performed by or under the direct supervision of an International Society of Arboriculture (ISA) certified arborist.
- C. Any proposed root pruning trenches shall be identified on site (i.e. staked or painted) inspected and approved by the City's representative prior to actual root pruning.
- D. Root pruning shall be performed as far in advance of other construction activities as is feasible, but at a minimum shall be performed prior to ANY impacts to the soil. Associated tree protection measures should be implemented upon completion of said root pruning.
- E. If there is a likelihood of excessive wind and/or rain exceptional care shall be taken on any root pruning activities.

- F. Root pruning shall be limited to a minimum of ten inches (10”) per one inch (1”) of the trunk diameter from the tree base. Any exception must be approved by the City’s representative prior to said root pruning.
- G. Roots shall be cut cleanly, as far from the trunk of the tree as possible. Root pruning shall be done to a minimum depth of eighteen inches (18”) from existing grade, or to the depth of the disturbance if less than eighteen inches (18”).
- H. Root pruning shall be performed using a root cutting machine specifically designed for this purpose. Alternate equipment or techniques must be approved by the City’s representative, prior to any work adjacent to trees to be preserved.
- I. Root pruning shall be completed, inspected and accepted prior to the commencement of any excavation or other impacts to the critical root zones of trees to be protected.
- J. Excavations in an area where root are present shall not cause the tearing or ripping of tree roots. Roots must first be cleanly severed prior to continuing with the excavation, or tunneled around to prevent damage to the root.
- K. Tree roots shall not be exposed to drying out. Root ends shall be covered with native soil or burlap and kept moist until final backfill or final grades has been established.
- L. When deemed appropriate (e.g., during periods of drought) the City representative may require a temporary irrigation system be utilized in the remaining critical root zones of root pruned trees.
- M. When underground utility lines are to be installed within the critical root zone, the root pruning requirement may be waived if the lines are installed via tunneling or directional boring as opposed to open trenching.

910-3. PROPER TREE PRUNING

- A. All tree pruning and/or root pruning on existing trees to remain shall only be performed by or under the direct supervision of an International Society of Arboriculture (ISA) certified arborist. Furthermore, all tree work shall conform to the American National Standards Institute (ANSI) 2001, American National Standard for tree care operations – Tree, Shrub and other Woody Plant Maintenance – Standard practices (pruning) ANSI A-300.
- B. Proper pruning techniques for all lateral branches of protected trees are required. Flush cuts (pruning cuts that remove the branch collar) and stub cuts (cuts that leave a stub on the tree) are improper techniques. Any protected tree that has been improperly pruned will not be recognized as a tree left on the project in a healthy growing condition, and will require replacement consistent with the current City Code of Ordinances and Community Development Code.
- C. No protected tree shall have more than thirty percent (30%) of its foliage removed.
- D. No protected tree shall be topped, hat raked or lion-tailed. Any protected tree that has been improperly pruned will not be recognized as a tree left on the project in a healthy growing condition, and will require replacement consistent with the current City Code of Ordinances and Community Development Code.

- E. Tree Trunks and limbs shall be protected. The use of tree spikes or other devices that damage trunk and bark tissue on protected trees shall be prohibited. Any protected tree that has been damaged in such a manner will not be recognized as a tree left on the project in a healthy growing condition and will require replacement consistent with the current City Code of Ordinances and Community Development Code.

**CITY OF CLEARWATER
MS WRF CHLORINE CONTACT CHAMBER**

BID SET SUBMITTAL

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**CITY OF CLEARWATER
MS WRF CHLORINE CONTACT CHAMBER**

BID SET SUBMITTAL

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CLEARWATER
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DIVISION 1

GENERAL **REQUIREMENTS**

SECTION 01005

PROJECT REQUIREMENTS

PART 1 - GENERAL

1.01 DESCRIPTION

A. Scope of Work:

1. The Work to be done consists of the furnishing of all labor, materials, and equipment, and the performance of all Work included in this Contract. The summary of the work is presented in Section 01010: Summary of Project.
2. Work Included:
 - a. The Contractor shall furnish all labor, superintendence, materials, plant power, light, heat, fuel, water, tools, appliances, equipment, supplies, and means of construction necessary for proper performance and completion of the Work. The Contractor shall obtain and pay for all necessary local building and other regulatory permits. The Contractor shall perform and complete the Work in the manner best calculated to promote rapid construction consistent with safety of life and property and to the satisfaction of the Engineer, and in strict accordance with the Contract Documents. The Contractor shall clean up the Work and maintain it during and after construction, until accepted, and shall do all Work and pay all costs incidental thereto. He shall repair or restore all structures and property that may be damaged or disturbed during performance of the Work.
 - b. The cost of incidental work described in these Project Requirements, for which there are no specific Contract Items, shall be considered as part of the general cost of doing the Work and shall be included in the prices for the various Contract Items. No additional payment will be made therefore.
 - c. The Contractor shall provide and maintain such modern plant, tools, and equipment as may be necessary, in the opinion of the Engineer, to perform in a satisfactory and acceptable manner all the Work required by this Contract. Only equipment of established reputation and proven efficiency shall be used. The Contractor shall be solely responsible for the adequacy of his workmanship, materials, and equipment, prior approval of the Engineer notwithstanding.

3. Public Utility Installations and Structures:

- a. Public utility installations and structures shall be understood to include all poles, tracks, pipes, wires, conduits, vaults, manholes, and all other appurtenances and facilities pertaining thereto whether owned or controlled by the Owner, other governmental bodies, or privately owned by individuals, firms, or corporations, used to serve the public with transportation, traffic control, gas, electricity, telephone, sewerage, drainage, water, or other public or private property which may be affected by the Work shall be deemed included hereunder.
- b. The Contract Documents contain data relative to existing public utility installations and structures above and below the ground surface. These data are not guaranteed as to their completeness or accuracy and it is the responsibility of the Contractor to make his own investigations to inform himself fully of the character, condition, and extent of all such installations and structures as may be encountered and as may affect the construction operations.
- c. The Contractor shall protect all public utility installations and structures from damage during the Work. Access across any buried public utility installation or structure shall be made to avoid any damage to these facilities. All required protective devices and construction shall be provided by the Contractor at his expense. All existing public utilities damaged by the Contractor shall be repaired by the Contractor, at his expense. No separate payment shall be made for such protection or repairs to public utility installations or structures.
- d. Public utility installations or structures owned or controlled by the Owner or other governmental body which are shown on the Drawings to be removed, relocated, replaced, or rebuilt by the Contractor shall be considered as a part of the general cost of doing the Work and shall be included in the prices bid for the various Contract Items. No separate payment shall be made therefor.
- e. Where public utility installations or structures owned or controlled by the Owner or other governmental body are encountered during the course of the Work, and are not indicated on the Drawings or in the Specifications, and when, in the opinion of the Engineer, removal, relocation, replacement, or rebuilding is necessary to complete the Work under this Contract, such Work shall be accomplished by the utility having jurisdiction, or such Work may be ordered, in writing by the Engineer, for the Contractor to accomplish. If such work is accomplished by the utility having jurisdiction it will be carried out expeditiously, and the Contractor shall give full cooperation to permit the utility to complete the removal, relocation, replacement, or

rebuilding as required. If such work is accomplished by the Contractor, it will be paid for as extra work as provided in the Agreement.

- f. The Contractor shall, at all times in performance of the Work, employ acceptable methods and exercise reasonable care and skill so as to avoid unnecessary delay, injury, damage, or destruction of public utility installations and structures; and shall, at all times in the performance of the Work, avoid unnecessary interference with, or interruption of, public utility services, and shall cooperate fully with the owners thereof to that end.
- g. The Contractor shall give written notice to Owner and other governmental utility departments and other owners of public utilities of the location of his proposed construction operations, at least 48-hours in advance of breaking ground in any area or on any unit of the Work.
- h. The maintenance, repair, removal, relocation, or rebuilding of public utility installations and structures, when accomplished by the Contractor as herein provided, shall be done by methods approved by the owners of such utilities.

1.02 DRAWINGS AND PROJECT MANUAL

- A. Drawings: When obtaining data and information from the Drawings, figures shall be used in preference to scaled dimensions, and large-scale drawings in preference to small-scale drawings.
- B. Supplementary Drawings:
 - 1. When, in the opinion of the Engineer, it becomes necessary to explain more fully the Work to be done or to illustrate the Work further or to show any changes which may be required, drawings known as Supplementary Drawings, with specifications pertaining thereto, will be prepared by the Engineer, and the Contractor will be furnished one (1) complete set of Construction Drawings (24 inches by 36 inches) and one (1) reproducible copy of the Project Manual.
 - 2. The Supplementary Drawings shall be binding upon the Contractor with the same force as the Contract Drawings. Where such Supplementary Drawings require either less or more than the estimated quantities of Work, credit to the Owner or compensation therefor to the Contractor shall be subject to the terms of the Agreement.
- C. Contractor to Check Drawings and Data:
 - 1. The Contractor shall verify all dimensions, quantities, and details shown on the Drawings, Supplementary Drawings, schedules, Specifications, or other data received from the Engineer, and shall notify him of all errors, omissions,

conflicts, and discrepancies found therein. Failure to discover or correct errors, conflicts, or discrepancies shall not relieve the Contractor of full responsibility for unsatisfactory work, faulty construction, or improper operation resulting therefrom, nor from rectifying such conditions at his own expense. He will not be allowed to take advantage of any errors or omissions, as full instructions will be furnished by the Engineer, should such errors or omissions be discovered.

2. All schedules are given for the convenience of the Engineer and the Contractor and are not guaranteed to be complete. The Contractor shall assume all responsibility for the making of estimates of the size, kind, and quality of materials and equipment included in work to be done under the Contract.
- D. Specifications: The Technical Specifications consist of three (3) parts: General, Products, and Execution. The General part of a Specification contains General Requirements which govern the Work. The Products and Execution parts modify and supplement the General Requirements by detailed requirements for the Work and shall always govern whenever there appears to be a conflict.
- E. Intent:
1. All Work called for in the Specifications applicable to this Contract, but not shown on the Drawings in their present form, or vice versa, shall be of like effect as if shown or mentioned in both. Work not specified in either the Drawings or in the Specifications, but involved in carrying out their intent or in the complete and proper execution of the Work, is required and shall be performed by the Contractor as though it were specifically delineated or described.
 2. The apparent silence of the Specifications as to any detail, or the apparent omission from them of a detailed description concerning any work to be done and materials to be furnished, shall be regarded as meaning that only the best general practice is to prevail and that only material and workmanship of the best quality is to be used, the interpretation of these Specifications shall be made upon that basis.

1.03 MATERIALS AND EQUIPMENT

- A. Manufacturer:
1. All transactions with the manufacturers or subcontractors shall be through the Contractor, unless the Contractor shall request and at the Engineer's option, that the manufacturer or subcontractor deal directly with the Engineer. Any such transactions shall not in any way release the Contractor from his full responsibility under this Contract.
 2. Any two (2) or more pieces of material or equipment of the same kind, type, or classification, and being used for identical types of service, shall be made by the same manufacturer.

B. Delivery:

1. The Contractor shall deliver materials in ample quantities to ensure the most speedy and uninterrupted progress of the Work so as to complete the Work within the allotted time.
2. The Contractor shall also coordinate deliveries in order to avoid delay in, or impediment of, the progress of the work of any related Contractor.
3. The Contractor shall be fully responsible for all tariffs associated with materials, equipments, and their delivery.

C. Tools and Accessories:

1. The Contractor shall, unless otherwise stated in the Contract Documents, furnish with each type, kind, or size of equipment, one (1) complete set of suitably marked high grade special tools and appliances which may be needed to adjust, operate, maintain, or repair the equipment. Such tools and appliances shall be furnished in approved painted steel cases, properly labeled and equipped with good grade cylinder locks and duplicate keys.
2. Spare parts shall be furnished as specified herein and as recommended by the manufacturer necessary for the operation of the equipment, not including materials required for routine maintenance.
3. Each piece of equipment shall be provided with a substantial nameplate, securely fastened in place and clearly inscribed with the manufacturer's name, year of manufacture, serial number, weight, and principal rate data.

D. Service of Manufacturer's Engineer:

1. The Contract Prices for equipment shall include the cost of furnishing a competent and experienced engineer or superintendent who shall represent the manufacturer and shall assist the Contractor, when required, to install, adjust, test, and place in operation, the equipment in conformity with the Contract Documents.
2. After the equipment is placed in permanent operation by the Owner, such engineer or superintendent shall make all adjustments and tests required by the Engineer to prove that such equipment is in proper and satisfactory operating condition, and shall instruct such personnel as may be designated by the Owner in the proper operation and maintenance of such equipment.

1.04 INSPECTION AND TESTING

A. General:

1. For tests specified to be made by the Contractor, the testing personnel shall make the necessary inspections and tests, and the reports thereof shall be in such form as will facilitate checking to determine compliance with the Contract Documents. Five (5) copies of the reports shall be submitted, and authoritative certification thereof must be furnished to the Engineer as a prerequisite for the acceptance of any material or equipment.
2. If, in the making of any test of any material or equipment, it is ascertained by the Engineer that the material or equipment does not comply with the Contract Documents, the Contractor will be notified thereof, and he will be directed to refrain from delivering said material or equipment, or to remove it promptly from the site or from the Work and replace it with acceptable material, without cost to the Owner.
3. Tests of electrical and mechanical equipment and appliances shall be conducted in accordance with the recognized test codes of the ANSI, ASME, or the IEEE, except as may otherwise be stated herein.
4. The Contractor shall be fully responsible for the proper operation of equipment during testing and instruction periods and shall neither have nor make any claim for damage which may occur to equipment prior to the time when the Owner formally takes over the operation thereof.

B. Costs:

1. All inspection and testing of materials furnished under this Contract will be provided by the Contractor, unless otherwise expressly specified.
2. The cost of shop and field tests of equipment and of certain other tests specifically called for in the Contract Documents shall be borne by the Contractor, and such costs shall be deemed to be included in the Contract Price.
3. Materials and equipment submitted by the Contractor as the equivalent to those specifically named in the Contract may be tested by the Owner for compliance. The Contractor shall reimburse the Owner for the expenditures incurred in making such tests of materials and equipment which are rejected for non-compliance.

C. Certificate of Manufacture:

1. Contractor shall furnish to Engineer authoritative evidence in the form of a certificate of manufacture that the materials to be used in the Work have been manufactured and tested in conformity with the Contract Documents.
2. These certificates shall be notarized and shall include copies of the results of physical tests and chemical analyses, where necessary, that have been made directly on the product or on similar products of the manufacturer.

D. Shop Tests:

1. Each piece of equipment for which pressure, duty, capacity, rating, efficiency, performance, function, or special requirements are specified shall be tested in the shop of the maker in a manner which shall conclusively prove that its characteristics comply fully with the requirements of the Contract Documents.
2. Five (5) copies of the manufacturer's actual test data and interpreted results thereof, accompanied by a certificate of authenticity sworn to by a responsible official of the manufacturing company and/or independent laboratory, shall be submitted to the Engineer for approval.
3. The cost of shop tests and of furnishing manufacturer's preliminary and shop test data of operating equipment shall be borne by the Contractor.

E. Start-up Tests:

1. As soon as conditions permit, the Contractor shall furnish all labor, materials, and instruments and shall make start-up tests of equipment.
2. If the start-up tests disclose any equipment furnished under this Contract which does not comply with the requirements of the Contract Documents, the Contractor shall, prior to demonstration tests, make all changes, adjustments, and replacements required. The furnishing Contractor shall assist in the start-up tests as applicable.

F. Demonstration Tests:

1. Prior to Contractor's request for a Substantial Completion inspection, all equipment and piping installed under this Contract shall be subjected to demonstration tests as specified or required to prove compliance with the Contract Documents.
2. The Contractor shall furnish labor, fuel, energy, water, and all other materials, equipment, and instruments necessary for all demonstration tests, at no additional cost to the Owner. Contractor shall assist in the demonstration tests as applicable.

1.05 LINES AND GRADES

A. Grade:

1. All work under this Contract shall be constructed in accordance with the lines and grades shown on the Drawings, or as given by the Engineer. The full responsibility for keeping alignment and grade shall rest upon the Contractor.
2. Adjustments of grades shown on Drawings may be necessary to conform to actual field conditions or to maintain cover under proposed future grades. Such adjustments shall be considered part of the job conditions and no extra compensation will be allowed for such changes, except where specifically otherwise noted in the Drawings or Specifications. Such adjustments must be approved by the Engineer prior to being made.

B. Surveys:

1. The Contractor shall furnish and maintain, at his own expense, stakes and other such materials.
2. The Contractor shall check such reference marks by such means as he may deem necessary and, before using them, shall call the Engineer's attention to any inaccuracies.
3. The Contractor shall, at his own expense, establish all working or construction lines and grades as required from the reference marks set by the Engineer, and shall be solely responsible for the accuracy thereof. He shall, however, be subject to the check and review by the Engineer.

C. Safeguarding Marks:

1. The Contractor shall safeguard all points, stakes, grade marks, monuments, and bench marks made or established on the Work, bear the cost of re-establishing them if disturbed, and bear the entire expense of rectifying work improperly installed due to not maintaining or protecting or to removing without authorization such established points, stakes, and marks.
2. The Contractor shall safeguard all existing and known property corners, monuments, and marks adjacent to but not related to the Work and shall bear the cost of re-establishing them if disturbed or destroyed.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION

SECTION 01010

SUMMARY OF PROJECT

PART 1 - GENERAL

1.01 WORK COVERED BY CONTRACT DOCUMENTS

- A. This Contract is for the Marshall Street Water Reclamation Facility's Inner Chlorine Contact Chamber (CCC) Repair as shown on the Drawings and specified herein. The Work consists of furnishing all labor, equipment, and materials for the repair of the structure consisting of, but not limited to, the following:

Phase 1

1. Repair eastern end of chamber at weir wall.
2. Install sump pump to collect external seepage during repair.
3. Repair and seal any concrete cracks contributing to current seepage.
4. Replace bolt gaskets on the baffle wall adjacent to the Filter Building.

Phase 2

5. Apply coating system to wall adjacent to Filter Building and weir wall.
6. Conduct hydrostatic leak test.

Phase 3 (Additive Alternative as directed by Owner)

7. Repair eastern end of Outer CCC chamber at weir wall.
8. Conduct hydrostatic leak test.

1.02 CONTRACTOR'S USE OF PREMISES

- A. The Contractor shall assume full responsibility for the protection and safekeeping of products and materials at the job site. If additional storage or work areas are required, they shall be obtained by the Contractor at no additional cost to the Owner.

1.03 PROJECT SEQUENCE

- A. The Contractor shall establish his work sequence based on the use of crews to facilitate completion of construction and testing within the specified Contract Time. The proposed project sequence shall be submitted to the Engineer prior to construction.

END OF SECTION

SECTION 01025

MEASUREMENT AND PAYMENT

PART 1 - GENERAL

1.01 GENERAL INFORMATION

- A. Refer to Section 01010 for a description of the work required for completion of the Work.
- B. Subject to the provisions in the Contract General Conditions, all work and payment for the work is represented by the Total Base Bid amount shown on the Bid Form.

1.02 PAYMENT

- A. Work under this contract will be paid for on a unit price basis as outlined on the Bid Form.
- B. The prices shown on the Bid Form establish a total price cost for completing the Work in its entirety. Furnish all materials, equipment, transportation, tools, labor, services and supplies, plus any miscellaneous items and services that may not be specifically identified in the Contract Drawings and Specifications but that can be inferred from the Contract Drawings and Specifications and are necessary to produce a completed Work that is usable in a manner for which it was intended. If any items for a complete work are omitted or not shown, the Contractor shall furnish and install them without additional cost to the OWNER. No separate payment will be made for another Payment Item required to complete the work of a lump sum item.
- C. The Contractor shall prepare and submit an Application for Payment no more often than each month.
- D. Retainage shall apply to all Contractor payments prior to final acceptance as provided for in the Contract General Conditions.

1.03 MEASUREMENT FOR PAYMENT

- A. Measurement for Lump Sum bid items shall be based on the percent of actual completion as determined by the Contractor and agreed upon by the ENGINEER.
- B. Measurement of volumes shall be the actual "as-built" volume pertinent to payment items. Quantities on the Bid Form are estimated and may be increased or decreased without limit.

1.04 PAYMENT ITEMS

- A. Separate payment will be made for the Unit Price and Lump Sum Items listed on the Bid Form. Related work not specifically listed or identified, but evidently necessary for satisfactory completion of the Item, shall be considered to be included.
- B. No separate payment will be made for the following Work and its cost shall be included in appropriate Payment Items:
 - 1. Maintenance and replacement of plantings and sodding.
 - 2. Record drawings.
 - 3. Construction photographs and videotape recordings.
 - 4. Field office(s) and storage facilities.
 - 5. Clean up.
 - 6. Testing materials and apparatus.
 - 7. Appurtenant work.
 - 8. Contractor fees associated with the performance of the Work.
 - 9. Night work.
- C. The following will clarify the work included for bid items in the Pay Item Sheet:
 - 1. Mobilization and Demobilization (Bid Item No. 1):
 - a. Measurement of various items for Mobilization and Demobilization will not be made for payment and all items shall be included in the lump sum price.
 - b. Payment for Mobilization and Demobilization will be made at the Contract lump sum price for the item, which price and payment shall be full compensation for the preparatory work and operations in mobilizing for beginning work on the Project and demobilizing for ending work on the Project. The establishment of field offices, buildings, safety equipment, first aid supplies, sanitary and other facilities, as required by these Specifications, State and local laws and any other preconstruction expense necessary for the state of the Work; the cost of field engineering, including disposal of cleared and grubbed material and debris, permits and fees, construction schedules, preconstruction video and photographs, project signs, shop drawings, temporary facilities, lay down storage area, construction aids, erosion control, work associated with Contractor support during Owner/Engineer testing, reviews and inspection, re-inspection and any rework resulting from same, cleaning, project records documents, operating and maintenance data. The Contractor shall submit invoices substantiating the cost of mobilization with each pay request. Ten percent of the cost for mobilization and demobilization will be withheld until acceptance and final payment.

Contractor is responsible for securing a site for storage of materials and equipment and all other construction needs and providing security for this site and its contents.

2. General Requirements (Bid Item No. 2):
 - a. Measurement for various items covered under General Requirements will not be made for payment, and all items shall be included in the lump sum price.
 - b. Payment for General Requirements shall include all Insurance requirements costs, the costs of all bonds, and all administrative costs associated with acquiring and maintaining the necessary coverage as described in the Contract Documents. This item will be paid upon each payment request made by the Contractor. The Contractor shall attach with the payment request invoices to substantiate that appropriate insurance and bonds have been obtained by the Contractor. Payment will be based on percentage of work completed during the pay period at time of pay application to the nearest 10% complete. The cumulative total shall not exceed the Lump Sum Bid Pay Item Amount.
3. Polyurethane Resin Crack Injections (Bid Item No. 3):
 - a. Measurement for this item will be based on the length of cracks repaired in linear feet (LF).
 - b. Payment for this item will include all materials, equipment, and work required to complete this portion of the project as shown on or inferred by the Contract Documents. The quantity of work described under this description shall be paid in the units of measurement as agreed and approved in writing. The total of which shall not exceed the amount listed on the Bid Form for Work in place, completed and accepted. Contractor shall provide line item breakdown of specific work and associated costs in the Schedule of Values.
4. All other work not included in line items 1, 2 and 3 to complete Phase 1 repairs to the Marshall Street WRF Inner Chlorine Contact Chamber (CCC) (Bid Item No. 4):
 - a. Measurement of various items not included in other bid items to repair the CCC will not be made for payment and all items shall be included in the lump sum price.
 - b. Payment for these items will include all materials, equipment, and work required to complete the project as shown on or inferred by the Contract Documents and will be made at the contract lump sum. Contractor shall provide line item breakdown of specific work and associated costs in the Schedule of Values.

5. Coating System on Walls (Bid Item No. 5):
 - a. Measurement for this item will be based on the area of wall coated in square feet (SF).
 - b. Payment for this item will include all materials, equipment, and work required to complete this portion of the project as shown on or inferred by the Contract Documents. The quantity of work described under this description shall be paid in the units of measurement as agreed and approved in writing. The total of which shall not exceed the amount listed on the Bid Form for Work in place, completed and accepted. Contractor shall provide line item breakdown of specific work and associated costs in the Schedule of Values.
6. All other work not included in line item 5 to complete Phase 2 repairs to the Marshall Street WRF Inner Chlorine Contact Chamber (CCC) (Bid Item No. 6):
 - a. Measurement of various items not included in other bid items to repair the CCC will not be made for payment and all items shall be included in the lump sum price.
 - b. Payment for these items will include all materials, equipment, and work required to complete the project as shown on or inferred by the Contract Documents and will be made at the contract lump sum. Contractor shall provide line item breakdown of specific work and associated costs in the Schedule of Values.
7. All other work not included in line items 1 through 6 to complete Phase 3 repairs to the Marshall Street WRF Outer Chlorine Contact Chamber (CCC). This work will only be completed if directed by the Owner (Bid Item No. 7):
 - a. Measurement of various items not included in other bid items to repair the CCC will not be made for payment and all items shall be included in the lump sum price.
 - b. Payment for these items will include all materials, equipment, and work required to complete the project as shown on or inferred by the Contract Documents and will be made at the contract lump sum. Contractor shall provide line item breakdown of specific work and associated costs in the Schedule of Values.
8. Owner's Contingency (Bid Item No. 8):
 - a. The work covered by this Bid Item consists of unforeseen items of work not included in other bid items but necessary for accomplishing the work and shall apply only to extra work or additional items over and above those specified or shown on the plans. The cost for unforeseen Utility Relocations will be paid for under a separate Pay Item. The cost of this additional work shall be agreed upon in writing and approved by the Owner or his authorized representative prior to starting this

additional work. The value of the work shall be based on unit prices or similar bid items called for in the Proposal.

- b. Measurement: The quantities and cost of unspecified work to be paid under this item shall be agreed upon and approved in writing by the Owner or his authorized representative prior to starting this unspecified work.
- c. The bid price for this Bid Item shall be ten percent (10%) of the total bid. This item will be treated as an allowance, against which the Owner, at his discretion, may direct work not shown on the plans, or require other additional work which falls within the general scope of work for the project, as approved in writing from the Owner. Each dollar of cost for the additional work will be considered one unit. The final project change order shall include all additional costs approved under the contingency. This item is for contingency if required during the course of the project to facilitate the project and will be paid only after written authorization to include the item in the progress payments.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION

SECTION 01041

PROJECT COORDINATION

PART 1 - GENERAL

1.01 WORK INCLUDED

- A. Furnish personnel and equipment that will be efficient, appropriate and large enough to secure a satisfactory quality of work and a rate of progress that will ensure the completion of the work within the Contract time. If at any time, such personnel appear to the Engineer to be inefficient, inappropriate or insufficient for securing the quality of work, he may order the Contractor to increase the efficiency, change the character or increase the personnel and equipment, and the Contractor shall conform to such order. Failure of the Engineer to give such order shall in no way relieve the Contractor of his obligations to secure the quality of the work and rate of progress.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION

3.01 PIPE LOCATIONS

- A. All pipes shall be located substantially as indicated on the Drawings, but the Engineer reserves the right to make such modifications in locations as may be found desirable to avoid interference with existing structures or for other reasons. Where fittings are noted on the Drawings, such notation is for the Contractor's convenience and does not relieve him from laying and jointing different or additional items where required.

3.02 OPEN EXCAVATIONS

- A. Contractor shall adequately safeguard all open excavations by providing temporary barricades, caution signs, lights, and other means to prevent accidents to persons, and damage to property. The Contractor shall, at his own expense, provide suitable and safe bridges and other crossings for accommodating travel by workmen. All open excavations shall comply with applicable OSHA Standards.

3.03 TEST PITS

- A. Test pits for the purpose of locating underground pipelines or structures in advance of the construction shall be excavated and backfilled by the Contractor. Test pits shall be backfilled immediately after their purpose has been satisfied and maintained in a manner satisfactory to the Engineer. The costs for such test pits shall be borne by the Contractor.

3.04 CARE AND PROTECTION OF PROPERTY

- A. The Contractor shall be responsible for the preservation of all public and private property, and shall use every precaution necessary to prevent damage thereto. If any direct or indirect damage is done to public or private property by or on account of any act, omission, neglect, or misconduct in the execution of the Work on the part of the Contractor, such property shall be restored by the Contractor, at his expense, to a condition similar or equal to that existing before the damage was done, or he shall make good the damage in other manner acceptable to the Engineer.

3.05 PROTECTION OF CONSTRUCTION AND EQUIPMENT

- A. All newly constructed work shall be carefully protected from damage in any way. No wheeling or walking or placing of heavy loads on it shall be allowed and all portions damaged shall be reconstructed by the Contractor at no additional expense to the Owner.
- B. Protect all structures in a suitable manner to prevent damage. Should any part of a structure become heaved, cracked or otherwise damaged, all such damaged portions of the work shall be completely repaired and made good by the Contractor at his own expense and to the satisfaction of the Engineer. If, in the final inspection of the work, any defects, faults or omissions are found, the Contractor shall cause the same to be repaired or removed and replaced by proper materials and workmanship without extra compensation for the materials and labor required. Further, the Contractor shall be fully responsible for the satisfactory maintenance and repair of the construction and other work undertaken herein, for at least the guarantee period described in the Contract.
- C. Further, the Contractor shall take all necessary precautions to prevent damage to any structure due to water pressure during and after construction and until such structure is accepted and taken over by the Owner.

3.06 MAINTENANCE OF TRAFFIC

- A. Unless permission to close a street is received in writing from the proper authority (County, City, FDOT, etc.), all excavated material shall be placed so that vehicular and pedestrian traffic may be maintained at all times. If the Contractor's operations cause traffic hazards, he shall repair the road surface, provide temporary ways, erect wheel guards or fences, or take other measures for safety satisfactory to the Engineer.
- B. Detours around construction will be subject to the approval of the Owner and the Engineer. Where detours are permitted, the Contractor shall provide all necessary barricades and signs as required to divert the flow of traffic. While traffic is detoured, the Contractor shall expedite construction operations and periods when traffic is being detoured will be strictly controlled by the Owner. All maintenance of traffic plans

required for construction shall be approved by the local governmental entity having jurisdiction.

- C. The Contractor shall take precautions to prevent injury to the public due to open excavation. Night watchmen may be required where special hazards exist, or police protection provided for traffic while work is in progress. The Contractor shall be fully responsible for damage or injuries whether or not police protection has been provided.

3.07 PRIVATE LAND

- A. The Contractor shall not enter or occupy private land outside the site, except by written permission of the appropriate owners. Contractor shall provide Owner a copy of such written permission prior to entering private land.
- B. The Contractor shall ensure that all individuals are signed-in and signed-out of the site using the City log located on the first floor of the Maintenance Building each day. List all individual names and do not sign-in or sign-out as a group.

3.08 COOPERATION WITHIN THIS CONTRACT

- A. The Contractor shall, prior to interrupting a utility service (water, sewer, etc.) for the purpose of making cut-ins to the existing lines or for any other purposes, contact the Owner and make arrangements for the interruption, which will be satisfactory to the Owner.

3.09 COOPERATION WITH OTHER CONTRACTS

- A. This Contract may require a portion of the work to be connected to work done under other contract(s). It will be necessary for the Contractor to plan his work and cooperate with other contractors insofar as possible to prevent any interference and delay.

END OF SECTION

SECTION 01070

ABBREVIATIONS AND SYMBOLS

PART 1 - GENERAL

1.01 STANDARDS AND ABBREVIATIONS

- A. Referenced Standards: Any reference to published specifications or standards of any organization or association shall comply with the requirements of the specification or standard which is current on the date of Advertisement for Bids. In case of a conflict between the referenced specifications or standards, the one having the more stringent requirements shall govern.

In case of conflict between the referenced specifications or standards and the Contract Documents, the Contract Documents shall govern.

- B. Abbreviations:

AA	Aluminum Association
AAA	American Arbitration Association
AABC	Associated Air Balance Council
AAMA	Architectural Aluminum Manufacturers Association
AASHO	The American Association of State Highway Officials
ABA	American Bar Association
ABMA	American Boiler Manufacturers Association
ABPA	Acoustical and Board Products Association
ACI	American Concrete Institute
ACPA	American Concrete Pipe Association
AEIC	Association of Edison Illuminating Companies
AFBMA	Anti-Friction Bearing Manufacturers Association
AGA	American Gas Association
AGC	Associated General Contractors of America
AGMA	American Gear Manufacturers Association
AHA	American Hardboard Association
AI	The Asphalt Institute
AIA	American Institute of Architects
AIA	American Insurance Association
AIEE	American Institute of Electrical Engineers (Now IEEE)
AIMA	Acoustical and Insulating Materials Association
AISC	American Institute of Steel Construction
AISI	American Iron and Steel Institute
AITC	American Institute of Timber Construction
AMCA	Air Moving and Condition Association
ANSI	American National Standard Institute
APA	American Plywood Association

SECTION IVa – Supplemental Technical Specifications

API	American Petroleum Institute
APWA	American Public Works Association
AREA	American Railway Engineering Association
ARI	American Refrigeration Institute
ASA	American Standards Association (Now ANSI)
ASAH	American Society of Architectural Hardware Consultants
ASCE	American Society of Civil Engineers
ASHRAE	American Society of Heating, Refrigerating and Air Conditioning Engineers
ASME	American Society of Mechanical Engineers
ASSC	American Standard Safety Code for Building Construction
ASSHTO	American Association of State Highway Transportation Officials
ASTM	American Society for Testing and Materials
AWG	American Wire Gauge
AWI	Architectural Woodwork Institute
AWPA	American Wood Preservers Association
AWPB	American Wood Preservers Bureau
AWPI	American Wood Preservers Institute
AWS	American Welding Society
AWWA	American Water Works Association
BHMA	Builders Hardware Manufacturers Association
BIA	Brick Institute of America (formerly SCPI)
CDA	Copper Development Association
CFS	Cubic Feet Per Second
CMAA	Crane Manufacturers Association of America
CRSI	Concrete Reinforcing Steel Institute
CS	Commercial Standard
DHI	Door and Hardware Institute
DIPRA	Ductile Iron Pipe Research Association
DOT Spec	Standard Specification for Road and Bridge Construction Florida Department of Transportation, 1982
E/A	Engineer and/or Architect
EDA	Economic Development Association
EEL	Edison Electric Institute
EPA	Environmental Protection Agency
FCI	Fluid Control Institute
FDEP	Florida Department of Environmental Protection
FDOT	Florida Department of Transportation
Fed Spec	Federal Specification
FGS	Florida Geological Survey
FPS	Feet Per Second
FS	Federal Standards
GPM	Gallons Per Minute
HMI	Hoist Manufacturers Institute
HP	Horsepower
HSBI	Hartford Steam Boiler Inspection and Insurance Co.
ID	Inside Diameter

SECTION IVa – Supplemental Technical Specifications

IEEE	Institute of Electrical and Electronic Engineers
IFI	Industrial Fasteners Institute
IPCEA	Insulated Power Cable Engineers Association
IPS	Iron Pipe Size
MGD	Million Gallons Per Day
MHI	Materials Handling Institute
MMA	Monorail Manufacturers Association
N _a OCI	Sodium Hypochlorite
NBFU	National Board of Fire Underwriters
NBHA	National Builders' Hardware Association
NBS	National Bureau of Standards
NCSA	National Crushed Stone Association
NCSPA	National Corrugated Steel Pipe Association
ND	Nominal Diameter
NEC	National Electrical Code
NECA	National Electrical Contractors' Association
NEMA	National Electrical Manufacturers' Association
NFPA	National Fire Protection Association
NLA	National Lime Association
NPC	National Plumbing Code
NPT	National Pipe Threads
NSC	National Safety Council
NSF	National Sanitation Foundation
OD	Outside Diameter
OSHA	U.S. Department of Labor, Occupational Safety and Health Act
PCA	Portland Cement Association
PCI	Prestressed Concrete Institute
PS	United States Products Standards
PSI	Pounds per Square Inch
PSIA	Pounds per Square Inch Absolute
PSIG	Pounds per Square Inch Gauge
RAS	Return Activated Sludge
RPM	Revolutions Per Minute
SAE	Society of Automotive Engineers
SDI	Steel Decks Institute
SJI	Steel Joists Institute
SWFWMD	Southwest Florida Water Management District
SMACNA	Sheet Metal and Air Conditioning Contractors' National Association
SSI	Scaffolding and Shoring Institute
SSPC	Steel Structures Painting Council
SSPC	Structural Steel Painting Council
STA	Station (100 feet)
TDH	Total Dynamic Head
TH	Total Head
UBC	Uniform Building Code
UL	Underwriter's Laboratories, Inc.

SECTION IVa – Supplemental Technical Specifications

USASI or	United States of America Standards Institute
USGS	United States Geological Survey
WAS	Waste Activated Sludge

- C. Additional abbreviations and symbols are shown on the Drawings.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION

SECTION 01091

REFERENCE SPECIFICATIONS

PART 1 - GENERAL

1.01 GENERAL

- A. Applicable Publications. Whenever in these specifications references are made to published specifications, codes, standards, or other requirements, it shall be understood that wherever no date is specified, only the latest specifications, standards, or requirements of the respective issuing agencies which have been published as of the date that the Work is advertised for bids, shall apply; except to the extent that said standards or requirements may be in conflict with applicable laws, ordinances, or governing codes. No requirements set forth herein or shown on the drawings shall be waived because of any provision of or omission from said standards or requirements.
- B. Assignment of Specialists. In certain instances, specification test requires (or implies) that specific Work is to be assigned to specialist or expert entities who must be engaged for the performance of the Work. Such assignments shall be recognized as special requirements over which the Contractor has no choice or option. These requirements shall not be interpreted so as to conflict with the enforcement of building codes and similar regulations governing the Work. They are not intended to interfere with local union jurisdiction settlements and similar conventions. Such assignments are intended to establish which party or entity involved in a specific unit of Work is recognized as "expert" for the indicated construction processes or operations. Nevertheless, the final responsibility for fulfillment of the entire set of contract requirements remains with the Contractor.

1.02 REFERENCE SPECIFICATIONS, CODES AND STANDARDS

- A. Without limiting the generality of other requirements of the specifications, all Work specified herein shall conform to or exceed the requirements of such documents are not in conflict with the requirements of these specifications not the applicable codes.
- B. References herein to "Building Code" shall mean the Florida Building Code (FBC). The latest edition of the code as approved and used by the local agency as of the date of award as adopted by the agency having jurisdiction shall apply to the Work herein, including all addenda, modifications, amendments, or other lawful changes thereto.
- C. In case of conflict between codes, reference standards, drawings, and the other Contract Documents, the most stringent requirements shall govern. All conflicts shall be brought to the attention of the Engineer for clarification and directions prior to ordering or providing any materials or labor. The Contractor shall bid the most stringent requirements.

SECTION IVa – Supplemental Technical Specifications

- D. Applicable Standard Specifications. The Contractor shall construct the Work specified herein in accordance with the requirements of the Contract Documents and the referenced portions of those referenced codes, standards, and specifications listed.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION

SECTION 01100

SPECIAL PROJECT PROCEDURES

PART 1 - GENERAL

1.01 PUBLIC NUISANCE

- A. The Contractor shall not create a public nuisance including, but not limited to, encroachment on adjacent lands, flooding of adjacent lands, or excessive noise.
- B. Sound levels measured by the Engineer shall not exceed 50 dBA from 7 P.M. to 7 A.M. or 60 dBA 7 A.M. to 7 P.M. This sound level shall be measured at the exterior of the nearest exterior wall of the nearest residence. Levels at the equipment shall not exceed 85 dBA at any time. Sound levels in excess of these values are sufficient cause to have the Work halted until equipment can be quieted to these levels. Work stoppage by the Engineer or Owner for excessive noise shall not relieve the Contractor of the other portions of this Specification including, but not limited to, completion dates and bid amounts.
- C. No extra charge may be made for time lost due to work stoppage resulting from the creation of a public nuisance.

1.02 PIPE LOCATIONS AND EXISTING UTILITIES

- A. Pipe Locations. All pipes shall be located substantially as indicated on the Drawings, but the Engineer reserves the right to make such modifications in locations as may be found desirable to avoid interference with existing structures or for other reasons. Where fittings are noted on the Drawings, such notation is for the Contractor's convenience and does not relieve him from laying and jointing different or additional items where required.
- B. Utility Conflicts. Contractor must identify all locations where there is the possibility of conflicts with existing utilities. Contractor will promptly notify the Owner and Engineer in writing in accordance with these documents. Contractor acknowledges that resolving utility conflicts, can sometimes require permitting. The Owner will grant additional days to the Contractor to cover the length of unanticipated delay in writing. However, under no circumstances will the Contractor be eligible for remobilization costs.

1.03 LANDSCAPING RESTORATION

- A. Contractor shall be responsible for replacing all landscaping disturbed during construction with landscaping of equal or better quality, quantity, material and size. The extent of existing landscaping is not shown on drawing and shall be the responsibility of Contractor and field inspected prior to bidding.

1.04 OPEN EXCAVATIONS

- A. All open excavations shall be adequately safeguarded by providing temporary barricades, caution signs, lights and other means to prevent accidents to persons, and damage to property. The Contractor shall, at his own expense, provide suitable and safe bridges and other crossings for accommodating travel by workmen.

1.05 TEST PITS

- A. Test pits for the purpose of locating underground pipeline or structures in advance of the construction shall be excavated and backfilled by the Contractor. Test pits shall be backfilled immediately after their purpose has been satisfied and maintained in a manner satisfactory to the Engineer. The costs for such test pits shall be borne by the Contractor.

1.06 JURISDICTIONAL DISPUTES

- A. It shall be the responsibility of the Contractor to pay all costs that may be required to perform any of the Work shown on the Drawings or specified herein in order to avoid any work stoppages due to jurisdictional disputes. The basis for subletting Work in question, if any, shall conform to precedent agreements and decisions on record with the Building and Construction Trades Department, AFL-CIO, dated June, 1973, including any amendments thereto.

1.07 INCLEMENT WEATHER

- A. In the event of inclement weather, or whenever the Engineer directs; the Contractor shall, and shall cause subcontractors to protect carefully the Work and materials against damage or injury from the weather. If, in the opinion of the Engineer, any portion of work or materials have been damaged or injured by reason of failure on the part of the Contractor or any subcontractors to so protect the Work, such Work and materials shall be removed and replaced at the expense of the Contractor.

1.08 COORDINATION OF WORK

- A. The Contractor shall cooperate fully so as to eliminate or minimize the creation of conflicts. Adjustments from time to time may be required in the Contractor's work location and/or schedule provided a reasonable notice is given by the Owner or Engineer.

1.09 USE OF PUBLIC/PRIVATE STREETS

- A. The use of public/private streets and roads shall be such as to provide a minimum of an inconvenience to the public and to other traffic. Any earth or other excavated materials spilled from trucks shall be removed by the Contractor and the streets and roads cleaned to the satisfaction of the Owner.

- B. Access to properties along the Project must be maintained at all times throughout the duration of the Project as shown in the Drawings.

1.10 TRAFFIC

- A. All safety precautions shall be taken and all traffic controls be furnished satisfactorily to the City, FDOT, and/or other government agencies having jurisdiction, where partial or complete obstruction of highways, roadways, streets, drives or sidewalks is required in the performance of the Work.

1.11 CHEMICALS

- A. All chemicals used during project construction, or furnished for project operations, whether herbicide, pesticide, disinfectant, polymer, reactant or of other classification, must show approval of the State Department of Health, Florida Department of Environmental Protection and if required, also the EPA or USDA. Use of all such chemicals and disposal of residues shall be in strict conformance with the manufacturer's instructions or recommended use procedures.

1.12 SAFETY AND HEALTH REGULATIONS

- A. The Contractor shall comply with the Department of Labor Safety & Health Regulations for construction promulgated under the Occupational Safety & Health Act of 1970, (PL 91-596) and under Section 107 of the Contract Work Hours & Safety Standards Act (PL 91-54).
- B. All equipment furnished and installed under this Contract shall comply to Part 1910, Occupational Safety & Health Standards & Amendments thereto.
- C. The Contractor shall comply with the Florida Trench Safety Act (90-96, Florida Law).

1.13 STATE AND FEDERAL PERMITS

- A. Construction in Florida Department of Transportation rights-of-way, wetlands and navigable water bodies will be governed by applicable State and Federal permits. All conditions set forth on the permits shall be a part of the Contract and they shall be attached by addendum.

1.14 INSPECTION

- A. The authorized representatives and agents of the Environmental Protection Agency and Controlling State and Local Pollution Control Agencies shall be permitted to inspect all work, material, payrolls, personnel records, invoices of materials and any other relevant data and records. The Owner and Engineer shall be permitted access to any work area for the inspection of work and materials. The Owner may, at the Contractor's expense, order the uncovering or removal of any finished work if circumstances indicate faulty work or materials were used in the original installation. The Owner and Engineer shall

also be permitted to inspect material invoices, payrolls or any other relevant data or records as may be necessary or required to satisfy the requirements of the Contract.

1.15 ENVIRONMENTAL PROTECTION

A. General:

1. Contractor shall comply with all Federal, State and Local laws and regulations controlling pollution of the environment. He shall take necessary precautions to prevent pollution of streams, lakes, ponds, and reservoirs with fuels, oils, bitumens, chemicals, or other harmful materials and to prevent pollution of the atmosphere from particulate and gaseous matter. In the event of conflict between such laws and regulations and the requirements of the Specifications, the more restrictive requirements shall apply. Environmental protection requirements specified in other Sections shall be considered as supplementing the requirements of this Section.
2. Failure of the Contractor to fulfill any of the requirements of this Section may result in the Owner ordering the stopping of construction operations.
3. Failure on the part of the Contractor to perform the necessary measures to control erosion, siltation, and pollution will result in the Owner notifying the Contractor to take such measures. In the event that the Contractor fails to perform such measures within 24 hours after receipt of such notice, the Owner may stop the Work as provided above, or may proceed to have such measures performed by others. The cost of such work performed by others plus related fees by the Engineer will be deducted from monies due the Contractor on his Contract.
4. All erosion and pollution control features installed by the Contractor shall be acceptably maintained by the Contractor during the time that construction work is being done.
5. Repair or replace damaged or inoperative erosion and pollution control devices as directed by the Engineer or the Owner's Representative.
6. Where there is a high potential for erosion and possible water pollution, the Contractor shall not expose, by his construction methods or procedures, an area of erosive land at any one time larger than the minimum amount required for the proper and efficient construction operation. If the exposure of any incomplete work corresponding to the exposure period required for erosion is anticipated, temporary protective measures shall be taken to prevent the erosion or collapse of land in that immediate construction area.

- B. Erosion and Pollution Control Schedule: At or prior to the preconstruction conference, the Contractor shall submit to the Owner for his information, three (3) copies of his erosion and pollution control work schedule. This schedule shall show the time

relationship between phases of the Work which must be coordinated to reduce erosion and pollution, and shall describe construction practices and temporary control measures which will be used to minimize erosion and pollution. The schedule shall also show the Contractor's proposed method of erosion control on haul roads and borrow and material pits, and his plan for disposal of waste materials or other sources of pollution. Maps or other documents may also be required to show the proposed final surface gradient of proposed borrow pits, soil type base course pits, and waste areas. No work shall be started until the erosion and pollution control schedules and methods of operations have been submitted to the Owner for his information.

C. Air Pollution Controls:

1. Contractor shall control dust caused by his operations in the construction of the Project, including but not specifically limited to the following:
 - a. Clearing, grubbing, and stripping.
 - b. Excavation and placement of embankment.
 - c. Cement and aggregate handling.
 - d. Limerock stabilization.
 - e. Use of haul roads.
 - f. Sandblasting or grinding.
2. Contractor shall control air pollution from the following causes in constructing the project:
 - a. Volatiles escaping from asphalt and cutback materials.
 - b. Use of herbicides or fertilizers.
3. Control of dust and other air pollutants by the Contractor shall include:
 - a. Exposing the minimum area of land.
 - b. Applying temporary mulch with or without seeding.
 - c. Use of water sprinkler trucks.
 - d. Use of covered haul trucks.
 - e. Use of stabilizing agents in solution.
 - f. Use dust palliatives and penetration asphalt on temporary roads.

- g. Use of wood chips in traffic and work areas.
 - h. Use of vacuum-equipped sandblasting systems.
 - i. Use of plastic sheet coverings.
 - j. Restricting the application rate of herbicides to recommended dosage. Materials shall be covered and protected from the elements. Application equipment and empty containers shall not be rinsed and discharged so as to pollute a stream, river, lake, pond, water impoundment, or the ground water.
 - k. Relay of operations until climate or wind conditions dissipate or inhibit the potential pollutants.
- D. Open Burning of Combustible Wastes: No open burning of combustible waste materials or vegetation shall be permitted. All waste materials shall be removed from the site or within public rights-of-way and disposed in a legal manner.
- E. Permanent and Temporary Water Pollution Control (Soil Erosion):
- 1. Sufficient precautions shall be taken during construction to minimize the run-off of polluting substances such as silt, clay, fuels, oils, bitumens, calcium chloride, or other polluting materials harmful to humans, fish, or other life, into the supplies and surface waters of the State. Control measures must be adequate to assure that turbidity in the receiving water will not be increased more than allowed by the State or controlling agency. Such measures may consist of construction of berms, dikes, dams, drains and sediment basins, or use of fiber mats, woven plastic filter cloths, gravel, mulches, quick growing grasses, sod, bituminous spray and other erosion control devices or methods approved by the State or controlling agency.
 - 2. The Contractor shall promptly clear all waterways and drainage patterns of false work, piling, debris, or other obstructions placed during construction work and not a part of the finished work.
 - 3. The Contractor shall remove and dispose of silt accumulations as directed by the Engineer or the Owner's Representative.
 - 4. If new and additional erosion control structures are to be installed, under this project, to prevent possible future erosion as a result of work under this contract, they shall be constructed concurrently with the other work, as early as possible, and as conditions permit.
- F. Noise Control: The Contractor shall provide adequate protection against objectionable noise levels caused by the operation of construction equipment in order to comply with

all current City ordinances and these Specifications. Sound levels shall be measured at the exterior of the nearest exterior wall of the nearest residence or building. Levels at construction equipment shall not exceed 85 dBA at any time. Sound levels in excess of allowable values are sufficient cause to have the work halted until equipment can be quieted to these levels. Work stoppage by the Engineer or Owner for excessive noise shall not relieve the Contractor of the other portions of this Specification including, but not limited to completion dates and bid amounts.

1.16 SITE CLEANUP AND RESTORATION

- A. The Contractor shall keep the working area free at all times of tools, materials and equipment not essential to the progress of the Work. Debris, waste materials, and rubbish shall be properly disposed of and not allowed to accumulate. If the Contractor should fail to do this, the Owner will make the necessary arrangements to effect the cleanup by others and will back charge the cost to the Contractor. If such action becomes necessary on the part of and in the opinion of the Owner, the Owner will not be responsible for the inadvertent removal of material which the Contractor would not have disposed of had he effected the required cleanup.
- B. Where material or debris has washed or flowed into or been placed in watercourses, ditches, gutters, drains, catch basins, or elsewhere as result of the Contractor's operations, such material or debris shall be entirely removed and satisfactorily disposed of during progress of the Work, and the ditches, channels, drains etc., kept in a clean and neat condition.
- C. On or before the completion of the Work, the Contractor shall, unless otherwise especially directed or permitted in writing, tear down and remove all temporary buildings and structures built by him; shall remove all temporary works, tools, and machinery or other construction equipment furnished by him; shall remove, acceptably disinfect, and cover all organic matter and material containing organic matter in, under, and around privies, houses, and other buildings used by him; shall remove all rubbish from any grounds he has occupied; and shall leave the roads and all parts of the premises and adjacent property affected by his operations, in a neat and satisfactory condition.
- D. The Contractor shall restore the entire project site to its original or better condition, with the exception of any area(s) designated for alteration by the Contract Documents. The Contractor shall restore or replace; when and as directed, any public or private property damaged by his work, equipment, or employees to a condition at least equal to that existing immediately prior to the beginning of operations. To this end the Contractor shall do as required all necessary highway or driveway, walk, and landscaping work. Suitable materials, equipment, and methods shall be used for such restoration.
- E. The Contractor shall thoroughly clean all materials and equipment installed by him and his subcontractors and on completion of the Work shall deliver it undamaged and in fresh and new appearing condition.

1.17 LAWS AND REGULATIONS

- A. It shall be the responsibility of the Contractor to give all notices and comply with all the laws, rules, regulations, ordinances, etc., that may be applicable at the time the Work is started on the project. Should the Contractor discover the Drawings or Specifications are contradictory to, or in variance with the above, he shall notify the Engineer immediately, in writing, in order that any required changes or modifications can be made. It is not the Contractor's responsibility to make certain that the Drawings or Specifications are in non-compliance with any of the above; however, should he be aware of any existing discrepancy, or have reason to believe such may exist and performs work without proper notice to the Engineer, the Contractor shall be responsible for any cost involved in making the necessary alterations or corrections.

1.18 CONTRACTOR'S USE OF PREMISES

- A. All project construction work will be accomplished on the Owner's property, public/private rights-of-way/easements or within temporary construction easements and the Contractor shall confine his activity to those designated areas. The Contractor shall not enter upon private property for any reason without securing prior permission from the property owner. Such permission, including any stipulations, shall be in writing and a copy shall be delivered to the Engineer prior to the Contractor's entry or occupation of the subject property. This requirement will be rigidly enforced, particularly with regard to the utilization of vacant areas adjacent to the work site for the storage of materials or parking equipment.
- B. The Contractor shall perform his work in such manner that he will not damage adjacent public or private property. Any damage to existing physical structures or utility services shall be repaired or restored promptly at no expense to the Owner.
- C. The Contractor shall avoid damage to and preserve all existing vegetation (grass, shrubs, trees, etc.) on or near the work area which do not, within reason, interfere with construction. The Contractor will be responsible for and required to replace or restore all such vegetation damaged or destroyed at no cost to the Owner. The Contractor will also be responsible for any unauthorized cutting or damage to trees, shrubs, etc., and also damage caused by careless operation of equipment, storage of materials and rutting or tracking of grass by equipment.
- D. The Contractor shall conduct access, hauling, filling, and storage operations as specified herein and as shown on the Contract Drawings.
 - 1. On-site borrow areas are designated as follows: Suitable material, as approved by Engineer, from excavations for project structures. Any additional borrow material required shall be provided by the Contractor from off-site.
 - 2. On-site spoil areas will become property of the Contractor and are to be disposed off-site.

- E. Construct all fill areas so runoff will not flood improved areas.
- F. All connections to existing piping systems shall be made as shown or indicated on the Drawings after consultation, cooperation, and coordination with the Owner. Some such connections may have to be made during off-peak hours (late night or early morning hours). The Contractor shall give a minimum of 72 hours' notice to the Owner when tie-ins with the existing plant utilities are required.

1.19 HAZARDOUS LOCATIONS

- A. The Contractor shall be responsible for identification of hazardous locations, appropriate construction methods, and all other safety issues.

1.20 ADDITIONAL PROVISIONS

- A. The Contractor shall provide at his own cost all necessary temporary facilities for access to, and for protection of, all existing structures. The Contractor is responsible for all damage to existing structures, equipment, and facilities caused by his construction operations, and must repair all such damage when and as ordered by the Engineer.
- B. All coatings and materials that come in contact with reclaimed water shall comply with ANSI-NSF Standard 61. The manufacturer shall provide documentation to demonstrate certification and compliance.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION

SECTION 01200

PROJECT MEETINGS

PART 1 - GENERAL

1.01 DESCRIPTION

A. Scope of Work:

1. The Contractor shall cooperate and coordinate with the Engineer to schedule and administer the preconstruction meeting, periodic progress meetings, and specifically called meetings throughout the progress of the Work. The Contractor shall:
 - a. Prepare agenda for meetings.
 - b. Make physical arrangements for meetings.
 - c. Preside at Progress meetings.
 - d. Take and distribute meeting minutes.
2. Representatives of Contractor, subcontractors, and suppliers attending meetings shall be qualified and authorized to act on behalf of the entity each represents.
3. The Owner shall attend meetings to ascertain that the Work is expedited consistent with Contract Documents and construction schedules.
4. The Contractor shall record the preconstruction meeting and each progress meeting in its entirety, and shall provide the Engineer with a copy of such recording, having good quality and clarity, and a typed transcript of the minutes of each meeting. A copy of the minutes of each progress meeting shall be available five business days after the meeting.

B. Related Requirements Described Elsewhere:

1. Construction Progress Schedules: Section 01310.
2. Shop Drawings, Working Drawings, and Samples: Section 01340.
3. Project Record Documents: Section 01720.

1.02 PRECONSTRUCTION MEETING

- A. Engineer will schedule a preconstruction meeting no later than twenty (20) days after date of Notice to Proceed. The meeting shall be scheduled at the convenience of all parties.
- B. Location: A local site, convenient for all parties, designated by the Owner.
- C. Attendance:
 - 1. Owner's representative.
 - 2. Engineer and his professional consultants.
 - 3. Resident project representative.
 - 4. Contractor and his superintendent.
 - 5. Major subcontractors.
 - 6. Representatives of major suppliers and manufacturers as appropriate.
 - 7. Governmental representatives as appropriate.
 - 8. Others as requested by the Contractor, Owner, and Engineer.
- D. The Engineer shall preside at the preconstruction meeting. The Contractor shall provide for keeping minutes and distribution of minutes to the Owner, Engineer and others. The purpose of the preconstruction meeting is to designate responsible personnel and establish a working relationship. Matters requiring coordination will be discussed and procedures for handling such matters established.
- E. Contractor shall provide a preliminary construction schedule to demonstrate complete fulfillment of contract requirements utilizing critical path method at the Pre-Construction Meeting.
- F. The suggested agenda for the preconstruction meeting would include the following:
 - 1. Distribution and discussion of:
 - a. List of major subcontractors and suppliers.
 - b. Projected schedules.
 - c. Schedule of Values.

2. Critical work sequencing: Relationships and coordination with other contracts and/or work.
3. Major equipment deliveries and priorities.
4. Project coordination: Designation and responsible personnel.
5. Procedures and processing of:
 - a. Field decisions.
 - b. Proposal requests.
 - c. Request for Information.
 - d. Submittals.
 - d. Change Orders.
 - f. Applications for Payment.
6. Submittal of Shop Drawings, project data and samples.
7. Adequacy of distribution of Contract Documents.
8. Procedures for maintaining Record Documents
9. Use of premises:
 - a. Office, work, and storage areas.
 - b. Owner's requirements.
 - c. Access and traffic control.
10. Construction facilities, controls, and construction aids.
11. Temporary utilities.
12. Safety and first aid procedures.
13. Check of required Bond and Insurance certifications.
14. Completion time for contract and liquidated damages.
15. Request for extension of Contract Time.

16. Procedures for periodic monthly (or whatever interval is deemed appropriate or necessary, however, a minimum of monthly meetings will be required) progress meetings, for all involved.
17. Security procedures.
18. Procedures for making partial payments.
19. Guarantees on completed work.
20. Equipment to be used.
21. Project layout and staking of work.
22. Project inspection.
23. Labor requirements.
24. Laboratory testing of material requirements.
25. Provisions for material stored (well casing only) on site and monthly inventory of materials stored.
26. Requirements of other organizations such as utilities, railroads, highway departments, building departments.
27. Rights-of-way and easements.
28. Housekeeping procedures.
29. Liquidated damages.
30. Posting of signs and installation of Project Sign.
31. Pay request submittal dates.
32. Equal opportunity requirements.

1.03 PROGRESS MEETINGS

- A. The Engineer shall schedule regular periodic meetings. The progress meetings will be held as needed and at other times as required by the progress of the Work. The first meeting shall be held within thirty (30) days after the preconstruction meeting.
- B. Hold called meetings as required by progress of the Work.
- C. Location of the meetings: Owner's Offices.

- D. Attendance:
1. Engineer and his professional Subconsultants as needed.
 2. Resident Project Representative.
 3. Contractor and his Superintendent.
 4. Owner's representatives.
 5. Subcontractors (active on the site, as appropriate to the agenda).
 6. Others as appropriate to the agenda (suppliers, manufacturers, other subcontractors, etc.).
- E. The Contractor shall preside at the meetings and provide for keeping minutes and distribution of the minutes to the Owner, Engineer, and others. The purpose of the meetings will be to review the progress of the Work. Contractor shall provide updated progress construction schedule at each progress meeting.
- F. The suggested agenda for the progress meetings will include but not be limited to the following:
1. Review approval of minutes of previous meeting.
 2. Review of Work progress since previous meeting and Work scheduled (3-week look ahead schedule).
 3. Field observations, problems, conflicts.
 4. Problems which impede construction schedule.
 5. Review of off-site fabrication, delivery schedules.
 6. Corrective measures and procedures to regain projected schedule.
 7. Status of approved Construction Schedule and revisions to the Construction Schedule as appropriate.
 8. Progress schedule during succeeding work period.
 9. Coordination of schedules.
 10. Review status of submittals and submittal schedule, expedite as required.
 11. Maintenance of quality standards.

12. Pending changes and substitutions.
 13. Shop drawing problems.
 14. Review proposed changes for:
 - a. Effect on Construction Schedule and on completion date.
 - b. Effect on other contracts of the Project.
 15. Critical/long lead items.
 16. Other business.
- G. The Contractor is to attend progress meetings and is to study previous meeting minutes and current agenda items, and be prepared to discuss pertinent topics and provide specific information including but not limited to:
1. Status of all submittals and what specifically is being done to expedite them.
 2. Status of all activities behind schedule and what specifically will be done to regain the schedule.
 3. Status of all material deliveries, latest contact with equipment manufacturer, and specific actions taken to expedite materials.
 4. Status of open deficiencies and what is being done to correct the same.
- H. The Contractor is to provide a current submittal log at each progress meeting in accordance with Section 01340: Shop Drawings, Working Drawings, and Samples.

PART 2- PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION

SECTION 01310

CONSTRUCTION PROGRESS SCHEDULES

PART 1 - GENERAL

1.01 DESCRIPTION

A. Scope of Work:

1. Promptly after award of the Contract, prepare and submit to the Engineer estimated construction progress schedules demonstrating complete fulfillment of all Contract requirements utilizing a Critical Path Method (hereinafter referred to as CPM) in planning, coordinating, and performing the Work under this Contract (including all activities of subcontractors, equipment vendors, and suppliers). The principles and definition of CPM terms used herein shall be as set forth in the Associated General Contractors of America (AGC) publication, The Use of CPM in Construction, A Manual for General Contractors and the Construction Industry, Copyright 1976, but the provisions of this Specification shall govern the planning, coordinating, and performance of the Work.
2. Submit revised progress schedules on a monthly basis. No partial payments shall be approved until there is an updated construction progress schedule on hand.

B. Related Requirements Described Elsewhere:

1. Conditions of the Contract.
2. Summary of Project: Section 01010.
3. Project Meetings: Section 01200.
4. Shop Drawings, Working Drawings, and Samples: Section 01340.
5. Schedule of Values: Section 01370.

1.02 QUALIFICATIONS

- A. A statement of computerized CPM capability shall be submitted and shall verify that either Contractor's organization has in-house capability to use the CPM technique or that Contractor will employ a CPM consultant who is so qualified.

1.03 FORM OF SCHEDULES

- A. Prepare schedules in the form of a horizontal bar chart.

1. Provide a separate horizontal bar for each trade or operation within each structure or item.
 2. Horizontal time scale:
 - a) Show starting and completion dates for each activity in terms of the number of days after Notice to Proceed. All completion dates shown shall be within the period specified for contract completion.
 - b) Identify the first work day of each month.
 3. Scale and Spacing: Sufficient to allow space for notations and future revisions.
 4. Maximum Sheet Size: 24 inches by 36 inches.
- B. Format of Listings: The chronological order of the start of each item of work for each structure.
- C. Identification of Listings: By major specification section numbers as applicable and by structure.
- D. Construction Progress Schedules shall be computer generated using software equal to Primavera Project Planner for Windows by Primavera Systems, Inc., Bala Cynwyd, P.A., Microsoft Project, or approved equal.

1.04 CONTENT OF SCHEDULES

- A. Construction Progress Schedule:
1. Show the complete sequence of construction by activity and by structure.
 2. Show the dates for the beginning and completion of each major element of construction in no more than a two (2) week increment scale.
 3. Show projected percentage of completion for each item, as of the first day of each month.
 4. Show projected dollar cash flow requirements for each month of construction and for each activity as indicated by the approved Schedule of Values.
- B. Submittals for construction progress schedules shall be in accordance with Section 01340: Shop Drawings, Work Drawings, and Samples. Indicate on the schedule the following:
1. The dates for Contractor's submittals.

2. The dates submittals will be required for Owner-furnished products, if applicable.
 3. The dates approved submittals will be required from the Engineer.
- C. A typewritten list of all long lead items (equipment, materials, etc.).
- D. Failure to include 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.
- E. Scheduling Constraints: The work within Owner's property must be completed within the maximum number of days start to finish, as indicated in the Contract. Additionally, work must proceed on a continuous basis, without stoppages, except for nights and weekends. There shall be no lapses between phases of construction.

1.05 PROGRESS REVISIONS

- A. Indicate progress of each activity to date of submission.
- B. Show changes occurring since previous submission of schedule:
1. Major changes in scope.
 2. Activities modified since previous submission.
 3. Revised projections of progress and completion.
 4. Other identifiable changes.
- C. Provide a narrative report as needed to define:
1. Problem areas, anticipated delays, and the impact on the schedule.
 2. Corrective action recommended, and its effect.
 3. The effect of changes on schedules of other prime contractors.
- D. If the Work falls behind the critical path schedule by two (2) weeks or more, the Contractor shall prepare a recovery schedule.

1.06 SUBMISSIONS

- A. Submittal Requirements.
1. Logic network and/or time-phased bar chart, computer generated.

2. Narrative description of the logic and reasoning of the schedule.
- B. Time of Submittals: Within ten (10) working days after Notice to Proceed, Contractor shall submit a network diagram describing the activities to be accomplished in the project and their dependency relationships, (predecessor/successor) as well as a tabulated schedule as herein defined. The total length of time indicated on the initial CPM schedule shall equal the exact number of days as defined in the Contract. The schedule produced and submitted shall also indicate calendar dates, including project starting and completion dates, based on the Contract Commencement and completion dates indicated in the Notice to Proceed. The Engineer will complete the review of the complete schedule within fifteen (15) working days after receipt. During the review process, the Engineer may meet with a representative of Contractor to review the proposed plan and schedule to discuss any clarifications that may be necessary.
 - C. Within ten (10) working days after the conclusion of the Engineer's review period, Contractor shall revise the network diagram as required and resubmit the network diagram and a tabulated schedule produced therefrom. The revised network diagram and tabulated schedule shall be reviewed and accepted or rejected by the Engineer within fifteen (15) working days after receipt. The network diagram and tabulated schedule, when accepted by the Engineer, shall constitute the project work schedule unless a revised schedule is required due to substantial changes in the Work, a change in Contract Time or a recovery schedule is required and requested.
 - D. Acceptance. The finalized schedule will be acceptable to the Engineer when, in the opinion of the Engineer, it demonstrates an orderly progression of the Work to completion in accordance with the Contract Documents. Such acceptance will neither impose on the Engineer responsibility for the progress or scheduling of the Work nor relieve Contractor from full responsibility therefore. The finalized schedule of shop drawing submittals will be acceptable to the Engineer when, in the opinion of the Engineer, it demonstrates a workable arrangement for processing the submittals in accordance with the requirements. The finalized Schedule of Values (lump sum price breakdown), as applicable, will be acceptable to the Engineer as to form and content when, in the opinion of the Engineer, it demonstrates a substantial basis for equitably distributing the Contract Price. When the network diagram and tabulated schedule have been accepted, the Contractor shall submit to the Engineer six (6) copies of the time-scaled network diagram, six (6) copies of a computerized tabulated schedule in which the activities have been sequenced by numbers, six (6) copies of a computerized tabulated schedule in which the activities have been sequenced by early starting date, and six (6) copies of a computerized, tabulated schedule in which activities have been sequenced by total float, and six (6) copies sorted by predecessor/successor.
 - E. Revised Work Schedules. Contractor, if requested by the Engineer, shall provide a revised work schedule if, at any time, the Engineer considers the completion date to be in jeopardy because of "activities behind schedule." The revised work schedule shall include a new diagram and tabulated schedule conforming to the requirements of Paragraph 1.09 herein, designed to show how Contractor intends to accomplish the

Work to meet the completion date. The form and method employed by Contractor shall be the same as for the original work schedule. No payment will be made if activities fall more than two (2) weeks behind schedule and a revised work schedule is not furnished.

- F. Schedule Revisions. The Engineer may require Contractor to modify any portions of the work schedule that become infeasible because of "activities behind schedule" or for any other valid reason. An activity that cannot be completed by its original latest completion date shall be deemed to be behind schedule. No change may be made to the sequence, duration, or relationships of any activity without approval of the Engineer.

1.07 DISTRIBUTION

- A. Distribute copies of the reviewed schedules to:
 - 1. Engineer.
 - 2. Jobsite file.
 - 3. Subcontractors.
 - 4. Other concerned parties.
 - 5. Owner (two copies).
- B. Instruct recipients to report promptly to the Contractor, in writing, any problems anticipated by the projections shown in the schedules.

1.08 CHANGE ORDERS

- A. Upon approval of a change order, the approved changes shall be reflected in the next scheduled revision or update submittal of the construction progress schedule by the Contractor.

1.09 CPM STANDARDS

- A. CPM, as required by this Section, shall be interpreted to be generally as outlined in the Associated General Contractor's (AGC) publication, The Use of CPM in Construction, A Manual for General Contractors and the Construction Industry, Copyright 1976.
- B. Work schedules shall include a graphic network and computerized, tabulated schedules as described below. To be acceptable the schedule must demonstrate the following:
 - 1. A logical succession of work from start to finish.

2. Definition of each activity. Activities shall be identified by major specification section numbers, as applicable, and by major structure.
3. A logical flow of work crews/equipment (crews are to be defined by manpower category and man-hours; equipment by type and hours).
4. Show all work activities and interfaces including submittals as well as major material and equipment deliveries.

C. Networks.

1. The CPM network, or diagram, shall be in the form of a time-scaled diagram of the customary activity-on-type and may be divided into a number of separate pages with suitable notation relating the interface points among the pages. Notation on each activity line shall include a brief work description and a duration, as described in Paragraph 1.09, D. herein.
2. All construction activities and procurement shall be indicated in a time-scaled format, and a calendar shall be shown on all sheets along the entire sheet length. Each activity arrow shall be plotted so the beginning and completion dates of said activity can be determined graphically by comparison with the calendar scale. All activities shall be shown using the symbols that clearly distinguish between critical path activities, non-critical path activities, and float for each non-critical activity. All non-critical path activities shall show estimated performance time and float time in scaled form.

D. The duration indicated for each activity shall be in calendar days and shall represent the single best time considering the scope of the work and resources planned for the activity including time for inclement weather. Except for certain non-labor activities, such as curing concrete or delivering materials, activity durations shall not exceed fourteen (14) days nor be less than one (1) day unless otherwise accepted by the Engineer.

E. Tabulated Schedules. The initial schedule shall include the following minimum data for each activity.

1. Activity Beginning and Ending Numbers (i-j numbers) (single activity numbers may be used).
2. Duration.
3. Activity Description.
4. Early Start Date (Calendar Dated).
5. Late Start Date (Calendar Dated).

6. Early Finish Date (Calendar Dated).
 7. Late Finish Date (Calendar Dated).
 8. Identified Critical Path.
 9. Total Float (Note: No activity may show more than 20 days float).
 10. Cost of Activity.
 11. Equipment Hours, by type; Man-Power Hours, by crew or trade.
- F. Project Information. Each tabulation shall be prefaced with the following summary data.
1. Project Name.
 2. Contractor.
 3. Type of Tabulation (Initial or Updated).
 4. Project Duration.
 5. Project Scheduled Completion Date.
 6. Effective or Starting Date of the Schedule.
 7. New Project Completion Date and Project Status (if an updated or revised schedule).
 8. Actual Start Date and Actual Finish Date (for all updated schedules.)

1.10 SCHEDULE MONITORING

- A. At not less than monthly intervals or when specifically requested by Engineer, Contractor shall submit to the Engineer a computer printout of an updated schedule for those activities that remain to be completed. Typically, the updated schedule will be submitted with the application for payment as specified below.
- B. The updated schedule shall be submitted in the form, sequence, and number of copies requested for the initial schedule.

1.11 PROGRESS MEETINGS

For the monthly progress meeting, Contractor shall submit a revised CPM schedule and a three-week look-ahead schedule, showing all activities completed, in progress, uncompleted, or scheduled to be worked during the weeks. The three weeks include the current week plus the

SECTION IVa – Supplemental Technical Specifications

next two weeks. All activities shall be from the approved CPM and must be as shown on the CPM unless behind or ahead of schedule. One copy of the revised CPM schedule shall be submitted with each copy of that month's application for payment, six (6) copies minimum.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION

SECTION 01340

SHOP DRAWINGS, WORKING DRAWINGS, AND SAMPLES

PART 1 - GENERAL

1.01 DESCRIPTION

A. Scope of Work:

1. The Contractor shall submit to the Engineer for review and approval, such Shop Drawings, Test Reports, and Product Data on materials and equipment (hereinafter in this Section called Data), and material samples (hereinafter in this Section called Samples) as are required for the proper control of work, including but not limited to those Shop Drawings, Data, and Samples for materials and equipment specified elsewhere in the Specifications and in the Drawings.
2. Within fourteen (14) calendar days after the Effective Date of the Agreement, the Contractor shall submit to the Engineer a complete list of preliminary data on items for which Shop Drawings are to be submitted. Included in this list shall be the names of all proposed manufacturers furnishing specified items. Review of this list by the Engineer shall in no way expressed or implied relieve the Contractor from submitting complete Shop Drawings and providing materials, equipment, etc., fully in accordance with the Contract Documents. This procedure is required in order to expedite final review of Shop Drawings.
3. The Contractor is to maintain an accurate updated submittal log and will bring this log to each scheduled progress meeting with the Owner and the Engineer. This log should include the following items:
 - a. Submittal description and number assigned.
 - b. Date to Engineer.
 - c. Date returned to Contractor (from Engineer).
 - d. Status of submittal (Approved, Approved as Noted, Amend and Resubmit, and Rejected).
 - e. Date of resubmittal and return (as applicable).
 - f. Date material release (for fabrication).
 - g. Projected date of fabrication.

- h. Projected date of delivery to site.
 - i. Status of O&M manuals submittal.
 - j. Specification Section.
 - k. Drawings sheet number.
- B. Related Requirements Described Elsewhere:
 - 1. General Requirements: Division 1
 - 2. Construction Progress Schedules: Section 01310
 - 3. Shop Drawings, Working Drawings, and Samples: Section 01340
 - 4. Material and Equipment: Section 01600
 - 5. Project Record Documents: Section 01720

1.02 CONTRACTOR'S RESPONSIBILITY

- A. It is the responsibility of the Contractor to check all drawings, data and samples prepared before submitting them to the Engineer for review. Each and every copy of the Drawings and data shall bear the Contractor's stamp showing that they have been so checked. Shop drawings submitted to the Engineer without the Contractor's stamp will be returned to the Contractor for conformance with this requirement. Shop drawings shall indicate any deviations in the submittal from requirements of the Contract Documents. If the Contractor takes exception to the specifications, the Contractor shall note the exception in the letter of transmittal to the Engineer.
- B. Determine and verify:
 - 1. Field measurements.
 - 2. Field construction criteria
 - 3. Catalog numbers and similar data.
 - 4. Conformance with Specifications.
- C. The Contractor shall furnish the Engineer a schedule of Shop Drawing submittals fixing the respective dates for the submission of shop and working drawings, the beginning and ending of manufacture, testing, and installation of materials, supplies, and equipment. This schedule shall indicate those that are critical to the progress schedule.

- D. The Contractor shall not begin any of the work covered by a Shop Drawing, Data, or a Sample returned for correction until a revision or correction thereof has been reviewed and returned to him, by the Engineer, with approval.
- E. The Contractor shall submit to the Engineer all drawings and schedules sufficiently in advance of construction requirements to provide no less than thirty (30) calendar days for checking and appropriate action from the time the Engineer receives them.
- F. All submittals shall be accompanied with a transmittal letter prepared in duplicate containing the following information:
 - 1. Date.
 - 2. Project Title and Number.
 - 3. Contractor's name and address.
 - 4. The number of each Shop Drawings, Project Data, and Sample submitted.
 - 5. Notification of Deviations from Contract Documents.
 - a. The Contractor shall indicate in **bold type** at the top of the cover sheet of submittal of shop drawing if there is a deviation from the Drawings, Specifications, or referenced specifications or codes.
 - b. The Contractor shall also list any deviations from the Drawings, Specifications, or referenced specifications or codes and identify in green ink prominently on the applicable Shop Drawings.
 - 6. Submittal Log Number conforming to Specification Section Number.
- G. The Contractor shall submit five (5) copies of descriptive or product data information and Shop Drawings to the Engineer plus the number of copies which the Contractor requires returned.
- H. The Contractor shall be responsible for and bear all costs of damages which may result from the ordering of any material or from proceeding with any part of Work prior to the completion of the review by the Engineer of the necessary Shop Drawings.
- I. The Contractor shall be fully responsible for observing the need for and making any changes in the arrangement of piping, connections, wiring, manner of installation, etc., which may be required by the materials/equipment he proposes to supply both as pertains to his own work and any work affected under other parts, headings, or divisions of the Drawings and Specifications.
- J. The Contractor shall not use Shop Drawings as a means of proposing alternate items to demonstrate compliance with the Drawings and Specifications.

- K. Each submittal will bear a stamp indicating that Contractor has satisfied Contractor's obligations under the Contract Documents with respect to Contractor's review and approval of that submittal. The Contractor stamp shall be similar to the sample given below.

<p>(OWNER'S NAME) (PROJECT NAME) (PROJECT NUMBER)</p> <p>SHOP DRAWING NO.: _____</p> <p>SPECIFICATION SECTION: _____ DRAWING NO. _____</p> <p>WITH RESPECT TO THIS SHOP DRAWING OR SAMPLE, I HAVE DETERMINED AND VERIFIED ALL QUANTITIES, DIMENSIONS, SPECIFIED PERFORMANCE CRITERIA, INSTALLATION REQUIREMENTS, MATERIALS, CATALOG NUMBERS, AND SIMILAR DATA WITH RESPECT THERETO AND REVIEWED OR COORDINATED THIS SHOP DRAWING OR SAMPLE WITH OTHER SHOP DRAWINGS AND SAMPLES AND WITH THE REQUIREMENTS OF THE WORK AND THE CONTRACT DOCUMENTS.</p> <p>_____ NO VARIATION FROM CONTRACT DOCUMENTS</p> <p>_____ VARIATION FROM CONTRACT DOCUMENTS AS SHOWN</p> <p>(CONTRACTOR'S NAME) (CONTRACTOR'S ADDRESS)</p> <p>BY: _____</p> <p style="text-align: center;">AUTHORIZED SIGNATURE</p> <p>DATE: _____</p>
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- L.. Drawings and schedules shall be checked and coordinated with the work of all trades and sub-contractors involved, before they are submitted for review by the Engineer and shall bear the Contractor's stamp of approval as evidence of such checking and coordination. Drawings or schedules submitted without this stamp of approval shall be returned to the Contractor for resubmission.

1.03 ENGINEER'S REVIEW OF SHOP DRAWINGS

- A. The Engineer's review of Shop Drawings, Data, and Samples as submitted by the Contractor will be to determine if the items(s) generally conforms to the information in the Contract Documents and is compatible with the design concept. The Engineer's review and exceptions, if any, will not constitute an approval of dimensions, connections, quantities, and details of the material, equipment, device, or item shown.
- B. The review of drawings and schedules will be general, and shall not be construed:
 - 1. As permitting any departure from the Contract Documents.
 - 2. As relieving the Contractor of responsibility for any errors, including details, dimensions, and materials.
 - 3. As approving departures from details furnished by the Engineer, except as otherwise provided herein.
- C. If the drawings or schedules as submitted describe variations and show a departure from the Contract Documents which the Engineer finds to be in the interest of the Owner and to be so minor as not to involve a change in Contract Price or contract time, the Engineer may return the reviewed drawings without noting an exception.
- D. "Approved As Noted" - Contractor shall incorporate Engineer's comments into the submittal before release to manufacturer. The Contractor shall send a letter to the Engineer acknowledging the comments and their incorporation into the Shop Drawing.
- E. "Amend And Resubmit" - Contractor shall resubmit the Shop Drawing to the Engineer. The resubmittal shall incorporate the Engineer's comments highlighted on the Shop Drawing.
- F. "Rejected" - Contractor shall correct, revise and resubmit Shop Drawing for review by Engineer.
- G. Resubmittals will be handled in the same manner as first submittals. On resubmittals the Contractor shall direct specific attention, in writing or on resubmitted Shop Drawings, to revisions other than the corrections requested by the Engineer on previous submissions. The Contractor shall make any corrections required by the Engineer.
- H. If the Contractor considers any correction indicated on the drawings to constitute a change to the Drawings or Specifications, the Contractor shall give written notice thereof to the Engineer.
- I. When the Shop Drawings have been completed to the satisfaction of the Engineer, the Contractor shall carry out the construction in accordance therewith and shall make no further changes therein except upon written instructions from the Engineer.

- J. No partial submittals will be reviewed. Submittals not deemed complete will be stamped "Rejected" and returned to the Contractor for resubmittal. Unless otherwise specifically permitted by the Engineer, make all submittals in groups containing all associated items for:

1. Systems.
2. Processes.
3. As indicated in specific Specifications Sections.

All drawings, schematics, manufacturer's product data, certifications, and other Shop Drawing submittals required by a system specification shall be submitted at one time as a package to facilitate interface checking.

- K. Only the Engineer shall utilize the color "red" in marking Shop Drawing submittals.
- L. Shop drawing and submittal data shall be reviewed by the Engineer for each original submittal and first resubmittal; thereafter review time for subsequent resubmittals shall be charged to the Contractor and the Contractor shall reimburse the Owner for services rendered by the Engineer as specified in the Supplementary Conditions.

1.04 SHOP DRAWINGS

- A. When used in the Contract Documents, the term "Shop Drawing" shall be considered to mean Contractor's plans for materials and equipment which become an integral part of the Project. Shop Drawings shall be complete and detailed and shall consist of fabrication, erection, setting and schedule drawings, manufacturer's scale drawings, and wiring and control diagrams. Catalogs cuts, catalogs, pamphlets, descriptive literature, and performance and test data shall be considered only as supportive information to required Shop Drawings as defined above. As used herein, the term "manufactured" applies to standard units usually mass-produced; and "fabricated" means items specifically assembled or made out of selected materials to meet individual design requirements.
- B. Manufacturer's catalog sheets, brochures, diagrams, illustrations, and other standard descriptive data shall be clearly marked to identify pertinent materials, products, or models. Delete information which is not applicable to the Work by striking or cross-hatching.
- C. Each Shop Drawing shall be submitted with an 8-1/2" by 11" cover sheet which shall include a title block for the submittal. Each Shop Drawing cover sheet shall have a blank area 3-1/2 inches high by 4-1/2 inches wide, located adjacent to the title block. The title block/cover sheet shall display the following:
1. Project Title and Number.

2. Name of project building or structure.
 3. Number and title of the Shop Drawing.
 4. Date of Shop Drawing or revision.
 5. Name of Contractor and subcontractor submitting drawing.
 6. Supplier/manufacturer.
 7. Separate detailer when pertinent.
 8. Specification title and Section number.
 9. Applicable Drawing number.
- D. Data on materials and equipment shall include, without limitation, materials and equipment lists, catalog data sheets, catalog cuts, performance curves, diagrams, verification of conformance with applicable standards or codes, materials of construction, and similar descriptive material. Materials and equipment lists shall give, for each item thereon, the name and location of the supplier or manufacturer, trade name, catalog reference, size, finish, and all other pertinent Data.
- E. For all mechanical and electrical equipment furnished, the Contractor shall provide a list including the equipment name, and address, and telephone number of the manufacturer's representative and service company so that service and/or spare parts can be readily obtained.
- F. If drawings show variations from Contract requirements because of standard shop practice or for other reasons, the Contractor shall describe such variations in his letter of transmittal. If acceptable, proper adjustment in the Contract shall be implemented where appropriate. If the Contractor fails to describe such variations, he shall not be relieved of the responsibility for executing the Work in accordance with the Contract, even though such drawings have been reviewed.
- G. All manufacturers or equipment suppliers who propose to furnish equipment or products shall submit an installation list to the Engineer along with the required shop drawings. The installation list shall include at least five (5) installations where identical equipment has been installed and has been in operation for a period of at least two (2) years unless specified otherwise in the Specification Section applicable.

1.05 WORKING DRAWINGS

- A. When used in the Contract Documents, the term "Working Drawings" shall be considered to mean the Contractor's plan for temporary structures such as temporary bulkheads, support of open cut excavation, support of utilities, ground water control

systems, forming and falsework for underpinning, and for such other work as may be required for construction but does not become an integral part of the Project.

- B. Copies of working drawings as noted in paragraph 1.05 A. above, shall be submitted to the Engineer where required by the Contract Documents or requested by the Engineer, and shall be submitted at least thirty (30) calendar days (unless otherwise specified by the Engineer) in advance of their being required for the Work.
- C. Working Drawings shall be signed by a registered Professional Engineer, currently licensed to practice in the State of Florida, and shall convey, or be accompanied by, calculations or other sufficient information to completely explain the structure, machine, or system described and its intended manner of use. Prior to commencing such work, working drawings must have been reviewed without specific exceptions by the Engineer, which review will be for general conformance and will not relieve the Contractor in any way from his responsibility with regard to the fulfillment of the terms of the Contract. All risks to new or existing work are assumed by the Contractor; the Owner and Engineer shall have no responsibility therefor.

1.06 SAMPLES

- A. The Contractor shall furnish, for the approval of the Engineer, samples required by the Contract Documents or requested by the Engineer. Samples shall be delivered to the Engineer as specified or directed. The Contractor shall prepay all shipping charges on samples. Materials or equipment for which samples are required shall not be used in the Work until approved by the Engineer.
- B. Samples shall be of sufficient size and quantity to clearly illustrate:
 - 1. Functional characteristics of the product, with integrally related parts and attachment devices.
 - 2. Full range of color, texture, and pattern.
 - 3. A minimum of two (2) samples of each item shall be submitted.
- C. Each sample shall have a label indicating:
 - 1. Name of Project.
 - 2. Name of Contractor and subcontractor.
 - 3. Material or equipment represented.
 - 4. Place of origin.
 - 5. Name of producer/supplier and brand (if any).

6. Location in Project.
7. Submittal and specification numbers.

(Samples of finished materials shall have additional marking that will identify them under the finished schedules.)

- D. The Contractor shall prepare a transmittal letter and a description sheet for each shipment of samples. The description sheet shall contain the information required in Paragraphs 1.06B and C above. He shall enclose a copy of the letter and description sheet with the shipment and send a copy of the letter and description sheet to the Engineer. Approval of a sample shall be only for the characteristics or use named in such approval and shall not be construed to change or modify any Contract requirements.
- E. Approved samples not destroyed in testing shall be sent to the Engineer or stored at the site of the Work. Approved Samples of the hardware in good condition will be marked for identification and may be used in the Work. Materials and equipment incorporated in the Work shall match the approved Samples. Samples which failed testing or were not approved will be returned to the Contractor at his expense, if so requested at time of submission.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION

SECTION 01370

SCHEDULE OF VALUES

PART 1 - GENERAL

1.01 DESCRIPTION

A. Scope of Work:

1. Submit to the Engineer a Schedule of Values allocated to the various lump sum portions of the Work, at the Pre-Construction Conference.
2. Upon request of the Engineer support the values with data which will substantiate their correctness. The data shall include, but not be limited to quantity of materials, all sub-elements of the activity, and their units of measure.
3. The Schedule of Values shall establish the actual value for each activity of the Work to be completed taken from the Critical Path Method (CPM) Construction Schedule, and shall be used as the basis for the Contractor's Applications for Payment.

B. Related Requirements Described Elsewhere:

1. Conditions of the Construction Contract.

1.02 FORM AND CONTENT OF SCHEDULE OF VALUES

A. Type schedule on 8-1/2 inch x 11 inch white paper. Contractor's standard forms and computer printouts may be considered for approval by the Engineer upon Contractor's request. Identify schedule with:

1. Title of project and location.
2. Owner and purchase order number.
3. Engineer and project number.
4. Name and address of Contractor.
5. Contract designation.
6. Date of submission.

- B. Schedule shall list the installed value of the component parts of the Work in sufficient detail to serve as a basis for computing item prices for progress payments during construction.
- C. Identify each line item with the number and the title of the respective section of the Specifications.
- D. For each major item of the Work, list sub-values of major products or operations under the major item.
- E. For the various portions of the Work:
 - 1. The amount for each item shall reflect a total installed cost including a directly proportional amount of the Contractor's overhead and profit.
 - 2. For items on which progress payments will be requested for stored materials, break down the value into:
 - a. The cost of the materials, delivered and unloaded, with taxes paid. Paid invoices are required for materials. Payment for materials shall be limited to the invoiced amount only.
 - b. The total installed value.
- F. Round off figures to nearest dollar amount.
- G. The sum of the costs of all items listed in the schedule shall equal the total Contract Price.
- H. For each item which has an installed value of more than \$15,000, provide a breakdown of costs to list major products or operations under each item.

1.03 SUBSCHEDULE OF UNIT MATERIAL VALUES

- A. Submit a separate schedule of unit prices for materials to be stored on site and for those materials incorporated into the Work for which progress payments will be requested.
- B. The unit values for the materials shall be broken down into:
 - 1. Cost of the material, delivered and unloaded at the site, with taxes paid.
 - 2. Copies of paid invoices for component material shall be included with the payment request in which the material first appears.

- C. Only materials unique to the project may be billed when stored on site. Materials of standard use such as conduit, wire, small-diameter pipe, steel, etc., shall not be accepted for payment.
- D. The installed unit value multiplied by the quantity listed shall equal the cost of that item in the Schedule of Values.

1.04 REVIEW AND RESUBMITTAL

- A. After review by Engineer, revise and resubmit Schedule of Values and Schedule of Unit Material Values as required.
- B. Resubmit revised schedules in same manner.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION

SECTION 01410

TESTING AND TESTING LABORATORY SERVICES

PART 1 - GENERAL

1.01 DESCRIPTION

A. Scope of Work:

1. Contractor will employ and pay for services of an Independent Testing Laboratory to perform testing specifically indicated on the Contract Documents or specified in the Specifications and may at any other time elect to have materials and equipment tested for conformity with the Contract Documents.
2. Contractor shall cooperate with the laboratory to facilitate the execution of its required services.
3. The Contractor shall provide Engineer with all test results herein within five (5) days of receipt.
4. The Owner may at any time during the progress of the work request additional testing beyond that, which is specified in the Contract. This testing will be at the Owner's expense, unless the results of the tests show deficiencies. For tests that show deficiencies in the work, costs shall be borne by the contractor.

B. Related Requirements Described Elsewhere:

1. Conditions of the Contract.
2. Respective section of the Specifications: Certification of products.
3. Each Specification section listed: Laboratory tests required, and standards for testing.
4. Testing laboratory inspection, sampling and testing is required for, but not limited to the following:
 - a. Chlorine residual in seepage

C. The following schedule defines the responsibilities of various tests.

Test	Notes	Paid for By
Chlorine Residual	To verify if water in sump basin is from CCC seepage or from non-chlorinated source.	Contractor

1.02 LABORATORY DUTIES: LIMITATIONS OF AUTHORITY

- A. Cooperate with Engineer and Contractor; provide qualified personnel promptly on notice.
- B. Perform specified inspections, sampling and testing of materials and methods of construction:
 - 1. Comply with specific standards; ASTM, other recognized authorities, and as specified.
 - 2. Determine and report on compliance with requirements of Contract Documents.
- C. Promptly notify the Engineer and Contractor of material or operations which do not meet the specifications.
- D. Promptly submit five (5) copies of reports of inspections and tests to the Engineer including:
 - 1. Date issued.
 - 2. Project title and Engineer's job number.
 - 3. Testing Laboratory name and address.
 - 4. Name and signature of inspector.
 - 5. Date of inspection or sampling.
 - 6. Record of temperature and weather.
 - 7. Date of test.
 - 8. Identification of product and Specification section.
 - 9. Location in project.
 - 10. Type of inspection or test.
 - 11. Compliance with Contract Documents or not.

- E. Perform additional services as required by Owner.
- F. Laboratory is not authorized to:
 - 1. Release, revoke, alter, or enlarge on requirements of Contract Documents.
 - 2. Approve or reject any portion of work.
 - 3. Perform any duties of the Contractor.

1.03 CONTRACTOR'S RESPONSIBILITIES

- A. Cooperate with laboratory personnel. Provide access to Work and manufacturer's operations.
- B. Secure and deliver to the laboratory adequate representational samples of materials proposed to be used and which require testing.
- C. Materials and equipment used in the performance of work under this Contract are subject to inspection and testing at the point of manufacturer or fabrication. Standard specifications for quality and workmanship are indicated in the Contract Documents. The Engineer may require the Contractor to provide statements or certificates from the manufacturers and fabricators that the materials and equipment provided by them are manufactured or fabricated in full accordance with the standard specifications for quality and workmanship indicated in the Contract Documents. All costs of providing statements and certificates shall be a subsidiary obligation of the Contractor, and no extra charge to the Owner shall be allowed on account of such testing and certification.
- D. Furnish incidental labor and facilities:
 - 1. To provide access to Work to be tested.
 - 2. To obtain and handle samples at the Project site or at the source of the product to be tested.
 - 3. To facilitate inspections and tests.
 - 4. For storage and curing of test samples.
- E. Notify laboratory sufficiently in advance of operations to allow for laboratory assignment of personnel and scheduling of tests.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION

SECTION 01505

MOBILIZATION AND DEMOBILIZATION

PART 1 - GENERAL

1.01 DEFINITION AND SCOPE

- A. Mobilization shall include the obtaining of all permits, insurance, and bonds; moving onto the site of all equipment; and furnishing and erecting temporary construction facilities; all as required for the proper performance and completion of the Work. Mobilization shall include, but not be limited to, the following principal items.
1. Move onto the site all Contractor's plant and equipment required for first month operations.
 2. Install temporary construction power, wiring, and lighting facilities, as required.
 3. Establish fire protection plan and safety program.
 4. Secure construction water supply.
 5. Provide on-site sanitary facilities and potable water facilities as required by agencies having jurisdiction.
 6. Arrange for and erect Contractor's work and storage yard and employee's parking facilities.
 7. Submit all required insurance certificates and bonds.
 8. Obtain all required permits.
 9. Post all OSHA, EPA, Department of Labor, and all other required notices.
 10. Submit a detailed construction schedule acceptable to the Engineer as specified.
 11. Submit a schedule of values of the Work. Mobilization and Demobilization shall not be more than 5.0% of the bid amount.
 12. Submit a schedule of submittals.
 13. Install project sign.

1.02 DEMOBILIZATION

- A. Demobilization is the timely and proper removal of all Contractor owned material, equipment or plant, from the job site and the proper restoration or completion of work necessary to bring the site into full compliance with the Contract Documents.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION

SECTION 01568

TEMPORARY EROSION AND SEDIMENTATION CONTROL

PART 1 - GENERAL

1.01 DESCRIPTION

A. Scope of Work:

1. The Work specified in this Section consists of designing, providing, maintaining and removing temporary erosion and sedimentation controls as required by applicable rules and regulations and permit conditions.
2. Temporary erosion controls include, but are not limited to, grassing, mulching, netting, and providing interceptor ditches at ends of berms and at those locations which will ensure that erosion during construction will be either eliminated or maintained within acceptable limits.
3. Temporary sedimentation controls include, but are not limited to, silt dams, traps, barriers, and appurtenances at the foot of sloped surfaces which will ensure that sedimentation pollution will be either eliminated or maintained within acceptable limits.
4. Contractor is responsible for providing effective temporary erosion and sediment control measures during construction or until final controls become effective.

PART 2 - PRODUCTS

2.01 EROSION CONTROL

- B. Netting shall be fabricated of material acceptable to the Owner.

2.02 SEDIMENTATION CONTROL

- A. Bales shall be clean, seed-free cereal hay type.
- B. Netting shall be fabricated of material acceptable to the Owner.
- C. Filter stone shall be crushed stone which conforms to Florida Department of Transportation (FDOT) Specifications.
- D. Concrete block shall be hollow, non-load bearing type.

- E. Concrete shall be exterior grade not less than 1-inch thick.

PART 3 - EXECUTION

3.01 EROSION CONTROL

- A. Minimum procedures for grassing are:
 - 1. Scarify slopes to a depth of not less than 6 inches and remove large clods, rock, stumps, roots larger than 1/2 inch in diameter and debris.
 - 2. Sow seed within 24 hours after the ground is scarified with either mechanical seed drills or rotary hand seeders.
 - 3. Apply mulch loosely and to a thickness of between 3/4 inch and 1-1/2 inches.
 - 4. Apply netting over mulched areas on sloped surfaces.
 - 5. Roll and water seeded areas in a manner which will encourage sprouting of seeds and growing of grass. Reseed areas which exhibit unsatisfactory growth. Backfill and seed eroded areas.

3.02 SEDIMENTATION CONTROL

- A. Install and maintain silt dams, traps, barriers, and appurtenances as shown on the approved descriptions and working drawings. Hay bales which deteriorate and filter stone which is dislodged shall be replaced.

3.03 PERFORMANCE

- A. Should any of the temporary erosion and sediment control measures employed by the Contractor fail to produce results which comply with the requirements of the State of Florida, the Owner or Engineer, the Contractor shall immediately take whatever steps are necessary to correct the deficiency at his own expense.

END OF SECTION

SECTION 01600

MATERIAL AND EQUIPMENT

PART 1 - GENERAL

1.01 DESCRIPTION

- A. Scope of Work: Material and equipment incorporated into the Work:
 - 1. Manufactured and fabricated products:
 - a. Design, fabricate and assemble in accord with the best engineering and shop practices.
 - b. Manufacture like parts of duplicate units to standard sizes and gauges, to be interchangeable.
 - c. Two (2) or more items of the same kind shall be identical, by the same manufacturer.
 - d. Products shall be suitable for service conditions.
 - e. Equipment capacities, sizes and dimensions shown or specified shall be adhered to unless variations are specifically approved in writing.
 - 2. Do not use material or equipment for any purpose other than that for which it is designed or specified.

1.02 MANUFACTURER'S INSTRUCTIONS FOR INSTALLATION

- A. When Contract Documents require that installation of work shall comply with manufacturer's printed instructions, obtain and distribute copies of such instructions to parties involved in the installation, including five copies of the Engineer.
 - 1. Maintain one (1) set of complete instructions at the job site during installation and until completion.
- B. Handle, install, connect, clean, condition and adjust products in strict accord with such instructions and in conformity with specified requirements.
 - 1. Should job conditions or specified requirements conflict with manufacturer's instructions, consult with Engineer for further instructions.
 - 2. Do not proceed with work without clear instructions.

- C. Perform work in accordance with manufacturer's instructions. Do not omit any preparatory step or installation procedure unless specifically modified or exempted by Contract Documents.

1.03 TRANSPORTATION AND HANDLING

- A. Arrange deliveries of products in accordance with progress schedules, coordinate to avoid conflict with work and conditions at the site. City employees will not accept deliveries, sign receipts for materials, inspect deliveries, assist in unloading or participate in any activities related to the Contractor receiving materials or equipment. Deliveries shall be scheduled during normal working hours and a representative of the Contractor must be present to receive all shipments.
 - 1. Deliver products in undamaged condition, in manufacturer's original containers or packaging, with identifying labels intact and legible.
 - 2. Immediately on delivery, inspect shipments to assure compliance with requirements of Contract Documents and approved submittals, and that products are properly protected and undamaged.
- B. Provide equipment and personnel to handle products by methods to prevent soiling or damage to products or packaging.

1.04 STORAGE AND PROTECTION

- A. The Contractor shall furnish a covered, weather-protected storage structure providing a clean, dry, noncorrosive environment for all mechanical equipment, valves, architectural items, electrical and instrumentation equipment, and special equipment to be incorporated into this Project. Storage of equipment shall be in strict accordance with the "instructions for storage" of each equipment supplier and manufacturer including connection of heaters, placing of storage lubricants in equipment, etc. Corroded, damaged or deteriorated equipment and parts shall be replaced before acceptance of the project. Equipment and materials not properly stored will not be included in a payment estimate.
- B. Store products in accord with manufacturer's instructions, with seals and labels intact and legible.
 - 1. Store products subject to damage by the elements in weather-tight enclosures.
 - 2. Maintain temperature and humidity within the ranges required by manufacturer's instructions.
 - 3. Store fabricated products above the ground, on blocking or skids, prevent soiling or staining. Cover products which are subject to deterioration with impervious sheet coverings, provide adequate ventilation to avoid condensation.

4. Store loose granular materials in a well-drained area on solid surfaces to prevent mixing with foreign matter.
- C. All materials and equipment to be incorporated in the work shall be handled and stored by the Contractor before, during and after shipment in a manner to prevent warping, twisting, bending, breaking, chipping, rusting, and any injury, theft or damage of any kind whatsoever to the material or equipment.
- D. Cement, sand and lime shall be stored under a roof and off the ground and shall be kept completely dry at all times. All structural and miscellaneous steel, and reinforcing steel shall be stored off the ground or otherwise to prevent accumulations of dirt or grease, and in a position to prevent accumulations of standing water and to minimize rusting. Beams shall be stored with the webs vertical. Precast concrete beams shall be handled and stored in a manner to prevent accumulations of dirt, standing water, staining, chipping or cracking. Brick, block and similar masonry products shall be handled and stored in a manner to reduce breakage, chipping, cracking and spalling to a minimum.
- E. All materials, which, in the opinion of the Engineer, have become so damaged as to be unfit for the use intended or specified shall be promptly removed from the site of the work, and the Contractor shall receive no compensation for the damaged material or its removal.
- F. Arrange storage in a manner to provide easy access for inspection. Make periodic inspections of stored products to assure that products are maintained under specified conditions, and free from damage or deterioration.
- G. Protection After Installation: Provide substantial coverings as necessary to protect installed products from damage from traffic and subsequent construction operations. Remove covering when no longer needed.
- H. The Contractor shall be responsible for all material, equipment and supplies sold and delivered to the Owner under this Contract until final inspection of the work and acceptance thereof by the Owner. In the event any such material, equipment and supplies are lost, stolen, damaged or destroyed prior to final inspection and acceptance, the Contractor shall replace same without additional cost to the Owner.
- I. Should the Contractor fail to take proper action on storage and handling of equipment supplied under this Contract within seven (7) days after written notice to do so has been given, the Owner retains the right to correct all deficiencies noted in previously transmitted written notice and deduct the cost associated with these corrections from the Contractor's Contract. These costs may be comprised of expenditures for labor, equipment usage, administrative, clerical, engineering and any other costs associated with making the necessary corrections.

1.05 STORAGE AND HANDLING OF EQUIPMENT ON SITE

- A. Because of the long period allowed for construction, special attention shall be given to the storage and handling of equipment on site. As a minimum, the procedure outlined below shall be followed:
1. Materials shall not be shipped until approved by the Engineer. The intent of this requirement is to avoid unnecessary delivery of unapproved materials and to reduce on-site storage time prior to installation and/or operation. Under no circumstances shall major equipment or finish products be delivered to the site more than one month prior to installation without written authorization from the Engineer. Materials shipped to the site, or temporarily stored off-site in approved locations, shall be stored in accordance with Paragraph 1.04, herein.
 2. All equipment having moving parts such as gears, electric motors, etc. and/or instruments shall be stored in a temperature and humidity controlled building approved by the Engineer, until such time as the equipment is to be installed.
 3. All equipment shall be stored fully lubricated with oil, grease, etc. unless otherwise instructed by the manufacturer.
 4. Manufacturer's storage instructions shall be carefully studied by the Contractor and reviewed with the Engineer by him. These instructions shall be carefully followed and a written record of this kept by the Contractor.
 5. Moving parts shall be rotated a minimum of once weekly to insure proper lubrication and to avoid metal-to-metal "welding". Upon installation of the equipment, the Contractor shall start the equipment, at least half the load, once weekly for an adequate period of time to insure that the equipment does not deteriorate from lack of use.
 6. Lubricants shall be changed upon completion of installation and as frequently as required thereafter during the period between installation and acceptance. Mechanical equipment to be used in the work, if stored for longer than ninety (90) days, shall have the bearings cleaned, flushed and lubricated prior to testing and startup, at no extra cost to the Owner.
 7. Prior to acceptance of the equipment, the Contractor shall have the manufacturer inspect the equipment and certify that its condition has not been detrimentally affected by the long storage period. Such certifications by the manufacturer shall be deemed to mean that the equipment is judged by the manufacturer to be in a condition equal to that of equipment that has been shipped, installed, tested and accepted in a minimum time period. As such, the manufacturer will guarantee the equipment equally in both instances. If such a certification is not given, the equipment shall be judged to be defective. It shall be removed and replaced at the Contractor's expense.

1.06 SPARE PARTS

- A. Spare parts for certain equipment provided under Divisions 11: Equipment; 13: Special Construction; 15: Mechanical; and 16: Electrical have been specified in the pertinent sections of the Specifications. The Contractor shall collect and store all spare parts so required in an area to be designated by the Engineer. In addition, the Contractor shall furnish to the Engineer an inventory listing all spare parts, the equipment they are associated with, the name and address of the supplier, and the delivered cost of each item. Copies of actual invoices for each item shall be furnished with the inventory to substantiate the delivered cost.

1.07 GREASE, OIL AND FUEL

- A. All grease, oil and fuel required for testing of equipment shall be furnished with the respective equipment. The Owner shall be furnished with a year's supply of required lubricants including grease and oil of the type recommended by the manufacturer with each item of equipment supplied.
- B. The Contractor shall be responsible for changing the oil in all drives and intermediate drives of each mechanical equipment after initial break-in of the equipment, which in no event shall be any longer than three (3) weeks of operation.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION

SECTION 01650

START-UP AND DEMONSTRATION

PART 1 - GENERAL

1.01 DESCRIPTION

- A. Scope of Work: Demonstrate to Owner and Engineer that the Work functions as a complete and operable system under normal and emergency operating conditions.
- B. Requirements
 - 1. Contractor shall provide all materials, personnel, equipment and expendables as needed and as specified to perform the required start-up and demonstration tests.
 - 2. Equipment testing and facility start-up is requisite to satisfactory completion of the contract and, therefore, shall be completed within the required contract time for substantial completion.
 - 3. The Contractor may use reclaimed water from the Marshall Street WRF in the testing of the Inner Chlorine Contact Chamber (CCC) repair. The Contractor shall notify the Owner of the amount of water required for the test at the time the testing is scheduled. The Owner reserves the right to limit the amount of water or set the time of day and dates of the deliveries of water.
- C. Related Work Described Elsewhere:
 - 1. Construction Progress Schedules: Section 01310.
 - 2. Operating and Maintenance Data: Section 01730.
 - 3. Equipment: Division 11.

PHASE 1 & PHASE 2

PART 2a - PRODUCTS

2.01 START-UP PLAN

- A. Submit for approval by the Engineer a detailed start-up plan outlining the schedule and sequence of all tests and start-up activities, including submittal of check-out forms. Start-up and commissioning may not begin until the plan is approved by the Engineer.

PART 3a - EXECUTION

3.01 COMPONENT TEST AND CHECK-OUT

- A. Start-up Certification: Prior to system start-up, successfully complete all the testing required of the individual components of the Work. Submit five (5) copies of check-out forms for each individual component or piece of equipment, signed by the Contractor or the subcontractor. All copies of the Operation and Maintenance Manuals must be provided before start-up may begin. These forms shall be completed and submitted before Instruction in Operation to Owner or a request for initiating any final inspections. Insert one (1) copy of this form into the applicable section of each Operation and Maintenance Manual.
- B. Demonstrate to the Engineer and the Owner's representative, that all temporary jumpers and/or bypasses have been removed and that all of the components are operating under their own controls as designated.
- C. Coordinate start-up activities with the Owner's operating personnel at the site and with the Engineer prior to commencing system start-up.

3.02 START-UP

- A. Confirm that all equipment is properly energized and that the flow path through the new Work is unobstructed.
- B. Initiate start-up and training in accordance with and with the use of the facility operation and maintenance manuals.
- C. Observe the component operation and make adjustments as necessary to optimize the performance of the Work.
- D. Coordinate with Owner for any adjustments desired or operational problems requiring debugging.
- E. Make adjustments as necessary.

3.03 START-UP DEMONSTRATION AND TESTING

- A. After all Work components have been constructed, field tested, and started up in accordance with the individual Specifications and manufacturer requirements, and after all Check-Out Forms have been completed and submitted, perform the Start-Up Demonstration and Testing. The demonstration period shall be held upon completion of all systems at a starting date to be agreed upon in writing by the Owner or his representative.
- B. Prior to testing, clean exposed surfaces by thorough hosing and remove the loosened matter and wash water from the structures. Remove and properly dispose of wash water and debris by means other than washing through plant piping.

- C. Do not start leak testing or cleaning of surfaces until concrete crack injections are cured and joint sealants have set and cured based on manufacturer's specified cure times.
- D. Fill hydraulic structures to be subjected to leakage tests with water to specified liquid level line. Filling rate shall not exceed 4 feet of rise in water elevation as measured along the vertical walls of the Inner Chlorine Contact Chamber (CCC) per hour, unless otherwise approved by Engineer.
- E. Evaporation and precipitation shall be measured. Contractor shall provide rain gauge and evaporation pan.
- F. The Start-Up Demonstration Testing will be conducted by filling the Inner Chlorine Contact Chamber (CCC) in ¼-full increments. The Contractor will be responsible for monitoring the water level in the Inner Chlorine Contact Chamber (CCC) and the condition (e.g. dry, wet) of the seepage catchment (sump pump pit). After each ¼-fill, the Inner Chlorine Contact Chamber (CCC) will be left to sit for a 24-hour period. If start-up is interrupted by rainfall, the seepage catchment (sump pump pit) must be emptied and another 24-hour period must commence for the current fill level.
- G. After each ¼-fill and 24-hour period, the seepage catchment must be inspected for signs of water, which would indicate that external seepage is still occurring. If it is confirmed that no water has leaked into the seepage catchment, then the next ¼-fill increment may commence followed by the next 24-hour sit period. If seepage is present anywhere in the vicinity of the Inner Chlorine Contact Chamber (CCC), the Contractor shall notify the Owner and Engineer immediately and start-up testing will cease until further notice by the Owner or Engineer.
- H. Once the Inner Chlorine Contact Chamber (CCC) has been completely full for 24-hours with no water seen in the seepage catchment, then the final stages of Start-Up Demonstration can commence. The final stages include allowing the full Inner Chlorine Contact Chamber (CCC) to sit for an additional 48 hours. It will be assumed, for the purposes of the test, that the absorption of moisture by the concrete in the structure is complete at this point. Then, close all valves and gates to the structure and measure the change in water surface each day for at least a period of three (3) days.
- I. If at any point water is present in the seepage catchment, then the Inner Chlorine Contact Chamber (CCC) must be emptied completely and the repairs inspected for integrity. The Owner and Engineer must be notified once seepage is seen in the seepage catchment and notified when the repair inspection will take place.
- J. During the test period, examine all exposed portions of the structure, and mark all visible leaks or damp spots. Such leaks or damp spots shall be repaired later. If the drop in water surface in a 24-hour period exceeds 1/20 of 1 percent of the normal volume of liquid contained in the structure, the leakage shall be considered excessive.
- K. If the leakage is excessive, drain the structure, repair visible leaks and damp spots if possible, and inspect Phase 1 & 2 repairs as described below:

- L. If any existing Phase 1 & 2 repairs are enhanced after inspection, then the Start-Up Demonstration can restart from the beginning. If the existing repairs are satisfactory but the external seepage persists or the water level drop was considered excessive, then the Phase 3 repairs will be executed and the Start-Up Demonstration Testing can commence for Phase 3 as described in the next section.
- M. Repairs and additional tests shall be made by the Contractor at no additional cost to the Owner.
- N. Acceptability of the Work's performance will be based on the Work performing as specified under these actual and simulated operating conditions and as defined in the Contract Documents. The intent of the start-up demonstration and testing is for the Contractor to demonstrate to the Owner and the Engineer that the Work will function as a complete and operable system under normal, as well as emergency operating conditions, and is ready for final acceptance.
- O. Submit to the Engineer five (5) copies of the Certificate of Completed Demonstration Form, for each item of equipment or system in the Work, signed by the Contractor, Subcontractor, Engineer, and the Owner. Insert one (1) copy of this form in the applicable section of each Operation and Maintenance Manual. Samples of the Check Out Form and Certificate of Completed Demonstration Form are provided at the end of this Section.

PHASE 3 (If Needed As Directed By The Owner)

PART 2b - PRODUCTS

2.01 START-UP PLAN

- A. Submit for approval by the Engineer a detailed start-up plan outlining the schedule and sequence of all tests and start-up activities. Start-up and commissioning may not begin until the plan is approved by the Engineer.

PART 3b – EXECUTION

3.03 START-UP DEMONSTRATION AND TESTING

- A. After all Work components have been constructed, field tested, and started up in accordance with the individual Specifications and manufacturer requirements, and after all Check-Out Forms have been completed and submitted, perform the Start-Up Demonstration and Testing. The demonstration period shall be held upon completion of all systems at a starting date to be agreed upon in writing by the Owner or his representative.
- B. Prior to testing, clean exposed surfaces by thorough hosing and remove the loosened matter and wash water from the structures. Remove and properly dispose of wash water and debris by means other than washing through plant piping.

- C. Do not start leak testing or cleaning of surfaces until concrete crack injections are cured and joint sealants have set and cured based on manufacturer's specified cure times.
- D. Fill hydraulic structures to be subjected to leakage tests with water to specified liquid level line. Filling rate shall not exceed 4 feet of rise in water elevation as measured along the vertical walls of the Outer Chlorine Contact Chamber (CCC) per hour, unless otherwise approved by Engineer.
- E. Evaporation and precipitation shall be measured. Contractor shall provide rain gauge and evaporation pan.
- F. Once the Outer Chlorine Contact Chamber (CCC) has been completely full for 24-hours with no water seen in the seepage catchment, then the final stages of Start-Up Demonstration can commence. The final stages include allowing the full Outer Chlorine Contact Chamber (CCC) to sit for an additional 48 hours. It will be assumed, for the purposes of the test, that the absorption of moisture by the concrete in the structure is complete at this point. Then, close all valves and gates to the structure and measure the change in water surface each day for at least a period of three (3) days.
- G. If at any point water is present in the seepage catchment, then the Outer Chlorine Contact Chamber (CCC) must be emptied completely and the repairs inspected for integrity. The Owner and Engineer must be notified once seepage is seen in the seepage catchment and notified when the repair inspection will take place.

CHECK OUT FORM

<input type="checkbox"/>	OWNER	<u>City of Clearwater</u>	No. Copies	_____	CHECK-OUT MEMO NO. _____
<input type="checkbox"/>	ENGINEER:	<u>Tetra Tech</u>	No. Copies	_____	
<input type="checkbox"/>	ARCHITECT:	_____	No. Copies	_____	
<input type="checkbox"/>	CONTRACTOR:	_____	No. Copies	_____	
<input type="checkbox"/>	FIELD:	_____	No. Copies	_____	
<input type="checkbox"/>	OTHER:	_____	No. Copies	_____	

PROJECT DATA

NAME: _____
 LOCATION: _____
 OWNER: _____
 OTHER: _____

CONTRACT DATA

NUMBER: _____
 DATE: _____
 DRAWING NO: _____
 SPECIFICATION
 SECTION: _____

Name of equipment checked: _____

Name of manufacturer of equipment: _____

1. The equipment furnished by us has been checked on the job by us. We have reviewed, where applicable, the performance verification information submitted to us by the Contractor.
2. The equipment is properly installed, except for items noted below.*
3. The equipment is operating satisfactorily, except for items noted below.*
4. The written operating and maintenance information, where applicable, has been presented to the Contractor, and been discussed with him in detail. Five (5) copies of all applicable operating and maintenance information and parts lists have been furnished to him.

Checked By: _____

 Name of Manufacturer's Rep.

 Name of General Contractor

 Address and Phone # of Rep.

 Authorized Sig./Title/Date

 Sig./Title/Pers. Making Chk.

 Name of Subcontractor

 Date Checked

 Authorized Sig./Title/Date

Manufacturer's Representative Notations: Exceptions noted at time of check were:

Manufacturer's Representative to note adequacy of related equipment that directly affects operation, performance or function of equipment checked. (No comment presented herein will indicate adequacy of related systems or equipment):

CERTIFICATE OF COMPLETED DEMONSTRATION FORM

<input type="checkbox"/>	OWNER	<u>City of Clearwater</u>	No. Copies	_____	CERTIFICATE OF COMPLETED DEMONSTRATION MEMO NO. _____
<input type="checkbox"/>	ENGINEER:	<u>Tetra Tech</u>	No. Copies	_____	
<input type="checkbox"/>	ARCHITECT:	_____	No. Copies	_____	
<input type="checkbox"/>	CONTRACTOR:	_____	No. Copies	_____	
<input type="checkbox"/>	FIELD:	_____	No. Copies	_____	
<input type="checkbox"/>	OTHER:	_____	No. Copies	_____	

PROJECT DATA

NAME: _____
 LOCATION: _____
 OWNER: _____
 OTHER: _____

CONTRACT DATA

NUMBER: _____
 DATE: _____
 DRAWING NO: _____
 SPECIFICATION
 SECTION: _____

NOTE TO CONTRACTOR:

Submit five (5) copies of all information listed below for checking at least one (1) week before scheduled demonstration of the Work. After all information has been approved by the Engineer, give the Owner a Demonstration of Completed Systems as specified and have the Owner sign five (5) copies of this form. After this has been done, a written request for a final inspection of the system shall be made.

MEMORANDUM:

This memo is for the information of all concerned that the Owner has been given a Demonstration of Completed Systems on the work covered under this Specification Section. This conference consisted of the system operation, a tour on which all major items of equipment were explained and demonstrated, and the following items were given to the Owner:

- (a) Owner's copy of Operation and Maintenance Manual for equipment or systems specified under this Section containing approved submittal sheets on all items, including the following:
 - (1) Maintenance information published by manufacturer on equipment items.
 - (2) Printed warranties by manufacturers of equipment items.
 - (3) Performance verification information as recorded by the Contractor.
 - (4) Check-Out Memo on equipment by manufacturer's representative.
 - (5) Written operating instructions on any specialized items.
 - (6) Explanation of guarantees and warranties on the system.
- (b) Prints showing actual "As-Built" conditions.
- (c) A demonstration of the system in operation and of the maintenance procedures which will be required.

SECTION IVa – Supplemental Technical Specifications

(Name of General Contractor)

By: _____
(Authorized Signature, Title and Date)

(Name of Subcontractor)

By: _____
(Authorized Signature, Title and Date)

Operation and Maintenance Manuals, Instruction Prints, Demonstration and Instruction in Operation
Received:

(Name of Owner)

By: _____
(Authorized Signature/Title/Date)

END OF SECTION

SECTION 01700

CONTRACT CLOSEOUT

PART 1 - GENERAL

1.01 DESCRIPTION

- A. Scope of Work: Comply with requirements stated in Conditions of the Contract and in Specifications for administrative procedures in closing out the Work.
- B. Related Requirements Described Elsewhere:
 - 1. Contract Closeout: Section 01700.
 - 2. Project Housekeeping/Cleaning: Section 01710.
 - 3. Project Record Documents: Section 01720.
 - 4. Warranties and Bonds: Section 01740.

1.02 SUBSTANTIAL COMPLETION

- A. The Work will not be substantially complete, and Contractor may not request substantial completion inspection unless the following submittals and work is completed:
 - 1. Project Record Documents are complete and have been submitted and reviewed to the requirements of Section 01720.
 - 2. All start-up and demonstration testing completed, and Certificates of Completed Demonstration submitted to the requirements of Section 01650.
 - 3. All areas to be used and occupied are safe, operable in automatic and complete.
 - 4. All building occupancy certificates have been issued by the appropriate building permitting agency.
 - 5. All painting, finishes, fencing, cleanup, final grading, grassing, planting, sidewalk construction, and paving shall have been completed and are ready for inspection.
 - 6. All deficiencies noted on inspection reports or nonconformances are corrected or the correction plan approved.
- B. When the conditions of paragraph 1.02 A. are met the Contractor shall submit to the Engineer:

1. A written notice that he considers the Work, or portion thereof, is substantially complete, and request an inspection.
 2. A punchlist of items to be corrected. (Uncompleted work which is not related to the safe, effective, efficient use of the Project may be allowed on the punchlist with the Engineer's approval.)
- C. Within a reasonable time after receipt of such notice, the Engineer will make an inspection to determine the status of completion.
- D. Should the Engineer determine that the Work is not substantially complete:
1. The Engineer will promptly notify the Contractor in writing, giving the reasons therefor.
 2. Contractor shall remedy the deficiencies in the Work and send another written notice of substantial completion to the Engineer.
 3. The Engineer will within reasonable time, reinspect the Work. The Contractor will be liable for reinspection fees as described in Paragraph 1.04, herein.
- E. When the Engineer finds that the Work is substantially complete, he will:
1. Schedule a walk-through of the facility to include the Owner. Engineer shall determine the completeness of the punchlist and readiness of the facility for occupancy by the Owner.
 2. Prepare and deliver to Owner a tentative Certificate of Substantial Completion with the tentative punchlist of items to be completed or corrected before final inspection.
 3. After consideration of any objections made by the Owner as provided in Conditions of the Contract, and when the Engineer considers the Work substantially complete, he will execute and deliver to the Owner and the Contractor a definite Certificate of Substantial Completion with a revised tentative list of items to be completed or corrected. Any incomplete work allowed on a punchlist must be reinspected upon completion and any deficiencies found will be added to the punchlist.

1.03 FINAL INSPECTION

- A. Prior to Contractor's request for a final inspection the following submittals and work must be complete:
1. Project Record Documents must be approved.

2. All spare parts and maintenance materials must be suitably delivered to the Owner per the requirements of the Technical Sections of the Specifications.
 3. Contractor to submit evidence of compliance with requirements of governing authorities.
- B. After satisfying the requirements of Paragraph 1.03 A. and when Contractor considers the Work complete, he shall submit written certification that:
1. Contract Document requirements have been met.
 2. Work has been inspected for compliance with Contract Documents.
 3. Work has been completed in accordance with Contract Documents.
 4. Equipment and systems have been tested in the presence of the Owner's representative and are operational.
 5. All punchlist items have been corrected or completed and the Work is ready for final inspection.
- C. The Engineer will, within reasonable time, make an inspection to verify the status of completion after receipt of such certification.
- D. Should the Engineer consider that the Work is incomplete or defective:
1. The Engineer will promptly notify the Contractor in writing, listing the incomplete or defective work.
 2. Contractor shall take immediate steps to remedy the stated deficiencies, and send another written certification to the Engineer that the Work is complete.
 3. The Engineer will, within a reasonable amount of time, reinspect the Work and the Contractor shall be liable for reinspection fees as described in Paragraph 1.04, herein.
- E. When the Engineer finds that the Work is acceptable under the Contract Documents, the Contractor may make closeout submittals.
- 1.04 REINSPECTION FEES
- A. Should the Engineer perform reinspections due to failure of the Work to comply with the claims of status of completion made by the Contractor:
1. Contractor will compensate the Owner for such additional services.

2. Owner will deduct the amount of such compensation from the final payment to the Contractor.

1.05 CONTRACTOR'S CLOSEOUT SUBMITTALS

- A. Warranties and Bonds: To requirements of Section 01740.
- B. Evidence of Payment and Release of Liens: To requirements of General and Supplementary Conditions.
- C. Certificate of Insurance for Products and Completed Operations.

1.06 FINAL ADJUSTMENT OF ACCOUNTS

- A. Submit a final statement of accounting to the Engineer.
- B. Statement shall reflect all adjustments to the Contract Sum:
 1. The original Contract Sum.
 2. Additions and deductions resulting from:
 - a. Previous change orders or written amendments.
 - b. Allowances.
 - c. Unit prices.
 - d. Deductions for uncorrected work.
 - e. Penalties and bonuses.
 - f. Deductions for liquidated damages.
 - g. Deductions for reinspection payments.
 - h. Other adjustments.
 3. Total Contract Sum, as adjusted.
 4. Previous payments.
 5. Sum remaining due.

1.07 FINAL APPLICATION FOR PAYMENT

- A. Contractor shall submit the final Application for Payment in accordance with procedures and requirements stated in the Agreement between City and Contractor.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION

SECTION 01710

PROJECT HOUSEKEEPING/CLEANING

PART 1 - GENERAL

1.01 DESCRIPTION

- A. Scope of Work: Execute cleaning, during progress of the Work and at completion of the Work.

1.02 DISPOSAL REQUIREMENTS

- A. Conduct cleaning and disposal operations to comply with codes, ordinances, regulations, and anti-pollution laws.

PART 2 - PRODUCTS

2.01 MATERIALS

- A. Use only those cleaning materials which will not create hazards to health or property and which will not damage surfaces.
- B. Use only those cleaning materials and methods recommended by manufacturer of the surface material to be cleaned.
- C. Use cleaning materials only on surfaces recommended by cleaning material manufacturer.

PART 3 - EXECUTION

3.01 DURING CONSTRUCTION

- A. Execute daily cleaning to keep the Work, the site and adjacent properties free from accumulations of waste materials, rubbish and windblown debris, resulting from construction operations or personal activities.
- B. Provide on-site containers for the collection of waste materials, debris and rubbish.
- C. Remove waste materials, debris and rubbish from the site periodically, or as directed by the Owner, and dispose of at legal disposal areas away from the site.

3.02 DUST CONTROL

- A. The Contractor shall employ construction techniques that minimize the production and distribution of dust.
- B. Clean interior spaces prior to the start of finish painting and continue cleaning on an as-needed basis until painting is finished.
- C. Schedule operations so that dust and other contaminants resulting from cleaning process will not fall on wet or newly-coated surfaces.

3.03 FINAL CLEANING

- A. Employ skilled workmen for final cleaning.
- B. Remove grease, mastic, adhesives, dust, dirt, stains, fingerprints, labels, and other foreign materials from sight-exposed interior and exterior surfaces.
- C. Prior to final completion, or Owner occupancy, Contractor shall conduct an inspection of sight-exposed interior and exterior surfaces and all work areas, to verify that the entire Work is clean.

END OF SECTION

SECTION 01720

PROJECT RECORD DOCUMENTS

PART 1 - GENERAL

1.01 DESCRIPTION

A. Scope of Work: Maintain at the site for the Owner one (1) record copy of:

1. Drawings.
2. Specifications.
3. Addenda.
4. Change Orders and other modifications of the Contract.
5. Engineer's Field Orders or written instructions.
6. Approved Shop Drawings, Working Drawings and Samples.
7. Field test records.
8. Construction photographs.

B. Related Requirements Described Elsewhere:

1. Shop Drawings, Working Drawings and Samples: Section 01340.

1.02 MAINTENANCE OF DOCUMENTS AND SAMPLES

A. Store documents and samples in Contractor's field office apart from documents used for construction.

1. Provide files and racks for storage of documents.
2. Provide locked cabinet or secure storage space for storage of samples.

B. File documents and samples in accordance with CSI format with section numbers as provided herein.

C. Maintain documents in a clean, dry, legible, condition and in good order. Do not use record documents for construction purposes.

- D. Make documents and samples available at all times for inspection by the Engineer or the Owner.
- E. As a prerequisite for monthly Progress payments, the Contractor is to exhibit the currently updated "Record Documents" for review by the Engineer and Owner. Payment may be withheld if record documents are not satisfactorily maintained.

1.03 MARKING DEVICES

- A. Provide felt tip marking pens for recording information in the color code designated by the Engineer.

1.04 RECORDING

- A. Label each document "PROJECT RECORD" with a rubber stamp having one (1) inch high letters.
- B. Record information concurrently with construction progress.
 - 1. Do not conceal any work until required information is recorded.
- C. Drawings: Legibly and clearly mark, to scale, each drawing to record actual construction:
 - 1. Depths of various elements of foundation in relation to finish first floor datum.
 - 2. All underground piping with elevations and dimensions. Changes to piping location. Horizontal and vertical locations of underground utilities and appurtenances, referenced to permanent surface improvements. Actual installed pipe material, class, etc.
 - 3. Location of internal utilities and appurtenances concealed in the construction, referenced to visible and accessible features of the structure.
 - 4. Field changes of dimension and detail.
 - 5. Changes made by Field Order or by Change Order.
 - 6. Details not on original Contract Drawings.
 - 7. Equipment and piping relocations.
 - 8. Major architectural and structural changes including relocation of doors, windows, etc.
 - 9. Architectural schedule changes according to Contractor's records and shop drawings.

- D. Specifications and Addenda: Legibly mark each section to record:
 - 1. Manufacturer, trade name, catalog number of Supplier of each product and item of equipment actually installed.
 - 2. Changes made by Field Order or by Change Order.
- E. Shop Drawings (after final review and approval): Provide six (6) sets of record shop drawings, for each process equipment, piping, electrical system and instrumentation system (see Section 01340).

1.05 SUBMITTAL

- A. At Contract closeout, deliver Record Documents to the Engineer for the Owner.
- B. Accompany submittal with transmittal letter in duplicate, containing:
 - 1. Date.
 - 2. Project title and number.
 - 3. Contractor's name and address.
 - 4. Title and number of each Record Document.
 - 5. Signature of Contractor or his authorized representative.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION

SECTION 01740

WARRANTIES AND BONDS

PART 1 - GENERAL

1.01 DESCRIPTION

- A. Related Work Described Elsewhere:
 - 1. Contract Closeout: Section 01700.

1.02 SUBMITTAL REQUIREMENTS

- A. Assemble warranties, bonds and service and maintenance contracts, executed by each of the respective manufacturers, suppliers, and subcontractors.
- B. Number of original signed copies required: Two (2) each.
- C. Table of Contents: Neatly typed, in orderly sequence. Provide complete information for each item.
 - 1. Product of work item.
 - 2. Firm, with name of principal, address and telephone number.
 - 3. Scope.
 - 4. Date of beginning of warranty, bond or service and maintenance contract.
 - 5. Duration of warranty, bond or service maintenance contract.
 - 6. Provide information for Owner's personnel:
 - a. Proper procedure in case of failure.
 - b. Instances which might affect the validity or warranty or bond.
 - 7. Contractor, name of responsible principal, address and telephone number.

1.03 FORM OF SUBMITTALS

- A. Prepare in duplicate packets.
- B. Format:
 - 1. Size 8-1/2 inches by 11 inches, punch sheets for standard three (3) ring binder.

- a. Fold larger sheets to fit into binders.
- 2. Cover: Identify each packet with typed or printed title "WARRANTIES AND BONDS". List:
 - a. Title of Project.
 - b. Name of Contractor.
- C. Binders: Commercial quality, three (3) D-ring type binders with durable and cleanable white plastic covers and maximum D-ring width of two (2) inches. Binders shall be presentation type with clear vinyl covers on front, back, and spine. Binders shall include two sheet lifters and two horizontal inside pockets.

1.04 WARRANTY SUBMITTALS REQUIREMENTS

- A. For all major pieces of equipment, submit a warranty from the equipment manufacturer. The manufacturer's warranty period shall be concurrent with the Contractor's for one (1) year, unless otherwise specified, commencing at the time of final acceptance by the Owner.
- B. The Contractor shall be responsible for obtaining certificates for equipment warranty for all major equipment. Electrical and which has at least a 1 hp motor or which lists for more than \$1,000. The Engineer reserves the right to request warranties for equipment not classified as major. The Contractor shall still warrant equipment not considered to be "major" in the Contractor's one-year warranty period even though certificates of warranty may not be required.
- C. In the event that the equipment manufacturer or supplier is unwilling to provide a one (1) year warranty commencing at the start of the Correction Period, the Contractor shall obtain from the manufacturer a two (2) year warranty commencing at the time of equipment delivery to the job site. This two (2) year warranty from the manufacturer shall not relieve the Contractor of the one (1) year warranty, starting at the time of Owner's acceptance of the equipment.
- D. The Owner shall incur no labor or equipment cost during the guarantee period.
- E. Guarantee shall cover all necessary labor, equipment, materials, and replacement parts resulting from faulty or inadequate equipment design, improper assembly or erection, defective workmanship and materials, leakage, breakage or other failure of all equipment and components furnished by the manufacturer or the Contractor.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION



CLEARWATER
BRIGHT AND BEAUTIFUL • BAY TO BEACH

DIVISION 3

CONCRETE

SECTION 03151

CONCRETE JOINTS, WATER STOPS, AND SEALANTS

PART 1 - GENERAL

1.01 DESCRIPTION

This section describes materials, testing, and installation of construction and expansion joints, PVC water stops, premolded joint filler, joint sealant, bond breaker tape, preformed control joints, backing rod, and steel expansion joint dowels.

1.02 SUBMITTALS

- A. Submit shop drawings in accordance with the General Conditions and Section 01340 Shop Drawings, Working Drawings and samples.
- B. Submit manufacturer's literature, catalog data, and statement of compliance with referenced standards and specifications for materials specified herein.
- C. Submit material samples of PVC water stops.
- D. Provide technical data sheets for the Contractor's personnel and the Owner covering joint preparation, priming, and sealant materials application.
- E. Submit layouts for construction joints.

1.03 MANUFACTURER'S SERVICES

Prior to joint preparation for joints receiving sealant materials, the Contractor shall require joint manufacturer's technical representative to demonstrate at the site joint preparation, priming, and sealant materials application for the Contractor's personnel performing joint work.

PART 2 - MATERIALS

2.01 WATER STOP SHALL BE:

- A. Water stops shall be extruded from a PVC compound and shall be lock-rib, center-bulb, retro-fit or flat-strip type as manufactured by Greenstreak, Durajoint, Kirkhill Rubber Company, Vinylex, or equal. Water stop shall comply with Corps of Engineers Specification CRD-C-572-74.
- B. PVC waterstop for construction joints shall be flat ribbed type, 6 inches wide unless otherwise noted on the drawings, with a minimum thickness at any point of 3/8 inches. PVC waterstop shall be Model 732 by Greenstreak or approved equal.

- C. PVC waterstop for control joints shall be ribbed with a center bulb, 6 inches wide with a minimum thickness at any point of 3/8 inches. The center bulb shall have an O.D. not less than 1-3/8 inches. PVC waterstop shall be Model 732 by Greenstreak or approved equal.
- D. PVC waterstop for expansion joints shall be ribbed with a center bulb, 9 inches wide with a minimum thickness at any point of 3/8 inches. The center bulb shall have an O.D. not less than 1-3/8 inches. PVC waterstop shall be Model 738 by Greenstreak or approved equal.
- E. PVC waterstops for sealing existing concrete structures and new concrete placement shall be retro-fit type, 6 inches wide and 3-3/16 inches height with a minimum thickness at any point of 3/8 inches. The waterstop shall be attached to the existing concrete using 1/4" X 2-1/4" SS sleeve exp. Bolt with SS batten bars. PVC waterstop shall be Model 609 by Greenstreak or approved equal.
- F. All PVC waterstops shall have an integral fastening system consisting of hog rings and grommets.
- G. Extruded from virgin elastomeric PVC compound.
- H. Provide factory-made crosses, tees and ells fabricated by the waterstop manufactured using thermostatically controlled electric heat source.
- I. Resistant to chemical action with portland cement, alkalies, acids, and not affected by mildew or fungi. It shall show no effect when immersed for 10 days in a 10% solution of sulfuric or hydrochloric acid, saturated lime solution or salt water. Water stops shall be such that any cross section will be dense, homogeneous, and free from porosity and other imperfections. They shall be symmetrical in shape. When tested in accordance with Federal Standard No. 601, the material shall meet the following minimum requirements:

Requirement	ASTM Spec.
Tensile strength, 2,000 psi	D638
Hardness, Shore durometer, 60-70	D2240
Elongation, ultimate, 280%	D638
Water absorption, dry weight, maximum (48 hours) 0.32%	D570
Specific gravity, 1.3	D792
Stiffness in flexure, 920 psi	D747
Cold brittleness, -35°F	D746
Tear resistance, 290 lbs/inch	D624

2.02 JOINT SEALANT FOR CONCRETE STRUCTURES

- A. Joint sealant shall be a multipart, gray, nonstaining, nonsagging, gun grade polyurethane sealant, which cures at ambient temperature to a firm, flexible, resilient, tear-resistant rubber. Sealant shall comply with ASTM C920, Type M, Grade P, Class 25 for horizontal joints and Grade NS, Class 25 for vertical joints and be recommended by the manufacturer for continuous immersion in water.

Characteristic or Parameter	Technical Requirements
Pot life	1 to 3 hours
Hardness	35 Shore A, ± 5
Elongation	650%, ASTM D412
Tensile strength	200 psi, ASTM D412
Peel strength on concrete	No adhesion loss at 25 pounds
Temperature service range	40°F to 167°F
Immersion in water	Continuous

- B. Sealant shall be Tremco Vulkem 227 or Sikaflex-2CNS (for Grade NS, Class 25), Sikaflex-2CSL of Sika Corporation or Vulkem 245 (for Type M, Grade P, Class 25), or equal. Troweling of sealants into joints will not be permitted.
- C. For wastewater applications, use multi-component chemical resistant polysulfide sealant conforming to ASTM C 920, Type M, Grade NS, Class 25 such as Sonolastic Two-part, Sonneborn, Minneapolis, MN, Hornflex-L, Tamms, Beltsville, MD, or Cormax PSC, DuPont, or approved equal.

2.03 BACKING ROD FOR EXPANSION JOINTS

Backing rod shall be an extruded closed-cell polyethylene foam rod, such as Minicel backer rod, manufactured by Industrial Systems Department, Plastic Products Group of Hercules, Inc., Middletown, Delaware, or equal. The rod shall be 1/4 inch larger in diameter than the joint width. Where possible, provide full-length sections for the joint; minimize splices. Apply backup rod and bond breaker tape in expansion joints.

2.04 BOND BREAKER TAPE

Bond breaker tape shall be an adhesive-backed glazed butyl or polyethylene tape that will adhere to the premolded joint material or concrete surface. The tape shall be the same width as the joint. The tape shall be compatible with the sealant.

2.05 PREFORMED CONTROL JOINT

Preformed control joint shall be a one-piece, flexible, PVC joint former, such as Kold-Seal Zip-Per Strip KSF-150-50-50, manufactured by Vinylex Corp., Knoxville, Tennessee, or a one-piece steel strip with preformed groove, such as Keyed Kold Retained Kap, manufactured by Burke Concrete Accessories, Inc., San Mateo, California, or equal. Provide the preformed control joint material in full-length unspliced pieces.

2.06 PREMOLDED JOINT FILLER FOR PAVEMENTS AND SLABS

Joint filler shall be preformed, nonextruded type constructed of closed-cell neoprene conforming to ASTM D1752, Type I, as manufactured by W. R. Grace Company of Cambridge, Massachusetts; W. R. Meadows, Inc., Elgin, Illinois; or equal or bituminous-type preformed expansion joint filler conforming to ASTM D994.

2.07 PREMOLDED JOINT FILLER FOR HYDRAULIC STRUCTURES

Sponge rubber per ASTM D1752, Type I or self-expanding cork per ASTM D1752, Type III.

2.08 STEEL EXPANSION JOINT DOWELS

A. Steel expansion joint dowels shall conform to the following:

1. Stainless steel bar dowels conforming to ASTM A276, Type 316.

B. Expansion joint shall be thoroughly greased prior to placing adjoining wall or slab concrete.

2.09 STYROFOAM FILLER BLOCK

Styrofoam filler blocks for future construction and expansion joints shall be Styrofoam SM brand as manufactured by Dow Chemical Company or equal.

PART 3 - EXECUTION**3.01 PVC WATER STOPS**

A. Water stops shall be heat spliced at ends and intersections to ensure continuity. Bend water stops up from footing and slab joints and splice to wall water stop to result in a watertight structure. Construct forms for construction joints in such a manner as to prevent injury to water stops. Hold water stops securely in position in the construction joints by wire ties, continuous bars, and rings as indicated. Install water stops in construction and expansion joints in hydraulic structures or where shown in the drawings.

- B. Make field splices with a thermostatically controlled heating iron in conformance with the manufacturer's current recommendations. Allow at least 10 minutes before pulling or straining the new splice in any way. The finished splices shall provide a cross section that is dense and free of porosity with tensile strength of not less than 80% of the unspliced materials.

3.02 CONSTRUCTION JOINTS

- A. Layout of construction joints shall be as shown in the drawings and according to the following guidelines:
 - 1. Provide horizontal construction joints at top of foundation members and slabs on grade and at the soffit of supported slabs and beams.
 - 2. Space horizontal construction joints at least 8 inches below bottom of slabs.
- B. For slabs-on-grade that are not subject to hydraulic loading, use formed construction joints. Maximum size of pour shall be 30 feet each way. Allow 24 hours between pours of adjacent slabs. Provide joints as specified or shown. Set continuous expansion joint strips between slabs and abutting vertical surfaces as indicated in the drawings.
- C. Place expansion joint fillers every 30 feet in straight runs of walks, at right-angle turns, and wherever concrete walks butt into vertical surfaces.
- D. For control joints of nonstructural slabs, provide partial depth plastic strips set flush with finished surface or 1/8-inch-wide joints cut with a diamond saw. Use control joints one-quarter to one-third the depth of the slab unless otherwise indicated.
- E. Construction joints shall be keyed, unless otherwise detailed. Form keyways by beveled strips or boards placed at right angles to the formed face. Except where otherwise shown in the drawings or specified, keyways shall be at least 1-1/2 inches in depth over at least 25% of the width of the section.
- F. After the pour has been completed to the construction joint and the concrete has hardened, thoroughly clean the entire surface of the joint of surface laitance, loose or defective concrete, and foreign material, and expose clean aggregate by sandblasting the surface of construction joints before placing the new concrete. Cover horizontal construction joints with mortar. Spread uniformly and work thoroughly into all irregularities of the surface. The water-cement ratio of the mortar in place shall not exceed that of the concrete to be placed, and the consistency of the mortar shall be suitable for placing and working.
- G. In case of emergency, place additional construction joints. (An interval of 45 minutes between two consecutive batches of concrete shall constitute cause for an emergency construction joint.)

3.03 EXPANSION JOINTS

Provide expansion joints with continuous edge reservoirs, which shall be filled with a joint sealant. Leave the material used for forming the reservoirs in place until immediately before the grooves are cleaned and filled with joint sealant. After removing edge forms from the reservoir, remove grout, loose concrete, and fins; then sandblast the slots. Allow the reservoirs to become thoroughly dry; then blow out the reservoirs and immediately prime and fill with the expansion joint sealant and backup materials. The primer used shall be supplied by the manufacturer of the joint sealant.

3.04 INSTALLATION OF PREMOLDED JOINT FILLER

Install in joint accurately as shown. Attach to concrete with a bonding agent recommended by the joint sealant and joint filler manufacturer for compatibility.

3.05 INSTALLATION OF JOINT SEALANTS

- A. Immediately before installing the joint sealant, clean the joint cavity by sandblasting or power wire brushing. Install bond breaker tape per manufacturer's instructions.
- B. Apply masking tape along the edges of the exposed surface of the exposed joints.
- C. Application criteria for the sealant materials, such as temperature and moisture requirements and primer cure time, shall be in accordance with the recommendations of the sealant manufacturer.
- D. After the joints have been prepared as described above, apply the joint sealant. Apply the primer, if required, and joint sealant only with the equipment and methods recommended by the joint sealant manufacturer.
- E. Trowel the joints smooth with a tuck pointing tool wiped with a solvent recommended by the sealant manufacturer.
- F. After the sealant has been applied, remove the masking tape and any sealant spillage.

3.06 INSTALLATION OF STEEL EXPANSION JOINT DOWELS

Align dowels as indicated in the drawings. Secure tightly in forms with rigid ties. Orient dowels to permit joint movement.

3.07 CRACKING

- A. Saw joints in slabs before the formation of uncontrolled cracking (i.e., cracking that occurs at locations other than construction, control, or contraction joints) and as soon as the concrete has hardened sufficiently to permit cutting without chipping, spalling, or tearing. Saw joints both during the day and night as required.

- B. If concrete cracks at locations other than construction, control, or contraction joints, the Contractor may be required to remove and replace the defective work (cracked concrete) in accordance with the provisions of this section, at no additional cost to the Owner.

END OF SECTION

SECTION 03740

REPAIR TO CONCRETE

PART 1 - GENERAL

1.01 SCOPE OF WORK

- A. Furnish all labor, materials, equipment and incidentals required to modify/repair parts of existing concrete structures as specified herein.

1.02 SUBMITTALS

- A. Submit manufacturer's technical literature on all product brands proposed for use, to the Engineer for review. The submittal shall include the manufacturer's installation and/or application instructions.
- B. When substitutions for acceptable brands of materials specified herein are proposed, submit brochures and technical data of the proposed substitutions to the Engineer for approval before delivery to the project.

1.03 REFERENCE STANDARDS

- A. American Society for Testing and Materials (ASTM)
 - 1. ASTM C881 - Standard Specification for Epoxy-Resin-Base Bonding Systems for Concrete.
 - 2. ASTM C882 - Standard Test Method for Bond Strength of Epoxy-Resin Systems Used with Concrete by Slant Shear.
 - 3. ASTM C883 - Standard Test Method for Effective Shrinkage of Epoxy-Resin Systems Used with Concrete.
 - 4. ASTM D570 - Standard Test Method for Water Absorption of Plastics.
 - 5. ASTM D638 - Standard Test Method for Tensile Properties of Plastics.
 - 6. ASTM D695 - Standard Test Method for Compressive Properties of Rigid Plastics.
 - 7. ASTM D732 - Standard Test Method for Shear Strength of Plastics by Punch Tool.
 - 8. ASTM D790 - Standard Test Methods for Flexural Properties of Unreinforced and Reinforced Plastics and Electrical Insulating Materials.
- B. Where reference is made to one of the above standards, the revision in effect at the time of bid opening shall apply.

1.04 QUALITY ASSURANCE

- A. No existing structure or concrete shall be shifted, cut, removed, or otherwise altered until authorization is given by the Engineer.
- B. When removing materials or portions of existing structures all precautions shall be taken and all necessary barriers, shoring and bracing and other protective devices shall be erected to prevent damage to the structures beyond the limits necessary for the new work, protect personnel, control dust and to prevent damage to the structures or contents by falling or flying debris. Unless otherwise permitted, shown or specified, line drilling will be required in cutting existing concrete.
- C. Manufacturer Qualifications: The manufacturer of the specified products shall have a minimum of 10 years experience in the manufacture of such products and shall have an ongoing program of training, certifying and technically supporting the Contractor's personnel.

1.05 DELIVERY, STORAGE AND HANDLING

- A. Deliver the specified products in original, unopened containers with the manufacturer's name, labels, product identification and batch numbers.
- B. Store and condition the specified product as recommended by the manufacturer.

PART 2 - PRODUCTS

2.01 MATERIALS

- A. General
 - 1. Materials shall comply with this Section and any state or local regulations.
- B. Crack Repair
 - 1. General
 - a. Crack Repair product shall be a hydrophilic resin, low viscosity polyurethane resin which expands to a closed cell water-tight foam. It shall be formulated for the specific size of opening or crack being injected.
 - b. All concrete surfaces containing reclaimed water or water to be treated for reclaimed use that are repaired by the epoxy adhesive injection system shall be coated with an acceptable epoxy coating system that conforms with ANSI/NSF standards.
 - 2. Approved manufacturers include:
 - a. Prime Resins, Prime Flex 900 XLV

PART 3 - EXECUTION

3.01 GENERAL

- A. Cut, repair, reuse, demolish, excavate or otherwise modify parts of the existing structures or appurtenances, as indicated on the Drawings, specified herein, or necessary to permit completion of the Work. All work shall comply with other requirements of this of Section and as shown on the Drawings.
- B. All commercial products specified in this Section shall be stored, mixed and applied in strict compliance with the manufacturer's recommendations.
- C. In all cases where concrete is repaired in the vicinity of an expansion joint or control joint the repairs shall be made to preserve the isolation between components on either side of the joint.

3.02 CRACK REPAIR

- A. Cracks on horizontal surfaces shall be repaired by gravity feeding crack sealant into cracks per manufacturer's recommendations. If cracks are less than 1/16-in in thickness they shall be pressure injected.
- B. Cracks on vertical surfaces shall be repaired by pressure injecting crack sealant through valves sealed to surface with crack repair product per manufacturer's recommendations.
 - 1. Remove any efflorescence, dirt, oil, etc., off the surfaces in the vicinity of the observed seepage. Where loose cementitious surfacer/slurry is encountered, it shall be removed to reveal the original concrete surface. Removal shall be performed using mechanical methods chemical solutions provided they are approved by other product manufacturers which are to be used (i.e. paint).
 - 2. Apply adequate surface seal to crack to prevent leakage of product.
 - 3. Establish injection points at a distance along crack not less than thickness of cracked member.
 - 4. Crack injection sequence:
 - a. Ensure that tank is full of water or moisture is applied to product.
 - b. Inject product into crack from exterior at first port with sufficient pressure to advance product to adjacent port.
 - c. Seal original port and shift injection to port where product appears.
 - d. Continue port-to-port injection until crack has been injected for its entire length.

SECTION IVa – Supplemental Technical Specifications

- e. The crack is considered to be sealed once no moisture is transferred from the concrete to a dry hand for a minimum of 24 hours after injections. Continue injection procedures if the crack does not meet this condition.
- f. After injection is complete, remove surface seal material and refinish concrete in area where epoxy was injected to match existing concrete including applying new surfacer patch material to match existing in thickness, texture, etc. All materials used for patching or repairs shall be coordinated with the Engineer and shall be NSF 61 approved.

END OF SECTION



CLEARWATER
BRIGHT AND BEAUTIFUL • BAY TO BEACH

DIVISION 7

THERMAL AND MOISTURE **PROTECTION**

SECTION 07900

JOINT SEALANTS

PART 1 - GENERAL

1.01 SUMMARY

- A. Section Includes: Extent of each form and type of joint sealer as indicated on Drawings and Schedules.
- B. Section includes joint sealers for the following locations:
 - 1. Exterior joints in vertical surfaces and nontraffic horizontal surfaces as indicated below.
 - a. Control and expansion joints in unit masonry.
 - b. Joints between different materials.
 - c. Perimeter joints between materials and frames of doors and windows.
 - d. Other joints where indicated.
 - 2. Exterior joints in horizontal traffic surfaces as indicated below.
 - a. Control, expansion, and isolation joints in cast-in-place concrete slabs for floors and paving.
 - b. Joints between different materials.
 - c. Other joints as indicated.
 - 3. Interior joints in vertical surfaces and horizontal nontraffic surfaces as indicated below.
 - a. Control and expansion joints on exposed interior surfaces of exterior walls.
 - b. Perimeter joints of exterior openings.
 - c. Perimeter joints of toilet fixtures.
 - d. Other joints as indicated.
 - 4. Interior joints in horizontal traffic surfaces as indicated below.
 - a. Control and expansion joints in cast-in-place concrete slabs.
 - b. Other joints where indicated.
- C. Related Documents: Drawings and general provisions of Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to Work of this Section.

1.02 SYSTEM PERFORMANCE

- A. Provide joints sealers that have been produced and installed to establish and maintain watertight and airtight continuous seals.

1.03 SUBMITTALS

- A. Shop Drawings: Submit in accordance with Section 01300, covering items included under this Section. Shop Drawing submittals shall include:
 - 1. Product Data from manufacturer for each joint sealer product required, including instructions for joint preparation and joint sealer application.
 - 2. Samples for Initial Selection Purposes: Manufacturer's standard bead samples consisting of strips of actual products showing full range of colors available for each product exposed to view.
 - 3. Samples for verification purposes of each type and color of joint sealer required. Install joint sealer samples in 1/2-inch-wide joints formed between two 6-inch-long strips of material matching the appearance of exposed surfaces adjacent to joint sealers.
 - 4. Certificates from manufacturers of joint sealers attesting that their products comply with specification requirements and are suitable for the use indicated.

1.04 DELIVERY, STORAGE, AND HANDLING

- A. Deliver materials to Site in original unopened containers or bundles with labels informing about manufacturer, product name and designation, color, expiration period for use, pot life, curing time, and mixing instructions for multi-component materials.
- B. Store and handle materials in compliance with manufacturer's recommendations to prevent their deterioration or damage due to moisture, high or low temperatures, contaminants, or other causes.

1.05 PROJECT CONDITIONS

- A. Environmental Conditions: Do not proceed with installation of joint sealers under the following conditions:
 - 1. When ambient and substrate temperature conditions are outside the limits permitted by joint sealer manufacturer or below 40 degrees F (4.4 degrees C).
 - 2. When joint substrates are wet due to rain, frost, condensation, or other causes.
- B. Joint Width Conditions: Do not proceed with installation of joint sealers where joint widths are less than allowed by joint sealer manufacturer for application indicated.
- C. Joint Substrate Conditions: Do not proceed with installation of joint sealers until contaminants capable of interfering with their adhesion are removed from joint substrates.

1.06 SEQUENCING AND SCHEDULING

- A. Sequence installation of joint sealers to occur not less than 21 or more than 30 days after completion of waterproofing, unless otherwise indicated.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

- A. Subject to compliance with specified requirements, manufacturers offering products which may be incorporated in Work include:
 - 1. Multi-Part Nonsag Urethane Sealant for Use NT:
 - a. "Dymeric 240," Tremco, Inc.
 - b. "Dynatrol II," Pecora Corp.
 - c. "Sikaflex 2c NS", Sika Corp.
 - 2. One-Part Nonsag Urethane for Use NT:
 - a. "Dymonic," Tremco, Inc.
 - b. "Dynatrol I-XL," Pecora Corp.
 - c. "Sikaflex-15LM," Sika Corp.
 - 3. One-Part Nonsag Urethane Sealant for Use T:
 - a. "Sonolastic NP 1," BASF Building Systems.
 - b. "Sikaflex-1a," Sika Corp.
 - c. "Vulkem 45 SSL," Tremco Sealant/Weatherproofing Division, RPM.
 - 4. One-Part Pourable Urethane Sealant for Use T:
 - a. "Chem-Calk 950," Bostik Construction Products Division.
 - b. "Urexpan NR-201," Pecora Corp.
 - c. "Sikaflex-1CSL," Sika Corp.
 - d. "Vulkem 45," Tremco Sealant/Weatherproofing Division, RPM.
 - 5. Multi-part Nonsag Immersible Polysulfide or Polyurethane Sealant:
 - a. "Synthacalk GC-2+," Pecora Corp.
 - b. "Sonolastic Polysulfide Sealant," Sonneborn, Degussa Building Systems.
 - c. "Vulkem 116," Tremco Sealant/Weatherproofing Division, RPM (non waste water facilities)

6. Pre-formed Foam Sealant:
 - a. Horizontal and Traffic Applications:
 - 1) "Emseal 20H," Emseal Corp.
 - 2) "Will-Seal EPS," Will-Seal Construction Foams Dw., Illbruck.
 - b. Vertical Applications Above Grade (Control and Expansion Joints):
 - 1) "Emseal Greyflex," Emseal Corp.
 - 2) "Polytite Standard," Sandell Manufacturing Co., Inc.
 - 3) "Will-Seal 150," Will-Seal Construction Foams Dw., Illbruck.
 - c. Below Grade Applications:
 - 1) "Emseal 20H," Emseal Corp.
 - 2) "Will-Seal 250," Will-Seal Construction Forms Dw., Illbruck.
 - d. Pre-formed Hollow Neoprene Gasket:
 - 1) The D.S. Brown Co.
 - 2) Watson-Bowman and Acme Corp.
 - 3) Williams Products, Inc.
7. Foamed-In-Place Fire-Stopping Sealant:
 - a. "Dow Corning Fire Stop Sealant," Dow Corning Corp.
 - b. "Pensil 851," General Electric Co.
8. One-Part Fire-Stopping Sealant:
 - a. "Dow Corning Fire Stop Sealant," Dow Corning Corp.
 - b. "Fyre Putty," Standard Oil Engineered Materials Co.
 - c. "Metachaulk 1100," The RectorSeal Corporation.
 - d. "RTV 7403," General Electric Co.
 - e. "3M Fire Barrier Caulk CP-25," Electrical Products Division/3M.
9. Joint Sealant Backing:
 - a. Expand-o-Foam, 1380 Series, Williams Products, Inc.
10. Joint Fillers for Concrete:
 - a. Cementone, W.R. Meadows.
 - b. Concrete Grey Sponge Rubber, 1300 Series, Williams Products, Inc.

2.02 MATERIALS, GENERAL

- A. Compatibility: Provide joint sealers, joint fillers, and other related materials that are compatible with one another and with joint substrates under conditions of service and application as demonstrated by sealant manufacturer based on testing and field experience.

2.03 ELASTOMERIC JOINT SEALANTS

- A. Elastomeric Sealant Standard: Provide manufacturer's standard chemically curing, elastomeric sealant of base polymer indicated which complies with ASTM C 920 requirements, including those referenced for type, grade, class, and uses.

AbbreviationsTypes, Grade, Uses (Exposure)

S	Single component	Type
M	Multi-component	Type
P	Pourable	Grade
NS	Nonsag	Grade
NT	Nontraffic	Use
T	Traffic	Use
I	Immersion	Use

Uses (Joint Substrates)

A	Aluminum
O	Other
G	Glass
M	Mortar

Class

25 - Percent Movement Capability

- B. Multi-Part Nonsag Urethane Sealant for Use NT: Type M, Grade NS, Class 25, and complying with the following requirements for Uses:
1. Uses NT, M, A, and, as applicable to joint substrates indicated, O.
 2. Colors: Provide color of exposed joint sealers indicated, or if not otherwise indicated, as selected by OWNER to match the existing Point Place Pump Station from manufacturer's standard colors.

- C. One-Part Nonsag Urethane Sealant for Use NT: Type S, Grade NS, Class 25, and Uses NT, M, A, and, as applicable to joint substrates indicated, O.
 - 1. Colors: Provide color of exposed joint sealers indicated or, if not otherwise indicated, as selected by OWNER to match the existing Point Place Pump Station from manufacturer's standard colors.
- D. One-Part Nonsag Urethane Sealant for Use T: Type S, Grade NS, Class 25, and complying with the following requirements for Uses:
 - 1. Uses T, NT, M, G, A, and, as applicable to joint substrates indicated, O.
 - 2. Colors: Provide color of exposed joint sealers indicated, or if not otherwise indicated, as selected by OWNER to match the existing Point Place Pump Station from manufacturer's standard colors.
- E. One-Part Pourable Urethane Sealant for Use T: Type S, Grade P, Class 25, and complying with the following requirements for Uses:
 - 1. Uses T, M, A, and, as applicable to joint substrates indicated, O.
 - 2. Colors: Provide color of exposed joint sealers indicated, or if not otherwise indicated, as selected by OWNER to match the existing Point Place Pump Station from manufacturer's standard colors.
- F. Multi-Part Nonsag Polysulfide or Polyurethane Sealant for Uses T, NT, I: Type M, Grade NS, Class 25, and complying with the following requirements for Uses:
 - 1. Uses T, NT, I, M, G, A, and, as applicable to joint substrates indicated, O.
 - 2. Colors: Provide color of exposed joint sealers indicated or, if not otherwise indicated, as selected by OWNER to match the existing Point Place Pump Station from manufacturer's standard colors.

2.04 COMPRESSION SEALS

- A. Pre-formed Foam Sealant: Manufacturer's standard pre-formed, pre-compressed, impregnated open-cell foam sealant manufactured from high-density urethane foam impregnated with a nondrying, water repellant agent; factory-produced in pre-compressed sizes and in roll or stick form to fit joint widths indicated and to develop a watertight and airtight seal when compressed to the degree specified by manufacturer; and complying with the following requirements:
 - 1. Properties: Permanently elastic, mildew-resistant, nonmigratory, nonstaining, compatible with joint substrates and other joint sealers.
 - 2. Impregnating Agent:

- a. Chemically stabilized acrylic (EMSEAL).
 - b. Neoprene rubber suspended in chlorinated hydrocarbons (WILL-SEAL).
 - c. Polymerized polybutylene (POLYTITE).
- 3. Density: 8 - 10 pounds per cubic foot.
 - 4. Backing: None.
- B. Pre-formed Hollow Neoprene Gasket: Manufacturer's standard pre-formed polychloroprene elastomeric joint seal of the open-cell compression type complying with ASTM D 2628 and with requirements indicated for size, profile, and cross-sectional design.

2.05 JOINT SEALANT BACKING

- A. Provide sealant backings of material and type which are nonstaining; are compatible with joint substrates, sealants, primers, and other joint fillers; and are approved for applications indicated by sealant manufacturer based on field experience and laboratory testing.
- B. Plastic Foam Joint Fillers: Pre-formed, compressible, resilient, nonwaxing, nonextruding strips of flexible, nongassing plastic foam of material indicated below; nonabsorbent to water and gas; and of size, shape, and density to control sealant depth and otherwise contribute to producing optimum sealant performance.
- C. Either open-cell polyurethane foam or closed-cell polyethylene foam, unless otherwise indicated, subject to approval of sealant manufacturer, for cold-applied sealants only.
- D. Elastomeric Tubing Joint Fillers: Neoprene, butyl, EPDM, or silicone tubing complying with ASTM D 1056, nonabsorbent to water and gas, capable of remaining resilient at temperatures down to -26 degrees F (-15 degrees C). Provide products with low compression set and of size and shape to provide a secondary seal, control sealant depth, and otherwise contribute to optimum sealant performance.
- E. Bond Breaker Tape: Polyethylene tape or other plastic tape as recommended by sealant manufacturer for preventing sealant from adhering to rigid, inflexible joint filler materials or joint surfaces at back of joint where such adhesion would result in sealant failure. Provide self-adhesive tape where applicable.

2.06 MISCELLANEOUS MATERIALS

- A. Primer: Provide type recommended by joint sealer manufacturer where required for adhesion of sealant to joint substrates indicated, as determined from pre-construction joint sealer substrate tests and field tests.
- B. Cleaners for Nonporous Surfaces: Provide nonstaining, chemical cleaners of type which are acceptable to manufacturer of sealants and sealant backing materials, which are not harmful

to substrates and adjacent nonporous materials, do not leave oily residues, or otherwise have a detrimental effect on sealant adhesion or in-service performance.

- C. Masking Tape: Provide nonstaining, nonabsorbent type compatible with joint sealants and to surfaces adjacent to joints.

2.07 JOINT FILLERS FOR CONCRETE

- A. Provide joint fillers of thickness and widths indicated. Sponge Rubber Joint Filler: Pre-formed strips complying with ASTM D 1752 for Type I.

PART 3 - EXECUTION

3.01 EXAMINATION

- A. Examine joints indicated to receive joint sealers, with Installer present, for compliance with requirements for joint configuration, installation tolerances, and other conditions affecting joint sealer performance. Do not proceed with installation of joint sealers until unsatisfactory conditions have been corrected.

3.02 PREPARATION

- A. Surface Cleaning of Joints: Clean out joints immediately before installing joint sealers to comply with recommendations of joint sealer manufacturers and the following requirements:
 - 1. Remove all foreign material from joint substrates which could interfere with adhesion of joint sealer, including dust, paints (except for permanent, protective coatings tested and approved for sealant adhesion and compatibility by sealant manufacturer), old joint sealers, oil, grease, waterproofing, water repellants, water, surface dirt, and frost.
 - 2. Clean concrete, masonry, unglazed surfaces of ceramic tile, and similar porous joint substrate surfaces by brushing, grinding, blast cleaning, mechanical abrading, or a combination of these methods to produce a clean, sound substrate capable of developing optimum bond with joint sealers. Remove loose particles remaining from cleaning operations by vacuuming or blowing out joints with oil-free compressed air.
 - 3. Remove laitance and form release agents from concrete.
 - 4. Clean metal, glass, porcelain enamel, glazed surfaces of ceramic tile, and other nonporous surfaces by chemical cleaners or other means which are not harmful to substrates or leave residues capable of interfering with adhesion of joint sealers.
- B. Joint Priming: Prime joint substrates where indicated or where recommended by joint sealer manufacturer based on pre-construction joint sealer-substrate tests or prior experience. Apply primer to comply with joint sealer manufacturer's recommendations. Confine primers to areas of joint sealer bond; do not allow spillage or migration onto adjoining surfaces.

- C. Masking Tape: Use masking tape where required to prevent contact of sealant with adjoining surfaces which otherwise would be permanently stained or damaged by such contact or by cleaning methods required to remove sealant smears. Remove tape immediately after tooling without disturbing joint seal.

3.03 INSTALLATION OF JOINT SEALERS

- A. Comply with joint sealer manufacturers' printed installation instructions applicable to products and applications indicated except where more stringent requirements apply.
- B. Elastomeric Sealant Installation Standard: Comply with recommendations of ASTM C 962 for use of joint sealants as applicable to materials, applications, and conditions indicated.
- C. Installation of Sealant Backings: Install sealant backings to comply with the following requirements:
 - 1. Install joint fillers of type indicated to provide support of sealants during application and at position required to produce the cross-sectional shapes and depths of installed sealants relative to joint widths which allow optimum sealant movement capability.
 - a. Do not leave gaps between ends of joint fillers.
 - b. Do not stretch, twist, puncture, or tear joint fillers.
 - c. Remove absorbent joint fillers which have become wet prior to sealant application and replace with dry material.
 - d. See Standard Detail on Drawings for face brick control joint application.
 - 2. Install bond breaker tape between sealants and joint fillers, compression seals, or back of joints where adhesion of sealant to surfaces at back of joints would result in sealant failure.
 - 3. Install compressible seals serving as sealant backings to comply with requirements indicated above for joint fillers.
 - 4. Installation of Sealants: Install sealants by proven techniques that result in sealants directly contacting and fully wetting joint substrates, completely filling recesses provided for each joint configuration and providing uniform, cross-sectional shapes and depths relative to joint widths which allow optimum sealant movement capability.
 - a. Note: Install all sealant in interior joints after painting of adjoining surfaces have been performed. Do not paint over sealant joints.
- D. Tooling of Nonsag Sealants: Immediately after sealant application and prior to time skinning or curing begins, tool sealants to form smooth, uniform beads of configuration indicated, to eliminate air pockets, and to ensure contact and adhesion of sealant with sides of joint.

Remove excess sealants from surfaces adjacent to joint. Do not use tooling agents which discolor sealants or adjacent surfaces or are not approved by sealant manufacturer.

1. Provide concave joint configuration per Figure 6A in ASTM C 962 unless otherwise indicated.
 2. Provide flush joint configuration per Figure 6B in ASTM C 962 where indicated.
 3. Use masking tape to protect adjacent surfaces of recessed tooled joints.
 4. Provide recessed joint configuration per Figure 6C in ASTM C 962, of recess depth and at locations indicated.
- E. Installation of Pre-formed Foam Sealants: Install each length of sealant immediately after removing protective wrappings, taking care not to pull or stretch material, and complying with sealant manufacturer's directions for installation methods, materials, and tools which produce seal continuity at ends, turns, and intersections of joints. For applications at low ambient temperatures where expansion of sealant requires acceleration to produce seal, apply heat to sealant in conformance with sealant manufacturer's recommendations.
- F. Installation of Pre-formed Hollow Neoprene Gaskets: Install gaskets, with minimum number of end joints, in joint recesses with edges free of spalls and sides straight and parallel, both within tolerances specified by gasket manufacturer. Apply manufacturer's recommended adhesive to joint substrates immediately prior to installing gaskets. For straight sections, provide gaskets in continuous lengths; where changes in direction occur, adhesively splice gaskets together to provide watertight joint. Recess gasket below adjoining joint surfaces by 1/8 to 1/4 inch.

3.04 CLEANING

- A. Clean off excess sealants or sealant smears adjacent to joints as Work progresses, by methods and with cleaning materials approved by manufacturers of joint sealers and of products in which joints occur.

3.05 PROTECTION

- A. Protect joint sealers during and after curing period from contact with contaminating substances or from damage resulting from construction operations or other causes so that they are without deterioration or damage at time of Substantial Completion. If, despite such protection, damage or deterioration occurs, cut out and remove damaged or deteriorated joint sealers immediately and reseal joints with new materials to produce joint sealer installations with repaired areas indistinguishable from original Work.

END OF SECTION



CLEARWATER
BRIGHT AND BEAUTIFUL • BAY TO BEACH

DIVISION 9

FINISHES

SECTION 09901

PROTECTIVE LINING SYSTEM FOR INTERIOR CONCRETE

PART 1 – GENERAL

1.01 SCOPE OF WORK

- A. This specification covers all work, materials and equipment required for rehabilitating and protecting existing concrete structures by spray-application of a multi-component liner. These linings shall eliminate infiltration, provide corrosion protection, repair voids, seal cracks and enhance structural integrity. Where applicable, this lining System may also be used to protect metal surfaces as specified.
- B. Procedures for surface preparation, cleaning, application and testing are described herein. The Applicator/Installer shall furnish all labor, tools, materials, equipment, and incidentals required to provide a corrosion resistant lining System for the surfaces as specified in corrosive areas including walls, ceiling, and floor.
- C. The lining shall be suitable for gas and liquid tight applications at a maximum hydrostatic pressure of 30 feet of water and a maximum temperature of 120° F.

1.02 DEFINITIONS

- A. Applicator/Installer: The Manufacturer certified subcontractor responsible to the Contractor for coordinating all materials, labor and incidentals for a complete protective system meeting all the requirements of the Manufacturer of the materials used.
- B. Manufacturer: The term Manufacturer refers to the entity that manufactures and supplies the materials that are part of the overall System. The Manufacturer also supplies the knowledgeable personnel (Manufacturers Representative) that provide direction in the application/installation of the System.
- C. System: The term System refers to the protective lining system including surface preparation and repair, lining materials and installation and all appurtenant items and work required to provide a Manufacturer approved protective covering on new or existing surfaces.

1.03 QUALITY ASSURANCE

- A. To ensure total unit responsibility, all materials and installation thereof shall be approved and furnished by, and coordinated with, GML Coatings LLC or approved equal.
- B. Applicator/Installer/Manufacturer shall initiate, enforce and record quality control procedures consistent with applicable ASTM, NACE and SSPC standards, the System Manufacturer's recommendations and these specifications.

- C. Installer/Manufacturer shall provide on-site observation and site-specific recommendations relative to surface preparation, handling, application/installation, curing and testing of its products.
- D. This section contains references to the following documents. They are a part of this section as specified and modified. Where a referenced document contains references to other standards, those documents are included as references under this section as if referenced directly. In the event of conflict between the requirements of this section and those of the listed documents, the requirements of this section shall prevail.

Reference	Title
ACI 506.2	Specifications for Materials, Proportioning, and Application of Shotcrete
ASTM D638	Tensile Properties of Plastics
ASTM D792	Test Methods for Specific Gravity and Density of Plastics by Displacement
ASTM D1238	Test Methods for Flow Rates of Thermoplastics by Extrusion Plastometer
ASTM D1621	Test Methods for Compressive Properties of Rigid Cellular Plastics
ASTM D1622	Test Method for Apparent Density of Rigid Cellular Plastics
ASTM D1638	Testing Urethane Foam Isocyanate Raw Materials
ASTM D1940	Test Method for Open-Cell Content of Rigid Cellular Plastics by the Air Pycnometer
ASTM D2240	Durometer Hardness, Type D
ASTM D2584	Volatile Matter Content
ASTM D4414	Standard Practice for Measurement of Wet Film Thickness of Organic Coatings by Notched Gages
ASTM D4541	Pull-off Strength of Coatings Using a Portable Adhesion Tester
EPA	Environmental Protection Agency
NACE	National Association of Corrosion Engineers, Houston, Texas
OSHA	Occupational Safety and Health Administration
RCRA	Resource Conservation and Recovery Act
SSPC	Steel Structures Painting Council, Pittsburgh, Pennsylvania
UL-94	Test for Flammability of Plastic Materials for Parts in Devices and Appliances

D. STANDARDIZATION

Materials and supplies provided shall be the standard products of manufacturers. Materials in each of the specified Systems shall be the products of a single manufacturer or manufactured by another for specific use in the System. Lining system components shall be manufactured by GML Coatings, LLC, or approved equal.

1.04 DELIVERY, STORAGE AND HANDLING

Materials shall be delivered to the job site in their original, unopened containers. Each container shall bear the Manufacturer's name, coating type, batch number, date of manufacture, storage life, and special directions.

Materials shall be stored in enclosed structures and shall be protected from weather, high humidity and excessive heat or cold. System materials are to be stored between 50 deg F and 90 deg F unless the System materials Manufacturer requires more stringent conditions. Do not store near flame, heat or strong oxidants. Flammable materials shall be stored in accordance with state and local codes. Materials exceeding storage life recommended by the Manufacturer shall be removed from the site.

System materials are to be handled according to their Material Safety Data Sheets and Manufacturer's recommendations.

1.05 SUBMITTALS

Before materials are delivered to the job site, the Contractor shall provide the following information:

A. LINING SYSTEM

1. For the materials used in the System, the Contractor shall provide the Manufacturer's application instructions that shall include the following:
 - a. Surface preparation recommendations.
 - b. Primer type.
 - c. Minimum mil thickness per coat/layer.
 - d. Minimum and maximum curing times including atmospheric conditions for each.
 - e. Curing time before submergence in liquid.
 - f. Thinner/cleaner to be used with each material, where applicable.
 - g. Ventilation requirements.
 - h. The range of atmospheric conditions during which the material can be

applied.

- i. Allowable application methods.
 - j. Maximum allowable moisture content of the substrate.
 - k. Maximum storage life.
2. List of materials proposed to be used under this section and Manufacturer's material data sheet for each material.

B. ADDITIONAL INFORMATION

The following additional information shall be submitted for the System:

1. Technical data sheet on each product used, including ASTM test results indicating the product conforms to and is suitable for its intended use per these specifications.
2. Material Safety Data Sheets (MSDS) for each product used.
3. Detailed, project specific guidelines and recommendations for surface preparation, surface repair and System application/installation including proper techniques for all procedures and a description of the proper appearance, texture or other characteristics of the process at each step. The submittal shall include guidelines for the proper inspection of all phases of work.
4. Qualification of Applicator/Installer:
 - a. Applicator/Installer shall submit a written Manufacturer certification that they have been trained and approved in the handling, mixing and application/installation of the repair mortar and System products to be used. Applicator/Installer shall have 5 years minimum experience in the use and application/installation of each particular product being proposed for this project.
 - b. Certification that the equipment to be used for applying the products has been manufactured or approved by the System Manufacturer and Applicator/Installer's personnel have been trained and certified for proper use of the equipment.
 - c. Five recent references of Applicator/Installer indicating successful application/installation of the System under similar conditions. At least two of the references shall be in excess of 2 years old.
 - d. Proof of any federal, state or local permits or licenses necessary for the project.

5. Design details for any ancillary systems and equipment to be used in surface preparation, application and/or testing.
6. Provide documentation that the System has a minimum 5-year successful history for use in similar applications.

1.06 SITE CONDITIONS AND COORDINATION WITH OTHER WORK

- A. Applicator/Installer shall comply with all local, state and federal regulations including those set forth by OSHA, RCRA and the EPA and any other applicable authorities having jurisdiction in safety, environmental and procedural matters. Method statements and procedures are to be provided to the Owner for review when confined space entry is necessary in order for Applicator/Installer to perform the specified work.
- B. The Contractor shall coordinate all work with the Applicator/Installer. Applicator/Installer shall clean, prepare and repair all surfaces receiving the System material, and apply the System material.
- C. Following completion of all work the Applicator/Installer shall inspect the condition of the System and touch up or repair any surfaces that have been damaged or disturbed.

1.07 WARRANTY

Both the System Manufacturer and the Applicator/Installer shall be jointly and severally responsible for providing a written warranty stating that all work shall be free from defects in materials and workmanship for a period of ten years (non-prorated) from the date of final acceptance of the project. The Contractor shall, either through the System Manufacturer or Applicator/Installer, within sixty days of written notification, repair defects in materials or workmanship which may develop during the ten-year warranty period, and any damage to other work caused by such defects or the repairing of same, at their own expense and without cost to the Owner.

PART 2 – PRODUCTS

2.01 GENERAL

- A. All surfaces as specified and shown in the Drawings shall be covered with a corrosion-resistant protective lining System. This includes the floors, walls, ceilings, support beams and any other surfaces shown in the Drawings and listed in the Table in paragraph 09901 3.05.
- B. The System shall be designed for protection of concrete and metal from the corrosive environment found in enclosed wastewater structures and shall be fully resistant to the acids, alkalis, grease, and oils typically found in sewage.

2.02 PROTECTIVE LINING MATERIAL

A. ACCEPTABLE MANUFACTURERS:

- 1. Multi-component Modified Polymer Coating: The 100% solids pure polyurea coating system shall be Green Monster, as manufactured by GML Coatings LLC, Lakewood Ranch, FL, or approved equal.

B. MULTI-COMPONENT MODIFIED POLYMER COATING:

- 1. The material used in this System shall be a multi-component, 100% solids pure polyurea lining system as described below:

Layer	Material
Primer	Low Viscosity Primer
Surfacer	Calcium Aluminate Blend Cementitious Mortar
Final Corrosion Barrier	Modified Polymer

- 2. Primer shall be 100% solids and have the following properties:

Tensile Strength, PSI	ASTM D638	4500
Elongation, %	ASTM D638	6
Compressive Strength, Neat	ASTM D695	3800

- 3. Modified polymer shall be sprayable, solvent free, two-component polymeric, moisture/chemical barrier specifically developed for the corrosive environment of wastewater meeting the requirements in the table below.

Tensile Strength, PSI	ASTM D412	4500
Elongation, %	ASTM D412	460
100% Modulus	ASTM D412	1460
Tear Strength, PLI	ASTM D624	570
Hardness, Shore A	ASTM D2240	98
Hardness, Shore D	ASTM D2240	52
Flexibility, 1/8" Mandrel	ASTM D1737	Pass
Flash Point, °F	Pensky-Martin	>200
Taber Abrasion, MG Loss	ASTM D4060	17.0
CS 17 Wheels	1 KG, 100 Revs	
A-Side Hose Temperature	°F	140 – 160
B-Side Hose Temperature	°F	140 – 160
Block Temperature	°F	160
Adhesion to Concrete	Green Monster Primer	600 PSI
Adhesion to Carbon Steel (direct)	Epoxy Glue Failure	900 PSI
Gel Time	Seconds	20
Tack Free Time	Seconds	45
Volume Ratio	V:V	1:1

4. Cementitious mortar shall have the following physical properties:

Compressive Strength, PSI	ASTM C928	6500
Freeze Thaw Resistance	ASTM C666	1% Loss
Shear Bond Strength, PSI	ASTM C882	1650
Flexural Strength, PSI	ASTM C348	1180

5. Total thickness of multi-component stress panel liner shall be a minimum of 125 mils and shall, as a system, sustain a 300 PSI pull test.

2.03 PROTECTIVE COATING APPLICATION EQUIPMENT

- A. Specifically designed, or approved for use by the System manufacturer, for use in the application of the specified System.

2.04 REPAIR MORTAR SPRAY APPLICATION EQUIPMENT (if spray applied)

- A. Specifically designed or approved for use by the repair mortar material manufacturer, for continuous mixing and spraying of the material.
- B. Spray mortar shall be applied in accordance with ACI 506.2.

2.05 REPAIR MATERIALS

All repair materials shall be provided by the Applicator/Installer and the System manufacturer shall approve each of the materials used in writing.

PART 3 – EXECUTION

3.01 SURFACE PREPARATION FOR SYSTEM MATERIALS

- A. Applicator/Installer and System Manufacturer's Representative shall inspect all surfaces specified to receive the System prior to surface preparation. Applicator/Installer shall notify Owner of any noticeable disparity in the surfaces, which may interfere with the proper preparation, or application of the System.
- B. All contaminants including: oils, grease, incompatible existing coatings, waxes, form release, curing compounds, efflorescence, sealers, salts, acids or other contaminants shall be removed.
- C. Surface preparation method(s) should be based upon the conditions of the substrate, service environment, the requirements of the repair mortar and System Manufacturer.
- D. All surfaces shall be repaired as required by the System Manufacturer to ensure good adhesion and bonding. The Applicator/Installer shall be responsible for selecting the proper material, means and methods for complying with the Manufacturer's recommendations. Prior to initiating work, the Applicator/Installer shall submit a copy of the Manufacturer's recommendations and the Applicator/Installer's proposed materials and procedures to the Engineer for review.
- E. Surfaces to receive the System shall be cleaned and abraded to produce a sound surface with uniform, adequate profile and porosity to provide a strong bond between the System and the substrate. At a minimum, all concrete or mortar that is not sound or has been damaged shall be removed. Methods such as high-pressure water jetting according to NACE Standard Numbers 5 & 6 or SSPC-SP 12 & 13, abrasive blasting, shotblasting, grinding, scarifying or acid etching may be used. Detergent water cleaning and hot water blasting may be necessary to remove oils, grease or other hydrocarbon residues from the concrete. The Applicator/Installer shall, in full compliance with the Manufacturers requirements, be responsible for selecting the method or combination of methods needed to adequately prepare the surface for receiving the System. Whichever method(s) are used, they shall be performed in a manner that provides a uniform, sound, clean, neutralized surface that is not excessively damaged.
- F. Infiltration shall be completely stopped by using a material that is compatible with the selected repair mortar and is suitable for topcoating with the System.
- G. Test prepared surfaces after cleaning but prior to application of the repair and System materials to determine that the pH or moisture content of the concrete is within the range of the Manufacturer's recommendations.
- H. Following abrasive blasting, all blasting material and debris shall be completely removed from the work area and disposed of by the Applicator/Installer. All surfaces shall be water washed as needed to remove residual dust, debris, or other blasting materials that could inhibit proper bonding of either the repair or System materials. All surfaces should be

inspected by the Owner's Inspector and Manufacturers Representative during and after preparation and before the repair mortar is applied. Manufacturer's Representative for the repair mortar shall inspect the surface and shall certify in writing that the surface has been adequately and properly prepared to receive their product.

3.02 APPLICATION OF REPAIR MATERIALS

- A. Areas where structural steel has been exposed or removed shall be repaired prior to the application of repair mortar or System materials. Removed reinforcement shall be replaced with matching size bars, mechanically coupled at each end to existing reinforcement. In areas where concrete corrosion has progressed behind reinforcement bars, sufficient concrete shall be removed behind the bars to allow full encasement of the bars with the repair mortar.
- B. Repair materials shall be trowel or spray applied, utilizing proper equipment, on to wall, ceiling and floor surfaces as needed. There shall be a minimum of 1" cover of the repair material over the surface of the reinforcing bars.
- C. When using approved cementitious repair materials, they shall be finished after application to provide a surface with the profile recommended by the System Manufacturer to receive the System. No bugholes or honeycomb surfaces should remain after the final finishing procedure of the repair mortar.
- D. The repair materials shall be permitted to cure according to Manufacturer's recommendations prior to the application of the System. Curing compounds shall not be used unless approved for compatibility with the System Manufacturer.
- E. After abrasive blast and leak repair is performed, all surfaces shall be inspected for remaining laitance prior to System application. Any evidence of remaining contamination or laitance shall be removed by additional abrasive blast, shotblast or other approved method. If repair materials are used, refer to these specifications and the manufacturer's recommendations for surface preparation. Areas to be finished with System must also be prepared in accordance with these specifications after receiving repair mortar and prior to application of the System.
- F. All surfaces shall be inspected by the Owner's Inspector and System Manufacturer's Representative during and after preparation and before the System is applied. The Manufacturer shall certify in writing that the surface has been adequately and properly prepared for the application of the System. Application of the System material shall not be initiated until the Owner has received the certification.

3.03 APPLICATION/INSTALLATION OF SYSTEM MATERIAL

A. GENERAL

- 1. Application/installation procedures shall conform to the recommendations of the System Manufacturer, including material handling, mixing, environmental controls

during application, safety, and the use of spray equipment. All materials shall be applied in strict accordance with the manufacturer's recommendations. Non-uniformity, sagging, delamination, excessive holidays, bubbles or other defects will be cause for rejection of the lining. Unless specifically approved to the contrary by the manufacturer, application of the System material shall only occur at temperatures at least 5 degrees Fahrenheit above dewpoint.

2. The spray equipment utilized by the Applicator shall be specifically designed to accurately ratio and apply the specified System materials and shall be regularly maintained and in proper working order throughout the application period.
3. The System material must be applied by an Applicator certified by the System Manufacturer as specified herein.
4. The Applicator/Installer shall furnish a written affidavit from the System Manufacturer stating that the finished System has been inspected by the Manufacturers Representative and that the System has been installed in accordance with the Manufacturer's recommendations.

B. MULTI-COMPONENT SYSTEMS

1. Plural component, airless spray application equipment approved by the System manufacturer shall be used to apply each coat of the System to avoid any potential contamination from compressed air oil, which may encourage inter-coat delamination. Air assisted plural component spray application equipment may be acceptable, especially for thinner coats (<10 mils), only if the air source is filtered to completely remove all oil and water.
2. If necessary, subsequent topcoating or additional coats of the System materials should occur within the period of time recommended by the Manufacturer of the material. The System Manufacturer must be consulted for any additional-coat surface preparation guidelines and shall provide written instructions detailing the proper procedures for applying subsequent coats of the material to ensure a good bond between layers.
3. Application to Metallic Surfaces:
 - a. Where the specified coatings are applied to metal surfaces, these surfaces shall first be prepared in accordance with SPCC SP-6 (commercial blast cleaning) or its equivalent as approved by the Manufacturer. All rust, grease and other foreign substances shall be removed.
 - b. Where the coatings are applied to piping the bolts shall be masked or otherwise protected such that the finished coating will not interfere with their removal.

- c. Where the modified polymer coating is applied to metal surfaces only the primer and finish coating is required.

3.04 TESTING AND INSPECTION OF LINING SYSTEM

A. GENERAL:

1. After application/installation of the System, all surfaces shall be inspected with high-voltage holiday detection equipment.
2. An induced holiday shall be made on a finished concrete surface and shall serve to determine the minimum/maximum voltage to be used to test the System for holidays in that general area.
3. All touch-up/repair procedures shall follow the protective coating/lining Manufacturer's recommendations. An excessive number of holidays (> 1 per 16 square feet) may be cause for rejection of the entire coating/lining at the sole discretion of the Owner. Rejected coating/lining shall be removed and replaced by the Applicator/Installer at no additional cost to the Owner.
4. Measurement of bond strength of the protective coating/lining to the substrate may be measured in accordance with ASTM D4541 at the Owner's discretion. The Owner shall evaluate any areas detected to have inadequate bond strength (<150 psi). Further bond tests may be performed in that area to determine the extent of potentially deficient bonded area and repairs shall be made by Applicator/Installer in strict accordance with Manufacturer's recommendations.
5. The Owner's Inspector and Manufacturer's Representative shall make the final visual inspection. Any deficiencies in the finished lining shall be marked and repaired by Applicator/Installer at no additional cost according to the procedures set forth by the Manufacturer and approved by the Owner.

B. MULTI-COMPONENT SYSTEMS:

1. During application, a wet film thickness gage meeting ASTM D4414 shall be used to ensure a monolithic coating and uniform thickness of spray applied coatings.
2. The spark tester shall be initially set at 100 volts per 1 mil (25 microns) of film thickness applied. This voltage may be adjusted as necessary to detect the induced holiday.
3. After abrading and cleaning, additional System material can be hand applied to a repair area as appropriate.

AREAS TO RECEIVE COATING/LINING SYSTEM

The following areas are to receive one of the specified coating/lining Systems:

Area Description	Multi-Component Modified Polymer
Inner Chlorine Contact Chamber (CCC): the wall adjacent to the Filter Building and the weir wall.	X

END OF SECTION



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DIVISION 11

EQUIPMENT

SECTION 11346

SUBMERSIBLE SUMP PUMPS

PART 1 - GENERAL

1.01 DESCRIPTION

A. Scope of Work

1. Furnish all labor, materials, equipment and incidentals required and install, place in operation, and field test submersible sump pump and discharge connection for the Marshall Street Chlorine Contact Chamber seepage catchment basin.
2. These Specifications are intended to give a general description of what is required, but do not cover all details which will vary in accordance with the requirements of the equipment as offered. It is, however, intended to cover the furnishing, the shop testing, the delivery and complete installation and field testing, of all materials, equipment and appurtenances for the complete pumping units as herein specified, whether specifically mentioned in these Specifications or not.
3. For all units there shall be furnished and installed all necessary and desirable accessory equipment and auxiliaries whether specifically mentioned in these Specifications or not, and as required for an installation incorporating the highest standard for this type of service including field testing of the entire installation and instructing the regular operating personnel in the care, operation and maintenance of all equipment.

1.02 QUALIFICATIONS

- A. The pumps covered by these Specifications are intended to be standard pumping units of proven ability as manufactured by a manufacturer having a minimum of five (5) years experience in the production of such pumps. The pumps furnished shall be designed, constructed and installed in accordance with the best practice and methods, and shall operate satisfactorily when installed. Pumps shall be manufactured in accordance with the Hydraulic Institute Standards.
- B. All equipment furnished under this Specification shall be new and unused, shall be the standard product of manufacturers having a successful record of manufacturing and servicing the equipment and systems specified herein for a minimum of five (5) years.
- C. Pumps shall be Xylem-Flygt Ready 4, or equal to provide specified features and to meet specified operating conditions.

1.03 SUBMITTALS

- A. The Contractor shall provide the following submittals in accordance with Division 1:
 - 1. Manufacturer's data including materials of construction and equipment weight.
 - 2. Data on Predicted performance curves developed for the specific application.
 - 3. Complete motor data.
- B. In the event that it is impossible to conform with certain details of the Specifications due to different manufacturing techniques, describe completely all nonconforming aspects.

1.04 OPERATING INSTRUCTIONS

- A. Operating and maintenance manuals shall be furnished. The manuals shall be prepared specifically for this installation and shall include all required cuts, drawings, equipment lists, descriptions, etc., that are required to instruct operating and maintenance personnel unfamiliar with such equipment.

1.05 TOOLS AND SPARE PARTS

- A. One (1) set of all special tools required for normal operation and maintenance shall be provided. All such tools shall be boxed.
- B. Required spare parts include all parts that normally require maintenance in the five (5) years after installation. Spare parts shall be properly bound and labeled for easy identification without opening the packaging and suitably protected for long-term storage. Spare parts shall be boxed.

1.06 PRODUCT HANDLING

- A. All parts shall be properly protected so that no damage or deterioration will occur during a prolonged delay from the time of shipment until installation is completed and the units and equipment are ready for operation.
- B. All equipment and parts must be properly protected against any damage during a prolonged period at the site.
- C. Factory assembled parts and components shall not be dismantled for shipment unless permission is received in writing from the Engineer.

1.07 WARRANTY

- A. The pump manufacturer shall warrant the units being supplied against defects in workmanship and material for a period of 18 months.

PART 2 - PRODUCTS

2.01 MATERIALS

A. Construction:

Component	Material
Outer Casing	Aluminum
Volute	Polyurethane
Impeller	Polyurethane
All fasteners	Stainless steel, Type 304
Shaft	Stainless steel, ANSI 420

- B. Each Materials specified are considered the minimum acceptable for the purposes of durability, strength, and resistance to erosion and corrosion. The Contractor may propose alternative materials for the purpose of providing greater strength or to meet required stress limitations. However, alternative materials must provide at least the same qualities as those specified for the purpose.

2.02 EQUIPMENT

- A. Impellers shall be designed to be non-clog and able to pass solids.
- B. Bearings shall be heavy-duty permanently lubricated ball type.
- C. Casings shall be constructed of aluminum and polyurethane and shall be designed to allow removal of all rotating parts from the motor end of the pumps. All mating surfaces where watertight sealing is required shall be machined and fitted with nitrile O-rings. Unless otherwise specified, pump volute shall have vertical discharge.
- D. Pumps shall be provided with carbon / ceramic upper and silicon carbide / silicon carbide lower seals running in oil lubricant.
- E. Motors:
1. The motor shall be designed to be non-overloading over the entire pump curve. The motor housing shall be of submersible construction with the windings operating in a sealed environment. Motors shall be air filled, NEMA design B with Class F (155°C) insulation; 2 pole, 3400 rpm. They shall be shrink-fit to the motor housing and allow up to 15 starts per hour.
 2. Explosion proof motors, where specified, shall be UL listed in accordance with UL 674 for Class I, Group D hazardous atmosphere.
- F. Pump motor and detector cables shall be suitable for submersible pump applications. Power for the motor shall be carried by a heavy-duty, flexible, water-resistant portable cable, sealed at the motor bell and of sufficient length to connect to the junction box or

the plug outlet as specified. The cable entry shall prevent water from leaking into the motor due to capillary action even if cable is cut or damaged.

PART 3 - EXECUTION

3.01 INSTALLATION

- A. Installation shall be in strict accordance with the manufacturer's instructions and recommendations and in the locations shown on the Drawings.

3.02 INSPECTION AND TESTING

- A. General:
 - 1. Materials and equipment shall be tested or inspected as required by the Engineer, and the cost of such work shall be included in the cost of the equipment.
 - 2. Field tests shall not be conducted until such time as the entire installation is complete and ready for testing.
- B. Pumps:
 - 1. Sump pump system shall be field tested for control, capacity and head over a 1-hour period.

3.03 PUMP PERFORMANCE SCHEDULE

- A. Sump pump shall be furnished according to "Table 11208-A, Pump Performance Schedule" below:

TABLE 11208-A

PUMP PERFORMANCE SCHEDULE

Pump/ Sump	Parameter	Value	Unit
Pump	Type	Integral Float w/ Field Adjustable ON/OFF Level Controls	--
	TDH	25.1	Feet
	Flow	10	GPM
	Min Water Level	<0.1	Inches
	Discharge Diameter	1(15/16)	Inches
Sump	Length x Width	3 x 2.5	Feet
	Depth	24	Inches
	On (From Grade)	6	Inches
	Off (At Base)	~2	Inches
Discharge Pipe	Material	PVC	--
	Diameter	1	Inches
Liner	Material	UV & Chlorine Resistant Reinforced PVC Liner	--
	Area	25	Square Ft.
Electrical Requirements	Voltage	120	Volts
	Frequency	60	Hertz
	Power Phase	Single	--
	Power Cord w/ Plug, Length	25	Feet

END OF SECTION



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DIVISION 15

MECHANICAL

SECTION 15070

SCHEDULE 80 POLYVINYL CHLORIDE (PVC) PIPE AND FITTINGS

PART 1 - GENERAL

1.01 DESCRIPTION

A. Scope of Work:

1. Furnish all labor, materials, equipment and incidentals required, and install and test in the locations as shown on the Drawings, the Schedule 80 polyvinyl chloride piping, fittings and appurtenances specified herein.
2. Schedule 80 PVC piping shall be used on all small diameter PVC piping systems (4 inches and smaller in diameter) which includes, but are not limited to, chemical solutions, potable and non-potable water, and sample water.
3. All plastic pipe and fittings shall conform to this specification section whether provided as a part of an equipment "package" or purchased separately by the contractor.

1.02 QUALITY ASSURANCE

- A. All plastic pipe, fittings and appurtenances shall be furnished by a single manufacturer who is fully experienced, reputable, and qualified in the manufacture of the items to be furnished. The equipment shall be designed, constructed, and installed in accordance with the best practices and methods and shall comply with these Specifications. The equipment shall be manufactured by Spears, IPEX, or an Engineer approved equal.

1.03 SUBMITTALS

A. Materials and Shop Drawings:

1. Shop drawings shall be submitted to the Engineer for approval in accordance with the General Conditions and Section 01340. All products within this specification shall be combined into a single submittal which shall include at least the following:
 - a. Dimensioning and the technical specification for all piping, fittings, and appurtenances to be furnished.

B. Additional Information:

1. Submit to the Engineer, for approval, samples of all materials specified herein, along with the manufacturer's Certificates of Inspection, descriptive literature, illustrations, specifications, installation instructions and related information.

1.04 PRODUCT DELIVERY, STORAGE AND HANDLING

- A. PVC pipe shall be delivered to the site in unbroken bundles packaged in such manner as to provide protection against damage. When possible pipe should be stored at the job site in the unit packages until ready for use. Packaged units shall be handled using a forklift or a spreader bar with fabric straps. Packaged units shall not be stacked at the job site higher than two units high.
- B. When it is necessary to store PVC pipe for more than 30 days, exposure to direct sunlight shall be prevented by covering the pipe with an opaque material. Adequate air circulation above and around the pipe shall be provided as required to prevent excessive heat accumulation. PVC pipe shall not be stored close to heat sources or hot objects such as heaters, fires, boilers or engine exhaust. Pipe gaskets shall be protected from excessive exposure to heat, direct sunlight, ozone, oil and grease. The interior and all sealing surfaces of pipe, fittings and other appurtenances shall be kept clean and free of dirt and foreign matter.
- C. Care shall be taken in handling and laying pipe and fittings to avoid severe impact blows, crushing, abrasion damage, gouging or cutting. Pipe shall be lowered, not dropped, from trucks or into trenches. All cracked, damaged or defective pipe and fittings, or any length of pipe having a gouge, scratch or other permanent indentation of more than 10 percent of the wall thickness in depth, shall be rejected and removed at once from the work and replaced with new acceptable pipe at no additional cost to the Owner.

1.05 WARRANTY AND GUARANTEES

- A. Provide equipment warranty in accordance with Section 01740: Warranties and Bonds.

PART 2 - PRODUCTS

2.01 GENERAL

2.02 MATERIALS AND EQUIPMENT

- A. PVC Pipe:
 - 1. Pipe shall be made of polyvinyl chloride, Schedule 80 pipe, conforming to ASTM D1785. Schedule 80 pipe shall have solvent welded joints. Threaded connections are permissible when connecting to valves or other equipment where solvent weld connections are not an option. Connection of PVC female threads to metal male threads are not allowable.

B. Fittings:

1. Fittings for Schedule 80 pipe 4 inches and smaller in diameter shall be socket type, solvent welded in conformance with ASTM D 2467. When permitted, threaded joints shall be in conformance with ASTM D 2464. Solvent welded and threaded joints shall be watertight. Chlorine solution lines shall have solvent welded fittings.
2. Fittings for Schedule 80 pipe greater than 4 inches in diameter shall be socket type, solvent welded in conformance with ASTM D 2467. Fittings shall be a 1-piece injection molded design. Use of low pressure fabricated PVC fittings will not be permitted.

C. Solvent Cement:

1. PVC solvent cement shall be in compliance with ASTM D 2564.
2. Solvent cement shall be specified by compatibility based on pipe service and size. Large diameter joints shall be solvent welded with slow setting solvent cement.
3. Manufacturer to provide certification with submittal.
4. All PVC chemical feed piping joints are to be solvent welded using CPVC solvent cement.

D. Flanges:

1. Slip-on flanges shall be provided to connect to flanged valves, fittings, or equipment. Flanges shall match the connecting flanges on the adjacent fitting, valve or piece of equipment.
2. Flange hardware (bolts, nuts, and washers) for PVC flanges shall be Type 316 stainless steel in accordance with ASTM F593 and F594, respectively. The length such that, after installation, bolts will project 1/8 to 3/8 inch beyond the outer face of the nut. Flat Washers shall be of the same material as the bolts.

2.03 ACCESSORIES (NOT APPLICABLE)

2.04 SPARE PARTS

- A. All special tools, solvents, lubricants, and cements required for normal installation shall be furnished with the pipe.

2.05 QUALITY CONTROL

- A. Contractor shall follow Manufacturer's and Supplier's recommended product quality control specifics as required for project.

PART 3 - EXECUTION

3.01 PREPARATION (NOT APPLICABLE)

3.02 INSTALLATION

- A. Install PVC pipe where shown on the Drawings and in strict accordance with the manufacturer's technical data and printed instructions.
- B. Joints for Schedule 80 PVC pipe and fittings shall be solvent welded, flanged, or threaded. All joints shall be made watertight. All pipe cutting, threading and jointing procedures for solvent welded and threaded PVC pipe joints shall be in strict accordance with the pipe and fittings manufacturer's printed installation instructions. Thread lubricant for threaded joints shall be Teflon tape only. In making solvent welded connections, clean dirt and moisture from pipe and fittings, bevel pipe ends slightly with emery cloth, if necessary and apply solvent cement of proper grade.
- C. Installation of valves and fittings shall be strictly in accordance with the manufacturer's instructions. Particular care shall be taken not to over-stress threaded connections at sleeves. In making solvent weld connections the solvent shall not be spilled on valves or allowed to run from joints.
- D. All piping shall have sufficient number of unions to allow convenient removal and shall be as approved by the Engineer.
- E. Concrete inserts for hangers and supports shall be furnished and installed in the concrete as it is placed. The inserts shall be set in accordance with the requirements of the piping layout and the Contractor shall verify their locations from approved piping layout Drawings and the structural Drawings.
- G. Jointing:
 - 1. Clean each pipe length, coupling and fitting of all debris and dirt before installation.
 - 2. Do not use pipe length if there are any cuts, abrasions, or defects on the surface of the pipe.
 - 3. Provide and use coupling pullers for joining the pipe when required.
 - 4. Shove home each length of pipe against the pipe previously laid and hold securely in position.

5. Do not pull or cramp joints.

H. Fabrication:

1. Cutting:

- a. Use a hand saw or pipe cutter with blades (not rollers).
- b. Examine all cut ends for possible cracks caused by cutting.

2. Connecting:

- a. Solvent weld connections are recommended by the manufacturer.
- b. Connect pipe and fittings only when temperature is above the minimum recommended by the manufacturer.
- c. Threaded adapters shall be connected only with plastic male into metal female.

3.03 INSPECTION AND TESTING

- A. All PVC piping shall be hydrostatically pressure tested and flushed.

3.04 START-UP AND INSTRUCTION (NOT APPLICABLE)

END OF SECTION

SECTION 15126

PIPE HANGERS AND SUPPORTS FOR PROCESS PIPING

PART 1 - GENERAL

1.01 DESCRIPTION

A. Scope of Work:

1. Furnish all labor, materials, equipment and incidentals and install pipe hangers, supports, concrete inserts, and anchor bolts including all metallic hanging and supporting devices for supporting exposed piping.

B. Related Work Described Elsewhere:

1. Concrete is included in Division 3.
3. Pipe and fittings are included in Division 15.

C. General Design (Not Applicable)

1.02 QUALITY ASSURANCE

- A. Hangers and supports shall be of approved standard design where possible and shall be adequate to maintain the supported load in proper position under all operating conditions. The minimum working factor of safety for pipe supports shall be five (5) times the ultimate tensile strength of the material, assuming 10 feet of water filled pipe being supported.
- B. All pipe and appurtenances connected to equipment shall be supported in such a manner as to prevent any strain being imposed on the equipment. When manufacturers have indicated requirements that piping loads shall not be transmitted to their equipment, the Contractor shall submit a certification stating that such requirements have been complied with.

1.03 SUBMITTALS

A. Materials and Shop Drawings:

1. Submit to the Engineer for approval, as provided in Section 01340: Shop Drawings, Working Drawings, and Samples, shop drawings of all items to be furnished under this Section.
2. Submit to the Engineer, for approval, samples of all materials specified herein.

1.04 PRODUCT DELIVERY STORAGE AND HANDLING

- A. The equipment provided under this section shall be shipped, handled and stored in accordance with the Manufacturer's written instructions, and in accordance with Section 01600: Materials and Equipment.

1.05 WARRANTY AND GUARANTEES

- A. Provide equipment warranty in accordance with Section 01740: Warranties and Bonds.

PART 2 - PRODUCTS

2.01 GENERAL

- A. All pipe and tubing shall be supported as required to prevent significant stresses in the pipe or tubing material, valves, and fittings and to support and cure the pipe in the intended position and alignment. All supports shall be designed to adequately secure the pipe against excessive dislocation due to thermal expansion and contraction, internal flow forces, and all probable external forces such as equipment, pipe, and personnel contact. All pipe supports shall be approved prior to installation.
- B. The Contractor shall select and design all piping support systems within the specified spans and component requirements. Structural design and selection of support system components shall withstand the dead loads imposed by the weight of the pipes filled with water, plus any insulation. Commercial pipe supports and hangers shall have a minimum safety factor of 5.
- C. No attempt has been made to show all required pipe supports in all locations, either on the Drawings or in the details. The absence of pipe supports and details on any drawings shall not relieve the Contractor of the responsibility for providing them throughout the plant.
- D. All support anchoring devices, including anchor bolts, inserts and other devices used to anchor the support onto a concrete base, roof, wall or structural steel works, shall be of the proper size, strength and spacing to withstand the shear and pullout loads imposed by loading and spacing on each particular support.
- E. All materials used in manufacturing hangers and supports shall be capable of meeting the respective ASTM Standard Specifications with regard to tests and physical and chemical properties, and be in accordance with MSS SP-58.
- F. Hangers and supports shall be spaced in accordance with ANSI B31.1.0 except that the maximum unsupported span shall not exceed 10 feet unless otherwise specified herein.
- G. Unless otherwise specified herein, pipe hangers and supports shall be as manufactured by ITT Grinnel Co., Inc., Carpenter and Patterson, Inc., or equal. Any reference to a

specific figure number of a specific manufacturer is for the purpose of establishing a type and quality of product, and shall not be considered as proprietary. Any item comparable in type, style, quality, design and performance will be considered for approval.

2.02 MATERIALS AND EQUIPMENT

A. Pipe Hangers and Supports for Metal Pipe:

1. Suspended single pipes shall be supported by hangers suspended by steel rods from galvanized concrete inserts, beam clamps, or ceiling mounting bolts as follows:

a. Hangers

<u>Pipe Size, Inches</u>	<u>Grinnel Fig. No.</u>
Less than 1/2	138R
1/2 through 1	97C
1-1/4 through 4	104
6 through 12	590
14 through 30	171

- b. Hanger rods shall be rolled steel machine threaded with load ratings conforming to ASTM Specifications and the strength of the rod shall be based on root diameter. Hanger rods shall have the following minimum diameters:

<u>Pipe Size, Inches</u>	<u>Min. Rod Diameter, In.</u>
Less than 2-1/2	3/8
2-1/2 to 3	1/2
4	5/8
6	3/4
8 to 12	7/8
14 to 18	1

- c. Where applicable, structural attachments shall be beam clamps. Beam clamps, for rod sizes 1/2-inch through 3/4-inch shall be equal to Grinnel Fig. No. 229, and for rod sizes 7/8-inch through 1-1/4 inches shall be equal to Grinnel Fig. No. 228, or equal.
- d. Concrete inserts for pipe hangers shall be; continuous metal inserts designed to be used in ceilings, walls or floors, spot inserts for individual pipe hangers, or ceiling mounting bolts for individual pipe hangers and shall be as manufactured by Unistrut Corp., Wayne, Michigan; Carpenter and Patterson, Inc., Laconia, New Hampshire; Richmond or equal and shall be as follows:

- 1) Continuous concrete inserts shall be used where applicable and/or as shown on the Drawings and shall be used for hanger rod sizes up to and including 3/4-inch diameter. Inserts to be used where supports are parallel to the main slab reinforcement shall be Series P3200 by Unistrut Corp., Fig 1480 Type 2 by Carpenter and Patterson, Inc., or equal. Inserts to be used where supports are perpendicular to the main slab reinforcement shall be Series P3300 by Unistrut Corp., Fig. 1480 Type I by Carpenter and Patterson, Inc. or equal.
 - 2) Spot concrete inserts shall be used where applicable and shall be used for hanger sizes up to and including 7/8-inch diameter. Inserts shall be Fig. 650 by Carpenter and Patterson, Inc. for hanger rod sizes 1/2-inch through and including 3/4-inch, and Fig. 266 by Carpenter and Patterson Inc., for 7/8-inch hanger rods.
 - 3) Ceiling mounting bolts shall be used where applicable and be for hanger rod sizes 1-inch through and including 1-1/4 inches and shall be Fig. 104M as manufactured by Carpenter and Patterson, Inc., or equal.
- e. All pipe hangers shall be capable of vertical adjustment under load and after erection. Turnbuckles, as required and where applied, shall be equal to Grinnel Fig. No. 230.
2. Wall or column supported pipes shall be supported by welded steel brackets equal to Grinnel Fig. 194, 195 and 199 as required, for pipe sizes up to and including 20-inch diameter. Additional wall bearing plates shall be provided where required.
- a. Where the pipe is located above the bracket, the pipe shall be supported by an anchor chair and U-bolt assembly supported by the bracket for pipes 4 inches and larger and by a U-bolt for pipes smaller than 4 inches. Anchor chairs shall be equal to Carpenter Patterson Fig. No. 127. U-bolts shall be equal to Grinnel Fig. No. 120 and 137.
 - b. Where the pipe is located below the bracket, the pipes shall be supported by pipe hangers suspended by steel rods from the bracket. Hangers and steel rods shall be as specified above.
3. Floor supported pipes 3-inches and larger in diameter shall be supported by either cast-in-place concrete supports or adjustable pipe saddle supports as directed by the Engineer. In general, concrete supports shall be used when lateral displacement of the pipes is probable (unless lateral support is provided), and adjustable pipe saddle type supports shall be used where lateral displacement of pipes is not probable.

- a. Each concrete support shall conform to the details shown on the Drawings. Concrete shall be poured after the pipe is in place with temporary supports. Concrete piers shall conform accurately to the bottom $\frac{1}{3}$ to $\frac{1}{2}$ of the pipe. Top edges and vertical corners of each concrete support shall have 1-inch bevels. Each pipe shall be secured on each concrete support by a wrought iron or steel anchor strap anchored to the concrete with cast-in-place bolts or with expansion bolts. Where directed by the Engineer, vertical reinforcement bars shall be grouted into drilled holes in the concrete floor to prevent overturning or lateral displacement of the concrete support. Unless otherwise approved by the Engineer, maximum support height shall be five (5) feet.
 - b. Concrete piers used to support base elbows and tees shall be similar to that specified above. Piers may be square or rectangular.
 - c. Each adjustable pipe saddle support shall be screwed or welded to the corresponding size 150 pound companion flanges or slip-on welding flanges respectively. Supporting pipe shall be of Schedule 40 steel pipe construction. Each flange shall be secured to the concrete floor by a minimum of two (2) expansion bolts per flange. Adjustable saddle supports shall be equal to Grinnel Fig. No. 264. Where used under base fittings, a suitable flange shall be substituted for the saddle.
4. Vertical piping shall be supported as follows:
 - a. Where pipes change from horizontal to vertical, the pipes shall be supported on the horizontal runs within 2 feet of the change in direction by pipe supports as previously specified herein.
 - b. For vertical runs exceeding 15 feet, pipes shall be supported by approved pipe collars, clamps, brackets, or wall rests at all points required to insure a rigid installation.
 - c. Where vertical piping passes through a steel floor sleeve, the pipe shall be supported by a friction type pipe clamp which is supported by the pipe sleeve. Pipe clamps shall be equal to Grinnel Fig. 262.
5. Anchor bolts shall be equal to Kwik-Bolt as manufactured by the McCulloch Industries, Minneapolis, Minnesota, or Wej-it manufactured by Wej-it Expansion Products, Inc., Bloomfield, Colorado.
6. All rods, hangers, inserts, brackets, and components shall be furnished with galvanized finish.

B. Pipe Hangers and Supports for Plastic Pipe:

1. Single plastic pipes shall be supported by pipe supports as previously specified herein.
2. Multiple, suspended, horizontal plastic pipe runs, where possible, and rubber hose shall be supported by ladder type cable trays such as the Electray Ladder by Husky-Burndy, the Globetray by the Metal Products Division of United States Gypsum, or equal. Ladder shall be of mild steel construction. Rung spacing shall be approximately 18 inches for plastic pipe and 12 inches for rubber hose. Tray width shall be approximately 6-inch for single runs of rubber hose and 12 inches for double runs of rubber hose. Ladder type cable trays shall be furnished complete with all hanger rods, rod couplings, concrete inserts, hanger clips, etc. required for a complete support system. Individual plastic pipes shall be secured to the rungs of the cable tray by strap clamps or fasteners equal to Globe Model M-CAC, Husky-Burndy Model SCR or approved equal. Spacing between clamps shall not exceed 9 feet. The cable trays shall provide continuous support along the length of the pipe.
3. Individual clamps, hangers, and supports in contact with plastic pipe shall provide firm support but not so firm as to prevent longitudinal movement due to thermal expansion and contraction.

C. Pipe Supports for Small Diameter PVC and Steel Pipe:

1. Small diameter Schedule 80 PVC piping 3-inches in diameter and smaller, and steel piping 2-inches in diameter and smaller shall be supported with "SUSPORT" system arrangements as manufactured by Universal Suspension Systems Inc. of Gillette, New Jersey or an equal approved by the Engineer. Clamping halves for the pipe support shall be manufactured of molded polypropylene and shall support and fit closely for 360° around the pipe. To support piping carrying non-corrosive fluids or gases and located in noncorrosive, indoor environments, all hardware for the "SUSPORT" system shall be nickel chrome plated carbon steel. To support piping carrying corrosive fluids or gases, piping located in corrosive environments or piping located outdoors, all hardware for the system shall be manufactured of Type 304 stainless steel.
2. In some cases, to adequately support small diameter PVC or steel piping, a metal frame support structure may be required for support of the "SUSPORT" system specified above. Where required, metal frame support structures shall be constructed using channels, fittings, brackets, hardware and other accessories as manufactured by B-Line Systems, Inc. of Highland, Illinois, or an equal approved by the Engineer. If located in indoor, non-corrosive environments, the materials for the frame structure shall be carbon steel with an epoxy coating applied by a cathodic, electro-deposition process which is equal to "Dura-a-Green" by B-Line Systems, Inc. For corrosive or outdoor environments, the materials for the frame structure be Type 316 stainless steel unless otherwise noted on the Drawings. Hardware used to construct the

frame support structure shall be cadmium plated for carbon steel supports or Type 316 stainless steel for stainless steel supports.

3. Pipe supports for small diameter PVC and steel piling shall be located wherever necessary in the opinion of the Engineer to adequately support the pipe, however, they shall have a maximum spacing as specified below for straight pipe runs. Adequate supports shall especially be used adjacent to valves and fittings in pipelines. The following table is based on spacing requirements for Schedule 80 PVC or Standard Weight (Schedule 40) steel pipe carrying a fluid with a Specific Gravity of 1.0 at a temperature not exceeding 120°F. Support spacing for PVC or steel piping carrying fluids with Specific Gravities or temperatures exceeding those stated above shall be approved by the Engineer.

Nominal Pipe Diameter, Inches	Support Spacing, Feet	
	PVC Pipe	Steel Pipe
1/2"	3.5	4.5
3/4"	4.0	5.0
1"	4.5	5.5
1-1/4"	5.0	6.5
1-1/2"	5.0	7.5
2"	5.5	8.0
2-1/2"	5.5	-
3"	6.0	-

2.03 ACCESSORIES (NOT APPLICABLE)

2.04 SPARE PARTS (NOT APPLICABLE)

2.05 QUALITY CONTROL

- A. Contractor shall follow Manufacturer's and Supplier's recommended product quality control specifics as required for this project.

PART 3 - EXECUTION

3.01 PREPARATION

- A. Prior to prime coating, all pipe hangers and supports shall be thoroughly clean, dry and free from all mill-scale, rust, grease, dirt, paint and other foreign substances to the satisfaction of the Engineer.
- B. All submerged pipe supports shall be prime coated with Koppers 654 Epoxy Primer or approved equal. All other pipe supports shall be prime coated with Rustinhibitive Primer No. 621 as manufactured by Koppers Company, Inc., Pittsburgh, Pa., or equal.

- C. Finish coating shall be compatible with the prime coating used and shall be applied as specified in Section 09961: High Performance Paints and Coatings.

3.02 INSTALLATION

- A. All pipes, horizontal and vertical, shall be rigidly supported from the building structure by approved supports. Supports shall be provided at changes in direction and elsewhere as shown in the Drawings or specified herein. No piping shall be supported from other piping or from metal stairs, ladders, and walkways, unless it is so indicated on the Drawings, or specifically directed or authorized by the Engineer.
- B. All pipe supports shall be designed with liberal strength and stiffness to support the respective pipes under the maximum combination of peak loading conditions to include pipe weight, liquid weight, liquid movement, and pressure forces, thermal expansion and contraction, vibrations, and all probable externally applied forces. Prior to installation, all pipe supports shall be approved by the Engineer.
- C. Pipe supports shall be provided to minimize lateral forces through valves, both sides of split type couplings, and sleeve type couplings and to minimize all pipe forces on pump housings. Pump housings shall not be utilized to support connecting pipes.
- D. Pipe supports shall be provided as follows:
 - 1. Cast iron and ductile iron shall be supported at a maximum support spacing of 10 feet, 0-inches with minimum of one support per pipe section at the joints.
 - 2. All vertical pipes shall be supported at each floor or at intervals of at least 15 feet by approved pipe collars, clamps brackets or wall rests, and at all points necessary to insure rigid construction.
- E. Effects of thermal expansion and contraction of the pipe shall be accounted for in pipe support selection and installation.
- F. Inserts for pipe hangers and supports shall be installed on forms before concrete is poured. Before setting these items, all Drawings and figures shall be checked which have a direct bearing on the pipe location. Responsibility for the proper location of pipe supports is included under this Section.
- G. Continuous metal inserts shall be embedded flush with the concrete surface.

H. Standard Pipe Supports:

1. Horizontal Suspended Piping:
 - a. Single Pipes: Adjustable swivel-ring, splint-ring, or clevis hangers.
 - b. Grouped Pipes: Trapeze hanger systems.
 - c. Furnish galvanized steel protection shield and oversized hangers for all insulated pipe.
 - d. Furnish precut sections of rigid insulation with vapor barrier at hangers for all insulated pipe.
2. Horizontal Piping Supported From Walls:
 - a. Single Pipes: Wall brackets or wall clips attached to wall with anchors. Clips attached to wall mounted framing also acceptable.
 - b. Stacked Piping:
 - 1) Wall mounted framing system and clips acceptable for piping smaller than 3-inch minimal diameter.
 - 2) Piping clamps which resist axial movement of pipe through support not acceptable.
 - c. Wall mounted piping clips not acceptable for insulated piping.
3. Horizontal Piping Supported From Floors:
 - a. Stanchion Type:
 - 1) Pedestal type; adjustable with stanchion, saddle, and anchoring flange.
 - 2) Use yoke saddles for piping whose centerline elevation is 18 inches or greater above the floor and for all exterior installations.
 - 3) Provide neoprene waffle isolation pad under anchoring flanges, adjacent to equipment or where otherwise required to provide vibration isolation.
 - b. Floor Mounted Channel Supports:

SECTION IVa – Supplemental Technical Specifications

- 1) Use for piping smaller than 3-inch nominal diameter running along floors and in trenches at piping elevations lower than can be accommodated using pedestal pipe supports.
 - 2) Attach channel framing to floors with anchor bolts.
 - 3) Attach pipe to channel with clips or pipe clamps.
- c. Concrete Cradles: Use for piping larger than 3-inch along floor and in trenches at piping elevations lower than can be accommodated using stanchion type.
4. Vertical Pipe: Support with wall brackets and base elbow or riser clamps on floor penetrations.
5. Standard Attachments:
 - a. To Concrete Ceilings: Concrete inserts.
 - b. To Steel Beams: I-beam clamp or welded attachments.
 - c. To Wooden Beams: Lag screws and angle clips to members not less than 2-1/2 inches thick.
 - d. To Concrete Walls: Concrete inserts or brackets or clip angles with anchor bolts.
6. Existing Walls and Ceilings: Install as specified for new construction, unless shown otherwise.

3.03 INSPECTION AND TESTING (NOT APPLICABLE)

3.04 START-UP AND INSTRUCTION (NOT APPLICABLE)

END OF SECTION

SECTION V

CONTRACT DOCUMENTS

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Bond No.: _____

PUBLIC CONSTRUCTION BOND

(1)

This bond is given to comply with § 255.05, Florida Statutes, and any action instituted by a claimant under this bond for payment must be in accordance with the notice and time limitation provisions in subsections (2) and (10).

Pursuant to § 255.05(1)(b), Florida Statutes, “**Before commencing the work** or before recommencing the work after a default or abandonment, **the contractor shall provide to the public entity a certified copy of the recorded bond**. Notwithstanding the terms of the contract or any other law governing prompt payment for construction services, the public entity may not make a payment to the contractor until the contractor has complied with this paragraph.”

CONTRACTOR**SURETY****OWNER**

[name]

[name]

City of Clearwater
Engineering Dept.
100 S. Myrtle Avenue
Clearwater, FL 33756
(727) 562-4747

[principal business address]

[principal business address]

[phone number]

[phone number]

PROJECT NAME: MS WRF Chlorine Contact Chamber**PROJECT NO.:** 18-0060-UT

PROJECT DESCRIPTION: The City operates two (2) chlorine contact chambers (CCCs) at the Marshall Street Water Reclamation Facility (WRF). The inner CCC needs repair at the weir wall before the de-chlorination tank as it may be the source of external seepage during operation. Phase 1 will include crack injections and waterproofing expansion joints along the weir wall. Phase 2 includes lining a portion of the inner CCC with a coating system. A Phase 3 additive alternative is also proposed to waterproof the Outer CCC expansion joint at the weir wall, if Phase 1&2 repairs fail to stop the external seepage.

BY THIS BOND, We, _____, as Contractor, and _____, a corporation, as Surety, are bound to the City of Clearwater, Florida, herein called Owner, in the sum of \$[x,xxx,xxx.xx], for payment of which we bind ourselves, our heirs, personal representatives, successors, and assigns, jointly and severally.

THE CONDITION OF THIS BOND is that if Contractor:

1. Performs the contract dated _____, between Contractor and Owner for construction of MS WRF Chlorine Contact Chamber, the contract documents being made a part of this bond by reference (which include the Advertisement for Bids, Proposal, Contract, Surety Bond, Instructions to Bidders, General Conditions, Plans, Technical Specifications and Appendix, and such alterations as may be made in said Plans and Specifications as therein provided for), at the times and in the manner prescribed in the contract; and

2. Promptly makes payments to all claimants, as defined in Section 255.05(1), Florida Statutes, supplying Contractor with labor, materials, or supplies, used directly or indirectly by Contractor in the prosecution of the work provided for in the contract; and

Bond No.: _____

PUBLIC CONSTRUCTION BOND

(2)

3. Pays Owner all losses, damages, expenses, costs, and attorney's fees, including appellate proceedings, that Owner sustains because of a default by Contractor under the contract; and
4. To the limits of § 725.06(2), Florida Statutes, shall indemnify and hold harmless Owner, their officers and employees, from liabilities, damages, losses and costs, including, but not limited to, reasonable attorney's fees, to the extent caused by the negligence, recklessness, or intentional wrongful misconduct of Contractor and persons employed or utilized by Contractor in the performance of the construction contract; and
5. Performs the guarantee of all work and materials furnished under the contract for the time specified in the contract, then this bond is void; otherwise it remains in full force.
6. Any action instituted by a claimant under this bond for payment must be in accordance with the notice and time limitation provisions in Section 255.05(2), Florida Statutes.
7. Any changes in or under the contract documents and compliance or noncompliance with any formalities connected with the contract or the changes does not affect Surety's obligation under this bond, and Surety does hereby waive notice of any such change, extension of time, alteration or addition to the terms of the contract or to the work or to the specifications.

IN TESTIMONY WHEREOF, witness the hands and seals of the parties hereto this _____ day of _____, 20__.

(If sole Ownership or Partnership, two (2) Witnesses required).

(If Corporation, Secretary only will attest and affix seal).

[TYPE LEGAL NAME OF CONTRACTOR]

By: _____
 Title: _____
 Print Name: _____

WITNESS:

WITNESS:

 Corporate Secretary or Witness
 Print Name: _____

 Print Name: _____

(affix corporate seal)

(Corporate Surety)

By: _____
 ATTORNEY-IN-FACT
 Print Name: _____

(affix corporate seal)

(Power of Attorney must be attached)

CONTRACT

(1)

This **CONTRACT** made and entered into this ____ day of _____, 20__ by and between the City of Clearwater, Florida, a municipal corporation, hereinafter designated as the "City", and _____, of the City of _____ County of _____ and State of Florida, hereinafter designated as the "Contractor".

[Or, if out of state:]

This **CONTRACT** made and entered into this ____ day of _____, 20__ by and between the City of Clearwater, Florida, a municipal corporation, hereinafter designated as the "City", and _____, a/an _____ (State) Corporation authorized to do business in the State of Florida, of the City of _____ County of _____ and State of _____, hereinafter designated as the "Contractor".

WITNESSETH:

That the parties to this contract each in consideration of the undertakings, promises and agreements on the part of the other herein contained, do hereby undertake, promise and agree as follows:

The Contractor, and his or its successors, assigns, executors or administrators, in consideration of the sums of money as herein after set forth to be paid by the City and to the Contractor, shall and will at **their** own cost and expense perform all labor, furnish all materials, tools and equipment for the following:

PROJECT NAME: MS WRF Chlorine Contact Chamber

PROJECT NO.: 18-0060-UT

in the amount of \$ _____

In accordance with such proposal and technical supplemental specifications and such other special provisions and drawings, if any, which will be submitted by the City, together with any advertisement, instructions to bidders, general conditions, technical specifications, proposal and bond, which may be hereto attached, and any drawings if any, which may be herein referred to, are hereby made a part of this contract, and all of said work to be performed and completed by the contractor and its successors and assigns shall be fully completed in a good and workmanlike manner to the satisfaction of the City.

If the Contractor should fail to comply with any of the terms, conditions, provisions or stipulations as contained herein within the time specified for completion of the work to be performed by the Contractor, then the City, may at its option, avail itself of any or all remedies provided on its behalf and shall have the right to proceed to complete such work as Contractor is obligated to perform in accordance with the provisions as contained herein.

CONTRACT

(2)

THE CONTRACTOR AND HIS OR ITS SUCCESSORS AND ASSIGNS DOES HEREBY AGREE TO ASSUME THE DEFENSE OF ANY LEGAL ACTION WHICH MAY BE BROUGHT AGAINST THE CITY AS A RESULT OF THE CONTRACTOR'S ACTIVITIES ARISING OUT OF THIS CONTRACT AND FURTHERMORE, IN CONSIDERATION OF THE TERMS, STIPULATIONS AND CONDITIONS AS CONTAINED HEREIN, AGREES TO HOLD THE CITY FREE AND HARMLESS FROM ANY AND ALL CLAIMS FOR DAMAGES, COSTS OF SUITS, JUDGMENTS OR DECREES RESULTING FROM ANY CLAIMS MADE UNDER THIS CONTRACT AGAINST THE CITY OR THE CONTRACTOR OR THE CONTRACTOR'S SUB CONTRACTORS, AGENTS, SERVANTS OR EMPLOYEES RESULTING FROM ACTIVITIES BY THE AFOREMENTIONED CONTRACTOR, SUB CONTRACTOR, AGENT SERVANTS OR EMPLOYEES, TO THE LIMITS OF § 725.06(2).

In addition to the foregoing provisions, the Contractor agrees to conform to the following requirements:

In connection with the performance of work under this contract, the Contractor agrees not to discriminate against any employee or applicant for employment because of race, sex, religion, color, or national origin. The aforesaid provision shall include, but not be limited to, the following: employment, upgrading, demotion, or transfer; recruitment or recruitment advertising; lay off or termination; rates of pay or other forms of compensation; and selection for training, including apprenticeship. The Contractor agrees to post hereafter in conspicuous places, available for employees or applicants for employment, notices to be provided by the contracting officer setting forth the provisions of the non-discrimination clause.

The Contractor further agrees to insert the foregoing provisions in all contracts hereunder, including contracts or agreements with labor unions and/or worker's representatives, except sub-contractors for standard commercial supplies or raw materials.

It is mutually agreed between the parties hereto that time is of the essence of this contract, and in the event that the work to be performed by the Contractor is not completed within the time stipulated herein, it is then further agreed that the City may deduct from such sums or compensation as may be due to the Contractor the sum of **\$1,000.00 per day** for each day that the work to be performed by the Contractor remains incomplete beyond the time limit specified herein, which sum of **\$1,000.00 per day** shall only and solely represent damages which the City has sustained by reason of the failure of the Contractor to complete the work within the time stipulated, it being further agreed that this sum is not to be construed as a penalty but is only to be construed as liquidated damages for failure of the Contractor to complete and perform all work within the time period as specified in this contract.

It is further mutually agreed between the City and the Contractor that if, any time after the execution of this contract and the public construction bond which is attached hereto for the faithful performance of the terms and conditions as contained herein by the Contractor, that the City shall at any time deem the surety or sureties upon such public construction bond to be unsatisfactory or if, for any reason, the said bond ceases to be adequate in amount to cover the performance of the work the Contractor shall, at his or its own expense, within ten (10) days after receipt of written notice from the City to do so, furnish an additional bond or bonds in such term and amounts and with such surety or sureties as shall be satisfactory to the City. If such an event occurs, no further payment shall be made to the Contractor under the terms and provisions of this contract until such new or additional security bond guaranteeing the faithful performance of the work under the terms hereof shall be completed and furnished to the City in a form satisfactory to it.

CONTRACT

(3)

In addition to all other contract requirements as provided by law, the contractor executing this agreement agrees to comply with public records law.

IF THE CONTRACTOR HAS QUESTIONS REGARDING THE APPLICATION OF CHAPTER 119, FLORIDA STATUTES, THE CONTRACTORS DUTY TO PROVIDE PUBLIC RECORDS RELATING TO THIS CONTRACT. CONTACT THE CUSTODIAN OF PUBLIC RECORDS AT 727-562-4092, Rosemarie.Call@myclearwater.com, 600 Cleveland St. Clearwater, FL 33756

The contractor's agreement to comply with public records law applies specifically to:

- a) Keep and maintain public records required by the City of Clearwater (hereinafter "public agency") to perform the service being provided by the contractor hereunder.
- b) Upon request from the public agency's custodian of public records, provide the public agency 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 for in Chapter 119, Florida Statutes, as may be amended from time to time, or as otherwise provided by law.
- c) Ensure that the 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 the contract if the contractor does not transfer the records to the public agency.
- d) Upon completion of the contract, transfer, at no cost, to the public agency all public records in possession of the contractor or keep and maintain public records required by the public agency to perform the service. If the contractor transfers all public records to the public agency upon completion of the contract, the contractor shall destroy any duplicate public records that are exempt or confidential and exempt from public records disclosure requirements. If the contractor keeps and maintains public records upon completion of the contract, the contractor shall meet all applicable requirements for retaining public records. All records stored electronically must be provided to the public agency, upon request from the public agency's custodian of public records, in a format that is compatible with the information technology systems of the public agency.
- e) A request to inspect or copy public records relating to a public agency's contract for services must be made directly to the public agency. If the public agency does not possess the requested records, the public agency shall immediately notify the contractor of the request and the contractor must provide the records to the public agency or allow the records to be inspected or copied within a reasonable time.
- f) The contractor hereby acknowledges and agrees that if the contractor does not comply with the public agency's request for records, the public agency shall enforce the contract provisions in accordance with the contract.
- g) A contractor who fails to provide the public records to the public agency within a reasonable time may be subject to penalties under Section 119.10, Florida Statutes.
- h) If a civil action is filed against a contractor to compel production of public records relating to a public agency's contract for services, the court shall assess and award against the contractor the reasonable costs of enforcement, including reasonable attorney fees, if:
 1. The court determines that the contractor unlawfully refused to comply with the public records request within a reasonable time; and

CONTRACT

(4)

2. At least 8 business days before filing the action, the plaintiff provided written notice of the public records request, including a statement that the contractor has not complied with the request, to the public agency and to the contractor.
- i) A notice complies with subparagraph (h)2. if it is sent to the public agency's custodian of public records and to the contractor at the contractor's address listed on its contract with the public agency or to the contractor's registered agent. Such notices must be sent by common carrier delivery service or by registered, Global Express Guaranteed, or certified mail, with postage or shipping paid by the sender and with evidence of delivery, which may be in an electronic format.
- j) A contractor who complies with a public records request within 8 business days after the notice is sent is not liable for the reasonable costs of enforcement.

IN WITNESS WHEREOF, the parties to the agreement have hereunto set their hands and seals and have executed this Agreement, the day and year first above written.

**CITY OF CLEARWATER
IN PINELLAS COUNTY, FLORIDA**

By: _____ (SEAL)
William B. Horne, II
City Manager

Attest:

Countersigned:

Rosemarie Call
City Clerk

By: _____
Frank Hibbard
Mayor

Approved as to form:

Owen Kohler
Assistant City Attorney

Contractor must indicate whether:

_____ Corporation, _____ Partnership, _____ Company, or _____ Individual

(Contractor)

By: _____ (SEAL)

Print Name: _____

Title: _____

The person signing shall, in his own handwriting, sign the Principal's name, his own name, and his title; where the person is signing for a Corporation, he must, by Affidavit, show his authority to bind the Corporation – **provide Affidavit.**

CONSENT OF SURETY TO FINAL PAYMENT

TO OWNER: City of Clearwater PROJECT NAME: MS WRF Chlorine Contact Chamber
Engineering Dept. PROJECT NO.: 18-0060-UT
100 S. Myrtle Ave. CONTRACT DATE: [REDACTED]
Clearwater, FL 33756 BOND NO. : [REDACTED], recorded in O.R. Book [REDACTED],
Page [REDACTED], of the Public Records of Pinellas County, Florida.

CONTRACTOR: [REDACTED]

Pursuant to § 255.05(11), Florida Statutes, and in accordance with the provisions of the Contract between the Owner and the Contractor as indicated above, the:

[insert name of Surety]

[address]

[address]

,SURETY,

on bond of

[insert name of Contractor]

[address]

[address]

,CONTRACTOR,

hereby approves of the final payment to the Contractor, and agrees that final payment to the Contractor shall not relieve Surety of any of its obligations to

City of Clearwater
Engineering Dept.
100 S. Myrtle Ave.
Clearwater, FL 33756

,OWNER,

as set forth in said Surety's bond.

IN WITNESS WHEREOF, the Surety has hereunto set its hand this ____ day of _____, _____

(Surety)

(Signature of authorized representative)

(Printed name and title)

Attest:
(Seal):

PROPOSAL/BID BOND

(Not to be filled out if a certified check is submitted)

KNOWN ALL MEN BY THESE PRESENTS: That we, the undersigned, _____
 _____ as Contractor, and _____
 _____ as Surety, whose address is _____,
 _____, are held and firmly bound unto the City
 of Clearwater, Florida, in the sum of _____ Dollars
 (\$_____) (being a minimum of 10% of Contractor's total bid amount) for the payment of which,
 well and truly to be made, we hereby jointly and severally bind ourselves, our heirs, executors,
 administrators, successors and assigns.

The condition of the above obligation is such that if the attached Proposal of _____
 _____ as Contractor, and _____ as Surety, for
 work specified as: _____

all as stipulated in said Proposal, by doing all work incidental thereto, in accordance with the plans and
 specifications provided herefor, all within Pinellas County, is accepted and the contract awarded to the
 above named bidder, and the said bidder shall within ten days after notice of said award enter into a contract,
 in writing, and furnish the required Public Construction Bond with surety or sureties to be approved by the
 City Manager, this obligation shall be void, otherwise the same shall be in full force and virtue by law and
 the full amount of this Proposal/Bid Bond will be paid to the City as stipulated or liquidated damages.

Principal must indicate whether:

_____ Corporation, _____ Partnership, _____ Company, or _____ Individual

Signed this _____ day of _____, 20____.

Contractor_____
Principal

By: _____

Title _____

Surety

The person signing shall, in his own handwriting, sign the Principal's name, his own name, and his title;
 where the person is signing for a Corporation, he must, by Affidavit, show his authority to bind the
 Corporation – **provide Affidavit.**

AFFIDAVIT

(To be filled in and executed if the bidder is a corporation)

STATE OF FLORIDA)

COUNTY OF _____)

_____, being duly sworn, deposes and says that he/she is
Secretary of _____
a corporation organized and existing under and by virtue of the laws of the State of Florida, and having its
principal office at:

(Street & Number) (City) (County) (State)

Affiant further says that he is familiar with the records, minute books and by-laws of

(Name of Corporation)

Affiant further says that _____ is _____
(Officer's Name) (Title)

of the corporation, is duly authorized to sign the Proposal for _____

or said corporation by virtue of _____
(state whether a provision of by laws or a Resolution of
Board of Directors. If by Resolution give date of adoption).

Affiant

Sworn to before me this _____ day of _____, 20____.

Notary Public

Type/print/stamp name of Notary

Title or rank, and Serial No., if any

PROPOSAL

(1)

TO THE CITY OF CLEARWATER, FLORIDA, for

MS WRF Chlorine Contact Chamber (18-0060-UT)

and doing such other work incidental thereto, all in accordance with the contract documents, marked

MS WRF Chlorine Contact Chamber (18-0060-UT)

Every bidder must take notice of the fact that even though his proposal be accepted and the documents signed by the bidder to whom an award is made and by those officials authorized to do so on behalf of the City of Clearwater, Florida, that no such award or signing shall be considered a binding contract without a certificate from the Finance Director that funds are available to cover the cost of the work to be done, or without the approval of the City Attorney as to the form and legality of the contract and all the pertinent documents relating thereto having been approved by said City Attorney; and such bidder is hereby charged with this notice.

The signer of the Proposal, as bidder, also declares that the only person, persons, company or parties interested in this Proposal, are named in this Proposal, that he has carefully examined the Advertisement, Instructions to Bidders, Contract Specifications, Plans, Supplemental Specifications, General Conditions, Special Provisions, and Public Construction Bond, that he or his representative has made such investigation as is necessary to determine the character and extent of the work and he proposes and agrees that if the Proposal be accepted, he will contract with the City of Clearwater, Florida, in the form of contract; hereto annexed, to provide the necessary labor, materials, machinery, equipment, tools or apparatus, do all the work required to complete the contract within the time mentioned in the General Conditions and according to the requirements of the City of Clearwater, Florida, as herein and hereinafter set forth, and furnish the required surety bonds for the following prices to wit:

If the foregoing Proposal shall be accepted by the City of Clearwater, Florida, and the undersigned shall fail to execute a satisfactory contract as stated in the Advertisement herein attached, then the City may, at its option determine that the undersigned has abandoned the contract, and thereupon this Proposal shall be null and void, and the certified check or bond accompanying this Proposal, shall be forfeited to become the property of the City of Clearwater, Florida, and the full amount of said check shall be retained by the City, or if the Proposal Bond be given, the full amount of such bond shall be paid to the City as stipulated or liquidated damages; otherwise, the bond or certified check accompanying this Proposal, or the amount of said check, shall be returned to the undersigned as specified herein.

PROPOSAL

(2)

Attached hereto is a bond or certified check on _____
 _____ Bank, for the sum of _____
 _____ (\$ _____)
 (being a minimum of 10% of Contractor's total bid amount).

The full names and residences of all persons and parties interested in the foregoing bid are as follows:

(If corporation, give the names and addresses of the President and Secretary. If firm or partnership, the names and addresses of the members or partners. The Bidder shall list not only his name but also the name of any person with whom bidder has any type of agreement whereby such person's improvements, enrichment, employment or possible benefit, whether sub-contractor, materialman, agent, supplier, or employer is contingent upon the award of the contract to the bidder).

NAMES:

ADDRESSES:

_____	_____
_____	_____
_____	_____
_____	_____

Signature of Bidder: _____

The person signing shall, in his own handwriting, sign the Principal's name, his own name and his title. Where the person signing for a corporation is other than the President or Vice President, he must, by affidavit, show his authority, to bind the corporation.

Principal: _____

By: _____ Title: _____

Company Legal Name: _____

Doing Business As (if different than above): _____

Business Address of Bidder: _____

City and State: _____ Zip Code _____

Phone: _____ Email Address: _____

Dated at _____, this _____ day of _____, A.D., 20__.

CITY OF CLEARWATER
ADDENDUM SHEET

PROJECT: MS WRF Chlorine Contact Chamber (18-0060-UT)

Acknowledgment is hereby made of the following addenda received since issuance of Plans and Specifications.

Addendum No. _____ Date: _____

Addendum No. _____ Date: _____

Addendum No. _____ Date: _____

Addendum No. _____ Date: _____

Addendum No. _____ Date: _____

Addendum No. _____ Date: _____

Addendum No. _____ Date: _____

Addendum No. _____ Date: _____

Addendum No. _____ Date: _____

Addendum No. _____ Date: _____

Addendum No. _____ Date: _____

(Name of Bidder)

(Signature of Officer)

(Title of Officer)

(Date)

BIDDER'S PROPOSAL**PROJECT: Marshall Street Chlorine Contact Chamber Repair (18-0060-UT)****CONTRACTOR:** _____**BIDDER'S GRAND TOTAL: \$** _____ **(Numbers)****BIDDER'S GRAND TOTAL:** __________ **(Words)**

Item	Description	Unit	Estimated Quantity	Unit Price	Amount
1	Mobilization & Demobilization	LS	1		\$
2	General Requirements	LS	1		\$
3	Polyurethane Resin Crack Injections	LF	200		\$
4	All other work not included in line items 1, 2 and 3 to complete Phase 1 repairs to the Marshall Street WRF Inner Chlorine Contact Chamber (CCC)	LS	1		\$
5	Coating System on Walls	SF	750		\$
6	All other work not included in line item 5 to complete Phase 2 repairs to the Marshall Street WRF Inner Chlorine Contact Chamber (CCC)	LS	1		\$
7	All other work not included in line items 1 through 6 to complete Phase 3 repairs to the Marshall Street WRF Outer Chlorine Contact Chamber (CCC). This work will only be completed if directed by the Owner.	LS	1		\$
SUB TOTAL					\$
8	Contingency (10%)	LS	1	\$	\$
GRAND TOTAL					\$

THE BIDDER'S GRAND TOTAL ABOVE IS HIS TOTAL BID BASED ON HIS UNIT PRICES AND LUMP SUM PRICES AND THE ESTIMATED QUANTITIES REQUIRED FOR EACH SECTION. THIS FIGURE IS FOR INFORMATION ONLY AT THE TIME OF OPENING BIDS. THE CITY WILL MAKE THE TABULATION FROM THE UNIT PRICES AND LUMP SUM PRICE BID. IF THERE IS AN ERROR IN THE TOTAL BY THE BIDDER, IT SHALL BE CHANGED AS ONLY THE UNIT PRICES AND LUMP SUM PRICE SHALL GOVERN.

THE CONTRACTOR SHALL PROVIDE COPIES OF A CURRENT CONTRACTOR LICENSE/REGISTRATION WITH THE STATE OF FLORIDA AND PINELLAS COUNTY IN THE BID RESPONSE.

**SCRUTINIZED COMPANIES AND BUSINESS OPERATIONS WITH
CUBA AND SYRIA CERTIFICATION FORM**

PER SECTION III, ITEM 25, IF YOUR BID IS \$1,000,000 OR MORE, THIS FORM MUST BE COMPLETED AND SUBMITTED WITH THE BID PROPOSAL. FAILURE TO SUBMIT THIS FORM AS REQUIRED, MAY DEEM YOUR SUBMITTAL NONRESPONSIVE.

The affiant, by virtue of the signature below, certifies that:

1. The vendor, company, individual, principal, subsidiary, affiliate, or owner is aware of the requirements of section 287.135, Florida Statutes, regarding companies on the Scrutinized Companies with Activities in Sudan List, the Scrutinized Companies with Activities in the Iran Petroleum Energy Sector List, or engaging in business operations in Cuba and Syria; and
2. The vendor, company, individual, principal, subsidiary, affiliate, or owner is eligible to participate in this solicitation and is not listed on either the Scrutinized Companies with Activities in Sudan List, the Scrutinized Companies with Activities in the Iran Petroleum Sector List, or engaged in business operations in Cuba and Syria; and
3. Business Operations means, for purposes specifically related to Cuba or Syria, engaging in commerce in any form in Cuba or Syria, including, but not limited to, acquiring, developing, maintaining, owning, selling, possessing, leasing or operating equipment, facilities, personnel, products, services, personal property, real property, military equipment, or any other apparatus of business or commerce; and
4. If awarded the Contract (or Agreement), the vendor, company, individual, principal, subsidiary, affiliate, or owner will immediately notify the City of Clearwater in writing, no later than five (5) calendar days after any of its principals are placed on the Scrutinized Companies with Activities in Sudan List, the Scrutinized Companies with Activities in the Iran Petroleum Sector List, or engages in business operations in Cuba and Syria.

Authorized Signature

Printed Name

Title

Name of Entity/Corporation

STATE OF _____

COUNTY OF _____

The foregoing instrument was acknowledged before me on this _____ day of _____, 20____, by _____ (name of person whose signature is being notarized) as the _____ (title) of _____ (name of corporation/entity), personally known to me as described herein _____, or produced a _____ (type of identification) as identification, and who did/did not take an oath.

Notary Public

Printed Name

My Commission Expires: _____

NOTARY SEAL ABOVE

SCRUTINIZED COMPANIES THAT BOYCOTT ISRAEL LIST
CERTIFICATION FORM

PER SECTION III, ITEM 25, THIS FORM MUST BE COMPLETED AND SUBMITTED WITH THE BID PROPOSAL. FAILURE TO SUBMIT THIS FORM AS REQUIRED, MAY DEEM YOUR SUBMITTAL NONRESPONSIVE.

The affiant, by virtue of the signature below, certifies that:

1. The vendor, company, individual, principal, subsidiary, affiliate, or owner is aware of the requirements of section 287.135, Florida Statutes, regarding companies on the Scrutinized Companies that Boycott Israel List, or engaged in a boycott of Israel; and
2. The vendor, company, individual, principal, subsidiary, affiliate, or owner is eligible to participate in this solicitation and is not listed on the Scrutinized Companies that Boycott Israel List, or engaged in a boycott of Israel; and
3. “Boycott Israel” or “boycott of Israel” means refusing to deal, terminating business activities, or taking other actions to limit commercial relations with Israel, or persons or entities doing business in Israel or in Israeli-controlled territories, in a discriminatory manner. A statement by a company that it is participating in a boycott of Israel, or that it has initiated a boycott in response to a request for a boycott of Israel or in compliance with, or in furtherance of, calls for a boycott of Israel, may be considered as evidence that a company is participating in a boycott of Israel; and
4. If awarded the Contract (or Agreement), the vendor, company, individual, principal, subsidiary, affiliate, or owner will immediately notify the City of Clearwater in writing, no later than five (5) calendar days after any of its principals are placed on the Scrutinized Companies that Boycott Israel List, or engaged in a boycott of Israel.

Authorized Signature

Printed Name

Title

Name of Entity/Corporation

STATE OF _____

COUNTY OF _____

The foregoing instrument was acknowledged before me on this _____ day of _____, 20____, by _____ (name of person whose signature is being notarized) as the _____ (title) of _____ (name of corporation/entity), personally known to me as described herein _____, or produced a _____ (type of identification) as identification, and who did/did not take an oath.

Notary Public

Printed Name

My Commission Expires: _____
NOTARY SEAL ABOVE