Solicitation 263-11809

Fiveash Water Treatment Plant Hydrotreators 3 & 4 Influent Pipe Modifications

Bid Designation: Public

CITY OF FORT LAUDERDALE

City of Fort Lauderdale

Bid 263-11809
Fiveash Water Treatment Plant Hydrotreators 3 & 4 Influent Pipe Modifications

Bid Number	**263-11809**
Bid Title	**Fiveash Water Treatment Plant Hydrotreators 3 & 4 Influent Pipe Modifications**
Bid Start Date	**Jul 22, 2016 10:14:16 AM EDT**
Bid End Date	**Aug 23, 2016 2:00:00 PM EDT**
Question & Answer End Date	**Aug 12, 2016 5:00:00 PM EDT**
Bid Contact	**Jim Hemphill** **Sr. Procurement Specialist** **Procurement Department** **954-828-5143** **jhemphill@fortlauderdale.gov**
Contract Duration	**One Time Purchase**
Contract Renewal	**Not Applicable**
Prices Good for	**120 days**
Pre-Bid Conference	**Aug 8, 2016 10:00:00 AM EDT** **Attendance is optional** **Location: Fiveash Water Treatment Plant** **4321 NW 9th Avenue · Conference Room** **Fort Lauderdale, FL 33311**

Bid Comments

INVITATION TO BID

Sealed bids will be received electronically until 2:00 P.M., local time, on Tuesday, August 23, 2016, and opened immediately thereafter in the 5th Floor Conference Room, City Hall, City of Fort Lauderdale, Florida, 100 North Andrews Avenue, for BID NO., 263-11809, PROJECT NO., 12197 – Fiveash Water Treatment Plant Hydrotreators 3 & 4 Influent Pipe Modifications.

This project consists of Drawing File No.4-139-40 (21 sheets).

The work includes the procurement, construction, testing, and placing in service, replacement of piping, valves, fittings and accessories within the influent vaults for Hydrotreators 3 and 4. The work shall be sequenced so that one of the hydrotreators will be removed from service and all work shown on the contract documents performed and accepted by the City prior to proceeding with the work on the next hydrotreator.

NOTE: Payment on this contract will be made by Visa or MasterCard.

Possession of a certified general contractor license OR a certified underground utility and excavation contractor license issued by the Florida Department of Business and Professional Regulation is required for this project.

A pre-bid meeting will be held on August 8, 2016, at 10:00 a.m. local time, at Fiveash Water Treatment Plant, 4321 NW 9th Avenue, Fort Lauderdale Fl. 33309.

Bidding blanks may be obtained free of charge at BIDSYNC.COM. Drawing Plans are on file in the Public Works Department, City of Fort Lauderdale at 100 North Andrews Avenue, 4th floor, (Monday thru Friday 8:00 am to 4:30 pm) at a NON-REFUNDABLE cost of $25.00 (including sales tax per set). Only cash or cashier's check made payable to the City of Fort Lauderdale are accepted.

It will be the sole responsibility of the bidder to ensure that his bid is submitted prior to the bid opening date and time listed. PAPER BID SUBMITTALS WILL NOT BE ACCEPTED. BIDS MUST BE SUBMITTED ELECTRONICALLY VIA BIDSYNC.COM

Bid Security: A certified check, cashier's check, bank officer's check or bid bond for FIVE percent (5%) of the bid amount, made payable to the City of Fort Lauderdale, Florida, shall accompany each proposal.

Bid Bonds:

Bidders can submit bid bonds for projects four different ways:

BidSync allows bidders to submit bid bonds electronically directly through their system using Surety 2000. For more information on this feature and to access it, contact BIDSYNC customer care department.

Bidders may upload their original executed bid bond on BIDSYNC to accompany their bids with the electronic proposal, and deliver, upon request, the original, signed and sealed hard copy within five (5) business days after bid opening, with the company name, bid number and title clearly indicated.

Bidders can hand deliver their bid bond in a sealed envelope to the Finance Department/Procurement Services Division, 100 North Andrews Avenue, Room 619, Fort Lauderdale, FL 33301-1016, before time of bid opening, with the company name, bid number and title clearly indicated on the envelope.

Bidders can mail their bid bond to the Finance Department/Procurement Services Division, 100 North Andrews Avenue, Room 619, Fort Lauderdale, FL 33301-1016, before time of bid opening, with the company name, bid number and title clearly indicated on the envelope.

Certified Checks, Cashier's Checks and Bank Drafts CANNOT be submitted via BIDSYNC, nor are their images allowed to be uploaded and submitted with your electronic bid. These forms of securities, as well as hard copy bid bonds, must be received on or before the Invitation to Bid (ITB) opening date and time, at the Finance Department/Procurement Services Division, 100 North Andrews Avenue, Room 619, Fort Lauderdale, FL 33301-1016, with the bid number and title clearly indicated on the envelope.

It is the bidder's sole responsibility to ensure that his bid bond or other bid security is received by the Procurement Services Division before time of bid opening. Failure to adhere to this requirement may be grounds to consider the bid as non-responsive.

The City of Fort Lauderdale reserves the right to waive any informality in any or all bids and to reject any or all bids.

For information concerning technical specifications, please utilize the question/answer feature provided by BIDSYNC at www.bidsync.com . Questions of a material nature must be received prior to the cut-off date specified in the solicitation. Material changes, if any, to the scope of services or bidding procedures, will only be transmitted by written addendum. (See addendum section of BIDSYNC Site). Contractors please note: No part of your bid can be submitted via FAX. No variation in price or conditions shall be permitted based upon a claim of ignorance. Submission of a bid will be considered evidence that the Contractor has familiarized himself with the nature and extent of the work, equipment, materials, and labor required. The entire bid response must be submitted in accordance with all specifications contained in this solicitation.

Information on bid results and projects currently out to bid can be obtained on the City's website – http://www.fortlauderdale.gov/purchasing . For general inquiries, please call (954) 828-5933.

Item Response Form

Item	**263-11809--01-01 - Mobilization and Demobilization**
Quantity	**1 lump sum**
Percentage	
Delivery Location	**City of Fort Lauderdale**
	See ITB Specifications
	See ITB Specifications

Fort Lauderdale FL 33301
Qty 1

Description
This item includes , but is not limited to, the costs for Mobilization, demobilization, pre-construction photography and video, staging area, storage, temporary construction facilities, sanitary facilities, site cleanup, project cordination, testing, compliance with Florida Trench Safety Act, project sign, insurance, bonds, and indemnification.

Item	**263-11809--01-02 - Fiveash Water Treatment Plant Hydrotreators 3 & 4 Influent Pipe Modifications**
Quantity	**1 lump sum**
Percentage	
Delivery Location	**City of Fort Lauderdale**

See ITB Specifications
See ITB Specifications
Fort Lauderdale FL 33301
Qty 1

Description
This item includes the costs for all material, labor, equipment and incidentals for the performance of all work described in the Contract Documents including, but not limited to: preparation of emergency response plan, removal of concrete and piping; modification of the Hydrotreator 3 and 4 influent valve vaults; exposing of the joint between the existing wall pipe and concrete pipe; retaining a concrete pressure pipe manufacturer to inspect the joint between the existing wall pipe and the existing concrete pipe to determine joint type(s); design and manufacture custom 30-inch nominal diameter steel fabricated wall fitting to replace the existing wall fitting and existing 30-inch nominal diameter flanged steel spool piece with 8-inch nominal diameter outlet; temporary removal, storage, cleaning, painting, reinstallation and testing of the magnetic flow meters, butterfly valves, torque tubes, motor operators and all other items necessary for a complete and operable system; cleaning vaults along with removal of debris, abandoned piping and abandoned conduits and associated supports; ladders; hatches; piping, couplings, gaskets, pipe supports, nuts and bolts; sump pumps; materials, equipment and labor to prevent groundwater from entering the vaults following removal of the existing wall pipe; temporary piping, valves, pumps and all necessary accessories to remove water entering the vaults; along with all appurtenant work, complete, tested and ready for operation, all in conformance with Contract Document requirements. This item includes all incidental costs to complete the Work and miscellaneous items not specifically covered in other Proposal Items.

CITY OF FORT LAUDERDALE
CONTRACT AND SPECIFICATIONS PACKAGE

BID NO. 263-11809

PROJECT NO. 12197

FIVEASH WATER TREATMENT HYDROTREATORS 3&4 INGFLUENT PIPE MODIFICATIONS

Issued on Behalf of: The Public Works Department
100 North Andrews Avenue
Fort Lauderdale, Florida 33301

PROJECT MANAGER Daniel Lizarazo, P.E.
TITLE Project Manager II

SR. PROCUREMENT SPECIALIST – JAMES HEMPHILL
SENIOR PROCUREMENT SPECIALIST
Telephone: (954) 828-5143 E-mail: Jhemphill@fortlauderdale.gov

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Note: The following documents are available electronically for completion.

Attachment 1 - CITB Construction Bid Certification (formerly CITB Signature Page)
Attachment 2 - CITB Questionnaire Sheets (formerly P-4 to P-5)
Attachment 3 - CITB Trench Safety (formerly P-6)
Attachment 4 - CITB Prime Contractor ID Form (MBE-1 & 2)
Attachment 5 - CITB Non-Collusion Statement (NCS-1)
Attachment 6 - CITB Contract Payment Method
Attachment 7 - Contractor Safety Qualification Form
Attachment 8 - Bid 263-11809 / Project 12197 Specific Reference doc.

These documents **must** be returned with your bid along with your bid security, proof of insurance, and proof of required licenses/certifications.

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3) Bidders can **hand deliver** their bid bond in a sealed envelope to the Finance Department/Procurement Services Division, 100 North Andrews Avenue, Room

Invitation to Bid (Continued)

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Jeffrey A. Modarelli
City Clerk

INSTRUCTIONS TO BIDDERS

The following instructions are given for the purpose of guiding bidders in properly preparing their bids or proposals. These directions have equal force and weight with the specifications and strict compliance is required with all of these provisions.

QUALIFICATIONS OF BIDDERS – No proposal will be accepted from, nor will any contract be awarded to, any person who is in arrears to the CITY OF FORT LAUDERDALE, upon any debt or contract, or who has defaulted, as surety or otherwise, upon any obligation to the City, or who is deemed irresponsible or unreliable by the City Commission of Fort Lauderdale.

PERSONAL INVESTIGATION - Bidders shall satisfy themselves by personal investigation, and by such other means as they may think necessary or desirable, as to the conditions affecting the proposed work and the cost. No information derived from maps, plans, specifications, or from the Engineer, City Manager, or their assistants shall relieve the Contractor from any risk or from fulfilling all terms of the contract.

INCONSISTENCIES – Any seeming inconsistency between different provisions of the plans, specifications, proposal or contract, or any point requiring explanation must be inquired into by the bidder, in writing, at least ten (10) days prior to the time set for opening proposals. After proposals are opened, the bidders shall abide by the decision of the Engineer as to such interpretation.

ADDENDA AND INTERPRETATIONS - No interpretations of the meaning of the plans, specifications or other contract documents will be made orally to any bidder. Prospective bidders must request such interpretation in writing as instructed in the bid package. To be considered, such request must be received by the Questions and Answers deadline as indicated in BIDSYNC.COM. Material changes, if any, to the scope of services or bidding procedures will only be transmitted by written addendum. **It is the bidder's responsibility to verify if addendums have been issued in BIDSYNC.COM.** Failure of any bidder to receive any such addenda or interpretation shall not relieve any bidder from any obligation under his bid as submitted. All addenda so issued shall become a part of the contract document. **Bidder** shall verify **in BIDSYNC.COM** that he has all addenda before submitting a bid.

LEGAL CONDITIONS - Bidders are notified to familiarize themselves with the provisions of the laws of the State of Florida relating to hours of labor on municipal work, and with the provisions of the laws of the State of Florida and the Charter and the ordinances of the City of Fort Lauderdale.

PUBLIC ENTITY CRIMES - A person or affiliate who has been placed on the convicted vendor list following a conviction for a public entity crime may not submit a bid on a contract to provide any goods or services to a public entity, may not submit a bid on a contract with a public entity for the construction or repair of a public building or public work, may not submit bids on leases of real property to a public entity, may not be awarded or perform work as a Contractor, supplier, subcontractor, or consultant under a contract with any public entity, and may not transact business with any public entity in excess of the threshold amount provided in Section 287.017, Florida Statutes, for CATEGORY TWO for a period of thirty-six (36) months from the date of being placed on the convicted vendor list.

FORMS OF PROPOSALS - Each proposal and its accompanying statements must be made on the blanks provided. THE FORMS MUST BE SUBMITTED ELECTRONICALLY, IN GOOD ORDER WITH ALL BLANKS COMPLETED, and must show the name of the bidder and a statement as to its contents.

INSTRUCTIONS TO BIDDERS (continued)

FORMS OF PROPOSALS (CONTINUED) - The proposal must be signed by one duly authorized to do so, and in case signed by a deputy or subordinate, the principal's properly written authority to such deputy or subordinate must accompany the proposal. No proposal will be accepted, for any reason whatsoever, which is not submitted to the City as stated above, within the specified time.

INSURANCE - Contractor shall provide and shall require all of its sub-contractors to provide, pay for, and maintain in force at all times during the term of the Agreement, such insurance, including Property Insurance (Builder's Risk), Commercial General Liability Insurance, Business Automobile Liability Insurance, Workers' Compensation Insurance, Employer's Liability Insurance, and Umbrella/Excess Liability, as stated below. Such policy or policies shall be issued by companies authorized to do business in the State of Florida and having agents upon whom service of process may be made in the State of Florida.

BID BOND - A certified check, cashier's check or bank officer's check, for the sum set forth in the advertisement, made payable to the City of Fort Lauderdale, Florida, or bid bond in such amount, shall accompany each proposal as evidence of the good faith and responsibility of the bidder. The check or bond shall be retained by the City as liquidated damages should the bidder refuse to or fail to enter into a contract for the execution of the work embraced in this proposal, in the event the proposal of the bidder is accepted. Retention of such amount shall not be construed as a penalty or forfeiture.

The above bond or check shall be a guarantee that the bidder will, if necessary, promptly execute a satisfactory contract and furnish good and sufficient bonds. As soon as a satisfactory contract has been executed and the bonds furnished and accepted, the check or bond accompanying the proposal of the successful bidder will be returned to him. The certified or other checks or bid bonds of the unsuccessful bidders will be returned to them upon the acceptance of the bid of the successful bidder. If the successful bidder shall not enter into, execute, and deliver such a contract and furnish the required bonds within ten (10) days after receiving notice to do so, the certified or other check or bid bond shall immediately become the property of the City of Fort Lauderdale as liquidated damages. Retention of such amount shall not be construed as a penalty or forfeiture.

FILLING IN BIDS - All prices must be electronically submitted in the proposal pages, and all proposals must fully cover all items for which proposals are asked and no other. Bidders are required to state the names and places of residence of all persons interested, and if no other person is interested, the bidder shall distinctly state such fact and shall state that the proposal is, in all respects, fair and without collusion or fraud. Where more than one person is interested, it is required that all persons interested or their legal representative make all verification and subscribe to the proposal.

PRICES QUOTED: Deduct any discount offered and quote firm net unit prices. In the case of a discrepancy in computing the amount of the bid, the unit price quoted will govern. All prices quoted shall be F.O.B. destination, freight prepaid (Bidder pays and bears freight charges, Bidder owns goods in transit and files any claims), unless otherwise stated in Special Conditions. Each item must be bid separately. No attempt shall be made to tie any item or items contained in the ITB with any other business with the City.

BIDS FIRM FOR ACCEPTANCE: Bidder warrants, by virtue of bidding, that his bid and the prices quoted in his bid will be firm for acceptance by the City for a period of one hundred and twenty (120) days from the date of bid opening unless otherwise stated in the ITB. The City shall award contract within this time period or shall request to the recommended awarded vendor an extension to hold pricing, until products/services have been awarded.

ADDITIONAL ITEMS OR SERVICES: The City may require additional items or services of a similar nature, but not specifically listed in the contract. The Contractor agrees to provide such items or

services, and shall provide the City prices on such additional items or services based upon a formula or method, which is the same or similar to that used in establishing the prices in his proposal. If the price(s) offered are not acceptable to the City, and the situation cannot be resolved to the satisfaction of the City, the City reserves the right to procure those items or services from other vendors, or to cancel the contract upon giving the Contractor thirty (30) days written notice.

DELETION OR MODIFICATION OF SERVICES: The City reserves the right to delete any portion of the Contract at any time without cause, and if such right is exercised by the City, the total fee shall be reduced in the same ratio as the estimated cost of the work deleted bears to the estimated cost of the work originally planned. If work has already been accomplished on the portion of the Contract to be deleted, the Contractor shall be paid for the deleted portion on the basis of the estimated percentage of completion of such portion.

If the Contractor and the City agree on modifications or revisions to the task elements, after the City has approved work to begin on a particular task or project, and a budget has been established for that task or project, the Contractor will submit a revised budget to the City for approval prior to proceeding with the work.

CAUSES FOR REJECTION - No proposal will be canvassed, considered or accepted which, in the opinion of the City Commission, is informal or unbalanced, or contains inadequate or unreasonable prices for any items; each item must carry its own proportion of the cost as nearly as is practicable. Any alteration, erasure, interlineation, or failure to specify bids for all items called for in the schedule shall render the proposal informal.

REJECTION OF BIDS - The City reserves the right to reject any bid if the evidence submitted by the bidder, or if the investigation of such bidder, fails to satisfy the City that such bidder is properly qualified to carry out the obligations and to complete the work contemplated. Any or all proposals will be rejected, if there is reason to believe that collusion exists among bidders. A proposal will be considered irregular and may be rejected, if it shows serious omissions, alterations in form, additions not called for, conditions or unauthorized alternates, or irregularities of any kind. The City reserves the right to reject any or all proposals and to waive such technical errors as may be deemed best for the interests of the City.

BID PROTEST PROCEDURE: Any proposer or bidder who is not recommended for award of a contract and who alleges a failure by the City to follow the City's procurement ordinance or any applicable law may protest to the Procurement Division – Deputy Director of Finance, by delivering a letter of protest within five (5) days after a Notice of Intent to award is posted on the City's website at the following link: http://www.fortlauderdale.gov/purchasing/notices_of_intent.htm. The complete protest ordinance may be found on the City's website at the following link: http://www.fortlauderdale.gov/purchasing/protestordinance.pdf

WITHDRAWALS - Any bidder may, without prejudice to himself, withdraw his proposal at any time prior to the expiration of the time during which proposals may be submitted. Such request for withdrawal must be in writing and signed in the same manner and by the same person who signed the proposal. After expiration of the period for receiving proposals, no proposal can be withdrawn, modified, or explained.

CONTRACT - The bidder to whom award is made shall execute a written contract to do the work and maintain the same in good repair until final acceptance by the proper authorities, and shall furnish

good and sufficient bonds as specified within ten (10) days after receiving such contract for execution. If the bidder to whom the first award is made fails to enter into a contract as provided, the award may be annulled and the contract let to the next lowest bidder who is reliable, responsible, and responsive in the opinion of the City Commission, and that bidder shall fulfill every stipulation and obligation as if such bidder were the original party to whom award was made.

The contract shall provide that the Contractor agrees to correct any defective or faulty work or material, which may appear within one (1) year after completion of the work and receipt of final payment.

ENFORCEMENT OF SPECIFICATIONS - Copies of the specifications will be placed in the hands of all the assistants to the Engineer and Inspectors employed on the work, who shall enforce each and every requirement of the contract. Such assistants shall have no authority to vary from such requirements.

COPIES OF DRAWING PLANS - Copies of the drawing plans are on file in the Public Works Department, City Hall, 4th Floor, 100 N. Andrews Avenue, Fort Lauderdale, Florida 33301.

SURETY BOND – The Contractor shall execute and record in the public records of Broward County, Florida, a payment and performance bond in an amount at least equal to the Contract Price with a surety insurer authorized to do business in the State of Florida as surety, ("Bond"), in accordance with Section 255.05, Florida Statutes (2014), as may be amended or revised, as security for the faithful performance and payment of all of the Contractor's obligations under the Contract Documents.

The successful bidder shall furnish a performance and payment bond in compliance with Section 255.05, Florida Statutes, written by a Corporate Surety company, holding a Certificate of Authority from the Secretary of the Treasury of the United States as acceptable sureties on federal bonds, in an amount equal to the total amount payable by the terms of the contract, executed and issued by a Resident Agent licensed by and having an office in the State of Florida, representing such Corporate Surety, conditioned for the due and faithful performance of the work, and providing in addition to all other conditions, that if the Contractor, or his or its subcontractors, fail to duly pay for any labor, materials, or other supplies used or consumed by such Contractor, or his or its subcontractor or subcontractors, in performance of the work contracted to be done, the Surety will pay the same in the amount not exceeding the sum provided in such bonds, together with interest at the rate of fifteen percent (15%) per annum, and that they shall indemnify and save harmless the City of Fort Lauderdale to the extent of any and all payments in connection with carrying out of the contract, which the City may be required to make under the law.

The Contractor is required at all times to have a valid surety bond in force covering the work being performed. A failure to have such bond in force at any time shall constitute a default on the part of the Contractor. A bond written by a surety, which becomes disqualified to do business in the State of Florida, shall automatically constitute a failure on the part of the Contractor to meet the above requirements.

Such bond shall continue in effect for one (1) year after completion and acceptance of the work with liability equal to at least twenty-five percent (25%) of contract price, or an additional bond shall be conditioned that the Contractor will correct any defective or faulty work or material which appear within one (1) year after completion of the contract, upon notification by the City, except in contracts which are concerned solely with demolition work, in which cases twenty-five percent (25%) liability will not be applicable.

AUDIT OF CONTRACTOR'S RECORDS - Upon execution of the Contract, the City reserves the right to conduct any necessary audit of the Contractor's records. Such an audit, or audits, may be conducted by the City or its representatives at any time prior to final payment, or thereafter, for a

period up to three (3) years. The City may also require submittal of the records from either the Contractor, the Subcontractor, or both. For the purpose of this Section, records shall include all books of account, supporting documents and papers deemed necessary by the City to assure compliance with the contract provisions.

Failure of the Contractor or Subcontractor to comply with these requirements may result in disqualification or suspension from bidding for future contracts or disapproval as a Subcontractor at the option of the City.

The Contractor shall assure that each of its Subcontractors will provide access to its records pertaining to the project upon request by the City.

PERIODIC ESTIMATE FOR PARTIAL PAYMENT - After the Contractor has submitted a periodic estimate for partial payment, approved and certified by the Public Works Department, the City shall make payment in the manner provided in the Contract Documents and in accordance with Florida's Prompt Payment Act, Section 218, Florida Statutes.

RESERVATION FOR AWARD AND REJECTION OF BIDS - The City reserves the right to accept or reject any or all bids, part of bids, and to waive minor irregularities or variations to specifications contained in bids, and minor irregularities in the bidding process. The City also reserves the right to award the contract on a split order basis, lump sum basis, individual item basis, or such combination as shall best serve the interest of the City. The City reserves the right to make an award to the responsive and responsible bidder whose product or service meets the terms, conditions, and specifications of the ITB and whose bid is considered to best serve the City's interest. In determining the responsiveness of the offer and the responsibility of the Bidder, the following shall be considered when applicable: the ability, capacity and skill of the Bidder to perform as required; whether the Bidder can perform promptly, or within the time specified, without delay or interference; the character, integrity, reputation, judgment, experience and efficiency of the Bidder; the quality of past performance by the Bidder; the previous and existing compliance by the Bidder with related laws and ordinances; the sufficiency of the Bidder's financial resources; the availability, quality and adaptability of the Bidder's supplies or services to the required use; the ability of the Bidder to provide future maintenance, service or parts; the number and scope of conditions attached to the bid.

MINORITY AND WOMEN BUSINESS ENTERPRISE PARTICIPATION AND BUSINESS - It is the desire of the City of Fort Lauderdale to increase the participation of minority (MBE) and women-owned (WBE) businesses in its contracting and procurement programs. While the City does not have any preference or set aside programs in place, it is committed **to a policy of equitable participation for these firms.** The City of Fort Lauderdale wants to increase the participation of Minority Business Enterprises (MBE), Women Business Enterprises (WBE), and Small Business Enterprises (SBE) in its procurement activities. If your firm qualifies in accordance with the below definitions please indicate in the space provided in this ITB.

Minority Business Enterprise (MBE) "A Minority Business" is a business enterprise that is owned or controlled by one or more socially or economically disadvantaged persons. Such disadvantage may arise from cultural, racial, chronic economic circumstances or background or other similar cause. Such persons include, but are not limited to: Blacks, Hispanics, Asian Americans, and Native Americans.

The term "Minority Business Enterprise" means a business at least fifty-one percent (51%) of which is owned by minority group members or, in the case of a publicly owned business, at least fifty-one percent (51%) of the stock of which is owned by minority group members. For the purpose of the preceding sentence, minority group members are citizens of the United States who include, but are not limited to: Blacks, Hispanics, Asian Americans, and Native Americans.

INSTRUCTIONS TO BIDDERS (continued)

Women Business Enterprise (WBE) a "Women Owned or Controlled Business" is a business enterprise at least fifty-one percent (51%) of which is owned by females or, in the case of a publicly owned business, at least fifty-one percent (51%) of the stock of which is owned by females.

Small Business Enterprise (SBE) "Small Business" means a corporation, partnership, sole proprietorship, or other legal entity formed for the purpose of making a profit, which is independently owned and operated, has either fewer than 100 employees or less than $1,000,000 in annual gross receipts.

BLACK includes persons having origins in any of the Black racial groups of Africa.

WHITE includes persons whose origins are Anglo-Saxon and Europeans and persons of Indo-European decent including Pakistani and East Indian.

HISPANIC includes persons of Mexican, Puerto Rican, Cuban, Central and South American, or other Spanish culture or origin, regardless of race.

NATIVE AMERICAN includes persons whose origins are American Indians, Eskimos, Aleuts, or Native Hawaiians.

ASIAN AMERICAN includes persons having origin in any of the original peoples of the Far East, Southeast Asia, the Indian subcontinent, or the Pacific Islands.

DEBARRED OR SUSPENDED BIDDERS OR PROPOSERS - The bidder or proposer certifies, by submission of a response to this solicitation, that neither it nor its principals and subcontractors are presently debarred or suspended by any Federal department or agency.

SPECIAL CONDITIONS

1. PURPOSE

The City of Fort Lauderdale, Florida (City) is seeking bids from qualified bidders, hereinafter referred to as the Contractor, to provide all labor, material, and equipment for the FIveash Water Treatment Plant Hydrotreators 3 & 4 Influent Pipe Modifications project.

This project is located at Fiveash Water Treatment Plant, 4321 Northwest 9th Avenue, in the City of Fort Lauderdale. The work to be accomplished under this contract includes, but is not limited to, the procurement, construction, testing, and placing in service, replacement of piping, valves, fittings and accessories within the influent vaults for Hydrotreators 3 and 4. The work shall be sequenced so that one of the hydrotreators will be removed from service and all work shown on the contract documents performed and accepted by the OWNER prior to proceeding with the work on the next hydrotreator. The replacement of the steel fittings that connect to the underground reinforced concrete pipe will require the contractor to retain the original concrete pipe supplier to confirm the joint types during construction and design and fabricate new custom steel fittings. The replacement of the steel fittings that connect to the underground reinforced concrete pipe requires removal of a section of reinforced concrete wall within each vault along with subsequent repair of the wall.

Number of awards anticipated: one (1)

2. TRANSACTION FEES

The City of Fort Lauderdale uses BidSync (www.bidsync.com) to distribute and receive bids and proposals. There is no charge to vendors/contractors to register and participate in the solicitation process, nor will any fees be charged to the awarded contractor.

3 SUBMISSION OF BIDS

It is the sole responsibility of the Contractor to ensure that their bid is submitted electronically through BidSync at www.bidsync.com and that any bid security not submitted via BidSync reaches the City of Fort Lauderdale City Hall, Procurement Services Division, 6th floor, Room 619, 100 N. Andrews Avenue, Fort Lauderdale, FL 33301 in a sealed envelope marked on the outside with the ITB solicitation number and Contractor's name, no later than the time and date specified in this solicitation. **PAPER BID SUBMITALS WILL NOT BE ACCEPTED. PLEASE SUBMIT YOUR BID RESPONSE ELECTRONICALLY.**

4. INFORMATION OR CLARIFICATION

For information concerning procedures for responding to this solicitation, contact **James Hemphill, Senior Procurement Specialist**, via email at jhemphill@fortlauderdale.gov. Such contact shall be for clarification purposes only.

For information concerning technical specifications please utilize the question/answer feature provided by BidSync at www.bidsync.com. Questions of a material nature must be received prior to the cut-off date specified in the solicitation. Material changes, if any, to the scope of services or bidding procedures will only be transmitted by written addendum. (See addendum section of BidSync Site). **Contractors please note**: No part of your bid can be submitted via FAX. No variation in price or conditions shall be permitted based upon a claim of ignorance. Submission of a bid will be considered evidence that the Contractor has familiarized himself with the nature and extent of the work, and the equipment, materials, and labor required. The entire bid response must be submitted in accordance with all specifications contained in this

solicitation. The questions and answers submitted in BidSync shall become part of any contract that is created from this ITB.

5. PRE-BID MEETING AND/OR SITE VISIT

A pre-bid meeting will be held on August 8, 2016, at 10:00 a.m. local time, at Fiveash Water Treatment Plant, 4321 NW 9th Avenue, Fort Lauderdale Fl, 33309. It is strongly suggested that all Contractors attend the pre-proposal conference.

While attendance is not mandatory, it will be the sole responsibility of the bidder to inspect the City's location(s)/facilities and/or become familiar with the scope of the City's requirements and systems prior to submitting a proposal. No variation in price or conditions shall be permitted based upon a claim of ignorance. It is strongly suggested that all Contractor's attend the pre-bid meeting and/or site visit.

6. CONTRACT PERIOD

The Contractor recognizes that TIME IS OF THE ESSENCE. The Work shall commence within 30 calendar days of the date of the Notice to Proceed.

The Work shall be Substantially Completed within 300 calendar days after the date when the Contract Time commences to run as provided in the Notice to Proceed.

The Work shall be finally completed on the Final Completion Date and ready for final payment in accordance with this Agreement within 330 calendar days after the date when the Contract Time commences to run as provided in the Notice to Proceed.

The City of Fort Lauderdale reserves the right to waive any informality in any bid and to reject any or all bids. The City of Fort Lauderdale reserves the right to reduce or delete any of the bid items.

At time of award of contract, the City reserves the right to set a maximum dollar limit that may be expended on this project. Contract quantities of any or all items may be increased, reduced, or eliminated to adjust the contract amount to coincide with the amount of work necessary or to bring the contract value to within the established limit. All quantities are estimated and the City reserves the right to increase, reduce, or eliminate the contract quantities in any amount.

The undersigned bidder affirms that he has or will obtain all equipment necessary to complete the work described, that he has or will obtain all required permits and licenses from the appropriate agencies, and that his firm is authorized to do business in the State of Florida.

7. BID SECURITY

A certified check, cashier's check, bank officer's check or bid bond for five (5) percent of the bid amount, made payable to the City of Fort Lauderdale, Florida, shall accompany each proposal.

8. REQUIRED LICENSES/CERTIFICATIONS

Contractor must possess the following licenses/certifications to be considered for award:

Contractor must possess a certified general contractor license OR a certified underground utility and excavation contractor license issued by the Florida Department of Business and Professional Regulation. License number shall begin with the letter code "CG" or "CU, respectively.

Note: Contractor must have proper licensing prior to submitting bid and must submit evidence of same with bid

9. SPECIFIC EXPERIENCE REQUIRED

The following expertise is required to be considered for this contract. Specific references attesting to this expertise must be submitted with bid:

Contractor must have experience with repair/replacement of concrete pressure pipe 24-inch nominal diameter or larger. Bidder shall submit proof of the construction of a minimum of three projects that include repair/replacement of concrete pressure pipe 24-inch nominal diameter and larger at an operating water or wastewater treatment plant within the past 10 years. Include the owner's name, address, phone number, type of work performed, and project name (if applicable).

10. BID ALLOWANCE

Allowance for permits: Payments will be made to the contractor based on the actual cost of permits upon submission of paid permit receipts. The City shall not pay for other costs related to obtaining or securing permits.

The amount indicated is intended to be sufficient to cover the entire project. If the City Permit fees exceed the allowance indicated, the City will reimburse the contractor the actual amount of City Permit Fees required for project completion.

Allowance	**$**
Permit Fee(s)	10,000
Special Inspector Allowance	10,000

Note: The City will add this allowance to your bid.

11. INSURANCE REQUIREMENTS *(See Article 10, Bonds and Insurance, of the Contract for details)*

Insurance

11.1 Contractor shall provide and shall require all of its sub-contractors to provide, pay for, and maintain in force at all times during the term of the Agreement, such insurance, including Property Insurance (Builder's Risk), Commercial General Liability Insurance, Business Automobile Liability Insurance, Workers' Compensation Insurance, Employer's Liability Insurance, and Umbrella/Excess Liability, as stated below, as well as Professional Liability insurance in the amount of $1,000,000 for any Architectural and/or Engineering requirements associated with the fulfillment of the contract if required. Such policy or policies shall be issued by companies authorized to do business in the State of Florida and having agents upon whom service of process may be made in the State of Florida. **A Sample Insurance Certificate shall be included with the proposal to demonstrate the firm's ability to comply with insurance requirements. Provide a previous certificate or other evidence listing the insurance companies' names for all required coverage, and the dollar amounts of the coverage.**

A. The City is required to be named as additional insured on the Commercial General Liability insurance policy. BINDERS ARE UNACCEPTABLE. The insurance coverage required shall include those classifications, as listed in standard liability insurance manuals, which most nearly reflect the operations of the Contractor. Any exclusions or provisions in the insurance maintained by the Contractor that precludes coverage for the work contemplated in this Agreement shall be deemed unacceptable, and shall be considered a breach of contract.

B. The Contractor shall provide the City an original Certificate of Insurance for policies required by Article 10. All certificates shall state that the City shall be given ten (10) days' notice prior to expiration or cancellation of the policy. The insurance provided shall be endorsed or amended to comply with this notice

requirement. In the event that the insurer is unable to accommodate, it shall be the responsibility of the Contractor to provide the proper notice. Such notification will be in writing by registered mail, return receipt requested and addressed to the Finance Department. Such policies shall: (1) name the insurance company or companies affording coverage acceptable to the City, (2) state the effective and expiration dates of the policies, (3) include special endorsements where necessary. Such policies provided under Article 10 shall not be affected by any other policy of insurance, which the City may carry in its own name.

C. Contractor shall as a condition precedent of this Agreement, furnish to the City of Fort Lauderdale, c/o Project Manager, 100 N. Andrews Avenue, Fort Lauderdale, FL 33301, Certificate(s) of Insurance upon execution of this Agreement, which indicate that insurance coverage has been obtained which meets the requirements as outlined below:

11.2 Commercial General Liability

A. Limits of Liability:
Bodily Injury and Property Damage - Combined Single Limit

Each Occurrence	$1,000,000
Project Aggregate	$1,000,000
General Aggregate	$2,000,000
Personal Injury	$1,000,000
Products/Completed Operations	$1,000,000

B. Endorsements Required:
City of Fort Lauderdale included as an Additional Insured
Broad Form Contractual Liability
Waiver of Subrogation
Premises/Operations
Products/Completed Operations
Independent Contractors
Owners and Contractors Protective Liability
***Contractors Pollution Liability**

11.3 Business Automobile Liability

A. Limits of Liability:
Bodily Injury and Property Damage - Combined Single Limit
All Autos used in completing the contract
Including Hired, Borrowed or Non-Owned Autos

Any One Accident	$1,000,000

B. Endorsements Required:
Waiver of Subrogation

11.4 Workers' Compensation and Employer's Liability Insurance

Limits: Workers' Compensation – Per Florida Statute 440
Employers' Liability - $500,000

Any firm performing work on behalf of the City of Fort Lauderdale must provide Workers' Compensation insurance. Exceptions and exemptions can only be made if they are in accordance with Florida Law.

Contractor must be in compliance with all applicable State and Federal workers' compensation laws, including the U.S. Longshore Harbor Workers' Act or Jones Act.

11.5 Umbrella/Excess Liability: The Contractor shall provide umbrella/excess coverage with limits of no less than $2,000,000 excess of Commercial General Liability, Automobile Liability and Employer's Liability.

11.6 All insurance policies required above shall be issued by companies authorized to do business under the laws of the State of Florida, with the following qualifications:

The Contractor's insurance must be provided by an A.M. Best's "A-" rated or better insurance company authorized to issue insurance policies in the State of Florida, subject to approval by the City's Risk Manager. Any exclusions or provisions in the insurance maintained by the Contractor that precludes coverage for work contemplated in this project shall be deemed unacceptable, and shall be considered breach of contract.
NOTE: CITY PROJECT NUMBER MUST APPEAR ON EACH CERTIFICATE.

A Sample Insurance Certificate shall be included with the proposal to demonstrate the firm's ability to comply with insurance requirements. Provide a previous certificate or other evidence listing the insurance companies' names for all required coverage, and the dollar amounts of the coverage.
Compliance with the foregoing requirements shall not relieve the Contractor of their liability and obligation under this section or under any other section of this Agreement.

The Contractor shall be responsible for assuring that the insurance certificates required in conjunction with this Section remain in force for the duration of the Project. If insurance certificates are scheduled to expire during the contractual period, the Contractor shall be responsible for submitting new or renewed insurance certificates to the City at a minimum of thirty (30) calendar days in advance of such expiration. In the event that expired certificates are not replaced with new or renewed certificates that cover the contractual period, the City shall:

A. Suspend the Agreement until such time as the new or renewed certificates are received by the City.

B. The City may, at its sole discretion, terminate the Agreement for cause and seek damages from the Contractor in conjunction with the violation of the terms and conditions of the Agreement.

12. PERFORMANCE AND PAYMENT BOND: 100%

13. CITY PROJECT MANAGER

The Project Manager is hereby designated by the City as Daniel Lizarazo, P.E. The Project Manager will assume all duties and responsibilities and will have the rights and authorities assigned to the Project Manager in the Contract Documents in connection with completion of the Work in accordance with this Agreement.

14. LIQUIDATED DAMAGES (See Article 16, Liquidated Damages, of the Contract for details)

Upon failure of the Contractor to complete the Work within the time specified for completion, the Contractor shall pay to the City the sum of **Five Hundred ($500.00)** for each and every calendar day that the completion of the Work is delayed beyond the time specified in this Agreement for completion, as fixed and agreed liquidated damages and not as a penalty, so long as the delay is caused by the Contractor. (See Article 16, Liquidated Damages Clause, of the Contract)

15. REGULAR CONTRACTOR WORK SCHEDULE: 8:00 am to 5:00 pm Monday through Friday.

16. CITY ENGINEERING INSPECTORS HOURS: 8:00 am to 4:30 pm Monday through Friday.

City Inspector hours are 8:00 a.m. to 4:30 p.m. Any inspection requested by the contractor outside those hours will be considered overtime to be paid by the Contractor.
Overtime Cost: $219

CITY OF FORT LAUDERDALE
CONSTRUCTION AGREEMENT

THIS AGREEMENT made and entered into this _____ day of _____, 20__, by and between the City of Fort Lauderdale, a Florida municipal corporation (City) and _____, (Contractor), (parties);

WHEREAS, the City desires to retain a contractor for the Project as expressed in its Invitation to Bid No., _____, Project Number, _____, which was opened on _____; and,

WHEREAS, the Contractor has expressed its willingness and capability to perform the necessary work to accomplish the Project.

NOW, THEREFORE, the City and the Contractor, in consideration of the mutual covenants and conditions contained herein and for other good and valuable consideration, the receipt and sufficiency is hereby acknowledged, agree as follows:

ARTICLE 1 – DEFINITIONS

Whenever used in this Agreement or in other Contract Documents, the following terms have the meanings indicated which are applicable to both the singular and plural forms:

1.1 Agreement – This written Agreement between the City and the Contractor covering the work to be performed including other Contract Documents that are attached to or incorporated in the Agreement.

1.2 Application for Payment – The form accepted by the City which is to be used by the Contractor in requesting progress or final payment and which is to include such supporting documentation as is required by the Contract Documents

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

1.4 Bid – The offer or Bid of the Contractor submitted on the prescribed form setting forth the total prices for the Work to be performed.

1.5 Bid Documents –This Agreement, advertisement for Invitation to Bids, the Instructions to Bidders, the Bid Form (with supplemental affidavits and agreements), the Contract Forms, General Conditions, the Supplementary Conditions, the Specifications, and the Plans, which documents all become an integral part of the Contract Documents.

1.6 Certificate of Substantial Completion - Certificate provided by the City certifying that all Work, excluding the punch list items, has been completed, inspected, and accepted by the City.

1.7 Change Order - A change order is defined as a written order to a contractor approved by the City, authorizing a revision of an underlying agreement between the City and a contractor that is directly related to the original scope of work or an adjustment in the original contract price or the contract time directly related to the original scope of work, issued on or after the effective date of the contract.

1.8 City – The City of Fort Lauderdale, Florida, including but not limited to its employees, agents, officials, representatives, contractors, subcontractors, volunteers, successors and assigns, with whom the Contractor has entered into the Agreement and for whom the Work is to be provided.

1.9 Contract Documents – The Contract Documents shall consist of this Agreement, Exhibits to this Agreement, Public Construction Bond, Performance Bond, Payment Bond and Certificates of Insurance, Notice of Award and Notice to Proceed, General Conditions as amended by the Special Conditions, Technical Specifications, Plans/Drawings, Addenda, Bid Form and supplement Affidavits and Agreements, all applicable provisions of State and Federal Law and any modification, including Change Orders or written amendments duly delivered after execution of Agreement, Invitation to Bid, Instructions to Bidders and Bid Bond, Contractor's response to the City's Invitation to Bid, Schedule of Completion, Schedule of Values, all amendments, modifications and supplements, change orders and work directive changes issued on or after the Effective Date of the Agreement, as well as any additional documents that are required to be submitted under the Agreement.

Permits on file with the City and or those permits to be obtained shall be considered directive in nature and will be considered a part of this Agreement. A copy of all permits shall be given to the City for inclusion in the Contract Documents. Terms of permits shall be met prior to acceptance of the Work and release of the final payment.

1.10 Contract Price – The monies payable to the Contractor by the City under the Contract Documents and in accordance with the line item unit prices listed in the Bid.

1.11 Contract Time – The number of calendar days stated in the Agreement for the completion of the Work. The dates on which the work shall be started and shall be completed as stated in the Notice to Proceed.

1.12 Contractor – The person, firm, company, or corporation with whom the City has entered into the Agreement, including but not limited to its employees, agents, representatives, contractors, subcontractors, their subcontractors and their other successors and assigns.

1.13 Day – A calendar day of twenty-four (24) hours ending at midnight.

1.14 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, test or approval referred to in the Contract Documents, or has been damaged prior to the Project Manager's recommendation of final payment.

1.15 Effective Date of the Agreement – The effective date of the agreement shall be the date the City Commission approves the work. The contractor shall provide all required payment and performance bonds and insurances to the City within ten (10) Calendar days following the City Commission approval. Upon verification of all bonds and insurances, the City will issue a notice to proceed (NTP) to the Contractor. Contract time will commence on the date when the Notice to Proceed is issued. The Contractor shall commence the work immediately upon receipt of the Notice to Proceed. Failure of the contractor to proceed with the work will constitute non-performance of the Contractor and would be ground for termination of the contract per ARTICLE 17 of the Agreement.

1.16 Final Completion Date – The date the Work is completed, including completion of the final punch list, and delivered along with those items specified in the Contract Documents and is accepted by the City.

1.17 Hazardous Materials (HAZMAT) - Any solid, liquid, or gaseous material that is toxic, flammable, radioactive, corrosive, chemically reactive, or unstable upon prolonged storage in quantities that could pose a threat to life, property, or the environment defined in Section 101(14) of Comprehensive Environmental Response, Compensation and Liability Act of 1980 and in 40 CFR 300.6. Also defined by 49 CFR 171.8 as a substance or material designated by the Secretary of Transportation to be capable of posing an unreasonable risk to health, safety, and property when transported in commerce and which has been so designated.

1.18 Hazardous Substance - As defined by Section 101(14) of the Comprehensive Environmental Response, Compensation and Liability Act; any substance designated pursuant to Section 311(b) (2) (A) of the Clean Water Act; any element, compound, mixture, solution or substance designated pursuant to Section 102 identified under or listed pursuant to Section 3001 of the Solid Waste Disposal Act {but not including any waste listed under Section 307[a] of the Clean Water Act}; any hazardous air pollutant listed under Section 112 of the Clean Air Act; and any imminently hazardous chemical substance or mixture pursuant to Section 7 of the Toxic Substances Control Act. The term does not include petroleum, including crude oil or any fraction thereof, which is not otherwise specifically listed or designated as a hazardous substance in the first sentence of this paragraph, and the term does not include natural gas, natural gas liquids, liquefied natural gas, or synthetic gas usable for fuel (or mixtures of natural gas and such synthetic gas).

1.19 Hazardous Waste - Those solid wastes designated by OSHA in accordance with 40 CFR 261 due to the properties of ignitability, corrosivity, reactivity, or toxicity. Any material that is subject to the Hazardous Waste Manifest requirements of the EPA specified in 40 CFR Part 262.

1.20 Holidays - Those designated non-work days as established by the City Commission of the City of Fort Lauderdale.

1.21 Inspection – The term “inspection” and the act of inspecting as used in this Agreement is defined to mean the examination of construction to ensure that it conforms to the design concept expressed in the plans and specifications. This term shall not be construed to mean supervision, superintending and/or overseeing.

1.22 Notice of Award - The written notice by City to the Contractor stating that upon compliance by the Contractor with the conditions precedent enumerated therein, within the time specified that the City will sign and deliver this Agreement.

1.23 Notice to Proceed – A written notice given by the City to the Contractor fixing the date on which the Contract Time will commence to run and on which the Contract Time will end.

1.24 Plans - The drawings which show the character and scope of the work to be performed and which have been prepared or approved by the City and are referred to in the Contract Documents.

1.25 Premises (otherwise known as Site or Work Site) – means the land, buildings, facilities, etc. upon which the Work is to be performed.

1.26 Project – The total construction of the Work to be provided as defined in the Contract Documents.

1.27 Project Manager - The employee of the City, or other designated individual who is herein referred to as the Project Manager, will assume all duties and responsibilities and will have the rights and authorities assigned to the Project Manager in the contract Documents in connection with completion of the Work in accordance with this Agreement. The Project Manager, or designee, shall be the authorized agent for the City unless otherwise specified.

1.28 Punch List - The City's list of Work yet to be done or be corrected by the Contractor, before the Final Completion date can be determined by the City.

1.29 Record Documents - A complete set of all specifications, drawings, addenda, modifications, shop drawings, submittals and samples annotated to show all changes made during the construction process.

1.30 Record Drawings or "As-Builts" - A set of drawings which show significant changes in the work made during construction and which are usually based on drawings marked up in the field and other data furnished by the contractor. These documents will be signed and sealed by the Engineer of Record or a Professional Land Surveyor licensed in the State of Florida.

1.31 Substantially Completed Date – A date when the Contractor has requested in writing, stating that the Work is substantially completed and is ready for an inspection and issuance of a final punch list for the Project.

1.32 Work – The entire completed delivered product or the various separately identifiable parts thereof required to be furnished under the Contract Documents. Work is the result of performing services, furnishing labor and furnishing and incorporating material and equipment into the product, all as required by the Contract Documents.

ARTICLE 2 – SCOPE OF WORK

2.1 The Contractor shall complete all work as specified or indicated in the Contract Documents. The Project for which the Work under the Contract Documents may be the whole or only part is generally described as follows:

PROJECT NAME
ITB # PROJECT #

2.2 All Work for the Project shall be constructed in accordance with the Drawings and Specifications. The Work generally involves:

PROJECT DESCRIPTION

2.3 Within ten (10) days of the execution of this Agreement, the Contractor shall submit a Construction Schedule, Schedule of Values and a listing of those subcontractors that will be utilized by the Contractor. The general sequence of the work shall be submitted by the Contractor and approved by the City before any work commences. The City reserves the right to issue construction directives necessary to facilitate the Work or to minimize any conflict with operations.

ARTICLE 3 – PROJECT MANAGER

3.1 The Project Manager is hereby designated by the City as _____, whose address is 100 N. Andrews Avenue, 4th Floor, Fort Lauderdale, FL 33301. The Project Manager will assume all duties and responsibilities and will have the rights and authorities assigned to the Project Manager in the Contract Documents in connection with completion of the Work in accordance with this Agreement.

ARTICLE 4 – CONTRACT DOCUMENTS

The Contract Documents which comprise the entire Agreement between the City and Contractor are attached to this Agreement, are made a part hereof and consist of the following:

4.1 This Agreement.

4.2 The Contract Documents may only be altered, amended, or repealed in accordance with the specific provisions of the terms of this Agreement.

4.3 Exhibits to this Agreement: (Plans sheets [ ] to [ ] inclusive).

4.4 Public Construction Bond, Performance Bond, Payment Bond and Certificates of Insurance.

4.5 Notice of Award and Notice to Proceed.

4.6 General Conditions as amended by the Special Conditions.

4.7 Technical Specifications.

4.8 Plans/Drawings.

4.9 Addenda number _____ through _____, inclusive.

4.10 Bid Form and supplement Affidavits and Agreements.

4.11 All applicable provisions of State and Federal Law.

4.12 Invitation to Bid No., _____, Instructions to Bidders, and Bid Bond.

4.13 Contractor's response to the City's Invitation to Bid No., _____, dated _____.

4.14 Schedule of Completion and Schedule of Values.

4.15 All amendments, modifications and supplements, change orders and work directive changes issued on or after the Effective Date of the Agreement.

4.16 Any additional documents that are required to be submitted under the Agreement.

4.17 Permits on file with the City and or those permits to be obtained shall be considered directive in nature and will be considered a part of this Agreement. A copy of all permits shall be given to the City for inclusion in the Contract Documents. Terms of permits shall be met prior to acceptance of the Work and release of the final payment.

In the event of any conflict between the documents or any ambiguity or missing specification or instruction, the following priority is established:

a. Specific direction from the City Manager (or designee).

b. Approved change orders, addenda or amendments.

c. Specifications (quality) and Drawings (location and quantity).

d. Supplemental conditions or special terms.

e. General Terms and Conditions.

f. This Agreement dated _____ and any attachments.

g. Invitation to Bid No., _____, and the specifications prepared by the City.

h. Contractor's response to the City's Invitation to Bid No., _____, dated _____.

i. Schedule of Values.

j. Schedule of Completion.

If during the performance of the Work, Contractor finds a conflict, error or discrepancy in the Contract Documents, Contractor shall so report to the Project Manager, in writing, at once and before proceeding with the Work affected shall obtain a written interpretation or clarification from the City.

It is the intent of the specifications and plans to describe a complete Project to be constructed in accordance with the Contract Documents. Any Work that may reasonably be inferred from the specifications or plans as being required to produce the intended result shall be supplied whether or not it is specifically called for. When words which have a well-known technical or trade meaning are used to describe Work, materials, or equipment, such works shall be interpreted in accordance with such meaning. Reference to standard specifications, manuals or codes of any technical society, organization or associations, or to the code of any governmental authority whether such reference be specific or implied, shall mean the latest standard specification, manual or code in effect as of the Effective Date of this Agreement, except as may be otherwise specifically stated. However, no provision of any referenced standard specification, manual or code (whether or not specifically incorporated by reference in the Contract Documents) shall change the duties and responsibilities of the City, the Contractor, or any of their agents or employees from those set forth in the Contract Documents.

ARTICLE 5 – CONTRACT TIME

5.1 The Contractor recognizes that **TIME IS OF THE ESSENCE**. The Work shall commence within _____ calendar days of the date of the Notice to Proceed.

5.2 The Work shall be Substantially Completed within _____ calendar days after the date when the Contract Time commences to run as provided in the Notice to Proceed.

5.3 The Work shall be finally completed on the Final Completion Date and ready for final payment in accordance with this Agreement within _____ calendar days after the date when the Contract Time commences to run as provided in the Notice to Proceed.

ARTICLE 6 – CONTRACT PRICE

6.1 City shall pay Contractor for performance of the Work in accordance with Article 7, subject to additions and deletions by Change Order, as provided for in this Agreement.

6.2 The parties expressly agree that the Contract Price, which shall not exceed the amount of $_____, constitutes the total maximum compensation payable to Contractor for performing the Work, plus any Work done pursuant to a Change Order. The Contract Price is in accordance with the line item unit prices listed in the Bid. Line items are based on a unit price cost multiplied by a defined quantity. Any

additional duties, responsibilities and obligations assigned to or undertaken by Contractor shall be at Contractor's expense without change to the Contract Price.

6.3 The Contract Price constitutes the compensation payable to Contractor for performing the Work plus any Work done pursuant to a Change Order. All duties, responsibilities and obligations assigned to or undertaken by Contractor shall be at Contractor's expense without change in the Contract price.

ARTICLE 7 – PAYMENT

7.1 Contractor shall submit Applications for Payment in accordance with the Contract Documents. Applications for Payment will be processed by City as provided in the General Conditions.

7.2 Progress Payments. City shall make progress payments on account of the Contract Price on the basis of Contractor's monthly Applications for Payment, which shall be submitted by the Contractor between the first (1st) and the tenth (10th) day after the end of each calendar month for which payment is requested. All progress payments will be made on the basis of the progress of the Work completed.

7.3 Prior to Final Completion, progress payments will be made in an amount equal to ninety percent (90%) of the value of Work completed less in each case the aggregate of payments previously made.

7.4 Final Payment. Upon final completion of the Work in accordance with the General Conditions, as may be supplemented, the City shall pay Contractor an amount sufficient to increase total payments to one-hundred percent (100%) of the Contract Price. However, not less than ten percent (10%) of the Contract Price shall be retained until Record Drawings (as-builts), specifications, addenda, modifications and shop drawings, including all manufacturers' instructional and parts manuals are delivered to and accepted by the City.

7.5 City may withhold, in whole or in part, payment to such extent as may be necessary to protect itself from loss on account of:

7.5.1 Defective work not remedied.
7.5.2 Claims filed or reasonable evidence indicating probable filing of claims by other parties against Contractor or City because of Contractor's performance.
7.5.3 Failure of Contractor to make payments properly to Subcontractors or for material or labor.
7.5.4 Damage to another contractor not remedied.
7.5.5 Liquidated damages and costs incurred by Consultant for extended construction administration, if applicable.
7.5.6 Failure of Contractor to provide any and all documents required by the Contract Documents.

When the above grounds are removed or resolved satisfactory to the Project Manager, payment shall be made in whole or in part.

7.6 The City shall make payment to the Contractor in accordance with the Florida Prompt Payment Act, Section 218.70, Florida Statutes.

7.7 The City shall make payment to the Contractor through utilization of the City's P-Card Program.

ARTICLE 8 – CONTRACTOR'S REPRESENTATIONS

In order to induce the City to enter into this Agreement, Contractor makes the following representations upon which the City has relied:

8.1 Contractor is qualified in the field of public construction and in particular to perform the Work and services set forth in this Agreement.

8.2 Contractor has visited the Work Site, has conducted extensive tests, examinations and investigations and represents and warrants a thorough familiarization with the nature and extent of the Contract Documents, the Work, locality, soil conditions, moisture conditions and all year-round local weather and climate conditions (past and present), and, in reliance on such tests, examination and investigations conducted by Contractor and the Contractor's experts, has determined that no conditions exist that would in any manner affect the Proposed Price and that the project can be completed for the Proposed Price submitted within the Contract Time as defined in this Agreement. Furthermore, Contractor warrants and confirms that he is totally familiar with, understands and obligates Contractor to comply with all federal, state and local laws, ordinances, rules, regulations and all market conditions that affect or may affect the cost and price of materials and labor needed to fulfill all provisions of this Agreement or that in any manner may affect cost, progress or performance of the Work.

8.3 The Contractor has satisfied itself as to the nature and location of the Work under the Contract Documents, the general and local conditions of the Project, particularly those bearing upon availability of transportation, disposal, handling and storage of materials, availability of labor, water, electric power, and roads, the conformation and conditions at the ground based on City provided reports, the type of equipment and facilities needed preliminary to and during the prosecution of the Work and all other matters which can in any way affect the Work or the cost thereof under the Contract Documents.

8.4 The Contractor has also studied carefully all reports of investigations and tests of subsurface and latent physical conditions at the site or otherwise affecting cost, progress or performance of the Works, and finds and has further determined that no conditions exist that would in any manner affect the Proposed Price and that the project can be completed for the Proposed Price submitted.

8.5 Contractor has made or caused to be made examinations, investigations, tests and studies of such reports and related data in addition to those referred to in Paragraphs 8.2, 8.3 and 8.4 above as he deems necessary for the performance of the Work at the Contract Prices, within the Contract Time and in accordance with the other terms and conditions of the Contract Documents; and no additional examinations, investigations, tests, reports or similar data are, or will be, required by Contractor for such purposes.

8.6 Contractor has correlated the results of all such observations, examinations, investigations, tests, reports and data with the terms and conditions of the Contract Documents.

8.7 Contractor has given City written notice of all conflicts, errors or discrepancies that he has discovered in the Contract Documents and the written resolution by City is acceptable to the Contractor.

8.8 Labor

8.8.1 The Contractor shall provide competent, suitable qualified personnel to survey and lay out the Work and perform construction as required by the Contract Documents. The Contractor shall at all times maintain good discipline and order at the site.

8.8.2 The Contractor shall, at all times, have a competent superintendent, capable of reading and thoroughly understanding the drawings and specifications, as the Contractor's agent on the Work, who shall, as the Contractor's agent, supervise, direct and otherwise conduct the Work.

8.8.3 The Contractor shall designate the superintendent on the job to the City, in writing, immediately after receipt of the Notice to Proceed. The Contractor understands and agrees that the superintendent's physical presence on the job site is indispensable to the successful completion of the Work. If the superintendent is frequently absent from the job site, the Project Manager may deliver written notice to the Contractor to stop work or terminate the Contract in accordance with Article 17.

8.8.4 The Contractor shall assign personnel to the job site that have successfully completed training programs related to trench safety, confined space and maintenance of traffic. A certified "competent person" shall be assigned to the job site. Personnel certified by the International Municipal Signal Associations with Florida Department of Transportation qualifications are required relative to maintenance of traffic. Failure to pursue the Work with the properly certified supervisory staff may result in notice to stop work or terminate the Contract in accordance with Article 17.

8.9 Materials:

8.9.1 The Contractor shall furnish all materials, equipment, labor, transportation, construction equipment and machinery, tools, appliances, fuel, power, light, heat, telephone, water and sanitary facilities and all other facilities and incidentals necessary for the execution, testing, initial operation and completion of Work.

8.9.2 All material and equipment shall be of good quality and new, except as otherwise provided in the Contract Documents. Suppliers shall be selected and paid by the Contractor; the City reserves the right to approve all suppliers and materials.

8.10 Work Hours: Except in connection with the safety or protection of persons, or the Work, or property at the site or adjacent thereto, and except as otherwise indicated in

the Supplementary Conditions, all work at the site shall be performed during regular working hours between 7 a.m. and 6:00 p.m., Monday through Friday. The Contractor will not permit overtime work or the performance of work on Saturday, Sunday or any legal holiday (designated by the City of Fort Lauderdale) without the Project Manager's written consent at least seventy-two (72) hours in advance of starting such work. If the Project Manager permits overtime work, the Contractor shall pay for the additional charges to the City with respect to such overtime work. Such additional charges shall be a subsidiary obligation of the Contractor and no extra payment shall be made to the Contractor for overtime work. It shall be noted that the City's Inspector work hours are from 8:00 a.m. to 4:30 p.m. and any Work requiring inspection oversight being performed outside of this timeframe shall be paid for by the Contractor as Inspector overtime. The cost to the Contractor to reimburse the City for overtime inspection is established at direct-labor and overtime costs for each person or inspector required. Incidental overtime costs for engineering, testing and other related services will also be charged to the Contractor at the actual rate accrued.

8.11 Patent Fee and Royalties: The 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, or any invention, design, process, product or device which is the subject of patent rights or copyrights held by others. The Contractor hereby expressly binds himself or itself to indemnify and save harmless the City from all such claims and fees and from any and all suits and action of every name and description that may be brought against City on account of any such claims, fees, royalties, or costs for any such invention or patent, and from any and all suits or actions that may be brought against said City for the infringement of any and all patents or patent rights claimed by any person, firm corporation or other entity.

8.12 Permits: The Contractor shall obtain and pay for all permits and licenses. There shall be no allowance for Contractor markup, overhead or profit for permits and licenses. The Contractor shall pay all government charges which are applicable at the time of opening of proposals. It shall be the responsibility of the Contractor to secure and pay for all necessary licenses and permits of a temporary nature necessary for the prosecution of Work.

8.13 Law and Regulations: The Contractor shall give all notices and comply with all laws, ordinances, rules and regulations applicable to the Work. If the Contractor observes that the specifications or plans are at variance therewith, the Contractor shall give the Project Manager prompt written notice thereof, and any necessary changes shall be adjusted by any appropriate modifications. If the Contractor performs any work knowing or having reason to know that it is contrary to such laws, ordinances, rules and regulations, and without such notice to the Project Manager, the Contractor shall bear all costs arising therefrom; however, it shall not be the Contractor's primary responsibility to make certain that the specifications and plans are in accordance with such laws, ordinances, rules and regulations.

8.14 Taxes: The Contractor shall pay all sales, consumer, use and other similar taxes required to be paid by him in accordance with the laws of the City of Fort Lauderdale, County of Broward, State of Florida.

8.15 Contractor Use of Premises: The Contractor shall confine construction equipment, the storage of materials and equipment and the operations of workmen to areas permitted

by law, ordinances, permits and/or the requirements of the Contract Documents, and shall not unreasonably encumber the premises with construction equipment or other materials or equipment. The Contractor shall not enter upon private property for any purpose without first securing the permission of the property owner in writing and furnishing the Project Manager with a copy of said permission. This requirement will be strictly enforced, particularly with regard to such vacant properties as may be utilized for storage or staging by the Contractor.

The Contractor shall conduct his work in such a manner as to avoid damage to adjacent private or public property. Any damage to existing structures of work of any kind, including permanent reference markers or property corner markers, or the interruption of a utility service, shall be repaired or restored promptly at no expense to the City or property owner.

The Contractor will preserve and protect all existing vegetation such as trees, shrubs and grass on or adjacent to the site which do not reasonably interfere with the construction, as determined by the Project Manager. The Contractor will be responsible for repairing or replacing any trees, shrubs, lawns and landscaping that may be damaged due to careless operation of equipment, stockpiling of materials, tracking of grass by equipment or other construction activity. The Contractor will be liable for, or will be required to replace or restore at no expense to the City all vegetation not protected or preserved as required herein that may be destroyed or damaged.

During the progress of the work, the Contractor shall keep the premises free from accumulations of waste materials, rubbish and debris resulting from the Work. At the completion of the Work, the Contractor shall remove all waste materials, rubbish and debris from and about the premises as well as all tools, appliances, construction equipment and machinery, and surplus materials and shall leave the site clean and ready for occupancy by the City. The Contractor shall restore to their original condition those portions of the site not designated for alteration by the Contract Documents at no cost to the City.

8.16 Project Coordination: The Contractor shall provide for the complete coordination of the construction effort. This shall include, but not necessarily be limited to, coordination of the following:

8.16.1 Flow of material and equipment from suppliers.
8.16.2 The interrelated work with affected utility companies.
8.16.3 The interrelated work with the City where tie-ins to existing facilities are required.
8.16.4 The effort of independent testing agencies.
8.16.5 Notice to affected property owners as may be directed by the Project Manager.

8.17 Project Record Documents and Final As-Builts (Record Drawings): Contractor shall be responsible for maintaining up-to-date redline as-built drawings, on site, at all times during construction. All as-built information shall be surveyed and verified by a professional land surveyor registered in the State of Florida. Contractor shall provide the City with a minimum of three (3) sets of signed and sealed record drawings (Final As-Builts) and a CD of the electronic drawings files created in AutoCad 2014 or later.

All costs associated with survey work required for construction layout and as-built preparation shall be the responsibility of the Contractor.

8.18 Safety and Protection:

8.18.1 The Contractor shall be responsible for initiating, maintaining and supervising all safety precautions and programs in connection with the Work. The Contractor shall take all necessary precautions for the safety of, and shall provide the necessary protection to prevent damage, injury or loss to:

8.18.1.1 All employees working on the project and other persons who may be affected thereby.
8.18.1.2 All the Work and all materials or equipment to be incorporated therein, whether in storage on or off the site.
8.18.1.3 Other property at the site or adjacent thereto, including trees, shrubs, lawns, walks, pavements, roadways, structures and utilities not designated for removal, relocation or replacement in the course of construction.

8.18.2 The Contractor shall comply with all applicable laws, ordinances, rules, regulations and orders of any public body having jurisdiction for the safety of persons or property or to protect them from damage, injury or loss; and shall erect and maintain all necessary safeguards for such safety and protection. The Contractor shall notify owners of adjacent property and utilities when execution of the Work may affect them at least seventy-two (72) hours in advance (unless otherwise required). All damage, injury or loss to any property caused, directly or indirectly, in whole or in part by the Contractor, any subcontractor or anyone directly or indirectly employed by any of them or anyone for whose acts any of them may be liable, shall be remedied by the Contractor. The Contractor's duties and responsibilities for safety and protection of the Work shall continue until such time as all the Work is completed and accepted by the City.

8.19 Emergencies: In emergencies affecting the safety or protection of persons or the Work or property at the site or adjacent thereto, the Contractor, without special instruction or authorization from the City is obligated to act to prevent threatened damage, injury or loss. The Contractor shall give the Project Manager prompt written notice of any significant changes in the Work or deviations from the Contract Documents caused thereby.

8.20 Risk of Loss: The risk of loss, injury or destruction shall be on the Contractor until acceptance of the Work by the City. Title to the Work shall pass to the City upon acceptance of the Work by the City.

8.21 Environmental: The Contractor has fully inspected the Premises and agrees, except as to the presence of any asbestos, to accept the Premises in an "as is" physical condition, without representation or warranty by the City of any kind, including, without limitation, any and all existing environmental claims or obligations that may arise from the presence of any "contamination" on, in or about the Premises. Further, Contractor and all entitles claiming by, through or under the Contractor, releases and discharges the City, from any claim, demand, or cause of action arising out of or relating to the

Contractor's use, handling, storage, release, discharge, treatment, removal, transport, decontamination, cleanup, disposal and/or presence of any hazardous substances including asbestos on, under, from or about the Premises. The Contractor shall have no liability for any pre-existing claims or "contamination" on the Premises.

The Contractor shall not use, handle, store, discharge, treat, remove, transport, or dispose of Hazardous Substances including asbestos at, in, upon, under, to or from the Premises until receipt of instructions from the City. At such time, a City approved Change Order, which shall not include any profit, shall authorize the Contractor to perform such services.

The Contractor shall immediately deliver to the Project Manager complete copies of all notices, demands, or other communications received by the Contractor from any governmental or quasi-governmental authority or any insurance company or board of fire underwriters or like or similar entities regarding in any way alleged violations or potential violations of any Environmental Law or otherwise asserting the existence or potential existence of any condition or activity on the Premises which is or could be dangerous to life, limb, property, or the environment.

For other and additional consideration, the Contractor hereby agrees, at its sole cost and expense, to indemnify and protect, defend, and hold harmless the City and its respective employees, agents, officials, officers, representatives, contractors and subcontractors, successors, and assigns (hereafter the "City") from and against any and all claims, demands, losses, damages, costs, expenses, including but not limited to mitigation, restoration, and natural restoration expenses, liabilities, assessments, fines, penalties charges, administrative and judicial proceedings and orders, judgments, causes of action, in law or in equity, remedial action requirements and/or enforcement actions of any kind (including, without limitation, attorneys' fees and costs) directly or indirectly arising out of or attributable to, in whole or in part, the Contractor's use, handling, storage, release, threatened release, discharge, treatment, removal, transport, decontamination, cleanup, disposal and/or presence of a Hazardous Substance (excluding asbestos) on, under, from, to or about the Premises or any other activity carried on or undertaken on or off the Premises by the Contractor or its employees, agents or subcontractors, in connection with the use, handling, storage, release, threatened release, discharge, treatment, mitigation, natural resource restoration, removal, transport, decontamination, cleanup, disposal and/or presence or any Hazardous Substance including asbestos located, transported, or present on, undue, from, to, or about the Premises. This indemnity is intended to be operable under 42 U.S.C. sections 9607, as amended, and any successor section.

The scope of the indemnity obligations includes, but is not limited to: (a) all consequential damages; (b) the cost of any required or necessary repair, cleanup, or detoxification of the applicable real estate and the preparation and implementation of any closure, remedial or other required plan, including without limitation; (i) the costs of removal or remedial action incurred by the United States government or the State of Florida or response costs incurred by any other person, or damages from injury to destruction of, or loss of, natural resources, including the cost of assessing such injury, destruction, or loss, incurred pursuant to the Comprehensive Environmental Response, Compensation and Liability Act, as amended; (ii) the clean-up costs, fines, damages, or penalties incurred pursuant to any applicable provisions of Florida law; and (iii) the cost and expenses of abatement, correction or cleanup, fines, damages,

response costs, or penalties which arise from the provisions of any other statute, law, regulation, code ordinance, or legal requirement state or federal; and (c) liability for personal injury or property damage arising under any statutory or common law tort theory, including damages assessed for the maintenance of a public private nuisance, response costs, or for the carrying on of an abnormally dangerous activity.

8.22 No Extended Damages: For other and additional good and valuable consideration the receipt and sufficiency of which is hereby acknowledged, the Contractor covenants and agrees that in the event of any delay of construction or for any other reason or allegation or claim, and notwithstanding the reason of the delay, reason, claim or allegation or who caused them or the construction delay or whether they were caused by the City, that there will be no entitlement to Contractor to or for any direct or indirect financial damages or losses for extended corporate overhead impact, extended project overhead impacts, project support services, mobilization or demobilization or by whatever other label or legal concept or theory and types of names or labels or basis such claims may have, or any business damages or losses of whatever type or nature, and Contractor hereby waives any right to make any such claim or claims. This provision will have application and effect when construction delays are anticipated and agreed upon by both the City and the Contractor.

8.23 No Liens: If any Subcontractor, supplier, laborer, or materialmen of Contractor or any other person directly or indirectly acting for or through Contractor files or attempts to file a mechanic's or construction lien against the real property on which the work is performed or any part or against any personal property or improvements or claim against any monies due or to become due from the City to Contractor or from Contractor to a Subcontractor, for or on account of any work, labor, services, material, equipment, or other items furnished in connection with the Work or any Change Order, Contractor agrees to satisfy, remove, or discharge such lien or claim at its own expense by bond, payment, or otherwise within twenty (20) days of the filing or from receipt of written notice from the City.

Additionally, until such time as such lien or claim is satisfied, removed or discharged by Contractor, all monies due to Contractor, or that become due to Contractor before the lien or claim is satisfied, removed or otherwise discharged, shall be held by City as security for the satisfaction, removal and discharge of such lien and any expense that may be incurred while obtaining such. If Contractor shall fail to do so, City shall have the right, in addition to all other rights and remedies provided by this Agreement or by law, to satisfy, remove, or discharge such lien or claim by whatever means City chooses at the entire and sole cost and expense of Contractor which costs and expenses shall, without limitation, include attorney's fees, litigation costs, fees and expenses and all court costs and assessments.

8.24 Weather Emergencies: Upon issuance of a Hurricane Watch by the National Weather Service, the Contractor shall submit to the City a plan to secure the work area in the event a Hurricane Warning is issued. The plan shall detail how the Contractor will secure the Premises, equipment and materials in a manner as to prevent damage to the Work and prevent materials and equipment from becoming a hazard to persons and property on and around the Premises. The plan shall include a time schedule required to accomplish the hurricane preparations and a list of emergency contacts that will be available and in the City before, during and immediately after the storm.

Upon issuance of a Hurricane Warning by the National Weather Service, if the Contractor has not already done so, the Contractor shall implement its hurricane preparedness plan. Cost of development and implementation of the hurricane preparedness plan shall be considered as incidental to construction. Cost of any clean up and rework required after the storm will be considered normal construction risk within Florida and shall not entitle the Contractor to any additional compensation. Contractor shall be entitled to request an extension in time for completion of the Work, in accordance with the provisions of Article 15 of this Agreement, equal to the time he is shut down for implementation of the preparedness plan, the duration of the storm and a reasonable period to restore the Premises.

8.25 Force Majeure: No Party shall hold the other responsible for damages or for delays in performance caused by force majeure, acts of God, or other acts or circumstances beyond the control of the other party or that could not have been reasonably foreseen and prevented. For this purposes, such acts or circumstances shall include, but not be limited to weather conditions affecting performance, floods, epidemics, war, riots, strikes, lockouts, or other industrial disturbances, or protest demonstrations. Should such acts or circumstances occur, the parties shall use their best efforts to overcome the difficulties arising therefrom and to resume the Work as soon as reasonably possible with the normal pursuit of the Work.

Inclement weather, continuous rain for less than three (3) days or the acts or omissions of subcontractors, third-party contractors, materialmen, suppliers, or their subcontractors, shall not be considered acts of force majeure.

No Party shall be liable for its failure to carry out its obligations under the Agreement during a period when such Party is rendered unable by force majeure to carry out its obligation, but the obligation of the Party or Parties relying on such force majeure shall be suspended only during the continuance of the inability and for no longer period than the unexpected or uncontrollable event.

The Contractor further agrees and stipulates, that its right to excuse its failure to perform by reason of force majeure shall be conditioned upon giving written notice of its assertion that a Force Majeure delay has commenced within 96 hours after such an occurrence. The CONTRACTOR shall use its reasonable efforts to minimize such delays. The CONTRACTOR shall promptly provide an estimate of the anticipated additional time required to complete the Project.

8.26 Participation by Disadvantaged Business Enterprises in Department of Transportation Financial Assisted Contracts: The recipient shall not discriminate on the basis of race, color, national origin, or sex in the award and performance of any DOT-assisted contract or in the administration of its DBE program or the requirements of 49 CFR part 26. The recipient shall take all necessary and reasonable steps under 49 CFR part 26 to ensure nondiscrimination in the award and administration of DOT-assisted contracts. The recipient's DBE program, as required by 49 CFR part 26 and as approved by DOT, is incorporated by reference in this agreement. Implementation of this program is a legal obligation and failure to carry out its terms shall be treated as a violation of this agreement. Upon notification to the recipient of its failure to carry out its approved program, the Department may impose sanctions as provided for under part 26 and may, in appropriate cases, refer the matter for enforcement under 18 U.S.C. 1001 and/or the Program Fraud Civil Remedies Act of 1986 (31 U.S.C. 3801 *et*

seq.). Additionally, the contractor assures that they, the sub recipient or the subcontractor shall not discriminate on the basis of race, color, national origin, or sex in the performance of this contract. The contractor shall carry out applicable requirements of 49 CFR part 26 in the award and administration of DOT-assisted contracts. Failure by the contractor to carry out these requirements is a material breach of this contract, which may result in the termination of this contract or such other remedy as the recipient deems appropriate. (This additional language must be included in each subcontract the prime contractor signs with a subcontractor.)

ARTICLE 9 – CITY'S RESPONSIBILITIES

9.1 The City shall furnish the data required of the City under the Contract Documents promptly and shall make payments to the Contractor promptly after they are due as provided in Article 7.

9.2 The City's duties in respect of providing lands and easements and providing engineering surveys to establish reference points are set forth in the Contract Documents.

9.3 Technical Clarifications and Interpretations:

9.3.1 The City shall issue, with reasonable promptness, such written clarifications or interpretations of the Contract Documents as it may determine necessary, which shall be consistent with or reasonably inferable from the overall intent of the Contract Documents. Should the Contractor fail to request interpretation of questionable items in the Contract Documents, the City shall not entertain any excuse for failure to execute the Work in a satisfactory manner.

9.3.2 The City shall interpret and decide matters concerning performance under the requirements of the Contract Documents, and shall make decisions on all claims, disputes or other matters in question. Written notice of each claim, dispute or other matter will be delivered by claimant to the other Party but in no event later than five (5) days after the occurrence of event, and written supporting date will be submitted to the other Party within five (5) days after such occurrence. All written decisions of the City on any claim or dispute will be final and binding.

9.4 The Contractor shall perform all Work to the reasonable satisfaction of the City in accordance with the Contract Documents. In cases of disagreement or ambiguity, the City shall decide all questions, difficulties, and disputes of whatever nature, which may arise under or by reason of this Agreement or the quality, amount and value of the Work, and the City's decisions on all claims, questions and determination are final.

ARTICLE 10 – BONDS AND INSURANCE

10.1 Public Construction and Other Bonds: The Contractor shall furnish Public Construction or Performance and Payment Bonds ("Bond"), each in an amount at least equal to the Contract Price as security for the faithful performance and payment of all the Contractor's obligations under the Contract Documents. These Bonds shall remain in effect until at least one (1) year after the date of final payment, except as otherwise provided by law. All Bonds shall be furnished and provided by the surety

and shall be in substantially the same form as prescribed by the Contract Documents and be executed by such sureties as (i) are licensed to conduct business in the State of Florida, and (ii) 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 Accounts, U.S. Treasury Department and (iii) otherwise meet the requirements set forth herein that apply to sureties. All Bonds signed by an agent must be accompanied by a certified copy of the authority to act.

10.1.1 Performance Bond: A Corporate Surety Bond legally issued, meeting the approval of, and running to the City in an amount not less than the Contract Price of such improvements, conditioned that the Contractor shall maintain and make all repairs to the improvements constructed by the Contractor at their own expense and free of charge to the City, for the period of one (1) year after the date of acceptance of the Work within such period by reason of any imperfection of the material used or by reason of any defective workmanship, or any improper, imperfect or defective preparation of the base upon which any such improvement shall be laid.

The Contractor shall execute and record in the public records of Broward County, Florida, a payment and performance bond in an amount at least equal to the Contract Price with a surety insurer authorized to do business in the State of Florida as surety, ("Bond"), in accordance with Section 255.05, Florida Statutes (2014), as may be amended or revised, as security for the faithful performance and payment of all of the Contractor's obligations under the Contract Documents.

10.2 Disqualification of 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 the State of Florida or it ceases to meet the requirements of clauses (i) and (ii) of Paragraph 10.1, the Contractor shall within five (5) days thereafter substitute another Bond and Surety, both of which shall be acceptable to the City.

10.3 Insurance

10.3.1 Contractor shall provide and shall require all of its sub-contractors to provide, pay for, and maintain in force at all times during the term of the Agreement, such insurance, including Property Insurance (Builder's Risk), Commercial General Liability Insurance, Business Automobile Liability Insurance, Workers' Compensation Insurance, Employer's Liability Insurance, and Umbrella/Excess Liability, as stated below, as well as Professional Liability insurance in the amount of $1,000,000 for any Architectural and or Engineering requirements associated with the fulfillment of the contract if required. Such policy or policies shall be issued by companies authorized to do business in the State of Florida and having agents upon whom service of process may be made in the State of Florida. **A Sample Insurance Certificate shall be included with the proposal to demonstrate the firm's ability to comply with insurance requirements. Provide a previous certificate or other evidence listing the insurance companies' names for all required coverage, and the dollar amounts of the coverage.**

A. The City is required to be named as additional insured on the Commercial General Liability insurance policy. BINDERS ARE UNACCEPTABLE. The insurance coverage required shall include those classifications, as listed in standard liability insurance manuals, which most nearly reflect the operations of the Contractor. Any exclusions or provisions in the insurance maintained by the Contractor that precludes coverage for the work contemplated in this Agreement shall be deemed unacceptable, and shall be considered a breach of contract.

B. The Contractor shall provide the City an original Certificate of Insurance for policies required by Article 10. All certificates shall state that the City shall be given ten (10) days' notice prior to expiration or cancellation of the policy. The insurance provided shall be endorsed or amended to comply with this notice requirement. In the event that the insurer is unable to accommodate, it shall be the responsibility of the Contractor to provide the proper notice. Such notification will be in writing by registered mail, return receipt requested and addressed to the Finance Department. Such policies shall: (1) name the insurance company or companies affording coverage acceptable to the City, (2) state the effective and expiration dates of the policies, (3) include special endorsements where necessary. Such policies provided under Article 10 shall not be affected by any other policy of insurance, which the City may carry in its own name.

C. Contractor shall as a condition precedent of this Agreement, furnish to the City of Fort Lauderdale, c/o Project Manager, 100 N. Andrews Avenue, Fort Lauderdale, FL 33301, Certificate(s) of Insurance upon execution of this Agreement, which indicate that insurance coverage has been obtained which meets the requirements as outlined below:

10.3.2 Property Insurance (Builder's Risk): The Contractor shall purchase and maintain property insurance upon the Work at or off the site of 100% of the contract completed value. These policies shall insure the interest of the owner, contractor and subcontractors in the Work, and shall insure against "all risks" of physical loss and damage including theft, vandalism and malicious mischief, collapse and water damage. All such insurance required by this paragraph shall remain in effect until the Work is completed and accepted by the City.

10.3.3 Commercial General Liability

A. Limits of Liability:

Bodily Injury and Property Damage - Combined Single Limit	
Each Occurrence	$1,000,000
Project Aggregate	$1,000,000
General Aggregate	$2,000,000
Personal Injury	$1,000,000
Products/Completed Operations	$1,000,000

B. Endorsements Required:
City of Fort Lauderdale included as an Additional Insured
Broad Form Contractual Liability
Waiver of Subrogation
Premises/Operations
Products/Completed Operations
Independent Contractors
Owners and Contractors Protective Liability
Contractor's Pollution Liability

10.3.4 Business Automobile Liability

A. Limits of Liability:
Bodily Injury and Property Damage - Combined Single Limit
All Autos used in completing the contract including Hired, Borrowed or Non-Owned Autos
Any One Accident $1,000,000

B. Endorsements Required:
Waiver of Subrogation

10.3.5 Workers' Compensation and Employer's Liability Insurance

Limits: Workers' Compensation – Per Florida Statute 440
Employers' Liability - $500,000

Any firm performing work on behalf of the City of Fort Lauderdale must provide Workers' Compensation insurance. Exceptions and exemptions can only be made if they are in accordance with Florida Law.

Contractor must be in compliance with all applicable State and Federal workers' compensation laws, including the U.S. Longshore Harbor Workers' Act or Jones Act.

10.3.6 Umbrella/Excess Liability: The Contractor shall provide umbrella/excess coverage with limits of no less than $2,000,000 excess of Commercial General Liability, Automobile Liability and Employer's Liability.

10.3.7 All insurance policies required above shall be issued by companies authorized to do business under the laws of the State of Florida, with the following qualifications:

The Contractor's insurance must be provided by an A.M. Best's "A-" rated or better insurance company authorized to issue insurance policies in the State of Florida, subject to approval by the City's Risk Manager. Any exclusions or provisions in the insurance maintained by the Contractor that precludes coverage for work contemplated in this project shall be deemed unacceptable, and shall be considered breach of contract.
NOTE: CITY PROJECT NUMBER MUST APPEAR ON EACH CERTIFICATE.

A Sample Insurance Certificate shall be included with the proposal to demonstrate the firm's ability to comply with insurance requirements. Provide a previous certificate or other evidence listing the insurance companies' names for all required coverage, and the dollar amounts of the coverage.

Compliance with the foregoing requirements shall not relieve the Contractor of their liability and obligation under this section or under any other section of this Agreement.

The Contractor shall be responsible for assuring that the insurance certificates required in conjunction with this Section remain in force for the duration of the Project. If insurance certificates are scheduled to expire during the contractual period, the Contractor shall be responsible for submitting new or renewed insurance certificates to the City at a minimum of thirty (30) calendar days in advance of such expiration. In the event that expired certificates are not replaced with new or renewed certificates that cover the contractual period, the City shall:

A. Suspend the Agreement until such time as the new or renewed certificates are received by the City.

B. The City may, at its sole discretion, terminate the Agreement for cause and seek damages from the Contractor in conjunction with the violation of the terms and conditions of the Agreement.

ARTICLE 11- WARRANTY AND GUARANTEE, TESTS AND INSPECTIONS, CORRECTION, REMOVAL OR ACCEPTANCE OF DEFECTIVE WORK

11.1 Warranty: The Contractor warrants and guarantees to the City that all Work will be in accordance with the Contract Documents and will not be defective. Prompt notice of all defects shall be given to the Contractor. All defective work, whether or not in place, may be rejected, corrected or accepted as provided in this Article.

11.1.1 Warranty of Title: The Contractor warrants to the City that it possesses good, clear and marketable title to all equipment and materials provided and that there are no pending liens, claims or encumbrances against the equipment and materials.

11.1.2 Warranty of Specifications: The Contractor warrants that all equipment, materials and workmanship furnished, whether furnished by the Contractor, its subcontractors or suppliers, will comply with the specifications, drawings and other descriptions supplied or adopted and that all services will be performed in a workmanlike manner.

11.1.3 Warranty of Merchantability: The Contractor warrants that any and all equipment to be supplied pursuant to this Agreement is merchantable, free from defects, whether patent or latent in material or workmanship, and fit for the ordinary purposes for which it is intended.

11.2 Tests and Inspections: Contractor shall retain the services of an independent, certified, testing lab to perform all testing as required by the specifications, Contract drawings, and any applicable permitting agency. Contractor shall provide evidence of certification to the City before the work and testing is done. Testing results shall be submitted to the Engineer for review and approval at the time the results are provided to the Contractor. The Contractor shall give the Project Manager and City Inspector a minimum of twenty-four (24) hours' advanced notice of readiness of the Work for all required inspections, tests, or approvals and shall notify all applicable permitting agencies in a timely manner based on requirements set forth in the permit documents.

11.2.1 Neither observations by the Project Manager nor inspections, tests or approvals by others shall relieve the Contractor from its obligations to perform the Work in accordance with the Contract Documents.

11.3 Uncovering Work: If any work that is to be inspected, tested or approved is covered without approval or consent of the Project Manager, it must, if requested by the Project Manager, be uncovered for observation and/or testing. Such uncovering and replacement shall be at the Contractor's sole expense unless the Contractor has given the Project Manager timely notice of the Contractor's intention to cover such Work and the Project Manager has not acted with reasonable promptness in response to such notice.

11.3.1 If the Project Manager considers it necessary or advisable that Work covered in accordance with Paragraph 11.2.1, 11.2.2 and 11.2.3 be observed by the City or inspected or tested by others, the Contractor at the City's request, shall uncover, expose or otherwise make available for observation, inspection or testing as the Project Manager may require, that portion of the Work in question, furnishing all necessary labor, material and equipment. If it is found that such Work is defective, the Contractor shall bear all the expenses of such uncovering, exposure, observation, inspection and testing and of satisfactory reconstruction, including compensation for additional professional services, and an appropriate deductive Change Order shall be issued. If, however, such work is not found to be defective, the Contractor shall be allowed an increase in the Contract Price or an extension of the Contract Time, or both, directly attributable to such uncovering, exposure, observation, inspection testing and reconstruction if he makes a claim therefore as provided in Articles 14 and 15.

11.4 City May Stop the Work: If the Work is defective, or the Contractor fails to supply sufficient skilled supervisory personnel or workmen or suitable materials or equipment or the work area is deemed unsafe, the City may order the Contractor to stop the Work, or any portion thereof, until the cause for such order has been eliminated; however, this right of the City to stop the Work shall not give rise to any duty on the part of the City to exercise this right for the benefit of the Contractor or any other party. The City will not award any increase in Contract Price or Contract Time if the Work is stopped due to the circumstances described herein.

11.5 Correction or Removal of Defective Work Before Final Payment: If required by the Project Manager, the Contractor shall promptly, without cost to the City and as Specified by the Project Manager, either correct any defective Work, whether or not fabricated, installed or completed, or if the Work has been rejected by the City remove it from the site and replace it with non-defective Work.

11.6 One Year Correction Period After Final Payment: If within one (1) year after the date of final acceptance, or such longer period of time as may be prescribed by law or by the terms of any applicable special guarantee required by the Contract Documents, any work is found to be defective, the Contractor shall promptly, without cost to the City and in accordance with the City's written instructions, either correct such defective Work, or, if it has been rejected by the City, remove it from the site and replace it with non-defective Work.

If The Contractor does not promptly comply with the terms of such instructions or in an emergency where delay would cause serious risk of loss or damage, the City may have the defective Work corrected or the rejected Work removed and replaced, and all direct and indirect costs for such removal and replacement, including compensation for additional professional services, shall be paid by the Contractor.

11.7 Acceptance of Defective Work, Deductions: If, instead of requiring correction or removal and replacement of defective Work, the City, at the city's sole option, prefers to accept it, the City may do so. In such a case, if acceptance occurs prior to the Project Manager's recommendation of final payments, a Change Order shall be issued incorporating the necessary revisions in the Contracts Documents, including appropriate reduction in the Contract Price; or if the acceptance occurs after such recommendation, an appropriate amount shall be paid by the Contractor to the City.

11.8 City May Correct Defective Work: If the Contractor fails within a reasonable time after written notice of the Project Manager to proceed to correct defective Work or to remove and replace rejected Work as required by the Project Manager in accordance with Paragraph 11.5, or if the Contractor fails to perform the Work in accordance with the Contract Documents, the City may, after seven (7) days written notice to the Contractor, correct and remedy any such deficiency. In exercising its rights under this paragraph, the City shall proceed expeditiously. To the extent necessary to complete corrective and remedial action, the City may exclude the Contractor from all or part of the site, take possession of all or part of the Work, suspend the Contractor's services related thereto and take possession of the Contractor's tools, construction equipment and materials stored at the site or elsewhere. The Contractor shall allow the City's representative agents and employees such access to the site as may be necessary to enable the City to exercise its rights under this paragraph. All direct and indirect costs of the City in exercising such rights shall be charged against the Contractor in an amount verified by the Project Manager, and a Change Order shall be issued incorporating the necessary revisions in the Contract Documents and a reduction in the Contract Price. Such direct and indirect costs shall include, in particular but without limitation, compensation for additional professional services required and costs of repair and replacement of work of others destroyed or damaged by correction, removal or replacement of the Contractor's defective Work. The Contractor shall not be allowed an extension of the Contract Time because of any delay in performance of the Work attributable to the exercise by the City of the City's right hereunder.

ARTICLE 12 – INDEMNIFICATION

12.1 Disclaimer of Liability: The City shall not at any time, be liable for injury or damage occurring to any person or property from any cause, whatsoever, arising out of Contractor's construction and fulfillment of this agreement.

12.2 Indemnification: For other, additional good valuable consideration, the receipt and sufficiency of which is hereby acknowledged:

12.2.1 Contractor shall, at its sole cost and expense, indemnify and hold harmless the City, its representatives, employees and elected and appointed officials from or on account of all claims, damages, losses, liabilities and expenses, direct, indirect or consequential including but not limited to fees and charges of engineers, architects, attorneys, consultants and other professionals and court costs arising out of or in consequence of the performance of this Agreement at all trial and appellate levels. Indemnification shall specifically include but not be limited to claims, damages, losses, liabilities and expenses arising out of or from (a) the negligent or defective design of the project and Work of this Agreement; (b) any act, omission or default of the Contractor, its Subcontractors, agents, servants or employees; (c) any and all bodily injuries, sickness, disease or death; (d) injury to or destruction of tangible property, including any resulting loss of use; (e) other such damages, liabilities, or losses received or sustained by any person or persons during or on account of any operations connected with the construction of this Project including the warranty period; (f) the use of any improper materials; (g) any construction defect including both patent and latent defects; (h) failure to timely complete the work; (i) the violation of any federal, state, county or city laws, ordinances or regulations by Contractor, its subcontractors, agents, servants, independent contractors or employees; (j) the breach or alleged breach by Contractor of any term of the Agreement, including the breach or alleged breach of any warranty or guarantee.

12.2.2 Contractor agrees to indemnify, defend, save and hold harmless the City, its officers, agents and employees, from all damages, liabilities, losses, claims, fines and fees, and from any and all suits and actions of every name and description that may be brought against City, its officers, agents and employees, on account of any claims, fees, royalties, or costs for any invention or patent and/or for the infringement of any and all copyrights or patent rights claimed by any person, firm, or corporation.

12.2.3 Contractor shall pay all claims, losses, liens, settlements or judgments of any nature in connection with the foregoing indemnifications including, but not limited to, reasonable attorney's fees and costs for trails and appeals.

12.2.4 If any Subcontractor, supplier, laborer, or materialmen of Contractor or any other person directly or indirectly acting for or through Contractor files or attempts to file a mechanic's or construction lien against the real property on which the work is performed or any part or against any personal property or improvements thereon or make a claim against any monies due or to become due from the City to Contractor or from Contractor to a Subcontractor, for or on account of any work, labor, services, material, equipment, or other items furnished in connection with the Work or any change order, Contractor agrees to satisfy, remove, or discharge such lien or claim at its own expense by bond, payment, or otherwise within five (5) days of the filing or from receipt of written notice from the City.

Additionally, until such time as such lien or claim is satisfied, removed or discharged by Contractor, all monies due to Contractor, or that become due to Contractor before the lien or claim is satisfied, removed or otherwise discharged, shall be held by City as security for the satisfaction, removal and discharge of such lien and any expense that may be incurred while obtaining the discharge. If Contractor shall fail to do so, City shall have the right, in addition to all other rights and remedies provided by this Agreement or by law, to satisfy, remove, or discharge such lien or claim by whatever means City chooses at the entire and sole cost and expense of Contractor which costs and expenses shall, without limitation, include attorney's fees, litigation costs, fees and expenses and all court costs and assessments, and which shall be deducted from any amount owing to Contractor. In the event the amount due Contractor is less than the amount required to satisfy Contractor's obligation under this, or any other article, paragraph or section of this Agreement, the Contractor shall be liable for the deficiency due the City.

12.2.5 The Contractor and the City agree that Section 725.06(2), Florida Statutes controls the extent and limits of the indemnification and hold harmless provisions of this Agreement, if any, and that the parties waive any defects in the wording of this Article that runs afoul of said statutory section.

ARTICLE 13 – CHANGES IN THE WORK

13.1 Without invalidating this Agreement, the City may, at any time or from time to time order additions, deletions or revisions in the Work through the issuance of Change Orders. Upon receipt of a Change Order, the Contractor shall proceed with the Work involved. All Work shall be executed under the applicable conditions of the Contract Documents. If any Change Order causes an increase or decrease in the Contract Price or an extension or shortening of the Contract Time, an equitable adjustment will be made as provided in Article 14 or Article 15 on the basis of a claim made by either Party.

13.2 The Project Manager may authorize minor changes in the work not involving an adjustment in the Contract Price or the Contract Time, which are consistent with the overall intent of the Contract Documents. Such changes must be in writing and signed by the City and the Contractor.

13.3 If notice of any change affecting the general scope of the Work or change in the Contract Price is required by the provisions of any Bond to be given to the Surety, it will be the Contractor's responsibility to so notify the Surety, and the amount of each applicable Bond shall be adjusted accordingly. The Contractor shall furnish proof of such adjustment to the City.

ARTICLE 14 – CHANGE OF CONTRACT PRICE

Change of Contract Price, approved by City, shall be computed as follows:

14.1 Cost of the Work: The term "Cost of the Work" means the sum of all direct costs necessarily incurred and paid by Contractor in the proper performance of the Work. Except as otherwise may be agreed to in writing by the City, these costs shall be in amounts no higher than those prevailing in the City and shall include only the following items and shall not include any of the costs itemized in Paragraph 14.3:

14.1.1 Payroll costs for employees in the direct employ of the Contractor in the performance of the Work under schedules of job classifications agreed upon by the City and the Contractor. Payroll costs for employees not employed full time on the Work shall be apportioned on the basis of their time spent on the Work. Payroll costs shall include, but not be limited to, salaries and wages plus and cost of fringe benefits which shall include social security contributions, unemployment, excise and payroll taxes, worker's compensation, health and retirement benefits, bonuses, sick leave, vacation and applicable holiday pay.

14.1.2 Cost of all materials and equipment furnished and incorporated in the Work, including costs of transportation and storage, and required suppliers and field services. All cash discounts, rebates and refunds and all returns from sale of surplus materials and equipment shall accrue to the City, and the Contractor shall make provisions so that they may be obtained.

14.1.3 Supplemental costs including the following:

14.1.3.1 Cost, including transportation and maintenance of all materials, supplies, equipment, machinery, appliances, office and temporary facilities at the site and hand tools not owned by the workers, which are consumed in the performance of the Work.

14.1.3.2 Rentals of all construction equipment and machinery and the parts whether rented from the Contractor or others in accordance with rental agreements approved by the City, and the costs of transporting, loading, unloading, installation, dismantling and removal. The rental of any such equipment, machinery or parts shall cease when the use is no longer necessary for the Work.

14.1.3.3 Sales, consumer, use or similar taxes related to the Work and for which the Contractor is liable, imposed by laws and regulations.

14.1.3.4 Royalty payments and fees for permits and licenses.

14.1.3.5 The cost of utilities, fuel and sanitary facilities at the Work site.

14.1.3.6 Minor expenses such as telegrams, long distance telephone calls, telephone service at the site, expressage and similar petty cash items in connection with the Work.

14.1.3.7 Cost of premiums for additional bonds and insurance required because of changes in the Work.

14.2 The Contract Price may only be increased by a Change Order when Work is modified in accordance with Article 13 and approved by the City in writing. Any claim for an increase in the Contract Price resulting from a Change Order shall be based on written notice delivered to the Project Manager within ten (10) days of the occurrence of the Change Order giving rise to the claim. Notice of the amount of the claim with supporting data shall be included in the Change Order and delivered within twenty (20) days of such occurrence unless Project Manager allows an additional period of time to ascertain accurate cost data. Any change in the Contract Price resulting from any such claim shall be incorporated in the Change Order. **IT IS EXPRESSLY AND SPECIFICALLY AGREED THAT ANY AND ALL CLAIMS FOR CHANGES TO THE CONTRACT PRICE SHALL BE WAIVED IF NOT SUBMITTED IN STRICT ACCORDANCE WITH THE REQUIREMENTS OF THIS SECTION.**

14.3 Not Included in the Cost of the Work: The term "cost of the Work" shall not include any of the following:

14.3.1 Payroll costs and other compensation of the Contractor's officers executives, principals (of partnership and sole proprietorships), general managers, engineers, architects, estimators, attorneys, auditor, accountants, purchasing and contracting agents, expediters, timekeepers, clerks and other personnel employed by the Contractor whether at the site or in the Contractor's principal or branch office for general administration of the work and not specifically included in the agreed upon schedule of job classifications referred to in Paragraph 14.1.1, all of which are to be considered administrative costs covered by the Contractor's fee.

14.3.2 Expenses of the Contractor's principal and branch offices other than the Contractor's office at the site.

14.3.3 Any part of the Contractor's capital expenses, including interest on the Contractor's capital employed for the Work and charges against the Contractor for delinquent payments.

14.3.4 Cost of premiums for all bonds and for all insurance whether or not the Contractor is required by the Contract Documents to purchase and maintain the same.

14.3.5 Costs due to the negligence of the Contractor, any subcontractor, or anyone directly or indirectly employed by any of them or for whose acts any of them may be liable, including but not limited to, the correction of defective Work, disposal of materials or equipment wrongly supplied and making good any damage to property.

14.3.6 Other overhead or general expense costs of any kind and the costs of any item not specifically and expressly included in Paragraph 14.1

14.4 Basis of Compensation: The Contractor's compensation, allowed to the Contractor for overhead and profit, shall be determined as follows:

14.4.1 A mutually acceptable negotiated fee:

14.4.1.1 For costs incurred under Paragraphs 14.1.1 and 14.1.2, the Contractor's fee shall not exceed five percent (5%).

14.4.1.2 No fee shall be payable on the basis of costs itemized under Paragraphs 14.1.3.1, 14.1.3.2, 14.1.3.3, 14.1.3.4, 14.1.3.5, 14.1.3.6, 14.1.3.7, 14.3.1, 14.3.2, 14.3.3, 14.3.4, 14.3.5 and 14.3.6.

14.4.1.3 The amount of credit to be allowed by the Contractor to the City for any such change which results in a net decrease plus a deduction in the Contractor's fee by an amount equal to five percent (5%) for the net decrease.

14.4.1.4 When both additions and credits are involved in any one change the combined overhead and profit shall be figured on the basis of net increase if any, however, not to exceed five percent (5%) of the agreed compensation. Profit will not be paid on any Work not performed.

14.5 Cost Breakdown Required: Whenever the cost of any Work is to be determined pursuant to this Article, the Contractor will submit in form acceptable to the City an itemized cost breakdown together with supporting documentation. Whenever a change in the Work is to be based upon mutual acceptance of a lump sum, whether the amount is an addition, credit, or no-charge-in-cost, the Contractor shall submit an estimate substantiated by a complete itemized breakdown:

14.5.1 The breakdown shall list quantities and unit prices for materials, labor, equipment and other items of cost.

14.5.2 Whenever a change involves the Contractor and one (1) or more subcontractors and the change is an increase in the agreed compensation, the overhead and profit percentage for the Contractor and each subcontractor shall be itemized separately.

14.6 Time for the City to Approve Extra Work: Any Extra Work in an amount up to and not exceeding a cumulative amount of $25,000 for a specific project can be approved by the City Manager and shall require a written Change Order proposal to be submitted to the Public Works Director for submittal and approval by the City Manager. Extra Work exceeding the cumulative amount of $25,000 for a specific project must be approved by the City Commission and a written Change Order proposal must be submitted to the Public Works Director for submittal and approval by the City Manager and City Commission. No financial or time claim for delay to the project resulting from the Change Order approval process outlined above under Section 14.6 will be allowed.

ARTICLE 15 – CHANGE OF THE CONTRACT TIME

15.1 The Contract Time may only be changed by a Change Order. Any claim for an extension in the Contract Time shall be based on written notice delivered to the Project Manager within five (5) days of the occurrence of the event giving rise to the claim. Any change in the Contract Time resulting from any such claim shall be incorporated in a Change Order.

15.2 The Contract Time will be extended in an amount equal to time lost due to delays beyond the control of the Contractor if a claim is made there for as provided in Paragraph 15.1. Such delays shall include but not be limited to, acts or neglect by the City, or to fires, floods, labor disputes, epidemics, abnormal weather conditions, or acts of God.

15.3 All time limits stated in the Contract Documents are of the essence. The provisions of this Article 15 shall not exclude recovery for damages for delay by the Contractor.

15.4 Delays caused by or resulting from entities, contractors or subcontractors who are not affiliated with the CONTRACTOR (non-affiliated Contractors) shall not give rise to a claim by the CONTRACTOR for damages for increases in material and/or labor costs. Such entities, contractors and subcontractors include, but are not limited to, the City's contractors and subcontractors, Florida Power and Light Company, AT&T and Florida East Coast Railway, LLC.

15.5 Rights of Various Interests: Whenever work being done by City's forces or by other contractors is contiguous to or within the limits of work covered by this Contract, the respective rights of the various interests involved shall be established by the Project Manager to secure the completion of the various portions of the work in general harmony.

ARTICLE 16 – LIQUIDATED DAMAGES

16.1 Upon failure of the Contractor to complete the Work within the time specified for completion, the Contractor shall pay to the City the sum of **_____Hundred/Thousand Dollars ($_00.00)** for each and every calendar day that the completion of the Work is delayed beyond the time specified in this Agreement for completion, as fixed and agreed liquidated damages and not as a penalty, so long as the delay is caused by the Contractor. Should an act of God or the acts or omissions of the City, its agents or representatives, in derogation to the terms of this Agreement cause the delay, the Contractor shall not be responsible for the delay nor liquidated damages. Liquidated damages are fixed and agreed upon between the Parties, recognizing the impossibility of precisely ascertaining the amount of damages that will be sustained by the City as a consequence of such delay and both parties desiring to obviate any question of dispute concerning the amount of damages and the cost and effect of the failure of the Contractor to complete the Work on time. Liquidated damages shall apply separately to each portion of the Work for which a time of completion is given. The City shall have the right to deduct from or retain any compensation which may be due or which may become due and payable to the Contractor the amount of liquidated damages, and if the amount retained by the City is insufficient to pay in full such liquidated damages, the Contractor shall pay all

liquidated damages in full. The Contractor shall be responsible for reimbursing the City, in addition to liquidated damages or other damages for delay, for all costs of engineering, architectural fees, and inspection and other costs incurred in administering the construction of the Project beyond the completion date specified or beyond an approved extension of time granted to the Contractor whichever is later. Delays caused by or resulting from entities, contractors or subcontractors who are not affiliated with the Contractor shall not give rise to a claim by Contractor for damages for increase in material and/or labor costs. Such entities, contractors and subcontractors include, but are not limited to, the City's contractors and subcontractors, Florida Power and Light Company, AT&T, and Florida East Coast Railway, LLC.

16.2 No Extended Damages: For other and additional good and valuable consideration the receipt and sufficiency of which is hereby acknowledged, the Contractor covenants and agrees that in the event of any delay of construction or for any reason, allegation or claim, and notwithstanding the reason of the delay, reason, claim or allegation or who caused them or the construction delay or whether they were caused by the City, that there will be no entitlement to Contractor to or for any direct or indirect financial damages or losses for extended corporate overhead impact, extended project overhead impacts, project support services, mobilization or demobilization or by whatever other label or legal concept or theory and types of names or labels or basis such claims may have, or any business damages or losses of whatever type or nature, and Contractor hereby waives any right to make any such claim or claims. This provision will have application and effect when construction delays are anticipated and agreed upon by both the City and the Contractor.

ARTICLE 17 – SUSPENSION OF WORK AND TERMINATION

17.1 City May Suspend Work: The City may, at any time and without cause, suspend the Work or any portion of the Work for a period of not more than ninety (90) days by notice in writing to the Contractor which shall fix the date on which Work shall be resumed. The Contractor shall resume the Work on the date fixed. The Contractor will be allowed an increase in the Contract Price or an extension of the Contract Time, or both, directly attributable to any suspension, if the Contractor makes a claim as provided in Articles 14 and 15.

17.2 City's Right to Terminate Contract: The City may terminate this Agreement upon fifteen (15) calendar days' written notice upon the occurrence of any one or more of the following events:

17.2.1 If the Contractor commences a voluntary case or a petition is filed against the Contractor, under any chapter of the Bankruptcy Code, or if the Contractor takes any equivalent or similar action by filing a petition or otherwise under any other federal or state law in effect at such time relating to the bankruptcy or insolvency.

17.2.2 If the Contractor makes a general assignment for the benefit of creditors.

17.2.3 If a trustee, receiver, custodian or agent of the Contractor is appointed under applicable law or under Contract, whose appointment or authority to take charge of property of the Contractor is for the purpose of enforcing a lien

against such property or for the purpose of general administration of such property for the benefit of the Contractor's creditors.

17.2.4 If Contractor fails to begin the Work within fifteen (15) calendar days after the Project Initiation Date, or fails to perform the Work with sufficient workers and equipment or with sufficient materials to ensure the prompt completion of the Work, or shall perform the Work unsuitably, or cause it to be rejected as defective and unsuitable, or shall discontinue the prosecution of the Work pursuant to the accepted schedule or if Contractor shall fail to perform any material term set forth in the Contract Documents, or from any other cause whatsoever shall not carry on the Work in an acceptable manner, Project Manager may give notice in writing to Contractor and its Surety of such delay, neglect or default, specifying the same.

17.2.5 If the Contractor repeatedly fails to make prompt payments to subcontractors or for labor, material or equipment.

17.2.6 If the Contractor repeatedly disregards proper safety procedures.

17.2.7 If the Contractor disregards any local, state or federal laws or regulations.

17.2.8 If the Contactor otherwise violates any provisions of this Agreement.

17.3 If Contractor, within a period of ten (10) calendar days after such notice, shall not proceed in accordance therewith, the City may exclude the Contractor from the Work site and take the prosecution of the Work out of the hands of the Contractor, and take possession of the Work and all of the Contractor's tools, appliances, construction equipment and machinery at the site and use them without liability to the City for trespass or conversion, incorporate in the Work all materials and equipment stored at the site or for which the City has paid the Contractor but which are stored elsewhere, and finish the Work as the City may deem expedient. In this instance, the Contractor shall not be entitled to receive any further compensation until the Work is finished.

17.3.1 If after notice of termination of Contractor's right to proceed, it is determined for any reason that Contractor was not in default, the rights and obligations of City and Contractor shall be the same as if the notice of termination had been issued pursuant to the Termination for Convenience clause as set forth in Section 17.5 below.

17.3.2 Upon receipt of Notice of Termination pursuant to Sections 17.2 or 17.5, Contractor shall promptly discontinue all affected work unless the Notice of Termination directs otherwise and deliver or otherwise make available to City all data, drawings, specifications, reports, estimates, summaries and such other information as may have been required by the Contract Documents whether completed or in process.

17.4 If the Contractor commits a default due to its insolvency or bankruptcy, the following shall apply:

17.4.1 Should this Agreement be entered into and fully executed by the parties, funds released and the Contractor (Debtor) files for bankruptcy, the following shall occur:

17.4.1.1 In the event the Contactor files a voluntary petition under 11 U.S.C. 301 or 302, or an order for relief is entered under 11 U.S.C. 303, the Contractor shall acknowledge the extent, validity, and priority of the lien recorded in favor of the City. The Contractor further agrees that in the event of this default, the City shall, at its option, be entitled to seek relief from the automatic stay pursuant to 11 U.S.C. 362. The City shall be entitled to relief from the automatic stay pursuant to 11 U.S.C. 362(d) (1) or (d) (2), and the Contactor agrees to waive the notice provisions in effect pursuant to 11 U.S.C. 362 and any applicable Local Rules of the United States Bankruptcy Court. The Contactor acknowledges that such waiver is done knowingly and voluntarily.

17.4.1.2 Alternatively, in the event the City does not seek stay relief, or if stay relief is denied, the City shall be entitled to monthly adequate protection payments within the meaning of 11 U.S.C. 361. The monthly adequate protection payments shall each be in an amount determined in accordance with the Note and Mortgage executed by the Contractor in favor of the City.

17.4.1.3 In the event the Contractor files for bankruptcy under Chapter 13 of Title 11, United States Code in additional to the foregoing provisions, the Contractor agrees to cure any amounts in arrears over a period not to exceed twenty-four (24) months from the date of the confirmation order, and such payments shall be made in addition to the regular monthly payments required by the Note and mortgage. Additionally, the Contractor shall agree that the City is over secured and, therefore, entitled to interest and attorney's fees pursuant to 11 U.S.C. 506(b). Such fees shall be allowed and payable as an administrative expense. Further, in the event the Contractor has less than five (5) years of payments remaining on the Note, the Contractor agrees that the treatment afforded to the claim of the City under any confirmed plan of reorganization shall provide that the remaining payments shall be satisfied in accordance with the Note, and that the remaining payments or claim shall not be extended or amortized over a longer period than the time remaining under the Note.

17.4.2 Should this Agreement be entered into and fully executed by the parties, and the funds have not been forwarded to Contractor, the following shall occur:

17.4.2.1 In the event the Contractor files a voluntary petition pursuant to 11 U.S.C. 301 or 302, or an order for relief is entered under 11 U.S.C. 303., the Contractor acknowledges that the commencement of a bankruptcy proceeding constitutes an event of default under the terms of this Agreement. Further, the Contractor acknowledges that this Agreement constitutes an executory contract within the meaning of 11 U.S.C. 365. The Contractor acknowledges that this Agreement is not capable of being assumed pursuant to 11 U.S.C. 365(c)(2), unless the

City expressly consents in writing to the assumption. In the event the City consents to the assumption, the Contractor agrees to file a motion to assume this Agreement within ten (10) days after receipt of written consent from the City, regardless of whether the bankruptcy proceeding is pending under Chapter 7, 11, or 13 of Title 11 of the United States Code. The Contractor further acknowledges that this Agreement is not capable of being assigned pursuant to 11 U.S.C. 365(b)(1).

17.5 Termination for Convenience: This Contract may be terminated for convenience in writing by City upon thirty (30) days written notice to Contractor (delivered by certified mail, return receipt requested) of intent to terminate and the date on which such termination becomes effective. In such case, Contractor shall be paid for all work executed and expenses incurred prior to termination in addition to termination settlement costs reasonably incurred by Contractor relating to commitments which had become firm prior to the termination. Payment shall include reasonable profit for work/services satisfactorily performed. No payment shall be made for profit for work/services which have not been performed.

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

17.7 The Contractor has no right, authority or ability to terminate the Work except for the wrongful withholding of any payments due the Contractor from the City.

ARTICLE 18 – DISPUTE RESOLUTION

18.1 Resolution of Disputes: Questions, claims, difficulties and disputes of whatever nature which may arise relative to the technical interpretation of the Contract Documents and fulfillment of this Agreement as to the character, quality, amount and value of any work done and materials furnished, or proposed to be done or furnished under or, by reason of, the Contract Documents which cannot be resolved by mutual agreement of Contract Administrator and Contractor shall be submitted to the Consultant for resolution. When either party has determined that a disputed question, claim, difficulty or dispute is at an impasse, that party shall notify the other party in writing and submit the question, claim, difficulty or dispute to the Consultant for resolution. The parties may agree to a proposed resolution at any time without the involvement and determination of the Consultant.

18.1.1 Consultant shall notify Contract Administrator and Contractor in writing of Consultant's decision within twenty-one (21) calendar days from the date of the submission of the question, claim, difficulty or dispute, unless Consultant requires time to gather information or allow the parties to provide additional information.

18.1.2 In the event the determination of a dispute by the Consultant under this Article is unacceptable to any of the parties hereto, the party objecting to the determination must notify the other party and the City Manager, in writing within ten (10) days after receipt of the determination. The notice must state

the basis of the objection and the proposed resolution. Final resolution of such dispute shall be made by the City Manager. The City Manager's decision shall be final and binding on the parties.

18.1.3 All non-technical administrative disputes (such as billing and payment) shall be determined by Contract Administrator.

18.1.4 During the pendency of any dispute and after a determination thereof, Contractor, Consultant, and Contract Administrator shall act in good faith to mitigate any potential damages including utilization of construction schedule changes and alternate means of construction. During the pendency of any dispute arising under this Agreement, other than termination herein, Contractor shall carry on the Work and adhere to the progress schedule. The Work shall not be delayed or postponed pending resolution of any disputes or disagreements.

18.1.5 For any disputes which remain unsolved, within sixty (60) calendar days after Final Completion of the Work, the parties shall participate in mediation to address all unresolved disputes. A mediator shall be mutually agreed upon by the parties. Should any objection not be resolved in mediation, the parties retain all their legal rights and remedies under applicable law. If a party objecting to a determination, fails to comply in strict accordance with the requirements of this Article, said party specifically waives all of its rights provided hereunder, including its rights and remedies under applicable law.

ARTICLE 19 – NOTICES

19.1 All notices required by any of the Contract Documents shall be in writing and shall be deemed delivered upon mailing by certified mail, return receipt requested to the following:

To the City:

City Manager
City of Fort Lauderdale
100 North Andrews Avenue
Fort Lauderdale, Florida 33301

with copy to the:

Project Manager and City Attorney
City of Fort Lauderdale
100 North Andrews Avenue
Fort Lauderdale, Florida 33301

To the Contractor:

_____
_____
_____
_____

ARTICLE 20 – LIMITATION OF LIABILITY

20.1 The City desires to enter into this Agreement only if in so doing the City can place a limit on the City's liability for any cause of action arising out of this Agreement, so that the City's liability for any breach never exceeds the sum of $1,000. For other good and valuable consideration, the receipt and sufficiency of which is hereby acknowledged, the Contractor expresses its willingness to enter into this Agreement with the knowledge that the Contractor's recovery from the City to any action or claim arising from the Agreement is limited to a maximum amount of $1,000, which amount shall be reduced by the amount actually paid by the City to the Contractor pursuant to this Agreement, for any action or claim arising out of this Agreement. Nothing contained in this paragraph or elsewhere in this Agreement is in any way intended either to be a waiver of the limitation placed upon the City's liability as set forth in Section 768.28, Florida Statutes, or to extend the City's liability beyond the limits established in said Section 768.28; and no claim or award against the City shall include attorney's fees, investigative costs, expert fees, suit costs or pre-judgment interest.

20.2 No Extended Damages: For other and additional good and valuable consideration the receipt and sufficiency of which is hereby acknowledged, the Contractor covenants and agrees that in the event of any delay of construction or for any reason, allegation or claim, and notwithstanding the reason of the delay, reason, claim or allegation or who caused them or the construction delay or whether they were caused by the City, that there will be no entitlement to Contractor to or for any direct or indirect financial damages or losses for extended corporate overhead impact, extended project overhead impacts, project support services, mobilization or demobilization or by whatever other label or legal concept or theory and types of names or labels or basis such claims may have, or any business damages or losses of whatever type or nature, and Contractor hereby waives any right to make any such claim or claims. This provision will have application and effect when construction delays are anticipated and agreed upon by both the City and the Contractor.

ARTICLE 21 – GOVERNING LAW

21.1 This Agreement shall be governed by the laws of the State of Florida. Both Parties agree that the courts of the State of Florida shall have jurisdiction of any claim arising in connection with this Agreement. Venue for any claim, objection or dispute arising out of this Agreement shall be in Broward County, Florida. **By entering into this Contract, Contractor and City hereby expressly waive any rights either party may have to a trial by jury or any civil litigation related to, or arising out of the Project. Contractor shall specifically bind all subcontractors to the provisions of this Contract.**

ARTICLE 22 – MISCELLANEOUS

22.1 The duties and obligations imposed by this Agreement and the rights and remedies available to the parties and, in particular but without limitation, the warranties, guaranties and obligations imposed upon the Contractor and all of the rights and remedies available to the City, are in addition to, and are not to be construed in any way as a limitation of, any rights and remedies available to any or all of them which are

otherwise imposed or available by laws or regulations, by special warranty or guarantee or by other provisions of the Contract Documents, and the provisions of this Paragraph will be as effective as if repeated specifically in the Contract Documents, and the provisions of this Paragraph will survive final payment and termination or completion of this Agreement.

22.2 The Contractor shall not assign or transfer this Agreement or its rights, title or interests. The obligations undertaken by the Contractor pursuant to this Agreement shall not be delegated or assigned to any other person or firm. Violation of the terms of this Paragraph shall constitute a material breach of Agreement by the Contractor and the City any, at its discretion, cancel this Agreement and all rights, title and interest of the Contractor which shall immediately cease and terminate.

22.3 The Contractor and its employees, volunteers and agents shall be and remain an independent contractors and not agents or employees of the City with respect to all of the acts and services performed by and under the terms of this Agreement. This Agreement shall not in any way be constructed to create a partnership, association or any other kind of joint undertaking or venture between the Parties.

22.4 The City reserves the right to audit the records of the Contractor relating in any way to the Work to be performed pursuant to this Agreement at any time during the performance and term of this Agreement and for a period of three (3) years after completion and acceptance by the City. If required by the City, the Contractor agrees to submit to an audit by an independent certified public accountant selected by the City. The Contractor shall allow the City to inspect, examine and review the records of the Contractor at any and all times during normal business hours during the term of this Agreement.

22.5 The remedies expressly provided in this Agreement to the City shall not be deemed to be exclusive but shall be cumulative and in addition to all other remedies in favor of the City now or later existing at law or in equity.

22.6 Should any part, term or provisions of this Agreement be decided by the courts to be invalid, illegal or in conflict with any state or federal law, the validity of the remaining portion or provision shall not be affected.

22.7 Public Entity Crimes: In accordance with the Public Crimes Act, Section 287.133, Florida Statutes, a person or affiliate who is a contractor, consultant or other provider, who has been placed on the convicted vendor list following a conviction for a public entity crime may not submit a bid on a contract to provide any goods or services to the City, may not submit a bid on a contract with the City for the construction or repair of a public building or public work, may not submit bids on leases of real property to the City, may not be awarded or perform work as a contractor, supplier, subcontractor, or consultant under a contract with the City, and may not transact any business with the City in excess of the threshold amount provided in Section 287.017, Florida Statutes, for category two purchases for a period of thirty-six (36) months from the date of being placed on the convicted vendor list. Violation of this section by Contractor shall result in cancellation of the City purchase and may result in Contractor debarment.

Project Name
(Contractor)
Project #

CITY

IN WITNESS OF THE FOREGOING**,** the parties have set their hands and seals the day and year first above written.

CITY OF FORT LAUDERDALE, a municipal corporation of the State of Florida

By: _____
LEE R. FELDMAN, City Manager

(CORPORATE SEAL)

ATTEST:

By: _____
JEFFREY A. MODARELLI
City Clerk

Approved as to Legal Form:

By:_____
RHONDA MONTOYA HASAN
Assistant City Attorney

CONTRACTOR

WITNESSES:

CONTRACTOR.,
a Florida corporation.

_____ By_____

_____ _____ _____
Print Name PRINT NAME Title

_____ ATTEST:

_____ BY: _____
Print Name

_____ _____
PRINT NAME Secretary

(CORPORATE SEAL)

STATE OF FLORIDA:
COUNTY OF BROWARD:

The foregoing instrument was acknowledged before me this _____ day of _____, 2016, by _____ (Name), as _____ (Title) of _____ (CONTRACTOR), a Florida corporation, on behalf of the Corporation.

SEAL

_____
Notary Public, State of Florida

_____
Name of Notary Typed, Printed or Stamped

☐ Personally Known or ☐ Produced Identification:

Type of Identification Produced: _____

GENERAL CONDITIONS

Unless otherwise modified in the projects special conditions, the following General Conditions shall be part of the Contract:

GC - 01 - DEFINITIONS - The following words and expressions, or pronouns used in their stead, shall wherever they appear in the Contract and the Contract Documents, be construed as follows:

"Addendum" or "Addenda" - shall mean the additional Contract provisions issued in writing, by the Engineer, prior to the receipt of bids.

"Bid" – shall mean the offer or proposal of the Bidder submitted on the prescribed form setting forth the prices for the Work to be performed.

"Bidder" – shall mean any person, firm, company, corporation or entity submitting a Bid for the Work.

"Bonds" –shall mean Bid, performance and payment bonds and other instruments of security, furnished by Contractor and his surety in accordance with the Contract Documents.

“City” – shall mean the City of Fort Lauderdale, Florida, a Florida municipal corporation. In the event the City exercises its regulatory authority as a government body, the exercise of such regulatory authority and the enforcement of any rules, regulations, codes, laws and ordinances shall be deemed to have occurred pursuant to City’s authority as a governmental body and shall not be attributable in any manner to the City as a party to this Contract. For the purpose of this Contract, “City” without modification shall mean the City Commission, and/or City Manager or his/her designee(s) as applicable.

“Construction Manager” - shall mean the Public Works Director or his/her designee.

“Construction Project Manager” - shall mean the Public Works Director or his/her designee.

"Consultant" – shall mean a person, firm, company, corporation or other entity employed by the City to perform the professional services for the project.

“Contract Work” - shall mean everything expressed or implied to be required to be furnished and furnished by the Contractor by any one or more of the parts of the Contract Documents referred to in the Contract hereof except Extra Work as hereinafter defined, it being understood that, in case of any inconsistency in or between any part or parts of this Contract, the Public Works Director shall determine which shall prevail.

“Design Documents” – shall mean the construction plans and specifications included as part of a Bid/Proposal Solicitation prepared either by the City or by the Consultant under a separate Agreement with the City.

“Engineer” - shall mean the Public Works Director or his/her designee.

"Extra Work" - shall mean work other than that required by the Contract.

"Inspector" – shall mean an authorized representative of the City assigned to make necessary inspections of materials furnished by Contractor and of the Work performed by Contractor.

"Notice" - shall mean written notice sent by certified United States Mail, return receipt requested, or sent by commercial express carrier with acknowledgement of delivery, or via fax or email, or by hand delivery with a request for a written receipt of acknowledgment of delivery and shall be served upon the Contractor either personally or to its place of business listed in the Bid.

“Owner” - shall mean the City of Fort Lauderdale.

“Project Manager” - shall mean the Public Works Director or his/her designee.

"Public Works Director" –shall mean the Public Works Director of the City of Fort Lauderdale, Florida or his/her designee(s).

"Site" - shall mean the area upon or in which the Contractor's operations are carried out and such other areas adjacent thereto as may be designated as such by the Public Works Director.

"Subcontractor" - shall mean any person, firm, company, corporation or other entity, other than employees of the Contractor, who or which contracts with the contractor, to furnish, or actually furnishes labor and materials, or labor and equipment, or labor, materials and equipment at the site.

"Surety" - shall mean any corporation or entity that executes, as Surety, the Contractor's performance and payment bond securing the performance of this Contract.

GC - 02 - SITE INVESTIGATION AND REPRESENTATION - The Contractor acknowledges that it has satisfied itself as to the nature and location of the Work under the Contract Documents, the general and local conditions of the Site, particularly those bearing upon availability of transportation, disposal, handling and storage of materials, availability of labor, water, electric power, and roads, the conformation and conditions at the ground based on City provided reports, the type of equipment and facilities needed preliminary to and during the prosecution of the Work and all other matters which can in any way affect the Work or the cost thereof under the Contract Documents.

The Contractor acknowledges that it has conducted extensive tests, examinations and investigations and represents and warrants a thorough familiarization with the nature and extent of the Contract Documents, the Work, locality, soil conditions, moisture conditions and all year-round local weather and climate conditions (past and present), and, in reliance on such tests, examination and investigations conducted by Contractor and the Contractor’s experts, has determined that no conditions exist that would in any manner affect the Bid Price and that the project can be completed for the Bid Price submitted.

The Contractor, on its own, has made or caused to be made examinations, investigations, tests and studies of reports and related data in addition to those referred above, as Contractor deemed necessary to perform the Work at the Bid price set by the Contractor, within the contract time and in accordance with the other terms and conditions of the Contract Documents and the Bid made by the Contractor; and no additional examinations, investigations, tests, reports or similar data are, or will be, required by Contractor to assure that the Work can be done at the Bid price set by the Contractor.

The Contractor further acknowledges that it has satisfied itself based on any geotechnical reports the City may provide and inspection of the project Site as to the character, quality, and quantity of surface and subsurface materials to be encountered from inspecting the site and from evaluating information derived from exploratory work that may have been done by the City or included in the

Contract Documents and finds and has further determined that no conditions exist that would in any manner affect the Bid price and that the project can be completed for the Bid price submitted..

Any failure by the Contractor to acquaint itself with all the provided information and information obtained by visiting the project Site will not relieve Contractor from responsibility for properly estimating the difficulty or cost thereof under the Contract Documents. In the event that the actual subsurface conditions vary from the actual City provided reports, the Contractor shall notify the City and the Contract amount may be adjusted depending on the conditions, at the approval of the City.

GC - 03 - SUBSTITUTIONS - If the Contractor desires to use materials and/or products of manufacturer's names different from those specified in the Contract Documents, the Bidder requesting the substitution shall make written application as described herein. The burden of proving the equality of the proposed substitution rests on the Bidder making the request. To be acceptable, the proposed substitution shall meet or exceed all expressed requirements of the Contract Documents and shall be submitted upon the Contractor's letterhead, in addition to the "Contractor's Request for Substitution" form provided by the Public Works Director. The following requirements shall be met in order for the substitution to be considered:

1. Requests for substitution shall reach the Public Works Director no less than ten (10) Working Days prior to the date set for opening of Bids; and

2. Requests for substitution shall be accompanied by such technical data, as the party making the request desires to submit. The Public Works Director will consider reports from reputable independent testing laboratories, verified experience records from previous users and other written information valid in the circumstances; and

3. Requests for substitution shall completely and clearly indicate in what respects the materials and/or products differ from those indicated in the Contract Documents; and

4. Requests for substitution shall be accompanied by the manufacturer's printed recommendations clearly describing the installation, use and care, as applicable, of the proposed substitutions; and

5. Requests for substitution shall be accompanied by a complete schedule of changes in the Contract Documents, if any, which must be made to permit the use of the proposed substitution; and

6. Provide the "Contractor's Request for Substitution" form, completely executed. Failure to provide all pertinent data will result in immediate rejection of such a request.

If a proposed substitution is approved by the Public Works Director, an Addendum will be issued to prospective bidders not less than three (3) working days prior to the date set for opening of Bids. Unless substitutions are received and approved as described above, the successful Bidder shall be responsible for furnishing materials and products in strict accordance with the Contract Documents.

GC - 04 - CONTROL OF THE WORK - The Public Works Director shall have full control and direction of the Work in all respects. The Public Works Director and/or his authorized designee(s) shall, at all times, have the right to inspect the Work and materials. The Contractor shall furnish all reasonable facilities for obtaining such information, as the Public Works Director may desire respecting the quality of the Work and materials and the manner of conducting the Work. Should the Contractor be directed or permitted to perform night Work, or to vary the period which work is

ordinarily carried on in the daytime, he shall give ample notice to the Public Works Director so that proper and adequate inspection may be provided. Such Work shall be done only under such regulations as are furnished in writing by the Public Works Director, and no extra compensation shall be allowed to the Contractor therefore. In the event of night work, the Contractor shall furnish such light, satisfactory to the Public Works Director, as will insure proper inspection. Nothing herein contained shall relieve the Contractor from compliance with any and all City ordinances relating to noise or Work during prohibited hours.

The Contractor shall keep the Public Works Director informed, a reasonable time in advance, as to his need for grades and lines in order that the same may be furnished and all necessary measurements made for records and for payment with the minimum of inconvenience to the Public Works Director or of delay to the Contractor. The Contractor shall submit to the Public Works Director or Inspector on the job a written request outlining the streets, etc., for which the Contractor desires lines and grades. It is the intention not to delay the Work for the giving of lines and grades, but when necessary, work operations shall be suspended for such reasonable time as the Public Works Director may require for this purpose. However, such cost increases shall be authorized either by the City Manager and/or designee, or the City Commission based upon the purchasing threshold amounts provided for in Chapter 2 of the City of Fort Lauderdale's Code of Ordinances.

GC - 05 - SUBCONTRACTOR - The Contractor shall not sublet, in whole or any part of the Work without the written consent and approval of the Public Works Director. Within ten (10) days after official notification of starting date, the Contractor must submit in writing, to the Public Works Director, a list of all Subcontractors. No Work shall be done by any Subcontractor until such Subcontractor has been officially approved by the Public Works Director. A subcontractor not appearing on the original list will not be approved without written request submitted to the Public Works Director and approved by the Public Works Director. In all cases, the Contractor shall give his personal attention to the Work of the Subcontractors and the Subcontractor is liable to be discharged by the Contractor, at the direction of the Public Works Director, for neglect of duty, incompetence or misconduct.

Acceptance of any Subcontractor, other person, or organization by the Public Works Director shall not constitute a waiver of any right of Public Works Director to reject defective Work or Work not in conformance with the Contract Documents.

Contractor shall be fully responsible for all acts and omissions of his Subcontractors and of persons and organizations directly or indirectly employed by them and of persons and organizations for whose acts any of them may be liable to the same extent that he is responsible for the acts and omissions of persons directly employed by him. Nothing in the Contract Documents shall create any contractual relationship between City and any Subcontractor or other person or organization having a direct contract with Contractor, nor shall it create any obligation on the part of City to pay or to see to the payment of any moneys due to any Subcontractor or other person, or organization, except as may otherwise be required by law.

GC – 06 - **QUANTITIES** - It is mutually agreed that the proposal shows the approximate amounts only along with the Plans and the general location. It is also mutually agreed that no change will be made involving any departure from the general scheme of the Work and that no such change involving a material change in cost, either to the City or Contractor, shall be made, except upon written permission of the City. However, the Public Works Director shall have the right to make minor alternations in the line, grade, plan, form or materials of the Work herein contemplated any time before the completion of the same. That if such alterations shall diminish the quantity of the Work to be done, such alterations shall not constitute a claim for damages or anticipated profits. That if such alterations increase the amount of the Work to be done, such increase shall be paid

for according to the quantity actually performed and at the unit price or prices stipulated therefore in the Contract.

The City shall, in all cases of dispute, determine the amount or quantity of the several kinds of Work which are to be paid for under this Contract, and shall decide all questions relative to the execution of the same, and such estimates and decisions shall be final and binding.

Any Work not herein specified, which might be fairly implied as included in the Contract, of which the City shall judge, shall be done by the Contractor without extra charge. However, such cost increases shall be authorized either by the City Manager and/or designee, or the City Commission based upon the purchasing threshold amounts provided for in Chapter 2 of the City of Fort Lauderdale's Code of Ordinances.

GC–07 - NO ORAL CHANGES - Except to the extent expressly set forth in the Contract, no change in or modification, termination or discharge of the Contract in any form whatsoever, shall be valid or enforceable unless it is in writing and signed by the parties charged, therewith or their duly authorized representative.

GC - 08 - PERMITS AND PROTECTION OF PUBLIC – Permits on file with the City and or those permits to be obtained shall be considered directive in nature and will be considered a part of this Contract. A copy of all permits shall be given to the City and become part of the Contract Documents. Terms of permits shall be met prior to acceptance of the Work and release of the final payment.

The Contractor shall be required to observe all the ordinances in relation to obtaining permits for occupying, excavating, or in any way obstructing the streets and alleys. He shall erect and maintain barricades and sufficient safeguards around all excavations, embankments or obstructions; he shall place sufficient warning lights at or near the Work; keep the same burning from sunset to sunrise, employ watchmen, and strictly obey all laws and ordinances controlling or limiting those engaged in similar work.

Where there are telephones, light or power poles, water mains, conduits, pipes or drains or other construction, either public or private, in or on the streets or alleys, the Work shall be so conducted that no interruption or delay will be caused in the operation or use of the same. Proper written notice shall be given, and all the facilities, afforded the owners of such construction encountered or likely to be encountered, as will enable them to preserve the same from injury.

The Contractor shall not be permitted to interfere with public travel and convenience by grading or tearing up streets indiscriminately, but the Work of constructing the various items in this contract shall proceed in an orderly, systematic and progressive manner.

Contractor shall not load nor permit any part of any structure to be loaded with weights that will endanger the structure, nor shall he subject any part of the Work to stresses or pressures that will endanger it.

Where lifting operations involving the use of specialized cranes are required as part of construction, Contractor must make undertake the following investigation and submit the results and documentation to the Engineer prior to commencing any lifting operations: marking a very specific area in the field for the placement of the crane; a drawing showing the limitations of the job operation (i.e. not over adjacent properties or pedestrian and high vehicular traffic areas);underground utility exploration in the vicinity of the crane location, which may include ground penetrating radar to identify voids or old pipe or other subsurface features that could lead to sudden failure; assessment of the underlying soil and roadway materials and a worst case

analysis based on entire load being distributed on just one or two outriggers; provision of properly sized pads under the outriggers; loading charts from manufacturer showing allowable configurations/loads; and inspection to make sure crane operation is in accordance with the permit conditions.

GC - 09 - DISEASE REGULATIONS - The Contractor shall enforce all sanitary regulations and take all precautions against infectious diseases as the Public Works Director may deem necessary. Should any infectious or contagious diseases occur among his employees, he shall arrange for the immediate removal of the employee from the Site and isolation of all persons connected with the Work.

GC - 10 - CONTRACTOR TO CHECK PLANS, SPECIFICATIONS, AND DATA - The Contractor shall verify all dimensions, quantities, and details shown on the plans, supplementary drawings, schedules, or other data received from the Public Works Director, and shall notify the Public Works Director of all errors, omissions, conflicts and discrepancies found therein within three (3) working days of discovery. Failure to discover or correct errors, conflictions, or discrepancies shall not relieve the Contractor of full responsibility for unsatisfactory Work, faulty construction, or improper operation resulting there from nor from rectifying such condition at his own expense.

GC - 11 - SUPPLEMENTARY DRAWINGS - When, in the opinion of the Public Works Director, 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 Public Works Director and copies will be given to the Contractor.

The supplementary drawings shall be binding upon the Contractor with the same force as the original Plans. Where such supplementary drawings require either less or more than the estimated quantities of work, credit to the City or compensations therefore to the Contractor shall be subject to the terms of the Contract.

GC - 12 - MATERIALS AND WORKMANSHIP - All material and workmanship shall, in every respect, be in conformity with approved modern practice and with prevailing standards of performance and quality. In the event of dispute the Public Works Director's decision shall be final. Wherever the Plans, specifications, Contract Documents, or the directions of the Public Works Director are unclear as to what is permissible and/or fail to note the quality of any Work, that interpretation will be made by the Public Works Director, which is in accordance with approved modern practice, to meet the particular requirements of the Contract.

In all cases, new materials shall be used, unless this provision is waived by notice from the City in writing.

GC - 13 - SAFEGUARDING MARKS - 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 same if disturbed, or bear the entire expense of rectifying Work improperly installed due to not maintaining or protecting or for removing without authorization, such established points, stakes and marks. The Contractor shall safeguard all existing and known property corners, monuments and marks not related to the Work and, if required, shall bear the cost of having them re-established by a licensed surveyor if disturbed or destroyed during the course of construction.

GC - 14 - EXISTING UTILITY SERVICE - All existing utility service shall be maintained with a minimum of interruption at the expense of the Contractor.

GC - 15 - JOB DESCRIPTION SIGNS – Contractor, at Contractor's expense, shall furnish, erect, and maintain suitable weatherproof signs on jobs over $100,000 containing the following information:

1. City Seal (in colors)
2. Project or Improvement Number
3. Job Description
4. Estimated Cost
5. Completion Date

Minimum size of sign shall be four feet high, eight feet wide and shall be suitably anchored. The entire sign shall be painted and present a pleasing appearance. Exact location of signs will be determined in the field. Two (2) signs will be required, one at each end of the job. All costs of this work shall be included in other parts of the work.

GC - 16 - FLORIDA EAST COAST RIGHT-OF-WAY - Whenever a City contractor is constructing within the Florida East Coast Railway Company's Right-of-Way, it will be mandatory that the contractor carry separate bodily injury and property damage insurance in the amounts as stated below. This insurance shall be taken out and maintained during the life of the Contract.

Bodily injury insurance in an amount not less than $500,000.00 for injuries, including wrongful death to any one person, and subject to the same limit for each person, in an amount not less than $1,000,000.00 on account of any one occurrence, and

Property damage insurance in an amount not less than $500,000.00 for damages on account of any one occurrence and in an amount not less than $1,000,000.00 for damages on account of all occurrences.

GC - 17 - ACCIDENTS - The Contractor shall provide such equipment and facilities as are necessary and/or required, in the case of accidents, for first aide services to be provided to a person who may be injured during the project duration. The Contractor shall also comply with the OSHA requirements as defined in the United States Labor Code 29 CFR 1926.50.

In addition, the Contractor must report immediately to the Public Works Director every accident to persons or damage to property, and shall furnish in writing full information, including testimony of witnesses regarding any and all accidents.

GC - 18 - SAFETY PRECAUTIONS - Contractor must adhere to the applicable environmental protection guidelines for the duration of a project. If hazardous waste materials are used, detected or generated at any time, the Project Manager must be immediately notified of each and every occurrence. The Contractor shall comply with all codes, ordinances, rules, orders and other legal requirements of public authorities (including OSHA, EPA, DERM, the City, Broward County, State of Florida, and Florida Building Code), which bear on the performance of the Work.

The Contractor shall take the responsibility to ensure that all Work is performed using adequate safeguards, including but not limited to: proper safe rigging, safety nets, fencing, scaffolding, barricades, chain link fencing, railings, barricades, steel plates, safety lights, and ladders that are necessary for the protection of its employees, as well as the public and City employees. All riggings and scaffolding shall be constructed with good sound materials, of adequate dimensions for their intended use, and substantially braced, tied or secured to ensure absolute safety for those required to use it, as well as those in the vicinity. All riggings, scaffolding, platforms, equipment guards, trenching, shoring, ladders and similar actions or equipment shall be OSHA approved, as applicable, and in accordance with all Federal, State and local regulations.

GC - 19 - DUST PREVENTION - The Contractor shall, by means of a water spray, or temporary asphalt pavement, take all necessary precautions to prevent or abate a dust nuisance arising from dry weather or Work in an incomplete stage. All costs of this Work shall be included in cost of other parts of the Work.

Should the Contractor fail to abate a dust nuisance by the above methods, and then he will be required to immediately construct temporary patches per City standards.

GC - 20 - PLACING BARRICADES AND WARNING LIGHTS - The Contractor shall furnish and place, at his own expense, all barricades, warning lights, automatic blinker lights and such devices necessary to properly protect the work and vehicular and pedestrian traffic. Should the Contractor fail to erect or maintain such barricades, warning lights, etc., the Public Works Director may, after 24 hours' notice to the Contractor, proceed to have such barricades and warning lights placed and maintained by City or other forces and all costs incurred thereof charged to the Contractor and may be retained by the City from any monies due, or to become due, to the Contractor.

GC - 21 - TRAFFIC CONTROL - The Contractor shall coordinate all Work and obtain, through the Engineering Department, any permits required to detour traffic or close any street before starting to work in the road. The following section: Part VI Traffic Controls for Street and Highway Construction and Maintenance Operations, MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES, U.S. Department of Transportation Federal Highway Administration, 2009, or current edition, shall be used as a guide for requirement and placement of traffic control devices, signs and barricades. The Public Works Director shall determine requirements for the above. The above publication is available from the Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402. In the event that a Maintenance of Traffic (MOT) Plan is required, the Plan shall be prepared by an A.A.S.T.A. certified technician.

All traffic control devices, flashing lights, signs and barricades shall be maintained in working condition at all times.

GC - 22 - COORDINATION - The Contractor shall notify all utilities, transportation department, etc., in writing, with a copy to the Public Works Director before construction is started and shall coordinate his Work with them. The Contractor shall cooperate with the owners of any underground or overhead utility lines in their removal, construction and rearrangement operations in order that services rendered by these parties will not be unnecessarily interrupted.

The Contractor shall arrange his Work and dispose of his materials so as to not interfere with the operation of other Contractors engaged upon adjacent work and to join his Work to that of others in a proper manner and to perform his Work in the proper sequence in relation to that of other Contractors all as may be directed by the Public Works Director.

Each Contractor shall be responsible for any damage done by him or his agents to the work performed by another Contractor.

The Contractor shall contact the Broward County Transportation Department and the Florida Department of Transportation, as applicable, to verify and obtain location of any and all traffic conduits, loops, and street light underground services.

GC - 23 - WATER - Bulk water used for construction, flushing pipelines, and testing shall be obtained from fire hydrants. Contractor shall make payment for hydrant meter at Treasury Billing

Office, 1st Floor, City Hall, 100 N. Andrews Avenue. With the paid receipt, contractor can pick up hydrant meter at the utility location office. No connection shall be made to a fire hydrant without a meter connected.

GC - 24 - PROHIBITION AGAINST CONTRACTING WITH SCRUTINIZED COMPANIES - Subject to *Odebrecht Construction, Inc., v. Prasad*, 876 F.Supp.2d 1305 (S.D. Fla. 2012), *affirmed*, *Odebrecht Construction, Inc., v. Secretary, Florida Department of Transportation*, 715 F.3d 1268 (11th Cir. 2014), this Section applies to any contract for goods or services of $1 million or more:

The Contractor certifies that it is not on the Scrutinized Companies with Activities in Sudan List or the Scrutinized Companies with Activities in the Iran Petroleum Energy Sector List and that it does not have business operations in Cuba or Syria as provided in section 287.135, Florida Statutes (2014), as may be amended or revised. The City may terminate this Contract at the City's option if the Contractor is found to have submitted a false certification as provided under subsection (5) of section 287.135, Florida Statutes (2014), as may be amended or revised, or been placed on the Scrutinized Companies with Activities in Sudan List or the Scrutinized Companies with Activities in the Iran Petroleum Energy Sector List or has been engaged in business operations in Cuba or Syria, as defined in Section 287.135, Florida Statutes (2014), as may be amended or revised.

GC - 25 - LOCATION OF UNDERGROUND FACILITIES - If the Proposer, for the purpose of responding to this solicitation, requests the location of underground facilities through the Sunshine State One-Call of Florida, Inc. notification system or through any person or entity providing a facility locating service, and underground facilities are marked with paint, stakes or other markings within the City pursuant to such a request, then the Proposer shall be deemed non-responsive to this solicitation in accordance with Section 2-184(5) of the City of Fort Lauderdale Code of Ordinances.

GC - 26 – USE OF FLORIDA LUMBER TIMBER AND OTHER FOREST PRODUCTS - In accordance with Florida Statute 255.20 (3), The City specifies that lumber, timber, and other forest products used for this project shall be produced and manufactured in the state of Florida if such products are available and their price, fitness, and quality are equal. This requirement does not apply to plywood specified for monolithic concrete forms, if the structural or service requirements for timber for a particular job cannot be supplied by native species, or if the construction is financed in whole or in part from federal funds with the requirement that there be no restrictions as to species or place of manufacture.

The Bidder affirms by submitting a bid response to this solicitation that they will comply with section 255.20 (3) Florida Statutes.

GC – 27 – PUBLIC RECORDS - Contractor shall:

a) Keep and maintain public records that ordinarily and necessarily would be required by the City in order to perform the service.

(b) Provide the public with access to public records on the same terms and conditions that the City would provide the records and at a cost that does not exceed the cost provided in Chapter 119, Florida Statutes (2013), as may be amended or revised, or as otherwise provided by law.

(c) Ensure that public records that are exempt or confidential and exempt from public records disclosure requirements are not disclosed except as authorized by law.

(d) Meet all requirements for retaining public records and transfer, at no cost, to the City, all public records in possession of the contractor upon termination of this 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 City in a format that is compatible with the information technology systems of the City.

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 AT: (PROVIDE TELEPHONE NUMBER, EMAIL ADDRESS AND MAILING ADDRESS OF CONTRACT COORDINATOR)

Name:

Mailing Address:

Telephone Number:

E-mail Address:

PROJECT NO. 12197

SECTION 01005
INTENT OF DRAWINGS AND SPECIFICATIONS

A. Intent of specifications and drawings is to cover an installation complete in every respect. It is not intended to give every detail on drawings and in specifications. The OWNER will not be responsible for absence of any detail which the CONTRACTOR may require, nor for any special construction which may be found necessary as work progresses. If an item is either indicated or specified, it shall be considered sufficient for inclusion of said item in contract. The CONTRACTOR shall furnish and install materials and equipment usually furnished with such systems, and as needed to complete an operating installation, whether mentioned or not, which are customary to its trade.

B. Incidental accessories not usually shown or specified but which are necessary for the proper installation and operation shall be included in work without additional cost to the OWNER, the same as if herein specified.

C. Any apparatus, appliance, material or work not shown on but mentioned in the specifications, or vice versa, or any incidental accessories necessary to make the work complete and ready for operation, shall be furnished, delivered, and installed by the CONTRACTOR without additional cost to the OWNER.

D. Drawings are diagrammatic and indicate the general arrangement of systems and work indicated (do not scale the drawings). Consult the OWNER or ENGINEER for exact locations of fixtures, appurtenances, etc., where these items are not definitely located on the drawings.

E. The OWNER’s or ENGINEER's interpretation of drawings and specifications shall be final and binding upon CONTRACTOR.

F. The CONTRACTOR shall visit site prior to submitting bid, and thoroughly investigate and verify all conditions under which work shall be performed.

- END OF SECTION -

PROJECT NO. 12197

SECTION 01010 - SUMMARY OF WORK

PART 1 -- GENERAL

1.01 THE REQUIREMENT

A. The work to be performed under this Contract shall consist of furnishing of all tools, equipment, materials, supplies, manufactured articles, transportation and services, including fuel, power, water, and essential communications, for the performance of all labor, work, testing and/or other operations as required for the fulfillment of the Contract in strict accordance with the Contract Documents. The work shall be complete, and all work, materials, and services not expressly shown or called for in the Contract Documents which may be necessary for the complete and proper execution of the contract in good faith shall be performed, furnished, and/or provided by the CONTRACTOR as though originally so specified or shown, at no increase in cost to the OWNER.

B. Wherever the Contract Documents address a third party, i.e., subcontractor, manufacturer, etc., it is to be considered as the CONTRACTOR through the third party.

C. Wherever a reference to number of days is noted, it shall be construed to mean calendar days.

D. The CONTRACTOR is advised that the work is to be performed in a fully operational water treatment facility, which is the principal source of potable water supply for the City of Fort Lauderdale and associated communities. Work activities will be on electrical systems that control equipment active in the treatment process. The CONTRACTOR shall be fully responsible for all precautionary measures together with all remediation, cleanup, disinfection, regulatory agency fines and all other labor, materials, and costs associated with any contamination of the potable water supply or interruption of water treatment caused directly or indirectly by the activities of the CONTRACTOR in the performance of the work.

E. Notwithstanding other indemnification requirements of the Contract Documents, the CONTRACTOR shall also indemnify, defend, and hold harmless the OWNER, the ENGINEER and the OWNER's agents from any and all legal action which may arise from contamination of the potable water supply or interruption of water treatment caused directly or indirectly by the CONTRACTOR in the performance of the work.

1.02 WORK COVERED BY CONTRACT DOCUMENTS

A. The work includes, but is not limited to, the procurement, construction, testing, and placing in service, replacement of piping, valves, fittings and accessories within the influent vaults for Hydrotreators 3 and 4. The work shall be sequenced so that one of the hydrotreators will be removed from service and all work shown on the contract documents performed and accepted by the OWNER prior to proceeding with the work on the next hydrotreator. The replacement of the steel fittings that connect to the underground

reinforced concrete pipe will require the contractor to retain the original concrete pipe supplier to confirm the joint types during construction and design and fabricate new custom steel fittings. The replacement of the steel fittings that connect to the underground reinforced concrete pipe requires removal of a section of reinforced concrete wall within each vault along with subsequent repair of the wall.

B. The work under this Contract is described in the technical specifications and shown on the drawing sets titled as follows:

CITY OF FORT LAUDERDALE
PROJECT NO. 12197
FIVEASH WATER TREATMENT PLANT
HYDROTREATORS 3 AND 4 INFLUENT VAULT MODIFICATIONS

C. The work is located at the following location:

1. FIVEASH WATER TREATMENT PLANT
4321 Northwest 9th Avenue
Fort Lauderdale, Florida 33309

1.03 WORK BY OTHERS

A. The CONTRACTOR's attention is directed to the fact that other contractors will conduct other work at the site(s) during the performance of the work under this Contract. The CONTRACTOR shall conduct its operations so as to cause a minimum of interference with the work of such other contractors, and shall cooperate fully with such contractors to provide continued safe access to their respective portions of the site, as required to perform their respective contracts.

B. Work to be performed on site under other contracts may consist of (but may not necessarily be limited to) any and/or all of the following other projects:

1. Not Applicable

C. When two or more contracts are being executed at one time on the same or adjacent areas in such manner that work on one contract may interfere with that on another, the OWNER shall determine the sequence and order of the work. When the territory of one contract is the necessary or convenient means of access for the execution of another contract, such privilege of access or any other reasonable privilege may be granted by the OWNER to the CONTRACTOR so desiring, to the extent, amount, in the manner, and at the times permitted. No such decision as to the method or time of conducting the work or the use or territory shall be made the basis of any claim of delay or damage.

D. Interference with Work on Utilities: The CONTRACTOR shall cooperate fully with all utility forces of the OWNER or forces of other public or private agencies engaged in the relocation, altering, or otherwise rearranging of any facilities which interfere with the

progress of the work, and shall schedule the work so as to minimize interference with said relocation, altering, or other rearranging of facilities.

1.04 OWNER FURNISHED MATERIALS AND/OR EQUIPMENT

A. Not Used.

1.05 CONTRACTOR USE OF PROJECT SITE

A. Staging Plan: The CONTRACTOR's use of the project site shall be limited to its construction operations, including on-site storage of materials, on-site fabrication facilities, and field offices, as noted on the “Staging Plan” in the Contract Drawings.

B. The CONTRACTOR shall confine his operations within the Contract limits shown on the Drawings and/or property lines and/or fence lines. Storage of equipment and materials, or erection and use of sheds outside of the Contract limits, if such areas are the property of the OWNER, shall be used only with the OWNER's approval. Such storage or temporary structures, even within the Contract's limits, shall be confined to the OWNER's property and shall not be placed on properties designated as easements or rights-of-way unless specifically permitted elsewhere in the Contract Documents.

1.06 OWNER USE OF THE PROJECT SITE

A. The OWNER may utilize all or part of the facilities during the entire period of construction for the conduct of the OWNER’s normal operations. The CONTRACTOR shall cooperate with the OWNER to minimize interference with the CONTRACTOR's operations and to facilitate the OWNER's operations.

1.07 ADDITIONAL ENGINEERING SERVICES

A. In the event that the ENGINEER is required to provide additional engineering services as a result of substitution of materials or equipment which are not "or equal" by the CONTRACTOR, or changes by the CONTRACTOR in dimension, weight, power requirements, etc., of the equipment and accessories furnished, or if the ENGINEER is required to examine and evaluate any changes proposed by the CONTRACTOR for the convenience of the CONTRACTOR, then the ENGINEER's charges in connection with such additional services shall be charged to the CONTRACTOR by the OWNER.

B. Structural design shown on the Contract Drawings is based upon typical weights for major items of equipment as indicated on the Contract Drawings and specified. If the equipment furnished exceeds the weights of said equipment, the CONTRACTOR shall assume the responsibility for all costs of redesign and for any construction changes required to accommodate the equipment furnished, including the ENGINEER's expenses in connection therewith.

C. In the event that the ENGINEER is required to provide additional engineering services as a result of CONTRACTOR's errors, omissions, or failure to conform to the requirements

of the Contract Documents, or if the ENGINEER is required to examine and evaluate any changes proposed by the CONTRACTOR solely for the convenience of the CONTRACTOR, then the ENGINEER's charges in connection with such additional services shall be charged to the CONTRACTOR by the OWNER.

1.08 ADDITIONAL OWNER'S EXPENSES

A. In the event the Work of this Contract is not completed within the time set forth in the Contract or within the time to which such completion may have been extended in accordance with the Contract Documents, the additional engineering or inspection charges incurred by the OWNER may be charged to the CONTRACTOR and deducted from the monies due him in accordance with General Conditions 5-17. Extra work or supplemental Contract work added to the original Contract, as well as extenuating circumstances beyond the control of the CONTRACTOR, will be given due consideration by the OWNER before assessing engineering and inspection charges against the CONTRACTOR.

B. Unless otherwise specifically permitted, the normal time of work under this Contract is limited to 8 hours per day, Monday through Friday. Work beyond these hours will result in additional expense to the OWNER. Any expenses and/or damages, including the cost of the ENGINEER's on site personnel, arising from the CONTRACTOR's operations beyond the hours and days specified above shall be borne by the CONTRACTOR.

C. Charges assessed to the CONTRACTOR for additional engineering and inspection costs will be determined based on actual hours charged to the job by the ENGINEER. Daily rates will depend on the number and classifications of employees involved, but in no case shall such charges exceed $800 per day for field personnel and $1,200 per day for engineering personnel, based on an eight hour workday.

D. Charges for additional OWNER's expenses shall be in addition to any liquidated damages assessed in accordance with the Contract.

D. No payments will be made for work completed without first acquiring and furnishing two (2) copies of each permit to the ENGINEER.

1.09 PERMITS

A. Permit Application Fees: All permit application fees for CONTRACTOR obtained permits will be paid for by the OWNER. Payment for permit fees will be based upon the actual permit fees required by the CONTRACTOR from the various agencies having jurisdiction for construction of the project, in accordance with the Contract Documents. The CONTRACTOR shall produce documentation verifying the actual cost of permit application fees. Only permit application fees substantiated by the CONTRACTOR and approved by the ENGINEER will be paid by the OWNER.

B. It shall be the CONTRACTOR's responsibility to secure all permits of every description required to initiate and complete the work under this contract, except permits obtained by the OWNER.

C. Permits that have been (or will be) obtained by the OWNER or its authorized representative (copies are available to the CONTRACTOR upon request), include the following:

1. Broward County Health Department correspondence dated June 26, 2015 indicating that a permit is not required for this project. A copy of this correspondence is included in Appendix A.

2. Other permits obtained by the OWNER will be identified during the pre-bid meeting.

1.10 FIELD ENGINEERING

A. Yard piping 2-inches in diameter and smaller that is shown on the yard piping drawings shall be field routed with the assistance of the ENGINEER and OWNER.

B. The CONTRACTOR shall provide sketches for ENGINEER's review of all field routed piping (generally 2-inch and smaller), instrument locations and conduit stub-ups at equipment.

1.11 SITE CONDITIONS

A. The CONTRACTOR acknowledges that it has investigated prior to bidding and satisfied itself as to the conditions affecting the work, including but not restricted to those bearing upon transportation, disposal, handling and storage of materials, availability of labor, water, electric power, roads and uncertainties of weather, river stages, tides, water tables or similar physical conditions at the site, the conformation and conditions of the ground, the character of equipment and facilities needed preliminary to and during prosecution of the work. The CONTRACTOR further acknowledges that it has satisfied itself as to the character, quality and quantity of surface and subsurface materials or obstacles to be encountered insofar as this information is reasonably ascertainable from an inspection of the site, or any contiguous site, as well as from information presented by the Drawings and Specifications made a part of this Contract, or any other information made available to it prior to receipt of Bids. Any failure by the CONTRACTOR to acquaint itself with the available information will not relieve it from responsibility for estimating properly the difficulty or cost of successfully performing the work. The OWNER assumes no responsibility for any conclusions or interpretations made by the CONTRACTOR on the basis of the information made available by the OWNER.

B. In the preparation of the Contract Documents, the ENGINEER has relied on drawings of existing facilities (prepared by various other firms) and various geotechnical report(s). These documents are included as appendices to the Contract Documents and are for information purposes only, and not a part of the Contract Documents. In making these

materials available for inspection, the OWNER and the ENGINEER make no guarantee, either expressed or implied, as to their accuracy or completeness.

1.12 DIMENSIONS OF EXISTING FACILITIES

A. Where the dimensions and locations of existing improvements are of critical importance in the installation or connection of new work, the CONTRACTOR shall verify such dimensions and locations in the field prior to the fabrication and/or installation of materials or equipment, which are dependent on the correctness of such information.

1.13 SURVEYS AND LAYOUT

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

B. The Contractor shall verify existing utility and structure locations and elevations sufficiently ahead of the Work to allow time for any necessary adjustments without delay to the progress of the installation. Costs due to delays occasioned by locations and/or elevations differing from those shown on the Drawings which could have or should have been discovered by timely verification ahead of the Work shall rest solely with the Contractor. No request for additional compensation or Contract time (except for a non-compensable time extension at the sole discretion of the Engineer, whose decision shall be final) resulting from encountering interfering installations not shown, or existing installations differing in location or elevation from that shown, will be considered.

C. The survey shall be performed by a Professional Land Surveyor in the State of Florida and shall meet the minimum technical standards identified in Chapter 61G17-6, FAC.

D. Elevations: The contract drawings (e.g., civil, grading, structural, mechanical, electrical, architectural drawings) of the proposed facilities are in National Geodetic Vertical Datum (NGVD) of 1929.

E. Existing Plant Benchmark: All elevations shall be based off of the existing NGVD 1929 permanent benchmark elevation(s) shown on the Staging Plan.

F. Horizontal Locations: State Plane Coordinates shall be based on NAD 1983/90.

G. All survey work for construction control purposes shall be made by the CONTRACTOR at his expense. The CONTRACTOR shall provide a Licensed Surveyor as Chief of Party, competently qualified men, all necessary instruments, stakes, and other material to perform the work.

H. CONTRACTOR shall establish all baselines for the location of the principal component parts of the work together with a suitable number of bench marks and batter boards adjacent to the work. Based upon the information provided by the Contract Drawings, the CONTRACTOR shall develop and make all detail surveys necessary for construction, including slope stakes, batter boards, stakes for all working points, lines and elevations.

I. CONTRACTOR shall have the responsibility to carefully preserve the bench marks, reference points and stakes, and in the case of destruction thereof by the CONTRACTOR or resulting from his negligence, the CONTRACTOR shall be charged with the expense and damage resulting therefrom and shall be responsible for any mistakes that may be caused by the unnecessary loss or disturbance of such bench marks, reference points and stakes.

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

K. The ENGINEER may check all or any portion of the work and the CONTRACTOR shall afford all necessary assistance to the ENGINEER in carrying out such checks. Any necessary corrections to the work shall be immediately made by the CONTRACTOR. Such checking by the ENGINEER shall not relieve the CONTRACTOR of any responsibilities for the accuracy or completeness of his work.

L. At completion of the work, the CONTRACTOR shall furnish Record Drawings indicating the final layout of all piping, electrical duct banks, roads, all structures, existing bench marks, etc. The Record Drawings shall indicate all critical elevations of piping, structures, finish grades, etc.

M. Submit record drawings in accordance with the requirements of Section 01300 and as herein specified.

N. The OWNER shall provide the Contractor with two sets of 24” x 36” contract drawings for the sole purposes of preparing red line markups for submittal as record drawings.

O. Red Line Markups: Submit three sets of 24” x 36” contract drawings neatly marked-up showing all changes form the original drawings as bid, including all Change Orders, alignment changes, depth changes of underground pipes and utilities, all other items that are not the same as they were originally shown. In addition, disciplines (i.e., electrical, instrumentation, mechanical, civil, structural, plumbing, HVAC, irrigation, landscaping, etc.) contract drawings shall be marked-up showing all changes. Furthermore, the markups shall illustrate existing features, such as existing underground utilities, that were not shown on the as bid contract drawings. Two sets shall be forwarded by the Program Manager to the Engineer for review.

P. Clearly and legibly marking the sets of record drawings is a priority. The Engineer shall review the submitted record drawings for clarity, legibility and that the markups accurately reflect the authorized changes. The Engineer will reject the record drawing submittal if, in the Engineer's opinion the markups are not sufficiently clear, legible and accurate.

1.14 MAINTENANCE OF RECORD DOCUMENTS

A. General:

1. Promptly following initiation of the project, secure from the Program Manager at no cost to CONTRACTOR, two complete sets of Contract Documents. Drawings will be full size (24" x 36").

2. Delete ENGINEER title block and seal from all documents.

3. Label or stamp each record document with title, "RECORD DOCUMENTS," in neat large printed letters.

4. Record information concurrently with construction progress and within 24 hours after receipt of information that change has occurred. Do not cover or conceal Work until required information is recorded. CONTRACTOR is responsible for providing "red-lined" markups of all changes including revised locations of buried features.

5. All underground piping inserts, fittings, piping at 20-foot intervals, and valve locations shall be located by the CONTRACTOR's surveyor in accordance with City of Fort Lauderdale surveying standards and per NAD 83/90.

B. Preservation:

1. Maintain documents in a clean, dry, legible condition and in good order. Do not use record documents for construction purposes.

2. Make documents available at all times for observation by PCM or ENGINEER.

C. Making Entries on Drawings:

1. Using an erasable colored pencil (not ink or indelible pencil), clearly describe change by graphic line and note as required.

a. Color Coding:

1) Green when showing information deleted from Drawings.

2) Red when showing information added to Drawings.

3) Blue and circled in blue to show notes.

2. Date entries.

3. Call attention to entry by “cloud” drawn around area or areas affected.

4. Legibly mark to record actual changes made during construction, including, but not limited to:

   a. Depths of various elements of foundation in relation to finished first floor data if not shown or where depth differs from that shown.

   b. Horizontal and vertical locations of existing and new Underground Facilities and appurtenances, and other underground structures, equipment, or Work. Reference to at least two measurements to permanent surface improvements.

   c. Location of internal utilities and appurtenances concealed in the construction referenced to visible and accessible features of the structure.

   d. Locate existing facilities, piping, equipment, and items critical to the interface between existing physical conditions or construction and new construction.

   e. Changes made by Addenda and Field Orders, Work Change Directive, Change Order, Written Amendment, and ENGINEER's written interpretation and clarification using consistent symbols for each and showing appropriate document tracking number.

5. Dimensions on Schematic Layouts: Show on record drawings, by dimension, the centerline of each run of items such as are described in previous subparagraph above.

   a. Clearly identify the item by accurate note such as “cast iron drain,” “galv. water,” and the like.

   b. Show, by symbol or note, vertical location of item (“under slab,” “in ceiling plenum,” “exposed,” and the like).

   c. Make identification so descriptive that it may be related reliably to Specifications.

D. Coordination with Contractor’s Surveyor:

1. CONTRACTOR shall not cover any bends, valves, or fittings installed until they have been located by the Contractor's survey crews for the purpose of preparing Record Drawings. In the event that traffic or safety conditions require that the trench be backfilled prior to location, the CONTRACTOR shall, under the direct supervision of the City Inspector onsite, provide and maintain a minimum of two aboveground physical reference points with distances to the fittings in question. Said reference points shall be maintained for a minimum of 48 hours after backfilling.

2. If the above conditions are not met, for any reason, CONTRACTOR shall bear the cost of potholing the constructed installation to allow for the locations.

1.15 FIRE PROTECTION

A. CONTRACTOR shall take all necessary precautions to prevent fires at or adjacent to the work, buildings, etc., and shall provide adequate facilities for extinguishing fires which do occur.

B. When fire or explosion hazards are created in the vicinity of the work as a result of the locations of fuel tanks, or similar hazardous utilities or devices, the CONTRACTOR shall immediately alert the local Fire Marshal, the ENGINEER, and the OWNER of such tank or device. The CONTRACTOR shall exercise all safety precautions and shall comply with all instructions issued by the Fire Marshal and shall cooperate with the OWNER of the tank or device to prevent the occurrence of fire or explosion.

1.16 CHEMICALS

A. All chemicals used during project construction or furnished for project operation, whether herbicide, pesticide, disinfectant, polymer, or reactant of other classification, must show approval of either the EPA or USDA. Use of all such chemicals and disposal of residues shall be in strict conformance with all applicable rules and regulations.

1.17 FIRST AID FACILITIES AND ACCIDENTS

A. First Aid Facilities: The CONTRACTOR shall provide at the site such equipment and facilities as are necessary to supply first aid to any of his personnel who may be injured in connection with the work.

B. Accidents:

1. The CONTRACTOR shall promptly report, in writing, to the ENGINEER and OWNER all accidents whatsoever out of, or in connection with, the performance of the work, whether on or adjacent to the site, which cause death, personal injury or property damage, giving full details and statements of witnesses.

2. If death, serious injuries, or serious damages are caused, the accident shall be reported immediately by telephone or messenger to both the OWNER and the ENGINEER.

3. If any claim is made by anyone against the CONTRACTOR or a Subcontractor on account of any accidents, the CONTRACTOR shall promptly report the facts, in writing, to the ENGINEER and OWNER, giving full details of the claim.

1.18 ULTIMATE DISPOSITION OF CLAIMS BY ONE CONTRACTOR ARISING FROM ALLEGED DAMAGE BY ANOTHER CONTRACTOR

A. During the progress of the work, other contractors may be engaged in performing other work or may be awarded other Contracts for additional work on this project. In that event, the CONTRACTOR shall coordinate the work to be done hereunder with the work of such other contractors and the CONTRACTOR shall fully cooperate with such other contractors and carefully fit its own work to that provided under other Contracts as may be directed by the ENGINEER. The CONTRACTOR shall not commit or permit any act which will interfere with the performance of work by any other CONTRACTOR.

B. If the ENGINEER shall determine that the CONTRACTOR is failing to coordinate his work with the work of the other contractors as the ENGINEER directed, then the OWNER shall have the right to withhold any payments otherwise due hereunder until the CONTRACTOR completely complies with the ENGINEER's directions.

C. If the CONTRACTOR notifies the ENGINEER in writing that another CONTRACTOR is failing to coordinate his work with the work of this Contract as directed, the ENGINEER will promptly investigate the charge. If the ENGINEER finds it to be true, he will promptly issue such directions to the other CONTRACTOR with respect thereto as the situation may require. The OWNER, the ENGINEER, nor any of their agents shall not, however, be liable for any damages suffered by the CONTRACTOR by reason of the other contractor’s failure to promptly comply with the directions so issued by the ENGINEER, or by reason of another contractor’s default in performance, it being understood that the OWNER does not guarantee the responsibility or continued efficiency of any CONTRACTOR.

D. The CONTRACTOR shall indemnify and hold the OWNER, and the ENGINEER harmless from any and all claims of judgments for damages and from costs and expenses to which the OWNER may be subjected or which it may suffer or incur by reason of the CONTRACTOR's failure to comply with the ENGINEER's directions promptly.

E. Should the CONTRACTOR sustain any damage through any act or omission of any other CONTRACTOR having a Contract with the OWNER for the performance of work upon the site or of work which may be necessary to be performed for the proper execution of the work to be performed hereunder, or through any act or omission of a Subcontractor of such Contract, the CONTRACTOR shall have no claim against the OWNER or the ENGINEER for such damage, but shall have a right to recover such damage from the

other CONTRACTOR under the provision similar to the following provisions which have been or will be inserted in the Contracts with such other contractors.

F. Should any other CONTRACTOR having or who shall hereafter have a Contract with the OWNER for the performance of work upon the site sustain any damage through any act or omission of the CONTRACTOR hereunder or through any act or omission of any Subcontractor of the CONTRACTOR, the CONTRACTOR agrees to reimburse such other CONTRACTOR for all such damages and to defend at his own expense any suit based upon such claim and if any judgment or claims against the OWNER shall be allowed, the CONTRACTOR shall pay or satisfy such judgment or claim and pay all costs and expenses in connection therewith and shall indemnify and hold the OWNER harmless from all such claims.

G. The OWNER's right to indemnification hereunder shall in no way be diminished, waived or discharged, by its recourse to assessment of liquidated damages as provided in the Contract, or by the exercise of any other remedy provided for by Contract Documents or by law.

1.19 BLASTING AND EXPLOSIVES

A. Blasting shall not be allowed.

1.20 WEATHER CONDITIONS

A. No work shall be done when the weather is unsuitable. The CONTRACTOR shall take necessary precautions (in the event of impending storms) to protect all work, materials, or equipment from damage or deterioration due to floods, driving rain, or wind. The OWNER reserves the right, through the opinion of the ENGINEER, to order that additional protection measures over and beyond those proposed by the CONTRACTOR, be taken to safeguard all components of the Project. The CONTRACTOR shall not claim any compensation for such precautionary measures so ordered, nor claim any compensation from the OWNER for damage to the work from weather elements.

B. The mixing and placing of concrete or pavement courses, the laying of masonry, and installation of sewers and water mains shall be stopped during rainstorms, if ordered by the ENGINEER; and all freshly placed work shall be protected by canvas or other suitable covering in such manner as to prevent running water from coming in contact with it. Sufficient coverings shall be provided and kept ready at hand for this purpose. The limitations and requirements for mixing and placing concrete or laying of masonry, in cold weather shall be as described elsewhere in these Specifications.

1.21 PERIODIC CLEANUP: BASIC SITE RESTORATION

A. Disposal of Debris: All debris, materials, piping, and miscellaneous waste products from the work described in this section shall be removed from the project as soon as possible and not less than twice per week. They shall be disposed of in accordance with applicable federal, state, and local regulations. The CONTRACTOR is responsible for determining

these regulations and shall bear all costs or retain any profit associated with disposal of these items.

B. When the work involves installation of sewers, drains, water mains, manholes, underground structures, or other disturbance of existing features in or across streets, rights-of-way, easements, or private property, the CONTRACTOR shall (as the work progresses) promptly backfill, compact, grade, and otherwise restore the disturbed area to the basic condition which will permit resumption of pedestrian or vehicular traffic and any other critical activity or functions consistent with the original use of the land. The requirements for temporary paving of streets, walks, and driveways are specified elsewhere. Unsightly mounds of earth, large stones, boulders, and debris shall be removed so that the site presents a neat appearance.

C. The CONTRACTOR shall perform the cleanup work on a regular basis and as frequently as ordered by the ENGINEER. Basic site restoration in a particular area shall be accomplished immediately following the installation or completion of the required facilities in that area. Furthermore, such work shall also be accomplished, when ordered by the ENGINEER, if partially completed facilities must remain incomplete for some time period due to unforeseen circumstances.

D. Upon failure of the CONTRACTOR to perform periodic cleanup and basic restoration of the site to the ENGINEER's satisfaction, the OWNER may, upon five (5) days prior written notice to the CONTRACTOR, without prejudice to any other rights or remedies of the OWNER, cause such work for which the CONTRACTOR is responsible to be accomplished to the extent deemed necessary by the ENGINEER, and all costs resulting therefrom shall be charged to the CONTRACTOR and deducted from the amounts of money that may be due him.

E. Refer to Section 01640 entitled “Construction and Demolition Waste Management” for additional requirements.

1.22 USE OF FACILITIES BEFORE COMPLETION

A. The OWNER reserves the right to enter and use any portion of the constructed facilities before final completion of the whole work to be done under this Contract. However, only those portions of the facilities which have been completed to the ENGINEER's satisfaction, as evidenced by his issuing a Certificate of Substantial Completion covering that part of the work, shall be placed in service.

B. It shall be the OWNER's responsibility to prevent premature connections to or use of any portion of the installed facilities by private or public parties, persons or groups of persons, before the ENGINEER issues his Certificate of Substantial Completion covering that portion of the work to be placed in service.

C. Consistent with the approved progress schedule, the CONTRACTOR shall cooperate with the OWNER, his agents, and the ENGINEER to accelerate completion of those facilities, or portions thereof, which have been designated for early use by the OWNER.

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1.23 CHLORINE EMERGENCY PREPARATION

A. The Contractor's attention is directed to the OWNER's policy of conducting periodic chlorine emergency drills at the project site. The drills are intended to ensure readiness to respond to a potential emergency due to the leakage of chlorine gas (which is a toxic substance) from the Chlorine Railcar and Chlorine Cylinder storage areas. The Contractor shall designate an on-site member of his staff that will be trained by the OWNER and be responsible for ensuring that the Contractor's and subcontractor's personnel fully participate in the drills and are prepared to deal with a potential emergency.

1.24 HYDROTREATOR ISOLATION

A. General:

1. Three of the OWNER's four Hydrotreators at the Fiveash Water Treatment Plant must remain in service at all times (with the exception of the four (4) hour short-term shutdown of the raw water supply to the aerator described below).

2. The OWNER's Peele-Dixie Water Treatment Plant must be fully operational prior to removing a Hydrotreator at the Fiveash Water Treatment Plant from service.

3. Once a Hydrotreator is removed from service, all work described in the contract documents within and around the out-of-service Hydrotreator influent vault shall be performed.

4. Upon successful startup and OWNER acceptance of the modified Hydrotreator influent vault, the CONTRACTOR shall request the OWNER in writing to remove the next Hydrotreator from service.

B. Removing a Hydrotreator from Service:

1. The CONTRACTOR shall request in writing the OWNER to remove a Hydrotreator from service. The request will indicate a date a minimum of two weeks from the date the request is issued.

2. The OWNER will be responsible for operating the shut-off valve upstream of the Hydrotreator influent vault (called out as a "Street Valve" on the Drawings) to remove a Hydrotreator from service.

3. The OWNER has determined that the street valves close but do not shutoff water tight.

4. The OWNER reports that testing of the street valve for Hydrotreator 4 indicated approximately 0.8 million gallons per day of water flowing past the closed street valve into Hydrotreator 4.

5. No data is available on the flow rate of water likely to flow past the closed street valve for Hydrotreator 3. The OWNER speculates that the flow past the closed street valve for Hydrotreator 3 will not be less than that for Hydrotreator 4.

6. There are no valves upstream of the street valves nor operable gates within the aerator structure to shut down the flow to Hydrotreators 3 and 4.

7. The OWNER will be responsible for draining and removing loose sludge from the Hydrotreator that is removed from service. It is roughly estimated that the OWNER will require 7 calendar days to complete draining and sludge removal from the Hydrotreator.

8. Following draining of the out-of-service aerator as much as practical, the OWNER and the CONTRACTOR shall coordinate a short-term (four (4) hour) shutdown of the raw water supply to the aerator.

9. AT A DATE AND TIME AGREED TO BY THE OWNER, THE OWNER WILL TURN OFF THE RAW WATER SUPPLY TO THE AERATOR FOR A MAXIMUM OF FOUR (4) HOURS SO THAT THE CONTRACTOR CAN REMOVE THE FLOW METER WITHIN A HYDROTREATOR INFLUENT VALVE VAULT AND INSTALL A TEMPORARY BLIND FLANGE ON THE HYDROTREATOR INFLUENT PIPE. THE ASSISTANT PUBLIC WORKS DIRECTOR – UTILITIES AND THE WATER AND WASTEWATER TREATMENT MANAGER WILL BE NOTIFIED AT LEAST THREE WORK DAYS PRIOR TO TURNING OFF THE RAW WATER SUPPLY.

10. The OWNER will open the 6-inch drain valve on the Aeration Basin Effluent Box that conveys water to Hydrotreator Nos. 3 and 4. The water from the Aerator Effluent Box will be conveyed from the drain valve to the sludge pit via temporary piping (up to 500 feet of pipe) furnished and installed by the CONTRACTOR. The OWNER will place the In-Service Hydrotreator motor operated influent valve in manual mode and close the valve to prevent backflow of water from the In-Service Hydrotreator from entering the Hydrotreator influent piping being removed from service.

C. Control of Water Leaking Past Street Valves:

1. The CONTRACTOR shall provide all necessary temporary pumps and piping to remove water from the Hydrotreator influent valve vault that leaks past the street valves.

2. The water pumped from the Hydrotreator influent valve vault shall be conveyed via CONTRACTOR supplied temporary piping to the lime sludge pit and pump station located approximately 600 feet from the influent valve vaults. The lime sludge pit and pump station can receive approximately 600 gallons per minute.

3. Additional water disposal capacity is available at the on-site retention pond. The amount of water that can be disposed of at this location is unknown. The

CONTRACTOR shall supply all necessary temporary pumps and piping to pump water from the Hydrotreator influent valve vault to the on-site retention pond located approximately 1,000 feet from the vaults.

4. The CONTRACTOR shall supply all improvements necessary to ensure that the temporary water pumps and piping do not impede truck access to the lime silo nor chlorine storage area.

5. As indicated on the Drawings, upon removal of the flow meter within a Hydrotreator influent valve vault, furnish and install a temporary blind flange (equipped with a pressure relieving gate valve) on the Hydrotreator Influent pipe. Provide all necessary equipment, materials and accessories to overcome the thrust on the blind flange resulting from the water flowing past the street valve. The OWNER will assist in controlling the thrust on the blind flange by shutting down the raw water supply to aerator for a maximum of four (4) hours.

6. AT A DATE AND TIME AGREED TO BY THE OWNER, THE OWNER WILL TURN OFF THE RAW WATER SUPPLY TO THE AERATOR FOR A MAXIMUM OF FOUR (4) HOURS TO FACILITATE THE INSTALLATION OF A TEMPORARY BLIND FLANGE ON THE HYDROTREATOR INFLUENT PIPE. THE ASSISTANT PUBLIC WORKS DIRECTOR – UTILITIES AND THE WATER AND WASTEWATER TREATMENT MANAGER WILL BE NOTIFIED AT LEAST THREE WORK DAYS PRIOR TO TURNING OFF THE RAW WATER SUPPLY.

D. Owner Work Within an Out-of-Service Hydrotreator:

1. The OWNER will likely perform maintenance work, not related to this project, within the out-of-service Hydrotreator.

2. The CONTRACTOR shall coordinate with OWNER to ensure that the OWNER's maintenance activities does not disrupt the CONTRACTOR's work.

PART 2 -- PRODUCTS (Not Used)

PART 3 -- EXECUTION (Not Used)

- END OF SECTION -

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SECTION 01011 – SPECIAL BUILDING INSPECTION

PART 1 -- GENERAL

1.01 THE REQUIREMENT

A. The CONTRACTOR shall provide a Special Building Inspector, in accordance with the requirements of the Florida Building Code, to perform all special inspections required by the Building Department with jurisdiction.

B. The Special Inspector shall be a Professional Engineer licensed in the State of Florida.

C. It is recognized that the scope of services associated with providing the special inspector cannot be quantified until the CONTRACTOR meets with the Building Department with jurisdiction and the Building Department defines the scope of special inspections.

D. For the purposes of bidding assume an allowance of 40 hours of professional engineering services on a time and material basis for special inspections.

E. Special Inspector Allowance: The allowance amount for this bid item is to pay for all labor, equipment and materials for all work necessary and required for a licensed Professional Engineer to perform special inspections of the Work. This item includes, but is not limited to performing all special inspections as required by the Florida Building Code and all discretionary special inspections as required by the Building Department with jurisdiction, completion of all inspection reports, and completion/submittal of the Certification of Compliance. The allowance shown on the bid schedule is an estimate of services required. Payment will be based on the actual fee paid directly to the Special Inspector, documented by paid receipts, specifically excluding any labor, mark-up, overhead and profit, administration or other costs involved in obtaining licenses or paying fees. Any portion of this allowance that remains after all authorized payments have been made will be withheld from contract payments and will remain with the Owner.

1.02 SPECIAL BUILDING INSPECTOR FORM

A. Prepare and submit the form for “Special Building Inspector” as required by the Building Department with jurisdiction. The form shall be executed by the Professional Engineer licensed in the state of Florida.

B. Provide a copy of the form that is submitted to the Building Department to the ENGINEER for informational purposes.

1.03 INSPECTION REPORTS

A. Prepare a log of all progress reports and inspections related to the Special Inspections required by the Building Official. The log shall be maintained at the job site.

B. On a weekly basis submit signed and sealed progress reports and inspection reports to the Building Official as required by the Florida Building Code.

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C. Provide copies of the reports that are submitted to the Building Department to the ENGINEER and the OWNER for informational purposes.

1.04 CERTIFICATION

A. The Special Inspector shall submit a Certificate of Compliance prior to scheduling the final building inspection in accordance with the Florida Building Code.

B. The Certificate of Compliance shall state that the work performed by the CONTRACTOR was done in accordance with the applicable portion of the permitted construction documents as delineated in the special building inspection plan.

C. Furnish a copy of the Certificate of Compliance to the OWNER and the ENGINEER.

PART 2 -- PRODUCTS (Not Used)

PART 3 -- EXECUTION (Not Used)

- END OF SECTION -

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SECTION 01025 - MEASUREMENT AND PAYMENT

PART 1 -- GENERAL

1.01 THE REQUIREMENT

A. Payment for the various items in the Schedule of Payment items, as further specified herein, shall include all compensation to be received by the CONTRACTOR for furnishing all tools, equipment, supplies, and manufactured articles, and for all labor, operations, taxes, materials, commissions, transportation and handling, bonds, permit fees, insurance, overhead and profit, and incidentals appurtenant to the items of Work being described, as necessary to complete the various items of the Work, all in accordance with the requirements of the Contract Documents, including all appurtenances thereto, and including all costs of compliance with the regulations of public agencies having jurisdiction, including Safety and Health Requirements of the Occupational Safety and Health Administration of the U.S. Department of Labor (OSHA). Such compensation shall also include payment for any loss or damages arising directly or indirectly from the Work.

B. The CONTRACTOR's attention is called to the fact that the quotations for the various items of Work are intended to establish a total price for completing the Work in its entirety. Should the CONTRACTOR feel that the cost for any item of Work has not been established by the Schedule of Payment items or this Section, it shall include the cost for that Work in some other applicable bid item, so that its proposal for the project does reflect its total price for completing the Work in its entirety.

1.02 SUBMITTALS

A. Informational:

1. Schedule of Values: Submit schedule on OWNER's form.

2. Application for Payment.

3. Final Application for Payment.

B. Submittals shall be in accordance with Section 01300 entitled “Submittals” and with “Construction Standards and Specifications of the City of Fort Lauderdale”, Second Edition, January 1982 or latest edition thereof.

1.03 SCHEDULE OF VALUES

A. Prepare a schedule of values for the Work.

B. Unit Price Work: Reflect unit price quantity and price breakdown from conformed Bid Form.

C. Lump Sum Work:

1. Reflect schedule of values format included in conformed Bid Form.

2. List Bonds and insurance premiums, mobilization, demobilization, facility startup, and contract closeout separately.

3. Break down by Divisions 1 through 17 with appropriate subdivision of each Specification.

D. An unbalanced or front-end loaded schedule will not be acceptable.

E. Summation of the complete schedule of values representing all the Work shall equal the Contract Price.

F. The CONTRACTOR shall submit a Schedule of Values for review with the return of the executed Agreement to the CITY. The schedule shall contain the installed value of the component parts of Work for the purpose of making progress payments during the construction period.

G. The schedule shall be given in sufficient detail for proper identification of Work accomplished. The Schedule of Values shall directly correlate to each activity outlined in the construction progress schedule and the construction network analysis (specified in the section entitled “Submittals”) to accurately relate construction progress to the requested payment. Each item shall include its proportional share of all costs including the CONTRACTOR's overhead, contingencies and profit. The sum of all scheduled items shall equal the total value of the Contract.

H. If the CONTRACTOR anticipates the need for payment for materials stored on the project site or off-site in bonded warehouse, it shall also submit a separate list covering the cost of materials, delivered and unloaded with taxes paid. This list shall also include the installed value of the item with coded reference to the Work items in the Schedule of Values. Payment for stored materials shall comply with requirements of General Conditions.

1.04 APPLICATION FOR PAYMENT

A. Transmittal Summary Form: Attach one Summary Form with each detailed Application for Payment and include Request for Payment of Materials and Equipment on Hand as applicable. Execute certification by authorized officer of CONTRACTOR.

B. Use detailed Application for Payment Form provided by CITY.

C. Include accepted schedule of values for each portion of Work and the unit price breakdown for the Work to be paid on unit price basis, and a listing of OWNER-selected equipment, if applicable, and allowances, as appropriate.

D. Preparation:

1. Round values to nearest dollar.

2. List each Change Order and Written Amendment executed prior to date of submission as separate line item. Totals to equal those shown on the Transmittal Summary Form.

3. Submit Application for Payment, including a Transmittal Summary Form and detailed Application for Payment Form, a listing of materials on hand as applicable, and such supporting data as may be requested by CITY.

1.05 MEASUREMENT—GENERAL

A. Weighing, measuring, and metering devices used to measure quantity of materials for Work shall be suitable for purpose intended and conform to tolerances and Specifications as specified in National Institute of Standards and Technology, Handbook 44.

B. Whenever pay quantities of material are determined by weight, material shall be weighed on scales furnished by CONTRACTOR and certified accurate by state agency responsible. Weight or load slip shall be obtained from weigher and delivered to CITY or OWNER's representative at point of delivery of material.

C. If material is shipped by rail, car weights will be accepted provided that actual weight of material only will be paid for and not minimum car weight used for assessing freight tariff, and provided further that car weights will not be acceptable for material to be passed through mixing plants.

D. Vehicles used to haul material being paid for by weight shall be weighed empty daily and at such additional times as required by CITY. Each vehicle shall bear a plainly legible identification mark.

E. Materials that are specified for measurement by the cubic yard measured in the vehicle shall be hauled in vehicles of such type and size that actual contents may be readily and accurately determined. Unless all vehicles are of uniform capacity, each vehicle must bear a plainly legible identification mark indicating its water level capacity. Vehicles shall be loaded to at least their water level capacity. Loads hauled in vehicles not meeting above requirements or loads of a quantity less than the capacity of the vehicle, measured after being leveled off as above provided, will be subject to rejection, and no compensation will be allowed for such material.

F. Where measurement of quantities depends on elevation of existing ground, elevations obtained during construction will be compared with those shown on Drawings. Variations of 1 foot or less will be ignored, and profiles shown on Drawings will be used for determining quantities.

G. Units of measure shown on Bid Form shall be as follows, unless specified otherwise. All methods of measurement shall be approved by the CITY.

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Item	Method of Measurement
AC	Acre—Field Measure
CY	Cubic Yard—Field Measure within limits specified or shown, or measured in vehicle by volume, as specified
EA	Each—Field Count
GAL	Gallon—Field Measure
HR	Hour
LB	Pound(s)—Weight Measure by Scale
LF	Linear Foot—Field Measure
LS	Lump Sum—Unit is one; no measurement will be made
SF	Square Foot
SY	Square Yard
TON	Ton—Weight Measure by Scale (2,000 pounds)

H. Payment for Lump Sum Work covers all Work specified or shown including but not limited to all material, labor, and equipment for all structural, architectural, mechanical, electrical, fire alarm system, instrumentation, controls, plumbing, ventilation, air conditioning, earthwork, civil work, irrigation, landscaping, painting, roadway paving and signage, operation and maintenance manuals, facility staff training, spare parts, startup and testing, final site work, together with all other appurtenant and miscellaneous work required for a complete installation as indicated in the Contract Documents. Payments for lump sum work will be made at the contract lump sum price(s) entered on the Proposal. All items of work not included but required to complete the work shall be included in the lump sum bid amount.

I. Payment for mobilization and demobilization will be made at the lump sum price named in the Bid Schedule. Mobilization includes, but is not limited to, maintenance of traffic, bonds, videos, computer, insurance, construction trailers (complete), site cleanup, sanitary facilities, labor associated with permit acquisition, contractor staging area, project signs, testing, project coordination, and demobilization. Partial payments for mobilization will be made as follows:

Construction % Complete	Allowable % of Lump Sum for Mobilization
5	25
10	50
25	75
100	100

1.06 PAYMENT

A. General:

1. Progress payments will be made monthly.

2. The date for CONTRACTOR's submission of monthly Application for Payment shall be established at the Preconstruction Conference.

1.07 NONPAYMENT FOR REJECTED OR UNUSED PRODUCTS

A. Payment will not be made for following:

1. Loading, hauling, and disposing of rejected material.

2. Quantities of material wasted or disposed of in manner not called for under Contract Documents.

3. Rejected loads of material, including material rejected after it has been placed by reason of failure of CONTRACTOR to conform to provisions of Contract Documents.

4. Material not unloaded from transporting vehicle.

5. Defective Work not accepted by OWNER.

6. Material remaining on hand after completion of Work.

1.08 PARTIAL PAYMENT FOR STORED MATERIALS AND EQUIPMENT

A. Partial Payment: No partial payments will be made for materials and equipment delivered or stored unless Shop Drawings or preliminary operation and maintenance manuals are acceptable to ENGINEER.

B. Final Payment: Will be made only for products incorporated in Work; remaining products, for which partial payments have been made, shall revert to CONTRACTOR unless otherwise agreed, and partial payments made for those items will be deducted from final payment.

1.09 ALLOWANCES

A. The allowances shall be used only at the discretion of and as ordered by the OWNER for such items as unforeseen conditions, unforeseeable conflicts between existing elements of work and the proposed work, unit price items exceed estimated quantities, and any associated work requested by the OWNER including all labor, materials, and services for modifications or extra work to complete the Project that was anticipated, but not specifically included in this Contract.

B. Any portion of these allowances that remain after all authorized payments have been made will be withheld from contract payments and will remain with the OWNER.

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C. Special Inspector Allowance: The allowance amount for this bid item is to pay for all labor, equipment and materials for all work necessary and required for a licensed Professional Engineer to perform special inspections of the Work. This item includes, but is not limited to performing all special inspections as required by the Florida Building Code and all discretionary special inspections as required by the Building Department with jurisdiction, completion of all inspection reports, and completion/submittal of the Certification of Compliance. The allowance shown on the bid schedule is an estimate of services required. Payment will be based on the actual fee paid directly to the Special Inspector, documented by paid receipts, specifically excluding any labor, mark-up, overhead and profit, administration or other costs involved in obtaining licenses or paying fees. Any portion of this allowance that remains after all authorized payments have been made will be withheld from contract payments and will remain with the Owner.

PART 2 -- PRODUCTS (NOT USED)

PART 3 -- EXECUTION (NOT USED)

- END OF SECTION -

PROJECT NO. 12197

SECTION 01070 - ABBREVIATIONS

PART 1 -- GENERAL

1.01 THE REQUIREMENT

A. Wherever in these specifications references are made to the standards, specifications, or other published data of the various national, regional, or local organizations, such organizations may be referred to by their acronym or abbreviation only. As a guide to the user of these specifications, the following acronyms or abbreviations which may appear in these specifications shall have the meanings indicated herein.

1.02 ABBREVIATIONS AND ACRONYMS

AAMA	Architectural Aluminum Manufacturer's Association
AASHTO	American Association of the State Highway and Transportation Officials
ACI	American Concrete Institute
ACOE	Army Corps of Engineers
ACPA	American Concrete Pipe Association
AFBMA	Anti-Friction Bearing Manufacturer's Association, Inc.
AGMA	American Gear Manufacturer's Association
AHGDA	American Hot Dip Galvanizers Association
AI	The Asphalt Institute
AIA	American Institute of Architects
AISC	American Institute of Steel Construction
AISI	American Iron and Steel Institute
AITC	American Institute of Timber Construction
AMCA	Air Moving and Conditioning Association
ANSI	American National Standards Institute, Inc.
APA	American Plywood Association
API	American Petroleum Institute
APHA	American Public Health Association
APWA	American Public Works Association
ASA	Acoustical Society of America
ASAE	American Society of Agriculture Engineers
ASCE	American Society of Civil Engineers
ASHRAE	American Society of Heating, Refrigerating, and Air-Conditioning Engineers

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ASLE	American Society of Lubricating Engineers
ASME	American Society of Mechanical Engineers
ASMM	Architectural Sheet Metal Manual
ASSE	American Society of Sanitary Engineers
ASTM	American Society for Testing and Materials
AWPA	American Wood Preservers Association
AWPI	American Wood Preservers Institute
AWS	American Welding Society
AWWA	American Water Works Association
BCDPEP	Broward County Department of Planning and Environmental Protection (formerly BCDNRP)
BCHD	Broward County Health Department
BHMA	Builders Hardware Manufacturer's Association
CMA	Concrete Masonry Association
CRSI	Concrete Reinforcing Steel Institute
DIPRA	Ductile Iron Pipe Research Association
EIA	Electronic Industries Association
ETL	Electrical Test Laboratories
FBC	Florida Building Code
FDEP	Florida Department of Environmental Protection
FDOT	Florida Department of Transportation
FS	Federal Specifications
IEEE	Institute of Electrical and Electronics Engineers
IES	Illuminating Engineering Society
IPCEA	Insulated Power Cable Engineers Association
ISA	Instrument Systems and Automation
ISO	International Organization for Standardization
MBMA	Metal Building Manufacturers Association
MMA	Monorail Manufacturers Association
MTI	Marine Testing Institute
NAAM	National Association of Architectural Metal Manufacturers
NACE	National Association of Corrosion Engineers
NBS	National Bureau of Standards

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NEC	National Electrical Code
NEMA	National Electrical Manufacturer's Association
NFPA	National Fire Protection Association
NIOSH	National Institute of Occupational Safety and Health
NIST	National Institute of Standards and Testing
NRCA	National Roofing Contractors Association
NSF	National Science Foundation
NTMA	National Tile and Marble Association
OSHA	Occupational Safety and Health Administration
PCA	Portland Cement Association
SMACCNA	Sheet Metal and Air Conditioning Contractors National Association
SSPC	Steel Structures Painting Council
SSPWC	Standard Specifications for Public Works Construction
SFWMD	South Florida Water Management District
UL	Underwriters Laboratories, Inc.

PART 2 -- PRODUCTS (Not Used)

PART 3 -- EXECUTION (Not Used)

- END OF SECTION -

PROJECT NO. 12197

SECTION 01090 - REFERENCE STANDARDS

PART 1 -- GENERAL

1.01 THE REQUIREMENT

A. Titles of Sections and Paragraphs: Captions accompanying specification sections and paragraphs are for convenience of reference only, and do not form a part of the Specifications.

B. 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 of the opening of 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.

C. Specialists, Assignments: In certain instances, Specification text requires (or implies) that specific work is to be assigned to specialists or expert entities, who must be engaged for the performance of that 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; also 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 all applicable codes.

B. References herein to "Building Code" shall mean the South Florida Building Code (SFBC) Broward Edition. The latest edition of the code as approved and used by the local agency as of the date of the opening of bids, 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 follow the most stringent requirements.

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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 herein.

E. References herein to "OSHA Regulations for Construction" shall mean Title 29, Part 1926, Construction Safety and Health Regulations, Code of Federal Regulations (OSHA), including all changes and amendments thereto.

F. References herein to "OSHA Standards" shall mean Title 29, Part 1910, Occupational Safety and Health Standards, Code of Federal Regulations (OSHA), including all changes and amendments thereto.

PART 2 -- PRODUCTS (Not Used)

PART 3 -- EXECUTION (Not used)

-END OF SECTION-

PROJECT NO. 12197

SECTION 01200 - PROJECT MEETINGS

PART 1 -- GENERAL

1.01 PRECONSTRUCTION MEETING

A. General: A preconstruction meeting will be held after Award of Contract, but prior to starting work at the site. The ENGINEER will schedule the meeting at a mutually agreed time.

B. Location:

Fiveash Water Treatment Plant
First Floor Training Room
4321 N.W. 9th Avenue
Fort Lauderdale, Florida 33309
Contact: Chief Operator
Phone: (954)828-7838

C. Attendance:

1. Owner
2. Engineer
3. Contractor
4. Major subcontractors
5. Safety representative
6. Representatives of governmental or other regulatory agencies.
7. Program Construction Manager (ENGINEER)

D. Minimum Agenda: The purpose of the meeting is to designate responsible personnel and establish a working relationship. The agenda will include the following:

1. Tentative construction schedule
2. Critical work sequencing
3. Designation of responsible personnel
4. Processing of Field Decisions and Change Orders
5. Adequacy of distribution of Contract Documents
6. Submittal of Shop Drawings and samples

7. Procedures for maintaining record documents

8. Use of site and Owner's requirements

9. Major equipment deliveries and priorities

10. Safety and first aid procedures

11. Security procedures

12. Housekeeping procedures

13. Processing of Partial Payment Requests

14. General regard for community relations

E. Duties: The ENGINEER will preside at the meeting and will keep and distribute meeting minutes.

1.02 PROGRESS MEETING

A. Frequency: Progress meetings will be held monthly during the performance of the work of this Contract. Additional meetings may be called as progress of work dictates. Meetings may be held less frequently at the discretion of the ENGINEER.

B. Primary Location - To be used prior to Operations Building Renovations:

Fiveash Water Treatment Plant
First Floor Training Room
4321 N.W. 9th Avenue
Fort Lauderdale, Florida 33309
Contact: Chief Operator
Phone: (954) 828-7838

C. Secondary Location - To be used during the construction of renovations at the Operations Building:

Public Services Department
Second Floor Conference Room
949 Southwest 38th Street
Fort Lauderdale, Florida 33309
Contact: Chief Operator
Phone: (954) 828-7838

D. Attendance:

1. Owner

2. Engineer

3. Contractor

4. Subcontractors active on-site

5. Others as may be requested by OWNER or ENGINEER

6. The CONTRACTOR may at its discretion request attendance of it suppliers and manufacturers.

E. Minimum Agenda: The purpose of the meetings will be to review progress of the work and maintain coordination efforts. The agenda will include the following:

1. Review and approve minutes of previous meetings.

2. Review progress of Work since last meeting.

3. Review the proposed 2 week look ahead schedule.

4. Review the longer range 30-60 day construction schedule.

5. Note and identify problems which impede planned progress.

6. Develop corrective measures and procedures to regain planned schedule.

7. Revise construction schedule as indicated and plan progress during next work period.

8. Maintaining of quality and work standards.

9. Complete other current business.

10. Schedule next progress meeting.

F. Duties: The ENGINEER will preside at the meeting and will keep and distribute meeting minutes.

PART 2 -- PRODUCTS

(NOT USED)

PART 3 -- EXECUTION

(NOT USED)

- END OF SECTION -

PROJECT NO. 12197

SECTION 01300 - SUBMITTALS

PART 1 - GENERAL

1.01 DEFINITIONS

A. Action Submittal: Written and graphic information submitted by CONTRACTOR, that requires ENGINEER's approval.

B. Informational Submittal: Information submitted by CONTRACTOR, that does not require ENGINEER or OWNER approval. Submittals not meeting conditions of the Contract will be returned.

1.02 PROCEDURES

A. During the preconstruction meeting the CONTRACTOR shall be instructed by the OWNER on the details of submitting correspondence for this Project.

B. Direct submittals to the OWNER, unless specified otherwise.

C. Transmittal of Submittal:

1. CONTRACTOR shall:

a) Review each submittal and check for compliance with Contract Documents.

b) Stamp each submittal with uniform approval stamp before submitting to OWNER.

c) Stamp to include Project name, submittal number, Specification number, CONTRACTOR's reviewer name, date of CONTRACTOR's approval, and statement certifying that submittal has been reviewed, checked, and approved for compliance with Contract Documents.

d) OWNER and ENGINEER will not review submittals that do not bear CONTRACTOR's approval stamp and will return them without action.

e) Complete, sign, and transmit with each submittal package, one Transmittal of CONTRACTOR's Submittal form attached at end of this Section.

2. Identify each submittal with the following:

a) Numbering and Tracking System:

b) Sequentially number each submittal.

c) Resubmission of submittal shall have original number with sequential alphabetic suffix.

d) Specification Section and paragraph to which submittal applies.

e) Project title and OWNER's project number.

f) Date of transmittal.

g) Names of CONTRACTOR, Subcontractor or Supplier and manufacturer as appropriate.

3. Identify and describe each deviation or variation from Contract Documents.

D. Format:

1. Do not base Shop Drawings on reproductions of Contract Documents.

2. Package submittal information by individual specification Section. Do not combine different specification Sections together in submittal package, unless otherwise directed in Specification.

3. Present in a clear and thorough manner and in sufficient detail to show kind, size, arrangement, and function of components, materials, and devices, and compliance with Contract Documents.

4. Index with labeled tab dividers in orderly manner.

5. Paper Submittal Format: Paper submittals will not be accepted.

6. Digital Submittal Format: Digital submittals shall be in searchable Adobe PDF format and shall be accessible through the use of standard, “off-the-shelf” software such as Adobe Reader. Hypertext links shall be embedded throughout the text for ease of navigation between references.

7. Digital Submission Procedures: Digital submission procedures shall be defined during the pre-construction meeting.

E. Timeliness: Schedule and submit in accordance with schedule of Shop Drawing and Sample submittals, and requirements of individual Specification Sections.

F. Processing Time:

1. Time for review shall commence on OWNER’s receipt of submittal.

2. OWNER will act upon CONTRACTOR's submittal and transmit response to CONTRACTOR not later than 21days after receipt, unless otherwise specified.

3. Resubmittals will be subject to same review time.

4. No adjustment of Contract Times or Price will be allowed due to delays in progress of Work caused by rejection and subsequent resubmittals.

G. Resubmittals: Clearly identify each correction or change made.

H. Incomplete Submittals:

5. OWNER will return entire submittal for CONTRACTOR's revision if preliminary review deems it incomplete.

6. When any of the following are missing, Submittal will be deemed incomplete:

a. CONTRACTOR’s review stamp, completed and signed.

b. Transmittal of CONTRACTOR’s Submittal, completed and signed.

c. Insufficient number of copies.

I. Submittals not required by Contract Documents:

1. Will not be reviewed and will be returned stamped “Not Subject to Review”.

2. OWNER will keep one copy and return all remaining copies to CONTRACTOR.

1.03 ACTION SUBMITTALS

A. Prepare and submit Action Submittals required by individual Specification Sections.

B. Shop Drawings:

1. Copies: Seven.

2. Identify and Indicate:

a. Applicable Contract Drawing and Detail number, products, units and assemblies, and system or equipment identification or tag numbers.

b. Equipment and Component Title: Identical to title shown on Drawings.

c. Critical field dimensions and relationships to other critical features of Work. Note dimensions established by field measurement.

d. Project-specific information drawn accurately to scale.

3. Manufacturer's standard schematic drawings and diagrams as follows:

a. Modify to delete information that is not applicable to the Work.

b. Supplement standard information to provide information specifically applicable to the Work.

4. Product Data: Provide as specified in individual Specification Sections.

5. Foreign Manufacturers: When proposed, include following additional information:

a. Names and addresses of at least 2 companies that maintain technical service representatives closest to Project.

b. Complete list of spare parts and accessories for each piece of equipment.

C. Samples:

1. Copies: 3, unless otherwise specified in individual Specification Sections.

2. Preparation: Mount, display, or package samples in manner specified to facilitate review of quality. Attach label on unexposed side that includes the following:

a. Manufacturer's name.

b. Model number.

c. Material.

d. Sample source.

3. Manufacturer's Color Chart: Units or Sections of units showing full range of colors, textures, and patterns available.

4. Full-size Samples:

a. Size as indicated in individual Specification Section.

b. Prepared from same materials to be used for the Work.

c. Cured and finished in manner specified.

d. Physically identical with product proposed for use.

D. Action Submittal Dispositions: ENGINEER will review, mark, and stamp as appropriate, and OWNER will distribute marked-up copies as noted:

1. Approved:

a. CONTRACTOR may incorporate product(s) or implement Work covered by submittal.

b. Distribution:

1) One digital copy to OWNER.

2) One digital copy to Resident Project Representative.

3) One digital copy retained in ENGINEER's file.

4) One digital copy to CONTRACTOR appropriately annotated.

2. Approved as Noted:

a. CONTRACTOR may incorporate product(s) or implement Work covered by submittal, in accordance with ENGINEER's notations.

b. Distribution:

1) One digital copy to OWNER.

2) One digital copy to Resident Project Representative.

3) One digital copy retained in ENGINEER's file.

4) One digital copy to CONTRACTOR appropriately annotated.

3. Partial Approval, Resubmit as Noted:

a. Make corrections or obtain missing portions, and resubmit.

b. Except for portions indicated, CONTRACTOR may begin to incorporate product(s) or implement Work covered by submittal, in accordance with ENGINEER's notations.

c. Distribution:

1) One digital copy to OWNER.

2) One digital copy to Resident Project Representative.

3) One digital copy retained in ENGINEER's file.

4) One digital copy to CONTRACTOR appropriately annotated.

4. Revise and Resubmit:

a. CONTRACTOR may not incorporate product(s) or implement Work covered by submittal.

b. Distribution:

1) One digital copy to OWNER.

2) One digital copy to Resident Project Representative.

3) One digital copy retained in ENGINEER's file.

4) One digital copy to CONTRACTOR appropriately annotated.

5. Not Subject to Review: Information received is not required by contract.

1.04 INFORMATIONAL SUBMITTALS

A. General:

1. Copies: Submit 3 copies, unless otherwise indicated in individual Specification Section.

2. Refer to individual Specification Sections for specific submittal requirements.

3. OWNER will review each submittal. If submittal meets conditions of the Contract, OWNER will forward copies to appropriate parties. If OWNER determines submittal does not meet conditions of the Contract and is therefore considered unacceptable, OWNER will retain one copy and return remaining copies with review comments to CONTRACTOR, and require that submittal be corrected and resubmitted.

B. Application for Payment: In accordance with the Section entitled “Measurement and Payment”.

C. Certificates:

1. General:

a. Provide notarized statement that includes signature of entity responsible for preparing certification. Signed by officer or other individual authorized to sign documents on behalf of that entity.

2. Welding: In accordance with individual Specification Sections.

3. Installer: Prepare written statements on manufacturer’s letterhead certifying that installer complies with requirements as specified in individual Specification Sections.

4. Material Test: Prepared by qualified testing agency, on testing agency’s standard form, indicating and interpreting test results of material for compliance with requirements.

5. Certificates of Successful Testing or Inspection: Submit when testing or inspection is required by Laws and Regulations or governing agency or specified in individual Specification Sections.

D. Construction photographs: In accordance with the Section entitled “Coordination”, and as may otherwise be required in Contract Documents**.**

E. Contract Closeout Submittals: In accordance with the Section entitled “Contract Closeout”.

F. CONTRACTOR Design Data:

1. Written and graphic information.

2. List of assumptions.

3. List of performance and design criteria.

4. Summary of loads or load diagram, if applicable.

5. Calculations.

6. List of applicable codes and regulations.

7. Name and version of software.

8. Information requested in individual Specification Section.

9. Manufacturer’s Instructions: Written or published information that documents manufacturer’s recommendations, guidelines, and procedures in accordance with individual Specification Sections.

G. Operation and Maintenance Data: As required in the Section entitled “Operation and Maintenance Data”.

H. Schedules:

1. Schedule of Shop Drawing and Sample Submittals: Prepare separately or in combination with Progress Schedule as specified in the Section entitled “Progress Schedules”.

a. Show for each, at a minimum, the following:

1) Specification Section number.

2) Identification by numbering and tracking system as specified under Paragraph Transmittal of Submittal.

3) Estimated date of submission to OWNER, including reviewing and processing time.

4) On a monthly basis, submit updated schedule to OWNER if changes have occurred or resubmittals are required.

2. Schedule of Values: In accordance with the Section entitled “Measurement and Payment”.

3. Schedule of Estimated Progress Payments: In accordance with the Section entitled “Progress Schedules”.

4. Progress Schedules: In accordance with the Section entitled “Progress Schedules”.

I. Special Guarantee: Supplier’s written guarantee as required in individual Specification Sections.

J. Statement of Qualification: Evidence of qualification, certification, or registration as required in Contract Documents to verify qualifications of professional land surveyor, engineer, materials testing laboratory, specialty subcontractor, trade, specialist, consultant, installer, and other professionals.

K. Submittals Required by Laws, Regulations, and Governing Agencies:

1. Submit promptly notifications, reports, certifications, payrolls, and otherwise as may be required, directly to the applicable federal, state, or local governing agency or their representative.

2. Transmit to OWNER one copy of correspondence and transmittals (to include enclosures and attachments) between CONTRACTOR and governing agency.

L. Test and Inspection Reports:

1. General: Shall contain signature of person responsible for test or report.

2. Factory:

a. Identification of product and Specification Section, type of inspection or test with referenced standard or code.

b. Date of test, Project title and number, and name and signature of authorized person.

c. Test results.

d. If test or inspection deems material or equipment not in compliance with Contract Documents, identify corrective action necessary to bring into compliance.

e. Provide interpretation of test results, when requested by ENGINEER.

f. Other items as identified in individual Specification Sections.

3. Field: As a minimum, include the following:

a. Project title and number.

b. Date and time.

c. Record of temperature and weather conditions.

d. Identification of product and Specification Section.

e. Type and location of test, sample, or inspection, including referenced standard or code.

f. Date issued, testing laboratory name, address, and telephone number, and name and signature of laboratory inspector.

g. If test or inspection deems material or equipment not in compliance with Contract Documents, identify corrective action necessary to bring into compliance.

h. Provide interpretation of test results, when requested by ENGINEER.

i. Other items as identified in individual Specification Sections.

M. Training Data: In accordance with applicable Sections of these Specifications.

1.05 CONTRACTOR CORRESPONDENCE

A. The CONTRACTOR shall be required to track, at a minimum, the following documents:

1. Requests for Information, RFI's.

2. Daily Reports.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

- END OF SECTION -

PROJECT NO. 12197

SECTION 01310 – PROGRESS SCHEDULES

PART 1 -- GENERAL

1.01 THE REQUIREMENT

A. The CONTRACTOR shall have the capability of preparing and utilizing the specified construction progress scheduling techniques and shall submit schedules as specified herein and in the Section entitled “Submittals”.

1.02 SUBMITTALS

A. Informational Submittals:

1. Preliminary Progress Schedule: Submit within 14 calendar days after Notice to Proceed**.**

2. Detailed Progress Schedule:

a. Submit initial Detailed Progress Schedule within 45 calendar days after Notice to Proceed.

b. Submit an Updated Progress Schedule at each update, in accordance with Article DETAILED PROGRESS SCHEDULE.

3. Submit with Each Progress Schedule Submission:

a. CONTRACTOR's certification that progress schedule submission is actual schedule being utilized for execution of the Work.

b. CD file compatible with Project Planner (P3) Version 3.0 by Primavera Systems, Inc., unless otherwise approved by OWNER and/or ENGINEER.

c. Progress Schedule: 6 legible color copies.

d. Narrative Progress Report: Same number of copies as specified for Progress Schedule.

4. Prior to final payment, submit a final Updated Progress Schedule.

1.03 PRELIMINARY PROGRESS SCHEDULE

A. Submit a detailed schedule, beginning with Notice to Proceed, for minimum duration of 90 calendar days, and a summary of balance of Project through Final Completion.

B. Show activities including, but not limited to the following:

1. Notice to Proceed.

2. Permits.

3. Submittals, with review time. CONTRACTOR may use schedule of Shop Drawings and Samples specified in Section 01300, SUBMITTALS.

4. Early procurement activities for long lead equipment and materials.

5. Initial site work.

6. Earthwork.

7. Specified Work sequences and construction constraints.

8. Contract Milestone and Completion Dates.

9. Owner-furnished products delivery dates or ranges of dates.

10. Major structural, mechanical, equipment, electrical, architectural, and instrumentation and control Work.

11. System startup summary.

12. Project closeout summary.

13. Demobilization summary.

C. Preliminary Progress Schedule will be resource / cost loaded to facilitate progress payments by the OWNER and/or ENGINEER. Cost loading will reflect cash flows and schedule of values.

D. Update Preliminary Progress Schedule monthly; as part of progress payment process. Failure to do so may cause OWNER to withhold all or part of the monthly progress payment until the Preliminary Progress Schedule is updated in a manner acceptable to OWNER and/or ENGINEER.

E. Format: In accordance with Article 1.05 PROGRESS SCHEDULE CRITICAL PATH NETWORK.

1.04 DETAILED PROGRESS SCHEDULE

A. Submit Detailed Progress Schedule beginning with Notice to Proceed and continuing through Final Completion.

B. Show the duration and sequences of activities required for complete performance of the Work reflecting means and methods chosen by CONTRACTOR.

C. Detailed Progress Schedule will be resource / cost loaded to facilitate progress payments by the OWNER and/or ENGINEER. Cost loading will reflect cash flows and the schedule of values with the sum of all tasks equal to the contract total.

D. When accepted by OWNER and/or ENGINEER, Detailed Progress Schedule will replace Preliminary Progress Schedule and become Baseline Schedule. Subsequent revisions will be considered as Updated Progress Schedules.

E. Format: In accordance with Article 1.05 entitled “Progress Schedule – Critical Path Network”.

F. Update monthly to reflect actual progress and occurrences to date, including weather delays.

1.05 PROGRESS SCHEDULE – CRITICAL PATH NETWORK

A. General: The Progress Schedule will be a comprehensive computer-generated schedule using CPM scheduling methodologies and techniques.

B. Contents:

1. Schedule shall begin with the date of Notice to Proceed and conclude with the date of Final Completion.

2. Identify Work schedule using calendar days as a unit of measure.

3. Show complete interdependence and sequence of construction and Project-related activities reasonably required to complete the Work.

4. Identify the Work of separate stages and other logically grouped activities, and clearly identify critical path of activities.

5. Reflect sequences of the Work, restraints, delivery windows, review times, Contract Times and Project Milestones set forth in the Agreement and Section 01520 entitled “Maintenance of Utility Operations During Construction”.

6. Include as applicable, at a minimum:

a. Obtaining permits, submittals for early product procurement, and long lead time items.

b. Mobilization and other preliminary activities.

c. Initial site work.

d. Specified Work sequences, constraints, and Milestones, including Substantial Completion date(s) Subcontract Work.

e. Major equipment design, fabrication, factory testing, and delivery dates.

f. Delivery dates for OWNER-furnished products, as specified in Section 01010, SUMMARY OF WORK, if applicable.

g. Sitework.

h. Concrete Work.

i. Structural steel Work.

j. Architectural features Work.

k. Conveying systems Work.

l. Equipment Work.

m. Mechanical Work.

n. Electrical Work.

o. Instrumentation and control Work.

p. Interfaces with OWNER-furnished equipment, if applicable.

q. Other important Work for each major facility.

r. Equipment and system startup and test activities.

s. Project closeout and cleanup.

t. Demobilization.

7. The duration of an activity, exclusive of those for Submittal reviews and product fabrication/ delivery, shall be not less than 1 day and not more than 14 days, unless otherwise approved.

8. Activity duration for Submittal review shall not be less than review time specified unless clearly identified and prior written acceptance has been obtained from OWNER and/or ENGINEER.

9. Constrained dates will not be utilized except for contractual start and complete dates unless otherwise approved by the OWNER and/or ENGINEER. All tasks will be logically tied unless approved by the OWNER and/or ENGINEER.

C. Network Graphical Display:

1. Plot or print on paper not greater than 30 inches by 42 inches or smaller than 22 inches by 34 inches, unless otherwise approved.

2. Title Block: Show name of Project, OWNER, date submitted, revision or update number, and the name of the scheduler. Updated schedules shall indicate the current data date.

3. Identify horizontally across top of schedule the time frame by year, month, and day.

4. Identify each activity with a unique number and a brief description of the Work associated with that activity.

5. Indicate the critical path.

6. Show, at a minimum, the controlling relationships between activities.

7. Plot activities on a time-scaled basis, with the length of each activity proportional to the current estimate of the duration.

8. Plot activities on an early start basis unless otherwise requested by OWNER and/or ENGINEER.

9. Plot to include current Early Bars as well as Target/Baseline bars.

10. Provide a legend to describe standard and special symbols used.

D. Schedule Report:

1. On 8-1/2-inch by 11-inch white paper, unless otherwise approved.

2. List information for each activity in tabular format, including , at a minimum:

a. Activity Identification Number.

b. Activity Description.

c. Original Duration.

d. Remaining Duration.

e. Early Start Date (Actual start on Updated Progress Schedules).

f. Early Finish Date (Actual finish on Updated Progress Schedules).

g. Late Start Date.

h. Late Finish Date.

i. Total Float.

3. Sort reports, in ascending order, as listed below:

a. Activity number sequence with predecessor and successor activity.

1.06 PROGRESS OF THE WORK

A. Updated Progress Schedule shall reflect:

1. Progress of Work to within 7 calendar days prior to submission.

2. Approved changes in Work scope and activities modified since submission.

3. Delays in Submittals or resubmittals, deliveries, or Work.

4. Adjusted or modified sequences of Work.

5. Other identifiable changes.

6. Revised projections of progress and completion.

7. Report of changed logic.

B. Produce detailed subschedules during Project, upon request of OWNER or ENGINEER, to further define critical portions of the Work such as facility shutdowns.

C. Produce a highlighted 3 Week Look Ahead schedule for construction meetings on a weekly basis or as determined by the OWNER or ENGINEER with schedule information compiled from the latest DETAILED PROGRESS SCHEDULE update.

D. If CONTRACTOR fails to complete activity by its latest scheduled completion date and this failure is anticipated to extend Contract Times (or Milestones), CONTRACTOR shall, within 7 calendar days of such failure, submit a written statement as to how CONTRACTOR intends to correct nonperformance and return to acceptable current progress schedule. Actions by CONTRACTOR to complete the Work within Contract Times (or Milestones) will not be justification for adjustment to Contract Price or Contract Times.

E. OWNER may order CONTRACTOR to increase plant, equipment, labor force or working hours if CONTRACTOR fails to:

1. Complete a Milestone activity by its completion date.

2. Satisfactorily execute Work as necessary to prevent delay to overall completion of Project, at no additional cost to OWNER.

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1.07 NARRATIVE PROGRESS REPORT

A. Format:

1. Organize same as Progress Schedule.

2. Identify, on a cover letter, reporting period, date submitted, and name of author of report.

B. Contents:

1. Number of calendar days and work days worked over the period, work force on hand, construction equipment on hand (including utility vehicles such as pickup trucks, maintenance vehicles, stake trucks).

2. General progress of Work, including a listing of activities started and completed over the reporting period, mobilization/demobilization of subcontractors, and major milestones achieved.

3. CONTRACTOR's plan for management of site (e.g., lay down and staging areas, construction traffic), utilization of construction equipment, buildup of trade labor, and identification of potential Contract changes.

4. Identification of new activities and sequences as a result of executed Contract changes.

5. Documentation of weather conditions over the reporting period, and any resulting impacts to the work.

6. Description of actual or potential delays, including related causes, and the steps taken or anticipated to mitigate their impact.

7. In the case that actual or potential delays have been identified, the Narrative Progress report should be accompanied by a proposed work around schedule to mitigate potential and/or actual delays.

8. Changes to activity logic.

9. Changes to the critical path.

10. Identification of, and accompanying reason for, any activities added or deleted since the last report.

11. Steps taken to recover the schedule from CONTRACTOR-caused delays.

1.08 SCHEDULE ACCEPTANCE

A. OWNER and/or ENGINEER's acceptance will demonstrate agreement that:

1. Proposed schedule is accepted with respect to:

    a. Contract Times, including Final Completion and all intermediate Milestones are within the specified times.

    b. Specified Work sequences and constraints are shown as specified.

    c. Specified OWNER-furnished Equipment or Material arrival dates, or range of dates, are included.

    d. Access restrictions are accurately reflected**.**

    e. Start-up and testing times are as specified.

    f. Submittal review times are as specified.

    g. Startup testing duration is as specified and timing is acceptable.

    h. Resource/cost loading and schedule of valves are equal to the total sum of the signed contract.

2. In all other respects, OWNER and/or ENGINEER's acceptance of CONTRACTOR's schedule indicates that, in OWNER and/or ENGINEER's judgment, schedule represents reasonable plan for constructing Project in accordance with the Contract Documents. OWNER and/or ENGINEER's review will not make any change in Contract requirements. Lack of comment on any aspect of schedule that is not in accordance with the Contract Documents will not thereby indicate acceptance of that change, unless CONTRACTOR has explicitly called the nonconformance to OWNER and/or ENGINEER's attention in submittal. Schedule remains CONTRACTOR's responsibility and CONTRACTOR retains responsibility for performing all activities, for activity durations, and for activity sequences required to construct Project in accordance with the Contract Documents.

B. Unacceptable Preliminary Progress Schedule:

1. Make requested corrections; resubmit within 14 calendar days.

2. Until acceptable to OWNER and/or ENGINEER as Baseline Progress Schedule, continue review and revision process, during which time CONTRACTOR shall update schedule on a monthly basis to reflect actual progress and occurrences to date.

C. Unacceptable Detailed Progress Schedule:

1. Make requested corrections; resubmit within 14 calendar days.

2. Until acceptable to OWNER and/or ENGINEER as Baseline Progress Schedule, continue review and revision process.

D. Narrative Report: All changes to activity duration and sequences, including addition or deletion of activities subsequent to OWNER and/or ENGINEER's acceptance of Baseline Progress Schedule, shall be delineated in Narrative Report current with proposed Updated Progress Schedule.

1.09 ADJUSTMENT OF CONTRACT TIMES

A. Reference General Conditions .

B. Evaluation and reconciliation of Adjustments of Contract Times shall be based on the Updated Progress Schedule at the time of proposed adjustment or claimed delay.

C. Float

1. Float time is a Project resource available to both parties to meet contract Milestones and Contract Times.

2. Use of float suppression techniques such as preferential sequencing or logic, special lead/lag logic restraints, and extended activity times are prohibited, and use of float time disclosed or implied by use of alternate float-suppression techniques shall be shared to proportionate benefit of OWNER and CONTRACTOR.

3. Pursuant to above float-sharing requirement, no time extensions will be granted nor delay damages paid until a delay occurs which (i) impacts Project's critical path, (ii) consumes available float or contingency time, and (iii) extends Work beyond contract completion date.

D. Claims Based on Contract Times:

1. Where OWNER and/or ENGINEER has not yet rendered formal decision on CONTRACTOR's claim for adjustment of Contract Times, and parties are unable to agree as to amount of adjustment to be reflected in progress schedule, CONTRACTOR shall reflect an interim adjustment in the progress schedule as acceptable to OWNER and/or ENGINEER.

2. It is understood and agreed that such interim acceptance will not be binding on either CONTRACTOR or OWNER, and will be made only for the purpose of continuing to schedule Work until such time as formal decision has been rendered as to an adjustment, if any, of the Contract Times.

3. CONTRACTOR shall revise progress schedule prepared thereafter in accordance with OWNER and/or ENGINEER's formal decision.

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PART 2 – PRODUCTS

(NOT USED)

PART 3 – EXECUTION

(NOT USED)

- END OF SECTION -

PROJECT NO. 12197

SECTION 01400 - QUALITY CONTROL

PART 1 -- GENERAL

1.01 THE REQUIREMENT

A. Testing Laboratory Services

1. Laboratory testing and checking required by the Specifications, including the cost of transporting all samples and test specimens, shall be provided and paid for by the OWNER unless otherwise indicated in the Specifications.

2. Materials to be tested include, but are not necessarily limited to the following: cement, concrete aggregate, concrete, bituminous paving materials, structural and reinforcing steel, waterproofing, select backfill, crushed stone or gravel and sand.

3. Tests required by the OWNER shall not relieve the CONTRACTOR from the responsibility of supplying test results and certificates from manufacturers or suppliers to demonstrate conformance with the Specifications.

4. Procedure

   a. The CONTRACTOR shall plan and conduct his operations to permit taking of field samples and test specimens, as required, and to allow adequate time for laboratory tests.

   b. The collection, field preparation and storage of field samples and test specimens shall be as directed by the ENGINEER with the cooperation of the CONTRACTOR.

5. Significance of Tests

   a. Test results shall be binding on both the CONTRACTOR and the OWNER, and shall be considered irrefutable evidence of compliance or noncompliance with the Specification requirements, unless supplementary testing shall prove, to the satisfaction of the OWNER, that the initial samples were not representative of actual conditions.

6. Supplementary and Other Testing

   a. Nothing shall restrict the CONTRACTOR from conducting tests he may require. Should the CONTRACTOR at any time request the OWNER to consider such test results, the test reports shall be certified by an independent testing laboratory acceptable to the OWNER. Testing of this nature shall be conducted at the CONTRACTOR's expense.

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1.02 IMPERFECT WORK, EQUIPMENT, OR MATERIALS

A. Any defective or imperfect work, equipment, or materials furnished by the CONTRACTOR which is discovered before the final acceptance of the work, as established by the Certificate of Substantial Completion, or during the subsequent guarantee period, shall be removed immediately even though it may have been overlooked by the ENGINEER and estimated for payment. Any equipment or materials condemned or rejected by the ENGINEER shall be tagged as such and shall be immediately removed from the site. Satisfactory work or materials shall be substituted for that rejected.

B. The ENGINEER may order tests of imperfect or damaged work, equipment, or materials to determine the required functional capability for possible acceptance, if there is no other reason for rejection. The cost of such tests shall be borne by the CONTRACTOR; and the nature, tester, extent and supervision of the tests will be as determined by the ENGINEER. If the results of the tests indicate that the required functional capability of the work, equipment, or material was not impaired, consistent with the final general appearance of same, the work, equipment, or materials may be deemed acceptable. If the results of such tests reveal that the required functional capability of the questionable work, equipment, or materials has been impaired, then such work, equipment, or materials shall be deemed imperfect and shall be replaced. The CONTRACTOR may elect to replace the imperfect work, equipment, or material in lieu of performing the tests.

1.03 INSPECTION AND TESTS

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

B. The CONTRACTOR shall furnish the services of representatives of the manufacturers of certain equipment, as prescribed in other Sections of the Specifications. The CONTRACTOR shall also place his orders for such equipment on the basis that, after the equipment has been tested prior to final acceptance of the work, the manufacturer will furnish the OWNER with certified statements that the equipment has been installed properly and is ready to be placed in functional operation. Tests and analyses required of equipment shall be paid for by the CONTRACTOR, unless specified otherwise in the Section which covers a particular piece of equipment.

C. Where other tests or analyses are specifically required in other Sections of these Specifications, the cost thereof shall be borne by the party (OWNER or CONTRACTOR)

so designated in such Sections. The OWNER will bear the cost of all tests, inspections, or investigations undertaken by the order of the ENGINEER for the purpose of determining conformance with the Contract Documents if such tests, inspection, or investigations are not specifically required by the Contract Documents, and if conformance is ascertained thereby. Whenever nonconformance is determined by the ENGINEER as a result of such tests, inspections, or investigations, the CONTRACTOR shall bear the full cost thereof or shall reimburse the OWNER for said cost. In this connection, the cost of any additional tests and investigations, which are ordered by the ENGINEER to ascertain subsequent conformance with the Contract Documents, shall be borne by the CONTRACTOR.

PART 2 -- PRODUCTS

(NOT USED)

PART 3 -- EXECUTION

(NOT USED)

- END OF SECTION -

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SECTION 01500 - CONSTRUCTION FACILITIES AND TEMPORARY CONTROLS

PART 1 -- GENERAL

1.01 REFERENCES

A. The following is a list of standards which may be referenced in this Section:

1. NFPA, National Fire Prevention Standard for Safeguarding Building Construction Operations.
2. Florida Department of Law Enforcement – Domestic Terrorism Task Force for Code Orange Conditions.

1.02 SUBMITTALS

A. Informational Submittals:

1. Copies of permits and approvals for construction as required by laws and regulations and governing agencies.
2. Submit a “Contractor Staging Area Location Plan” in accordance with Section 01300, entitled “Submittals”.

1.03 MOBILIZATION

A. Mobilization shall include, but not be limited to, these principal items:

1. Obtaining required permits.
2. Providing onsite sanitary facilities and potable water facilities as specified and as required by Laws and Regulations, and governing agencies.
3. Arrange with the OWNER a Contractor Staging Area. Arrange for size and location. Coordinate with the work of other contractors that are working on the site.
4. Posting OSHA required notices and establishing safety programs and procedures.
5. Have CONTRACTOR's superintendent at site full time.
6. Post Project Sign.

B. Available on-site staging, parking and material storage areas are limited. Refer to the Contract Drawings for specific on-site area availability. The CONTRACTOR is responsible for all costs and other expenses necessary to find and secure and utilize suitable property area(s) adjacent to, or in the vicinity of, the project site for

the CONTRACTOR's staging, parking and material storage area, as determined to be required for the project.

1.04 PERMITS

A. Permits, Licenses, or Approvals: Obtain in accordance with the OWNER's construction standards and Specifications and as otherwise required for completion of the Work.

1.05 PROTECTION OF WORK AND PROPERTY

A. Comply with OWNER's safety rules while on OWNER's project.

B. Keep OWNER informed of serious onsite accidents and related claims.

PART 2 -- PRODUCTS

2.01 PROJECT SIGN

A. Refer to attached Project Sign Detail.

B. Install at locations as directed by the OWNER.

C. Furnish and install up to four signs.

PART 3 -- EXECUTION

3.01 TEMPORARY UTILITIES

A. Power:

1. Commercial electric power service is available from Florida Power and Light in the vicinity of the project site. CONTRACTOR shall determine type and amount required and shall make arrangements for obtaining temporary electric power service, metering equipment, and pay all costs for the temporary electric power used. Upon completion, testing and acceptance of the connection between the proposed facility's electrical system and the permanent power system, portions (or all, as appropriate) of the temporary service may be discontinued; subject to the approval, in writing, by the ENGINEER.

2. The permanent power system shall be used for final equipment testing, startup, performance and acceptance testing.

3. Existing 120 volt, single phase power within the existing buildings (e.g., operations building, etc.) will be made available for the CONTRACTOR's use during construction at no cost to the CONTRACTOR.

4. CONTRACTOR shall determine type and amount required and shall make arrangements for obtaining temporary electric power service, metering equipment, and pay all costs for the temporary electric power used for their construction trailer(s).

5. In accordance with the requirements described in the Section 01520 titled "MAINTENANCE OF UTILITY OPERATIONS DURING CONSTRUCTION " Provide temporary power, including generator, fuel, cables, disconnects, etc. at the Public Services Administration Building and for backwash pump "BWP-2". Temporary generator for Public Services Administration Building shall be minimum 750kW, 480/277V rated unit. Temporary generator for backwash pump "BWP-2" shall be sized as required for the starting of the 150HP backwash pump with across-the-line starter at 4160V electrical system.

6. The cost of electric power supplied by the permanent power system used for final equipment testing, startup, performance and acceptance testing will be paid by the OWNER.

B. Lighting: Provide temporary lighting to meet all applicable safety requirements to allow erection, application, or installation of materials and equipment, and observation or inspection of the Work.

C. Heating, Cooling, and Ventilating:

1. Provide as required to maintain adequate environmental conditions to facilitate progress of the Work, to meet specified minimum conditions for installation of materials, and to protect materials, equipment, and finishes from damage due to temperature or humidity.

2. Provide adequate forced air ventilation of enclosed areas to cure installed materials, to dispense humidity, and to prevent hazardous accumulations of dust, fumes, vapors, or gases.

3. Pay all costs of installation, maintenance, operation, removal, and fuel consumed.

D. Potable Water – Dispenser Furnished: The CONTRACTOR shall furnish chilled bottled drinking water or water furnished in other suitable dispensers for their construction personnel.

E. Potable Water – Connection to Existing Water Supply: When shown or otherwise noted on the Drawings the CONTRACTOR shall be allowed to construct temporary connections and piping to an existing potable water supply at the water treatment plant.

F. Cost for Water: The CONTRACTOR shall make arrangements for and pay for all costs of temporary water service for field offices. Water used for filling and disinfecting tanks and pipes shall be provided by the OWNER at no cost the CONTRACTOR.

G. Sanitary and Personnel Facilities: Provide and maintain facilities for CONTRACTOR's employees, Subcontractors, and all other onsite employer's employees. Service, clean, and maintain facilities and enclosures.

H. Fire Protection: Furnish and maintain on site adequate firefighting equipment capable of extinguishing incipient fires. Comply with applicable parts of National Fire Prevention Standard for Safeguarding Building Construction Operations (NFPA No. 241).

3.02 PROTECTION OF WORK AND PROPERTY

A. General:

1. Where completion of the Work requires temporary or permanent removal and/or relocation of existing utility, coordinate all activities with owner of said utility and perform all work to their satisfaction.

2. Keep fire hydrants and water control valves free from obstruction and available for use at all times.

3. In areas where CONTRACTOR's operations are adjacent to or near a utility, such as gas, telephone, television, electric power, water, sewer, or irrigation system, and such operations may cause damage or inconvenience, suspend operations until arrangements necessary for protection have been made by CONTRACTOR.

4. Do not impair operation of existing utility systems. Prevent construction material, pavement, concrete, earth, volatile and corrosive wastes, and other debris from entering the operating water treatment plant filters.

B. Site Security:

1. General – Code Yellow or Less:

a. All Sites: Provide and maintain temporary security fences as necessary to protect the Work and CONTRACTOR furnished products not yet installed.

b. Secure sites include, but are not limited to, water treatment plants, wastewater treatment plants, wellfields, water booster pump stations, storage facilities, and master lift stations.

c. All employees shall have a company provided photo identification badge approved by the OWNER to be worn at all times while on a secure project site.

d. Visitors shall be required to obtain daily visitor badges and vehicle access.

e. Obtain approval in writing from the OWNER for work on secure sites outside of normal working hours. Approval must be available for inspection while working on the site after hours.

2. Code Orange Conditions for Work on Secure Sites:

a. The CONTRACTOR shall provide a list, to be updated weekly or whenever employees are added or removed, of all employees and subcontractor employees to be provided site access. Access for employees or visitors cannot be guaranteed and is subject to the discretion of security personnel.

b. All employees shall wear badges and sign-in daily.

c. The CONTRACTOR shall provide advance notice and coordinate with the OWNER for screening and delivery of all materials and supplies, including FedEx, US Postal Service, UPS, and all general delivery items.

1) All packages for water treatment plant sites will be delivered through the central depot.
2) All packages shall have the name of a CONTRACTOR’s employee stationed at the jobsite.
3) All delivery drivers shall have suitable photo identification and will be required to go through security procedures.
4) No delay claims will be allowed for failure to obtain clearance for deliveries or to delays associated with the above processes.

3. Code Red Conditions:

a. Work on secure sites will be stopped for the duration of code red conditions. No access by CONTRACTOR or subcontractor personnel will be permitted until clearance has been granted by the OWNER.

b. The CONTRACTOR will be compensated for standby delay under code red conditions as provided in Section 00826, SPECIAL CONDITIONS.

C. Barricades and Lights: Provide as necessary to prevent unauthorized entry to construction areas and affected roads, streets, and alleyways, inside and outside of fenced area, and as required to ensure public safety and the safety of CONTRACTOR's employees, other employer's employees, and others who may be affected by the Work.

D. Finished Construction: Protect finished floors and concrete floors exposed as well as those covered with composition tile or other applied surfacing.

3.03 TEMPORARY CONTROLS

A. Air Pollution Control:

1. Minimize air pollution from construction operations.

2. Burning: Of waste materials, rubbish, or other debris will not be permitted on or adjacent to site.

3. Conduct operations of carrying away demolition debris in trucks to cause a minimum of dust. Strictly adhere to applicable environmental regulations for dust prevention.

B. Noise Control:

1. Provide acoustical barriers so noise emanating from tools or equipment will not exceed legal noise levels.

2. Noise Control Plan: Propose plan to mitigate construction noise and to comply with noise control ordinances, including method of construction, equipment to be used, and acoustical treatments.

3.04 STORAGE YARDS AND BUILDINGS

A. Temporary Storage Yards: Construct temporary storage yards for storage of products that are not subject to damage by weather conditions.

B. Temporary Storage Buildings:

1. Provide environmental control systems that meet recommendations of manufacturers of equipment and materials stored.

2. Arrange or partition to provide security of contents and ready access for inspection and inventory.

3. Store combustible materials (paints, solvents, fuels) in a well ventilated and remote building meeting safety standards.

3.05 PARKING AREAS

A. Control vehicular parking to preclude interference with public traffic or parking, access by emergency vehicles, OWNER's operations, or construction operations.

B. Coordinate with the OWNER to obtain a designated parking area for employees working on this project.

3.06 CLEANUP PROCEDURES FOR HURRICANE WARNINGS AND WATCHES

A. In the event that the National Oceanographic and Atmospheric Administration (NOAA) issues a hurricane watch for the Fort Lauderdale area, the OWNER will contact the CONTRACTOR informing him that the watch has been established. Once notified of a hurricane watch, the CONTRACTOR will remove all unnecessary items from the work area and tie down all remaining supplies, barricades, and movable (under 200 pounds) objects. The OWNER and/or ENGINEER will determine "necessary" items. If a warning is issued, the CONTRACTOR shall complete the clean-up and evacuate the area the same day. The OWNER shall not be liable for any costs or delays caused as a result of demobilization or remobilization due to the above.

3.07 CLEANING DURING CONSTRUCTION

A. In accordance with General Conditions, as may be specified in Specification sections, and as required herein.

B. Wet down exterior surfaces prior to sweeping to prevent blowing of dust and debris. At least weekly, sweep all floors (basins, tunnels, platforms, walkways, roof surfaces), and pick up all debris and dispose.

C. Provide approved containers for collection and disposal of waste materials, debris, and rubbish. At least at weekly intervals, dispose of such waste materials, debris, and rubbish offsite.

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D. Thoroughly clean all spilled dirt, gravel, or other foreign material caused by the construction operations from all streets and roads at the conclusion of each day's operation. Sidewalks, unless under construction, shall be kept clear of material, and available for pedestrian use at all times.

3.08 SUPPLEMENTS

A. The supplements listed below, following “END OF SECTION,” are part of this Specification.

1. Supplement 1, Project Sign Detail.

- END OF SECTION -

Section 01500 – Supplement 1

Fiveash Water Treatment Plant
Hydrotreator 3 and 4
Influent Vault Modifications

STARTING DATE
DATE X, XXXX

PROJECT No. 12197

COMPLETION DATE
DATE X, XXXX

COST $X.X Million

PROJECT NO. 12197

SECTION 01520 – MAINTENANCE OF UTILITY OPERATIONS DURING CONSTRUCTION

PART 1 -- GENERAL

1.01 THE REQUIREMENT

A. The existing plant will be maintained in continuous operation by the OWNER during the entire construction period of the Contract as hereinafter specified. The intent of this Section is to outline the minimum requirements necessary to provide continuous treatment throughout the construction period.

B. Work under the Contract shall be scheduled and conducted by the CONTRACTOR so as not to impede any treatment process except as explicitly permitted hereinafter. In performing the Work shown and specified, the CONTRACTOR shall plan and schedule his Work to meet the plant's daily and seasonal operating requirements, and the constraints and construction requirements as outlined in this Section.

C. The work under the Contract to be performed by the CONTRACTOR may be adjacent to, or within, the work area(s) of other work concurrently in progress that is being performed by other contractors on site. Likewise the work under other Contracts may be adjacent to, or within, the work area(s) of the work under the Contract to be performed by the CONTRACTOR. The CONTRACTOR shall plan, coordinate and schedule his Work with all other contractors on site, to meet the constraints and construction requirements of other Contracts and also meet the plant's daily and seasonal operating requirements as outlined in this Section.

D. The CONTRACTOR shall be responsible for coordinating the general construction and the schedules of electrical, control system, HVAC, plumbing and related trades and for ensuring that permanent or temporary power and controls are available for all existing, proposed, and temporary facilities that are required to be on line at any given time.

E. The CONTRACTOR has the option of providing additional temporary facilities that can eliminate a constraint, provided it is done without cost to the OWNER (including additional OWNER labor) and provided that all requirements of these Specifications are fulfilled. Work not specifically covered in the following paragraphs may, in general, be done at any time during the contract period, subject to the operating requirements and constraints and construction requirements outlined hereinafter. All references to days in this Section shall be consecutive calendar days.

F. The CONTRACTOR is advised that the Work is to be performed in a fully operational water treatment facility, which is the principal source of potable water supply to the City of Fort Lauderdale and associated communities. Work activities include the deployment of personnel, equipment and materials within active potable water treatment units, clearwells and storage facilities. The CONTRACTOR shall be fully responsible for all precautionary measures together with all remediation, cleanup, disinfection, regulatory agency fines and all other labor, materials, and costs associated with any contamination of the potable water

supply caused directly or indirectly by the activities of the CONTRACTOR in the performance of the Work.

G. Notwithstanding other indemnification requirements of the Contract Documents, the CONTRACTOR shall also indemnify, defend, and hold harmless the CITY, the ENGINEER and the CITY's agents from any and all legal action which may arise from contamination of the potable water supply caused directly or indirectly by the CONTRACTOR in the performance of the Work.

1.02 GENERAL CONSTRAINTS

A. The CONTRACTOR shall schedule the Work so that the plant is maintained in continuous operation. All treatment processes shall be maintained in continuous operation during the construction period except during approved process interruptions. All short-term system or partial systems shutdowns shall be approved by the OWNER and the ENGINEER. Long-term process shutdowns and diversions shall conform to the requirements hereinafter specified and shall be minimized by the CONTRACTOR as much as possible. If in the judgment of the OWNER or ENGINEER, a requested shutdown is not required for the CONTRACTOR to perform the Work, the CONTRACTOR shall utilize approved alternative methods to accomplish the Work. All shutdowns shall be coordinated with and scheduled at times suitable to the OWNER. Shutdowns shall not begin until all required materials are on hand and ready for installation. Each shutdown period shall commence at a time approved by the OWNER, in writing. Where required in the Construction Sequence, the CONTRACTOR shall proceed with the Work continuously, (24 hours/day, 7 days/week) start to finish, until the Work is completed and normal plant operation is restored.

B. If the CONTRACTOR completes all required Work before the specified shutdown period has ended, the OWNER may immediately place the existing system back into service.

C. The CONTRACTOR shall schedule short-term and extended shutdowns in advance and shall present all desired shutdowns in the 30 and 60-day schedules at the construction progress meetings. Shutdowns shall be fully coordinated with the Water Facilities Manager and Chief Operator at least 24 hours before the scheduled shutdown. OWNER personnel shall operate OWNER's facilities involved in the short-term and extended shutdowns.

D. Short term shutdowns in plant flow will be allowed for tie-ins to existing facilities, installation of temporary bulkheads, etc. All such shutdowns shall be scheduled for low-flow period during the daily diurnal water demand (as determined by the Water Facilities Manager) and shall generally be limited to four (4) hours or less depending on water demand, system pressure, weather forecast and amount of potable water stored onsite. The schedule and duration of short-term shutdowns shall be at the discretion of the OWNER.

E. Any temporary Work, facilities, roads, walks, protection of existing structures, piping, blind flanges, valves, equipment, etc. that may be required within the CONTRACTOR's Work

limits to maintain continuous and dependable plant operation shall be furnished by the CONTRACTOR at no extra cost to the OWNER.

F. The OWNER shall have the authority to order Work postponed, stopped or prohibited that would, in his opinion, unreasonably result in interrupting the necessary functions of the plant operations.

G. If the CONTRACTOR impairs performance or operation of the plant as a result of not complying with specified provisions for maintaining plant operations, then the CONTRACTOR shall immediately make all repairs or replacements and do all Work necessary to restore the plant to operation to the satisfaction of the OWNER and the ENGINEER. Such Work shall progress continuously to completion on a 24-hours per day, seven Work days per week basis.

H. The CONTRACTOR shall provide the services of emergency repair crews on call 24-hours per day.

I. The Broward County Health Department will be contacted by the OWNER at least 24-hours prior to the shutdown of any process unit. CONTRACTOR shall coordinate scheduled shutdowns with the OWNER.

1.03 GENERAL OPERATING REQUIREMENTS, CONSTRAINTS, AND CONSTRUCTION REQUIREMENTS

A. Access to Plant Site, Roadways, and Parking Areas

1. An unobstructed traffic route through the facility shall be maintained at all times for the OWNER's operations personnel and maintenance equipment. Parking for personal vehicles of construction personnel may park on OWNER property within the facility where designated. The CONTRACTOR shall be responsible for providing access to and for preparing and maintaining approved parking areas.

2. Vehicular access to the treatment units and buildings for OWNER personnel shall be maintained at all times by the CONTRACTOR.

3. The CONTRACTOR shall provide temporary measures to protect the existing pavement by filling over with earthen material or supplying other measures acceptable to the ENGINEER. The CONTRACTOR shall repair any damage to existing paved surfaces that occurs during the construction period. Any areas disturbed along the shoulders of the access road and interior roads and elsewhere inside and outside of the plant shall be repaired, graded, seeded, etc. as necessary to match pre-existing conditions.

4. The CONTRACTOR shall not undertake the restoration/construction of new roadway (paved, gravel, or asphalt overlay) shown on the Contract Drawings, until all other Work on the plant improvements has been completed.

5. It shall be the responsibility of the CONTRACTOR to obtain any permits required from the Florida Department of Transportation and/or Broward County Engineering Division and pay all associated fees.

B. Personnel Access: Treatment plant personnel shall have access to all areas that remain in operation throughout the construction period. The CONTRACTOR shall locate stored material, dispose of construction debris and trash, provide temporary walkways, provide temporary lighting, and other such Work as directed by the ENGINEER to maintain personnel access to areas in operation. Access and adequate parking areas for plant personnel must be maintained throughout construction.

1.04 CONSTRUCTION SEQUENCE AND OPERATIONAL CONSTRAINTS

A. The CONTRACTOR shall plan the Work based on the following suggested outline sequence of construction. The CONTRACTOR shall include consideration of all other ongoing work on site performed by others under other Contracts, as may apply.

B. The following sequence of construction does not include all items necessary to complete the work, but is intended to identify the sequence of critical events necessary to minimize disruption to the on-going treatment plant process and to ensure compliance with regulatory requirements. Events identified below are not all inclusive and additional items of work not shown may be required.

C. Suggested Construction Sequence:

1. Work Element 1 - Construction Mobilization, Submittals and Procurement

a. Set up field offices (if applicable) and staging area, obtain permits, develop and submit construction schedule, shop drawing schedule and begin shop drawing submittals. Submit detailed construction sequence and schedule for review and acceptance in writing. The work cannot proceed until submittal and acceptance of a detailed construction sequence and schedule.

b. Complete connection to all temporary utility services.

c. All Hydrotreators shall remain in service during the performance of Work Element 1.

d. Perform exploratory excavations to locate the joints in the concrete pipe that connects to the wall fittings shown in the Drawings to be removed.

e. Perform all field measurements necessary to manufacture the fabricated wall fittings.

f. Retain a concrete pressure pipe manufacturer. The concrete pressure pipe manufacturer shall:

1) Confirm the joint types between the existing wall pipes and the existing concrete pipes;

2) Prepare shop drawings for the fabricated wall fittings;

3) Manufacture the fabricated wall fittings.

g. Scheduling Constraint: Work element 1 shall be initiated as soon as possible after the CONTRACTOR receives the Notice to Proceed.

2. Work Element 2 – Hydrotreator No. 3 Influent Valve Vault Modifications

a. Scheduling Constraint: Work element 2 shall not start until:

1) The fabricated wall fitting for Hydrotreator No. 3 has arrived on-site; and

2) The OWNER has accepted in writing the CONTRACTOR's Emergency Response Plan required by Specification Section 01535; and

3) The CONTRACTOR has received a letter from the OWNER agreeing to a date and time to initiate shutdown of Hydrotreator No. 3.

b. Coordinate with the OWNER to close the street valve to isolate the Hydrotreator No. 3 Influent Valve Vault along with draining Hydrotreator No. 3.

c. The OWNER will be responsible for draining and removing loose sludge from the Hydrotreator that is removed from service. It is roughly estimated that the OWNER will require seven (7) calendar days to complete draining and sludge removal from the out-of-service Hydrotreator.

d. At a date and time agreed upon by the OWNER in writing, the raw water supply to the aerator will be shut down by the OWNER for four (4) hours to allow the CONTRACTOR to remove the flow meter and install a blind flange on the Hydrotreator No. 3 influent pipe. THE ASSISTANT PUBLIC WORKS DIRECTOR – UTILITIES AND THE WATER AND WASTEWATER TREATMENT MANAGER WILL BE NOTIFIED AT LEAST THREE WORK DAYS PRIOR TO TURNING OFF THE RAW WATER SUPPLY.

e. The OWNER will open the 6-inch drain valve on the Aeration Basing Effluent Box that conveys water to Hydrotreator Nos. 3 and 4. The water from the Aerator Effluent Box will be conveyed from the drain valve to the

sludge pit via temporary piping furnished and installed by the CONTRACTOR. The OWNER will place the Hydrotreator No. 4 influent valve (MOV-2104) in manual mode and close the valve to prevent backflow of water from Hydrotreator No. 4 from entering the Hydrotreator No. 3 influent piping.

f. Remove the Hydrotreator No. 3 flow meter and install the blind flange on the Hydrotreator No. 3 influent pipe as indicated on the Drawings.

g. Perform all work described in the Contract Documents related to Hydrotreator No. 3 Influent Valve Vault.

h. Disinfect Hydrotreator No. 3. The OWNER will perform bacteriological testing. Once the satisfactory bacteriological results are obtained startup and testing of Hydrotreator No. 3 shall begin.

i. Following successful completion of all startup and testing of the Hydrotreator No. 3 Influent Valve Modifications, coordinate with the Owner to return Hydrotreator No. 3 to full time operation.

3. Work Element 3 – Hydrotreator No. 4 Influent Vault Modifications

a. Scheduling Constraint: Work element 3 shall not start until:

1) The fabricated wall fitting for Hydrotreator No. 4 has arrived on site; and

2) The OWNER has accepted in writing the CONTRACTOR's Emergency Response Plan required by Specification Section 01535; and

3) The CONTRACTOR has received a letter from the OWNER agreeing to a date and time to initiate shutdown of Hydrotreator No. 4; and

4) Hydrotreator No. 3 has been operational for seven (7) days continuously without interruption following the completion of Work Element 2.

b. Coordinate with the OWNER to close the street valve to isolate the Hydrotreator No. 4 Influent Valve Vault along with draining Hydrotreator No. 4.

c. The OWNER will be responsible for draining and removing loose sludge from the Hydrotreator that is removed from service. It is roughly estimated that the OWNER will require seven (7) calendar days to complete draining and sludge removal from the out-of-service Hydrotreator.

d. At a date and time agreed upon by the OWNER in writing, the raw water supply to the aerator will be shut down by the OWNER for four (4) hours to allow the CONTRACTOR to remove the flow meter and install a blind flange on the Hydrotreator No. 4 influent pipe. THE ASSISTANT PUBLIC WORKS DIRECTOR – UTILITIES AND THE WATER AND WASTEWATER TREATMENT MANAGER WILL BE NOTIFIED AT LEAST THREE WORK DAYS PRIOR TO TURNING OFF THE RAW WATER SUPPLY.

e. The OWNER will open the 6-inch drain valve on the Aeration Basin Effluent Box that conveys water to Hydrotreator Nos. 3 and 4. The water from the Aerator Effluent Box will be conveyed from the drain valve to the sludge pit via temporary piping furnished and installed by the CONTRACTOR. The OWNER will place the Hydrotreator No. 3 influent valve (MOV-2103) in manual mode and close the valve to prevent backflow of water from Hydrotreator No. 3 from entering the Hydrotreator No. 4 influent piping.

f. Remove the Hydrotreator No. 4 flow meter and install the blind flange on the Hydrotreator No. 4 influent pipe as indicated on the Drawings.

g. Perform all work described in the Contract Documents related to Hydrotreator No. 4 Influent Valve Vault.

h. Disinfect Hydrotreator No. 4. The OWNER will perform bacteriological testing. Once the satisfactory bacteriological results are obtained startup and testing of Hydrotreator No. 4 shall begin.

i. Following successful completion of all startup and testing of the Hydrotreator No. 4 Influent Valve Modifications, coordinate with the Owner to return Hydrotreator No. 4 to full time operation.

4. Work Element 4 - Closeout

a. Scheduling Constraint: Work element 4 shall not start until Hydrotreator No. 4 has been operational for seven (7) days continuously without interruption.

b. Perform closeout activities described in the Contract Documents.

PART 2 -- PRODUCTS

(NOT USED)

PART 3 -- EXECUTION

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(NOT USED)

- END OF SECTION -

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SECTION 01530 - PROTECTION OF EXISTING FACILITIES

PART 1 -- GENERAL

1.01 THE REQUIREMENT

A. The CONTRACTOR shall be responsible for the preservation and protection of property adjacent to the work site against damage or injury as a result of its operations under this Contract. Any damage or injury occurring on account of any act, omission or neglect on the part of the CONTRACTOR shall be restored in a proper and satisfactory manner or replaced by and at the expense of the CONTRACTOR to an equal or superior condition than previously existed.

B. The CONTRACTOR shall comply promptly with such safety regulations as may be prescribed by the OWNER or the local authorities having jurisdiction and shall, when so directed, properly correct any unsafe conditions created by, or unsafe practices on the part of, its employees. In the event of the CONTRACTOR's failure to comply, the OWNER may take the necessary measures to correct the conditions or practices complained of, and all costs thereof will be deducted from any monies due the CONTRACTOR. Failure of the ENGINEER to direct the correction of unsafe conditions or practices shall not relieve the CONTRACTOR of its responsibility hereunder.

C. In the event of any claims for damage or alleged damage to property as a result of work under this Contract, the CONTRACTOR shall be responsible for all costs in connection with the settlement of or defense against such claims. Prior to commencement of work in the vicinity of property adjacent to the work site, the CONTRACTOR, at its own expense, shall take such surveys as may be necessary to establish the existing condition of the property. Before final payment can be made, the CONTRACTOR shall furnish satisfactory evidence that all claims for damage have been legally settled or sufficient funds to cover such claims have been placed in escrow, or that an adequate bond to cover such claims has been obtained.

1.02 PROTECTION OF WORK AND MATERIAL

A. During the progress of the work and up to the date of final payment, the CONTRACTOR shall be solely responsible for the care and protection of all work and materials covered by the Contract.

B. All work and materials shall be protected against damage, injury or loss from any cause whatsoever, and the CONTRACTOR shall make good any such damage or loss at its own expense. Protection measures shall be subject to the approval of the ENGINEER.

1.03 BARRICADES, WARNING SIGNS AND LIGHTS

A. The CONTRACTOR shall provide, erect and maintain as necessary, strong and suitable barricades, danger signs and warning lights along all roads accessible to the public, as required by the authority having jurisdiction, to insure safety to the public. All barricades

and obstructions along public roads shall be illuminated at night and all lights for this purpose shall be kept burning from sunset to sunrise.

B. Each CONTRACTOR shall provide and maintain such other warning signs and barricades in areas of and around their respective work as may be required for the safety of all those employed in the work, OWNER operating personnel, or those visiting the site.

1.04 TEMPORARY BRIDGES

A. Construct temporary bridges at all points where maintenance of traffic across pipeline construction is necessary.

B. Make bridges over public streets, roads, and highways acceptable to authority having jurisdiction thereover.

C. Bridges erected over private roads and driveways shall be adequate for service to which they will be subjected.

D. Provide substantial guardrails and suitably protected approaches.

E. Provide foot bridges not less than 4 feet wide with handrails and uprights of dressed lumber.

F. Maintain bridges in place as long as conditions of the Work require their use for safety of public, except that when necessary for proper prosecution of the Work in immediate vicinity of bridge. Bridge may be relocated or temporarily removed for such period as ENGINEER may permit.

1.05 EXISTING UTILITIES AND STRUCTURES

A. The term existing utilities shall be deemed to refer to both publicly-owned and privately-owned utilities such as electric power and lighting, telephone, water, gas, storm drains, process lines, sanitary sewers and all appurtenant structures.

B. Where existing utilities and structures are indicated on the Drawings, it shall be understood that all of the existing utilities and structures affecting the work may not be shown and that the locations of those shown are approximate only. It shall be the responsibility of the CONTRACTOR to ascertain the actual extent and exact location of existing utilities and structures. In every instance, the CONTRACTOR shall notify the proper authority having jurisdiction and obtain all necessary directions and approvals before performing any work in the vicinity of existing utilities.

C. Prior to beginning any excavation work, the CONTRACTOR shall, through field investigations, determine any conflicts or interferences between existing utilities and new utilities to be constructed under this project. This determination shall be based on the actual locations, elevations, slopes, etc., of existing utilities as determined in the field investigations, and locations, elevation, slope, etc. of new utilities as shown on the Drawings. If interference exists, the CONTRACTOR shall bring it to the attention of the

ENGINEER as soon as possible. If the ENGINEER agrees that interference exists, it shall modify the design as required.

Additional costs to the CONTRACTOR for this change shall be processed through a Change Order as detailed elsewhere in these Contract Documents. In the event the CONTRACTOR fails to bring a potential conflict or interference to the attention of the ENGINEER prior to beginning excavation work, any actual conflict or interference which does arise during the Project shall be corrected by the CONTRACTOR, as directed by the ENGINEER, at no additional expense to the OWNER.

D. The work shall be carried out in a manner to prevent disruption of existing services and to avoid damage to the existing utilities. Temporary connections shall be provided, as required, to insure uninterruption of existing services. Any damage resulting from the work of this Contract shall be promptly repaired by the CONTRACTOR at its own expense in a manner approved by the ENGINEER and further subject to the requirements of any authority having jurisdiction. Where it is required by the authority having jurisdiction that they perform their own repairs or have them done by others, the CONTRACTOR shall be responsible for all costs thereof.

E. Where excavations by the CONTRACTOR require any utility lines or appurtenant structures to be temporarily supported and otherwise protected during the construction work, such support and protection shall be provided by the CONTRACTOR. All such work shall be performed in a manner satisfactory to the ENGINEER and the respective authority having jurisdiction over such work. In the event the CONTRACTOR fails to provide proper support or protection to any existing utility, the ENGINEER may, at its discretion, have the respective authority to provide such support or protection as may be necessary to insure the safety of such utility, and the costs of such measures shall be paid by the CONTRACTOR.

F. Protection of existing utilities, structures and other facilities: The underground pipes, utilities and structures shown on the Plans are located according to the best information available, but may vary by several feet from both the position and elevation shown. The CONTRACTOR shall explore far enough ahead of its work to determine the exact location and condition of such utilities, structures or facilities so that, before the Work is installed, the ENGINEER may change the line or grade of the pipe or other facility, should that become necessary to avoid a conflict. Should this exploration reveal that adjustments to the work are necessary; the CONTRACTOR shall immediately notify the ENGINEER and coordinate with him to adjust the work in a timely fashion avoiding delays to construction. No request for additional compensation or Contract time (except for a non-compensable time extension at the sole discretion of the ENGINEER, whose decision shall be final) resulting from encountering utilities or structures not shown, or differing in location or elevation from that shown, will be considered. The CONTRACTOR shall explore sufficiently ahead of the Work to allow time for any necessary adjustment without delay occasioned by encountering underground utilities or structures which could have or should have been discovered by timely exploration ahead of the Work shall rest solely with the CONTRACTOR.

G. Relocation of existing utilities: The relocation of existing utilities, as noted on the Plans, or for the convenience of the CONTRACTOR shall be the responsibility of the

CONTRACTOR. This work shall be completed by either the forces of the existing utility or the CONTRACTOR's forces at the discretion of the responsible utility. If the work is to be performed by the CONTRACTOR, all work shall be done in accordance with the utility company's requirements. Under no circumstances shall the CONTRACTOR be authorized extra payment for this work, and all cost for the relocation shall be the responsibility of the CONTRACTOR.

H. Any conflicts between the field investigation and the information shown on the Plans shall be brought to the immediate attention of the ENGINEER

1.06 TREES WITHIN PROJECT LIMITS

A. General: The CONTRACTOR shall exercise all necessary precautions so as not to damage or destroy any trees on the project site, and shall not trim or remove any trees unless such trees have been approved for trimming or removal by the jurisdictional agency or OWNER. All existing trees which are damaged during construction shall be replaced by the CONTRACTOR or a certified tree company to the satisfaction of the OWNER.

B. Replacement: The CONTRACTOR shall immediately notify the OWNER if any tree is damaged by the CONTRACTOR's operations. If, in the opinion of the OWNER, the damage is such that replacement is necessary, the CONTRACTOR shall replace the tree at its own expense. The tree shall be of a like size and variety as the tree damaged, or, if of a smaller size, the CONTRACTOR shall pay to the OWNER compensatory payment acceptable to the OWNER.

1.07 NOTIFICATION BY THE CONTRACTOR

A. Prior to any excavation in the vicinity of any existing underground facilities, including all water, sewer, storm drain, gas, petroleum products, or other pipelines; all buried electric power, communications, or television cables; all traffic signal and street lighting facilities; and all roadway and state highway rights-of-way the CONTRACTOR shall notify the respective authorities representing the owners or agencies responsible for such facilities not less than three days nor more than seven days prior to excavation so that a representative

1.08 DETOURS

A. Where authority having jurisdiction requires that traffic be maintained over construction work in a public street, road, or highway, and traffic cannot be maintained on original roadbed or pavement, construct and maintain detour around the Work. Coordinate traffic routing with that of others working in same or adjacent areas.

1.09 RESTORATION OF PAVEMENT

A. General: All paved areas including asphaltic concrete berms cut or damaged during construction shall be replaced with similar materials and of equal thickness to match the existing adjacent undisturbed areas, except where specific resurfacing requirements have been called for in the Contract Documents. All pavements which are subject to partial removal shall be neatly saw cut in straight lines.

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B. Temporary Resurfacing: Wherever required by the public authorities having jurisdiction, the CONTRACTOR shall place temporary surfacing, signage, striping and/or other traffic controls as required, promptly after backfilling and shall maintain such surfacing for the period of time fixed by said authorities before proceeding with the final restoration of improvements.

C. Permanent Resurfacing: In order to obtain a satisfactory junction with adjacent surfaces, the CONTRACTOR shall saw cut back and trim the edge so as to provide a clean, sound, vertical joint before permanent replacement of an excavated or damaged portion of pavement. Damaged edges of pavement along excavations and elsewhere shall be trimmed back by saw cutting in straight lines. All pavement restoration and other facilities restoration shall be constructed to finish grades compatible with adjacent undisturbed pavement.

PART 2 – PRODUCTS (NOT USED)

PART 3 – EXECUTION (NOT USED)

- END OF SECTION -

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SECTION 01535 - EMERGENCY RESPONSE PLANNING

PART 1 -- GENERAL

1.01 EMERGENCY RESPONSE PLAN REQUIREMENTS

A. During construction of the improvements described in these documents, it is conceivable that water piping critical to the production of drinking water in the City of Fort Lauderdale (OWNER) could be impacted by construction activities such as, but not limited to vibration, excavation, sheeting, etc. Depending on the magnitude of the impact, the OWNER's ability to produce water could be compromised. Consequently, the CONTRACTOR shall develop an emergency response plan as described herein.

B. The OWNER recognizes that despite precautions implemented by the CONTRACTOR, there could be risk of damage to the OWNER's piping associated with the construction. The purpose of the CONTRACTOR's emergency response plan is to identify and manage risk to the OWNER's critical piping to the extent practical.

1.02 SUBMITTAL REQUIREMENTS

A. Submit the emergency response plan in accordance with the requirements in Section 01300.

B. The emergency response plan must be accepted in writing by the OWNER prior to initiating piping modifications.

1.03 DAMAGE TO EXISTING UTILITIES

A. Any damage to the OWNER's facilities resulting from the CONTRACTOR's activities shall be promptly repaired by the CONTRACTOR at its own expense in a manner approved by the OWNER.

B. The CONTRACTOR shall work continuously, 24 hours per day, 7 days per week to repair any leak to the OWNER's piping resulting from the CONTRACTOR's activities.

C. In the event of a leak resulting the CONTRACTOR's activities, the OWNER and ENGINEER will observe and inspect the CONTRACTOR's repair/replacement activities. The CONTRACTOR shall reimburse the OWNER for all repair observation/inspection labor deemed necessary by the OWNER.

D. If the City of Fort Lauderdale has to request opening the water distribution piping interconnects with neighboring utilities, the CONTRACTOR will be held responsible for any costs associated with obtaining water from neighboring utilities.

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1.04 EMERGENCY RESPONSE PLAN OUTLINE

A. A conceptual table of contents that briefly outlines the OWNER's expectations for the content of the CONTRACTOR's emergency response plan is presented below.

1. Section 1 – Executive Summary.

2. Section 2 – Introduction: This section shall describe the purpose, goals and overall organization of the emergency response plan.

3. Section 3 – Incident Command System: This section shall describe the incident command system (ICS) organizational structure that will be implemented during a response. The ICS shall be modeled on the National Incident Management System developed by the Department of Homeland Security. The ICS command structure shall include personnel from the OWNER, CONTRACTOR and ENGINEER. The OWNER shall be the incident commander.

4. Section 4 – Crises Communication Plan: This section shall provide procedures and policies for communicating information to the public during an emergency. Members of the crises communication team shall be identified and shall include OWNER, CONTRACTOR and ENGINEER personnel. OWNER personnel lead the crises communication team. OWNER personnel authorized to conduct media interviews will be identified and included in the ICS organizational structure chart. Pre-scripted ("fill in the blank") news releases shall be prepared and included in an Appendix.

5. Section 5 – Agency Notification Plan: This section shall: 1) provide CONTRACTOR procedures for notifying the OWNER of an emergency condition and 2) identify OWNER personnel authorized to communicate with regulatory agencies.

6. Section 6 – Emergency Flow Control: This section shall identify methods for minimizing water consumption via news media releases and lowering of water supply pressure. This section shall also identify procedure for issuance of boil water orders and procedures for opening emergency water interconnects with adjacent water suppliers. Pre-scripted ("fill in the blank") news releases shall be prepared and included in an Appendix.

7. Section 7 – Emergency Operations: This section shall identify: 1) procedures for activating the emergency response plan; 2) potential failure modes; 2) feasible repair options; 3) repair materials recommended for purchase prior to initiating piping modifications; 4) list of OWNER "on-call" contractors that could supply resources during an emergency, such as dewatering; 5) list of available OWNER material and equipment resources that could be supplied during an emergency, such as mobile generators, portable lighting, repair couplings, etc.

8. Appendix A: City of Fort Lauderdale Contact List

9. Appendix B: Project No. 12197 Contractor Contact List

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10. Appendix C: City of Fort Lauderdale “On-Call” Contractor Contact List
11. Appendix D: Mutual Aid (FlaWARN) Resources List (adjacent municipalities and Miami-Dade Water and Sewer Department)
12. Appendix E: Regulatory Agency Contact List
13. Appendix F: Media Contact List – Television
14. Appendix G: Media Contact List – Radio
15. Appendix H: Media Contact List – Print
16. Appendix I: Pre-scripted News Releases

PART 2 – PRODUCTS (NOT USED)

PART 3 – EXECUTION (NOT USED)

- END OF SECTION -

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SECTION 01540
DEMOLITION AND REMOVAL OF EXISTING STRUCTURES AND EQUIPMENT

PART 1 -- GENERAL

1.01 THE REQUIREMENT

A. This Section covers the demolition, removal, and disposal of existing buildings, structures, pavement, curbs, and sidewalk, removal and disposal of asbestos materials, and any existing equipment including electrical, plumbing, heating and ventilating equipment and piping not required for the operation of the rehabilitated plant as indicated on the Drawings and as specified hereinafter. The CONTRACTOR shall furnish all labor, materials and equipment to demolish buildings and structures and to remove fixtures, anchors, supports, piping and accessories designated to be removed on the Drawings.

1.02 TITLE TO EQUIPMENT AND MATERIALS

A. CONTRACTOR shall have no right or title to any of the equipment, materials or other items to be removed from the existing buildings or structures unless and until said equipment, materials and other items have been removed from the premises. The CONTRACTOR shall not sell or assign, or attempt to sell or assign any interest in the said equipment, materials or other items until the said equipment, materials or other items have been removed.

B. CONTRACTOR shall have no claim against the OWNER because of the absence of such fixtures and materials.

1.03 CONDITION OF STRUCTURES AND EQUIPMENT

A. The OWNER does not assume responsibility for the actual condition of structures and equipment to be demolished and removed.

B. Conditions existing at the time of inspection for bidding purposes will be maintained by the OWNER so far as practicable.

C. The information regarding the existing structures and equipment shown on the Drawings is based on visual inspection and a walk-through survey only. Neither the ENGINEER nor the OWNER will be responsible for interpretations or conclusions drawn therefrom by the CONTRACTOR.

PART 2 -- PRODUCTS

(NOT USED)

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PART 3 -- EXECUTION

3.01 DEMOLITION AND REMOVALS

A. The removal of all equipment and piping, and all materials from the demolition of buildings and structure shall, when released by the OWNER and ENGINEER, shall be done by the CONTRACTOR and shall become the CONTRACTOR's property, unless otherwise noted, for disposition in any manner not contrary to the Contract requirements and shall be removed from the site to the CONTRACTOR's own place of disposal.

B. The Electrical Contractor (Subcontractor) specifically, shall de-energize all panelboards, lighting fixtures, switches, circuit breakers, electrical conduits, motors, limit switches, pressure switches, instrumentation such as flow, level and/or other meters, wiring, and similar power equipments prior to removal. Any electric panels or equipment that are to be retained shall be relocated or isolated by the Electrical Contractor (Subcontractor) specifically, prior to the removal of the equipment specified herein.

C. The CONTRACTOR shall proceed with the removal of the equipment, piping and appurtenances in a sequence designed to maintain the plant in continuous operation as described in Section 01520, Maintenance of Utility Operations During Construction, and shall proceed only after approval of the ENGINEER.

D. Any equipment piping and appurtenances removed without proper authorization, which are necessary for the operation of the existing facilities shall be replaced to the satisfaction of the ENGINEER at no cost to the OWNER.

E. Excavation caused by demolitions shall be backfilled with fill free from rubbish and debris.

3.02 PROTECTION

A. Demolition and removal work shall be performed by competent experienced workmen for the various type of demolition and removal work and shall be carried out through to completion with due regard to the safety of OWNER employees, workmen on-site and the public. The work shall be performed with as little nuisance as possible.

B. The work shall comply with the applicable provisions and recommendation of ANSI A10.2, Safety Code for Building Construction, all governing codes, and as hereinafter specified.

C. The CONTRACTOR shall make such investigations, explorations and probes as are necessary to ascertain any required protective measures before proceeding with demolition and removal. The CONTRACTOR shall give particular attention to shoring and bracing requirements so as to prevent any damage to new or existing construction.

D. The CONTRACTOR shall provide, erect, and maintain catch platforms, lights, barriers, weather protection, warning signs and other items as required for proper protection of the public, occupants of the building, workmen engaged in demolition operations, and adjacent construction.

E. The CONTRACTOR shall provide and maintain weather protection at exterior openings so as to fully protect the interior premises against damage from the elements until such openings are closed by new construction.

F. The CONTRACTOR shall provide and maintain temporary protection of the existing structure designated to remain where demolition, removal and new work is being done, connections made, materials handled or equipment moved.

G. The CONTRACTOR shall take necessary precautions to prevent dust from rising by wetting demolished masonry, concrete, plaster and similar debris. Unaltered portions of the existing buildings affected by the operations under this Section shall be protected by dust-proof partitions and other adequate means.

H. The CONTRACTOR shall provide adequate fire protection in accordance with local Fire Department requirements.

I. The CONTRACTOR shall not close or obstruct walkways, passageways, or stairways and shall not store or place materials in passageways, stairs or other means of egress. The CONTRACTOR shall conduct operations with minimum traffic interference.

J. The CONTRACTOR shall be responsible for any damage to the existing structure or contents by reason of the insufficiency of protection provided.

3.03 WORKMANSHIP

A. The demolition and removal work shall be performed as described in the Contract Documents. The work required shall be done with care, and shall include all required shoring, bracing, etc. The CONTRACTOR shall be responsible for any damage which may be caused by demolition and removal work to any part or parts of existing structures or items designated for reuse or to remain. The CONTRACTOR shall perform patching, restoration and new work in accordance with applicable Technical Sections of the Specifications and in accordance with the details shown on the Drawings. Prior to starting of work, the CONTRACTOR shall provide a detailed description of methods and equipment to be used for each operation and the sequence thereof for review by the ENGINEER.

B. All supports, pedestals and anchors shall be removed with the equipment and piping unless otherwise specified or required. Concrete bases, anchor bolts and other supports shall be removed to approximately 1-inch below the surrounding finished area and the recesses shall be patched to match the adjacent areas. Superstructure wall and roof openings shall be closed, and damaged surfaces shall be patched to match the adjacent areas, as specified under applicable Sections of these Specifications, as shown on the Drawings, or as directed by the ENGINEER. Wall sleeves and castings shall be plugged or blanked off, all openings in concrete shall be closed in a manner meeting the requirements of the appropriate Sections of these Specifications, as shown on the Drawings, and as directed and approved by the ENGINEER.

C. Materials or items designated to remain the property of the OWNER shall be as hereinafter tabulated. Such items shall be removed with care and stored at a location at the site to be designated by the OWNER.

D. Where equipment is shown or specified to be removed and relocated, the CONTRACTOR shall not proceed with removal of this equipment without specific prior approval of the ENGINEER. Upon approval, and prior to commencing removal operations, the equipment shall be operated in the presence of representatives of the CONTRACTOR, OWNER and ENGINEER. Such items shall be removed with care, under the supervision of the trade responsible for reinstallation and protected and stored until required. Material or items damaged during removal shall be replaced with similar new material or item. Any equipment that is removed without proper authorization and is required for plant operation shall be replaced at no cost to the OWNER.

E. Wherever piping is to be removed for disposition, the piping shall be drained by the CONTRACTOR and adjacent pipe and headers that are to remain in service shall be blanked off or plugged and then anchored in an approved manner.

F. Materials or items demolished and not designated to become the property of the OWNER or to be reinstalled shall become the property of the CONTRACTOR and shall be removed from the property and legally disposed of.

G. The CONTRACTOR shall execute the work in a careful and orderly manner, with the least possible disturbance to the public and to the occupants of the building.

H. In general, masonry shall be demolished in small sections, and where necessary to prevent collapse of any construction, the CONTRACTOR shall install temporary shores, struts, and bracing.

I. Where alterations occur, or new and old work join, the CONTRACTOR shall cut, remove, patch, repair or refinish the adjacent surfaces to the extent required by the construction conditions, so as to leave the altered work in as good a condition as existed prior to the start of the work. The materials and workmanship employed in the alterations, unless otherwise shown on the Drawing or specified, shall comply with that of the various respective trades which normally perform the particular items or work.

J. The CONTRACTOR shall finish adjacent existing surfaces to new work to match the specified finish for new work. The CONTRACTOR shall clean existing surfaces of dirt, grease, loose paint, etc., before refinishing.

K. The CONTRACTOR shall cut out embedded anchorage and attachment items as required to properly provide for patching and repair of the respective finishes.

L. The CONTRACTOR shall confine cutting of existing roof areas designated to remain to the limits required for the proper installation of the new work. The CONTRACTOR shall

cut and remove insulation, etc., and provide temporary weather tight protection as required until new roofing and flashings are installed.

M. The CONTRACTOR shall remove temporary work, such as enclosures, signs, guards, and the like when such temporary work is no longer required or when directed at the completion of the work.

3.04 MAINTENANCE

A. The CONTRACTOR shall maintain the buildings, structures and public properties free from accumulations of waste, debris and rubbish, caused by the demolition and removal operations.

B. The CONTRACTOR shall provide on-site dump containers for collection of waste materials, debris and rubbish, and he shall wet down dry materials to lay down and prevent blowing dust.

C. At reasonable intervals during the progress of the demolition and removal work or as directed by the ENGINEER, the CONTRACTOR shall clean the site and properties, and dispose of waste materials, debris and rubbish.

3.05 EQUIPMENT TEMPORARILY REMOVED FROM SERVICE

A. Certain existing equipment is shown on the Drawings to be removed from service, cleaned, painted, temporarily stored and reinstalled. Equipment to be temporarily removed from service include, but are not limited to: valves, torque tubes and magnetic flow meters. The OWNER will provide the CONTRACTOR with a storage location on the project site for storage of equipment.

B. The magnetic flow meters shall be stored in a climate controlled location.

3.06 STATEMENT OF RESPONSIBILITIES REGARDING ASBESTOS

A. Not used.

- END OF SECTION -

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SECTION 01600 - MATERIALS AND EQUIPMENT

PART 1 -- GENERAL

1.01 THE REQUIREMENT

A. The CONTRACTOR shall furnish, install, test, and place in acceptable operation all material and equipment and all necessary accessories as specified herein, as shown on the Drawings, and as required for a complete and operable system.

B. The equipment shall be provided complete with all accessories, special tools, spare parts, mountings, and other appurtenances as specified, and as may be required for a complete and operating installation.

C. It is the intent of these Specifications that the CONTRACTOR shall provide the OWNER complete and operational equipment/systems. To this end, it is the responsibility of the CONTRACTOR to provide necessary ancillary items such as controls, wiring, etc., to make each piece of equipment operational as intended by the Specifications.

D. Furnish and Install

1. Where the words "furnish", "provide", "supply", "replace", or "install" are used, whether singularly or in combination, they shall mean to furnish and install, unless specifically stated otherwise.

2. In the interest of brevity, the explicit direction "to furnish and install" has sometimes been omitted in specifying materials and/or equipment herein. Unless specifically noted otherwise, it shall be understood that all equipment and/or materials specified or shown on the Drawings shall be furnished and installed under the Contract as designated on the Drawings.

1.02 RELATED WORK SPECIFIED ELSEWHERE

A. Section 01430 – Operations and Maintenance Data

B. Section 01660 – Equipment Testing and Startup

1.03 JOB SITE DELIVERY TIMING

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

B. The CONTRACTOR shall not deliver to the job site equipment and materials that are not scheduled to be incorporated into the work within the following 120 calendar days.

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1.04 REFERENCE SPECIFICATIONS, CODES, AND STANDARDS

A. All equipment, materials, and installations shall conform to the requirements of the most recent editions with latest revisions, supplements, and amendments of the specifications, codes, and standards listed in Section 01090, Reference Standards.

1.05 PERFORMANCE AFFIDAVITS

A. When required in the appropriate equipment Specifications, the CONTRACTOR shall submit manufacturer's Performance Affidavits for equipment to be furnished.

B. By these affidavits, each manufacturer must certify to the CONTRACTOR and the OWNER, jointly, that he has examined the Contract Documents and that the equipment, apparatus, or process he offers to furnish will meet in every way the performance requirements set forth or implied in the Contract Documents.

C. The CONTRACTOR must transmit to the ENGINEER three (3) copies of the affidavit given him by the manufacturer or supplier along with the initial Shop Drawing submittals.

D. The Performance Affidavit must be signed by an officer of the basic corporation, partnership, or company manufacturing the equipment and witnessed by a notary public.

E. Shop Drawings, if required, will not be reviewed prior to receipt of an acceptable Performance Affidavit.

F. The Performance Affidavit shall have the following format:

Addressed to: City of Fort Lauderdale
100 N. Andrews Avenue
Engineering Division 4th Floor
Fort Lauderdale, FL 33301
Attention: Daniel Lizarazo

Reference: City of Fort Lauderdale
Project No. 12197
Fiveash Water Treatment Plant:
Hydrotreators 3 and 4 Influent Vault Modifications
Performance Affidavit

Text: (Manufacturer's Name) has examined the Contract Documents and hereby state that the (Product) meets in every way the performance requirements set forth or implied in Section _____ of the Contract Documents.

Signature: Corporate Officers shall be Vice President, or higher. (Unless statement authorizing signature is attached.)

1.06 SHOP DRAWINGS

A. Shop Drawings, descriptive data, dimensions, parts, performance characteristics, material Specifications, construction details, piping and wiring diagrams, and associated items, as appropriate, showing conformance of all equipment to the Contract Documents, shall be submitted to the ENGINEER for review in accordance with Section 01300, Submittals. Additional required information shall include: the horsepower, voltage, and rotative speed of the motor along with other pertinent motor data, and the total weight of the equipment plus the approximate weight of the shipped materials. Shop Drawings shall also include complete erection, installation, and adjustment instructions, and recommendations.

B. SHOP DRAWINGS ON ITEMS REQUIRING PERFORMANCE AFFIDAVITS WILL NOT BE REVIEWED UNTIL ACCEPTABLE PERFORMANCE AFFIDAVITS ARE RECEIVED.

1.07 OPERATION AND MAINTENANCE INSTRUCTION/MANUALS

A. Refer to Section 01430 entitled “Operations and Maintenance Data” for requirements.

1.08 COORDINATION

A. The CONTRACTOR shall coordinate all details, locations, field measurements and other conditions with various equipment suppliers, so that the equipment supplied functions as part of a complete system.

1.09 SERVICES OF THE MANUFACTURER’S REPRESENTATIVE

A. The CONTRACTOR shall provide the services of a qualified manufacturer's representative who shall adequately supervise the installation and testing of all equipment furnished under this Contract and instruct the OWNER's operating personnel in its maintenance and operation as outlined in Section 01660 – Equipment Testing and Startup. The Contract prices for equipment shall include the cost of furnishing the manufacturer's representative for the number of days specified in the individual equipment specifications. Any additional time required to achieve successful installation and operation shall be at the expense of the CONTRACTOR.

B. The manufacturer's representative shall sign in and out at the office of the ENGINEER's Resident Project Representative on each day he is at the project.

C. The times specified for services by the manufacturer's technical representative herein or in the equipment specifications are exclusive of travel time to and from the facility and shall not be construed as to relieve the manufacturer of any additional visits to provide sufficient service to place the equipment in satisfactory operation.

D. The CONTRACTOR shall notify manufacturers or suppliers that they will be required to state and guarantee a firm delivery date for all equipment that they offer to furnish. Delivery dates shall be as required by the CONTRACTOR to meet the approved progress schedule.

E. Unless otherwise referenced in the individual equipment specification section, the services of the manufacturer's representative shall be provided for a period as stated in the following schedule:

Item	Duration (days)
1. Proper Installation Check and Functional Test	1
2. Performance Test	1
3. Operation and Maintenance Training	1

1.10 SUBSTITUTIONS

A. Requests for substitutions of equipment or materials shall conform to the requirements of the General Conditions, Supplemental Conditions, and as hereinafter specified.

1. CONTRACTOR shall submit for each proposed substitution sufficient details, complete descriptive literature and performance data together with samples of the materials, where feasible, to enable the OWNER and ENGINEER to determine if the proposed substitution is equal.

2. CONTRACTOR shall submit certified tests, where applicable, by an independent laboratory attesting that the proposed substitution is equal.

3. A list of installations where the proposed substitution is equal.

4. Requests for substitutions shall include full information concerning differences in cost, and any savings in cost resulting from such substitutions shall be passed on to the OWNER.

B. Where the approval of a substitution requires revision or redesign of any part of the work, including that of other Contracts, all such revision and redesign, and all new drawings and details therefore, shall be provided by the CONTRACTOR at his own cost and expense, and shall be subject to the approval of the OWNER and ENGINEER.

C. In the event that the ENGINEER is required to provide additional engineering services, then the ENGINEER's charges for such additional services shall be charged to the CONTRACTOR by the OWNER in accordance with the requirements of the General Conditions, and the Supplemental Conditions.

D. In all cases the OWNER and ENGINEER shall be the judge as to whether a proposed substitution is to be approved. The CONTRACTOR shall abide by their decision when proposed substitute items are judged to be unacceptable and shall in such instances furnish the item specified or indicated. No substitute items shall be used in the work without written approval of the OWNER and ENGINEER.

E. CONTRACTOR shall have and make no claim for an extension of time or for damages by reason of the time taken by the ENGINEER in considering a substitution proposed by the

CONTRACTOR or by reason of the failure of the ENGINEER to approve a substitution proposed by the CONTRACTOR.

F. Acceptance of any proposed substitution shall in no way release the CONTRACTOR from any of the provisions of the Contract Documents.

PART 2 -- PRODUCTS

2.01 GENERAL

A. All parts of the equipment furnished shall be amply designed and constructed for the maximum stresses occurring during fabrication, erection, and continuous operation.

B. All materials shall be new and both workmanship and materials shall be of the very best quality, entirely suitable for the service to which the unit is to be subjected and shall conform to all applicable sections of these Specifications.

C. All parts of duplicate equipment shall be interchangeable without modification. Manufacturer's design shall accommodate all the requirements of these Specifications.

D. All bearings and moving parts shall be adequately protected by bushings or other approved means against wear, and provision shall be made for adequate lubrication by readily accessible devices.

E. All equipment or component of equipment (e.g., motors) greater than 100 pounds shall have lifting lugs, eyebolts, etc., for ease of lifting, without damage or undue stress exerted on its components.

F. Provide manufacturer's standard materials suitable for service conditions, unless otherwise specified in the individual Specifications.

G. Where product specifications include a named manufacturer, with or without model number, and also include performance requirements, named manufacturer's products must meet the performance specifications.

H. Like items of products furnished and installed in the Work shall be end products of one manufacturer and of the same series or family of models to achieve standardization for appearance, operation and maintenance, spare parts and replacement, manufacturer's services, and implement same or similar process instrumentation and control functions in same or similar manner.

I. Do not use materials and equipment removed from existing premises, except as specifically permitted by Contract Documents.

J. Provide interchangeable components of the same manufacturer, for similar components, unless otherwise specified.

K. Equipment, Components, Systems, Subsystems: Design and manufacture with due regard for health and safety of operation, maintenance, and accessibility, durability of parts, and shall comply with applicable OSHA, state, and local health and safety regulations.

L. Regulatory Requirement: Coating materials shall meet federal, state, and local requirements limiting the emission of volatile organic compounds and for worker exposure.

M. Safety Guards: All rotating shafts, couplings, or other moving pieces of equipment shall be provided with suitable protective guards of sheet metal or wire mesh, neatly and rigidly supported. Guards shall be removable as required to provide access for repairs.

N. Provide materials and equipment listed by UL wherever standards have been established by that agency.

2.02 EQUIPMENT FOUNDATIONS, SUPPORTS AND ANCHORS

A. The CONTRACTOR shall provide concrete foundations/bases for all equipment items including mechanical equipment, tanks, control cabinets, etc. Concrete foundations shall be provided whether shown on the drawings or not.

B. Concrete foundations shall be a minimum of 4-inches thick unless otherwise shown or detailed on the Drawings. Equipment bases shall be tied into floor slabs by means of reinforcing bars or dowels. Foundation drawings shall be submitted to the ENGINEER for review in accordance with the requirements of the Section entitled "Submittals".

C. All equipment supports, anchors, and restrainers shall be adequately designed for static, dynamic, and seismic loads. A seismic force of 0.25 of gravity shall be assumed for this purpose, unless otherwise required by local conditions.

D. Anchor bolts and fasteners shall be of number, size, strength, and material required for the purpose intended and shall be in accordance with section entitled “Metal Fastening”, and with the detailed equipment Specifications. Anchor bolts and templates for equipment foundations shall be furnished by the CONTRACTOR.

E. Pipe sleeves or other means of adjusting anchor bolts shall be provided where indicated or required. Equipment shall be leveled by first using sitting nuts on the anchor bolts, and then filling the space between the equipment base and concrete pedestal with non-shrink grout, unless alternate methods are recommended by the manufacturer and are acceptable to the ENGINEER (such as shim leveling pumps). Non-shrink grout shall be as specified in section entitled “Grout”.

2.03 STANDARDIZATION OF GREASE FITTINGS

A. The grease fittings on all mechanical equipment shall be such that they can be serviced with a single type of grease gun. Fittings shall be hydraulic type, Alemite.

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2.04 ACCESSORIES, LUBRICANTS, SPARE PARTS, AND SPECIAL TOOLS

A. Spare parts for equipment shall be furnished where indicated in the equipment Specifications or where recommended by the equipment manufacturer.

B. Spare parts shall be identical and interchangeable with original parts.

C. Parts shall be supplied in clearly identified containers, except that large or bulky items may be wrapped in polyethylene.

D. Painting requirements for spare parts shall be identical to those for original, installed parts.

E. Spare parts shall be stored separately in a locked area, maintained by the CONTRACTOR, and shall be turned over to the OWNER in a group prior to substantial completion. All of these materials shall be properly packed, labeled, and stored where directed by the OWNER and ENGINEER.

F. CONTRACTOR shall submit, for approval by the ENGINEER, a complete list of the special tools and appliances to be furnished. Such tools and appliances shall be furnished in approved painted steel cases, properly labeled and equipped with good grade cylinder locks and duplicate keys.

G. The CONTRACTOR shall furnish all special tools and appliances necessary to operate, disassemble, service, repair, and adjust the equipment and shall furnish a one year supply of all recommended lubricating oils and greases. The manufacturer shall submit a list of at least four manufacturer's standard lubricants that may be used interchangeably for each type of lubricant required. All of these materials shall be properly packed, labeled and stored where directed by the ENGINEER.

PART 3 -- EXECUTION

3.01 SHOP TESTING

A. All equipment so noted in the technical specifications, shall be tested in the shop of the manufacturer in a manner that shall conclusively prove that its characteristics comply fully with the requirements of the Contract Documents and that it will operate in the manner specified or implied.

B. Where multiple units of an identical design are specified to be tested, unless otherwise noted, only one of each group shall require testing.

C. Equipment specified to be shop tested shall not be shipped from the manufacturer until the ENGINEER has been furnished a certified copy of test results and has notified the CONTRACTOR, in writing, that the results of such tests are acceptable.

D. When called for in technical specifications, arrangements shall be made for the ENGINEER and OWNER to witness performance tests in the manufacturer's shop. The

ENGINEER shall be notified ten working days before shop testing commences. Expenses are to be paid by the CONTRACTOR.

E. Five (5) certified copies of the manufacturer's actual test data and interpreted results thereof, shall be forwarded to the ENGINEER for review.

3.02 DELIVERY, UNLOADING AND INSPECTION

A. The CONTRACTOR shall not deliver to the job site equipment and materials that are not scheduled to be incorporated into the work within the following 120 calendar days.

B. Deliver products in accordance with accepted current progress schedule and coordinate to avoid conflict with the Work and conditions at site. Deliver anchor bolts and templates sufficiently early to permit setting prior to placement of structural concrete.

C. Deliver products in undamaged condition, in manufacturer's original container or packaging, with identifying labels intact and legible. Include on label, date of manufacture and shelf life, where applicable. Include UL labels on products so specified.

D. Unload products in accordance with manufacturer's instructions for unloading or as specified. Record receipt of products at site. Inspect for completeness and evidence of damage during shipment.

E. Remove damaged products from site and expedite delivery of identical new undamaged products, and remedy incomplete or lost products to provide that specified, so as not to delay progress of the Work. Delays to the Work resulting from material or equipment damage that necessitates procurement of new products will be considered delays within CONTRACTOR's control.

F. Notify ENGINEER upon arrival of major equipment and materials.

3.03 HANDLING, STORAGE AND PROTECTION

A. CONTRACTOR shall store his equipment and materials at the job site in accordance with the requirements of the General Conditions, the Supplemental Conditions, and as hereinafter specified.

B. All equipment and materials shall be stored in accordance with manufacturer's recommendations and as directed by the OWNER or ENGINEER, and in conformity to applicable statutes, ordinances, regulations and rulings of the public authority having jurisdiction and in manner to prevent damage.

C. Equipment and materials stored in the job site, or offsite in a bonded warehouse, is stored at the CONTRACTOR's risk. Any equipment or materials of whatever kind, which may have become damaged or deteriorated from any cause, shall be removed and replaced by items that are satisfactory to the ENGINEER at no expense to the OWNER.

D. Arrange storage in a manner to provide easy access for inspection and manufacturer's recommended maintenance. Make periodic inspections of stored products to assure that products are maintained under specified conditions, and free from damage or deterioration. Keep running account of products in storage to facilitate inspection and to estimate progress payments for products delivered, but not installed in the Work.

E. Store electrical, instrumentation, and control products, and equipment with bearings in weather-tight structures maintained above 60 degrees F. Protect electrical, instrumentation, and control products, and insulation against moisture, water, and dust damage.

F. Where space or strip heaters are provided within the enclosure for motors, valve operators, motor starters, panels, instruments, or other electrical equipment, the CONTRACTOR shall make connections to these heaters from an appropriate power source and operate the heaters continuously with temperature control as necessary until the equipment is installed and being operated according to its intended use.

G. Store fabricated products above ground on blocking or skids, and prevent soiling or staining. Store loose granular materials in well-drained area on solid surface to prevent mixing with foreign matter. Cover products that are subject to deterioration with impervious sheet coverings; provide adequate ventilation to avoid condensation.

H. CONTRACTOR shall not store equipment and materials or encroach upon private property without the written consent of the owners of such private property.

I. CONTRACTOR shall not store unnecessary materials or equipment on the job site.

J. CONTRACTOR shall take care to prevent any structure from being loaded with a weight which will endanger its security or the safety of persons.

K. Materials shall not be placed within ten (10) feet of fire hydrants. Gutters, drainage channels and inlets shall be kept unobstructed at all times.

L. CONTRACTOR shall provide adequate temporary storage buildings/facilities, if required, to protect materials or equipment on the job site.

3.04 INSTALLATION

A. The CONTRACTOR shall obtain written installation manuals from the equipment manufacturer prior to installation. Equipment shall be installed strictly in accordance with recommendations of the manufacturer. The CONTRACTOR shall retain a copy of the manufacturer’s installation manuals on site, stored in the CONTRACTOR’s field office and available for review at all times.

B. The CONTRACTOR shall have on hand sufficient personnel, proper construction equipment, and machinery of ample capacity to facilitate the work and to handle all emergencies normally encountered in work of this character. To minimize field erection problems, mechanical units shall be factory-assembled insofar as practical.

C. Equipment shall be erected in a neat and workmanlike manner on the foundations at the locations and elevations shown on the Drawings.

D. All blocking and wedging required for the proper support and leveling of equipment during installation shall be furnished by the CONTRACTOR. All temporary supports shall be removed, except steel wedges and shims, which may be left in place with the approval of the ENGINEER.

E. When motors are shipped separately and/or with driven equipment, the motors shall be received, properly stored and protected from the environment, meggered once a month and the reports submitted to the ENGINEER. After driven equipment is set, the motors (if shipped separately) shall be set, mounted, shimmed, millrighted, coupled and connected complete.

F. Space heaters on all stored motors as well as on all motors supplied with equipment shall be continuously energized during storage and after installation, but prior to startup with temporary and/or permanent power as required. External low wattage electric heaters and temporary power, or equivalent, shall be provided for all stored motors not equipped with integral space heaters to satisfy the above requirements.

3.05 CONNECTIONS TO EQUIPMENT

A. Connections to equipment shall follow manufacturer's recommendations as to size and arrangement of connections and/or as shown in detail on the Drawings or approved Shop Drawings. Piping connections shall be made to permit ready disconnection of equipment with minimum disturbance of adjoining piping and equipment.

B. The Electrical Contractor or CONTRACTOR if no electrical contract exists shall be responsible for bringing proper electrical service to each item of equipment requiring electrical service as shown on the Drawings or approved Shop Drawings. The Electrical Contractor shall make electrical connections to equipment requiring electrical service, unless otherwise indicated on the Drawings or in the Technical Specifications.

C. The Electrical Contractor or CONTRACTOR if no electrical contract exists shall be responsible for bringing proper instrumentation/control service to each item of equipment requiring instrumentation/control service as shown on the Drawings or approved Shop Drawings. The Electrical Contractor shall make electrical connections to instrumentation/control equipment requiring electrical service, under the direction of the Instrumentation Subcontractor/supplier unless otherwise indicated on the Drawings or in the Technical Specifications.

D. The HVAC Contractor or CONTRACTOR if no HVAC Contract exists shall bring and connect HVAC service to all equipment items requiring same as shown on the Drawings. The Electrical Contractor shall make electrical connections to equipment requiring electrical service, unless otherwise indicated on the Drawings or in the Technical Specifications.

E. The Plumbing Contractor or CONTRACTOR if no plumbing contract exists shall bring and connect plumbing service to all equipment items requiring same as shown on the Drawings.

3.06 FAILURE OF EQUIPMENT TO PERFORM

A. Any defects in the equipment or failure to meet the guarantees or performance requirements of the Specifications shall be promptly corrected by the CONTRACTOR by replacements or otherwise.

B. If the CONTRACTOR fails to make these corrections, or if the improved equipment shall fail again to meet the guarantees or specified requirements, the OWNER, notwithstanding his having made partial payment for work and materials which have entered into the manufacture of said equipment, may reject said equipment and order the CONTRACTOR to remove it from the premises at the CONTRACTOR's expense.

C. The CONTRACTOR shall then obtain specified equipment to meet the contract requirements or upon mutual agreement with the OWNER, adjust the contract price to reflect not supplying the specific equipment item.

D. In case the OWNER rejects said equipment, then the CONTRACTOR hereby agrees to repay to the OWNER all sums of money paid to him for said rejected equipment on progress certificates or otherwise on account of the lump sum prices herein specified.

E. Upon receipt of said sums of money, the OWNER will execute and deliver to the CONTRACTOR a bill of sale of all his rights, title, and interest in and to said rejected equipment; provided, however, that said equipment shall not be removed from the premises until the OWNER obtains from other sources other equipment to take the place of that rejected.

F. Said bill of sale shall not abrogate OWNER's right to recover damages for delays, losses, or other conditions arising out of the basic contract.

3.07 PAINTING

A. All surface preparation, shop painting, field repairs, finish painting, and other pertinent detailed painting specifications shall conform to applicable sections of Section 09900, Painting.

B. All inaccessible surfaces of the equipment, which normally require painting, shall be finished painted by the manufacturer. The equipment and motor shall be painted with a high quality epoxy polyamide semi-gloss coating specifically resistant to chemical, solvent, moisture, and acid environmental conditions, unless otherwise specified.

C. Gears, bearing surfaces, and other unpainted surfaces shall be protected prior to shipment by a heavy covering of rust-preventive compound sprayed or hand applied which shall be maintained until the equipment is placed in operation. This coating shall be easily removable by a solvent.

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3.08 WELDING

A. The Equipment Manufacturer's shop welding procedures, welders, and welding operators shall be qualified and certified in accordance with the requirement of AWS D1.1 "Structural Welding Code - Steel" or AWS D1.2 "Structural Welding Code - Aluminum" of the American Welding Society, as applicable.

B. The Equipment Manufacturer's shop drawings shall clearly show complete information regarding location, type, size, and length of all welds in accordance with "Standard Welding Symbols" AWS A2.0 of the American Welding Society. Special conditions shall be fully explained by notes and details.

C. The CONTRACTOR's welding procedures, welders, and welding operators shall be qualified and certified in accordance with the requirements of AWS D1.1 "Structural Welding Code - Steel" or AWS D1.2 "Structural Welding Code - Aluminum" of the American Welding Society, as applicable.

D. The CONTRACTOR shall perform all field welding in conformance with the information shown on the Equipment Manufacturer's drawings regarding location, type, size, and length of all welds in accordance with "Standard Welding Symbols" AWS A2.0 of the American Welding Society, and special conditions, as shown by notes and details.

3.09 EQUIPMENT IDENTIFICATION

A. As a minimum, all mechanical, electrical and control system equipment, as well as all valves, gates, manual actuators and motorized actuators shall be provided with a stainless steel nameplate, securely fastened in a conspicuous place, and clearly inscribed with the manufacturer's name, year of manufacture, serial number, and principal rating data.

B. As a minimum, all mechanical, electrical and control system equipment, as well as all valves, gates, manual actuators and motorized actuators shall also be identified as to equipment tag number, name and description by a suitable stainless steel nameplate attached to the unit; for example, "RWP 11001 Raw Water Pump No. 1". Coordinate name and number with same on remotely located controls, control panel, etc.

D. Nameplates shall not be painted over.

E. Refer to Technical Specifications for additional requirements.

- END OF SECTION -

PROJECT NO. 12197

SECTION 01700 - PROJECT CLOSEOUT

PART 1 -- GENERAL

1.01 THE REQUIREMENT

A. Final Cleaning

1. At the completion of the work, the CONTRACTOR shall remove all rubbish from and about the site of the work, and all temporary structures, construction signs, tools, scaffolding, materials, supplies and equipment which he or any of his Subcontractors may have used in the performance of the work. CONTRACTOR shall broom clean paved surfaces and rake clean other surfaces of grounds.

2. CONTRACTOR shall thoroughly clean all materials, equipment and structures; all marred surfaces shall be touched up to match adjacent surfaces; dirty filters and burned out lights replaced as required; all glass surfaces cleaned and floors cleaned and polished so as to leave work in a clean and new appearing condition.

3. CONTRACTOR shall maintain cleaning until project, or portion thereof, is occupied by the OWNER.

B. Equipment Start-Up Services

1. Upon returning a Hydrtoreator to service, the ENGINEER and OWNER will observe the functionality of the flow meter and motor operated valve.

2. System shall be tested in automatic and manual control modes. In the manual model both local and remote controls shall be tested

3. The OWNER's personnel shall operate all equipment.

4. CONTRACTOR shall be available to promptly repair all work during the start-up period so as to cause minimum disruption to the total plant operation.

5. The modified system shall be considered acceptable upon completion of seven (7) consecutive and continuous days of satisfactory operation.

6. If the equipment malfunctions during this start-up period, the start-up period will be repeated until satisfactory operation is achieved.

7. In the event a system, equipment or component proves defective or is unable to perform satisfactorily (in the OWNER’s opinion), the CONTRACTOR shall replace the defective item and the minimum one (1) year guarantee period, or the guarantee period called for in the Technical Specifications shall start after satisfactory replacement, testing and acceptance of the item along with the completion of all other pre-requisites as required by the Contract Documents.

C. Final Cleanup; Site Rehabilitation

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

2. The site of the work shall be rehabilitated or developed in accordance with other sections of the Specifications and the Drawings. In the absence of any portion of these requirements, the CONTRACTOR shall completely rehabilitate the site to a condition and appearance equal or superior to that which existed just prior to construction, except for those items whose permanent removal or relocation was required in the Contract Documents or ordered by the OWNER.

D. Final Inspection

1. Final cleaning and repairing shall be so arranged as to be finished upon completion of the construction work. The CONTRACTOR will make his final cleaning and repairing, and any portion of the work finally inspected and accepted by the ENGINEER shall be kept clean by the CONTRACTOR, until the final acceptance of the entire work.

2. When the CONTRACTOR has finally cleaned and repaired the whole or any portion of the work, he shall notify the ENGINEER that he is ready for final inspection of the whole or a portion of the work, and the ENGINEER will thereupon inspect the work. If the work is not found satisfactory, the ENGINEER will order further cleaning, repairs, or replacement.

3. When such further cleaning or repairing is completed, the ENGINEER, upon further notice, will again inspect the work. The "Final Payment" will not be processed until the CONTRACTOR has complied with the requirements set forth, and the ENGINEER has made his final inspection of the entire work and is satisfied that the entire work is properly and satisfactorily constructed in accordance with the requirements of the Contract Documents.

E. Project Close Out

1. As construction of the project enters the final stages of completion, the CONTRACTOR shall, in concert with accomplishing the requirements set forth in the Contract Documents, attend to or have already completed the following items as they apply to his contract:

a. Scheduling equipment manufacturers' visits to site.

b. Required testing of project components.

c. Scheduling start-up and initial operation.

d. Scheduling and furnishing skilled personnel during initial operation.

e. Correcting or replacing defective work, including completion of items previously overlooked or work which remains incomplete, all as evidenced by the ENGINEER's "Punch" Lists.

f. Attend to any other items listed herein or brought to the CONTRACTOR's attention by the ENGINEER.

3. Before the Certificate of Substantial Completion is issued, the CONTRACTOR shall submit to the ENGINEER (or to the OWNER if indicated) certain records, certifications, etc., which are specified elsewhere in the Contract Documents. A partial list of such items appears below, but it shall be the CONTRACTOR's responsibility to submit any other items which are required in the Contract Documents:

   a. Test results of project components.

   b. Performance Affidavits for equipment.

   c. Certification of equipment or materials in compliance with Contract Documents.

   d. Operation and maintenance instructions or manuals for equipment.

   e. One set of neatly marked-up record drawings showing as-built changes and additions to the work under his Contract.

   f. Any special guarantees or bonds (Submit to OWNER).

PART 2 -- PRODUCTS

(NOT USED)

PART 3 -- EXECUTION

(NOT USED)

- END OF SECTION -

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SECTION 02222 - EXCAVATION AND BACKFILL FOR UTILITIES

PART 1 -- GENERAL

1.01 THE REQUIREMENT

A. Excavate, grade and backfill as required for underground piping systems and appurtenances as shown on the Drawings and specified herein.

1.02 REFERENCE SPECIFICATIONS, CODES, AND STANDARDS

A. Codes: All codes, as referenced herein, are specified in Section 01090, "Reference Standards".

B. Commercial Standards:

ASTM D 422	Standard Test Method for Particle-Size Analysis of Soils.
ASTM D 698	Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort.
ASTM D 1556	Standard Test Method for Density and Unit Weight of Soil in Place by the Sand-Cone Method.
ASTM D 1557	Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Modified Effort.
ASTM D 2419	Standard Test Method for Sand Equivalent Value of Soils and Fine Aggregate.
ASTM D6938	Standard Test Method for In-Place Density and Water Content of Soil and Soil-Aggregate by Nuclear Methods (Shallow Depth)

1.03 SUBMITTALS

A. General: Submit information and samples to the ENGINEER for review as specified herein in accordance with the Section entitled "Submittals".

B. Dewatering: The CONTRACTOR shall submit to the ENGINEER its proposed methods of handling trench water and the locations at which the water will be disposed of. Methods shall be acceptable to the ENGINEER before starting the excavation.

C. Bedding and Backfill Materials: The CONTRACTOR shall notify the ENGINEER of the off-site sources of bedding and backfill materials.

1. Submit to the ENGINEER a representative sample weighing approximately 25 lbs. The sample shall be delivered to a location at the work site determined by the ENGINEER.

2. The CONTRACTOR shall notify the ENGINEER in writing of the sources of each material at least ten calendar days prior to the anticipated use of the materials.

D. Sheeting System: Drawings of the sheeting system and design computations shall be submitted to the ENGINEER; however, the review of these drawings shall in no way relieve the CONTRACTOR of the responsibility to provide a safe and satisfactory sheeting and shoring system. Sheeting and shoring shall be designed by the CONTRACTOR, and the proposed design shall be sealed by a Professional ENGINEER registered in the State of Florida. If the ENGINEER is of the opinion that at any point sufficient or proper supports have not been provided, it may order additional supports put in at the CONTRACTOR's expense.

E. Dewatering Permits: If the quantity or nature of water withdrawn requires approval/permits from regulatory agencies, the CONTRACTOR shall procure such permits at its expense and submit copies to the ENGINEER before commencing the work.

1.04 QUALITY CONTROL

A. An independent testing laboratory will be retained by the OWNER to do appropriate testing as described in the Section entitled "Quality Control". The CONTRACTOR shall schedule its work so as to permit a reasonable time for testing before placing succeeding lifts and shall keep the laboratory informed of his progress. A minimum of 48 hours of notice shall be provided to the testing laboratory to mobilize its activities.

B. Field Density Testing Frequency for Pipeline Backfill: The frequency of the field density testing shall be in accordance with the notes on the Drawings. If the Drawings do not indicate a frequency then field density testing shall be as follows:

1. Pipeline Within the Fiveash Water Treatment Plant: For each layer (i.e., lift) of compacted material perform a minimum of one density test at 100 foot intervals.

1.05 SUBSURFACE INFORMATION

A. A separate geotechnical report is provided for information purposes with the Contract Documents. The report identifies properties below grade and also offers recommendations for foundation design, primarily for use of the ENGINEER. The recommendations shall not be construed as requirements of the Contract.

B. The OWNER and the ENGINEER will not assume responsibility for variations of sub-soil quality or conditions at locations other than places shown and at the time the geotechnical investigation was made. The CONTRACTOR shall examine the site and review the available geotechnical report or undertake its own subsurface investigation prior to submitting its bid, taking into consideration all conditions that may affect its work.

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1.06 GROUNDWATER

A. The CONTRACTOR shall be responsible for anticipating groundwater conditions and shall provide positive control measures as required. Such measures shall ensure stability of excavations, groundwater pressure control, prevention of tanks, pipes, and other structures from being lifted by hydrostatic pressures, and avoiding the disturbance of subgrade bearing materials.

B. The CONTRACTOR shall be responsible for obtaining all permits required for dewatering operations.

1.07 TRENCH SAFETY ACT COMPLIANCE

A. The CONTRACTOR by signing and executing the contract is, in writing, assuring that it will perform any trench excavation in accordance with the Florida Trench Safety Act, Section 553.60 et. seq.. The CONTRACTOR has further identified the separate item(s) of cost of compliance with the applicable trench safety standards as well as the method of compliance as noted in the "Bid Forms" Section of the Contract front-end documents.

B. The CONTRACTOR acknowledges that this cost is included in the applicable items of the Proposal and Contract and in the Grand Total Bid and Contract Price.

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

1.08 PROTECTION OF PROPERTY AND STRUCTURES

A. The CONTRACTOR shall, at its own expense, sustain in place and protect from direct or indirect injury, all pipes, poles, conduits, walls, buildings, and all other structures, utilities, and property in the vicinity of its Work. Such sustaining shall be done by the CONTRACTOR. The CONTRACTOR shall take all risks attending the presence or proximity of pipes, poles, conduits, walls, buildings, and all other structures, utilities, and its Work. It shall be responsible for all damage, and assume all expenses, for direct or indirect injury and damage, caused by its Work, to any such pipe, structures, etc., or to any person or property, by reason of injury to them, whether or not such structures, etc., are shown on the Drawings.

B. Barriers shall be placed at each end of all excavations and at such places as may be necessary along excavations to warn all pedestrian and vehicular traffic of such excavations. Barricades with flashing lights shall also be placed along excavation from sunset each day to sunrise of the next day until such excavation is entirely refilled, compacted, and paved. All excavations shall be barricaded where required to meet

OSHA, local and Federal Code requirements, in such a manner to prevent persons from falling or walking into any excavation within the site fenced property limits.

PART 2 -- PRODUCTS

2.01 MATERIALS

A. General: Materials shall be furnished as required from on-site excavations or from acceptable off-site sources as required. The CONTRACTOR shall notify the ENGINEER in writing of the sources of each material at least ten calendar days prior to the anticipated use of the materials.

2.02 BEDDING

A. Pipe Bedding: In general, clean sandy materials excavated from the utility trench, that is free from organics, clay and construction debris, can be used as pipe bedding when construction is in a dry condition and when the bedding is not sided by muck. Pipe bedding material shall be able to pass through a 3/4-inch sieve. Separation of suitable material for pipe bedding from other material shall be made during the excavation.

B. Sand shall be used for all copper and other service lines.

C. In the case of a “dry” installation, sand shall be used for PVC and ductile iron pipe where the bottom of the trench is located in the limestone zone.

D. In the case of a “wet” installation, pearock shall be used for PVC and ductile iron pipe where the bottom of the trench is located in the limestone zone.

E. Precast concrete items shall use crushed stone.

2.03 PEAROCK

A. Pearock shall consist of hard, durable particles of proper size and gradation, and shall be free from organic material, wood, trash, sand, loam, clay, excess fines, and other deleterious materials. Pearock shall conform to the requirements of ASTM C 33, Size Number 8, graded within the following limits:

Sieve Size	Percent Finer by Weight
1/2 inch	100
3/8 inch	85 to 100
No. 4	10 to 30
No. 8	0 to 10
No. 16	0 to 5

2.04 SELECT BACKFILL

A. Select Backfill: It is the intent of these specifications to obtain clean sandy material passing through a 3/4-inch sieve as select backfill material for utility and structural applications.

B. At locations where subsurface preparations for structures have been performed under this or other previous construction contracts, clean excavated material (structural fill) may be used as select backfill. Any excess fill shall be disposed of off-site by the CONTRACTOR.

2.05 GENERAL BACKFILL

A. General backfill (for grading applications) shall be placed above the select backfill. General backfill shall be clean granular soil, free of organics or other deleterious material, have a maximum size of 6 inches and shall contain no more that five percent fines passing a U.S. Standard No. 200 sieve.

B. General backfill used under roadways shall be compatible with the materials and compaction specified under the Sections entitled “Asphaltic Concrete Pavement” and “Concrete Curbs and Sidewalks”.

PART 3 -- EXECUTION

3.01 EXCAVATION

A. The CONTRACTOR shall perform all excavation of every description and of whatever substance encountered, to the dimensions, grades and depths shown on the Drawings, or as directed. For projects within the treatment plant, all excavations shall be made by open cut unless shown otherwise on the Drawings. For projects within the right-of-way, unless shown otherwise on the Drawings, all excavations shall be made by open cut, except for service connections to houses located across the road from the watermain, where directional boring shall be used. All existing utilities such as pipes, poles and structures shall be carefully located, supported and protected from injury; in case of damage, they shall be restored at the CONTRACTOR's expense.

B. Pipe trenches for piping shall be excavated to a width within the limits of the top of the pipe and the trench bottom so as to provide a clearance on each side of the pipe barrel, measured to the face of the excavation, or sheeting if used, of 8 inches to 12 inches. Where the pipe size exceeds 12 inches, the clearance shall be from 12 inches to 18 inches. All pipe trenches shall be excavated to a level where suitable material is reached, a minimum of 8 inches below the excavated depth that will allow for a minimum of 36-inches of covering unless otherwise indicated on the Drawings. Excavation depths in other types of materials and conditions shall be made as hereinafter specified.

C. In areas where trench widths are not limited by right-of-way and/or easement widths, property line restrictions, existing adjacent improvements, including pavements, structures and other utilities, and maintenance of traffic, the trench sides may be sloped

to a stable angle of repose of the excavated material but only from a point one foot above the crown of the pipe. A substantially and safely constructed movable shield, "box" or "mule" may be used in place of sheeting when the trench is opened immediately ahead of the shield and closed immediately behind the shield as pipe laying proceeds inside the shield.

D. Ladders or steps shall be provided for and used by Workmen to enter and leave trenches, in accordance with OSHA requirements.

E. Excavation for appurtenances shall be sufficient to provide a clearance between their outer surfaces and the face of the excavation or sheeting, if used, of not less than 12 inches.

F. Excavated unsuitable material shall be removed from the site and disposed of by the CONTRACTOR. Materials removed from the trenches shall be stored and in such a manner that will not interfere unduly with any on-site operations, traffic on public roadways and sidewalks and shall not be placed on private property. In congested areas, such materials as cannot be stored adjacent to the trench or used immediately as backfill shall be removed to other convenient places of storage acceptable to the OWNER at the CONTRACTOR's expense.

G. Excavated material that is suitable for use as backfill shall be used in areas where sufficient material is not available from the excavation. Suitable material in excess of backfill requirements shall be either used on the site as directed by the ENGINEER or disposed of the CONTRACTOR.

H. Barriers shall be placed at excavations in accordance with OSHA requirements.

3.02 SHEETING AND BRACING

A. The CONTRACTOR shall furnish, place and maintain sheeting and bracing to support sides of the excavation as necessary to provide safe working conditions in accordance with OSHA requirements, and to protect pipes, structures and other Work from possible damage. Where wood sheeting or certain designs of steel sheeting are used, the sheeting shall be cut off at a level of 2 feet above the top of the installed pipe and that portion below the level shall be left in place. If interlocking steel sheeting is used, it may be removed providing removal can be accomplished without disturbing the bedding, pipe or alignment of the pipe. Any damage to the pipe bedding, pipe or alignment of the constructed utility caused by the removal of sheeting shall be cause for rejection of the affected portion of the work. The OWNER may permit sheeting to be left in place at the request and expense of the CONTRACTOR, or the OWNER may order him in writing to leave in place, for the preventing of damage to structures or property. Payment for sheeting ordered to remain in place shall be paid for at a negotiated price.

B. If the ENGINEER is of the opinion that at any point sufficient or proper supports, have not be provided, he may order additional supports put in at the CONTRACTOR’s expense. The CONTRACTOR shall be responsible for the adequacy of all sheeting used

and for all damage resulting from sheeting and bracing failure or from placing, maintaining and removing it.

3.03 REMOVAL OF WATER

A. General: It is a basic requirement of these Specifications unless otherwise authorized per Article 3.10 that excavations shall be free from water before pipe or structures are installed.

B. The CONTRACTOR shall provide pumps, and other appurtenant equipment necessary to remove and maintain water at such a level as to permit construction in a dry condition. The CONTRACTOR shall continue dewatering operations until backfilling has progressed to a sufficient depth over the pipe to prevent flotation or movement of the pipe in the trench or so that it is above the water table. If at any point during the dewatering operation it is determined that fine material is being removed from the excavation sidewalls, the dewatering operation shall be stopped. If any of the subgrade or underlying material is disturbed by movement of groundwater, surface water, or any other reason, it shall be replaced at the CONTRACTOR's expense with crushed stone or gravel.

C. The CONTRACTOR shall use dewatering systems that include automatic starting devices, and standby pumps that will ensure continuous dewatering in the event of an outage of one or more pumps.

D. Disposal: Water from the trenches and excavation shall be disposed of in such a manner as will not cause injury to public health, to public or private property, to the Work completed or in progress, to the surface of the streets, cause any interference with the use of the same by the public, or cause pollution of any waterway or stream. The CONTRACTOR shall submit his proposed methods of handling trench water and locations at which the water will be disposed of to the ENGINEER for review and shall receive acceptance before starting the excavation. Disposal to any surface water body will require silt screens to prevent any degration in the water body. The CONTRACTOR shall have responsibility for acquiring all necessary permits for disposal.

3.04 TRENCH STABILIZATION

A. No claim for extras, or additional payment will be considered for cost incurred in the stabilization of trench bottoms which are rendered soft or unstable as a result of construction methods, such as improper or inadequate sheeting, dewatering or other causes. In no event shall pipe be installed when such conditions exist and the CONTRACTOR shall correct such conditions so as to provide proper bedding or foundations for the proposed installation at no additional cost to the OWNER before placing the pipe or structures.

3.05 PIPE BEDDING

A. Pipe trenches shall be excavated as described in Article 3.01. The resulting excavation shall be backfilled with acceptable pipe bedding material, up to the level of the centerline

of the proposed pipe barrel. This backfill shall be tamped and compacted to provide a proper bedding for the pipe and shall then be shaped to receive the pipe. Bedding shall be provided under the branch of all fittings to furnish adequate support and bearing under the fitting.

B. Any over excavation below the levels required for installation of the pipe shall be backfilled with acceptable bedding material, tamped, compacted and shaped to provide proper support for the proposed pipe, at the CONTRACTOR's expense.

3.06 BACKFILL

A. Pipeline trenches shall be backfilled to a level 12 inches above the top of the pipe with select backfill obtained from the trench excavation. When placed in the dry, such material shall be placed in 6-inch layers, each compacted to the densities specified in Article 3.07. Only hand operated mechanical compacting equipment shall be used within six inches of the installed pipe.

B. After the initial portion of backfill has been placed as specified above, and after all excess water has completely drained from the trench, backfilling of the remainder of the trench may proceed. The remainder of the backfill shall be selected material obtained from the excavation and shall be placed in horizontal layers, the depth of which shall not exceed the ability of the compaction equipment employed, and in no event shall exceed a depth of 9 inches. Each layer shall be moistened, tamped, puddled, rolled or compacted to the densities specified in Article 3.07.

3.07 COMPACTION AND DENSITIES

A. Compaction of backfill shall be 98 percent of the maximum density where the trench is located under structures or paved areas, and 95 percent of the maximum density elsewhere. More thorough compaction may be required when Work is performed in other regulatory agencies jurisdictions, such as the FDOT. Methods of control and testing of backfill construction are:

1. Maximum density of the material in trenches shall be determined by ASTM D 1557.

2. Field density of the backfill material in place shall be determined by ASTM D 1556 or D 2922.

B. Testing: Laboratory and field density tests, which in the opinion of the ENGINEER are necessary to establish compliance with the compaction requirements of these Specifications, shall be ordered by the ENGINEER. The CONTRACTOR shall coordinate and cooperate with the testing laboratory. The testing program will be implemented by the ENGINEER establishing depths and locations of tests. Modifications to the program will be made as job conditions change.

C. Trench backfill which does not comply with the specified densities, as indicated by such tests, shall be reworked and recompacted until the required compaction is secured, at no

additional cost to the OWNER. The costs for retesting such Work shall be paid for by the CONTRACTOR.

3.08 ADDITIONAL EXCAVATION AND BACKFILL

A. Where organic material, such as roots, muck, or other vegetable matter, or other material which, in the opinion of the ENGINEER, will result in unsatisfactory foundation conditions, is encountered below the level of the proposed pipe bedding material, it shall be removed to a depth of two feet below the outside bottom of the pipe or to a greater depths as directed by the ENGINEER and removed from the site. Sheeting shall be installed if necessary to maintain pipe trenches within the limits identified by the ENGINEER. The resulting excavation shall be backfilled with suitable backfill material, placed in 12-inch layers, tamped and compacted up to the level of the bottom of the proposed pipe bedding material. Sufficient compaction of this material shall be performed to protect the proposed pipe against settlement. Lean concrete may be used in lieu of backfill when pipe installation is in the wet or at the CONTRACTOR's option. Construction shall then proceed in accordance with the provisions of Article 3.05 "Pipe Bedding".

B. Additional excavation (more than two feet below the pipe) shall be performed when ordered by the ENGINEER. Where organic or other material is encountered in the excavation, the CONTRACTOR shall bring the condition to the attention of the ENGINEER and obtain his determination as to whether or not the material will require removal, prior to preparing the pipe bedding. The excavation of material up to a depth of two feet below the outside bottom is an incidental item of construction and the Work shall be done at no additional cost to the OWNER. Where ordered by the ENGINEER, excavation greater than two feet below the pipe and additional backfill will be compensated by the OWNER.

3.09 FINE GRADING

A. After piping trenches backfilled, the disturbed areas of the site shall be fine graded. Any lumber, undesirable materials and rocks larger than the 3-inch size shall be removed from the surface. The completed surface shall be to the preconstruction elevation unless otherwise directed by the OWNER. Minor adjustments to line and grade may be required as the work progresses in order to satisfy field conditions.

3.10 ALTERNATE METHOD OF CONSTRUCTION

A. Use of This Method: A combination of conditions in the substrate, water table, or method of disposal may be encountered during the course of the work which makes dewatering impossible, or only possible through the use of unusual methods, the cost of which is excessive. When such conditions are encountered, but only after all reasonable means (pumps, well points, etc.) to dewater the excavation have been employed without success, the CONTRACTOR, may request to employ the following Alternate Method of Construction. The concurrence of the ENGINEER shall be obtained in writing and shall limit the use of the alternate method of construction to such specific portions of the Work as the ENGINEER shall determine.

B. The requirements set forth in other sections of these Specifications shall establish the required standards of construction quality for this work. Use of the alternate method of construction described hereinafter shall in no way be construed as relieving the CONTRACTOR of the work. No additional payment will be made to the CONTRACTOR for excavation, backfill, sheeting or any cost incurred for Work or materials, or any other costs incurred as a result of the use of this alternate method of construction. The prices established in the Proposal shall be for full payment for the various items of work.

C. Subject to all the requirements stated herein, including written acceptance of the ENGINEER, construction will be permitted in accordance with the following specifications. All requirements of these Specifications shall apply to this construction unless otherwise specifically modified herein.

D. Removal of Water: The installation of pipe and appurtenances under water will be permitted and the requirements of Article 3.03 will be waived.

E. Excavation shall be performed in accordance with Article 3.01.

F. Pipe Bedding: Pipe bedding shall be placed from 6 inches below the outside bottom of the proposed pipe barrel up to the centerline of the pipe barrel. The bedding material shall be pearock as specified in Article 2.03 "Pearock". Limerock screenings, sand or other fine organic material shall not be used.

G. The bedding material shall be placed and then be shaped to receive the pipe at the intended elevation. Bedding shall be provided under the branch of all fittings to furnish adequate support and bearing under the fitting.

H. Backfill: After the pipe is installed, backfilling shall proceed in accordance with the provisions of Article 3.06 "Backfill" and 3.07 "Compaction and Densities". Select backfill material shall be used to backfill around the pipe and to a level one foot above the crown of the pipe. Under no circumstances will material other than select backfill or specified pipe bedding material be considered satisfactory for this purpose.

I. If the Alternate Method of Construction is used, all backfill material, including specified pipe bedding material, shall be carefully lifted into the trench and not released to fall freely therein until the bucket or container is at or just above water level. Under no circumstances will backfill material be dumped or pushed into the trenches containing water. Below existing water level, the backfill material shall be carefully rammed into place in uniform layers, of equal depth on each side of the pipe, up to the water level. Above the water level, backfill material shall be placed and compacted for normal backfill as previously specified.

3.11 RESTORATION OF EXISTING SURFACES

A. Restore all surfaces to match existing conditions.

- END OF SECTION -

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SECTION 02224 - EXCAVATION AND BACKFILL FOR STRUCTURES

PART 1 -- GENERAL

1.01 THE REQUIREMENT

A. This Section includes, except as elsewhere provided, excavation, filling and compacting within the limits defined on the Contract Drawings for complete construction of structures for this project.

1.02 QUALITY CONTROL

A. Codes and Standards: Excavation and backfill work shall be performed in compliance with applicable codes, standards and requirements of governing authorities having jurisdiction in the area.

B. Testing and Inspection Service: An independent testing laboratory shall be retained by the OWNER to conduct appropriate soils and other testing in accordance with the Contract Documents.

1.03 JOB CONDITIONS

A. General

1. A separate geotechnical report is provided for information purposes with the Contract Documents. The report identifies properties below grade and also offers recommendations for foundation design, primarily for use of the ENGINEER. The recommendations shall not be construed as requirements of the Contract unless specifically referenced by the Contract Documents.

2. The OWNER and/or the ENGINEER will not assume responsibility for variations of sub-soil quality or conditions at locations other than places shown and at the time the geotechnical investigation was made. The CONTRACTOR shall examine the site and review the available geotechnical report or undertake its own subsurface investigation prior to submitting its bid, taking into consideration all conditions that may affect its work.

B. Existing Utilities

1. Locate existing underground utilities in the areas of work. Accurate "As Built" Information describing existing pipelines and underground utilities is not available. Test pits and hand excavation in critical areas will be required prior to initiating work.

2. All existing utilities including piping, electrical conduits, electric duct banks and telephone cables that are shown on the Contract Drawings to be relocated, shall be relocated prior to initiating earth work. The CONTRACTOR shall coordinate relocation of utilities with utility companies having jurisdiction in the area. Should

unknown or incorrectly identified piping or other utilities be encountered during excavation, the CONTRACTOR shall consult the OWNER and the ENGINEER of such piping or utility immediately for directions.

3. The CONTRACTOR shall cooperate with the OWNER and utility companies in keeping respective services and facilities in operation.

1.04 PROHIBITION OF BLASTING

A. The use of explosives for excavation work is strictly prohibited on this project.

1.05 SUBMITTALS

A. The CONTRACTOR shall submit information and samples to the ENGINEER for review as specified herein in accordance with Section 01300. The information shall include:

1. Detailed description of dewatering method chosen and sequence of dewatering operations.

2. Plans showing the methods and location of dewatering and discharge. The drawings shall include a sufficient number of detailed sections to clearly illustrate the scope of work. The drawings showing all of the above information, including calculations, shall be prepared by a qualified Professional Engineer registered in the state of Florida, and shall bear its seal and signature. If required by regulatory agencies, a copy of the dewatering permit shall be submitted.

3. Lists of materials and equipment to be used. Detailed description of the method(s) of excavation, fill and compaction to be used.

4. Plans of open cut excavations showing side slopes and limits of the excavation at grade where not shown on the Contract Drawings.

5. Design computation of sheeting system. Sheeting and shoring plans shall be designed and sealed by a professional Engineer registered in the State of Florida. Submittals shall indicate depth of penetration.

6. The CONTRACTOR shall furnish the ENGINEER, for approval, a representative sample of structural fill material from off-site sources at least ten calendar days prior to the date of anticipated use of such material. The sample shall be delivered to the site at a location determined by the ENGINEER. The submittal shall identify the source of the material.

1.06 PROTECTION OF PROPERTY AND STRUCTURES

A. The CONTRACTOR shall, at its own expense, sustain in place and protect from direct and indirect injury, its work at all times as well as all pipes, poles, conduits, walls, buildings, and all other structures, utilities and property in the vicinity of its work. Such

sustaining shall be done by the CONTRACTOR. The CONTRACTOR shall take all risks attending the presence or proximity of pipes, poles, conduits, walls, buildings and all other structures, utilities, and property in the vicinity of its work. It shall be responsible for all damage, and assume all expenses, for direct or indirect injury and damage, caused by its work, to any such pipes, structures, etc., or to any person or property, by reason of injury to them, whether or not such structures, etc., are shown on the Drawings.

B. Barriers and lights shall be placed at all excavations in accordance with OSHA requirements.

C. Safe and suitable ladders for access to trenches shall be provided in accordance with OSHA requirements.

PART 2 – PRODUCTS

2.01 GENERAL

A. Specific locations/areas of work where these materials shall be utilized are defined on the Drawings.

2.02 STRUCTURAL FILL

A. Fill material shall be noncohesive, nonplastic, granular mixture of local clean sand or local clean sand and limerock free from vegetation, organic material, muck or deleterious matter. Material shall conform to AASHO-2 gradation with no more than ten (10) percent by weight passing the No. 200 sieve. All rock or hard material shall pass through a 3-inch diameter ring. Broken Portland cement or asphaltic concrete shall not be considered an acceptable fill material. Fill material containing limerock shall have sufficient sand to fill the voids in the limerock. Material placed in the upper 6-inches of all backfills or fills shall not contain any stones or rocks larger than 1-inch in diameter. Limits of excavation and fill shall be as defined on the Drawings. All structural fill materials shall be obtained from off-site sources.

2.03 CRUSHED LIMESTONE

A. Crushed limestone placed below foundation slabs shall be hard, durable, subangular particles of proper size and gradation, and shall be free from organic materials, wood, trash, sand, loam, chalk, excess fines and other deleterious materials. Maximum aggregate size shall be 3/4 inches.

2.04 OTHER MATERIALS

A. Requirements for any other fill material, if needed, are defined in the Drawings.

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PART 3 - EXECUTION

3.01 CONTRACTOR INSPECTIONS

A. Examine the areas and conditions under which excavating, filling, and grading are to be performed. Do not proceed with the work until unsatisfactory conditions have been corrected.

B. Examine and accept existing grade of the project site walkways, pavements, etc., prior to commencement of work and report to ENGINEER if elevations of existing subgrade substantially vary from elevations shown on the Drawings.

3.02 EXCAVATION FOR STRUCTURES

A. Unless otherwise indicated on the Drawings, all excavation shall be made in such a manner, and to such widths, as will give ample room for properly constructing and inspecting the structures they are to contain. Excavation shall be made in accordance with the details shown on the Drawings, and as specified herein. Attention shall be given to the proper handling of storm water runoff. The CONTRACTOR shall intercept and collect surface run off both at the top and bottom of cut slopes. The excavating equipment shall operate in an organized fashion so as to remove silt from one edge of the excavation to the other so as not to trap silt within the undercut area.

B. Where required on the Drawings, unsuitable material (silt layer) beneath the groundwater encountered at the site shall be removed using a drag line or hydraulic excavator, as approved by the ENGINEER. The equipment shall operate in an organized manner so as to remove silt from one edge of the excavation to the other so as not to trap silt within the undercut area. Unsuitable material shall be hauled to and stockpiled temporarily by the CONTRACTOR at the “Temporary Muck Storage” location defined on the Drawings. Once drained, and during “dry” weather as determined by the ENGINEER in the field, the CONTRACTOR shall remove and dispose of it off-site. The CONTRACTOR shall be responsible for managing and maintaining the temporary muck storage area and shall ensure impact of this area and his operation to the adjacent WWTP site, including providing dust control, runoff control, etc. is minimized. Also, the CONTRACTOR shall clean all roadways impacted by his demucking, hauling, temporary stockpiling and removal operations at a frequency as determined by the ENGINEER in the field.

C. In excavating for footings and foundations, the CONTRACTOR shall take care not to disturb bottom of excavation. Excavate by hand to final grade just before concrete reinforcement is placed. Trim bottoms to required lines and grades to leave solid base to receive concrete.

D. The CONTRACTOR shall ensure that its excavation work does not adversely affect the bearing capacity of the structural subsurface. Also, the CONTRACTOR shall proceed with foundation work immediately after excavation work and as expeditiously as possible so as to minimize any potential for subsurface disturbance due to environmental factors, adverse weather, etc. The CONTRACTOR shall also take all necessary precautions to

protect its work from potential adverse impacts. Where excavated areas are disturbed by subsequent operations or adverse weather, scarify surface reshape, fill as required and compact to required density.

E. All excavated soil material, removed underground utilities including pipes and fittings, electrical conduits and duct banks, and other undefined materials removed within the limits of the excavation, shall be disposed off-site by the CONTRACTOR.

F. Refer to the Drawings for additional requirements for excavation for specific locations/areas of work.

3.03 UNAUTHORIZED EXCAVATION

A. Excavation work carried outside of the work limits required by the Contract Documents shall be at the CONTRACTOR's expense, and shall be backfilled by the CONTRACTOR at its own expense with structural fill, as directed by the ENGINEER. Where, in the judgement of the ENGINEER, such over-excavation requires use of lean concrete or crushed stone, the CONTRACTOR, at its expense, shall furnish and place such materials.

3.04 SHEETING AND BRACING

A. The term "sheeting" shall represent any type of shoring used to support sides of the excavation. Walls of the excavation shall be kept vertical where open cut is not practical and, if required to protect the safety of workmen, the general public, this or other work or structure, or excavation walls, the excavation shall be properly sheeted and braced for conditions encountered and OSHA requirements. Excavation for the structures shall be sufficient to provide a clearance between their outer surfaces and the face of the excavation, sheeting, or bracing, of not less than two feet, unless otherwise indicated on the Drawings. Materials encountered in the excavation, which have a tendency to slough or flow into the excavation, undermine the bank, weaken the overlying strata, or are otherwise rendered unstable by the excavation operation shall be retained by sheeting, stabilization, grouting or other acceptable methods.

B. Minimum length of embedment below the deepest part of the excavation shall be 0.3 times the depth of excavation being supported or greater depending on the sheeting. The design of the sheeting arrangement shall be the responsibility of the CONTRACTOR.

C. Sheeting shall be removed provided its removal will not jeopardize pipes or structures. Any sheeting left in place shall be cut-off two feet below finished grade, or as directed. The CONTRACTOR will not receive extra compensation for sheeting left in place or the cut off work required.

3.05 REMOVAL OF WATER

A. <u>General</u>

1. The CONTRACTOR shall provide pumps, well points, and other appurtenant equipment necessary to remove and maintain water at such a level as to permit construction in the dry where defined on the Drawings. The ground water level shall be controlled so as to permit the placing and curing of concrete and the maintenance of supporting foundations and adjacent work and structures in the dry.

2. The CONTRACTOR shall use dewatering systems that include automatic starting devices, and standby pumps that will ensure continuous dewatering in the event of an outage of one or more pumps.

3. If excavations to be dewatered cannot be maintained dry by the CONTRACTOR's dewatering efforts, then the CONTRACTOR shall provide tremie seals at no additional cost to the OWNER. The placement of tremie seals shall not preclude dewatering operations specified herein. The limits of tremie seals shall be recommended by the CONTRACTOR and reviewed and accepted by the ENGINEER.

B. Disposal: The CONTRACTOR shall be responsible to dispose of water from the dewatering operation in accordance with the Contract Documents and shall obtain all necessary permits and conform to all local regulations and codes. Water from the excavation shall be disposed of in such a manner as will not cause injury to public health, to public or private property, to the work completed or in progress, to the surface of the streets, will not cause any interference with the use of the same by the public, or will not cause pollution of any waterway or stream. Water from dewatering operation may be disposed at locations directed by the OWNER with the proper installation of siltation screens and operation of the dewatering system in accordance with all local regulations and codes. The CONTRACTOR shall submit its dewatering method and point(s) of discharge to the ENGINEER for review at least twenty (20) days prior to any dewatering activities. The CONTRACTOR shall provide maintenance of canal(s) and drainage ditches to which it discharges. The cost of maintaining drainage ditches and canal(s) shall be included in the bid price. The CONTRACTOR shall remove siltation and haul, and dispose of this material on a regular basis to maintain the original base conditions at all time, so as not to impact drainage in the general area.

3.06 FILL PLACEMENT AND COMPACTION

A. General

1. Fill material (including structural fill and other fill material) shall be placed within the limits of excavations as shown on the Drawings. When placed in the wet, fill material shall be placed in standing groundwater to a level one foot above stabilized groundwater. The material shall be placed at one edge of the excavation and pushed to the other so as to move residuals across the bottom of the excavation. The leading edge of the fill should be cleaned regularly to remove it of the advancing residuals. All residuals shall be disposed at off-site locations shown on the Drawings or specified herein.

2. Once fill materials have been placed one foot above the stabilized groundwater, then the entire lift should be rolled with six passes from an 10-ton roller. The coverages shall be overlapping and shall occur while the compactor operated at a travel speed of not more than two feet per second. If a vibratory compactor is used, it should be operated with the vibrator off so as not to induce capillary moisture into the dry fill soils.

3. Fill materials placed following this initial lift shall be placed in the dry with loose lift thickness of eight inches or less. Each lift shall be compacted to achieve a minimum of 98 percent Modified Proctor maximum dry density in accordance with ASTM D1557. Fill materials shall be placed within two percent of optimum moisture content.

B. Inspection and Testing: The fill placement and compaction shall be observed by the ENGINEER. As a minimum, an in-place density test will be made in each lift of compacted soil for every 2,500 square feet of area. The CONTRACTOR shall coordinate and cooperate with the testing laboratory.

C. Final Grades: Final structure fill grades shall be within 0.1 feet of elevations shown. Where shown on the Drawings, surfaces shall be sloped for drainage or other surfaces.

D. Refer to the Drawings for additional fill and compaction requirements for specific locations/areas of work.

3.07 BACKFILL AGAINST STRUCTURES

A. Backfill against nonwater holding structures shall not be performed until the concrete has been inspected by the ENGINEER. Backfill against walls shall also be deferred until the structural slab for floors above the top fill line have been placed and attained design strength. Partial backfilling against adequately braced walls may be considered by the ENGINEER on an individual situation basis. Where walls are to be waterproofed, all work shall be completed and membrane materials dried or cured according to the manufacturer's instructions before backfilling.

- END OF SECTION -

PROJECT NO. 12197

SECTION 02668 - DISINFECTION AND BACTERIOLOGICAL TESTING

PART 1 - GENERAL

1.01 SCOPE

A. The Contractor shall perform all disinfection and bacteriological testing as specified herein and in accordance with the requirements of the Contract Documents. Work shall include conveyance of test water from Owner designated source to point of use and subsequent disposal.

1.02 REFERENCE SPECIFICATIONS, CODES, AND STANDARDS

A. Commercial Standards:

1. ANSI / AWWA B300 Hypochlorites
2. ANSI / AWWA C652 Disinfection of Water Storage Facilities
3. ANSI / AWWA C653 Disinfection of Water Treatment Plants
4. ANSI/AWWA C651 Disinfecting Water Mains
5. ANSI / AWWA / WEF Standard Methods for the Examination of Water and Wastewater

1.03 SUBMITTALS

A. Shop Drawings: The Contractor shall submit plans, procedures, and schedules for disinfection and testing for review and concurrence of the Engineer. The proposed plans shall address water conveyance, control, disposal and disinfection procedures.

PART 2 – PRODUCTS

2.01 WATER SUPPLY

A. The Owner shall provide reasonable quantities of water necessary for the disinfection of all facilities associated with this Contract.

2.02 CHEMICALS

A. The Contractor shall be responsible for all chemicals and chemical feed equipment required for disinfection.

2.03 TEMPORARY MATERIALS AND EQUIPMENT

A. Temporary valves, bulkheads, or other water control equipment and materials shall be as determined and provided by the Contractor.

PART 3 - EXECUTION

3.01 DISINFECTION OF WATER TREATMENT PROCESS UNITS

A. The Contractor shall disinfect Hydrotreators 3 and 4 prior to return the tank to service.

B. Comply with ANSI / AWWA C653.

C. Scheduling Sequence for Disinfection: Each structure / unit shall be disinfected in accordance with the following sequence:

1. Complete Work on the particular structure / unit in accordance with the contract documents.

2. Once the Contractor deems that it has completed the Work for a particular structure / unit process, it shall request an inspection.

3. The Engineer will make an inspection and issue a punch list.

4. Once the punch list items have been signed off by the Engineer as being satisfactorily addressed disinfection operations shall be scheduled by the Contractor.

5. The Contractor shall disinfect the structure / unit in accordance with this specification.

6. Once the structure / unit has been disinfected and successfully completed bacteriological testing, it may be placed into service.

D. Disinfection Procedure:

1. The structure / unit to be disinfected shall be filled with finished water pumped from an Owner designated source. The Contractor shall provide temporary pumping and transfer capability as needed.

2. Chlorination: A strong chlorine solution (approximately 500 ppm) shall be sprayed on all interior surfaces of the structure / unit. The structure / unit shall then be filled with the water level maintained approximately 6 inches below the top of the structure / unit. During the filling operation, a chlorine-water mixture shall be injected by means of a solution-feed chlorinating device. The dosage applied to the water shall be of sufficient strength to produce a chlorine residual of at least 50 ppm upon completion of the partial filling operation. Precautions shall be taken to prevent the strong chlorine solution from flowing back into the lines supplying the water.

3. Retention Period: Chlorinated water shall be retained in the structure / unit long enough to destroy all non-spore-forming bacteria, and in any event, for at least 24 hours. After the chlorine-treated water has been retained for the required time, the chlorine residual in the structure / unit and appurtenance piping shall be at least 25 ppm. All valves shall be operated while the lines are filled with the heavily chlorinated water.

4. Flushing: After the chlorine residual has been checked, and has been found to satisfy the above requirement, the water in the structure / unit shall be drained of heavily chlorinated water. The Contractor shall provide temporary pumping and transfer capability for draining as needed.

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3.02 DISINFECTION OF PIPING (LESS THAN 20-FEET)

A. Just prior to installing the new and existing pipe, fittings, valves, flow meters and accessories, flush and clean dirt and debris from the interior and swab the interior with a minimum one (1) percent solution of chlorine.

3.03 BACTERIOLOGICAL SAMPLING AND TESTING

A. Bacteriological sampling and testing shall be performed by the City's laboratory.

B. Once satisfactory bacteriological test results are achieved, the OWNER will give the Contractor written permission to initiate Work on other units as allowable by the construction sequence in the Section entitled "Summary of Work".

C. If results of the tests are not acceptable, the disinfection of the system shall be repeated until the bacteriological test is satisfactory.

- END OF SECTION –

PROJECT NO. 12197

SECTION 02710
LIMEROCK BASE

PART 1 GENERAL

1.1 DEFINITIONS

A. Completed Course: Compacted, unyielding, free from irregularities, with smooth, tight, even surface, true to grade, line, and cross section.

B. Completed Lift: Compacted with uniform surface reasonably true to cross-section.

PART 2 PRODUCTS

2.1 LIMEROCK BASE ROCK

A. The material used in limerock base shall be material classified as Miami Oolite Formation.

B. The minimum of carbonates of calcium and magnesium in the limerock shall be 70 percent. The maximum percentage of water-sensitive clay material shall be 3.

C. Limerock material shall be uniform in color and not contain cherty or other extremely hard pieces, or lumps, balls, or pockets of sand or clay size material in sufficient quantities as to be detrimental to the proper bonding, finishing, or strength of the limerock base.

D. The limerock base shall be uniformly graded from coarse to fine with 97 percent passing a 3-1/2-inch sieve, 80 percent passing a 2-inch sieve. The fine material shall consist entirely of dust of fracture. All crushing or breaking up, which might be necessary in order to meet such size requirements, shall be done before the material is placed on the road.

E. Physical Qualities:

1. Liquid Limit, AASHTO T89: Maximum 35 percent.
2. Nonplastic.
3. Limerock material shall have an average limerock bearing ratio (LBR) value of not less than 100.

2.2 SOURCE QUALITY CONTROL

A. CONTRACTOR: Perform tests necessary to locate acceptable source of materials meeting specified requirements.

B. Final approval of aggregate material will be based on materials' test results on installed materials.

C. Should separation of coarse from fine materials occur during processing or stockpiling, immediately change methods of handling materials to correct uniformity in grading.

PART 3 EXECUTION

3.1 SUBGRADE PREPARATION

A. As specified in Section 02222 and 02224.

B. Obtain ENGINEER's acceptance of subgrade before placement of limerock base rock.

C. Do not place base materials on soft, muddy subgrade.

3.2 EQUIPMENT

A. Use mechanical rock spreaders, equipped with a device that strikes off the rock uniformly to laying thickness, capable of producing even distribution. For areas where the use of a mechanical spreader is not practicable, the CONTRACTOR may spread the rock using bulldozers or blade graders.

3.3 HAULING AND SPREADING

A. Hauling Materials:

1. The limerock shall be transported to the point where it is to be used and dumped on the end of the preceding spread.
2. Do not haul over surfacing in process of construction.
3. Loads: Of uniform capacity.
4. Maintain consistent gradation of material delivered; loads of widely varying gradations will be cause for rejection.

B. Spreading Materials:

1. Distribute material to provide required density, depth, grade and dimensions with allowance for subsequent lifts.

2. Produce even distribution of material upon roadway without segregation.
3. Should segregation of coarse from fine materials occur during placing, immediately change methods of handling materials to correct uniformity in grading.

3.4 CONSTRUCTION OF COURSES

A. General: Complete each lift in advance of laying succeeding lift to provide required results and adequate inspection.

B. Limerock Base:

1. Maximum Completed Lift Thickness: 6 inches or equal thickness.
2. Completed Course Total Thickness: As shown.
3. Spread lift on preceding course to required cross-section.
4. Lightly blade and roll surface until thoroughly compacted.
5. Blade or broom surface to maintain true line, grade, and cross-section.

C. Gravel Surfacing:

1. Maximum Completed Lift Thickness: 6 inches or equal thickness.
2. Completed Course Total Thickness: As shown.
3. Spread on preceding course in accordance with cross-section shown.
4. Blade lightly and roll surface until material is thoroughly compacted.

3.5 ROLLING AND COMPACTION

A. Commence compaction of each layer of base after spreading operations and continue until density of 98 percent of maximum density has been achieved as determined by AASHTO T 180.

B. Roll each course of surfacing until material shall not creep under roller before succeeding course of surfacing material is applied.

C. Commence rolling at outer edges of surfacing and continue toward center; do not roll center of road first.

D. When the material does not have the proper moisture content to ensure the required density, wet or dry, as required. When adding water, uniformly mix it in by disking to the full depth of the course that is being compacted. During wetting or drying operations, manipulate as a unit, the entire width and depth of the course that is being compacted.

E. Place and compact each lift to required density before succeeding lift is placed.

F. Bind up preceding course before placing leveling course. Remove floating or loose stone from surface.

G. Blade or otherwise work surfacing as necessary to maintain grade and cross-section at all times, and to keep surface smooth and thoroughly compacted.

H. Surface Defects: Remedy surface defects by loosening and rerolling. Reroll entire area, including surrounding surface, until thoroughly compacted.

1. Finished Surface: True to grade and crown before proceeding with surfacing.

3.6 SURFACE TOLERANCES

A. Finished Surface of Base Course and Leveling Course: Within plus or minus 0.04-foot of grade shown at any individual point.

B. Compacted Surface of Leveling Course: Within 0.04-foot from lower edge of 10-foot straightedge placed on finished surface, parallel to centerline.

C. Overall Average: Within plus or minus 0.01-foot from crown and grade specified.

3.7 DRIVEWAY RESURFACING

A. Replace gravel surfacing on driveways which were gravel surfaced prior to construction.

B. Provide compacted gravel surfacing to depth equal to original, but not less than 4 inches.

C. Leave each driveway in as good or better condition as it was before start of construction.

3.8 FIELD QUALITY CONTROL

A. In-Place Density Tests:

1. Construct base course so areas shall be ready for testing.
2. Allow reasonable length of time for ENGINEER to perform tests and obtain results during normal working hours.

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3.9 CLEANING

A. Remove excess material; clean stockpile areas of aggregate.

END OF SECTION

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SECTION 02771
CONCRETE SIDEWALKS

PART 1 GENERAL (NOT USED)

PART 2 PRODUCTS

2.01 EXPANSION JOINT FILLER

A. 1/2-inch thick, preformed asphalt-impregnated, expansion joint material meeting AASHTO M153 Type I, II, or III, or AASHTO M213, or cellulose fiber types meeting the requirements of AASHTO M213, except the asphalt content is acceptable provided they contain minimum of 0.2 percent copper pentachlorophenate as a preservative and 1 percent water proofing wax.

2.02 CONCRETE

A. Ready-mixed meeting ASTM C94, Option A, with compressive strength of 3,000 psi at 28 days.

B. Maximum Aggregate Size: 1-1/2 inch.

C. Slump: 2 to 4 inches.

2.03 CURING COMPOUND

A. Liquid membrane-forming, clear or translucent, suitable for spray application and meeting ASTM C309, Type 1.

PART 3 EXECUTION

3.01 FORMWORK

A. Lumber Materials:

1. 2-inch dressed dimension lumber, or metal of equal strength, straight, free from defects that would impair appearance or structural quality of completed curb and sidewalk.
2. 1-inch dressed lumber or plywood may be used where short-radius forms are required.

B. Metals: Steel in new undamaged condition.

C. Setting Forms:

1. Construct forms to shape, lines, grades, and dimensions.

2. Stake securely in place.

D. Bracing:

1. Brace forms to prevent change of shape or movement resulting from placement.
2. Construct short-radius curved forms to exact radius.

E. Tolerances:

1. Do not vary tops of forms from gradeline more than 1/8 inch when checked with 10-foot straightedge.
2. Do not vary alignment of straight sections more than 1/8 inch in 10 feet.

3.02 PLACING CONCRETE

A. Excavate to the required depth, place and compact limerock base rock as specified in Section 02710, Limerock Base. Compact directly under the area and 1 foot beyond each side of the sidewalk and curb.

B. Prior to placing concrete, remove water from excavation and debris and foreign material from forms.

C. Place concrete as soon as possible, and within 1-1/2 hours after adding cement to mix without segregation or loss of ingredients, and without splashing.

D. Place, process, finish, and cure concrete in accordance with applicable requirements of ACI 304, and this section. Wherever requirements differ, the more stringent shall govern.

E. To compact, vibrate until concrete becomes uniformly plastic.

F. All edges shall be smooth and rounded.

3.03 SIDEWALK CONSTRUCTION

A. Thickness:

1. 4 inches in walk areas.
2. 6 inches in driveway and commercial areas.
3. 6 inches within the water treatment plants.

B. Connection to Existing Sidewalk:

1. Remove old concrete back to an existing contraction joint.

2. Clean the surface.
3. Apply a neat cement paste immediately prior to placing new sidewalk.

C. Expansion Joints: Place at maximum 20-foot intervals, at adjacent curb expansion joint, where sidewalk ends at curb, and around posts, poles, or other objects penetrating sidewalk. Install expansion joint filler at each joint.

D. Contraction Joints:

1. Provide transversely to walks at locations opposite contraction joints in curb.
2. Dimensions: 3/16-inch by 1-inch weakened plane joints.
3. Construct straight and at right angles to surface of walk.

E. Finish:

1. Broom surface with fine-hair broom at right angles to length of walk and tool at edges, joints, and markings.
2. Ensure that the surface variations are not more than ¼ inch under a 10-foot straightedge, or more than 1/8 inch on a 5-foot transverse section.
3. Mark walks transversely at 5-foot intervals, or in pattern shown on Drawings, with jointing tool; finish edges with rounded steel edging tool.
4. Apply curing compound to exposed surfaces upon completion of finishing.
5. Protect sidewalk from damage and allow to cure for at least 7 days.

END OF SECTION

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SECTION 03305 - CONCRETE AND GROUT

PART 1 -- GENERAL

1.01 THE REQUIREMENT

A. Where shown on the Drawings or required for a complete project, furnish and install concrete and grout as described herein.

B. The Contractor shall furnish all materials for concrete in accordance with the provisions of this Section and shall form, mix, place, cure, repair, finish, and do all other work as required to produce finished concrete, all in accordance with the requirements of the Contract Documents.

C. The following types of concrete shall be covered in this Section:

1. Structural Concrete: Concrete to be used in all cases except where noted otherwise in the Contract Documents.

2. Sitework Concrete: Concrete to be used curbs, gutters, catch basins, sidewalks, cart paths, fence and guard post embedment, underground duct bank encasement and all other concrete appurtenant to electrical facilities unless otherwise shown or noted on the Drawings.

D. The following types of grout are covered in this Section:

1. Cement Grout: This type of grout shall be used wherever grout or cementitious grout is called for in the Contract Documents, unless another type is specifically referenced.

2. Non-Shrink Grout: Non-shrink cementitious grout or non-shrink epoxy grout shall be used whenever non-shrink grout is called for. Non-shrink cementitious grout shall be used at locations where there are no dynamic loads, the grout will not come in contact with wastewater or wastewater gases. Non-shrink epoxy grout shall be used in submerged (water or wastewater), under wastewater gas environment, and for anchorage of pump bases, motor bases, and any other equipment imparting dynamic loads to the support system.

1.02 REFERENCE SPECIFICATIONS, CODES, AND STANDARDS

A. Codes: Without limiting the generality of other requirements of these specifications, all work specified herein shall conform to or exceed the requirements of the Florida Building Code and the applicable requirements of the following documents to the extent that the provisions of such documents are not in conflict with the requirements of this Section.

B. Commercial Standards:

ACI 214	Recommended Practice for Evaluation of Strength Test Results of Concrete
ACI 301	Specifications for Structural Concrete for Buildings.
ACI 305	Hot Weather Concreting
ACI 306	Cold Weather Concreting
ACI 315	Manual of Standard Practice for Detailing Reinforced Concrete Structures.
ACI 318	Building Code Requirements of Reinforced Concrete.
ACI 347	Recommended Practice for Concrete Formwork.
ASTM A 185	Specification for Steel Welded Wire, Fabric, Plain, for Concrete Reinforcement.
ASTM A 615	Specification for Deformed and Plain Billet-Steel Bars for Concrete Reinforcement.
ASTM C 31	Test Methods for Making and Curing Concrete Test Specimens in the Field.
ASTM C 33	Specification for Concrete Aggregates.
ASTM C 39	Test Method for Compressive Strength of Cylindrical Concrete Specimens.
ASTM C 88	Test Method for Soundness of Aggregates by use of Sodium Sulfate or Magnesium Sulfate
ASTM C 94	Specification for Ready-Mixed Concrete.
ASTM C 114	Method for Chemical Analysis of Hydraulic Cement
ASTM C 136	Method for Sieve Analysis of Fine and Coarse Aggregate
ASTM C 143	Test Method for Slump of Portland Cement Concrete.
ASTM C 150	Specification for Portland Cement.
ASTM C156	Test Method for Water Retention by concrete Curing Materials
ASTM C 157	Test Method for length Change of Hardened Cement Mortar and Concrete

ASTM C 192	Method of Making and Curing Concrete Test Specimens in the Laboratory
ASTM C 227	Standard Test Method for Potential Alkali Reactivity of Cement Aggregate Combinations (Mortar-Bar Method).
ASTM C 260	Specification for Air-Entraining Admixtures for Concrete.
ASTM C 289	Standard Test Method for Potential Reactivity of Aggregates (Chemical Method)
ASTM C 309	Specification for Liquid Membrane-Forming Compounds for Curing Concrete.
ASTM C 494	Specification for Chemical Admixtures for Concrete.
ASTM C 579	Test Methods for Compressive Strength of Chemical Resistant Mortars and Monolithic Surfacings.
ASTM C 618	Standard Specification for Fly Ash and Raw or Calcined Natural Pozzolan for use as a Mineral Admixture in Portland Cement Concrete
ASTM C 827	Test Method for Early Volume Change of Cemetitious Mixtures.
ASTM D 1751	Specification for Preformed Expansion Joint Fillers for Paving and Structural Construction (Non-extruding and Resilient Bituminous Types).
CRD C 621	Non-Shrink Grout
CRSI	Manual of Standard Practice.

C. Any procedure, materials or operation specified by reference to the American Society for Testing and Materials (ASTM), the American Concrete Institute (ACI), Building Code or other references shall comply with the requirements of the current and most recent specifications or standards. In conflicts between listed standards and this specification, the more stringent requirements shall govern.

D. The Contractor is expected to obtain the most recent issue of all standards, recommendations, codes or specifications referred to within this specification.

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1.03 SUBMITTALS

A. Mix Designs: The design mixes to be used shall be prepared by qualified persons and submitted for review. The design of the mix is the responsibility of the Contractor subject to the limitations of the specifications. Review processing of this submission will be required only as evidence the mix has been designed by qualified persons and that the minimum requirements of the specifications have been met. Such review will in no way alter the responsibility of the Contractor to furnish concrete meeting the requirements of the specifications. If in the progress of the work the sources of materials change in characteristics or the Contractor requests a new source in writing, the Contractor shall, at his expense submit new test data and information for the establishment of a new design mix. Submit mix designs for all classes of concrete to be used under this Contract. Mix design submittals shall include the following:

1. Sources of all materials and certifications of compliance with specifications for all sources of each material.

2. Certified current (less than one year old) chemical analysis of Portland Cement or Blended Cement to be used.

3. Certified current (less than one year old) chemical analysis of fly ash to be used.

4. Aggregate test results showing compliance with required standards, i.e. sieve analysis, aggregate soundness tests, etc.

5. Manufacturer’s data on all admixtures stating compliance with required standards and are compatible with one another. Written conformance to the above mentioned requirements and the chloride ion content of the admixture will be required from the admixture manufacturer prior to Mix design review by the Engineer.

6. Field experience records and/or trial mix data for the proposed concrete mixes.

C. Grout: The Contractor shall submit shop drawings for all types of grout for use in this Project. Shop drawings shall include certified test results verifying the compressive strength, shrinkage, and expansion requirements specified herein; and manufacturer's literature containing instructions and recommendations on the mixing, handling, placement and appropriate uses for each type of grout used in the work.

D. Accessories: The Contractor shall submit shop drawings for all types of concrete accessories to be used for this project including, but not limited to, form ties, water stops, joint materials and curing agents.

E. Delivery Tickets: Where ready-mix concrete is used, the Contractor shall submit delivery tickets at the time of delivery of each load of concrete. Each certificate shall show the State certified equipment used for measuring and the total quantities, by weight, of cement, sand, each class of aggregate, admixtures, and the amounts of water in the aggregate and added at the batching plant as well as the amount of water allowed to be

added at the site for the specific design mix. Each certificate shall, in addition, state the mix number, total yield in cubic yards, and the time of day, to the nearest minute, corresponding to when the batch was dispatched, when it left the plant, when it arrived at the job, the time that unloading began, and the time that unloading was finished.

F. Reinforcing Steel: The Contractor shall submit shop drawings of shop bending diagrams, placing lists, and Drawings of all reinforcing steel prior to fabrication.

1. The Contractor shall submit detailed placing and shop fabricating drawings, prepared in accordance with ACI 315 and ACI Detailing Manual - (SP66) for all reinforcing steel. These drawings shall be made to such a scale as to clearly show joint locations, openings, the arrangement, spacing and splicing of the bars. Where opening sizes are dependent on equipment selection the Contractor shall indicate all necessary dimensions to define steel lengths and placing details.

2. Details of the concrete reinforcing steel and concrete inserts shall be submitted by the Contractor at the earliest possible date after receipt by the Contractor of the Notice to Proceed. Said details of reinforcing steel for fabrication and erection shall conform to ACI 315 and the requirements specified and shown. The shop bending diagrams shall show the actual lengths of bars, to the nearest inch measured to the intersection of the extensions (tangents for bars of circular cross section) of the outside surface. The shop Drawings shall include bar placement diagrams which clearly indicate the dimensions of each bar splice.

3. Where mechanical couplers are shown on the Drawings to be used to splice reinforcing steel, the Contractor shall submit manufacturer's literature which contains instructions and recommendations for installation for each type of coupler used; certified test reports which verify the load capacity of each type and size of coupler used; and shop Drawings which show the location of each coupler with details of how they are to be installed in the formwork.

4. If reinforcing steel is spliced by welding at any location, the Contractor shall submit mill test reports which shall contain the information necessary for the determination of the carbon equivalent as specified in AWS Dl.4. The Contractor shall submit a written welding procedure for each type of weld for each size of bar which is to be spliced by welding, merely a statement that AWS procedures will be followed is not acceptable. Welding of rebar shall be done only where shown on the Drawings or allowed in writing by the Engineer.

G. Curing: Submit the following in accordance with Supplementary General Provisions Section 2.2b.

1. Proposed procedures for protection of concrete under wet weather placement conditions.

2. Proposed normal procedures for protection and curing of concrete.

3. Proposed special procedures for protection and curing of concrete under hot and cold weather conditions.

4. Proposed method of measuring concrete surface temperature changes.

5. Manufacturer's literature and material certification for proposed curing compounds.

1.04 QUALITY ASSURANCE

A. Tests on component materials and for compressive strength of concrete will be performed as specified herein. Test for determining slump will be in accordance with the requirements of ASTM C 143.

B. The cost of initial trial mixes and initial laboratory tests to design the mixes including compression tests, sieve analysis, and tests on trial mixes shall be included in the Contract Price.

C. The cost of all laboratory tests on cement, aggregates, and concrete, will be borne by the Owner. However, the Contractor shall be charged for the cost of any additional tests and investigation on work performed which does not meet the specifications.

C. Concrete for testing shall be supplied by the Contractor at no cost to the Owner, and the Contractor shall provide assistance to the Engineer in obtaining samples. The Contractor shall dispose of and clean up all excess material.

F. Construction Tolerances: The Contractor shall set and maintain concrete forms and perform finishing operations so as to ensure that the completed work is within the tolerances specified herein. Surface defects and irregularities are defined as finishes and are to be distinguished from tolerances. Tolerance is the specified permissible variation from lines, grades, or dimensions shown. Where tolerances are not stated in the Specifications, permissible deviations will be in accordance with ACI 347.

1.05 QUALITY CONTROL

A. Compressive Strength

1. Compression test specimens shall be taken during construction from the first placement of each class of concrete specified herein and at intervals thereafter as selected by the Engineer to insure continued compliance with these Specifications. At least one set of test specimens shall be made for each placement in excess of five cubic yards, or for each fifty (50) cubic yards of concrete placed, or for each 5000 square feet of surface area for slabs or walls, whichever is greater.

2. Samples of freshly mixed concrete shall be obtained in accordance with ASTM C 172, and compression test specimens for concrete shall be made in accordance with ASTM C 31. Specimens shall consist of at least five 6-inch diameter by 12-inch high cylinders, or eight 4-inch diameter by 8-inch high cylinders. Each cylinder shall be identified by a tag attached to the side of the cylinder.

3. The Contractor shall provide approved curing boxes for storage of cylinders on site. The insulated curing box shall be of sufficient size and strength to contain all the specimens made in any four consecutive working days and to protect the specimens from falling over, being jarred or otherwise disturbed during the period of initial curing. The box shall be erected, furnished and maintained by the Contractor. Such box shall be equipped to provide the moisture and to regulate the temperature necessary to maintain the proper curing conditions required by ASTM C31. Such box shall be located in an area free from vibration such as pile driving and traffic of all kinds. No concrete requiring inspection shall be delivered to the site until such storage curing box has been provided. Specimens shall remain undisturbed in the curing box until ready for delivery to the testing laboratory but not less than sixteen hours

4. Compression test shall be performed in accordance with ASTM C 39. For 6x12 cylinders, two test cylinders will be tested at 7 days and 2 at 28 days. For 4x8 cylinders, three test cylinders will be tested at 7 days and three at 28 days. The remaining cylinders will be held to verify test results, if needed.

B. Consistency

1. Consistency of the concrete will be checked by the Engineer by standard slump cone tests. The Contractor shall make any necessary adjustments in the mix as the Engineer may direct and shall upon written order suspend all placing operations in the event the consistency does not meet the intent of the specifications. No payment shall be made for delays, material or labor costs due to such eventualities.

2. Slump tests shall be made in accordance with ASTM C 143. Slump tests shall be performed as deemed necessary by the Engineer and each time compressive strength samples are taken.

C. Air Content

1. Samples of freshly mixed concrete will be tested for entrained air content by the Engineer in accordance with ASTM C 231.

2. Air content tests will be performed as deemed necessary by the Engineer and each time compressive strength samples are taken.

D. Evaluation and Acceptance of Concrete

1. Evaluation and acceptance of the compressive strength of concrete shall be according to the requirements of ACI 215 and ACI 318, Chapter 5 "Concrete Quality Mixing and Placing", and as specified herein.

2. If any concrete fails to meet these requirements, immediate corrective action shall be taken to increase the compressive strength for all subsequent batches of the type of concrete affected.

3. All concrete which fails to meet the ACI requirements and these specifications, is subject to removal and replacement at the cost of the Contractor. Additional testing may also be required to verify compressive strength of concrete. Additional testing shall involve extraction and testing of concrete cores in accordance with ASTM C 42. Engineer shall determine locations where concrete cores shall be taken. Nondestructive test methods shall not be used to verify strength of in-place concrete.

1.06 DEFINITIONS

A. In these Specifications, the term "Precast Concrete" shall mean precast manholes, handholes, vaults, pull boxes, and similar structures. It does not include precast prestressed concrete elements.

PART 2 -- PRODUCTS

2.01 FORMWORK

A. Form Materials: Except as otherwise expressly accepted by the Engineer, all lumber for use as forms, shoring, or bracing shall be new material. Materials for concrete forms shall conform to the following requirements:

1. Form materials shall be metal, wood, plywood, or other acceptable material that will not adversely affect the concrete and will facilitate placement of concrete to the shape, form, line, and grade shown.

2. Plywood for concrete formwork shall be new, waterproof, synthetic resin bonded, exterior type Douglas Fir or Southern Pine plywood manufactured especially for concrete formwork and shall conform to the requirements of PS 1 for Concrete Forms, Class 1, and shall be edge sealed. Wood forms for surfaces to be painted shall be Medium Density Overlaid plywood, MDO Exterior Grade. Thickness shall be as required to support concrete at the rate it is placed, but not less than 5/8-inch thick.

B. Formwork Accessories:

1. Unless otherwise shown, exterior corners in concrete members shall be provided with ¾-inch chamfers. Re-entrant corners in concrete members shall not have fillets unless otherwise shown.

2. Form ties shall be provided with a plastic cone or other suitable means for forming a conical hole to insure that the form tie may be broken off back of the face of the concrete. The maximum diameter of removable cones for rod ties, or of other removable form-tie fasteners having a circular cross-section, shall not exceed 1-1/2 inches; and all such fasteners shall be such as to leave holes of regular shape for reaming.

3. Form ties for water-retaining structures shall have integral waterstops. Removable taper ties may be used when acceptable to the Engineer. At locations where acceptable, a preformed neoprene or polyurethane tapered plug sized to seat at the center of the wall shall be inserted in the hole left by the removal of the taper tie.

4. Form release agent shall be a blend of natural and synthetic chemicals that employs a chemical reaction to provide quick, easy and clean release of concrete from forms. It shall not stain the concrete and shall leave the concrete with a paintable surface. Formulation of the form release agent shall be such that it would minimize formation of "Bug Holes" in cast-in-place concrete.

2.02 CONCRETE MATERIALS

A. Materials shall be delivered, stored, and handled so as to prevent damage by water or breakage. Only one brand of cement shall be used. Cement reclaimed from cleaning bags or leaking containers shall not be used. All cement shall be used in the sequence of receipt of shipments.

B. All materials furnished for the work shall comply with the requirements of ACI 301, as applicable.

C. Storage of materials shall conform to the requirements of ACI 301.

D. Materials for concrete shall conform to the following requirements:

1. Cement shall be standard brand Portland cement conforming to ASTM C 150 Type II. A single brand of cement shall be used throughout the work, and prior to its use, the brand shall be acceptable to the Engineer. The cement shall be suitably protected from exposure to moisture until used. Cement that has become lumpy shall not be used. Sacked cement shall be stored in such a manner as to as to permit access for inspection and sampling. Certified mill test reports for each shipment of cement to be used shall be submitted to the Engineer, verifying compliance with these Specifications.

2. Water shall be potable, clean, and free from objectionable quantities of silty organic matter, alkali, salts and other impurities. The water shall be considered potable, for the purposes of this Section only, if it meets the requirements of the local governmental agencies. Agricultural water with high total dissolved solids (over 1000 mg/1 TDS) shall not be used.

3. Aggregates shall be obtained from pits acceptable to the Engineer, shall be non-reactive, and shall conform to the Florida Building Code and ASTM C 33. Maximum size of coarse aggregate shall be as specified in Paragraph 2.11.B.

4. Ready-mix concrete shall conform to the requirements of ASTM C 94.

5. Air-entraining agent meeting the requirements of ASTM C 260, shall be used. Sufficient air-entraining agent shall be used to provide a total air content of 3 to 5 percent. The Owner reserves the right, at any time, to sample and test the air- entraining agent received on the job by the Contractor. The air-entraining agent shall be added to the batch in a portion of the mixing water. The solution shall be batched by means of a mechanical batcher capable of accurate measurement.

6. Water reducing and retarding admixtures shall be required at the Engineer's discretion or, if not required, may be added at the Contractor's option to control the set, effect water reduction, and increase workability. In either case, the addition of an admixture shall be at no additional cost to the Owner. The use of an admixture shall be subject to acceptance by the Engineer. Admixtures permitted shall conform to the requirements of ASTM C 494 (chemical admixtures). Admixtures shall contain no free chloride ions, be non-toxic after 30 days and shall be compatible with and made by the same manufacturer as the air entraining admixture.

2.03 CURING MATERIALS

A. Materials for curing concrete conform to ASTM C 309 Type 1-D, Class B with a minimum solids content of 30% and shall contain a fugitive dye. Curing compound shall be SureCure 30 by Kaufman Products, Inc., CA D.O.T. Acrylic Cure by Symons Corporation, Sealtight CS-309-30 by W. R. Meadows, or approved equal.

B. Polyethylene sheet for use as a concrete curing blanket shall be white and have a nominal thickness of 6 mils.

2.04 JOINT MATERIALS

A. Materials for joints in concrete shall conform to the following requirements:

1. Preformed joint filler shall be a non-extruding, resilient, bituminous type conforming to the requirements of ASTM D 1751.

2. Elastomeric joint sealer shall be a single component, pour grade, polyurethane sealant meeting FS TT-S-230A, Type 1. Material shall attain Shore A Hardness of 40-45.

3. Mastic joint sealer shall be a material that does not contain evaporating solvents; that will tenaciously adhere to concrete surfaces; that will remain permanently resilient and pliable; that will not be affected by continuous presence of water and will not in any way contaminate potable water; and that will effectively seal the joints against moisture infiltration even when the joints are subject to movement due to expansion and contraction. The sealer shall be composed of special asphalts or similar materials blended with lubricating and plasticizing agents to form a tough, durable mastic substance containing no volatile oils or lubricants and

shall be capable of meeting the test requirements set forth hereinafter, if testing is required by the Engineer.

B. Joint Cleaner: Joint cleaner shall be as recommended by the sealant caulking compound manufacturer.

C. Joint Primer: Joint primer shall be as recommended by sealant manufacturer.

2.05 REINFORCING STEEL

A. General: All reinforcing steel for all reinforced concrete construction shall conform to the following requirements:

1. Bar reinforcement shall conform to the requirements of ASTM A 615 for Grade 60 Billet Steel Reinforcement with supplementary requirement S-1, and shall be manufactured in the United States.

2. Welded wire fabric reinforcement shall conform to the requirements of ASTM A185. All welded wire fabric reinforcement shall be galvanized.

B. Accessories: Accessories shall include all necessary bolsters, chairs, spacers and other devices for supporting and fastening reinforcing in place complying with CRSI recommendations conforming to Class 1 bar supports. Bolsters for slab on grade shall have gray plastic tipped legs.

C. Concrete blocks (dobies), used to support and position reinforcement steel, shall have the same or higher comprehensive strength as specified for the concrete in which it is located. Where the concrete blocks are used on concrete surfaces exposed to view, the color and texture of the concrete blocks shall match that required for the finished surface. Wire ties shall be embedded in concrete block bar supports.

D. Couplers used to mechanically splice reinforcing steel shall develop a tensile strength which exceeds 125 percent of the yield strength of the reinforcing bar being spliced. Hot forged sleeve type couplers shall not be used. Acceptable mechanical couplers are: Dayton Superior Dowel Bar Splicer System by Dayton Superior.

2.06 DOWEL ADHESIVE SYSTEM

A. Where shown on the Contract Drawings, reinforcing bars anchored into hardened concrete with a dowel adhesive system shall use a two-component adhesive mix which shall be injected with a static mixing nozzle following manufacturer's recommendations. All holes shall be drilled with a carbide bit unless otherwise recommended by the manufacturer. If coring holes is allowed by the manufacturer and approved by the Engineer, cored holes shall be roughened in accordance with manufacturer requirements. Thoroughly clean drill holes of all debris and drill dust with compressed air followed by a wire brush prior to installation of adhesive and reinforcing bar. Degree of hole dampness shall be in strict accordance with manufacturer recommendations. Where depth of hole exceeds the length of the static mixing nozzle, a plastic extension hose shall be used to

ensure proper adhesive injection from the back of the hole. Injection of adhesive into the hole shall utilize a piston plug to minimize the formation of air pockets. The embedment depth of the bar shall be per manufacturer's recommendations, so as to provide a minimum allowable bond strength that is equal to 125 percent of the yield strength of the bar, unless noted otherwise on the Drawings. The adhesive system shall comply with the latest revision of ICC-ES Acceptance Criteria AC308, and shall have a valid ICC-ES report in accordance with the applicable building code. The adhesive system shall be “HIT-HY 150 MAX-SD Injection Adhesive Anchoring System” as manufactured by Hilti, Inc. “PE-1000 SD” by Powers Fasteners, “SET-XP” by Simpson Strong-Tie Co. or “Epcon System G5” as manufactured by ITW Redhead. Engineer’s approval is required for use of this system in locations other than those shown on the Contract Drawings.

B. All individuals installing dowel adhesive system shall be certified as an Adhesive Anchor Installer in accordance with the ACI-CRSI Anchor Installation Certification Program.

2.07 READY-MIXED CONCRETE

A. Ready-mixed concrete shall conform to meeting the requirements as to materials, batching, mixing, transporting, and placing as specified herein and in accordance with ASTM C 94.

B. Ready-mixed concrete shall be delivered to the site of the work, and discharge shall be completed within one and one half hour after the addition of the cement to the aggregates or before the drum has been revolved 250 revolutions, whichever is first. In hot weather, or under conditions contributing to quick stiffening of the concrete, or when the temperature of the concrete is 85 degrees F or above, the time between the introduction of the cement to the aggregates and discharge shall not exceed 60 minutes.

2.08 CEMENT GROUT

A. Cement grout shall be composed of Portland cement and sand in the proportion specified in the Contract Documents and the minimum amount of water necessary to obtain the desired consistency. If no proportion is indicated, cement grout shall consist of one part Portland cement to three parts sand. Water amount shall be as required to achieve desired consistency without compromising strength requirements. White Portland cement shall be mixed with Portland cement as required to match color of adjacent concrete.

B. The minimum compressive strength at 28 days shall be 4000 psi.

C. For beds thicker than 1-1/2 inch and/or where free passage of grout will not be obstructed by coarse aggregate, 1-1/2 parts of coarse aggregate having a top size of 3/8 inch should be added. This stipulation does not apply for grout being swept in by a mechanism. These applications shall use a plain cement grout without coarse aggregate regardless of bed thickness.

D. Sand shall conform to the requirements of ASTM C144.

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2.09 NON-SHRINK GROUT

A. Non-shrink Cement Grout:

1. Non-shrink cement grout shall be a prepackaged, inorganic, non-gas liberating, nonmetallic, cement-based grout requiring only the addition of water. Manufacturer's instructions shall be printed on each bag or other container in which the materials are packaged. The specific formulation for each class of nonshrink grout specified herein shall be that recommended by the manufacturer for the particular application.

2. Non-shrink cement grouts shall have a minimum 28 day compressive strength of 5000 psi (ASTM C109, restrained), shall have no shrinkage (0.0 percent) and a maximum 4.0 percent expansion in the plastic state when tested in accordance with ASTM C 827, and shall have no shrinkage (0.0 percent) and a maximum of 0.2 percent expansion in the hardened state when tested in accordance with CRD C 621.

3. Cement based grout shall be Five Star Grout as manufactured by Five Star Products, Inc., Fairfield, Connecticut, or approved equal.

4. Cementitious non-shrink grout shall be used at locations where there are no dynamic loads, the grout will not come in contact with wastewater or wastewater gases, and where non-shrink grout is identified on the Drawings. Applications include, but are not limited to, structural steel column base plates, gate frames and guides, and precast concrete to cast-in-place concrete joints.

B. Non-shrink Epoxy Grout:

1. Epoxy-based non-shrink grout shall be a three component, 100 percent solids, solvent-free system designed for machinery grouting. Applications include, but are not limited to, anchoring, pump and motor bases, and any other equipment imparting dynamic loads to the support system.

2. When non-shrink grout is identified on the Drawings in submerged (water or wastewater) or under wastewater gas environment, epoxy-based non-shrink grouts shall be used.

3. The epoxy grout shall be delivered to site as prepackaged, three-component systems composing of the resin, hardener, and specially blended aggregates. The components shall be stored as recommended by the manufacturer until use.

4. Non-shrink epoxy grout shall be Five Star DP Epoxy Grout by Five Star Products, Inc., Fairfield, Connecticut, or approved equal.

2.10 BONDING COMPOUND

A. For bonding freshly-mixed, plastic concrete to hardened concrete, Sikadur 32 Hi-Mod Epoxy Adhesive, as manufactured by Sika Corporation; Concresive Liquid (LPL), as manufactured by Master Builders; BurkEpoxy MV as manufactured by The Burk Company; or approved equal shall be used.

2.11 CONCRETE DESIGN REQUIREMENTS

A. General: Concrete shall be composed of cement, admixtures, aggregates, and water. These materials shall be of the qualities specified. The exact proportions in which these materials are to be used for different parts of the work will be determined during the trial batch. In general, the mix shall be designed to produce a concrete capable of being deposited so as to obtain maximum density and minimum shrinkage and, where deposited in forms, to have good consolidation properties and maximum smoothness of surface. Mix designs with more than 41 percent of sand of the total weight of fine and coarse aggregate shall not be used. The aggregate gradations shall be formulated to provide fresh concrete that will not promote rock pockets around reinforcing steel or embedded items. The proportions shall be changed whenever necessary or desirable to meet the required results at no additional cost to the Owner. All changes shall be subject to review by the Engineer.

B. Water-Cement Ratio and Compressive Strength: The minimum compressive strength and cement content of concrete shall be not less than that specified in the following tabulation.

Type of Work	Min. 28-Day Compressive Strength (psi)	Max. Size Aggregate (in.)	Min. Cement per cu yd (sacks)	Max. W/C Ratio (by wt.)
Structural Concrete: All reinforced concrete unless noted otherwise below.	4,000 (Class A)	3/4	6.0	0.45
Sitework Concrete: Sidewalks and Erosion Control.	3,000 (Class B)	3/4	5.0	0.50

Note: One sack of cement equals 94 lbs.

C. Adjustments to Mix Design: The mixes used shall be changed whenever such change is necessary or desirable to secure the required strength, density, workability, and surface finish, and the Contractor shall be entitled to no additional compensation because of such changes.

2.12 CONSISTENCY

A. The consistency of the concrete in successive batches shall be determined by slump tests in accordance with ASTM C 143.

2.13 CHEMICAL RESISTANT WATERSTOP

A. Not Used.

2.14 PREFABRICATED FORMS

A. Form materials shall be metal, wood, plywood, or other acceptable material that will not adversely affect the concrete and will facilitate placement of concrete to the shape, form, line, and grade indicated. Metal forms shall be an acceptable type that will accomplish such results. Wood forms for surfaces to be painted shall be Medium Density Overlaid plywood, MDO Ext. Grade.

2.15 FORMWORK ACCESSORIES

A. Unless otherwise shown, exterior corners in concrete members shall be provided with 3/4-inch chamfers. Re-entrant corners in concrete members shall not have fillets unless otherwise shown.

B. Form ties shall be provided with a plastic cone or other suitable means for forming a conical hole to insure that the form tie may be broken off back of the face of the concrete. The maximum diameter of removable cones for rod ties, or of other removable form-tie fasteners having a circular cross-section, shall not exceed 1-1/2 inches; and all such fasteners shall be such as to leave holes of regular shape for reaming.

C. Form release agent shall be a blend of natural and synthetic chemicals that employs a chemical reaction to provide quick, easy and clean release of concrete from forms. It shall not stain the concrete and shall leave the concrete with a paintable surface. Formulation of the form release agent shall be such that it would minimize formation of "Bug Holes" in cast-in-place concrete.

PART 3 -- EXECUTION

3.01 GENERAL FORMWORK REQUIREMENTS

A. Forms to confine the concrete and shape it to the required lines shall be used wherever necessary. The Contractor shall assume full responsibility for the adequate design of all forms, and any forms which are unsafe or inadequate in any respect shall promptly be removed and replaced at the Contractor's expense. All design, construction, maintenance, preparation, and removal of forms shall be in accordance with the FBC, ACI 347 and the requirements specified herein.

B. All forms shall be true in every respect to the required shape and size, shall conform to the established alignment and grade, and shall be of sufficient strength and rigidity to maintain their position and shape under the loads and operations incident to placing and vibrating the concrete.

3.02 FORMWORK CONSTRUCTION

A. Vertical Surfaces: All vertical surfaces of concrete members shall be formed, except where placement of the concrete against the ground is called for by the Engineer.

B. Construction Joints: Concrete construction joints will not be permitted at locations other than those shown or specified, except as may be acceptable to the Engineer. When a second lift is placed on hardened concrete, special precautions shall be taken in the way of the number, location, and tightening of ties at the top of the old lift and bottom of the new to prevent any unsatisfactory effect whatsoever on the concrete.

C. Form Ties: Wire ties for holding forms will not be permitted. No form-tying device or part thereof, other than metal, shall be left embedded in the concrete. Ties shall not be removed in such manner as to leave a hole extending through the interior of the concrete members. The use of snap-ties which cause spilling of the concrete upon form stripping or tie removal will not be permitted. If steel panel forms are used, rubber grommets shall be provided where the ties pass through the form in order to prevent loss of cement paste. Where metal rods extending through the concrete are used to support or to strengthen forms, the rods shall remain embedded and shall terminate not less than 1 inch back from the formed face or faces of the concrete.

3.03 REUSE OF FORMS

A. Forms may be reused only if in good condition and only if acceptable to the Engineer. Light sanding between uses will be required wherever necessary to obtain uniform surface texture on all exposed concrete surfaces. Exposed concrete surfaces are defined as surfaces which are permanently exposed to view.

3.04 REMOVAL OF FORMS

A. Careful procedures for the removal of forms shall be strictly followed, and this work shall be done with care so as to avoid injury to the concrete. No heavy loading on green concrete will be permitted. Members which must support their own weight shall not have their forms removed until they have attained at least 75 percent of the 28-day strength of the concrete as specified herein. Forms for all vertical walls and columns shall remain in place at least 2 days after the concrete has been placed. Forms for all parts of the Work not specifically mentioned herein shall remain in place for periods of time as determined by the Engineer.

3.05 FABRICATION OF REINFORCING STEEL

A. Reinforcing steel shall be accurately formed to the dimensions and shapes shown on the Drawings, and the fabricating details shall be prepared in accordance with ACI 315 and ACI 318, except as modified by the Drawings.

B. Bending or Straightening: Reinforcement shall not be straightened or rebent in a manner which will injure the material. Bars with kinks or bends not shown shall not be used. All bars shall be bent cold, unless otherwise permitted by the Engineer. No bars partially

embedded in concrete shall be field-bent except as shown or specifically permitted by the Engineer.

3.06 PLACING REINFORCING STEEL

A. Reinforcing steel shall be accurately positioned as shown on the Drawings, and shall be supported and wired together to prevent displacement, using annealed iron wire ties or suitable clips at intersections. All reinforcing steel shall be supported by concrete, plastic or metal supports, spacers or metal hangers which are strong and rigid enough to prevent any displacement of the reinforcing steel. Where concrete is to be placed on the ground, supporting concrete blocks (or dobies) shall be used, in sufficient numbers to support the bars without settlement, but in no case shall such support be continuous. All concrete blocks used to support reinforcing steel shall be tied to the steel with wire ties which are embedded in the blocks. For concrete over formwork, the Contractor shall furnish concrete, metal, plastic, or other acceptable bar chairs and spacers.

B. The portions of all accessories in contact with the formwork shall be made of concrete, plastic, or steel coated with a 1/8 inch minimum thickness of plastic which extends at least 1/2 inch from the concrete surface. Plastic shall be gray in color.

C. Tie wires shall be bent away from the forms in order to provide the specified concrete coverage.

D. Bars additional to those shown which may be found necessary or desirable by the Contractor for the purpose of securing reinforcement in position shall be provided by the Contractor at its own expense.

E. Reinforcement placing tolerances shall be within the limits specified in ACI 318, unless otherwise directed by the Engineer.

F. Welded wire fabric reinforcement placed over horizontal forms shall be supported on slab bolsters having gray, plastic-coated standard type legs as specified herein. Slab bolsters shall be spaced not less than 30 inches on centers, shall extend continuously across the entire width of the reinforcing mat, and shall support the reinforcing mat in the plane shown.

G. Welded wire fabric placed over the ground shall be supported on wired concrete blocks (dobies) spaced not more than 3 feet on centers in any direction. The construction practice of placing welded wire fabric on the ground and hooking into place in the freshly placed concrete shall not be used.

3.07 SPLICING

A. Reinforcement bar splices shall only be used at locations shown. When it is necessary to splice reinforcement at points other than where shown, the character of the splice shall be as acceptable to the Engineer.

B. Lap length for reinforcement bars shall be in a Class B Splice in accordance with ACI 318, unless otherwise shown. Laps of welded wire fabric shall be in accordance with the ACI 318.

3.08 CLEANING AND PROTECTION OF REINFORCING STEEL

A. Reinforcing steel shall at all times be protected from conditions conducive to corrosion until concrete is placed around it.

B. The surfaces of all reinforcing steel and other metalwork to be in contact with concrete shall be thoroughly cleaned of all dirt, grease, loose scale and rust, grout, mortar, and other foreign substances immediately before the concrete is placed. Where there is a delay in depositing concrete, reinforcing shall be re-inspected and, if necessary, re-cleaned.

3.09 PREPARATION OF SURFACES FOR CONCRETING

A. General: No concrete shall be placed until the reinforcement steel and formwork have been erected in a manner acceptable to the Engineer. The Contractor shall notify the Engineer not less than two working days prior to concrete placement, allowing for inspection and any corrective measures which are required. Earth surfaces shall be thoroughly wetted by sprinkling, prior to the placing of any concrete, and these surfaces shall be kept moist by frequent sprinkling up to the time of placing concrete thereon. The surface shall be free from standing water, mud, and debris at the time of placing concrete.

B. Joints in Concrete: Concrete surfaces upon or against which concrete is to be placed, where the placement of the old concrete has been stopped or interrupted so that, as determined by the Engineer, the new concrete cannot be incorporated integrally with that previously placed, are defined as construction joints. The surfaces of horizontal joints shall be given a compacted, roughened surface for good bond. Except where the Drawings call for joint surfaces to be coated, the joint surfaces shall be cleaned of all laitance, loose or defective concrete, and foreign material. Such cleaning shall be accomplished by sandblasting, followed by thorough washing. All pools of water shall be removed form the surface of construction joints before the new concrete is placed.

C. Existing concrete surfaces upon or against which concrete is to be placed shall be given a roughened surface for good bond. Joint surfaces shall be cleaned of all laitance, loose or defective concrete, and foreign material. Such cleaning shall be accomplished by hydroblasting. All pools of water shall be removed from the surface of construction joints before the new concrete is placed.

D. Placing Interruptions: When placing of concrete is to be interrupted long enough for the concrete to take a set, the working face shall be given a shape by the use of forms or other means that will secure proper union with subsequent work, provided that construction joints shall be made only where acceptable to the Engineer.

E. Embedded Items: No concrete shall be placed until all formwork, installation of parts to - be embedded, reinforcement steel, and preparation of surfaces involved in the placing

have been completed and accepted by the Engineer at east 4 hours before placement of concrete. All surfaces of forms and embedded items that have become encrusted with dried grout from concrete previously placed shall be cleaned of all such grout before the surrounding or adjacent concrete is placed.

F. All reinforcement, anchor bolts, sleeves, inserts, and similar items shall be set and secured in the forms where shown on the Drawings or by shop drawings and shall be acceptable to the Engineer before any concrete is placed. Accuracy of placement is the responsibility of the Contractor.

G. Casting Against Old Concrete: Where concrete is to be cast against old concrete (any concrete which is greater than 60 days of age), the surface of the old concrete shall be thoroughly cleaned and roughened by hydro-blasting (exposing aggregate) prior to the application of an epoxy bonding agent. Application shall be according to the bonding agent manufacturer's instructions and recommendations.

H. No concrete shall be placed in any structure until all water entering the space to be filled with concrete has been properly cut off or has been diverted by pipes, or other means, and carried out of the forms, clear of the work. No concrete shall be deposited under water nor shall the Contractor allow still water to rise on any concrete until the concrete has attained its initial set. Water shall not be permitted to flow over the surface of any concrete in such manner and at such velocity as will injure the surface finish of the concrete. Pumping or other necessary dewatering operations for removing ground water, if required, will be subject to the review of the Engineer.

I. Openings for pipes, inserts for pipe hangers and brackets, and the setting of anchors shall, where practicable, be provided for during the placing of concrete.

J. Corrosion Protection: Pipe, conduit, dowels, and other ferrous items required to be embedded in concrete construction shall be so positioned and supported prior to placement of concrete that there will be a minimum of 2 inches clearance between said items, and any part of the concrete reinforcement will not be permitted.

K. Cleaning: The surfaces of all metalwork to be in contact with concrete shall be thoroughly cleaned of all dirt, grease, loose scale and rust, grout, mortar, and other foreign substances immediately before the concrete is placed.

3.10 MIXING, HANDLING, TRANSPORTING, AND PLACING

A. General: Placing of concrete shall conform to the applicable requirements of Chapter 8 of ACI 301 and the requirements of this Section.

B. Mixing: Mixing of concrete shall conform to the requirements of Chapter 7 of ACI 301.

C. Retempering: Retempering of concrete or mortar which has partially hardened will not be permitted.

D. Non-Conforming Work or Materials: Concrete which upon or before placing is found not to conform to the requirements specified herein shall be rejected and immediately removed from the Work. Concrete which is not placed in accordance with these Specifications, or which is of inferior quality, shall be removed and replaced by and at the expense of the Contractor.

E. Unauthorized Placement: No concrete shall be placed except in the presence of duly authorized representative of the Owner. The Contractor shall notify the Engineer in writing at least 24 hours in advance of placement of any concrete.

F. Placement in Slabs: Concrete placed in sloping slabs shall proceed uniformly from the bottom of the slab to the top, for the full width of the pour. As the work progresses, the concrete shall be vibrated and carefully worked around the slab reinforcement, and the surface of the slab shall be screened in an up-slope direction.

G. Placement in Wall Forms: Concrete shall not be dropped through reinforcement steel or into any deep form, whether reinforcement is present or not, causing separation of the coarse aggregate from the mortar on account of repeatedly hitting rods or the sides of the form as it falls, nor shall concrete be placed in any form in such a manner as to leave accumulation of mortar on the form surfaces above the placed concrete. In such cases, some means such as the use of hoppers and, if necessary, vertical ducts of canvas, rubber, or metal shall be used for placing concrete in the forms in a manner that it may reach the place of final deposit without separation. In no case shall the free fall of concrete exceed 4 feet below the ends of ducts, chutes, or buggies. Concrete shall be uniformly distributed during the process of depositing, and in no case after depositing shall any portion be displaced in the forms more than 6 feet in horizontal direction. Concrete in forms shall be deposited in uniform horizontal layers not deeper than 2 feet; and care shall be taken to avoid inclined layers or inclined construction joints where such are required for sloping members. Each layer shall be placed while the previous layer is still soft. The rate of placing concrete in forms shall not exceed 5 feet of vertical rise per hour.

H. The surface of the concrete -shall be level whenever a run of concrete is stopped. To insure a level, straight joint on the exposed surface of walls, a wood strip at least 3/4 inch thick shall be tacked to the forms on these surfaces. The concrete shall be carded about 1/2 inch above the underside of the strip. About one hour after the concrete is placed, the strip shall be removed and any irregularities in the edge formed by the strip shall be leveled with a trowel and all laitance shall be removed.

I. Conveyor Belts and Chutes: All end of chutes, hopper gates and all other points of concrete discharge throughout the Contractor's conveying, hoisting and placing system shall be so designed and arranged that concrete passing from them will not fall separated into whatever receptacle immediately receives it. Conveyor belts, if used, shall be of a type acceptable to the Engineer. Chutes longer than 50 feet will not be permitted. Minimum slopes of chutes shall be such that concrete of the specified consistency will readily flow in them. If a conveyor belt is used, it shall be wiped clean by a device operated in such a manner that none of the mortar adhering to the belt will be wasted. All conveyor belts and chutes shall be covered. Sufficient illumination shall be provided in the interior of all forms so that the concrete, at the places of deposit, is visible from the deck or runway.

J. Temperature of Concrete: The temperature of concrete, when it is being placed, shall not be more than 90 degrees F nor less than 40 degrees F in moderate weather, and not less than 50 degrees F in whether during which the mean daily temperature drops below 40 degrees F. Concrete ingredients shall not be heated to a temperature higher than that necessarily to keep the temperature of the mixed concrete, as placed, from falling below the specified minimum temperature. If concrete is placed when the weather is such that the temperature of the concrete would exceed 90 degrees F, the Contractor shall employ effective means, such as precooling of aggregates and mixing water using ice or placing at night, as necessary to maintain the temperature of the concrete, as it is placed, below 90 degrees F. The Contractor shall be entitled to no additional compensation on account of the foregoing requirements.

3.11 PUMPING OF CONCRETE

A. If the pumped concrete does not produce satisfactory end results, the Contractor shall discontinue the pumping operation and proceed with the placing of concrete using conventional methods.

B. The minimum diameter of the hose (conduits) shall be 4 inches.

C. Minimum compressive strength, cement content, and maximum size of aggregates shall be as specified herein. Gradation of coarse aggregates shall conform to ASTM C 33 and shall be as close to the middle range as possible. Gradation of fine aggregate shall conform to ASTM C 33, with 15 to 30 percent passing the number 50 screen and 5 to 1 0 percent passing the number 1 00 screen. The fineness modulus of sand shall not be over 3.00.

3.12 TAMPING AND VIBRATING

A. As concrete is placed in the forms or in excavations, it shall be thoroughly settled and compacted, throughout the entire depth of the layer which is being consolidated, into a dense homogeneous mass, filling all comers and angles, thoroughly embedding the reinforcement, eliminating rock pockets, and bringing only a slight excess of water to the exposed surface of concrete during placement. Vibrators shall be high speed power vibrators (8,000 or 10,000 rpm) of an immersion type in sufficient number and with (at least one) standby units as required.

B. Concrete in walls shall be internally vibrated and at the same time rammed, stirred, or worked with suitable appliances, tamping bars, shovels, or forked tools until it completely fills the forms or excavations and closes snugly against all surfaces. Subsequent layers of concrete shall not be placed until the layers previously placed have been worked thoroughly as specified. Vibrators shall be provided in sufficient numbers, with standby units as required, to accomplish the results herein specified with 15 minutes after concrete of the prescribed consistency is placed in the forms. The vibrating head shall be kept from contact with the surfaces of the forms. Care shall be taken not to vibrate concrete excessively or to work it in any manner that causes segregation of its constituents.

3.13 FINISHING CONCRETE SURFACES

A. General: Surfaces shall be free from fins, bulges, ridges, offsets, honeycombing, or roughness of any kind, and shall present a finished, smooth, continuous hard surface. Allowable deviations from plumb or level and from the alignment, profiles, and dimensions shown on the Drawings are defined as tolerances and are specified herein. These tolerances are to be distinguished from irregularities in finish as described herein. Aluminum finishing tools shall not be used.

B. Formed Surfaces: After removal of forms, the finishes described below shall be applied in accordance with Article 3.13, D. Unless the finish schedule specifies otherwise, all surfaces shall receive at least a Type I finish. The Engineer shall be the sole judge of acceptability of all concrete finish work.

1. Type I - Rough: All fins, burrs and other projections left by the forms shall be removed. All holes left by removal of ends of ties, and all other holes, depressions, or voids shall be filled solid with cement grout after first being thoroughly wetted. Honeycombs shall be chipped back to solid concrete as directed, prior to patching with cement grout. Holes shall be filled with a small tool that will permit packing the hole solidly with cement grout. Cement grout shall consist of one part cement to three parts sand, and the amount of mixing water shall be as little as consistent with the requirements of handling and placing. Color of cement grout shall match the adjacent wall surface. At locations where concrete coatings are specified to be applied, epoxy based patch material or filler surfaces compatible with the coating shall be used in lieu of cement grout specified herein. Concrete finish shall be in strict conformance to the coating / paint manufacturer's recommendations.

2. Type II - Grout Cleaned: Where this finish is required, it shall be applied after completion of Type I finish. After the concrete has been predampened, slurry consisting of one part cement (including an appropriate quantity of white cement in order to produce a color matching the surrounding concrete) and 1-1/2 parts sand passing the No. 16 sieve, by damp loose volume, shall be spread over the surface with clean burlap pads or sponge rubber floats. Any surplus shall be removed by scraping and then rubbing with clean burlap. The finish shall be kept damp for at least 36 hours after application.

3. Type III - Smooth Rubbed: Where this finish is required, it shall be applied after the completion of the Type I finish. No rubbing shall be done before the concrete is thoroughly hardened and the mortar used for patching is firmly set. A smooth, uniform surface shall be obtained by wetting the surface and rubbing it with a carborundum stone to eliminate irregularities. Unless the nature of the irregularities requires it, the general surface of the concrete shall not be cut into. Corners and edges shall be slightly rounded by the use of the carborundum stone. Brush finishing or painting with grout or neat cement will not be permitted.

C. Unformed Surfaces: The finishes described below shall be applied to unformed surfaces such as floors, slabs, flow channels and top of walls in accordance with Article 3.05 -

Concrete Finish Schedule. The Engineer shall be the sole judge of acceptability of all such finish work.

1. Type "A" - Screeded: This finish shall be obtained by placing screeds at frequent intervals and striking off to the surface elevation required. When a Type "F" finish is subsequently to be applied, the surface of the screeded concrete shall be roughened with a concrete rake to ½" minimum deep grooves prior to final set.

2. Type "B" - Wood Floated: This finish shall be obtained after completion of a Type "A" finish by working a previously screeded surface with a wood float until the desired texture is reached. Floating shall begin when the water sheen has disappeared and when the concrete has sufficiently hardened so that a person's foot leaves only a slight imprint. If wet spots occur, water shall be removed with a squeegee. Care shall be taken to prevent the formation of laitance and excess water on the finished surface. The finished surface shall be true, even, and free from blemishes and other irregularities.

3. Type "C" - Cork Floated: This finish shall be similar to Type "B" but slightly smoother than that obtained with a wood float. It shall be obtained by power or band floating with cork floats.

4. Type "D" - Steel Troweled: This finish shall be obtained after completion of a Type "B" finish. When the concrete has hardened sufficiently to prevent excess fine material from working to the surface, the surface shall be compacted and smoothed with not less than two thorough and complete steel troweling operations. In areas, which are to receive a floor covering such as tile, resilient flooring, or carpeting, only one troweling operation is required. The finish shall be brought to a smooth, dense surface, free from defects and blemishes.

5. Type "E" - Broom or Belt: This finish shall provide the surface with a transverse scored texture by drawing a broom or burlap belt across the surface immediately after completion of a Type "B" finish.

6. Type "F" - Swept in Grout Topping: This finish shall be applied after a completion of a Type "A" finish. The concrete surface shall be properly cleaned, washed, and coated with a mixture of water and Portland Cement. Cement grout in accordance with Section 03315 shall then be plowed and swept into neat conformance with the blades or arms of the apparatus by turning or rotating the previously positioned mechanical equipment. Special attention shall be paid to true grades, shapes and tolerances as specified by the manufacturer of the equipment. Before beginning this finish, the Contractor shall notify the Engineer and the equipment manufacturer of the details of the operation and obtain approval and recommendations of the equipment manufacturer.

7. Type "G" - Hardened Finish: Either a liquid hardened finish or an aggregate hardened finish shall be provided at the Contractor's option.

a. Liquid hardened finish shall be provided by application of a liquid floor hardener. Floors to receive this finish shall have previously received a Type "D" finish. Liquid hardener shall be applied between 30 to 60 days after concrete placement. Surface to be treated shall be dry, clean and free of all loose dust, dirt, oil, wax, sealers and curing compounds. Application procedure shall be in accordance with manufacturer's instructions and shall consist of a three-coat treatment.

b. Aggregate hardened finish shall be provided by applying an aggregate floor hardener concurrently with the application of a Type "D" finish. Application procedure shall be in accordance with manufacturer's instructions.

8. Type "H" - Non-Slip Finish: This finish shall be provided by applying a non-slip shake-on aggregate concurrently with the application of a Type "D" finish. Application procedure shall be in accordance with manufacturer's instructions.

9. Type "J" - Raked Finish: This finish shall be provided by raking the surface as soon as the condition of the concrete permits by making depressions of +/-1/4-inch.

D. CONCRETE FINISH SCHEDULE

Item	Type of Finish
Inner face of walls of tanks, flow channels, wet wells, perimeter walls, and miscellaneous structures to be coated in accordance with the Section entitled “Painting”	I
Exterior concrete walls below grade	I
Exterior exposed concrete walls and columns (including top of wall) to one foot below grade. All other exposed concrete surfaces not specified elsewhere	II
All interior exposed concrete vertical surfaces in buildings	III
Interior exposed ceiling, including beams	III
Floors of process equipment tanks or basins, and slabs to receive roofing material or waterproof membranes	B
All interior finish floors of buildings and structures and walking surfaces which will be continuously or intermittently wet	C
All interior finish floors of buildings and structures which are not continuously or intermittently wet	D
Floors to receive tile, resilient flooring, or carpeting	D
Concrete in flow channels not specified to be coated	D
Exterior concrete sidewalks, steps, ramps, decks, slabs on grade and landings exposed to weather	E

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Item	Type of Finish
Floors of process tanks indicated on Drawings or in the specifications to receive cement grout topping	F
Precast concrete form panels, hollow core planks, double tees	J

3.14 CURING AND DAMPPROOFING

A. All concrete shall be cured for not less than 14 days after placing, in accordance with the methods specified herein for the different parts of the work, and described in detail in the following paragraphs.

FINISH SCHEDULE

Surface to be Cured or Dampproofed	Method
Unstripped forms	1
Construction joints between footings and walls, and between floor slab and columns	2
Encasement concrete and thrust blocks	3
All concrete surfaces not specifically provided for elsewhere in this Paragraph	4

B. Method 1: Wooden forms shall be wetted immediately after concrete has been placed and shall be kept wet with water until removed. If steel forms are used, the exposed concrete surfaces shall be kept continuously wet until the forms are removed. If forms are removed within 14 days of placing the concrete, curing shall be continued in accordance with Method 4.

C. Method 2: The surface shall be covered With burlap mats which shall be kept wet with water for the duration of the curing period, until the concrete in the walls has been placed. No curing compound shall be applied to surfaces cured under Method 2.

D. Method 3: The surface shall be covered with moist earth not less than 4 hours, nor more than 24 hours, after the concrete is placed. Earthwork operations that may damage the concrete shall not begin until at least 7 days after placement of concrete.

E. Method 4: The surface shall be sprayed with a liquid curing compound. It shall be applied in accordance with the manufacturers printed instructions at a maximum coverage rate of 200 square feet per gallon and in such a manner as to cover the surface with a uniform film which will seal thoroughly.

F. Care shall be exercised to avoid damage to the seal during the curing period. Should the seal be damaged or broken before the expiration of the curing period, the break shall be repaired immediately by the application of additional curing compound over the damaged portion.

G. Wherever curing compound may have been applied by mistake to faces against which concrete subsequently is to be placed and to which it is to adhere, said compound shall be entirely removed by hydroblasting just prior to the placing of new concrete.

H. Curing compound shall be applied as soon as the concrete has hardened enough to prevent marring on uniformed surfaces, and within 2 hours after removal of forms from contact with formed surfaces. Repairs required to be made to formed surfaces shall be made within the said 2-hour period; provided, however, that any such repairs which cannot be made within the said 2-hour period shall be delayed until after the curing compound has been applied. When repairs are to be made to an area on which curing compound has been applied, the area involved shall first be wet-sandblasted to remove the curing compound, following which repairs shall be made as provided herein.

3.15 PROTECTION

A. The Contractor shall protect all concrete against injury until final acceptance by the Engineer. Fresh concrete shall be protected from damage due to rain. The Contractor shall provide such protection while the concrete is still plastic and whenever such precipitation is imminent or occurring.

3.16 TREATMENT OF SURFACE DEFECTS

A. As soon as forms are removed, all exposed surfaces shall be carefully examined and any irregularities shall be immediately rubbed or ground in a satisfactory manner in order to secure a smooth, uniform, and continuous surface. Plastering or coating of surfaces to secure a smooth, uniform, and continuous surface. Plastering or coating of surfaces to be smoothed will not be permitted. No repairs shall be made until after inspection by the Engineer. In no case will extensive patching of honeycombed concrete be permitted. Concrete containing minor voids, holes, honeycombing, or similar depression defects shall have them repaired as specified herein. Concrete containing extensive voids, holes, honeycombing, or similar depression defects, shall be completely removed and replaced. All repairs and replacements herein specified shall be promptly executed by the Contractor at its own expense.

B. Defective surfaces to be repaired shall be cut back from trueline a minimum depth of 1/2 inch over the entire area. Feathered edges will not be permitted. Where chipping or cutting tools are not required in order to deepen the area properly, the surface shall be prepared for bonding by the removal of all laitance or soft material, and not less than 1/32 inch depth of the surface film from all hard portions, by means of an efficient sandblast. The material used for repair proposed shall be acceptable to the Engineer.

C. Holes left by tie-rod cones shall be reamed with suitable toothed reamers so as to leave the surfaces of the holes clean and rough. These holes then shall be repaired in an approved manner with dry-packed cement grout. Holes left by form-tying devices having a rectangular cross-section, and other imperfections having a depth greater than their least surface dimension, shall not be reamed, but shall be repaired in an approved manner with dry-packed cement grout.

D. All repairs shall be built up and shaped in such a manner that the completed work will conform to the requirements of this Section, using approved methods which will not disturb the bond, cause sagging, or cause horizontal fractures. Surfaces of said repairs shall receive the same kind and amount of curing treatment as required for the concrete in the repaired section.

3.17 CARE AND REPAIR OF CONCRETE

A. The Contractor shall protect all concrete against injury or damage from excessive heat, lack of moisture, overstress, or any other cause until final acceptance by the Owner. Particular care shall be taken to prevent the drying of concrete and to avoid roughening or otherwise damaging the surface. Any concrete found to be damaged, or which may have been originally defective, or which becomes defective at any time prior to the final acceptance of the completed work, or which departs from the established line or grade, or which, for any other reason, does not conform to the requirements of the Contract Documents, shall be satisfactorily repaired or removed and replaced with acceptable concrete at the Contractor's expense. This stipulation includes concrete experiencing cracking due to drying or thermal shrinkage of the concrete. Structural cracks shall be repaired using an epoxy injection system approved by the Engineer. Non-structural cracks shall be repaired using a hydrophilic resin pressure injected grout system approved by the Engineer, unless other means or repair are deemed necessary and approved by the Engineer.

3.18 GROUT INSTALLATION

A. All surface preparation, curing, and protection of cement grout shall be as specified herein. The finish of the grout surface shall match that of the adjacent concrete.

B. The Contractor through the manufacturer of non-shrink grout shall provide on-site technical assistance upon request, at no additional cost to the Owner.

C. All mixing, surface preparation, handling, placing, consolidation, and other means of execution for prepackaged grouts shall be done according to the instructions and recommendations of the manufacturer.

D. Grout shall be placed in such a manner, for the consistency necessary for each application, so as to assure that the space to be grouted is completely filled.

- END OF SECTION -

PROJECT NO. 12197

SECTION 05010 - METAL MATERIALS

PART 1 -- GENERAL

1.01 THE REQUIREMENT

A. Metal materials not otherwise specified shall conform to the requirements of this Section.

1.02 RELATED WORK SPECIFIED ELSEWHERE

A. Materials for fasteners are included in Section 05050 - Metal Fastening.

B. Requirements for specific products made from the materials specified herein are included in other sections of the Specifications. See the section for the specific item in question.

1.03 REFERENCE SPECIFICATIONS, CODES AND STANDARDS

A.	ASTM A36	Standard Specification for Structural Steel
B.	ASTM A47	Standard Specification for Malleable Iron Castings
C.	ASTM A48	Standard Specification for Gray Iron Castings
D.	ASTM A53	Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated Welded and Seamless
E.	ASTM A167	Standard Specification for Stainless and Heat-Resisting Chromium-Nickel Steel Plate, Sheet, and Strip
F.	ASTM A276	Standard Specification for Stainless and Heat-Resisting Steel Bars and Shapes
G.	ASTM A307	Standard Specification for Carbon Steel Externally Threaded Standard Fasteners
H.	ASTM A446	Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) by the Hot-Dip Process, Structural (Physical) quality
I.	ASTM A500	Standard Specification for Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes
J.	ASTM A501	Standard Specification for Hot-Formed Welded and Seamless Carbon Steel Structural Tubing

K.	ASTM A529	Standard Specification for Structural Steel with 42 000 psi (290 Mpa) Minimum Yield Point (2 in. (12.7 mm) Maximum Thickness)
L.	ASTM A536	Standard Specification for Ductile Iron Castings
M.	ASTM A570	Standard Specification for Hot-Rolled Carbon Steel Sheet and Strip, Structural Quality
N.	ASTM A572/A572M-94C	Standard Specification for High Strength Low-Alloy Columbium-Vanadium Structural Steel Grade 50
O.	ASTM A666	Standard Specification for Austenitic Stainless Steel, Sheet, Strip, Plate, and Flat Bar for Structural Applications
P.	ASTM B26	Standard Specification for Aluminum-Alloy Sand Castings
Q.	ASTM B85	Standard Specification for Aluminum-Alloy Die Castings
R.	ASTM B108	Standard Specification for Aluminum-Alloy Permanent Mold Castings
S.	ASTM B138	Standard Specification for Manganese Bronze Rod, Bar, and Shapes
T.	ASTM B209	Standard Specification for Aluminum-Alloy Sheet and Plate
U.	ASTM B221	Standard Specification for Aluminum-Alloy Extruded Bars, Rods, Wire, Shapes, and Tubes
V.	ASTM B308	Standard Specification for Aluminum-Alloy Standard Structural Shapes, Rolled or Extruded
W.	ASTM B574	Standard Specification for Nickel-Molybdenum-Chromium Alloy Rod
X.	ASTM F468	Standard Specification for Nonferrous Bolts, Hex Cap Screws, and Studs for General Use

1.04 SUBMITTALS

A. Material certifications shall be submitted along with any shop drawings for metal products and fabrications required by other sections of the Specifications.

1.05 QUALITY ASSURANCE

A. OWNER may engage the services of a testing agency to test any metal materials for conformance with the material requirements herein. If the material is found to be in

conformance with Specifications the cost of testing will be borne by the OWNER. If the material does not conform to the Specifications, the cost of testing shall be paid by the CONTRACTOR and all materials not in conformance as determined by the ENGINEER shall be replaced by the CONTRACTOR at no additional cost to the OWNER. In lieu of replacing materials the CONTRACTOR may request further testing to determine conformance, but any such testing shall be paid for by the CONTRACTOR regardless of outcome of such testing.

PART 2 -- PRODUCTS

2.01 CARBON AND LOW ALLOY STEEL

A. Material types and ASTM designations shall be as listed below:

1.	Plates and Structural Fabrications	A572 Grade 50
2.	Sheet Steel	A 570 Grade C
3.	Bars and Rods	A 36 or A307 Grade A
4.	Pipe - Structural Use	A53 Type E or S, Grade B
5.	Tubes	A500 Grade B or A501
6.	Cold-Formed Structural Studs and Joists (18-22 gauge)	A 446 Grade C
	Cold-Formed Structural Studs and Joists (12-16 gauge)	A 446 Grade D

2.02 STAINLESS STEEL

A. All stainless steel fabrications shall be Type 316.

B. Material types and ASTM designations are listed below:

1.	Plates and Sheets	ASTM A167 or A666 Grade A
2.	Structural Shapes	ASTM A276

2.03 ALUMINUM

A. All aluminum shall be alloy 6061-T6, unless otherwise noted or specified herein.

B. Material types and ASTM designations are listed below:

1.	Structural Shapes	ASTM B308
2.	Castings	ASTM B26, B85, or B108

3.	Extruded Bars	ASTM B221 - Alloy 6061
4.	Extruded Rods, Shapes and Tubes	ASTM B221 - Alloy 6063
5.	Plates	ASTM B209 - Alloy 6061
6.	Sheets	ASTM B221 - Alloy 3003

C. All aluminum structural members shall conform to the requirements of Section 05140 - Structural Aluminum.

D. All aluminum shall be provided with mill finish unless otherwise noted.

E. Where bolted connections are indicated, aluminum shall be fastened with Type 316 stainless steel bolts.

F. Aluminum in contact with dissimilar materials shall be insulated with an approved dielectric.

2.04 CAST IRON

A. Material types and ASTM designations are listed below:

1.	Gray	ASTM A48 Class 30B
2.	Malleable	ASTM A47
3.	Ductile	ASTM A536 Grade 60-40-18

2.05 BRONZE

A. Material types and ASTM designations are listed below:

1.	Rods, Bars and Sheets	ASTM B138 - Alloy B Soft

2.06 HASTELLOY

A. All Hastelloy shall be Alloy C-276.

PART 3 -- EXECUTION

(NOT USED)

- END OF SECTION -

PROJECT NO. 12197

SECTION 05050 - METAL FASTENING

PART 1 -- GENERAL

1.01 THE REQUIREMENT

A. The CONTRACTOR shall furnish all materials, labor, and equipment required to provide all metal welds and fasteners not otherwise specified, in accordance with the Contract Documents. Fasteners for structural steel are specified in Section 01520.

1.02 RELATED WORK SPECIFIED ELSEWHERE

A. Section 05010 - Metal Materials

B. Section 05140 - Structural Aluminum

1.03 REFERENCE SPECIFICATIONS, CODES, AND STANDARDS

A. Without limiting the generality of the other requirements of the specifications, all work herein shall conform to the applicable requirements of the following documents. All referenced specifications, codes, and standards refer to the most current issue available at the time of Bid.

1.	Florida Building Code	
2.	AISC	Specification for Structural Joints Using ASTM A325 or A490 Bolts.
3.	AISC	Code of Standard Practice
4.	AWS D1.1	Structural Welding Code - Steel
5.	AWS D1.2	Structural Welding Code - Aluminum
6.	Aluminum Association	Specifications for Aluminum Structures
7.	ASTM A572/A572M-94C	Standard Specification for High Strength Low-Alloy Columbium-Vanadium Structural Steel Grade 50
8.	ASTM A307	Standard Specification for Carbon Steel Externally Threaded Standard Fasteners
9.	ASTM A325	Standard Specification for High-Strength Bolts for Structural Steel Joints
10.	ASTM A489	Standard Specification for Eyebolts

11.	ASTM A490	Standard Specification for Quenched and Tempered Alloy Steel Bolts for Structural Steel Joints
12.	ASTM A563	Standard Specifications for Carbon and Alloy Steel Nuts
13.	ASTM F593	Standard Specification for Stainless Steel Bolts; Hex Cap Screws, and Studs
14.	ASTM F594	Standard Specification for Stainless Steel Nuts
15.	ASTM D1785	Standard Specification for Polyvinyl Chloride (PVC) Plastic Pipe
16.	ASTM F467	Standard Specification for Nonferrous Nuts for General Use

1.04 SUBMITTALS

A. Submit the following items in accordance with Section 01300 – Submittals.

1. Shop Drawings providing the fastener's manufacturer and type and certification of the fastener's material and capacity.

2. Copy of valid certification for each person who is to perform field welding.

3. Certified weld inspection reports, when required.

4. Welding procedures.

1.05 QUALITY ASSURANCE

A. Fasteners not manufactured in the United States shall be tested and certification provided with respect to specified quality and strength standards. Certifications of origin shall be submitted for all U.S. fasteners supplied on the project.

B. All steel welding shall be performed by welders certified in accordance with AWS D1.1. All aluminum welding shall be performed by welders certified in accordance with AWS D1.2. Certifications of field welders shall be submitted prior to performing any field welds.

C. Welds and high strength bolts used in connections of structural steel will be visually inspected in accordance with Article 3.04 of this Section.

D. The OWNER may engage an independent testing agency to perform testing of welded connections and to prepare test reports in accordance with AWS. Inadequate welds shall be corrected or redone and retested to the satisfaction of the ENGINEER and/or an acceptable independent testing laboratory, at no additional cost to the OWNER.

E. Provide a welding procedure for each type and thickness of weld. For welds that are not pre-qualified, include a Performance Qualification Report. The welding procedure shall be given to each welder performing the weld. The welding procedure shall follow the format in Annex E of AWS D1.1 with relevant information presented.

PART 2 -- PRODUCTS

2.01 ANCHOR BOLTS

A. For all conditions throughout this Contract, all anchor bolts shall be Type 316 stainless steel conforming to ASTM F-593.

B. Nuts shall conform to ASTM F-594, alloy 316.

C. Equipment manufacturers, fabricators, and suppliers shall design and furnish anchor bolts as required to install the supplied units. The anchor bolt layout shall be coordinated with concrete work as specified herein.

D. Drilled in type anchor bolts, either adhesive types or mechanical types shall not be used unless they are shown on the Drawings. All operating pieces of equipment such as pumps, generators, motors etc. shall not be anchored with wedge anchors or other mechanical anchors. Drilled in type anchor bolts shall be Type 316 stainless steel. Drilled in type anchor bolts are specified under Article 2.04 of this Section entitled "Concrete Anchors".

2.02 HIGH STRENGTH BOLTS

A. High strength bolts and associated nuts and washers shall be in accordance with ASTM A325 or ASTM A490. Bolts, nuts and washers shall meet the requirements of AISC "Specification for Structural Joints Using ASTM A325 or A490 Bolts".

B. Where high strength bolts are used to connect galvanized steel or are otherwise specified to be galvanized, bolts, nuts, and washers shall be hot-dip galvanized in accordance with ASTM A325.

2.03 STAINLESS STEEL BOLTS

A. Stainless steel bolts shall conform to ASTM F-593. All underwater fasteners shall be Type 316 stainless steel. Unless otherwise specified, fasteners for aluminum and stainless steel members shall be Type 316 stainless steel.

B. Stainless steel bolts shall have hexagonal heads with a raised letter or symbol on the bolts indicating the manufacturer, and shall be supplied with hexagonal nuts meeting the requirements of ASTM F594. Nuts shall be of the same alloy as the bolts.

2.04 CONCRETE ANCHORS

A. General

1. Where concrete anchors are called for on the Drawings, one of the types listed below shall be used; except, where one of the types listed below is specifically called for on the Drawings, only that type shall be used. The determination of anchors equivalent to those listed below shall be on the basis of test data performed by an approved independent testing laboratory. There are two types used:

   a. Expansion anchors shall be mechanical anchors of the wedge, sleeve, drop-in or undercut type.

   b. Adhesive anchors shall consist of threaded rods or bolts anchored with an adhesive system into hardened concrete. Adhesive anchors shall be two part injection type using the manufacturer's static mixing nozzle and shall be supplied as an entire system.

2. Expansion anchors shall not be used to hang items from above or in any other situations where direct tension forces are induced in anchor.

3. Unless otherwise noted, all concrete anchors which are submerged or are used in hanging items or have direct tension induced upon them, or which are subject to vibration from equipment such as pumps and generators, shall be adhesive anchors.

4. Adhesive anchors shall conform to the requirements of ACI 355.4 or alternately to AC 308. Expansion or mechanical anchors shall conform to the requirements of ACI 355.2 or alternately to AC 193.

5. Fire Resistance: All anchors installed within fire resistant construction shall either be enclosed in a fire resistant envelope, be protected by approved fire-resistive materials, be used to resist wind and earthquake loads only, or anchor non-structural elements.

6. Engineer's approval is required for use of concrete anchors in locations other than those shown on the Drawings.

B. Concrete Anchor Design:

An anchor design consists of specifying anchor size, quantity, spacing, edge distance and embedment to resist all applicable loads. Where an anchor design is indicated on the Drawings, it shall be considered an engineered design and anchors shall be installed to the prescribed size, spacing, embedment depth and edge distance. If all parts of an anchor design are provided on the Drawings except embedment depth, the anchors will be considered an engineered design and the Contractor shall provide the embedment depth as indicated in Paragraph B.3 unless otherwise directed by the Engineer. Where an anchor design is not indicated by the Engineer on the Drawings, the Contractor shall provide the anchor design per the requirements listed below.

1. Structural Anchors: All concrete anchors shall be considered structural anchors if they transmit load between structural elements; transmit load between non-structural components that make up a portion of the structure and structural

elements; or transmit load between life-safety related attachments and structural elements. Examples of structural concrete anchors include but are not limited to column anchor bolts, anchors supporting non-structural walls, sprinkler piping support anchors, anchors supporting heavy, suspended piping or equipment, anchors supporting barrier rails, etc. For structural anchors, the Contractor shall submit an engineered design with signed and sealed calculations performed by an Engineer currently registered in the State of North Carolina. Structural anchors shall be of a type recommended by the anchor manufacturer for use in cracked concrete and shall be designed by the Contractor in accordance with ACI 318 Appendix D.

2. Non-Structural Anchors: All other concrete anchors may be considered non-structural concrete anchors. The Contractor shall perform an engineered design for non-structural anchors. The Engineer may request the Contractor provide anchor design details for review, but submission of a signed, sealed design is not required. Non-structural anchors shall be designed by the contractor for use in uncracked concrete.

3. Embedment Depth

   a. Minimum anchor embedment shall be as indicated on the Drawings or determined by the Contractor's engineered design. Although all manufacturers listed are permitted, the embedment depth indicated on the Drawings is based on "Set-XP by Simpson Strong-Tie". If the contractor submits one of the other concrete adhesive anchors listed, the Engineer shall evaluate the required embedment and the Contractor shall provide the required embedment depth stipulated by the Engineer specific to the approved dowel adhesive.

   b. Where the embedment depth is not shown on the Drawings, concrete anchors shall be embedded no less than the manufacturer's standard embedment (expansion or mechanical anchors) or to provide a minimum allowable bond strength equal to the allowable yield capacity of the rod according to the manufacturer (adhesive anchors).

   c. The embedment depth shall be determined using the actual concrete compressive strength, a cracked concrete state, maximum long term temperature of 110 degrees F, and maximum short term temperature of 140 degrees F. In no case shall the embedment depth be less than the minimum or more than the maximum stated in the manufacturer's literature.

C. Structural Anchors:

1. Mechanical Anchors:

   a. Wedge Anchors: Wedge anchors shall be "Kwik Bolt TZ" by Hilti, Inc., "TruBolt +" by ITW Redhead, "Strong-Bolt 2" by Simpson Strong-Tie Co. or "Powerstud SD-1" or "Powerstud SD-2" by Powers Fasteners.

   b. Screw Anchors: Screw anchors shall be "Kwik HUS-EZ" and "KWIK HUS-EZ-I" by Hilti, Inc., "Titen HD" by Simpson Strong-Tie Co., or "Wedge-Bolt +" by Powers Fasteners. Bits specifically provided by manufacturer of chosen system shall be used for installation of anchors.

c. Sleeve Anchors: Sleeve anchors shall be “HSL-3 Heavy Duty Sleeve Anchor” by Hilti, Inc. or “Power-Bolt +” by Powers Fasteners.

d. Undercut Anchors: Undercut anchors shall be “HDA Undercut Anchor” by Hilti, Inc., “Torq-Cut Undercut Anchor” by Simpson Strong-Tie Co., “Atomic + Undercut Anchor” by Powers Fasteners

2. Adhesive Anchors:

a. Adhesive anchors shall be “Epcon C6+ Adhesive Anchoring System” by ITW Redhead, “HIT HY-200 Adhesive Anchoring System” by Hilti, Inc., “AT-XP” or “SET-XP Epoxy Adhesive Anchors” by Simpson Strong-Tie Co., or “PE-1000+ Epoxy Adhesive Anchor System” by Powers Fasteners.

b. Structural adhesive anchor systems shall be IBC compliant and capable of resisting short term wind and seismic loads (Seismic Design Categories A through F) as well as long term and short term sustained static loads in both cracked and uncracked concrete in all Seismic Design Categories. Structural adhesive anchor systems shall comply with the latest revision of ICC-ES Acceptance Criteria AC308, and shall have a valid ICC-ES report in accordance with the applicable building code. No or equal products will be considered unless prequalified and approved by the Engineer and Owner.

D. Non-Structural Anchors: In addition to the acceptable non-structural anchors listed below, all structural anchors listed above may also be used as non-structural anchors.

1. Mechanical Anchors:

a. Wedge Anchors: Wedge anchors shall be “Kwik Bolt 3” by Hilti, Inc., “Wedge-All” by Simpson Strong-Tie Co. or “TruBolt” by ITW Redhead.

b. Screw Anchors: Screw anchors shall be “Kwik HUS” by Hilti, Inc., “Wedge-Bolt” by Powers Fasteners “Large Diameter Tapcon (LDT) Anchor” by ITW Redhead, or “Titen HD” by Simpson Strong-Tie Co. Bits specifically provided by manufacturer of chosen system shall be used for installation of anchors.

c. Sleeve Anchors: Sleeve anchors shall be “HSL Heavy Duty Sleeve Anchors” by Hilti, Inc. “Power-Bolt” by Powers Fasteners “Dynabolt Sleeve Anchor” by ITW Redhead, or “Sleeve-All” by Simpson Strong-Tie Co.

d. Drop-In Anchors: Drop-in anchors shall be “Drop-In” by Simpson Strong-Tie Co., “HDI Drop-In Anchor” by Hilti, Inc. or “Multi-Set II Drop-In Anchor” by ITW Redhead.

e. Undercut Anchors: Undercut anchors shall be “HDA Undercut Anchor” by Hilti, Inc., or “Torq-Cut” by Simpson Strong-Tie Co.

2. Adhesive Anchors:

a. Adhesive anchors shall be “Epcon A7” or “Epcon C6+ Adhesive Anchoring System” by ITW Redhead, “HIT HY-200 Adhesive Anchoring System” by Hilti, Inc., “SET Epoxy Tie High Strength Anchoring Adhesive” or “AT High Strength Anchoring Adhesive” by Simpson Strong-Tie Co., or “Powers AC

100+ Gold Vinylester Injection Adhesive Anchoring System" or "T308+ Epoxy Adhesive Injection System" by Powers Fasteners.

b. Non-structural adhesive anchors systems shall be IBC compliant and capable of resisting short term wind and seismic (Seismic Design Categories A and B) as well as long term and short term sustained static loads in uncracked concrete.

c. Non-structural adhesive anchor embedment depth of the rod shall provide a minimum allowable bond strength that is equal to the allowable yield capacity of the rod unless noted otherwise on the Drawings.

d. No or equal products will be considered unless prequalified and approved by the Engineer and Owner.

E. Concrete Anchor Rod Materials:

1. Concrete anchors used to anchor structural steel shall be a threaded steel rod per manufacturer's recommendations for proposed adhesive system, but shall not have a yield strength (fy) less than 58 ksi nor an ultimate strength (fu) less than 72.5 ksi, unless noted otherwise. Where steel to be anchored is galvanized, concrete anchors shall also be galvanized unless otherwise indicated on the Drawings.

2. Concrete anchors used to anchor aluminum, FRP, or stainless steel shall be Type 304 stainless steel unless noted otherwise. All underwater concrete anchors shall be Type 316 stainless steel.

3. Nuts, washers, and other hardware shall be of a material to match the anchors.

2.05 MASONRY ANCHORS

A. Anchors for fastening to solid or grout-filled masonry shall be adhesive anchors as specified above for concrete anchors.

B. Anchors for fastening to hollow masonry or brick shall be adhesive anchors consisting of threaded rods or bolts anchored with an adhesive system dispensed into a screen tube inserted into the masonry. The adhesive system shall use a two-component adhesive mix and shall injected into the screen tube with a static mixing nozzle. The adhesive system shall be AEpcon System@ as manufactured by ITW Ramset/Redhead, AHIT HY-20 System@ as manufactured by Hilti, Inc, or equal.

C. All masonry anchors shall be Type 316 stainless steel.

2.06 WELDS

A. Electrodes for welding structural steel and all ferrous steel shall comply with AWS Code, using E70 series electrodes for shielded metal arc welding (SMAW), or F7 series electrodes for submerged arc welding (SAW).

B. Electrodes for welding aluminum shall comply with the Aluminum Association Specifications and AWS D1.2.

C. Electrodes for welding stainless steel and other metals shall comply with AWS code.

2.07 WELDED STUD CONNECTORS

A. Welded stud connectors shall conform to the requirements of AWS D1.1 Type C.

2.08 EYEBOLTS

A. Eyebolts shall conform to ASTM A489 unless noted otherwise.

2.09 HASTELLOY FASTENERS

A. Hastelloy fasteners and nuts shall be constructed of Hastelloy C-276.

2.10 ANTISEIZE LUBRICANT

A. Antiseize lubricant shall be Graphite 50 Anti-Seize by Loctite Corporation, 1000 Anti-Seize Paste by Dow Corning, 3M Lube and Anti-Seize by 3M, or equal.

PART 3 -- EXECUTION

3.01 MEASUREMENTS

A. The CONTRACTOR shall verify all dimensions and review the Drawings and shall report any discrepancies to the ENGINEER for clarification prior to starting fabrication.

3.02 BOLT INSTALLATION

A. Anchor Bolts, Concrete Anchors, and Masonry Anchors

1. Anchor bolts shall be installed in accordance with AISC "Code of Standard Practice" by setting in concrete while it is being placed and positioned by means of a rigidly held template.

2. The CONTRACTOR shall verify that all concrete and masonry anchors have been installed in accordance with the manufacturer's recommendations and that the capacity of the installed anchor meets or exceeds the specified safe holding capacity.

3. Concrete anchors shall not be used in place of anchor bolts without ENGINEER's approval.

4. All stainless steel threads shall be coated with antiseize lubricant.

B. High Strength Bolts

1. All bolted connections for structural steel shall use high strength bolts. High strength bolts shall be installed in accordance with AISC "Specification for Structural Joints, using A325 or A490 Bolts." All high strength bolts installed by the "turn-of-nut" method shall have the turned portion marked with reference to the steel being connected after the nut has been made snug and prior to final tightening. These marks will be considered in inspection.

2. All stainless steel bolts shall be coated with antiseize lubricant.

C. Other Bolts: All dissimilar metal shall be connected with appropriate fasteners and shall be insulated with a dielectric or approved equal. Unless otherwise specified, where aluminum and steel members are connected together they shall be fastened with Type 316 stainless steel bolts and insulated with micarta, nylon, rubber, or equal.

3.03 WELDING

A. All welding shall comply with AWS Code for procedures, appearance, quality of welds, qualifications of welders and methods used in correcting welded work.

B. Welded stud connectors shall be installed in accordance with AWS D1.1.

C. All welding shall comply with Section 005500 - Metal Fabrication, 3.04.

3.04 INSPECTION

A. High strength bolting will be visually inspected in accordance with AISC "Specification for Structural Joints Using A325 or A490 Bolts." Rejected bolts shall be either replaced or retightened as required. In cases of disputed bolt installation, the bolts in question shall be checked by a calibrated wrench certified by an independent testing laboratory. The certification shall be at the CONTRACTOR's expense.

B. Field welds will be visually inspected in accordance with AWS Codes. Inadequate welds shall be corrected or redone as required in accordance with AWS Codes.

- END OF SECTION -

PROJECT NO. 10508D

SECTION 05140 - STRUCTURAL ALUMINUM

PART 1 -- GENERAL

1.01 THE REQUIREMENT

A. The CONTRACTOR shall furnish all equipment, labor, materials, and services required to provide all structural aluminum work in accordance with the Contract Documents. The term "structural aluminum" shall include items as defined in the Aluminum Association "Specifications for Aluminum Structures".

1.02 RELATED WORK SPECIFIED ELSEWHERE

A. Section 05500 - Metal Fabrications

1.03 REFERENCE SPECIFICATIONS, CODES, AND STANDARDS

A. Without limiting the generality of other requirements of the Specifications, all work specified herein shall conform to the applicable requirements of the following documents. All referenced specifications, codes, and standards refer to the most current issue available at the time of the Bid.

1. Florida Building Code
2. Aluminum Association "Specifications for Aluminum Structures"
3. AWS D1.2 - "Structural Welding Code"

1.04 SUBMITTALS

A. Submit the following in accordance with Section 01300 entitled "Submittals".

1. Certified Mill Test Reports
2. Affidavit of Compliance with grade specified
3. Shop Drawings which include the following:
    a. Layout drawings indicating all structural shapes, sizes, and dimensions.
    b. Beam and column schedules.
    c. Detailed drawings indicating jointing, anchoring and connection details.

1.05 QUALITY ASSURANCE

A. Shop inspection may be required by the OWNER at his own expense. The CONTRACTOR shall give ample notice to the ENGINEER prior to the beginning of any fabrication work so that inspection may be provided. The CONTRACTOR shall furnish all facilities for the inspection of materials and workmanship in the shop, and the inspectors shall be allowed free access to the necessary parts of the work. Inspectors shall have the authority to reject any materials or work which do not meet the requirements of these Specifications. Inspection at the shop is intended as a means of facilitating the work and avoiding errors, but is expressly understood that it will in no way relieve the CONTRACTOR from his responsibility for furnishing proper materials or workmanship under this Specification.

PART 2 -- PRODUCTS

2.01 MATERIALS

A. Structural aluminum shall comply with Section 05010 entitled "Metal Materials".

B. Fasteners for structural aluminum shall be in accordance with Section 05050 entitled "Metal Fastening". Fasteners shall be Type 316 stainless steel.

C. Electrodes for welding shall be in accordance with Section 05050 entitled "Metal Fastening".

PART 3 -- EXECUTION

3.01 MEASUREMENT

A. The CONTRACTOR shall verify all dimensions and shall make any field measurements necessary and shall be fully responsible for accuracy and layout of work. The CONTRACTOR shall review the Drawings and any discrepancies shall be reported to the ENGINEER for clarification prior to starting fabrication.

3.02 FABRICATION

A. Fabrication shall be in accordance with the Aluminum Association "Specifications for Aluminum Structures". Fabrication shall begin only after Shop Drawing approval.

B. Except where otherwise noted on the Drawings or in this Specification, all shop connections shall be welded.

C. All holes in structural aluminum members required for anchors, anchor bolts, bolt holes, or other members or for attachment of other work shall be provided by the fabricator and detailed on the Shop Drawings.

D. All materials shall be properly worked and match-marked for field assembly.

3.03 DELIVERY, STORAGE AND HANDLING

A. Structural members shall be loaded in such a manner that they may be transported and unloaded without being over-stressed, deformed or otherwise damaged.

B. Structural aluminum members and packaged materials shall be protected from corrosion and deterioration. Material shall be stored in a dry area and shall not be placed in direct contact with the ground. Materials shall not be placed on the structure in a manner that might cause distortion or damage to the members or the supporting structures. The CONTRACTOR shall repair or replace damaged materials or structures as directed.

3.04 ERECTION

A. All temporary bracing, guys and bolts as may be necessary to ensure the safety of the structure until the permanent connections have been made shall be provided by the CONTRACTOR.

B. Structural members shall be set accurately to the lines and elevations indicated. The various members shall be aligned and adjusted to form a part of a complete frame or structure before being permanently fastened. The CONTRACTOR shall survey the structural aluminum during erection and shall provide a final survey indicating elevations and locations of all major members. Necessary adjustments to compensate for discrepancies in elevations and alignments shall be performed.

C. No cutting of structural aluminum members in the field will be allowed except by the written approval of the ENGINEER.

D. Bearing surfaces and other surfaces which will be in permanent contact shall be cleaned before assembly.

E. Field welding shall not be permitted unless specifically indicated in the Drawings or approved in writing by the ENGINEER. All field welding shall comply with Section 05500 - "Metal Fabrication".

F. All bolted connections shall comply with Section 05050 entitled "Metal Fastening".

G. All field connections shall be accurately fitted up before being bolted. Drifting shall be only such as will bring the parts into position and shall not be sufficient to enlarge the holes or to distort the metal. All unfair holes shall be drilled or reamed.

H. Misfits at Bolted Connections

1. Where misfits in erection bolting are encountered, the ENGINEER shall be immediately notified. The CONTRACTOR shall submit a method to remedy the

misfit for review by the ENGINEER. The ENGINEER will determine whether the remedy is acceptable or if the member must be refabricated.

2. Incorrectly sized or misaligned holes in members shall not be enlarged by burning or by the use of drift pins. The CONTRACTOR shall notify the ENGINEER immediately and shall submit a proposed method of remedy for review by the ENGINEER.

3. Where misalignment between anchor bolts and bolt holes in aluminum members are encountered, the ENGINEER shall be immediately notified. The CONTRACTOR shall submit a method to remedy the misalignment for review by the ENGINEER.

I. Grouting of Base Plates and Bearing Plates

1. The bottom surface of the plates shall be cleaned of all foreign materials, and concrete or masonry bearing surface shall be cleaned of all foreign materials and roughened to improve bonding.

2. Accurately set all base and bearing plates to designated levels with steel wedges or leveling plates.

3. Base-plates shall be grouted with non-shrink epoxy grout to assure full uniform bearing. Grouting shall be done prior to placing loads on the structure. Non-shrink epoxy grout shall conform to Section 03315 entitled "Grout".

4. Anchor bolts shall be tightened after the supported members have been positioned and plumbed and the non-shrink grout has attained its specified strength.

J. Where finishing is required, assembly shall be completed including bolting and welding of units before start of finishing operations.

3.05 FINISHES

A. Structural aluminum shall be furnished mill finished unless noted otherwise. Anodized finish shall be furnished where noted on the Drawings.

- END OF SECTION -

PROJECT NO. 12197

SECTION 05500 – METAL FABRICATIONS

PART 1 -- GENERAL

1.01 THE REQUIREMENT

A. This Section consists of miscellaneous metal items as shown on the Drawings and specified herein for a complete installation.

1.02 SUBMITTALS

A. The CONTRACTOR shall submit shop drawings, signed and sealed by a professional engineer licensed in the state of Florida, and other information to the ENGINEER for review in accordance with Section 01300 - Submittals. No fabrication shall be started until shop drawings have been reviewed by the ENGINEER. The drawings shall be made in conformity with standard practice and indicate: fabrication, assembly and erection details, sizes of members, profiles, fastenings, supports and anchors, finishes, patterns, clearances, and connections to other work.

1.03 DELIVERY, STORAGE, AND HANDLING

A. Deliver structural steel to Project site in such quantities and at such times to ensure continuity of installation.

B. Store materials to permit easy access for inspection and identification. Keep steel members off ground by using pallets, platforms, or other supports. Protect steel members and packaged materials from erosion and deterioration.

1. Store fasteners in a protected place. Clean and relubricate bolts and nuts that become dry or rusty before use.

2. Do not store materials on structure in a manner that might cause distortion or damage to members supporting structures. Repair or replace damaged materials or structures as directed.

PART 2 -- PRODUCTS

2.01 MATERIALS

A. All materials shall be of the best quality and entirely suited for the particular service. Metals shall be free from defects and have structural properties to safely render required service.

B. Fastenings shall, insofar as practicable, be noncorrosive, nonstaining and concealed. Exposed welds shall be ground smooth to form a neat uniform fillet without weakening base metal. Unexposed welds shall have all slag removed before applying shop coating. Moulded, bent or shaped members shall be formed and clean, sharp rises, without dents, scratches, cracks or other defects. All anchors, bolts, shims and accessory items shall

be provided as required for building into or fastening to adjacent work. All ferrous metals shall be galvanized, except as otherwise specified.

C. Unless otherwise specified on the Drawings, the miscellaneous metal work shall be equal to or exceed the requirements of the following standards:

Carbon and Low Alloy Steel	ASTM Designation
Plates and Structural Fabrication	A 50, A 529 or A 283, Grade C
Sheet Steel	A 570, Grade C
Bars and Rods	A 36 or A 306, Grade 60
Pipe – general use process pipe	A 53 or A 120 Schedule 40 A 524 Grade I
Fasteners*	
Standard Strength Bolts	A 307, Grade A
High Strength Bolts	A 325
Eyebolts	A 489
Steel Coatings	
Zinc – Electrodeposited	A 164
Hot Dipped	A 123 and A 386
Cadmium	A 165
Stainless Steel	
Plate and Sheets	A 167, Type 316
Bars and Shapes	A 276, Type 316
Fasteners*	A 167 and A 276, Type 316
Cast Iron	
Gray	A 48, Class 30B
Malleable	A 47
Ductile	A 536, Grade 60-40-18
Wrought Iron	
Plates	A 42
Sheets	A 162
Shapes and Bars	A 207
Pipe	A 72
Bronze	
Rods, Bars, and Shapes	B 138, Alloy B Soft
Fasteners	
Yellow Brass Cap Screws and Other Small Fasteners	B 16, B 36, or B 134
Silicon Bronze Bolts	B 97, B 98, B 99 and B 124

* All fasteners shall be manufactured in the U.S.A. Certifications of compliance shall be submitted for all fasteners supplied on this project.

Aluminum	
Structural Shapes	B 308, Alloy 6061-T6
Castings	B 26, B 85 and B 108
Extruded Bars, Rods and Tubes	B 221 Bars - Alloy 6061 Other - Alloy 6063
Plates and Sheet	B 209 Plates - Alloy 6061 Sheets - Alloy 3003

D. Materials with more than one specification or grade listed shall conform to specification or grade providing the highest strength and appropriate mechanical properties for the fabrication technique used.

2.02 PROTECTIVE COATINGS

A. All ferrous metal, except stainless steel and galvanized surfaces, shall be properly cleaned and given one shop coat of primer compatible with the coating system specified in Section 09900 “PAINTING”. Metal work, including anchors, to be encased in concrete shall be shop primed unless specified to be stainless steel or galvanized. Castings that are to be left unpainted shall be cleaned and coated with a coal-tar-pitch varnish.

B. Hot-dip galvanizing or zinc coatings applied on products fabricated from rolled, pressed or forged steel shapes, plates, bars and strips shall comply with ASTM A 123. Hot-dip galvanizing or zinc coatings on assembled steel products shall comply with ASTM A 386. The weight of coatings shall be designated in Table 1 for the class and thickness of material to be coated.

C. Galvanized surfaces for which a shop coat of paint is specified shall be chemically treated to provide a bond for the paint. Except for bolts and nuts, all galvanizing shall be done after fabrication.

D. Aluminum to be placed adjacent to masonry, concrete or dissimilar metals shall be protected with an isolating coating of bitumastic and/or felt.

2.03 STEEL

A. Unless otherwise noted, all steel shall conform to the following:

1. Stainless steel floor plates shall conform to ASTM A 793 and shall be furnished with checkered design.

2. Galvanized steel pipe shall conform to ASTM A 53.

3. Carbon steel bolts and fasteners shall conform to ASTM A 307 and shall be galvanized.

4. Carbon steel rails, 40 pound, shall conform to the dimensions listed in AISC Specifications.

5. Other steel shall be mild steel.

6. All stainless steel anchor bolts and fasteners shall be of Type 316 stainless steel.

2.04 STRUCTURAL AND MISCELLANEOUS ALUMINUM

A. All structural and miscellaneous aluminum shapes, bars and plates shall be Alloy 6061-T6. Aluminum to be placed adjacent to concrete, masonry or dissimilar metals shall be protected with one coat of bitumastic paint. Mill finish shall be provided.

2.05 FASTENERS

A. General: Bolts, screws, nuts, washers, anchors and other fasteners shall be first quality and shall conform to the material specifications named herein. All necessary bolts, anchor bolts, nuts, washers, plates and bolt sleeves shall be furnished by the CONTRACTOR in accordance herewith. Anchor bolts shall have suitable washers and, where so required, their nuts shall be hexagonal. Stainless steel and silicon bronze bolts shall have a raised letter or symbol on the bolts indicating the manufacturer.

B. Material: All bolts, anchor bolts, nuts, washers, plates, and bolt sleeves shall be type 316 stainless steel, for all metal fabrications except structural steel, unless otherwise noted on the Drawings.

If any bolts, anchor bolts, nuts and washers, are specified to be galvanized, they shall be zinc coated, after being threaded, by the hot dip process in conformity with ASTM A 123, or A 153, as is appropriate.

C. Concrete Inserts: Concrete inserts shall be designed to support safely, in the concrete that is used, the maximum load that can be imposed by the bolts used in the inserts.

Concrete and masonry inserts shall be drill-in type as manufactured by Phillips Drill Company, Michigan City, Indiana; Hilti, Tulsa, OK; or equal. Powder or gun-driven, fiber, and plastic inserts shall not be used unless specifically noted.

D. Dissimilar Metal: All dissimilar metal shall be connected with appropriate fasteners and shall be insulated with a dielectric or equal. Unless otherwise specified, aluminum shall be fastened with ASTM A276 Type 316 stainless steel bolts and insulated with micarta, nylon, rubber, or equal.

E. Anchor Bolts: Anchor bolts shall be set accurately and be carefully held in suitable templates of approved design. Where indicated on the Drawings, specified, or required, anchor bolts shall be provided with square plates at least 4-inches by 1/8 inch or shall have square heads and washers and be set in the concrete forms with suitable pipe sleeves, or both. Drill-in type anchors shall be as shown on the Drawings. Anchor bolts shall conform with Section 05050 – Metal Fastening.

F. Concrete Anchors: Where concrete anchors are called for on the Drawings, one of the types listed below shall be used; except, where one of the types listed below is specifically called for on the Drawings, only that type shall be used. The determination of anchors

equivalent to those listed below shall be on the basis of ultimate tensile and shear capacities from test data published by the manufacturer.

1. Shell-Type Anchors: Shell-type anchors shall be self-drilling or non-drilling Red Head anchors as manufactured by the Phillips Drill Company, or equal.

2. Wedge Anchors: Wedge anchors shall be Red Head wedge-type anchors as manufactured by the Phillips Drill Company, Parabolt anchors as manufactured by the Molly Division of Emhart Corporation, or equal.

3. Adhesive Anchors: Adhesive anchors shall be capsule-type by "HILTI" or equal. Anchors which use a pour-in or injection system for the epoxy resin placement may be used, provided that test data are submitted substantiating the equivalence of tensile and shear capacities to the capsule-type anchors specified herein.

G. Unless otherwise noted, all concrete anchors which are submerged, or which are subject to vibration from equipment such as pumps and generators, shall be adhesive anchors.

PART 3 – EXECUTION

3.01 FABRICATION

A. General: All workmanship shall be first class and conform to recognized and accepted best practice. All structural materials shall be thoroughly straightened in the shop by methods that will not injure them before templates are placed on same for laying out and before any work is done upon them.

B. Finished members shall be absolutely straight and free from open joints and distortions of any kind. All shearings shall be neatly finished. Flame cutting may be used in the preparation of the various members provided this operation is performed by a machine. All necessary fillets, connections, brackets, posts, and other details not shown on the drawings, but necessary for the work, shall be furnished by the CONTRACTOR. Fabrication shall be by welding except where riveted construction is specifically allowed by the Contract Documents.

C. Holes: Provide holes required for securing other work to structural steel framing and for passage of other work through steel framing members, as shown on Shop Drawings.

1. Cut, drill or punch holes perpendicular to metal surfaces. Do not flame-cut holes or enlarge holes by burning. Drill hole in bearing plates.

D. Steel: Steel fabrication shall meet the applicable requirements of the AISC Specification for Design, Fabrication, and Erection of Structural Steel for Buildings.

E. Aluminum: Aluminum fabrication shall meet the applicable requirements of the Aluminum Construction Manual, Specifications for Aluminum Structures.

F. Castings: Castings shall be tough, sound and free from blow holes, shrinkage cracks or other defects. Castings shall be smooth and clean. Units that have been plugged or filled will be rejected. Iron castings shall be close-grained gray iron or ductile iron.

3.02 EXAMINATION

A. Verify that field conditions are acceptable and are ready to receive work.

B. Beginning of installation means erector accepts existing conditions.

3.03 PREPARATION

A. Clean and strip primed steel items to bare metals where site welding is required.

B. Supply items required to be cast into concrete with setting templates, to appropriate sections.

3.04 INSTALLATION

A. Install items plumb and level, accurately fitted, free from distortion or defects.

B. Allow for erection loads, and for sufficient temporary bracing to maintain true alignment until completion of erection and installation of permanent attachments.

C. Field weld components indicated on Drawings.

D. Obtain ENGINEER approval prior to site cutting or making adjustments not scheduled.

E. Fabrication and Erection: Except as otherwise shown, the fabrication and erection of structural steel shall conform to the requirements of the American Institute of Steel Construction "Manual of Steel Construction."

3.05 WELDING

A. All welding shall be by the metal-arc method or gas-shielded arc method as described in the American Welding Society's "Welding Handbook" as supplemented by other pertinent standards of the AWS. Qualification of welders shall be in accordance with the AWS Standards governing same.

B. In assembly and during welding, the component parts shall be adequately clamped, supported and restrained to minimize distortion and for control of dimensions. Weld reinforcement shall be as specified by the AWS Code. Upon completion of welding, all weld splatter, flux, slag, and burrs left by attachments shall be removed. Welds shall be repaired to produce a workmanlike appearance, with uniform weld contours and dimensions. All sharp corners of material which is to be painted or coated shall be ground to a minimum of 1/32-inch on the flat.

- END OF SECTION -

PROJECT NO. 12197

SECTION 05515 - LADDERS

PART 1 -- GENERAL

1.01 REQUIREMENT

A. The Contractor shall furnish all materials, labor, and equipment required to provide all ladders in accordance with the requirements of the Contract Documents.

1.02 RELATED WORK SPECIFIED ELSEWHERE

A. Section 05010 – Metal Materials

B. Section 05500 – Metal Fabrications

1.03 REFERENCE SPECIFICATIONS, CODES AND STANDARDS

A. Without limiting the generality of the Specifications, all work specified herein shall conform to the applicable requirements of the following documents.

1. Florida Building Code (FBC)

2. Aluminum Association Specifications for Aluminum Structures

3. Occupational Safety and Health Administration (OSHA) Regulations

1.04 SUBMITTALS

A. Submit the following in accordance with Section 01300 entitled "Submittals".

1. Complete fabrication and erection drawings of all metalwork specified herein.

2. Other submittals as required in accordance with Section 05500 entitled "Metal Fabrications".

B. The ENGINEER will review and return the submittals to the CONTRACTOR. The CONTRACTOR shall then submit the accepted package to the Building Department. No fabrication or installation shall begin until the submittal is accepted by the Building Department with jurisdiction.

PART 2 -- PRODUCTS

2.01 METAL MATERIALS

A. Metal materials, fasteners and welds used for ladders shall conform to Section 05010 entitled "Metal Materials", unless noted otherwise.

PROJECT NO. 12197

2.02 VERTICAL LADDERS

A. Ladders shall be furnished with all mounting brackets, baseplates, fasteners, and necessary appurtenances for a complete and rigid installation.

B. All ladders shall be aluminum alloy 6061-T6 or 6063-T5 with a clear, anodized finish, Aluminum Association M12C22A41, unless noted otherwise.

C. All ladders shall conform to dimensions indicated on the Drawings and shall comply with OSHA requirements.

D. Side rails shall be 2-1/2 inch x 3/8 inch runners.

E. Rungs shall be solid serrated 3/4-inch diameter, minimum.

F. All exposed connections shall be welded and ground smooth.

G. All fixed ladders terminating below a roof, floor or wall shall be provided with Bilco Model 2 Ladder Up Safety Posts, or equal. The safety post system components shall be suitable for service in a corrosive environment. The safety posts shall be manufactured of high strength, hot dip galvanized steel with telescoping tubular sections that lock automatically when fully extended. Upward and downward movement shall be controlled by a stainless steel spring balancing mechanism. The safety posts shall be completely assembled with fasteners for securing to the ladder rungs in accordance with the manufacturer's recommendations.

2.03 SAFETY CAGE

A. For ladders exceeding fifteen feet in height, provide a safety cage in accordance with OSHA requirements.

B. Safety cages shall be fabricated of 1/4-inch aluminum plates designed to meet OSHA requirements.

C. An operable access door with padlock shall be provided for all safety cages.

2.04 FALL PREVENTION SYSTEM

A. Ladders with an uninterrupted length exceeding 20 ft shall be installed with a fall prevention system, unless indicated otherwise on the drawings.

B. Fall prevention system shall comply with OSHA requirements.

C. Fall prevention system shall include all necessary components to provide a fully operational system, including one full body safety harness with a 310 lb. weight capacity for each fall prevention system. System shall have a fall locking device, impact attenuator, and rail system. Rail extension with dismounting system, which allows detachment from

the system while not standing on the ladder, shall be provided for ladders accessed thru hatch openings. All components shall be stainless steel with a non-metallic cable guide.

D. Fall Prevention Systems shall be RTC 2000 Climb-Rite System, Sellstrom Manufacturing Company, or Saf-T-Climb Fall Prevention System, Norton by Honeywell.

PART 3 -- EXECUTION

3.01 FABRICATION

A. All measurements and dimensions shall be based on field conditions and shall be verified by the Contractor prior to fabrication. Such verification shall include coordination with adjoining work.

B. All fabricated work shall be shop fitted together as much as practicable, and delivered to the field, complete and ready for erection.

C. All work shall be fabricated and installed in a manner that will provide for expansion and contraction, prevent shearing of bolts, screws, and other fastenings, ensure rigidity, and provide a close fit of sections.

D. Finished members shall conform to the lines, angles, and curves shown on the Drawings and shall be free from distortions of any kind.

E. All shearings shall be neat and accurate, with parts exposed to view neatly finished. Flame cutting is allowed only when performed utilizing a machine.

F. All shop connections shall be welded unless otherwise indicated on the Drawings or specified herein. All fastenings shall be concealed where practicable.

G. Fabricated items shall be shop painted when specified in accordance with Section 09900 entitled "Painting".

3.02 INSTALLATION

A. Assembly and installation of fabricated system components shall be performed in strict accordance with manufacturer's recommendations.

B. All ladders shall be erected square, plumb and true, accurately fitted, adequately anchored in place, and set at proper elevations and positions.

C. Metalwork shall be field painted when specified in accordance with Section 09900 entitled "Painting".

- END OF SECTION -

PROJECT NO. 12197

SECTION 05531 – ACCESS HATCHES

PART 1 -- GENERAL

1.01 THE REQUIREMENT

A. The CONTRACTOR shall furnish all materials, labor, and equipment required to provide hatches in accordance with the Contract Documents.

1.02 REFERENCE SPECIFICATIONS, CODES AND STANDARDS

A. Without limiting the generality of the other requirements of the specifications, all work herein shall conform to the applicable requirements of the following documents. All referenced specifications, codes, and standards refer to the most current issue available at the time of Bid.

1. Florida Building Code

2. Aluminum Association Specifications for Aluminum Structures

3. Occupational Safety and Health Administration (OSHA) Regulations

1.03 SUBMITTALS

A. Submit the following in accordance with Section 01300 - Submittals.

B. The ENGINEER will review and return the submittals to the CONTRACTOR. The CONTRACTOR shall then submit the accepted package to the Building Department. No fabrication or installation shall begin until the submittal is accepted by the Building Department with jurisdiction.

PART 2 -- PRODUCTS

2.05 ALUMINUM ACCESS HATCHES

A. General

1. Door opening sizes, number and direction of swing of door leaves, and locations shall be as shown on the Drawings. The Drawings show the clear opening requirements.

2. All doors shall be aluminum (mill finish) unless otherwise noted.

3. Openings larger than 42 inches in either direction shall have double leaf doors, unless noted otherwise on the Drawings.

4. Doors shall be designed for flush mounting and for easy opening from both inside and outside.

5. All doors shall be provided with an automatic hold-open arm with release handle.

6. Double leaf doors shall be provided with 316 SS safety chains to go across the open sides of the door, when in the open position. Brackets shall be provided on the underside of the doors to hold the safety bars when not in use.

7. All hardware, including but not limited to, all parts of the latch and lifting mechanism assemblies, hold open arms and guides, brackets, hinges, springs, pins, and fasteners shall be 316 stainless steel.

8. Cylinder locks with keyway protected by a cover plug shall be provided with all hatches.

9. Door leafs shall be 1/4-inch aluminum diamond plate, minimum, stiffened and designed for H-20 live loads.

10. Access door frames shall be watertight type channel fabricated from ¼-inch aluminum with an anchor flange around the perimeter. The door frame shall be equipped with a 1 1/2-inch drainage coupling. Drain piping shall be provided by the Contractor and shall extend to the nearest point of discharge acceptable to the ENGINEER.

11. Access hatches shall be model J or JD (dual leaf) as manufactured by The Bilco Company, or equal.

12. Hatches shall be guaranteed against defects for a period of five years.

PART 3 -- EXECUTION

3.01 FABRICATION

A. All measurements and dimensions shall be based on field conditions and shall be verified by the Contractor prior to fabrication. Such verification shall include coordination with adjoining work. Fabrication shall begin only after such field measurements.

B. All fabricated work shall be shop fitted together as much as practicable, and delivered to the field, complete and ready for erection, unless sections have to be removable. All miscellaneous items such as stiffeners, fillets, connections, brackets, and other details necessary for a complete installation shall be provided.

C. All work shall be fabricated and installed in a manner that will provide for expansion and contraction, prevent shearing of bolts, screws, and other fastenings, ensure rigidity, and provide a close fit of sections.

D. Finished members shall conform to the lines, angles, and curves shown on the Drawings and shall be free from distortions of any kind.

E. All shearings shall be neat and accurate, with parts exposed to view neatly finished. Flame cutting is allowed only when performed utilizing a machine.

F. All shop connections shall be welded unless otherwise indicated on the Drawings or specified herein. Bolts and welds shall conform to Section 05500 - Metal Fabrication. All fastenings shall be concealed where practicable.

3.02 INSTALLATION

A. Assembly and installation of fabricated system components shall be performed in strict accordance with manufacturer's recommendations.

B. All, access hatches shall be erected square, plumb and true, accurately fitted, adequately anchored in place, and set at proper elevations and positions.

- END OF SECTION -

PROJECT NO. 12197

SECTION 09900 - PAINTING

PART 1 -- GENERAL

1.01 SCOPE

A. CONTRACTOR shall furnish all labor, tools, materials, supervision and equipment necessary to do all the work specified herein and as required for a complete installation, including surface preparation, priming and painting of existing and CONTRACTOR furnished equipment, materials and structures.

B. CONTRACTOR shall field measure all quantities. OWNER and ENGINEER are not responsible for ensuring accuracy of the dimensions shown on the Drawings.

C. It is the intent to coat all new work, all existing exterior concrete / masonry, existing exterior steel surfaces as identified and other interior and exterior surfaces as idenfied herein.

1.02 RELATED WORK SPECIFIED ELSEWHERE

A. Additional information about the paint removal operations and the construction of temporary enclosures to contain airborne debris and paint is specified in Section 09805.

B. Waterproofing is specified in Section 09810

1.03 QUALIFICATIONS

A. CONTRACTOR shall have minimum five years experience in industrial painting.

B. CONTRACTOR shall submit with his Bid a list of water treatment plant work they have completed in the last five years and or related work. Included shall be names, addresses, contacts and phone numbers.

1.04 GENERAL INFORMATION AND DESCRIPTION

A. All paint shall be applied in conformance with the manufacturer's published specifications.

B. The terms “coating” and "paint", as used interchangeably herein, includes alkyds, acrylics, emulsions, enamels, epoxies, paints, polyurethanes, flourourethanes, zinc rich primers and other products, whether used as prime, intermediate, or finish coats.

C. Dry Film Thickness (DFT) refers to paint thickness, measured in mils (1/1000 inch), of a coat of paint in its cured state.

D. All buildings, facilities, structures, and appurtenances, as indicated on the Drawings and as specified herein, shall be painted with not less than one shop coat and field coat(s), or one prime coat and finish coat(s) of the appropriate paint. Items to be painted include, but are not limited to exterior and interior concrete, fluted block, masonry, stucco, gypsum drywall, structural steel, miscellaneous metals, operators, pipe-fittings, valves,

mechanical equipment, motors, conduit, and all other work which is obviously required to be painted unless otherwise specified.

E. Baked-on enamel finishes and items with standard shop finishes such as graphic panels, electrical equipment, instrumentation, etc., shall not be field painted unless the finish is damaged during shipment or installation. Aluminum, stainless steel, fiberglass and bronze work shall not be painted unless color coding and marking is required or otherwise specified. A list of surfaces not to be coated is included in Article 1.13.

F. CONTRACTOR shall obtain all permits, licenses and inspections and shall comply with all laws, codes, ordinances, rules and regulations promulgated by authorities having jurisdiction which may bear on the work. This compliance will include Federal Public Law 91-596 more commonly known as the "Occupational Safety and Health Act of 1970".

G. CONTRACTOR shall be responsible for any damage to any surrounding structures such as buildings, cars, landscaping, sidewalks, fences, etc. as a result of paint splatter, blast abrasive, mechanical damage, etc. All damage shall be repaired and restored to the original condition.

1.05 REFERENCES

A. Standards, Specifications, Recommended Practices, and listed herein are part of this Section to extent referenced

1. American Society for Testing and Materials:

a. ASTM D 16 Terminology Relating to Paint, Varnish, Lacquer, and Related Products

b. ASTM D 523 Test Method for Specular Gloss

c. ASTM D 610 Standard Practice For Evaluating Degree of Rusting on Painted Steel Surfaces

d. ASTM D 2244 Test Method for Calculation of Color Differences from Instrumentally Measured Color Coordinates

e. ASTM D 3359 Test Method for Measuring Adhesion by Tape Test

f. ASTM D 4414 Standard Practice for Measurement of Wet Film Thickness by Notch Gages

g. ASTM D 4541 Test Method for Pull Off Strength of Coatings Using Portable Adhesion-Testers

h ASTM D 1005 Test for determining dry film thickness

i. ASTM D 4285 Standard Test Method for Indicating Oil or Water in Compressed Air

j. ASTM D 4417 Test for determining surface profile

k. ASTM D 6677 Standard Test Method for Evaluating Adhesion by Knife

2. The Society for Protective Coatings:

a. SSPC-SP-1 Specification for Solvent Cleaning

b. SSPC-SP-2 Specification for Hand Tool Cleaning

c. SSPC-SP-3 Specification for Power Tool Cleaning

d. SSPC-SP-5 Specification for White Metal Blast Cleaning

e. SSPC-SP-6 Specification for Commercial Blast Cleaning

f. SSPC-SP-7 Specification for Brush-Off Blast Cleaning

g. SSPC-SP-10 Specification for Near White Metal Blast Cleaning

h. SSPC-SP-11 Specification for Power Tool Cleaning to Bare Metal

i. SSPC-SP-12 Specification for Water Jetting

j. SSPC-SP-13 Surface Preparation of Concrete

k. SSPC-SP-14 Industrial Blast Cleaning

l. SSPC-SP-15 Power Tool Cleaning to Commercial Metal

m. SSPC-PA-1 Painting Application Specification

n. SSPC-PA-2 Measurement of Dry Paint Thickness with Magnetic Gages

o. SSPC-QP-1 Certification of Field Application to Complex Industrial and Marine Structures.

p. SSPC-QP-2 Certification of Field Removal of Hazardous Coatings.

q. SSPC-TU-11 Inspection of Fluorescent Coating Systems

r. SSPC-VIS-1 Visual Standard for Abrasive Blast Cleaned Steel

s. SSPC-VIS-2 Standard Method for Evaluating Degree of Rusting on Painted Steel Surfaces

1.06 MANUFACTURERS

B. All painting materials shall be as manufactured by Carboline, Sherwin Williams, Tnemec, International Paint, or equal.

1.07 SUBMITTALS

A. CONTRACTOR shall prepare a complete schedule of surfaces to be coated and shall identify the surface preparation and paint system he proposes to use. The coating schedule shall be in conformance with Article 3.07. The schedule shall contain the name of the paint manufacturer, and the name, address and telephone number of the manufacturer's representative that will inspect the work. The schedule shall be submitted to ENGINEER for review as soon as possible following the Notice to Proceed so that the schedule may be used to identify colors and to specify shop painting systems on order for fabricated equipment.

B. CONTRACTOR shall submit a sample copy of the warranty to be issued after completion of the work.

C. CONTRACTOR shall submit paint manufacturer's data sheets and samples of each finish and color to ENGINEER for review, before any work is started in accordance with the section entitled “Submittals”. Manufacturer's data sheets shall include descriptive data, curing times, mixing, thinning, application requirements and installation procedures, which will used in the evaluation for accepting or rejecting intended installation procedures.

D. The manufacturers' published instructions for use as a guide in specifying and applying the manufacturers' proposed paint shall be submitted to ENGINEER. The instructions must have been written and published by the manufacturer for the purpose and with the intent of giving complete instruction for the use and application of the proposed paint in the locality and for the conditions for which the paint is specified or shown to be applied under this Contract.

E. All limitations, precautions, and requirements that may adversely affect the paint; that may cause unsatisfactory results after the painting application; or that may cause the paint not to serve the purpose for which it was intended, that is, to protect the covered material from corrosion, shall be clearly and completely stated in the instructions. These limitations and requirements shall, if they exist, include, but not be limited to the following list:

1. Storage Requirements
2. Methods of application
3. Number of coats
4. Thickness of each coat
5. Total thickness
6. Drying time of each coat, including primer
7. Primer required to be used

8. Primers not permitted

9. Use of a primer

10. Thinner and use of thinner

11. Temperature and relative humidity limitations during application and after application

12. Time allowed between coats

13. Protection from sun

14. Physical properties of paint including solids content and ingredient analysis

15. Surface preparation

16. Touch up requirements and limitations

F. Submitted samples of each finish and color shall be prepared so that areas of each sample indicate the appearance of the various coats. For example, where a three coat system is specified, the sample shall be divided into three areas indicating one coat only, two coats and all three coats. ENGINEER will provide written authorization constituting a standard, as to color and finish only, for each coating system.

G. Submit manufacturer's certification that products to be used comply with specified requirements and are merchantable and suitable for intended application.

H. Submit listing of not less than five of applicator's most recent applications representing similar scope and complexity to the project requirements. List shall include information as follows:

1. Project name and address

2. Name of owner

3. Name of contractor

4. Name of engineer

5. Date of completion

I. CONTRACTOR shall provide the name and chemical composition, product data sheets, and MSDS sheets of cleaners that will be used for preparing the existing coating or for the removal of mildew.

1.08 SERVICES OF MANUFACTURERS REPRESENTATIVE

A. CONTRACTOR shall purchase paint from an acceptable manufacturer. The manufacturer shall assign a representative to inspect the application of his product both

in the shop and field. Prior to and after coating application, the manufacturer's representative shall submit reports to ENGINEER identifying the products used and verifying that said products were proper for the exposure and service intended and were properly applied, respectively.

B. Services shall also include, but not be limited to, inspecting prior coatings of paint, determination of best means of surface preparation, inspection of completed work, and final inspection of painted work to be performed eleven months after the job is completed.

1.09 WARRANTY

A. All work covered in these specifications shall be guaranteed for a period of one year. CONTRACTOR shall provide materials and labor necessary to repair any system failures during the warranty period.

C. After Substantial Completion of the project, OWNER will perform an inspection at one year (during the twelfth month following Substantial Completion). OWNER will notify CONTRACTOR when this inspection is scheduled. The CONTRACTOR shall provide a representative to attend the inspection and provide the necessary safety equipment to perform the inspection.

D. CONTRACTOR shall extend the terms of this warranty to cover repaired parts and all replacement parts furnished under the warranty provisions for a period of one year from the date of their installation.

E. If within ten days after OWNER gives CONTRACTOR notice of a defect, failure, or abnormality of the work, CONTRACTOR neglects to make, or undertake with due diligence to make, the necessary repairs or adjustments, OWNER is hereby authorized to make the repairs or adjustments or order the work to be done by a third party. The cost of the work shall be paid by CONTRACTOR.

F. Exposure to sunlight and normal atmospheric conditions characteristic of the Fort Lauderdale, Florida area shall not void the provisions of this warranty.

1.10 QUALITY ASSURANCE

A. General: Applicator shall be trained in application techniques and procedures of coating materials and shall demonstrate a minimum of five years successful experience in such application. Applicator shall maintain, throughout duration of application, a crew of painters who are fully qualified.

B. Single source responsibility shall be provided. Materials shall be products of a single manufacturer. Other, additional materials, which are produced or are specifically recommended by coating system manufacturer to ensure compatibility of system, may be used

C. CONTRACTOR shall give ENGINEER a minimum of three days advance notice of the start of any field surface preparation work of coating application work.

D. All work shall be performed only in the presence of ENGINEER, unless ENGINEER has specifically allowed the performance of such work in his absence.

E. Inspection by ENGINEER, or the waiver of inspection of any particular portion of the work, shall not relieve CONTRACTOR of his responsibility to perform the work in accordance with these Specifications.

F. Where protective coatings are to be performed by a subcontractor, said subcontractor must provide five references which show that the painting subcontractor has previous successful experience with the specified or comparable coating systems. Include the name, address, and the telephone number for the owner of each installation for which the painting subcontractor provided the protective coating.

G. The finish coat used shall be the same color and gloss throughout the duration of the Project.

H. Environmental Requirements: Apply coating materials per manufacturer's printed data sheet instructions:

1. Refer to specific product data sheets for minimum surface temperature requirements. Surface temperatures shall be at least 5 degrees F (15 degrees C) above dew point and rising.

2. Provide for proper ventilation and/or dehumidification using explosion proof equipment and allow operation during application and cure cycle of the coating systems as recommended by manufacturer.

3. Provide adequate illumination using explosion proof lights and equipment.

4. Provide work site free of airborne dust, debris, and other contaminants.

1.11 QUALITY WORKMANSHIP

A. CONTRACTOR shall be responsible for the cleanliness of his painting operations and shall use covers and masking tape to protect the work whenever such covering is necessary, or if so requested by OWNER. Any unwanted paint shall be carefully removed without damage to any finished paint or surface. If damage does occur, the entire surface, adjacent to and including the damaged area, shall be repainted without visible lapmarks and without additional cost to OWNER.

B. CONTRACTOR shall be responsible for any dust, debris and/or paint droplets which leave the City's property and/or cause damage to neighboring property. Insufficient containment of abrasive debris and/or generation of nuisance dust beyond the City property limits is just cause for shut-down of the job until proper protective measures are in place and violations have been remedied.

1.12 SAFETY AND HEALTH REQUIREMENTS

A. CONTRACTOR is responsible for the safety of the work and the job site. CONTRACTOR shall provide and position all safety equipment, rigging, lighting, scaffolding, labor and calibrated instruments.

B. In accordance with requirements of OSHA Safety and Health Regulations for General Industry (29 CFR 1910) and for Construction (29 CFR 1926), and the applicable requirements of regulatory agencies having jurisdiction, as well as manufacturer's printed instructions, appropriate technical bulletins, manuals, and material safety data sheets, CONTRACTOR shall provide and require use of personnel protective and safety equipment for persons working in or about the project site.

C. Adequate ventilation shall be provided and maintained during surface preparation, coating mixing, coating application, and curing phases of work to adequately remove dust and fumes to prevent injury to workmen or accumulation of volatile gases. Respirators shall be worn by persons engaged or assisting in spray painting. CONTRACTOR shall provide ventilating equipment and all necessary safety equipment for the protection of the workmen and the work.

D. CONTRACTOR shall provide and maintain safe, secure rigging and scaffolding in compliance with the OSHA scaffold standards 29 CFR 1926.450-454. CONTRACTOR is responsible for all attachments to or imposing loads on the structures. Any attachments to the structure are prohibited unless acceptable to OWNER in advance. If OWNER allows attachments, they shall be responsibility of CONTRACTOR.

E. Fall protection or prevention shall be provided in accordance with 29 CFR 1926.104, 29 CFR 1926.105, and 29 CFR 1926.500-503.

F. All paint shall comply with all requirements of the Air Pollution Regulatory Acts concerning the application and formulation of paints and coatings for an area in which the paints are applied. Specifically, paints shall be reformulated as required to meet the local, State and Federal requirements.

G. Coatings used in conjunction with potable water supply systems shall have NSF approval for use with potable water and shall not impart a taste or odor to the water.

H. All rigging shall meet OSHA requirements, conform to industry standards and shall be operated in a sage manner. CONTRACTOR is responsible for the integrity of rigging connections. All rods and other tank appurtenances that will be used for rigging purposes shall be carefully checked for structural integrity before they are used for climbing or rigging. Deficiencies shall be reported and corrected before use.

1.13 SURFACES NOT TO BE COATED

A. The following list of items shall not be coated unless otherwise noted herein or on the Drawings.

1. Encased piping or conduit

2. Stainless steel work.

3. Clear PVC secondary containment piping

4. Galvanized checkered plate

5. Aluminum handrails, grating and checkered plate.

6. Flexible couplings, lubricated bearing surfaces and insulation.

7. Packing glands and other adjustable parts of mechanical equipment.

8. Finish Hardware.

9. Steel enchased in concrete or masonry.

10. Plastic switch plates and receptacle plates.

11. Signs, nameplates, serial numbers, and operating instruction labels.

12. Any code-requiring labels, such as Underwriters' Laboratories and Factory Mutual, or any equipment identification, performance rating, name or nomenclature plates.

13. Any moving parts of operating units, mechanical and electrical parts, such as valve and damper operators, linkages, sensing devices, motor and fan shafts, unless otherwise indicated.

1.14 PROTECTION OF STRUCTURES

A. CONTRACTOR shall use extreme diligence to assure that adjacent vehicles, structures, buildings, equipment, hardware, fixtures, and other materials are protected against process and waste water, paint spillage, paint drips and other damage. Damage shall be corrected by cleaning, repairing or replacing the item as acceptable to OWNER, at no additional cost to OWNER.

1.15 SHIPPING, HANDLING AND STORAGE

A. Products shall be delivered in manufacturer's original unopened containers and shall be subject to inspection by ENGINEER. Packages shall not be opened until they are inspected by ENGINEER and required for use. Each container shall have manufacturer's label, intact and legible. Label for each container shall contain the following:

1. Manufacturer's name

2. Type of paint

3. Manufacturer's stock number

4. Color name and number

5. Instructions for thinning, where applicable

B. Where thinning is necessary, only the product of the manufacturer furnishing the paint shall be used. All such thinning shall be done strictly in accordance with the manufacturer's instructions, and with the full knowledge of ENGINEER.

C. Materials and their storage shall be in full compliance with the requirements of pertinent codes and fire regulations. All painting materials shall be stored under cover in a clean, dry, well-ventilated place protected from sparks, flame, direct rays of the sun or extreme temperatures. Storage shall be maintained at a temperature between 40° F and 90° F, unless the requirements of the manufacturer are more restrictive. Receptacles shall be placed outside buildings for paint gates and containers. Paint waste shall not be disposed of in plumbing fixtures, drains or on the ground.

1.16 ADDITIONAL PAINT

A. At the end of the project, CONTRACTOR shall turn over to OWNER one five-gallon can of each type and color of paint, primer, thinner or other coating used in the field painting. If the manufacturer packages the material concerned in gallon cans, then it shall be delivered in unopened labeled cans as it comes from the factory. If the manufacturer does not package the material in gallon cans, and in the case of special colors, the materials shall be delivered in new gallon containers, properly closed with typed labels indicating brand, type, color, etc. The manufacturer's literature describing the materials and giving directions for their use shall be furnished in three bound copies. A type-written inventory list shall be furnished at the time of delivery.

PART 2 -- PRODUCTS

2.01 MATERIALS

A. Table 09900-1 depicts the coatings referenced in Article 3.07, "Paint Schedule".

Table 09900-1
Product Listing

Reference Number	Description	Manufacturers Reference Carboline (or equal)
100	Waterborne Acrylic	Sanitile 120 (Formerly Carbocrylic 120)
101	Polymeric Epoxy Amine	Rustbond
102	Epoxy Polyamido Amine	Sanitile 600 & 600 TG
103	Aluminum Epoxy Mastic	Carbomastic 15
104	Cycloaliphatic Amine Epoxy	Carboguard 890 & 890 LT
105	Waterborne Acrylic	Galoseal WB
107	Alkyd Enamel, Gloss	Carbocoat 45

108	Aliphatic Acrylic Polyurethane	Carbothane 134 HG
109	Waterborne Acrylic	Sanitile 155
110	Aliphatic Acrylic-Polyester Polyurethane	Carbothane 133 HB
111	Waterborne Acrylic Elastomer	Flexxide Elastomer
117	Coal Tar Epoxy	Bitumastic 300 M
125	Polyamine Epoxy	Carboguard 891 HS
128	Modified Siloxane Hybrid	Carboxane 2000 Satin

B. No lead containing protective coating materials may be used on this project.

PART 3 -- EXECUTION

3.01 INSPECTION OF SURFACES

A. Before application of the prime coat and each succeeding coat, all surfaces to be painted shall be subject to inspection by ENGINEER. Any defects or deficiencies shall be corrected by CONTRACTOR before application of any subsequent coating.

B. Samples of surface preparation and of painting systems shall be furnished by CONTRACTOR to be used as a standard throughout the job, unless omitted by ENGINEER.

C. OWNER will inspect all phases of the Work to verify that it is in accordance with the requirements of the Specifications. CONTRACTOR shall facilitate this inspection as required, including allowing ample time for the inspections and safe access to the work.

D. CONTRACTOR shall perform visual holiday inspection per SSPC TU 11 Standards.

E. Hold point inspections may include, but are not limited to prepainting cleanliness, sufficiency of sanding for deglossing, exposed metal spot surface preparation, ambient conditions, paint application, film thickness measurement, film appearance and continuity, and adhesion. CONTRACTOR is not allowed to proceed with subsequent phases of the Work unless acceptable to OWNER. Prior to demobilization in a particular section worked, a final acceptance inspection will be performed by OWNER.

F. The inspection by OWNER in no way relieves CONTRACTOR of the responsibility to comply with all requirements of this specification, and to provide comprehensive inspections of its own to assure compliance with the acceptable Quality Control Inspection Plan. CONTRACTOR shall make available for OWNER's review all quality control inspection documentation maintained in accordance with CONTRACTOR's Quality Control Inspection Plan.

G. CONTRACTOR shall furnish, until final acceptance of the coating system, all equipment and instrumentation needed for self-inspection of all phases of the Work.

H. Deviations or nonconformances are items that do not meet the specified requirements and require either rework or repair as determined by OWNER. Deviations will be recorded by OWNER. CONTRACTOR's representative shall initial and date the nonconformance acknowledging a deviation exists. All deviations shall be brought into conformance prior to partial payment for the applicable area.

3.02 EQUIPMENT

A. Effective oil and water separators in conformance with ASTM D 4285 shall be used in all compressed air lines serving spray painting and sandblasting operations to remove oil or moisture from the air before it is used. Separators shall be placed as far as practicable from the compressor.

B. All equipment for application of the paint and the completion of the work shall be furnished by CONTRACTOR in first-class condition and shall comply with recommendations of the paint manufacturer.

3.03 WORK IN CONFINED SPACES

A. CONTRACTOR shall provide and maintain safe working conditions for all employees. Fresh air shall be supplied continuously to confined spaces through the combined use of existing openings, forced-draft fans, or by direct air supply to individual workers. Paint fumes shall be exhausted to the outside from the lowest level in the contained space.

B. Electrical fan motors shall be explosion proof if in contact with paint fumes. No smoking or open fires will be permitted in, or near, confined spaces where painting is being done.

3.05 SURFACE PREPARATION

A. General: Surface preparation shall be as specified in the following paragraphs, in the coating schedule or as recommended by the paint manufacturer's published application instructions, whichever imposes the most stringent requirements.

B. Surfaces to be painted shall be clean and dry, and free of dust, rust, scale and all foreign matter. No solvent cleaning, power or hand tool cleaning shall be permitted unless acceptable to ENGINEER or specified herein.

C. The manufacturer shall inspect all surfaces specified to receive protective coatings prior to surface preparation. The manufacturer shall notify the ENGINEER of any noticeable disparity in the surfaces which may interfere with the proper preparation or application of the repair materials or protective coatings.

D. Except as otherwise provided, all preparation of metal surfaces shall be in accordance with SSPC Specifications SP-1 through SP-15. Where SSPC Specifications are referred to in these Contract Documents, the corresponding Pictorial Surface Preparation Standard shall be used to define the minimum final surface conditions to be supplied. Grease and oil shall be removed and the surface prepared by hand tool cleaning, power tool cleaning or blast cleaning in accordance with the appropriate Specification SP-1 through SP-15.

E. Weld flux, weld spatter and excessive rust scale shall be removed by power tool cleaning as per SSPC-SP-3.

F. Hardware accessories, machined surfaces, plates, lighting fixtures, and similar items in place prior to cleaning and painting, and not intended to be painted, shall be protected or removed during painting operations and repositioned upon completion of painting operations.

G. Any abraded areas of shop or field applied coatings shall be touched up with the same type of shop or field applied coating, even to the extent of applying an entire coating, if necessary. Touch-up coatings and surface preparations shall be in addition to and not considered as the first field coat.

H. Abrasives from blasting shall be thoroughly removed, using vacuums if necessary. No surface, which has been blasted, shall be painted until inspected by ENGINEER.

I. Threaded portions of valve and gate stems, machined surfaces which are intended for sliding contact, surfaces which are to be assembled against gaskets, surfaces or shafting on which sprockets are to fit, or which are intended to fit into bearings, machined surfaces of bronze trim on slide gates and similar surfaces shall be masked off to protect them from the sandblasting of adjacent surfaces. Cadmium-plated or galvanized items shall not be sandblasted unless hereinafter specified, except that cadmium-plated, zinc-plated, or sherardized fasteners used in assembly of equipment to be sandblasted shall be sandblasted in the same manner as the unprotected metal. All installed equipment, mechanical drives, and adjacent painted equipment shall be protected from sandblasting. Protection shall prevent any sand or dust from entering the mechanical drive units or equipment where damage could be caused.

J. Hardware accessories, machined surfaces, plates, lighting fixtures, and similar items in place prior to cleaning and painting, and not intended to be painted, shall be protected or removed during painting operations and repositioned upon completion of painting operations.

K. Any abraded areas of shop or field applied coatings shall be touched up with the same type of shop or field applied coating, even to the extent of applying an entire coating, if necessary. Touch-up coatings and surface preparations shall be in addition to and not considered as the first field coat.

L. Exposed Pipe, Valves and Pumps: Bituminous coated pipe shall not be used in fully exposed locations. Pipe, valves, and pumps which shall be fully exposed after project completion shall be primed in accordance with the requirements herein. Any bituminous coated ferrous pipe which is inadvertently installed in exposed locations shall be sandblasted to SSPC-SP-5 White Metal before priming and painting. After installation all exterior, exposed flanged joints shall have the gap between adjoining flanges sealed with a single component Thiokol caulking to prevent rust stains.

M. Ferrous Metal Surfaces:

1. Ferrous metal surfaces in submerged or corrosive atmosphere shall be cleaned of all oil, grease, dirt, rust and tight and loose mill scale by abrasive blasting in

accordance with the SSPC-SP5 White Metal Blast Cleaning with a 2 - 3 mil profile. Prime coat shall follow blasting before any evidence of corrosion occurs.

2. All ferrous metal surfaces not required to be galvanized shall be cleaned of all oil, grease, dirt, rust and tight and loose mill scale by abrasive blasting in accordance with SSPC-SP-10 Near White Metal Blast Cleaning with a 2 - 3 mil profile. Prime coat shall follow blasting before any evidence of corrosion occurs.

3. Field surface preparation of small, isolated areas such as field welds, repair of scratches, abrasions or other marks to the shop prime or finish shall be cleaned by power tools in accordance with SSPC-SP-3, or in difficult and otherwise inaccessible areas by hand cleaning in accordance with SSPC-SP-2 and spot primed.

N. Primed or Previously Coated Metal Surfaces: All coated surfaces shall be cleaned prior to application of successive coats. Cleaning shall be done in accordance with SSPC-SP-12 Water Jetting (LP WC - Low Pressure Water Cleaning / WJ-4 Light Cleaning). Utilize SSPC-SP 2 and / or SSPC-SP3 guidelines to address any rusted areas, bare exposed steel, damaged and/or loose coatings. Spot prime all hand and power tooled cleaned areas as required prior to application of the recommended coating system.

O. Shop Finished Surfaces: All shop-coated surfaces shall be protected from damage and corrosion before and after installation by treating damaged areas immediately upon detection. Abraded or corroded spots on shop-coated surfaced shall be prepared in accordance with SSPC-SP-2, Hand Tool Cleaning and then touched up with the same materials as the shop coat. All shop coated surfaces which are faded, discolored, or which require more than minor touch-up, in the opinion of the ENGINEER, shall be repainted. Cut edges of galvanized sheets, electrical conduit, and metal pipe sleeves, not to be finish painted, shall be cleaned in accordance with SSPC-SP-1, Solvent Cleaning and primed with zinc dust-zinc oxide metal primer.

P. Galvanized, Zinc, Copper and Other Nonferrous Metal Surfaces: All nonferrous metal surfaces shall be given one coat of metal passivator or metal conditioner before applying the prime coat. The passivator or conditioner, which may not be identified in the paint schedule, shall be compatible with the complete paint system identified in the paint schedule.

Q. Concrete and Masonry Surfaces:

1. Concrete and masonry surfaces to be painted shall be prepared by removing efflorescence, chalk, dust, dirt, grease, oil, form coating, tar and by roughening to remove glaze. Concrete surfaces shall receive a light abrasive blast to expose bug holes.

2. All concrete that is not sound or has been damaged shall be removed to a sound concrete surface. All surfaces shall be repaired prior to commencement of the coating operation.

3. Concrete and masonry surfaces are to be cured for at least 28 days prior to coating them.

4. Submerged concrete surfaces that are to be painted shall be etched with 15 percent to 10 percent muriatic acid solution to produce the necessary "sandpaper texture" surface required for satisfactory adherence of the paint. Surfaces must be flushed and scrubbed with water to remove acid residue and particles loosened by it. Acid shall not be allowed to dry on surfaces.

5. Concrete surfaces specified by the paint manufacturer to be acid etched shall be etched in accordance with the manufacturer's instructions. The surface shall then be thoroughly scrubbed with clean water, rinsed, and allowed to dry. The surface shall be tested with a moisture meter to determine when dry before coating.

6. All rinse water shall be collected and properly disposed. The rinse water may only be discharged to the plant drains after being properly neutralized. Neutralization procedures must be approved in advance by the ENGINEER.

R. Existing Concrete and Masonry Surfaces to be Repainted:

1. Surface preparation of existing concrete surfaces shall be in conformance with SSPC-SP13 / NACE No. 6 and the manufacturer's recommendations.

2. All concrete, masonry and stucco that is not sound or has been damaged shall be removed to a sound surface. Concrete, masonry and stucco shall be repaired as specified in other sections prior to applying protective coatings.

3. All contaminants including: oils, grease, unsound or incompatible existing coatings, waxes, form release, curing compounds, efflorescence, sealers, salts, or other contaminants shall be removed.

4. Existing concrete surfaces to be coated shall be initially cleaned using low pressure, minimum 3,500 psi, water pressure in accordance with SSPC-SP12 / NACE No. 5. A maximum 5,000 psi water pressure in accordance with SSPC-SP-12 / NACE No. 5 may be required to remove additional surface contaminants such as efflorescence. The presurface preparation inspection by the manufacturer shall be performed after this initial cleaning.

S. PVC Pipe Surfaces: Prior to painting, all PVC pipe surfaces shall be cleaned per SSPC-SP-1, followed by a light sanding with medium weight sandpaper. The pipe shall be free of sanding dust prior to painting.

T. Gypsum Wallboard Surfaces: Sand joint compound smooth and feather edge.

U. Wood Surfaces: Sand rough areas, seal knots and pitch pockets. Fill cracks and nail holes after primer is dry. Previously coated surfaces shall be cleaned in accordance with SSPC-SP-12, Water-Jetting (LP WC - Low Pressure Water Cleaning / WJ-4 Light Cleaning). Utilize SSPC SP 2 and / or SSPC SP3 guidelines to address any damaged and / or loose coatings. Surfaces must be clean and dry prior to application of the recommended coating system.

V. Aluminum Surfaces: Prepare the substrate in accordance with SSPC-SP1 guidelines to remove dirt, dust, oil and all other contaminants.

W. Pipe Flanges: All exposed flanged joints shall have the gap between adjoining flanges cleaned and sealed with a NSF approved single component Thiokol caulking to prevent

3.06 SHOP PAINTING

A. All fabricated steel work and equipment shall receive at the factory at least one shop coat of prime paint compatible with the paint system required by these specifications. Surface preparation prior to shop painting shall be as specified. Finish coats may be applied in the shop if approved by the ENGINEER. All shop painted items shall be properly packaged and stored until they are incorporated in the work. Any painted surfaces that are damaged during handling, transporting, storage, or installation shall be cleaned, scraped, and patched before field painting begins so that the work shall be equal to the original painting received at the shop. Equipment or steel work that is to be assembled on the site shall likewise receive a minimum of one shop coat of paint at the factory. Surfaces of exposed members that will be inaccessible after erection shall be prepared and painted before erection.

B. The CONTRACTOR shall specify the shop paints to be applied when ordering equipment in order to assure compatibility of shop paints with field paints. The paints and surface preparation used for shop coating shall be identified on shop drawings submitted to the ENGINEER for review. Shop paint shop drawings will not be reviewed until the final project paint system has been submitted by the CONTRACTOR and reviewed by the ENGINEER.

C. Shop finish coats may be the standard finish as ordinary applied by the manufacturer if it can be demonstrated to the ENGINEER that the paint system is equal to and compatible with the paint system specified.

3.07 PREPARATION OF MATERIALS

A. Mechanical mixers, capable of thoroughly mixing the pigment and vehicle together, shall mix the paint prior to use where required by manufacturer's instructions; thorough hand mixing will be allowed for small amounts up to one gallon.

B. Pressure pots shall be equipped with mechanical mixers to keep the pigment in suspension, when required by manufacturer's instructions. Otherwise, intermittent hand mixing shall be done to assure that no separation occurs. All mixing shall be done in accordance with SSPC Volume 1, Chapter 4, "Practical Aspects, Use and Application of Paints" and/or with manufacturer's recommendations.

C. Catalysts or thinners shall be as recommended by the manufacturer and shall be added or discarded strictly in accordance with the manufacturer's instruction.

D. When using two component materials, only complete kits shall be mixed.

3.08 COATING SCHEDULE

A. General: CONTRACTOR shall adhere to this coating schedule, providing those paints named or equal. DFT shall mean the total minimum dry film thickness per application

measured in mils. Products are referenced by numbers listed in Article 2.01, “Materials,” and listed in Table 09900-1.

B. Metal Surfaces, Exterior (Atmospheric) Exposure

1. Metal surfaces exposed to the atmosphere that do not come into contact with corrosive atmospheres including the following types of surfaces shall be painted as follows:

   a. Pumps, motors, machinery, etc.

   b. Above ground piping, valves, hydrants and pipe supports.

   c. Miscellaneous steel shapes, angles, etc.

   d. Piping and valves inside below ground, valve vaults.

2. Coating System:

Application	No.	Description	DFT
First - 1 coat	104	Cycloaliphatic Amine Epoxy	4.0 - 6.0
Second - 1 coat	104	Cycloaliphatic Amine Epoxy	4.0 - 6.0
Finish - 1 coat	110	Aliphatic Acrylic-Polyester Polyurethane	3.0 - 5.0
		Min. Total	14 Mils

C. Existing Metal Surfaces, Exterior (Atmospheric) Exposure

1. Existing metal surfaces exposed to the atmosphere that do not come into contact with corrosive atmospheres that require touch-up painting due to CONTRACTOR activities (such as welding to existing structures) including the following types of surfaces shall be painted:

   a. Above ground piping and pipe supports identified on the Drawings to be painted.

   b. Miscellaneous steel shapes, angles, ladders, cages, piping, etc located on or mounted to existing concrete structures identified to be painted.

2. Surface preparation for this application only shall be using a low pressure, minimum 3,500 to 4,500 psi water pressure in accordance with SSPC-SP12 / NACE No. 5, followed the utilization of SSPC SP3 guidelines to address rust and any damaged and / or loose coatings.

3. Coating System:

Application	No.	Description	DFT
Spot Prime	104	Cycloaliphatic Amine Epoxy	4.0 - 6.0
Second - 1 coat	104	Cycloaliphatic Amine Epoxy	4.0 - 6.0
Finish - 1 coat	110	Aliphatic Acrylic-Polyester Polyurethane	3.0 - 5.0
		Min. Total	14 Mils

D. Metal Surfaces, Corrosive Exposure

1. Metal surfaces that come in contact with corrosive atmospheres, including but not limited to equipment, piping and miscellaneous metals within Hydrotreator Influent Vaults, shall be painted as follows:

2. Coating System:

Application	No.	Description	DFT
First - 1 coat	125	Polyamine Epoxy	4.0 - 6.0
Finish - 1 coat	125	Polyamine Epoxy	6.0 - 8.0
		Min. Total	12 Mils

E. Concrete Surfaces, Vault Interiors

1. Existing concrete surfaces within the Hydrotreator Influent Vaults shall be painted as follows:

2. Coating System:

Application	No.	Description	DFT
First - 1 coat	100	Waterborne Acrylic	1.0 - 2.0
Second - 1 coat	111	Waterborne Acrylic Elastomer	6.0
Finish - 1 coat	111	Waterborne Acrylic Elastomer	6.0
		Min. Total	13.0 Mils

F. PVC Piping and Appurtenances, Within the Hydrotreator Influent Vaults

1. PVC pipes, valves, and accessories, shall be coated as follows:

2. Coating System:

Application	No.	Description	DFT
Finish - 1 coat	104	Cycloaliphatic Amine Epoxy	4.0 - 6.0
Finish - 1 coat	110	Aliphatic Acrylic-Polyester Polyurethane	3.0 - 5.0
		Min. Total	9.0 Mils

3.09 COATING APPLICATION

A. General: All paint shall be applied by experienced painters with top quality, properly styled brushes, rollers, sprayers or other applicators reviewed by ENGINEER and the paint manufacturers Coatings shall be applied in accordance with the requirements of this Section, the coating manufacturer's product data sheet, and SSPC-PA1. In the event of a conflict between the manufacturers' technical data and the requirements of this Section, this Section shall govern unless the requirements of the manufacturer are more restrictive.

B. Quality of Surface Preparation: CONTRACTOR shall verify that the surface exhibits the specified degree of cleaning immediately prior to painting. CONTRACTOR shall reclean deficient areas prior to applying coatings. If contamination of the surface (e.g., dust) occurs prior to the application of the first full coat, all contamination shall be removed prior to painting.

C. Time Restrictions: Coatings shall only be applied to bare metal surfaces on the same day that the surface preparation was performed.

D. Ambient Conditions Restrictions: Coatings are not to be applied under the following conditions. If the manufacturer's requirements are more restrictive, the manufacturer's conditions shall govern.

1. Surface and Air Temperatures: Between 50°F and 100°F.

2. Relative Humidity: Less than 85%.

3. Dew Point: Surface temperature shall be at least 5ºF warmer than the dew point temperature of the surrounding air.

4. Dampness / Rain: Coatings are not to be applied to surfaces that are damp, have free standing water, during rain, during fog, or similar detrimental weather conditions.

E. Any paint that is exposed to unacceptable conditions (e.g. rain or dew) shall be removed and replaced prior to adequate curing.

F. The work areas which have been blasted and received any coating shall be protected as not to have ongoing blasting and painting operation affect previously prepared surfaces.

G. The primer shall not be applied on a nonprepared surface. Previous blasted and primed surfaces shall be tied in by blasting 2-inches into primed area.

H. The number of coats specified shall be minimum number acceptable. Apply additional coats as needed to provide a smooth, even application and achieve the specified DFT.

I. Application Methods: Regardless of application method used, paint drips, splashes, and spills must be controlled.

1. Roller Application: Nap size, roller quality and application technique shall be selected that will properly wet the substrate and produce a smooth, uniform film. When applying paint to circular or tubular structural elements, roll circumferentially wherever feasible rather than longitudinally for film uniformity.

2. Brush Application: Bristle lengths, bristle quality and application techniques shall be selected that will properly wet the substrate and produce a smooth, uniform film. Because of the emphasis on aesthetics on this project, brushes shall be used only when the use of rollers is not feasible.

3. Daubers: On surfaces such as the back side of the anchor bolts which inaccessible for paintbrushes, sheepskins, mitts or daubers especially constructed for the purpose shall be used when acceptable to the ENGINEER.

4. Sprayers: Paint may be applied with spraying equipment that is appropriate for the job conditions and is acceptable to the manufacture. If the material has thickened or must be diluted for application by spray gun, each coat shall be built up to the same film thickness achieved with undiluted brushed-on material. Where thinning is necessary, only the products of the particular manufacturer furnishing the paint shall be used; and all such thinning shall be done in strict accordance with the manufacturer's instructions, as well as with the full knowledge of ENGINEER.

J. Coverage and Continuity: Aesthetics of the application is critical. Each coat shall be applied at the proper consistency in a workmanlike manner to assure thorough wetting of the substrate or underlying coat, and to achieve a smooth, streamline surface. All shadow-through, pinholes, bubbles, blisters, fish eyes, skips, misses, drips, lap marks between applications, or other visible discontinuities in any coat shall be repaired before the application of subsequent coats. Runs or sags may be brushed out while the material remains wet. All surfaces shall be thoroughly coated with special attention to hard-to-reach areas, and irregular surfaces such as crevices and fasteners. When coating configurations such as bolts, material shall be applied from multiple directions to assure complete coverage.

K. Alternating Coats: Provide at least two shade difference between coats. The finish coat shall have sufficient hiding power to cover intermediate coat color. Visible detection of the underlining coat will not be acceptable.

L. Recoat Times: Each coating shall only be applied after the previous coat has been allowed to dry as required by the manufacturer's written instructions, but as soon as possible to minimize the length of time that the coating is exposed to dust and contamination. Coatings shall not be allowed to remain exposed for longer than the manufacturer’s written instructions prior to overcoating. If a coat exceeds the manufacturer’s maximum recoat times for any reason, the coating shall be removed and

replaced. As an alternative, the coating manufacturer can provide written instructions for specialized preparation (e.g., scarifying the surface) to properly prepare the surface to receive the next coat. The specialized steps can be undertaken only if acceptable to ENGINEER in writing. The specialized cleaning or removal and replacement of the coatings shall be performed at no additional cost to OWNER.

M. Surface Cleanliness Between Coats: The surface of each coat shall be thoroughly cleaned prior to the application of the next to remove dirt, dust, and other interference material. Particular attention shall be paid to the removal of detrimental residue from surfaces such as corners and pockets. Surfaces shall be cleaned by brushing, vacuuming, or blowing down with compressed air. If the coatings are slightly tacky, methods such as vacuuming shall not be used. If grease or oil has become deposited on the surface of any of the applied coats, the contaminants shall be removed by solvent cleaning in accordance with SSPC-SP-1 prior to the application of the next coat.

N. Stripe Coating: Surfaces identified to receive a stripe coat shall be applied to all edges, crevices, and irregular surface configurations such as bolts. The stripe coat shall be applied after the prime coat has cured sufficiently as identified in the manufacturer's literature. The strip coat shall be worked in by brush and allow it to dry sufficiently prior to the application of the intermediate or final coat.

O. Nonskid: Surfaces identified to receive a nonskid finish shall receive a 0.75-1.0 pounds of silica sand sprinkled on to the wet surface of the intermediate coat. After allowing to dry without backrolling, sweep off any loose grit.

P. Wet Film Thickness: A wet film thickness gage shall be used in accordance with ASTM D 4414 to verify the thickness of each coat at the time of application. The thickness of each coat shall be strictly controlled to assure that the minimums necessary to achieve complete coverage are applied. Frequent measurement of wet film thickness is required to assure that proper coating thickness is being applied.

Q. Dry Film Thickness: The dry film thickness objectives for the project are indicated in the Coating Schedule. The thickness of the existing coating must be accounted for when measuring the thickness of the newly applied coats. Coating thickness shall be determined by the use of a properly calibrated "Nordson-Mikrotest" (or equal) dry mil thickness gauge or other measuring instrument determined to be appropriate by ENGINEER. Measurements shall be made in accordance with SSPC PA-2.

R. Coating Adhesion: All applied coats shall be well adhered to each other and to the substrate. If the application of any coat causes lifting of an underlying coat, or there is poor adhesion between coats or to the substrate, the coating shall be removed in the affected area and the material reapplied. If the adhesion of the system is suspect, adhesion tests shall be conducted in accordance with ASTM D 3359, ASTM D 4541 or ASTM D 6677 as indicated by ENGINEER, and all test area repaired. The acceptance criteria for the testing will be established by the coating manufacturer and ENGINEER.

S. Destructive Testing: If there are questions regarding the nondestructive measurements of coating thickness, a Tooke Gage will be used when authorized by ENGINEER.

Measurements shall be made in accordance with ASTM D 4138. Areas damaged by the testing shall be marked and repaired, whether created by ENGINEER or CONTRACTOR.

3.10 HOLIDAY TESTING

A. Surfaces identified to receive holiday testing shall be tested by the CONTRACTOR in the presence of the ENGINEER with a wet-sponge, low-voltage holiday detector after the coating system has cured. The sponge shall be kept saturated with an electrolyte (5% sodium chloride) and a surfactant (2% household detergent). During testing the wet sponge shall be kept in continuous contact with the painted surface. Locations where holidays are detected shall be marked for repair and retested after repair work has been completed. Holiday testing shall be performed in accordance with SSPC SPO-188.

3.11 REPAIR OF DAMAGE AND UNACCEPTABLE COATINGS

A. Surface Preparation of Localized Areas: For the repair localized damage, corrosion, and unacceptable coatings, the surface shall be prepared by solvent cleaning in accordance with SSPC-SP-1 using a solvent that is acceptable to the paint manufacturer. If the damage does not extent to the substrate, the area shall be prepared by power tool cleaning to remove all loose material in accordance with SSPC-SP-1 or SP-3. If the damage extends to the substrate, the affected areas shall be prepared in accordance with SSPC-SP-11.

B. Feathering of Repair Areas: CONTRACTOR shall feather sand the existing coating surrounding each repair location. A distance of one to two inches to shall be feather sanded to provide a smooth, tapered transition into the existing intact coating. The edges of coating around the periphery of the repair areas shall be verified that they are tight and intact by probing with a dull putty knife in accordance with the requirements of SSPC-SP-3. The existing coating in the feathered area shall be roughened to assure proper adhesion of the repair coats.

C. Coating Application in Repair Areas: When the bare substrate is exposed in the repair area, all coats of the system shall be applied to the specified thickness. When the damage does not extend to the bare substrate, only the damaged coat(s) are to be reapplied. The thickness of the system in overlap areas shall be maintained within the specified total thickness tolerances. When, in the judgment of ENGINEER, the finish coat repair has a spotted appearance, a cosmetic coat of finish shall be applied over the spot areas and adjacent surfaces to blend the repair area into the surrounding coating.

3.12 MATERIAL SAFETY DATA SHEETS

A. Material Safety Data Sheets (MSDS) shall be maintained at the job site for each chemical product on the job site, including but not limited to coatings, thinners, solvents, cleaning agents, abrasives, welding materials, and flexible sealant material.

B. CONTRACTOR and OWNER shall exchange MSDS of any hazardous chemicals that are or will be stored at the Project site. CONTRACTOR and OWNER shall each appoint an individual who shall be responsible for overseeing the proper exchange of information regarding toxic chemicals, potential hazards, safe procedures, and proper protective

equipment, etc. It is anticipated that OWNER will not have materials requiring MSDS on site during the work-in-process.

3.13 HOUSEKEEPING AND WASTE DISPOSAL

A. The accumulation of empty paint cans, combustibles, and other debris is unacceptable. Waste chemical solutions, oily rags, and waste shall removed from the site daily.

B. All paint drips and splashes shall be removed from surfaces not intended to be painted. Removal shall be by proper methods of washing and scraping, using care not to scratch or otherwise damage finished surfaces.

C. CONTRACTOR shall handle, store, transport, and dispose of all hazardous and nonhazardous project waste in strict accordance with Federal and State regulations.

3.14 SCHEDULE OF COLORS

A. All colors shall be designated by the OWNER during shop drawing review. The CONTRACTOR shall submit color samples to the ENGINEER as specified in Article 1.07. The CONTRACTOR shall submit suitable samples of all colors (including custom colors as may be required) and finishes for the surfaces to be painted, or on portable surfaces when required by the ENGINEER. The ENGINEER shall decide upon the choice of colors and other finishes when alternates exist. No variation shall be made in colors without the OWNERS approval. Color names and/or numbers shall be identified according to the appropriate color chart issued by the manufacturer of the particular product in question.

3.15 COLOR CODING AND LETTERING OF PIPING

A. Pipe color coding and lettering are specified in Section 15030 – Piping and Equipment Identification Systems.

3.16 ANSI AND OSHA SAFETY COLORS

A. Items specified in the following subsections shall be safety color coated as specified. ANSI colors shall conform with (OSHA) ANSI Z53.1 and latest revisions. Materials shall be compatible with the system specified for the equipment, concrete, etc. Where a coating system is not specified and safety colors are required, the items shall be coated with a primer and two coats of an industrial enamel.

B. Red: Items listed in ANSI Z53.1, Section 2.1 shall be painted ANSI Red. In general, these items shall include fire protection equipment and apparatus; wall mounted breathing apparatus, danger signs and locations; and stop bars, buttons or switches. In addition, all hose valves and riser pipes, fire protection piping and sprinkler systems, and electrical stop switches shall be painted ANSI Red.

C. Orange: Items listed in ANSI Z53.1, Section 2.2 shall be painted ANSI Orange. ANSI Orange shall be used as a basic color for designating dangerous parts of machines or energized equipment which may cut, crush, shock, or otherwise injure and to emphasize

such hazards when enclosure doors are open or when gear belt or other guards around moving equipment are open or removed, exposing unguarded hazards. In addition, moving machinery having a linear or peripheral speed in excess of 10 feet per minute, which is either inadequately guarded due to physical problems or may be operated with the guard removed, rims or sprockets, gears, pulleys, etc.; crossheads of large engines and compressors; and flywheels shall be coated ANSI Orange.

D. Yellow: Items listed in ANSI Z53.1, Section 2.3 shall be painted ANSI Yellow. Yellow shall be the basic color for designating caution and for marking physical hazards such as striking against, stumbling, falling, tripping, and "caught in between". In addition, an 8-inch wide strip on the top and bottom tread of stairways shall be coated.

E. Green: Items listed in ANSI Z53.1, Section 2.4 shall be painted ANSI Green. Green shall be the basic color for designating safety and the location of first-aid equipment. In general, gas masks, first-aid kits, eye wash facilities, and safety deluge showers shall be coated with ANSI Green.

F. Blue: Blue shall be used for designating caution, limited to warning against the starting, the use of, or the movement of equipment under repair or being worked upon.

G. Purple: Items listed in ANSI Z53.1, Section 2.5 shall be painted ANSI Purple. In general, atomic sludge density meters shall be coated ANSI Purple.

3.17 CLEANING

A. CONTRACTOR shall protect at all times, in areas where painting is being done, floors, materials of other crafts, equipment, vehicles, fixtures, and finished surfaces adjacent to paint work. Before the start of painting work, all electrical wall plates, surface hardware, nameplates, gauge glasses, etc., shall be covered.

B. At completion of the work, remove all paint where spilled, splashed, splattered, sprayed or smeared on all surfaces, including glass, light fixtures, hardware, equipment, painted and unpainted surfaces.

C. Work areas shall be at all times kept free from accumulation of waste material and rubbish caused by the work. At the completion of the painting, all tools, equipment, rigging, scaffolding, surplus materials, and all rubbish shall be removed and the area left clean.

- END OF SECTION -

PROJECT NO. 12197

SECTION 11208 - SUMP PUMPS

PART 1 - GENERAL

1.01 THE REQUIREMENT

A. Furnish all labor, equipment, and materials for construction of sump pumping systems as shown on the Drawings and specified herein.

1.02 RELATED WORK SPECIFIED ELSEWHERE

A. Section 01300 – Submittals

B. Section 01600 – Materials and Equipment

C. Division 16 – Electrical

1.03 SUBMITTALS

A. Submit shop drawings, pump curves and manufacturer's product literature as specified under Section 01300 - Submittals.

PART 2 - PRODUCTS

2.01 SUMP PUMPS

A. Acceptable Manufacture: Zoeller Company, or equal.

B. Type: Completely submersible vertical centrifugal sump pumps.

C. Starting and Stopping Method: See the section in this specification titled, "CONDITIONS OF SERVICE" for a schedule that indicates the starting and stopping method for the pumps supplied.

1. When "manual:" starting and stopping is scheduled: Furnish and install a local hand switch to start and stop the sump pump. Local hand switch shall be motor rated switch with NEMA 4X 316 stainless steel enclosure.

2. When "float switch" starting and stopping is scheduled: The sump pump shall be furnished with an integral float switch to start and stop the sump pump. Cables between float switch and pump shall be prewired to the pump.

D. Power Cord: Twenty five (25) foot submersible power cord, cut to length and terminated in field. Provide appropriate plug for power receptacle (match existing conditions).

E. Electrical Data: The pump motor shall be designed for the following:

1. Voltage: 115 volt

2. Frequency: 60 Hertz.
3. Phase: 1
4. Maximum Amps: 10.4
5. Motor Horsepower: 0.5
6. Maximum Motor Speed: 3,350 RPM
7. Motors shall be furnished with integral starter and overload protection.

F. Pumps shall be capable of running dry without damage to components.

G. Conditions of Service:

Location	Manufacturer and Model	Starting and Stopping Method	No. Required	Min. Discharge Size (inches FNPT)	Capacity (GPM)	Total Dynamic Head (ft)
Hydrotreator 3 Influent Vault Sump	Zoeller Model 267, or equal	Float Switch	1	1.5”	85	10
Hydrotreator 4 Influent Vault Sump	Zoeller Model 267, or equal	Float Switch	1	1.5”	85	10

2.02 OIL SMART CONTROLLER

A. Not used.

PART 3 -- EXECUTION

3.01 INSTALLATION

A. Installation shall be in accordance with the manufacturer's instructions.

- END OF SECTION -

PROJECT NO. 12197

SECTION 15000 - PIPING, GENERAL

PART 1 -- GENERAL

1.01 THE REQUIREMENT

A. The Contractor shall furnish and install all piping systems shown and specified, in accordance with the requirements of the Contract Documents. Each system shall be complete with all necessary fittings, hangers, supports, anchors, expansion joints, flexible connectors, valves, accessories, lining and coating, testing, disinfection, excavation, and backfill, to provide a functional installation.

1.02 RELATED WORK SPECIFIED ELSEWHERE

A. Section 01300 – Submittals

B. Section 09900 – Painting

C. Section 15995 – Pipeline Testing and Disinfection

1.03 REFERENCE SPECIFICATIONS, CODES AND STANDARDS

A. Commercial Standards

1.	ANSI B16.1	Cast Iron Pipe Flanges and Flanged Fittings, Class 125.
2.	ANSI B16.5	Pipe Flanges and Flanged Fittings, Steel Nickel Alloy and other Special Alloys.
3.	ANSI/AWS D1.1	Structural Welding Code.
4.	ASME B31.3	Process Piping Code for Pressure Piping
5.	ASTM A 307	Standard Specifications for Carbon Steel Bolts, Studs and Threaded Rod 6000 psi Tensile Strength.
6.	ASTM A 325	Standard Specifications for Structural Bolts, Steel, Heat Treated, 120/105 ksi Minimum Tensile Strength.
7.	ASTM D 792	Test Methods for Specific Gravity and Density of Plastics by Displacement.

1.04 CONTRACTOR SUBMITTALS

A. The Contractor shall submit complete shop drawings and certificates, test reports, affidavits of compliance, of all piping systems, in accordance with the requirements in Section 01300 – Submittals, and as specified in the individual piping sections.

B. Each shop drawing submittal shall be complete in all aspects incorporating all information and data listed herein and all additional information required to evaluate the proposed piping material's compliance with the Contract Documents. Partial or incomplete submissions will be returned to the Contractor without review.

C. Data to be submitted shall include, but not be limited to:

1. Catalog Data consisting of specifications, illustrations, and a parts schedule that identifies the materials to be used for the various piping components and accessories. The illustrations shall be in sufficient detail to serve as a guide for assembly and disassembly.

2. Complete layout and installation drawings with clearly marked dimensions and elevations. Piece numbers which are coordinated with the tabulated pipe layout schedule shall be clearly marked. Piping layout drawings shall indicate the following additional information; pipe supports, location, support type, hanger rod size, insert type and the load on the hanger in pounds.

3. Weight of all component parts; including pipe hanger load calculations signed and sealed by a registered professional engineer.

4. Tabulated pipe layout schedule which shall include the following information for all pipe and fittings, service, pipe size, working pressure, wall thickness and piece number.

D. Certifications

1. Prior to installation, the Contractor shall furnish an Affidavit of Compliance certified by the pipe manufacturer that the pipe, fittings and specials furnished under this Contract comply with all applicable provisions of AWWA and these specifications. No pipe or fittings will be accepted for use in the Work on this project until the affidavits have been submitted and accepted in accordance with Section 01300 – Submittals.

E. All expenses incurred in making samples for certification of tests shall be borne by the Contractor.

1.05 QUALITY ASSURANCE

A. Tests: Except where otherwise specified, all materials used in the manufacture of the pipe shall be tested in accordance with the applicable Specifications and Standards.

B. Welding Requirements: All welding procedures used to fabricate pipe shall be prequalified under the provisions of ANSI/AWS D1.1. Welding procedures shall be required for, but not necessarily limited to, longitudinal and girth or spiral welds for pipe cylinders, spigot and bell ring attachments, reinforcing plates and ring flange welds, and plates for lug connections.

C. Welder Qualifications: All welding shall be done by skilled welders, welding operators, and tackers who have had adequate experience in the methods and materials to be used. Welders shall be qualified under the provisions of ANSI/AWS D1.1 by an independent local, acceptable testing agency not more than 12 months prior to commencing work. Machines and electrodes similar to those used in the Work shall be used in qualification tests. The Contractor shall furnish all material and bear the expense of qualifying welders.

1.06 MANUFACTURER'S SERVICE REPRESENTATIVE

A. Where the assistance of a manufacturer's service representative is advisable, in order to obtain correct pipe joints, supports, or special connections, the Contractor shall furnish such assistance at no additional cost to the Owner.

B. The Contractor shall retain Forterra Pressure Pipe to inspect the joint between the existing concrete pipe and the existing wall pipe to ensure that the proposed fabricated fitting spigot ring joint will match the joint in the existing concrete pipe.

1.07 MATERIAL DELIVERY, STORAGE, AND PROTECTION

A. All piping materials, fittings, valves, and accessories shall be delivered in a clean and undamaged condition and stored off the ground, to provide protection against oxidation caused by ground contact. All defective or damaged materials shall be replaced with new materials.

1.08 CLEANUP

A. After completion of the work, all remaining pipe cuttings, joining and wrapping materials, and other scattered debris, shall be removed from the site. The entire piping system shall be handed over in a clean and functional condition.

PART 2 -- PRODUCTS

2.01 GENERAL

A. All pipes, fittings, and appurtenances shall be installed in accordance with the requirements of the applicable Sections of Division 2 – Site Work and Division 15 – Mechanical and furnished as specified herein.

B. Pipe Supports

1. All pipes shall be adequately supported in accordance with the requirements of Section 15020 – Pipe Supports, and as shown.

C. Lining

1. All requirements pertaining to thickness, application, and curing of pipe lining, shall be in accordance with the requirements of the applicable Sections of Division 15 – Mechanical, unless otherwise specified.

D. Coating

1. All requirements pertaining to thickness, application, and curing of pipe coating, are in accordance with the requirements of the applicable Sections of Division 15 – Mechanical, unless otherwise specified. Pipes above ground or in structures shall be field-painted in accordance with Section entitled “Painting”.

E. Pressure Rating

1. All piping systems shall be designed for the rated working pressure, listed in the piping schedule.

2.02 PIPE FLANGES

A. Flanges

1. Cast or Ductile Iron flanges shall conform to either ANSI/AWWA C115/21.15 or ANSI B16.1 125-lb class. Flanges shall have flat faces and shall be attached with bolt holes straddling the vertical axis of the pipe unless otherwise shown. Attachment of the flanges to the pipe shall conform to the applicable requirements of ANSI/AWWA 115/21.15. Flanges for miscellaneous small pipes shall be in accordance with the standards specified for these pipes.

2. Forged steel flanges shall be ASTM A 181, Grade 1, slip on or welding neck, faced and drilled 125-lb flat faced, ANSI B16.5 Standard.

B. Blind Flanges

1. Blind flanges shall be in accordance with ANSI/AWWA C207, or with the standards for miscellaneous small pipes. All blind flanges for pipe sizes 12-inches and over shall be provided with lifting eyes in the form of welded or threaded eye bolts.

C. Flange Coating

1. All machined faces of metal blind flanges and pipe flanges shall be coated with a temporary rust-inhibitive coating to protect the metal until the installation is completed.

D. Flange Bolts

1. If studs are required, they shall be in accordance with ASTM A 307, Grade B, with heavy hex nuts. Machine bolts shall normally be used on all flanged connections and shall be in accordance with ASTM A 307, Grade B, with heavy hex nuts. If

studs are required, they shall extend through the nuts a minimum of 1/4-inch. All bolts and nuts shall conform to Section 05500 – Metal Fabrications.

2. For steel 125-lb flanges, bolts shall be ASTM A307, Grade A hex head bolts and ASTM A563, Grade A hex nuts.

3. Furnish and install new nuts and bolts for all existing pipe that is temporarily removed and reinstalled along with new nuts and bolts for all proposed piping.

E. Flange Gaskets

1. Gaskets for flanged joints shall be of materials as specified in piping sections. Blind flanges shall have gaskets covering the entire inside face of the blind flange and shall be cemented to the blind flange. Ring gaskets shall not be permitted.

2. Furnish and install new gaskets for all existing pipe that is temporarily removed and reinstalled along with new gaskets for all proposed piping.

F. Flange Gasket Suppliers shall be the following, or equal:

1. John Crane
2. Garlock

2.03 MECHANICAL COUPLINGS

A. Construction

1. Mechanical couplings shall be provided where shown on the Drawing, and shall be of similar material as the pipe, without pipe stop, and shall be of sizes to fit the pipe and fittings shown. The middle ring shall be not less than 1/4-inch in thickness and shall be either 5 or 7-inches long for standard steel couplings, and 16-inches long for long-sleeve couplings. The followers shall be single-piece contoured mill section welded and cold-expanded as required for the middle rings. They shall be of sufficient strength to accommodate the number of bolts necessary to obtain adequate gasket pressures without excessive rolling. The shape of the follower shall be of such design as to provide positive confinement of the gasket.

B. Gaskets

1. Gaskets for mechanical couplings shall be rubber-compound material that will not deteriorate from age or exposure to air under normal storage or use conditions. The rubber in the gasket shall meet the following specifications:

a. Color - Jet Black.

b. Surface - Nonblooming.

c. Durometer Hardness - 74 $\pm$ 5.

d. Tensile Strength - 1000 psi Minimum.

e. Elongation - 175 percent Minimum.

2. The gaskets shall be immune to attack by the material which is being transported.

C. Bolts, nuts and washers above-ground applications shall be ASTM A193, Grade B7. Bolts, nuts and washers for buried applications shall be 316 stainless steel.

D. Coatings: Couplings shall be shop primed with a primer compatible with the painting system specified in the Section entitled “Painting”.

E. Harnessing: Where harnesses are required for mechanical couplings, they shall be in accordance with the requirements shown on the Drawings.

F. Supplier shall be the following, or equal:

1. Smith-Blair, Style 411.
2. Dresser, Style 38.
3. Ford Meter Box Co., Inc., Style FC1 or FC3.

2.04 FLANGED ADAPTERS

A. Non-restrained flanged adapters shall be furnished as required and arranged as shown on the Drawings and described herein.

B. Pressure and services shall be the same as connected piping.

C. Flanged adapters shall be shop primed with a premium quality primer compatible with the paint system specified in Section 09900 – Painting.

D. Bolts and nuts shall be alloy steel, corrosion-resistant and prime coated.

E. 24-inch nominal diameter and less flanged adapters shall be as manufactured by Dresser Industries – Style 128, or equal.

F. Provide harnessing of flanged adapters where identified on the Drawings.

2.05 RESTRAINED FLANGED ADAPTERS

A. Restrained flanged adapters shall be Series 2100 MEGAFLANGE by EBAA Iron, or equal.

2.06 WATERTIGHT LINK SEALS

A. Application Location: Furnish watertight link type seals for all below ground piping that passes from the interior to the exterior of a building or structure. The sleeve and pipe

assembly shall be watertight, sealed at both ends with link seal as specified below. Additionally, furnish link seals at all other locations called for on the Contract Drawings.

B. Type: Interconnected synthetic rubber links shaped and sized to continuously fill annular space between pipe and wall sleeve opening.

C. Materials: Assemble interconnected rubber links with Type 316 stainless steel bolts, nuts, and pressure plates.

D. Sizing Criteria: Size modular mechanical seals according to manufacturer's instructions for the size of pipes shown to provide a watertight seal between pipe and wall sleeve opening.

E. Manufacturers and Products (or Equal):

1. Thunderline/LinkSeal, Div. Of PSI, Houston, TX; Link Seal;

2. Calpico, Inc., South San Francisco, California; Sealing Linx;

3. Advance Products and Systems, Lafayette, Louisiana; Innerlynx.

2.07 UNIONS

A. For ductile iron, carbon steel, and grey cast iron pipes assembled with threaded joints and malleable iron fittings, unions shall conform to ANSI B16.39.

B. For copper piping, unions shall be cast copper alloy solder joint type, and shall conform to ANSI B16.18.

C. For PVC and CPVC piping, unions shall be socket weld type with Viton O-ring.

2.08 FABRICATED WALL FITTINGS

A. Furnish as illustrated on the Drawings.

B. Fabricated wall fittings connecting to concrete pressure pipe shall be manufactured by a concrete pressure pipe manufacturer retained by the CONTRACTOR.

C. The CONTRACTOR shall retain Forterra Pressure Pipe, or equal.

D. Forterra Pressure Pipe assisted the ENGINEER in the development of the fabricated wall fitting illustrated on the Drawings.

E. Forterra Pressure Pipe Contact:

Rick Deremiah, PE
Technical Resources Engineering Manager-North America
9018 Payne Farm Lane

PROJECT NO. 12197

Dayton, OH 45458
Office: 937-350-5039
Mobile: 937-479-4117
Rick.deremiah@forterrabp.com

2.08 SERVICE SADDLES

A. General: Furnish and install service saddles at all ductile iron pipe taps for the installation of instrumentation. Furnish saddles whether shown on the drawings or not. Furnish model indicated on the Drawings.

2.09 DISMANTLING JOINT

A. Furnish and install dismantling joints where shown on the Drawings. All dismantling joints shall be restrained type.

B. Gaskets: Gaskets shall be EPDM.

C. Nuts and Bolts: Manufacturer's standard materials.

D. Flange Class: Furnish dismantling joints suitable for AWWA Class D flanges unless indicated otherwise on the Drawings.

E. Factory Coatings: Fusion bonded epoxy, NSF 61 certified.

F. Manufacture, Or Equal:

1. Model DJ400 by Romac Industries (http://www.romac.com/);

2. Model 975 by Smith-Blair, Inc. (http://www.smith-blair.com/)

PART 3 -- EXECUTION

3.01 GENERAL

A. The Contractor shall furnish all labor, tools, materials, and equipment necessary for installation and jointing of the pipe. All piping shall be installed in accordance with the Drawings in a neat workmanlike manner and shall be set for accurate line and elevation. All piping shall be thoroughly cleaned before installation, and care shall be taken to keep the piping clean throughout the installation.

B. Before setting wall sleeves, pipes, castings and pipes to be cast in place, the Contractor shall check the Drawings and equipment manufacturer's drawings which may have a direct bearing on the pipe locations. The Contractor shall be responsible for the proper location of the pipes and appurtenances during the construction of and renovation of the tanks and structures.

C. Piping shall be attached to pumps, valves, equipment, etc., in accordance with the respective manufacturers' recommendations. This includes the use of flexible connectors as required.

D. For piping assembled with threaded, solvent cemented, welded or soldered joints, liberal use of unions shall be made. Unions shall be provided close to main pieces of equipment and in branch lines to permit ready dismantling of piping without disturbing main pipe lines or adjacent branch lines. A minimum of one union per straight run of pipe between fitting and/or valves with multiple lengths of pipe shall be used.

E. All changes in directions or elevations shall be made with fittings, unless otherwise shown.

3.02 SHIPPING, HANDLING AND STORAGE

A. Special care in handling shall be exercised during delivery, distribution and storage of pipe to avoid damage and setting up stresses. Damaged pipe will be rejected and shall be replaced at the Contractor's expense. Pipe and specials stored prior to use shall be stored in such a manner as to keep the interior free from dirt and foreign matter.

B. No pipe shall be dropped from cars or trucks to the ground. All pipe shall be carefully lowered to the ground by mechanical means. In shipping, pipe and fittings shall be blocked in such manner as to prevent damage to castings or lining. Any broken or chipped lining shall be carefully patched. Where it is impossible to repair broken or damaged lining in pipe because of its size, the pipe shall be rejected as unfit for use.

C. All mechanical joint pipe shall be laid with 1/8-inch space between the spigot and shoulder of pocket.

3.03 LAYING PIPE

A. Proper and suitable tools and appliances for the safe convenient handling and laying of pipe shall be used and shall, in general, agree with manufacturer's recommendations. At the time of laying, the pipe shall be examined carefully for defects, and should any pipe be discovered to be defective after being laid, it shall be removed and replaced with sound pipe by the Contractor at his expense.

B. The Contractor shall perform all earthwork including excavation, backfill, bedding, compaction, sheeting, shoring and bracing, dewatering and grading in accordance with Section 02222 – Excavation and Backfill for Utilities.

C. Upon satisfactory excavation of the pipe trench and completion of the pipe bedding, a continuous trough for the pipe barrel and recesses for the pipe bells, or couplings, shall be excavated by hand digging. When the pipe is laid in the prepared trench, true to line and grade, the pipe barrel shall receive continuous, uniform support and no pressure shall be exerted on the pipe joints from the trench bottom.

D. All piping 3-inches and larger shall be provided with two 4-foot-lengths of pipe for the first two joints outside a building or tank wall unless a greater number of joints is shown on the Drawings.

E. Pipe shall be installed in accordance with the manufacturer's recommendation. Before being lowered into the trench, the pipes and accessories shall be carefully examined and the interior of the pipes shall be thoroughly cleaned of all foreign matter and other acceptable methods. At the close of each work day and during suspension of work for any reason at any time, a suitable stopper shall be placed in the end of the pipe last laid to prevent mud or other foreign material from entering the pipe.

F. Lines shall be laid straight and depth of cover shall be maintained uniform with respect to finish grade, whether grading is completed or proposed at time of pipe installation. Where a grade or slope is shown on the Drawings, the Contractor shall use laser based surveying instruments to maintain alignment and grade. At least one elevation shot shall be taken on each length of pipe and recorded. No abrupt changes in direction or grade will be allowed.

G. After pipe has been laid, inspected and found satisfactory, sufficient backfill shall be placed along the pipe barrel to hold the pipe securely in place during the conduction of the hydrostatic test. No backfill shall be placed over the joints until the hydrostatic tests is satisfactorily completed, leaving the joints exposed to view for the detection of visible leaks. Upon satisfactory completion of the hydrostatic test, backfilling of the trench shall be completed. Pipe trenches may be backfilled prior to hydrostatic testing subject to the permission of the Engineer.

H. All underground piping and fittings shall use restrained joints.

3.04 FLANGED JOINTS

A. Flanged joints shall be made up with full face gaskets as specified in the piping paragraphs. Flange faces shall have a uniform bearing on the gaskets. Flanges shall be drawn together uniformly until the joint is tight. No washers shall be permitted for the bolt and nut assemblies. The length of the bolts shall be uniform and in accordance with the standards specified herein. The bolt's maximum projection beyond the end of the nut shall be 0.25-inch. In addition, the bolt shall not fall short of the end of the nut. All buried flanges shall be installed with Type 316 SS nuts, bolts and hardware.

3.05 WELDED JOINTS

A. Welded joints shall be shop fabricated in accordance with the standards and specifications contained herein.

B. Field welding will be permitted for black carbon steel pipe where it can be demonstrated that the interior of the pipe can be satisfactorily lined and inspected. Welding in the field shall be performed only when requested on the shop drawings and accepted by the Owner and Engineer in writing as specified herein.

C. All welding shall be performed in accordance with ASME B31.3 and AWWA C 206 except as modified or supplemented herein. All welders shall be AWS certified in accordance with AWWA C206, and ASME B31.3 requirements.

D. Pipe and fittings with wall thicknesses of 3/16-inch and larger shall have ends beveled for welding. Bevels shall be 30 degrees with a maximum of 37-1/2 degrees. The abutting pipe ends shall be separated before welding to permit complete fusion to the inside wall of the pipe without overlapping. Welding shall be continuous around the joint and shall be completed without interruption. Welds shall be of the single vee butt type, of sound weld metal thoroughly fused into the ends of the pipe and into the bottom of the vee. Welds shall be free from cold spots, pin-holes, oxide inclusions, burrs, snags, rough projections or other defects.

E. Filler metal for welding shall be of the same composition as the base metal. All welding of steel pipe flanges shall be in accordance with requirements of AWWA C207 and ASME B31.3.

F. Field repairs of cement mortar lining welded joints shall be made in accordance with AWWA C205 or AWWA C602.

G. Field welds shall be "fixed position" type.

3.06 THREADED JOINTS

A. All threads shall be clean, machine cut and all pipe shall be reamed before erection. Taps and dies shall be cleaned, sharpened and in good condition. All threaded joints shall be made tight with teflon tape.

B. After having been set up, a joint shall not be backed off unless the joint is broken, the threads cleaned and new tape is applied.

3.07 SOLVENT CEMENTED JOINTS

A. Joints shall be made up in accordance with ASTM D 2855 and the manufacturers' recommendations. The Contractor is advised to handle the solvent cements in accordance with ASTM F 402.

3.08 PIPING SCHEDULE

A. This section includes schedule of piping specified in other sections of Division 15 - Mechanical.

B. The following abbreviations are used in the schedule:

1. Material

304SS - 304L Stainless Steel (welded joints)
316SS - 316 Stainless Steel (nonwelded joints) or

316L Stainless Steel – low carbon (welded joints)
Brass - Red Brass Pipe
BSP - Black Steel Pipe
CMP - Corrugated Metal Pipe
CU - Copper
CI - Cast Iron
DI - Ductile Iron
CPVC - Chlorinated Polyvinyl Chloride
PVC - Polyvinyl chloride
CSP - Carbon Steel Pipe
HDPE - High Density Polyethylene
Kyn - Kynar

2. Wall Thickness

CL - Class
DR - Diameter Ratio
Sch - Schedule
SDR - Standard Diameter Ratio

3. Joint Type

Grvd - Grooved
Flg - Flanged
PO - Push on Joint
RJ - Restrained Joint
MJ - Mechanical Joint
SW - Solvent Welded
SOL - Soldered
Thd - Threaded
Wld - Welded
Comp - Compression Fitting
FW - Fusion Welded

4. Fitting Type

304SS - 304L Stainless Steel (Welded joints)
316SS - 316 Stainless Steel (nonwelded joints) or
316L Stainless Steel – low carbon (welded joints)
Brass - Red Brass
BS - Black Steel
CU - Copper
CI - Cast Iron
DI - Ductile Iron
CPVC - Chlorinated Polyvinyl Chloride
PVC - Polyvinyl chloride
CSP - Carbon Steel Pipe
Mol - Molded HDPE

Kyn - Kynar
Gal - Galvanized

5. Interior Surface Protection

AC - Asphalt Coated
ACCL - Asphalt Coated Cement Lined
PE - Polyethylene Lined
CML - Cement Mortar Lined
EL - Epoxy Lined

6. Exterior Surface Protective Coating

AC - Asphalt Coated
P - Painted
Gal - Galvanized

PIPING SCHEDULE

Service	Nominal Pipe Diameter (inches)	Material	Thickness Class or Schedule	Working Press (PSIG)	Type of Joints	Type of Fittings	Protective Coating		Remarks
							Interior	Exterior	
HYDROTREATOR INFLUENT VAULT FABRICATED WALL FITTING	All	Steel ASTM A53 Grade B or ASTM A139 Grade B	As Indicated on the Drawings	150	As Indicated on the Drawings	Custom Made	EL	P	Field welding shall not be allowed.
HYDROTREATOR INFLUENT VAULT INFLUENT PIPING	All	DI	Note 1	150	Flg and Plain End as indicated on the Drawings	DI	ACCL	P	
SAMPLE PIPING	6 inch and smaller	Type K Hard CU	--	150	SOL	Cu	--	--	Solder shall be lead free
SLUDGE AGITATOR PUMP SUCTION	All	DI	Note 1	150	Flg	DI	ACCL	P	
SUMP PUMP DISCHARGE	All	PVC	Sch 80	100	SW	PVC	--	P	

Note 1: Refer to Section titled “Ductile Iron Pipe” for wall thickness.

- END OF SECTION -

PROJECT NO. 12197

SECTION 15006 - DUCTILE IRON PIPE

PART 1 -- GENERAL

1.01 WORK INCLUDED

A. The Contractor shall furnish and install ductile iron pipe and all appurtenant Work, complete in place, all in accordance with the requirements of the Contract Documents.

1.02 RELATED WORK SPECIFIED ELSEWHERE

A. Section 01600 - Materials and Equipment

B. Section 01300 - Submittals

C. Section 09900 - Painting

D. Section 15000 - Piping, General

1.03 REFERENCED SPECIFICATIONS, CODES, AND STANDARDS

A. Commercial Standards:

ANSI/AWWA C104/A21.4	Cement Mortar Lining for Ductile Iron Pipe and Fittings for Water
ANSI/AWWA C110/A21.10	Ductile-iron and Gray-Iron Fittings 3-in. Through 60-in. for Water and Other Liquids
ANSI/AWWA C111/A21.11	Rubber-Gasket Joints for Ductile-Iron and Gray-Iron Pressure Pipe and Fittings
ANSI/AWWA C150/A21.50	Thickness design of ductile iron pipe
ANSI/AWWA C151/A21.51	Ductile-iron Pipe, Centrifugally Cast in Metal Molds or Sand-Lined Molds, for Water or Other Liquids
ANSI/AWWA C600	Installation of Ductile-Iron Water Mains and Appurtenances

1.04 SUBMITTALS

A. Shop Drawings: The Contractor shall submit Shop Drawings of pipe and fittings in accordance with the requirements set forth in the Sections entitled – “Piping, General” and “Submittals”.

B. Contractor shall submit certification that all materials coming in contact with potable water comply with the requirements of NSF 61.

1.05 SCHEDULE OF PIPING MATERIALS

A. A schedule of piping materials is included in the Section entitled “Piping, General”. The

schedule indicates service, nominal pipe size, material, wall thickness, joint type, working pressure, restraint design pressure, test pressure, coatings and linings.

PART 2 -- PRODUCTS

2.01 GENERAL

A. Pipe shall be centrifugally cast in metal molds or sand lined molds in accordance with ANSI A21.51 (AWWA C151) of grade 60-42-10 ductile iron. The above standard covers ductile iron pipe with nominal pipe sizes from three inches up to and including sixty-four inches in diameter. Working pressure shall be as specified herein, unless higher pressure is indicated on the Piping Schedule in Section 15000 – Piping, General.

B. Wall Thickness

1. Flanged Pipe: Pipe wall thickness of threaded pipe for a flanged pipe end shall be minimum special thickness Class 53 from 4-inch to 54-inch and/or minimum pressure Class 350 for 60-inch to 64-inch diameter pipe in accordance with AWWA C115.

C. Joints

1. Ductile iron pipe above grade and within vaults shall be flanged.

2. All pipe and fittings below grade shall be restrained joint type.

3. Mechanical and push-on type joints shall be in accordance with ANSI A21.11 (AWWA C111).

4. Flanges for flanged pipe shall be in accordance with ANSI A21.15 (AWWA C115), shall be ductile iron, shall be rated at 250 psi maximum working pressure, and shall be similar to flange Class 125 per ANSI B16.1. Where shown on the Drawings, pipe and fittings shall be furnished with flanges similar to flange Class 250 per ANSI B16.1. Fittings shall be provided with flanges having a bolt circle and bolt pattern the same as the adjacent pipe and/or mechanical devices.

5. Bolts: hot dip galvanized carbon steel bolts and nuts.

6. No raised face flanges shall be used. The raised faces shall be milled flat.

7. Gasket Material: Gaskets shall be EPDM.

D. Restrained Joints

1. All ductile iron pipe and fittings below grade shall be restrained joint.

2. Manufactured Proprietary Restrained Joint Piping and Fittings: Restrained joint pipe and fittings shall be Flex-Ring or Lok-Ring type as manufactured by American Cast Iron Pipe, TR Flex as manufactured by U.S. Pipe, or equal.

3. Restrained Mechanical Joint Fittings: All mechanical joint fittings, valves and appurtenances shall be restrained as described herein. The restraint rings shall be

manufactured of ductile iron conforming to ASTM A536 and incorporate a plurality of individually-actuating gripping surfaces to grip the pipe. The restraint device shall be coated in MEGA-BOND Restraint Coating System. The restraint system shall consist of two series 1100 MEGALUGS mechanical joint restraint follower glands with the second follower gland having the mechanical joint lip removed at the factory to seat properly behind the first. The restraint system shall have a sufficient number of fastening bolts to connect the rings to the mechanical joint. Torque limiting twist off nuts shall be used to ensure proper actuation of the restraining wedges. The restraint system shall have a minimum safety factor of 2 to 1. The restraint system shall be the Series 1100TDM Tandem MEGALUG Mechanical Joint Restraint manufactured by EBAA Iron, Inc., or equal.

4. Restraining System for Field Cut Piping: Use only in areas where adjoining to fixed points where laying length is determined in field and requires field cutting of the pipe. Ductile iron pipe bell restraint shall consist of a wedge action restraint ring on the spigot joined to a split ductile iron ring behind the bell. The restraint ring shall have individually actuated wedges that increase their resistance to pull-out as pressure or external forces increase. Torque limiting twist off nuts shall be used to ensure proper actuation of the restraining wedges. The restraint devices shall be coated using MEGA-BOND. The product shall be the Series 1700 Megalug restraint harness, manufactured by EBAA Iron, Inc., or equal.

E. Fittings

1. General: Fittings shall be manufactured in accordance with AWWA C110 or AWWA C153 or the manufacturer's standard.

3. Materials: Fittings shall be ductile iron.

4. Joints - General: Fittings shall be either flanged, mechanical joint or manufactured proprietary restrained joint type as indicated on the Drawings and specified herein.

5. Flanged Joint Fittings: Above ground fittings shall be flanged.

6. Manufacturer Proprietary Restrained Joint Fittings: All below ground fittings 30-inches in diameter and greater shall be manufacturer's proprietary restrained joint type.

7. Mechanical Joint Fittings: Underground ductile iron fittings 24-inches in diameter and less shall be mechanical joint type fittings.

F. Joint Pressure Ratings:

1. Flanged Joints: The flanges shall be rated for at least 250 psi working pressure.

2. Grooved Joints:

a) Fittings 4 to 36-inch Diameter with Grooved Joints: Maximum 250 psi working pressure.

b) Grooved Couplings 4 to 18-inch Diameter: Maximum 250 psi working pressure

c) Grooved Couplings 20 to 36-inch Diameter: Maximum 150 psi working pressure.

3. Restrained, Push-on and Mechanical Joints:

a) 4 to 24-inch Diameter: Maximum 350 psi working pressure.

b) 30 to 64-inch Diameter: Maximum 250 psi working pressure.

F. Pipe Lining and Coating General: Pipe linings and coatings shall be as follows.

4. Buried Service: The piping manufacturer's standard asphaltic coating shall be applied prior to shipment to the exterior wall of buried pipe and fittings in accordance with AWWA C151.

5. Above Ground Piping and Exposed Piping within Underground Vaults: A coating of rust inhibitive primer, compatible with the coating system specified in Section 09900 – Painting, shall be applied to the pipe exterior prior to shipment for piping that is above ground and exposed piping within vaults. Primer shall be compliant with NSF Standard 61.

6. Cement-Mortar Lining: Pipe and fittings shall be cement-lined and seal-coated in accordance with AWWA C104, Cement-Mortar Lining for Ductile-Iron Pipe and Fittings for Water.

F. Color Coding for Potable Water Mains:

1. Above Ground Piping and Piping within Vaults: Pipe used for potable water main applications in above ground service (or within vaults) shall be painted blue.

2. Below Ground Piping: Pipe less than 24-inches in diameter used for potable water main applications in below ground service shall have one continuous blue line painted along the top of the pipe. Pipe 24-inches in diameter and larger used for potable water main applications in below ground service shall have three continuous blue lines painted along the top and each side of the pipe; equally spaced 120 degrees apart around the pipe.

PART 3 -- EXECUTION

3.01 INSTALLATION

A. The Contractor shall perform all earthwork including excavation, backfill, bedding, compaction, sheeting, shoring and bracing, dewatering and grading in accordance with Division 2 - Sitework.

B. Unless otherwise directed, ductile iron pipe shall be laid with the bell ends facing upstream in the normal direction of flow and in the direction of laying.

C. Thrust restrained and mechanical joints shall be made in accordance with the manufacturer's standards except as otherwise specified herein. Joints between mechanical joint pipe and/or fittings shall be made in accordance with ANSI/AWWA

Standard C600, except that deflection at joints shall not exceed one-half of the manufacturer's recommended allowable deflection, or one-half of the allowable deflection specified in ANSI/AWWA C600, whichever is the lesser amount.

D. Before laying thrust restrained and mechanical joint pipe and fittings, all lumps, blisters and excess bituminous coating shall be removed from the bell and spigot ends. The outside of each spigot and the inside of each bell shall be wire brushed, and wiped clean and dry. The entire gasket groove area shall be free of bumps or any foreign matter which might displace the gasket. The cleaned spigot and gasket shall not be allowed to touch the trench walls or trench bottom at any time. Vegetable soap lubricant shall be applied in accordance with the pipe manufacturer's recommendations, to aid in making the joint. The workmen shall exercise caution to prevent damage to the gasket or the adherence of grease or particles of sand or dirt. Deflections shall only be made after the joint has been assembled.

E. Prior to making up flanged joints in ductile iron pipe and fittings, the back of each flange under the bolt heads and the face of each flange shall have all lumps, blisters and excess bituminous coating removed and shall be wire brushed and wiped clean and dry. Flange faces shall be kept clean and dry when making up the joint, and the workmen shall exercise caution to prevent damage to the gasket or the adherence of grease or particles of sand or dirt. Bolts and nuts shall be tightened by opposites in order to keep flange faces square with each other, and to insure that bolt stresses are evenly distributed.

F. Bolts and nuts in thrust restrained, mechanical and flanged joints shall be tightened in accordance with the recommendations of the pipe manufacturer for a leak-free joint. The mechanics shall exercise caution to prevent overstress. Torque wrenches shall be used until, in the opinion of the ENGINEER, the mechanics have become accustomed to the proper amount of pressure to apply on standard wrenches.

G. Cutting of the ductile iron pipe for inserting valves, fittings, etc., shall be done by the Contractor in a neat and workmanlike manner without damage to the pipe, the lining, or the coating. Pipe 16 inches and larger in diameter shall be cut with a mechanical pipe saw. After cutting the pipe, the plain end shall be beveled with a heavy file or grinder to remove all sharp edges.

H. Areas of loose or damaged lining associated with field cutting shall be repaired or replaced as recommended by the pipe manufacturer and required by the ENGINEER. Repair methods shall be as recommended by the manufacturer and shall be submitted to the ENGINEER for review.

I. Any work within the pipe shall be performed with care to prevent damage to the lining. No cable, lifting arms or other devices shall be inserted into the pipe. All lifting, pulling or pushing mechanisms shall be applied to the exterior of the pipe barrel.

J. Homing the pipe shall be accomplished by the use of a hydraulic or mechanical pulling device, unless otherwise accepted by the ENGINEER. No pipe shall be driven or struck in order to seat it home.

K. Cleaning: Cleaning methods shall be acceptable to the ENGINEER, and must be sufficient to remove silt, rocks, or other debris which may have entered the pipeline during its installation and shall also follow the requirements of Section 15995, "Pipeline Testing and Disinfection".

- END OF SECTION -

PROJECT NO. 12197

SECTION 15009 - PVC PRESSURE PIPE

PART 1 -- GENERAL

1.01 THE REQUIREMENT

A. This Section includes materials, installation, and testing of polyvinyl chloride (PVC) pipe and fittings for use in process piping having a maximum operating pressure of 150 psi at a maximum operating temperature of 100 degrees Fahrenheit and a maximum operating pressure of 100 psi at a temperature of 120 degrees Fahrenheit.

1.02 RELATED WORK SPECIFIED ELSEWHERE

A. Piping, General

B. Pipeline Testing and Disinfection

1.03 REFERENCE SPECIFICATIONS, CODES, AND STANDARDS

A. Commercial Standards:

ASTM D 1784	Specification for Rigid Poly (Vinyl Chloride) (PVC) Compounds and Chlorinated Poly (Vinyl Chloride) (CPVC) Compounds.
ASTM D 2241	Specification for Poly (Vinyl Chloride) (PVC) Pressure-Rated Pipe (SDR-Series).
NSF 14	Plastic Piping System Components and Related Materials.
NSF 61	Drinking Water System Components – Health Effects

1.04 SUBMITTALS

A. Submit shop drawings in accordance with the Section titled “Submittals”.

PART 2 -- PRODUCTS

2.01 PIPE

A. General: All PVC pipe shall be continuously and permanently marked with the manufacturer's name, pipe size, and pressure rating in psi.

B. Smaller than 4-inches in Diameter: Pipe shall be Schedule 80, Type 1, Grade 1 (Class 12454B), conforming to ASTM D 1784 except as noted below.

C. 4-inches in Diameter and Larger: Not Used

D. Pipe to be used for potable water applications shall comply with the NSF International Standard No. 14 and Standard No. 61 and shall have markings on the pipe to indicate that it has been tested and is in compliance.

E. PVC pipe exposed to sunlight shall contain U.V. protection.

2.02 NIPPLES

A. Short nipples shall be the same as the PVC pipe.

2.03 FITTINGS

A. Socket type pipe fittings for Schedule 80 pipe shall conform to ASTM D2467.

2.04 FLANGES

A. PVC flanges shall be made of the same material as the pipe. Flanges shall match the dimensions of ANSI B16.5, Class 150, steel flanges. Flanges shall be flat face.

2.05 UNIONS

A. Union shall have socket-type ends, EPDM o-rings, and shall be Schedule 80. Material shall be Type 1, Grade 1 PVC, per ASTM D 1784.

2.06 JOINTS

A. Pipe and fittings joints shall be socket welded except where threaded and flanged joints are required to connect to unions, valves, and equipment.

B. Socket type joints shall be made up in accordance with ASTM D2855 with PVC solvent cement complying with ASTM D2564. Solvent cement shall be NSF listed for potable water.

PART 3 -- EXECUTION

3.01 GENERAL

A. Do not install PVC pipe when the temperature is below 40 F or above 90 F. Store loose pipes on racks with a minimum support spacing of 3 feet. Provide shade for pipe stored outdoors or installed outdoors until the pipe is filled with water.

B. Store fittings indoors in their original cartons.

C. Store solvent cement indoors or, if outdoors, shade from direct sunlight exposure.

D. The solvent cement manufacturer shall mark their cans with the date of manufacture. The solvent cement that is supplied shall be less than one year old from the date of manufacture.

E. Before installation, check pipe and fittings for cuts, scratches, gouges, buckling, kinking, or splitting on pipe ends. Remove any pipe section containing defects by cutting out the damaged section as a complete cylinder.

3.02 INSTALLATION

A. Do not drag PVC pipe over the ground, drop it onto the ground, or drop objects on it. Cut pipe ends square and remove all burrs, chips, and fillings before joining pipe or fittings. Bevel solvent welded pipe ends as recommended by the pipe manufacturer.

3.03 SOLVENT WELDED JOINTS

A. Prior to solvent welding, remove fittings and couplings from their cartons and expose them to the air for at least one hour to the same temperature conditions as the pipe.

B. Wipe away loose dirt and moisture from the ID and OD of the pipe end and the ID of the fitting before applying solvent cement. Do not apply solvent cement to wet surfaces.

C. Make up solvent welded joints per ASTM D 2855.

D. Allow at least eight hours of drying time (or as recommended by the manufacturer) before moving solvent welded joints or subjecting the joints to any internal or external loads or pressures.

3.04 INSTALLING UNIONS

A. Provide unions on exposed piping 3 inches and smaller as follows:

1. Provide a union at every change in direction (horizontal and vertical).

2. Provide a union 6 to 12 inches downstream of valves.

3. Provide a union every 40 feet in straight piping runs.

4. Near threaded connections to mechanical or piping equipment.

5. Where shown on the drawings.

3.10 FIELD ROUTED PIPING

A. When above ground PVC piping routing is not illustrated on the Drawings it shall be field routed with the assistance of the ENGINEER and OWNER. The piping shall be supported on walls and ceilings, unless otherwise shown on the Drawings or ordered by the ENGINEER, being kept clear of openings and positioned above “headroom” space. Where practical, such piping shall be run in neat clusters, plumb and level along walls, and parallel to overhead beams. The CONTRACTOR shall be responsible for design and furnishing all pipe supports for a complete and fully supported piping system.

- END OF SECTION -

PROJECT NO. 12197

SECTION 15014 - COPPER TUBING

PART 1 -- GENERAL

1.01 THE REQUIREMENT

A. Copper tubing and fittings up to 2-inches in diameter shown on the Drawings shall be furnished and installed as specified herein.

1.02 SUBMITTALS

A. Submit shop drawings in accordance with Section 01300.

B. Contractor shall submit certification that all materials coming in contact with potable water comply with the requirements of NSF 61.

C. Furnish documentation demonstrating that the solder complies with the requirements of NSF 61.

PART 2 – PRODUCTS

2.01 COPPER TUBING AND FITTINGS

A. Scope: This article applies to potable water piping where shown on the Drawings.

B. Materials:

1. Copper Tubing: The tubing shall be Type K. Tubing temper shall be the drawn tempered type (i.e., hard and rigid). Tubing material shall conform to ASTM B 88 (Standard Specification for Seamless Copper Water Tube) and NSF 61. Copper tubing shall be in 10 or 20 foot hard straight lengths. Copper tubing shall be by Mueller Industries, or equal.

2. Solder: Solder shall be lead free plumbing solder suitable for potable water applications. The solder shall contain tin, copper, and silver. Solder material shall conform to ASTM B 32 and NSF61. Solder shall be by Lenox, or Equal.

3. Threaded Joint Fittings: For above ground use only. ASME/ANSI B16.15 - Cast Bronze Threaded Fittings. The fittings shall be low lead and meet ASTM B-584 (alloy 87850) and NSF 61 Annex G standards. Certified for use in potable water applications.

4. Soldered Joint Fittings: For above or below ground use. ASME/ANSI B16.22 - Wrought Copper and Copper Alloy Solder Joint Pressure Fittings.

5. Flanged Joint Fittings: For above ground use only. ASME/ANSI B16.24 - Cast Copper Alloy Pipe Flanges and Flanged Fittings.

C. Joining Method:

1. Soldered Joints: Soldered joints are acceptable for buried or above ground piping.

2. Threaded Joints: Threaded joints are acceptable for above ground piping.

3. Flanged Joints: Flanged joints shall be allowed above ground only.

4. Flared Joints: Flared joints shall be made by a tool designed for that operation and then solder the two tubes together.

5. Joints Between Dissimilar Materials: Provide dielectric unions or flanges on all connections between dissimilar materials to prevent electrolysis or galvanic corrosive action.

2.02 DIELECTRIC UNIONS AND FLANGES

A. General: Furnish and install dielectric unions and flange unions wherever there is a need to prevent electrolysis or galvanic corrosive action such as when joining dissimilar metals in the piping and plumbing systems. Dielectric unions shall be supplied where needed whether shown on the Drawings or not.

B. Manufacturer:

1. Watts Regulator Co.;

2. Central Plastics Company (as supplied by Corrosion Control Products Company);

3. Or, Equal.

PART 3 -- EXECUTION

3.01 UNIONS

A. Provide unions on aboveground tubing 2 inches and smaller as follows:

1. Six to 12 inches downstream of valves.

2. Near threaded connections to mechanical equipment.

3. On both sides of threaded valves and other in-line instruments.

4. As required to allow installation of piping.

5. Where shown on the Drawings.

- END OF SECTION -

PROJECT NO. 12197

SECTION 15020 - PIPE SUPPORTS

PART 1 -- GENERAL

1.01 THE REQUIREMENT

A. The Contractor shall provide all tools, supplies, materials, equipment, and all labor necessary for the furnishing, construction, and installation of all pipe supports, hangers, guides, and anchors shown, specified, or required for a complete and operable piping system, in accordance with the requirements of the Contract Documents.

1.02 REFERENCE SPECIFICATIONS, CODES, AND STANDARDS

A. Commercial Standards:

ANSI / ASME B31.1	Power Piping
ANSI / ASME B31.3	Process Piping

1.03 SUBMITTALS

A. Shop Drawings: The Contractor shall furnish prior to fabrication or installation complete shop drawings of all pipe supports, hangers, anchors, and guides, as well as calculations for special supports and anchors, in accordance with Section 01300 entitled "Submittals".

PART 2 -- PRODUCTS

2.01 GENERAL REQUIREMENTS

A. The Contractor shall note that all pipe support locations are not shown on the Drawings and shall follow the Specifications herein in locating supports. Where deviations and modifications are required, they shall be made subject to review by the Engineer.

B. Code Compliance: All piping systems and pipe connections to equipment shall be properly supported, to prevent undue deflection, vibration, and stresses on piping, equipment, and structures. All supports and parts thereof shall conform to the requirements of ANSI/ASME B31.1 and ANSI / ASME B31.3, except as supplemented or modified by these Specifications. Supports for plumbing piping shall be in accordance with the latest edition of the applicable plumbing code, or local administration requirements.

C. All piping shall be rigidly supported from the building structure by approved hangers, inserts, or supports. No piping shall be supported from other piping or from metal stairs, ladders, and walkways unless specifically permitted by the Engineer.

D. Unless otherwise indicated on the Contract Drawings, piping supports shall consist of concrete piers or fabricated 316 Stainless Steel supports as specified below. Materials and workmanship shall be in full compliance with Division 3 - Concrete of these Specifications.

E. Supporting appurtenances shall be arranged to prevent undue stress on equipment to which piping is connected. Supporting appurtenances shall provide the desired pitch as specified or required for proper drainage of the piping. The pipe suspension shall prevent excessive stress, excessive variation in supporting force, and possible resonance with imposed vibration while the system is in operation. All valves and valve operators shall be rigidly supported independently of the piping. Vertical runs of pipe shall be supported independently of the connected horizontal runs. All vertical pipes shall be supported at each floor or at intervals of at least 10 feet by approved pipe collars, clamps, brackets or wall rests. Supporting appurtenances, when used with copper piping, shall be copper, bronze or bronze plated. All piping shall be supported independently of the equipment to which it is connected. All in line devices (flowmeters, etc.) shall be removable without the need for temporary supports for adjacent and connecting piping.

F. In general, the type of pipe supports to be used shall be as follows unless otherwise shown on the Drawings:

Height of Centerline of Pipe Above Floor	Type of Support
3 feet or less	Concrete Pier
Greater than 6 feet	Adjustable Pipe Saddle, Bracket Supports or Hangers

G. Wall bracket supports shall be used where shown for pipe to be installed adjacent to a wall. Where it is not feasible to install hanger supports, adjustable pipe saddle supports may be used upon review and acceptance by the Engineer. The Contractor shall install pipe supports in conformance with these Specifications unless otherwise shown on the Contract Drawings. Where deviations and modifications are required, they shall be made only with the permission of the Engineer. A detailed layout of pipe supports for each building shall be submitted to the Engineer for review prior to pipe fabrication or installation.

H. For all couplings, supports shall be placed on each side and as close to the coupling as possible.

I. Structural Members: Wherever possible, pipes shall be attached to structural members. Where it is necessary to frame structural members between existing members, such supplementary members shall be provided by the Contractor at no additional cost to the Owner. All supplementary members shall be in accordance with the requirements of the building code and the American Institute of Steel Construction. Stainless steel and non-metallic piping installed in tanks, channels or conduits shall be supported by hangers, hanger rods, hardware and inserts fabricated of Type 316 stainless steel.

J. Freestanding pipe connections to equipment shall be firmly attached to fabricated 316 stainless steel frames made of angles, channels, or I-beams anchored to the structure. Exterior, freestanding overhead piping shall be supported on fabricated 316 stainless steel pipe stands, consisting of pipe columns anchored to concrete footings, with horizontal,

welded steel angles and U-bolts or clamps, securing the pipes. All materials shall be Type 316 stainless steel.

K. Point Loads: Any meters, valves, heavy equipment, and other point loads on PVC, fiber glass, and other plastic pipes, shall be supported on both sides, according to manufacturer's recommendations to avoid undue pipe stresses and failures. To avoid point loads, all supports on plastic and fiber glass piping shall be equipped with extra wide pipe saddles or galvanized steel shields with minimum length equal to circumference of pipe.

L. Noise Reduction: To reduce transmission of noise in piping systems, all copper tubes in buildings and structures shall be wrapped with a 2-inch wide strip of rubber fabric or similar, suitable material, at each pipe support, bracket, clip, or hanger.

M. Where a specific pipe support is called for on the Drawings, this support shall be used as and where indicated for the specific application. In general, spacing of supports shall be as specified herein unless specifically modified by the Engineer.

N. All supports, saddles, bearing plates, and hangers, shall support by direct contact the pipe a minimum of 120 degrees around, except as specified herein.

O. Where continuous concrete inserts are used, the maximum concentrated load on the end two (2) inches of inserts, with laying lengths of eight (8) inches or longer, shall not be more than 50 percent of the maximum recommended loading of the channel. All pipe supports shall be positioned such that they will not interfere with the use of hoisting equipment, where provided.

P. Wherever expansion and contraction of piping is expected, a sufficient number of expansion loops or joints shall be provided, together with the necessary rolling or sliding supports, anchors, guides, pivots, and restraints. They shall permit the piping to expand and contract freely in directions away from the anchored points and shall be structurally suitable to withstand all loads imposed. Pipes subject to thermal expansion shall be installed perfectly aligned and concentrically guided. These piping support systems shall be submitted to the Engineer for review prior to erection and installation. The submittal shall show location of anchors, concentric pipe guides and expansion couplings (single or double).

2.02 316 STAINLESS STEEL CHANNEL SUPPORTS

A. Pipe supports shall be wall or slab mounted 1 5/8 X 1 5/8 UNISTRUT (or equal) 316 stainless steel channels with Type 316 stainless steel straps, and 316 stainless steel lock nuts. Supports shall be attached to walls and slabs by 3/8-inch diameter, 6-inch long Type 316 stainless steel anchor bolts with lock nuts. Bolt support spacing shall be maximum 12-inch O.C.

2.03 PIPE ROLLER SUPPORTS

A. The Contractor shall furnish and install self-lubricating roller supports where shown on the Contract Drawings and as specified herein. Roller supports shall be Anvil Figure No. 271 or equal. Assemblies shall include all directly connected or welded anchorage hardware.

B. Roller supports shall meet the loading requirements of the design and conforming to the details on the Drawings. The rollers shall have support section fabricated of the same material as is the pipe to be supported, a 316 series stainless steel slide plate, and a carbon steel base to which the Teflon is applied. The support plates at roller supports shall be stitch welded to stainless steel pipe at all roller support locations.

C. The roller supports shall be installed in the exact locations shown or indicated on the Contract Drawings, at required elevations, true to orientation and level, assuring that the correct half of each roller is in its proper position. The Contractor shall store the rollers to protect them from mechanical damage prior to installation, and shall protect the same during and after installation from contamination and damage due to placing of concrete and other materials. The Contractor shall clean the operation surfaces of rollers thoroughly before final assembly.

2.04 SPRING TYPE HANGERS

A. Spring-type pipe hangers shall be provided for piping subject to vibration or vertical expansion and contraction, such as engine exhausts and similar piping. All spring-type hangers shall be sized to the manufacturer's printed recommendations and the loading conditions encountered. Variable spring supports shall be provided with means to limit misalignment, buckling, eccentric loading, or to prevent overstressing of the spring, and with means to indicate at all times the compression of the spring. The support shall be designed for a maximum variation in supporting effort of 25 percent for the total travel resulting from thermal movement.

2.05 PIPE SUPPORT SPACING

A. The distance between supports for each size of pipe shall not exceed those listed in the attached schedule. However, if the pipe size to be supported is not listed in the schedule, the next smaller nominal pipe size spacing shall be used. In all cases, there shall be a minimum of one support per laying length of pipe on uninterrupted horizontal runs. This support shall be placed within one (1) foot of the joint. If the pipe manufacturer recommends a smaller spacing interval than specified herein, then the manufacturer's spacing shall be used.

B. The distance between supports shall not exceed that listed in the following schedule unless otherwise indicated on the Contract Drawings:

Nominal Pipe Size (in.)	Metallic Piping (ft.)	Plastic, Fiberglass and Copper Piping (ft.)
½	3	3

3/4 to 1-1/2	3	3
2 to 3	4	4
4	5	5
6 and larger	6	6

2.06 PIPE HANGERS AND HANGER RODS

A. Where pipe hangers are used, they shall be of the clevis or friction clamp type except where there is longitudinal movement due to temperature changes. Where longitudinal movement occurs, the adjustable yoke roller type hanger shall be used. See the hanger schedule below for location/type of hangers to be used. Pipe hangers shall be capable of supporting the pipe in all conditions of operation. They shall allow free expansion and contraction of the piping, and prevent excessive stress resulting from transferred weight being induced into the pipe or connected equipment.

B. All hangers shall have a means of vertical adjustment after erection. Hangers shall be designed so that they cannot become disengaged by any movement of the supported pipe. Hangers subject to shock, or thrust imposed by the actuation of safety valves, shall include hydraulic shock suppressors.

C. Hangers shall be designed so that they can not become disengaged by movements of the supported pipe. Lock nuts shall be used on all hangers. All piping systems shall be supported by means of hangers having an individual means of vertical adjustment for leveling of lines after piping is in place.

D. Spacing and arrangements shall conform to the requirements of Section 6, Chapter 1 of ANSI B31-1 code for pressure piping. Spacing indicated shall be the maximum spacing.

E. Hanger rods shall be subject to tensile loading only. At hanger locations where lateral or axial movement is anticipated, suitable linkage shall be provided to permit swing. Stainless steel hangers required in the pipe hanger schedule shall be supported by hanger rods, hardware and inserts fabricated of Type 316 stainless steel.

F. All other rods, hardware and inserts shall be fabricated of hot-dip galvanized steel. At hanger locations where lateral or axial movement is anticipated, suitable linkage shall be provided to permit such movement. Where horizontal pipe movement is greater than 1/2-inch, or where the hanger rod deflection from the vertical is greater than 4 degrees from the cold to the hot position of the pipe, the hanger rod and structural attachment shall be offset in such a manner that the rod is vertical in the hot position.

G. All concrete inserts and/or expansion bolts shall be capable of supporting the maximum working load of the rod which is attached to it.

H. Sheet metal insulation protector saddle shall be used for all hot water piping, refrigerant piping, etc.

I. A neoprene isolation pad shall be provided between galvanized clevis and stainless steel piping. For hot air applications, a Teflon pad shall be provided.

2.07 SADDLES

A. Pipe saddles shall be used to cradle horizontal piping when being supported from below except where expansion of pipe requires rollers. All saddles shall be capable of being adjusted after installation.

2.08 BASE ELBOWS, TEES AND CONCRETE PEDESTALS

A. Base elbows, tees and concrete pedestals shall be provided at the locations shown on the Drawings and as specified. All vertical runs of pipe shall be supported on a base elbow and/or concrete pedestal. After completion of curing of the concrete pedestal, the piping shall be adjusted to the proper grade.

2.09 HARNESSED PIPE SUPPORTS

A. Pipe harness straps shall be provided on concrete pedestal supports where shown on the Drawings and required by these Specifications.

B. Harness straps shall be 1/4-inch thick, 316 stainless steel and attached to the concrete pedestal supports by stainless steel anchors.

C. Unless otherwise indicated on the Contract Drawings, strap width shall be in accordance with the Table below:

Pipe Diameter	Strap Width
4 inches and below	2 inches
6 inches and above	3 inches

2.10 METAL FRAMING SYSTEMS

A. A metal framing system as manufactured by Unistrut, Globe-Strut or approved equal may be used for supporting the piping system. The metal framing system shall be designed and installed according to manufacturer's recommended procedure and shall be capable of supporting the piping system as specified herein.

B. Channel and fitting material: Type 316 stainless steel.

2.11 PLASTIC PIPE SUPPORTS

A. All pipe supports that will be used with plastic pipe shall be provided with a bearing plate where the width of hanger is less one-half (1/2) of the supported pipe's diameter. The bearing plate must provide bearing 180 degrees around and shall have a minimum laying length of ½ the pipe diameter or three (3) inches minimum. The bearing plates shall be rigid, corrosion resistant and not subject to long term plastic flow properties. To assure one

hundred (100) percent bearing, the pipe shall be seated on a filler. This material shall be compatible for use with the pipe. Clamps to be used with plastic pipe shall be fitted snug and shall not exert clamp pressure on the pipe.

2.12 THRUST RESTRAINT

A. Pipe anchors shall be spaced to divide pipe into sections. Anchors shall be located at valves, changes in direction of piping, and major branch connections. Anchors shall be of a type recommended by the pipe manufacturer and reviewed by the Engineer.

B. On all piping, where sleeve type couplings and flanged adapters are located near fittings or valves, tie rods shall span across the coupling as specified herein to restrain movements of the pipe along its axial direction. Such restraints can be deleted if both ends of the pipe are anchored in a concrete structure with no fitting or valve occurring within the span length, in the suction piping to a pump where the coupling is between the pump and valve, or when the water pressure measured at the crown of the pipe is less than five (5) feet.

C. All sleeve type couplings shall be harnessed except where noted. The harnessing shall be as shown on the drawings or as specified herein. Harnesses for steel pipe shall be in accordance with AWWA Manual M11 for the pipe size and pressure, working or test whichever is greater.

D. Harnesses for ductile iron pipe shall be tie rods spanning between adjacent flanges. Friction clamps shall not be permitted. The size and number of tie rods shall be the same as for steel pipe for the same pressure and pipe size.

E. Where the distance between adjacent flanges is in excess of ten (10) feet or where a harness can not be used, the pipe supports adjacent to the coupling shall restrain the piping preventing any linear or angular movement resulting in the pipe separating from the coupling or misalignment in the joint.

F. Where expansion joints are used, control units shall be provided. All tie rods and control units shall be installed in accordance with the manufacturer's recommended procedures.

G. Tie rods and associated hardware shall be Type 316 stainless steel.

H. In general, all valves and fittings shall be restrained in an approved manner such that the unbalanced force developed at them shall be supported independent of the piping system.

2.13 MANUFACTURED SUPPORTS

A. Stock Parts: Where not specifically shown or detailed, designs, generally accepted as exemplifying good engineering practice, using stock or production parts, shall be utilized wherever possible. Such parts shall be locally available, new, of best commercial quality, designed and rated for the intended purpose.

B. Suppliers, or equal:

1. Basic Engineers, Pittsburgh, PA;
2. Bergen-Paterson Corp., Boston, MA;
3. Elcen Metal Products Company, Franklin Park, IL;
4. Anvil International, Inc., Portsmouth, NH;
5. NPS Industries, Inc., Secaucus, NJ;
6. Unistrut Corp., Itasca, IL.

2.14 COATING

A. Galvanizing: All fabricated pipe supports, other than stainless steel or non-ferrous supports, shall be blast-cleaned after fabrication and hot-dip galvanized in accordance with ASTM A 123.

PART 3 -- EXECUTION

3.01 INSTALLATION

A. General: All pipe supports, hangers, brackets, anchors, guides, and inserts shall be fabricated and installed in accordance with the manufacturer's printed instructions and ANSI/ASME B31.1 and ANSI / ASME B31.3. All concrete inserts for pipe hangers and supports shall be coordinated with the formwork.

B. Appearance: Pipe supports and hangers shall be positioned in such a way as to produce an orderly, neat piping system. All hanger rods shall be vertical, without offsets. Hangers shall be adjusted to line up groups of pipes at the proper grade for drainage and venting, as close to ceilings or roofs as possible, without interference with other Work.

C. Pipe Support Spacing: The distance between supports for each size of pipe shall not exceed those specified in Article 2.05.

3.02 FABRICATION

A. Quality Control: Pipe hangers and supports shall be fabricated and installed by experienced welders and fitters, using the best welding procedures available. Welding shall conform with Section 05500 entitled “Metal Fabrications”. Fabricated supports shall be neat in appearance without sharp corners, burrs, and edges.

- END OF SECTION -

PROJECT NO. 12197

SECTION 15100 -VALVES AND APPURTENANCES

PART 1 -- GENERAL

1.01 SCOPE

A. Furnish and install, all valves complete with accessories, and special equipment as shown on the Drawings and specified herein.

1.02 GENERAL INFORMATION AND DESCRIPTION

A. The equipment covered by these specifications is intended to be standard equipment of proven performance as manufactured by reputable concerns. Equipment shall be designed, constructed and installed in accordance with the best practice of the trade, and shall operate satisfactorily when installed as shown on the Drawings.

1.03 SUBMITTALS

A. Each submittal shall be complete in all aspects incorporating all information and data listed herein and all additional information required to evaluate the proposed valve's or hydrant's compliance with the Documents. Partial or incomplete submissions shall be returned to the CONTRACTOR disapproved without review.

B. Data to be submitted shall include but not be limited to:

1. Catalog Data consisting of specifications, illustrations and a parts schedule that identifies the materials to be used for the various parts and accessories. The illustrations shall be in sufficient detail to serve as a guide for assembly and disassembly.

2. Complete assembly, and installation drawings with clearly marked dimensions. This information shall be in sufficient detail to serve as a guide for assembly and disassembly and for ordering parts.

3. Weight of all component parts and assembled weight.

4. Design calculations.

5. Listing of all lubricants required for the equipment with a minimum of two equivalent and compatible natural and/or synthetic lubricants produced by different manufacturers. The listing shall include the estimated quality of lubricant required for one year of operation.

6. Sample data sheet of equipment nameplate(s) including information contained thereon.

7. Spare parts list.

8. Special tools list.

1.04 OPERATION AND MAINTENANCE MANUALS

A. The CONTRACTOR shall submit operation and maintenance manual in accordance the procedures and requirements set forth in the General Conditions and Division 1.

PART 2 -- PRODUCTS

2.01 GENERAL

A. The valves, and accessories shall be in the quantity, quality, types and sizes as indicated on the Drawings and specified herein.

B. All valves shall have a minimum design pressure rating of 150 psi and capable of a test pressure of 300 psi. For service applications with pressures in excess of 150 psi, valves shall have a minimum pressure rating in excess of the service application working pressure. All above grade, interior valves with a nominal pipe size of 3 inches and larger shall have flanged ends unless otherwise noted. All above grade, interior valves less than 3 inch size shall be threaded ends. Buried service valves shall have mechanical joint pipe ends. Buried service valves shall be provided with AWWA operating nuts, extension stems and cast iron valve boxes. Extended valve stems, stem guides and operating nuts shall be provided as indicated or required.

C. All valves of one type shall be the product of one manufacturer.

D. Cast iron parts of valves shall meet the requirements of ASTM Designation A126, "Standard Specifications for Gray Iron Castings for Valves, Flanges and Pipe Fittings, Class 'B'". Flanged ends shall be flat-faced and have bolt circle and bolt patterns conforming to ANSI B16.1 Class 125 unless otherwise specified hereinafter. All castings shall be clean and sound, without defects of any kind and no plugging, welding or repairing of defects will be permitted. All bolt heads and nuts shall be hexagonal conforming to ANSI B18.2. Gaskets shall be full face and made of natural or synthetic elastomers in conformance with ANSI B16.21 suitable for the service characteristics especially chemical compatibility and temperature. Nonferrous alloys of various types shall be used for parts of valves as specified. Where no definite specification is given, the material shall be the recognized acceptable standard for that particular application.

E. All valves shall have applied to them the same coatings as the adjacent piping.

F. All valves which are dead ends for active pipelines shall be provided with blind flanges or plugs to prevent leakage.

G. Raised face flanges in conformance with ANSI B16.5 class 150 will not be acceptable. All raised faces shall be milled flat.

PART 3 -- EXECUTION

3.01 INSTALLATION

A. The procedures regarding unloading, inspection, storage and where applicable installation, described in the Appendix of AWWA C500 entitled "Installation, Operation and Maintenance of Gate Valves" shall be used for all valves.

B. All valves shall be manually opened and closed before installation to check their operation, and the interior of the valves shall be cleaned. Valves shall be placed in the positions shown on the Drawings. Joints shall be made as directed under the piping specifications.

C. Access: All valves shall be installed to provide easy access for operation, removal, and maintenance and to avoid conflicts between valve operators and structural members or handrails.

3.02 VALVE SUPPORTS

A. Valves shall be supported as integral components of the piping systems.

B. All horizontally mounted valve operators, manual, pneumatic or electric, whose weight exceeds 25 pounds shall be supported independently of the valve and piping system.

C. All vertically mounted valve operators, manual, pneumatic or electric, whose weight exceeds 100 pounds shall be supported independently of the valve and piping system.

D. Valve supports shall anchor the valves against an unbalanced force in either direction. The magnitude of the force shall be based on a pressure equal to twice the maximum working pressure with a maximum allowable stress of 1/2 of the support's yield strength.

- END OF SECTION -

PROJECT NO. 12197

SECTION 15109 – PLUG VALVES

PART 1 -- GENERAL

1.01 THE REQUIREMENT

A. The CONTRACTOR shall furnish and install plug valves, complete and operable, as shown and specified herein, including appurtenant and accessories, all in accordance with the requirements of the Contract Documents.

1.02 RELATED WORK SPECIFIED ELSEWHERE

A. Section 01300 – Submittals

B. Section 15100 - Valves and Appurtenances

PART 2 -- PRODUCTS

2.01 ECCENTRIC PLUG VALVES

A. Plug valves shall be of the non-lubricated, eccentric seating plug type with synthetic rubber-faced plugs. They shall have ports with a flow area not less than 70% of the connecting pipe area. Valves shall be designed for a working pressure of 175 psi for valves 12-inches and smaller and 150 psi for valves 14-inches and larger. All valves shall be provided with limit stops and rotate 90° from fully open to fully shut. The body and plug material shall be cast iron ASTM A126 Class B. Seats shall have a welded overlay of 90% pure nickel and machined to a smooth finish of not more than 16 micro-inch RMS roughness. Valves shall be suitable for use with potable water.

B. The shaft seal shall be either the bronze cartridge type with at least two O-Rings, monolithic V-Type, or pull down packing type. If monolithic V-Type or pull down packings are utilized, it shall be self-adjusting, self-compensating type. Plug valves with pull down packings shall be designed with an extension bonnet so that repacking can be done without removal of the actuator.

C. All buried valves shall have mechanical joint ends (unless otherwise shown), conforming to ANSI A21.11. (AWWA C 111), and shall be operated with a standard AWWA 2-inch square nut through a totally enclosed worm gear actuator. Valve boxes shall be installed with all buried plug valves and shall be as specified herein.

D. Unless otherwise shown, all exposed valves 4-inches in diameter and larger shall have flanged ends conforming to ANSI B16.1-125 pound standard with face-to-face dimensions of standard plug valves. Valves smaller than 4-inches in diameter shall have screwed ends, unless otherwise noted.

E. Valves 8-inches in diameter and larger shall be handwheel or floorstand operated where required or indicated on the Drawings through totally enclosed worm gear actuators,

unless otherwise specified or shown on the Drawings. Valves 6-inches in diameter and smaller shall have lever operators, unless otherwise specified or noted on the Drawings. Manual operators for plug valves mounted above 6 feet from the operating floor shall be equipped with worm gear chainwheel actuators.

F. The interior and exterior of the valve shall be factory coating with an NSF/ANSI 61 approved fusion bonded epoxy.

H. Manufacturers:

1. DeZurik Corporation

2. Pratt Valve

3. Or, Equal

PART 3 -- EXECUTION

3.01 INSTALLATION

A. All plug valves shall be installed in accordance with the manufacturer's published recommendations and the applicable provisions of section entitled "Valves and Appurtenances".

- END OF SECTION -

PROJECT NO. 12197

SECTION 15110 - BUTTERFLY VALVES

PART 1 -- GENERAL

1.01 THE REQUIREMENT

A. Furnish, install and test butterfly valves and appurtenances, complete and operable, in accordance with the Contract Documents.

1.02 SUBMITTALS

A. Submit shop drawings and Operation and Maintenance Manual all in accordance with sections entitled “Submittals”.

1.03 REFERENCE STANDARDS

A. ASME B16.1 Cast Iron Flanges and Flange Fitting

B. AWWA C504 Standard for Rubber Seated Butterfly Valves

PART 2 -- PRODUCTS

2.01 BUTTERFLY VALVES (AWWA)

A. General: Butterfly valves for water working pressures up to 150 psi shall conform to ANSI/AWWA C504 – Rubber Seated Butterfly Valves, subject to the following requirements. Valves shall be short-body class 150B flanged end type. Flanged valves shall have 125 pound in accordance with ASME B16.1, Class 125 dimensions. Shaft seals shall be designed for use with standard split-V type packing or other acceptable seal. The interior passage of butterfly valves shall not have any obstructions or stops. The seats shall be positively clamped or bonded on body of the valve, but cartridge-type seats which rely on a high coefficient of friction for retention shall not be acceptable. Where rubber-lined bodies are required, the lining shall wrap around to cover the flange sealing face. Valve seats shall be EPDM; suitable for the pipeline fluid operating conditions.

B. Connection with Existing Torque Tube: Furnish and install all necessary accessories to connect the proposed butterfly valves to the existing torque tubes.

C. Manufacturers:

1. De Zurik Corporation
2. Mueller Company
3. Henry Pratt Company

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PART 3 -- EXECUTION

3.01 PROTECTIVE COATINGS

A. Exterior Coatings: Exterior ferrous surfaces of valves shall receive a factory applied thermosetting epoxy coating conforming to AWWA C550. Coating shall be suitable for contact with potable water and shall meet the requirements of ANSI/NSF Standard 61: Drinking Water System Components.

B. Interior Coatings: Interior ferrous surfaces of valves that will be in contact with water shall receive a factory applied thermosetting epoxy coating conforming to AWWA C550. Coating shall be suitable for contact with potable water and shall meet the requirements of ANSI/NSF Standard 61: Drinking Water System Components.

- END OF SECTION -

PROJECT NO. 12197

SECTION 17000 - TESTING OF HYDROTREATOR 3 AND 4 CONTROL EQUIPMENT

PART 1 -- GENERAL

1.01 THE REQUIREMENT

A. Upon completion of the mechanical and structural modifications to the Hydrotreator 3 and 4 Influent Vaults, the ENGINEER shall test the functionality of reinstalled control equipment (i.e., magnetic flow meters and motor operated valve). The ENGINEER will determine that the equipment is operating correctly under all operating modes (auto, manual, local and remote).

B. The Contractor shall assume a minimum of five (5) days (Monday through Friday) of testing the functionality of reinstalled control equipment of each Hydrotreator vault.

C. If the reinstalled control equipment does not function properly, as determined by the ENGINEER, the Contractor shall adjust the equipment until satisfactory operation is achieved.

PART 2 -- FUNCTIONAL CONTROL DESCRIPTIONS, GENERAL

2.01 TESTING

A. The Functional Control Descriptions presented in Part 3 are for presented for reference purposes to facilitate the Engineer’s testing activities described herein.

B. The ENGINEER shall test the control equipment at Hydrotreator 3 and 4 Influent Vaults.

C. Testing shall be performed prior to removal of the existing control equipment to establish a baseline of functionality.

D. Testing shall be performed following reinstallation of the existing control equipment. The results will be compared to the baseline. The ENGINEER shall issue a written opinion relative to the functionality of reinstalled control equipment.

PART 3 -- FUNCTIONAL CONTROL DESCRIPTIONS

3.01 CONTROL DESCRIPTIONS INDEX

A. Control Description Index – Fiveash WTP

CSY_2100 Hydrotreator Master Flow Control (Aeration Basin Level Control)
FIC_2103 Hydrotreator 3 Flow Control
FIC_2104 Hydrotreator 4 Flow Control

3.02 CSY_2100 Hydrotreator Master Flow Control (Aeration Basin Level Control)

A. Control Description

Primarily, the desired water production rate is determined by the selection and operation of the raw water supply wells serving the plant. Operator selection and operation of the raw water wells is facilitated by the remote telemetry system and associated telemetry system operator workstation displays.

The general Hydrotreator flow balance is based upon monitoring the level in either Aeration Basins No. 1 or No. 2 whichever is higher (HSEL 2100) and generating a setpoint percentage to each Hydrotreators flow controller range (see FIC_2101 through FIC 2104) in response to changes in selected basin level. The flow controller range is defined under control strategies FIC_2101 through FIC_2104.

3.03 FIC_2103 Hydrotreator 3 Flow Control

A. Control Description

Each Hydrotreator Influent Valve Actuator shall operate in local or remote via a local actuator mounted selector switch as follows:

Local Mode: When the Local / Remote selector switch on the associated Hydrotreator Influent Valve Actuator is toggled to "local", the operators shall be able to locally open and close the valve to any desired position. The flow rate shall be displayed locally on each magnetic flow meter transmitter.

Remote Mode: When the Local / Remote selector switch on the Hydrotreator Influent Valve Actuator is toggled to "remote", the control of the Hydrotreator influent valve is transferred to the process control system. The plant operator can select one of the three available control options for each valve as follows:

Remote Manual Valve Control: Under remote manual valve control, the operator shall be able to adjust the Hydrotreator Influent Valves to any desired position from the Operator Workstation.

Remote Automatic Valve Control: Under remote automatic valve control, control of the valve is modulated to maintain setpoint flow. The setpoint may be either manually derived or automatically derived as described below.

Flow Control (Manual): With the valve control in remote automatic, the manual flow control mode of operation shall modulate the Hydrotreator Influent Valve based on the Hydrotreator flow setpoint entered by the operator. One or more of the Hydrotreators may operate in this mode.

Flow Control(Automatic): With the valve control in remote automatic, the automatic flow control mode of operation shall modulate the Hydrotreator Influent Valve based on the Hydrotreator flow setpoint from CSY_2100. One or more of the Hydrotreators may operate in this mode.

FIC_2103 shall also monitor the filter flume high high level control output (CSY_2300) and if the flume level exceeds the high high level setpoint (EL._), the position output setpoint to MOV_2103 shall be proportionally curtailed (reduced) by CSY_2300 to maintain the flume level at or below the high high level setpoint.

3.04 FIC_2104 Hydrotreator 4 Flow Control

A. Control Description

Each Hydrotreator Influent Valve Actuator shall operate in local or remote via a local actuator mounted selector switch as follows:

Local Mode: When the Local / Remote selector switch on the associated Hydrotreator Influent Valve Actuator is toggled to "local", the operators shall be able to locally open and close the valve to any desired position. The flow rate shall be displayed locally on each magnetic flow meter transmitter.

Remote Mode: When the Local / Remote selector switch on the Hydrotreator Influent Valve Actuator is toggled to "remote", the control of the Hydrotreator influent valve is transferred to the process control system. The plant operator can select one of the three available control options (at the Control Room workstation) for each valve as follows:

Remote Manual Valve Control: Under remote manual valve control, the operator shall be able to adjust the Hydrotreator Influent Valves to any desired position from the Operator Workstation.

Remote Automatic Valve Control: Under remote automatic valve control, control of the valve is modulated to maintain setpoint flow. The setpoint may be either manually derived or automatically derived as described below.

Flow Control (Manual): With the valve control in remote automatic, the manual flow control mode of operation shall modulate the Hydrotreator Influent Valve based on the Hydrotreator flow setpoint entered by the operator. One or more of the Hydrotreators may operate in this mode.

Flow Control (Automatic): With the valve control in remote automatic, the automatic flow control mode of operation shall modulate the Hydrotreator Influent Valve based on the Hydrotreator flow setpoint from CSY_2100. One or more of the Hydrotreators may operate in this mode.

FIC_2104 shall also monitor the filter flume high high level control output (CSY_2300) and if the flume level exceeds the high high level setpoint (EL._), the position output setpoint to MOV_2104 shall be proportionally curtailed (reduced) by CSY_2300 to maintain the flume level at or below the operator entered high level setpoint.

- END OF SECTION -

PROJECT NO. 12197

SECTION 17701 - MAGNETIC FLOW METERS

PART 1 -- GENERAL

1.01 THE REQUIREMENT

A. The Contractor shall furnish, test, install and place in satisfactory operation the magnetic flow meters, with all spare parts, accessories, and appurtenances as herein specified and as shown on the Drawings.

B. Provide all necessary tools and supplies to startup the new flow meters.

1.02 OPERATION AND MAINTENANCE MANUALS

A. The Contractor shall deliver equipment operation and maintenance manuals in compliance with Section 01300 - Submittals.

B. The manuals shall contain all illustrations, detailed drawings, wiring diagrams, and instructions necessary for installing, operating, and maintaining the equipment. The illustrated parts shall be numbered for identification. All modifications to manufacturer standard equipment and/or components shall be clearly identified and shown on the drawings and schematics. All information contained therein shall apply specifically to the equipment furnished and shall only include instructions that are applicable. All such illustrations shall be incorporated within the printing of the page to form a durable and permanent reference book.

C. The maintenance instructions shall describe the detailed preventive and corrective procedures required, including environmental requirements during equipment storage and system operation, to keep the equipment in good operating condition. All hardware maintenance documentation shall make reference to appropriate diagnostics, where applicable.

PART 2 -- PRODUCTS

2.01 MAGNETIC FLOW METER SYSTEMS

A. Magnetic flow meter systems shall include a magnetic flow tube and a microprocessor based transmitter that is capable of converting and transmitting a signal from the flow tube. The magnetic flow meters shall utilize the characterized field principle of electromagnetic induction, and shall produce DC signals directly proportional to the liquid flow rate. The flow meter shall be capable of reading flow rate in both forward and reverse directions.

B. Each meter shall be furnished with a stainless steel metering tube and carbon steel flanges with a full length (face to face) flow tube liner as specified herein (see instrument list below). Liner shall have a minimum thickness of 0.125 inches. The inside diameter of the liner shall be within 0.125 inches of the inside diameter of the adjoining pipe. Liner protectors shall be provided on all flow tubes.

PROJECT NO. 12197

C. The flow tube shall be provided with flush mounted electrodes. Ultrasonic electrode cleaning shall not be acceptable. The flow tube and sensors shall be permanently submersible to NEMA 6P (IP68) to 33 feet.

D. Grounding rings or ground electrodes shall be provided for all meters.

E. All materials of construction for metallic wetted parts (electrodes, grounding rings, etc.) shall be minimum 316 stainless steel, but shall be compatible with the process fluid for each meter in accordance with the recommendations of the manufacturer.

F. Flow tube shall be rated for temperatures of up to 140°C and pressures equal to the flange rating of adjacent piping. System shall be rated for ambient temperatures of -35 to +65°C. Meter and transmitter housings shall meet NEMA 4X requirements as a minimum. When meter and transmitter are located in classified explosion hazard areas, the meter and transmitter housings shall be selected with rating to meet the requirements for use in those areas.

G. CONTRACTOR shall perform field investigation as required to determine the output type of existing flow meters in the Hydrotreator 3 and 4 influent vaults. The proposed flow meter output signal shall match the existing.

H. The transmitter shall provide pulsed DC coil drive current to the flow tube and shall convert the returning signal to a linear, isolated 4-20 mA DC signal with HART communication capability. Additionally, provide Profibus DP or Modbus if required to match existing. The transmitter shall utilize "smart" electronics and shall contain automatic, continuous zero correction, signal processing routines for noise rejection, and an integral keypad with pushbuttons or capacitive touch type soft keys and a backlit LCD display capable of displaying flow rate and totalized flow in both forward and reverse directions. The transmitter shall include a dry contact output to indicate forward or reverse flow rate directions.

I. The transmitter's preamplifier input impedance shall be a minimum of 10^{15}ohms with driven shield capability which shall make the system suited for the amplification of low-level input signals and capable of operation with a material build up on the electrodes.

J. Each flow tube shall be factory calibrated and assigned a calibration constant or factor to be entered into the associated calibration constant or factor to be entered into the associated transmitter as part of the meter configuration parameters. Manual calibration of the flow meter shall not be required. Meter configuration parameters shall be stored in non-volatile memory in the transmitter. An output hold feature shall be provided to maintain a constant output during configuration changes.

K. The Flowmeter accuracy shall be better than ±0.2% of reading or ±1mm/s in both forward and reverse flows. The working flow range shall be 15mm/s to 15m/s (1000:1). Repeatability shall be 0.1% of rate; minimum range ability shall be 100:1. Minimum required liquid conductivity shall not be greater than 1 uS/cm. Maximum response time shall be adjustable between 1 and 100 seconds as a minimum. Transmitter ambient temperature operating limits shall be -10 to +50°C. Power supply shall be 120 VAC.

L. Flow tubes shall be AWWA Class D (150 psi) flange mounted unless otherwise noted. The cables for interconnecting the meter and transmitter shall be furnished by the manufacturer. Transmitter shall be mounted as shown in the Drawings and/or as specified.

M. Provide ABB VeriMaster factory calibration with digital fingerprinting to verify the integrity of sensor, cabling and transmitter.

N. Magnetic flow meter systems shall be WaterMaster as manufactured by ABB Instrumentation.

PART 3 -- EXECUTION

3.01 ADJUSTMENT AND CLEANING

A. General

1. The CONTRACTOR shall retain the flow meter manufacturer to provide a technician for a minimum of one day to adjust, calibrate and startup each magnetic flow meter.

2. The Engineer, or his designated representative(s), reserves the right to witness any test, inspection, calibration or start-up activity. Acceptance by the Engineer of any plan, report or documentation relating to any testing or commissioning activity specified herein shall not relieve the Contractor of his responsibility for meeting all specified requirements.

3. Any instrument which fails to meet any Contract requirements, or any published manufacturer performance specification for functional and operational parameters, shall be repaired or replaced, at the discretion of the Engineer, at no cost to the Owner. The Contractor shall bear all costs and provide all personnel, equipment and materials necessary to implement all installation tests and inspection activities for equipment specified herein.

B. Field Instrument Calibration Requirements

1. The CONTRACTOR, through the flow meter manufacturer shall provide the services of factory trained instrumentation technicians, tools and equipment to field calibrate each instrument supplied under this Contract to its specified accuracy in accordance with the manufacturer's specification and instructions for calibration.

2. Each instrument shall be calibrated at 0, 25, 50, 75 and 100 percent of span using test instruments to simulate inputs and read outputs. Test instruments shall be rated to an accuracy of at least five (5) times greater than the specified accuracy of the instrument being calibrated. Where applicable, such test instruments shall have accuracy’s as set forth by the National Institute for Standards and Technology (NIST).

PROJECT NO. 12197

3. The CONTRACTOR shall provide a written calibration sheet to the Engineer for each instrument, certifying that it has been calibrated to its published specified accuracy. The Contractor shall submit proposed calibration sheets for various types of instruments for Engineer approval prior to the start of calibration. This sheet shall include but be limited to date, instrument tag numbers, calibration data for the various procedures described herein, name of person performing the calibration, a listing of the published specified accuracy, permissible tolerance at each point of calibration, calibration reading as finally adjusted within tolerance, defect noted, corrective action required and corrections made.

4. If doubt exists as to the correct method for calibrating or checking the calibration of an instrument, the manufacturer's printed recommendations shall be used as an acceptable standard, subject to the approval of the Engineer.

5. Upon completion of calibration, devices calibrated hereunder shall not be subjected to sudden movements, accelerations, or shocks, and shall be installed in permanent protected positions. Caution shall be exercised to prevent such devices from being subjected to overvoltages, incorrect voltages, overpressure or incorrect air. Damaged equipment shall be replaced and recalibrated at no cost to the Owner.

6. After completion of instrumentation installation, the CONTRACTOR shall perform a loop check with the assistance of the ENGINEER. Loop test results shall be signed by all representatives involved for each loop test.

3.02 SCHEDULE

Magnetic Flow Meters					
Tag Number	**Service**	**Line Size**	**Range**	**Liner Material**	**Mounting Type**
FE/FIT 2103	Hydrotreator No. 3 Influent Flow	30”	Zero to 20,000 gpm	Hard Rubber	Pipe stand
FE/FIT 2104	Hydrotreator No. 4 Influent Flow	30”	Zero to 20,000 gpm	Hard Rubber	Pipe stand

– END OF SECTION –

APPENDIX A

BROWARD COUNTY HEALTH DEPARTMENT PERMIT DETERMINATION

ISSUED JUNE 26, 2015

FIVEASH WATER TREATMENT PLANT
HYDROTREATORS 3 AND 4
INFLUENT VAULT MODIFICATIONS

The attached document is included as part of the Contract Documents.

Mission:
To protect, promote & improve the health of all people in Florida through integrated state, county & community efforts.

Florida HEALTH Broward County

Rick Scott
Governor

John H. Armstrong, MD, FACS
State Surgeon General & Secretary

Vision: To be the **Healthiest State** in the Nation

Broward County
June 26, 2015

Hazen and Sawyer
Attn. Eric Antman, Assistant Engineer
4000 Hollywood Boulevard, Suite 750N
Hollywood, FL 33021

Dear Mr. Antman,

We have reviewed the attached permit determination request for an in-kind modification at the Fort Lauderdale's Fiveash WTP and in accordance with Rules 62.555.520(1)(c)1 and 62.555.520(1)(d)5, a permit is not required if the proposed modification does not include a piping reconfiguration within the influent vaults to Hydrotreators 3 and 4 at the FWTP.

However, all the work shall comply with applicable requirements of Part III of 62-555, F.A.C. including applicable requirements in the engineering references listed in Rule 62-555.330, F.A.C.

Ensure that cross connection controls are included in the project in accordance with the applicable Florida plumbing code and Rule 62.555.360 F.A.C.

Should you have any questions regarding this e-mail, do not hesitate to contact us.

Regards,

Sandra E. Giraldo, M.A., MPH
Engineer IV
Environmental Engineering Section
Florida Department of Health – Broward County

Memorandum

HAZEN AND SAWYER
Environmental Engineers & Scientists

4000 Hollywood Boulevard
Suite 750N
Hollywood, FL 33021

954 987-0066
hazenandsawyer.com

Date: June 24, 2015

To: Sandra E. Giraldo, Broward County Health Department

From: Eric Antmann

Re: Permit Determination for Fiveash Water Treatment Plant Pipe Replacement

---

The Fiveash Water Treatment Plant (FWTP) is owned and operated by the City of Fort Lauderdale. At the FWTP, four Hydrotreators are utilized for softening. Our office is preparing a scope of work for the replacement in kind of piping within the influent vaults to Hydrotreators 3 and 4 at the FWTP. In the attached drawings, Figure 1 provides a site plan of the plant showing the location of the influent vaults. The sections of pipe to be replaced in the influent vaults to Hydrotreators 3 and 4 are shown in figures 2 and 3, respectively. We are requesting a Permit Determination from the Broward County Health Department for this project. The softeners will be taken out of service, one at a time, for multiple weeks in order for the replacement pipe sections to be installed. There will be no modifications to other areas of the plant for this project, and three of the four softeners will be online at all times.

Fort Lauderdale

Fiveash WTP

Hydrotreator 3 & 4 Pipe Replacement

In Influent Vaults

Concept Figures

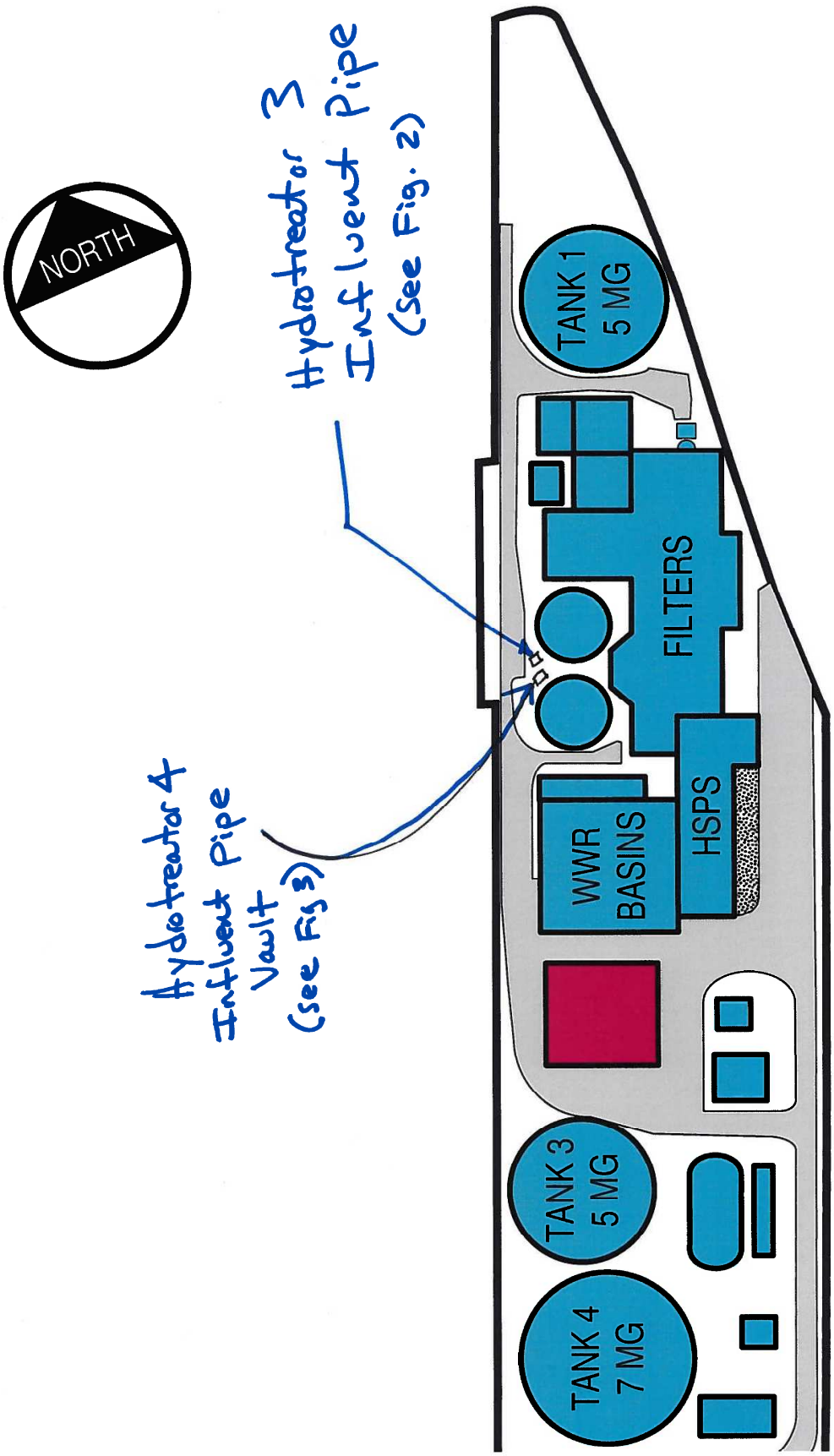
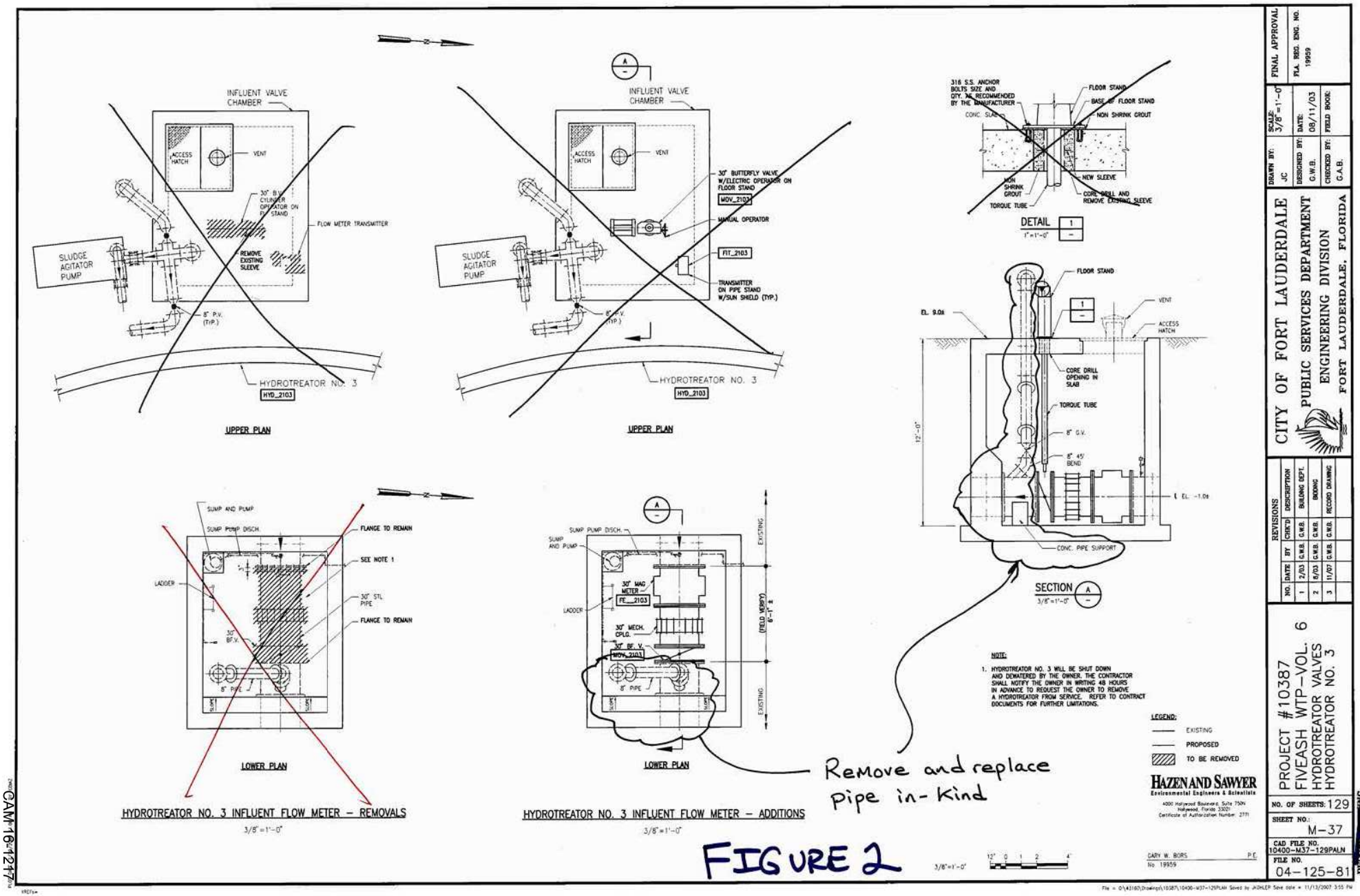
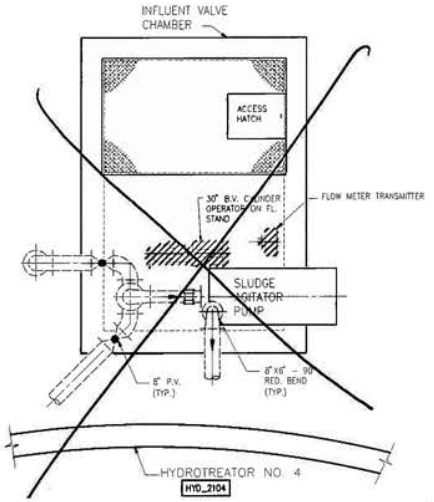


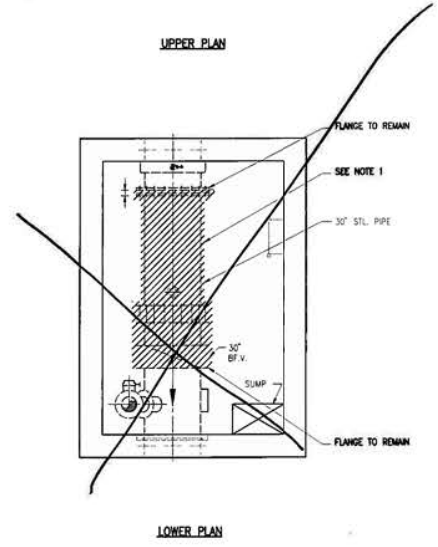
Figure 1

SITE PLAN





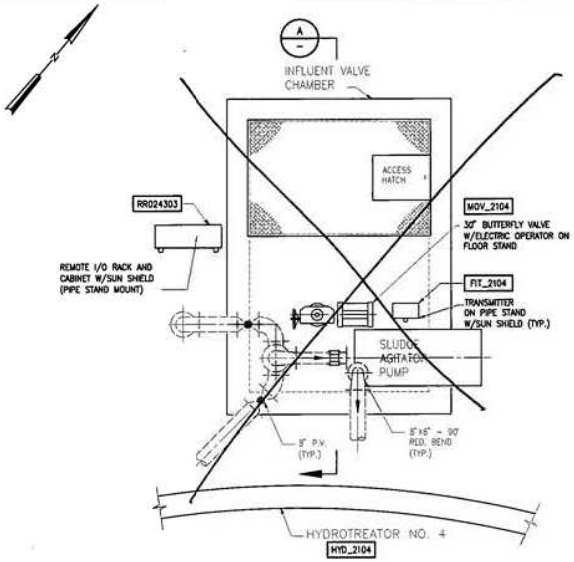
UPPER PLAN



LOWER PLAN

HYDROTREATOR NO. 4 INFLUENT FLOW METER – REMOVALS

3/8"=1'-0"



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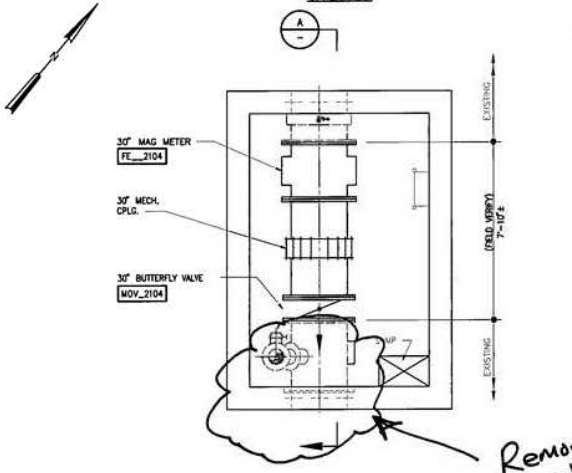
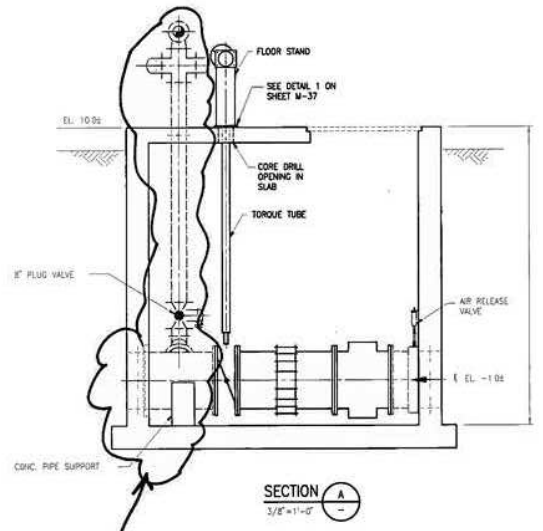


LOWER PLAN



SECTION A 3/8"=1'-0"

NOTE:
1. HYDROTREATOR NO. 4 WILL BE SHUT DOWN AND DEWATERED BY THE OWNER. THE CONTRACTOR SHALL NOTIFY THE OWNER IN WRITING 48 HOURS IN ADVANCE TO REQUEST THE OWNER TO REMOVE A HYDROTREATOR FROM SERVICE. REFER TO CONTRACT DOCUMENTS FOR FURTHER LIMITATIONS.

Remove and replace pipe in-kind

LEGEND:
- EXISTING
- PROPOSED
- TO BE REMOVED

HYDROTREATOR NO. 4 INFLUENT FLOW METER – ADDITIONS

3/8"=1'-0"

FIGURE 3

3/8"=1'-0"

HAZEN AND SAWYER
Environmental Engineers & Scientists
4000 Hollywood Boulevard, Suite 750N
Hollywood, Florida 33021
Certificate of Authorization Number 2771

GARY W. BORS P.E.
No. 19959

REVISIONS			
NO.	DATE	BY	CHK'D	DESCRIPTION
1	2/03	G.W.B.	C.W.B.	BUILDING DEPT.
2	8/03	G.W.B.	C.W.B.	BIDDING
3	11/07	G.W.B.	C.W.B.	RECORD DRAWING

CITY OF FORT LAUDERDALE
PUBLIC SERVICES DEPARTMENT
ENGINEERING DIVISION
FORT LAUDERDALE, FLORIDA

DRAWN BY: JC	SCALE: 3/8"=1'-0"	FINAL APPROVAL
DESIGNED BY: G.W.B.	DATE: 08/11/03	FLA. REG. ENG. NO. 19959
CHECKED BY: M.W.W.	FIELD BOOK:	

PROJECT #10387
FIVEASH WTP – VOL. 6
HYDROTREATOR VALVES
HYDROTREATOR NO. 4

NO. OF SHEETS: 129
SHEET NO.: M-38
CAD FILE NO. 10400-M38-129PLAN
FILE NO. 04-125-81

File = O:\43160\Drawings\10387\10400-M38-129PLAN Saved by JHOHLER Save date = 11/13/2007 3:56 PM

APPENDIX B

GEOTECHNICAL REPORT

ISSUED SEPTEMBER 15, 2011

BY NODARSE AND ASSOCIATES

The attached geotechnical report is provided for informational purposes with the Contract Documents. The attached geotechnical report is not a part of the Contract Documents. The Owner and the Engineer make no guarantee, either expressed or implied, as to its accuracy or completeness.

September 15, 2011
N&A Project No. H5115037

Mr. Steve Hillberg, P.E.
Project Engineer
City of Fort Lauderdale, Public Works – Utilities Engineering
100 North Andrews Avenue
Fort Lauderdale, FL 33301
Phone: (954) 828-5076

RE: Report for Geotechnical Engineering Services
Fiveash Water Treatment Plant, Disinfection System Replacement
4321 NW 9th Avenue
City of Fort Lauderdale, Florida
City Project No.: 11589

Dear Mr. Hillberg:

Nodarse & Associates (N&A), A Terracon Company has completed the required subsurface exploration for the Fiveash Water Treatment Plant – Disinfection System Replacement in accordance with the scope of services provided in our proposal number 05-10-0022-113 dated August 16, 2011. The purpose of this subsurface exploration is to determine the existing subsurface and groundwater conditions and provide geotechnical recommendations at the above referenced location.

We appreciate the opportunity to be of service to you. Please feel free to contact us if you have any questions or comments regarding this report.

Sincerely,
Nodarse & Associates, A Terracon Company
(Certificate of Authorization 6174)

Travis P. Iverson, E.I.
Staff Geotechnical Engineer

Julio De Blas, P.E.
Geotechnical Engineer
Florida License No. 64653

Rutugandha H. Nulkar, P.E.
Senior Associate, P.E.
Florida License No. 70625

Adressee: (3)
File: (1)

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4.2 Exfiltration Tests 2

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APPENDIX

Exhibit A-1 – Site Location Plan
Exhibit A-2 – Boring Location Plan
gINT Boring Profiles (Borings B-1 to B-4)
Exfiltration Test Logs (EX-1 & EX-2)

Fiveash Plant – Disinfection System Replacement
City of Fort Lauderdale, FL
City Project No.: 11589
N&A Project No. H5115037

1.0 SITE LOCATION AND PROJECT DESCRIPTION

The project site is located at the Fiveash Water Treatment Plant at 4321 NW 9th Avenue in the City of Fort Lauderdale. The site location is presented on **Exhibit A-1**- Site Location Plan in the **Appendix** of this report. We understand that the project consists of construction of a new building and storage tanks associated with the future sodium hyplochlorite facility at the referenced location. N&A understands that these will be reinforced concrete structures with a foundation load of 2,000 pounds per square foot (psf). The purpose of this subsurface exploration is to determine the existing subsurface and groundwater conditions at the location of the proposed structures and to provide geotechnical recommendations

2.0 SCOPE OF SERVICES

The scope of services may be summarized as follows:

- Laid out boring and obtained utility clearance prior to commencing the field work.
- Performed four (4) SPT borings to a depth of 50 feet below the existing grade.
- Perform two (2) exfiltration tests using the SFWMD Usual Open Hole Method.
- Grout boreholes upon completion of the SPT borings and exfiltration tests.
- Visually classified soil samples in Nodarse's laboratory.
- The results of the exploration are presented in this geotechnical report, which includes:
    1. Site location map
    2. Surface soil conditions on the basis of USDA soil survey
    3. SPT boring logs
    4. Exfiltration Test logs
    5. Geotechnical recommendations for foundations design

3.0 U.S.D.A. SOILS SURVEY

The information from the U.S.D.A. Soil Survey of Broward County, Florida, indicates the presence of the following soil unit at the project site.

Ur- Urban land: This map unit consists of areas that are more than 70 percent covered by airports, shopping centers, parking lots, large buildings, streets and sidewalks, and other structures, so that the natural soil is not readily observable. Unoccupied areas of the land type, mostly lawns, parks, vacant lots, and playgrounds, consist of soils that have been altered by fill material spread on the surface to an average thickness of about 12 inches. The fill is mostly sandy material, some of which contains limestone and shell fragments.

Fiveash Plant – Disinfection System Replacement
City of Fort Lauderdale, FL
City Project No.: 11589
N&A Project No. H5115037

4.0 FIELD EXPLORATION

4.1 Standard Penetration Test (SPT) Borings

The subsurface exploration was performed on August 29, 2011 and August 30, 2011. The field exploration consisted of four (4) SPT soil borings (B-1 to B-4) to a depth of 50 feet below the ground surface. The SPT borings were performed in general accordance with the American Society of Testing and Materials (ASTM) test designation D 1586 titled "Standard Practice for Penetration Test and Split-Barrel Sampling of Soils". After seating the sampler six (6) inches, the number of successive blows required to drive the sampler twelve (12) inches into the soil constitutes the test result commonly referred to as the "N" value. The "N" value has been empirically correlated with various soil properties and is considered to be indicative of the relative density of cohensionless soils and the consistency of cohesive soils. The SPT boring was performed using a CME-45 truck mounted drill rig equipped with an automatic hammer. The recovered split spoon samples were visually classified in the field and placed in sealed containers and transported to the laboratory for further review. The gINT boring logs are presented in the **Appendix**.

4.2 Exfiltration Tests

Two (2) exfiltration tests (EX-1 and EX-2) were performed for this project. The exfiltration tests were performed in general accordance with the South Florida Water Management District (SFWMD) "Usual Open-Hole" constant head method. The exfiltration tests were performed to determine the hydraulic conductivity values (k) of the subsurface materials at the depth of 10 feet below the existing ground surface. The hydraulic conductivity values (k) were determined from the test results and are presented in the **Appendix**. The hydraulic conductivity values are reported in units of cubic feet per second per square foot of seepage area per foot of head (cfs/ft^2-ft.). A summary of the exfiltration tests results is presented in **Table A** below:

Table A: Summary of Exfiltration Test Results

Test No.	Depth of Test (ft)	Hydraulic Conductivity "k" (cfs/ft^2-ft head)
EX-1	10	5.29E-05
EX-2	10	5.54E-05

The field test locations are presented on **Exhibit A-2**- Boring Location Plan in the **Appendix** of this report.

5.0 LABORATORY TESTING

Representative samples collected from the test boring locations were visually reviewed in the laboratory by a geotechnical engineer to confirm the field classifications. The samples were classified using the Unified Soil Classification System (USCS) in general accordance with the American Society of Testing and Materials (ASTM) test designation D 2487. The classification was based on visual observations only.

Fiveash Plant – Disinfection System Replacement
City of Fort Lauderdale, FL
City Project No.: 11589
N&A Project No. H5115037

6.0 SUBSURFACE AND GROUNDWATER CONDITIONS

6.1 Subsurface Conditions

The subsurface stratification is based on visual examination of the recovered soil samples and interpretation of the field boring logs by a geotechnical engineer. The results of the subsurface exploration disclosed three (3) different soil layers at the SPT boring locations. The generalized soil descriptions of the material encountered in the borings is presented in **Table B.**

Table B: Generalized Descriptions of Subsurface Soils

Stratum Number	Soil Description	U.S.C.S Classification
1	Brown to tan fine to medium SAND, Few to Little Limerock (Fill)	SP
2	Tan to dark brown fine to medium SAND	SP
3	Brown to gray fine to medium SAND, trace limestone and shell fragments	SP

The subsurface conditions encountered in the SPT borings are presented on the individual gINT Boring Logs, presented in the **Appendix.** The borings present the conditions at the particular boring locations. The boring stratification lines present the approximate boundaries between soil types of significantly different engineering properties. Stratification boundaries should be considered approximate as the actual transition between soil types may be gradual.

6.2 Groundwater Conditions

Groundwater level was observed at depths of approximately 8.5 to 9 feet below existing ground surface in the borings at the exfiltration test locations. The water levels were recorded shortly after completion of drilling. Fluctuations in the groundwater level should be expected due to seasonal climatic changes, rainfall variations, surface runoff and other construction activities. Therefore, at the time of the year different from the time of drilling, there is a possibility of a change in the recorded levels. It is to be noted that during the peak of the wet hydroperiod, with rainfall and recharge at a maximum, groundwater level at the site could be one (1) to two (2) feet higher than that measured in the test locations. The groundwater table encountered in the borings during the field investigation is presented on the gINT boring logs.

Fiveash Plant – Disinfection System Replacement
City of Fort Lauderdale, FL
City Project No.: 11589
N&A Project No. H5115037

7.0 EVALUATION AND RECOMMENDATIONS

7.1 Overall Site Geotechnical Suitability

Based on the results of the field exploration and our engineering analyses, we consider the site suitable for the proposed project from a geotechnical engineering perspective. We believe that this soil is suitable from a geotechnical stand point to support the proposed structures. The following sections provide our conclusions and recommendations for site preparation, compaction specifications, and construction recommendations.

7.2 Shallow Foundations

After completion of site preparation procedures as noted in Section 8.0 of the report, the proposed structure can be supported on shallow foundations that are designed using a maximum net allowable bearing pressure of 2,500 pounds per square foot (psf), resting on compacted approved structural fill material or on compacted existing sandy soils. The bottom of the footings should be at least 18 inches below the finished exterior grade in order to provide needed confinement. We further recommend that the footings supporting isolated columns have a minimum width of 24 inches and continuous footings have a minimum width of 18 inches, even if those dimensions produce a bearing pressure less than the allowable.

Foundations subject to transient lateral loads will resist these forces through a combination of base shearing resistance mobilized at the footing-subgrade interface and earth pressure acting on the vertical faces of the footings at right angles to the direction of applied load. Base shearing resistance may be determined using a friction factor of 0.6. Passive earth pressure resistance should be computed using an equivalent fluid pressure of 150 pounds per square foot per foot of depth, for granular backfill material. Resistance to sliding determined in accordance with the noted parameters should be considered available/ultimate resistance. Accordingly, the design for sliding resistance should include a factor of safety. We recommend that a factor of safety of at least 1.5 be used.

To calculate the resistance of a footing to uplift forces, a prismatic failure block with vertical faces should be assumed above the footing base. The resisting forces will be provided by the combination of footing weight, overburden soil weight in the failure block, and shearing resistance along the faces of the soil block. The weight of the soil above the water table should be taken as 110 pounds per cubic foot (pcf). For submerged soil, a buoyant weight of 47 pcf should be used. The factor of safety against uplift should not be less than 1.5.

Fiveash Plant – Disinfection System Replacement
City of Fort Lauderdale, FL
City Project No.: 11589
N&A Project No. H5115037

7.3 Settlements of Shallow Foundations

We have evaluated settlement for shallow foundations bearing on granular soils. The amount of settlement is primarily governed by the elastic compressibility of the material, the size and depth of its foundations, and the pressure imposed (compression loads) on the supporting materials by the foundations. Based on the field test data obtained, our experience with similar structures and empirical relationships and calculations for bearing capacity and settlement, we have estimated that the maximum total settlement of the foundations resting on granular soils will be less than one (1) inch. Differential settlement, between adjacent foundations, should be approximately ½ of the total settlement.

Compacted existing or structural fill that will provide support to the footings have very low compressibility characteristics and any settlement due to pressure applied by the foundations is likely to occur almost immediately upon application of the loads. In this case, nearly all of the settlement of the structure foundations due to dead loads is expected to take place during construction. The portion of the settlement due to the live load of the structure will generally take place soon after the first application of this load.

Our settlement estimates depend on the bearing surface preparation being carried out as recommended herein. Total and differential settlements of the noted magnitudes are usually considered tolerable for the anticipated construction; however, the tolerance of the proposed structure to the predicted total and differential settlements should be confirmed by the structural engineer/architect.

7.4 Slab-on-Grade Recommendations

We recommend that the procedures described in Section 8.0 of this report be used to prepare the slab-on-grade subgrade. Ground floor slabs can bear directly on top of compacted structural fill material. A modulus of subgrade reaction value of 150 pounds per cubic inch (pci) may be used for design.

To avoid potential moisture problems, we recommend that slab subgrade soils be covered with a vapor barrier (such as visqueen, normally 6 mil thick) prior to constructing the slab-on-grade floors. The floor slabs should be reinforced to make them as rigid as practical. Proper joints should be provided at the junctions of the slabs and foundation system so that a small amount of independent movement can occur without causing structural damage. A friction factor of 0.21 should be used for the vapor barrier-soil interface.

Fiveash Plant – Disinfection System Replacement
City of Fort Lauderdale, FL
City Project No.: 11589
N&A Project No. H5115037

8.0 SITE PREPARATION

8.1 General

Based on the results of our field exploration, we anticipate site preparation procedures to include the following:

1. Site preparation for the proposed development should include stripping unsuitable materials that might be encountered at the proposed structure location.

2. The location of any existing underground utility lines within the construction area should be established. Provisions should be made to relocate any interfering utility lines within the construction area. Abandoned utilities should be removed or grouted to reduce the possibility of subsurface erosion that could result in future settlement.

3. The cleared exposed subgrade should be densified as specified in Section 8.2. Densification of the soils should be performed within the proposed development areas plus a 5-foot wide perimeter extending beyond the outside edge, where practical. Densification operations should continue until the subgrade soils are firm and unyielding.

4. Any fill required to raise grades should conform to the recommendations in Section 8.3 of the report.

8.2 In-Situ Densification

Proof-rolling of in-place granular soils should be performed in the proposed development areas plus a five foot wide perimeter extending beyond the outer lines of the construction areas, where practical. Densification should be accomplished with a self-propelled vibratory roller which imparts a dynamic force of not less than 20,000 pounds. To minimize the effects of compaction induced vibrations on adjacent existing structures, the compaction operation should be limited to a distance not closer than 25 feet from existing structures.

The maximum drum roller weight to be used between 5 to 25 feet from the existing structures should be limited to 4 tons. For distances of less than 5 feet, a walk behind vibratory sled or roller should be used. Compaction of the bearing surface using this equipment should continue until no further vertical settlement of that surface is visually discernible. Any area of the exposed surface that deflects excessively under the weight of the compaction equipment should be excavated approximately 24 inches and replaced with compacted structural fill.

Density control should be exercised in the upper 12 inches of the subgrade. Soils in this interval should be compacted to at least 95 percent of the Modified Proctor maximum dry density determined per ASTM D-1557. Frequent wetting of the subgrade may be necessary during the rolling operations to prevent drying and loosening of the upper 6 to 12 inches of soil.

Fiveash Plant – Disinfection System Replacement
City of Fort Lauderdale, FL
City Project No.: 11589
N&A Project No. H5115037

8.3 Structural Fill and Backfill

Proper control of the placement and compaction of new fills for the project should be exercised by a representative of the geotechnical engineer. The fill materials should be placed in lifts not exceeding 12 inches in loose thickness. Each lift should be compacted to a minimum of 95 percent of the Modified Proctor maximum dry density near the optimum moisture content as determined by ASTM D-1557.

Fill to be compacted with a vibratory plate tamper or a small walk behind vibratory roller should be placed in lifts not exceeding six inches in loose thickness. It is imperative that any fill be placed, compacted and tested in accordance with the requirements of this report. The tests should be performed by a qualified soils technician working under the supervision of a geotechnical engineer in accordance with appropriate ASTM procedures. Any fill indicating less than the recommended relative compaction should be recompacted until the required density is obtained prior to the placement of subsequent fill lifts or pouring concrete for substructures.

Structural fill should be free of organic matter and consist of granular material containing less than 12 percent passing the U.S. Standard No. 200 mesh sieve. The fill material may be composed of either clean sands and/or limerock. The fill material should have no particle size in excess of three (3) inches and have a Unified Soil Classification System (USCS) designation of GP, GW, GP-GM, GW-GM, SP, SW, SP-SM or SW-SM.

Structural fill or backfill to be placed below the water table level should consist of an inorganic, non-plastic material, free of any man-made debris, limerock with a three (3) inch maximum particle size with ASTM classification (USCS) of GP, GW or FDOT 57 Stone with less than 5 percent material finer than the No. 200 sieve and a maximum particle size of 3 inches. The FDOT 57 stone should not be placed more than one foot above the water table level.

8.4 Groundwater Control

Groundwater control is not anticipated. If required, groundwater control for construction excavations at this site for either excavation dewatering or removal of temporarily perched water from a rain event can be controlled by pumping from sumps located in ditches or pits.

Groundwater should be maintained at the following levels:

1. At least one (1) foot below the bottom of any excavation made during construction operations and,
2. At least two (2) feet below the surface of any vibratory compaction operations.

If the above groundwater control is not sufficient, dewatering with well points may be used to facilitate construction. Dewatering systems should be designed and operated so as not to impact adjacent construction. Additionally, the discharge from dewatering systems should be handled in accordance with current regulatory criteria as related to the same.

Fiveash Plant – Disinfection System Replacement
City of Fort Lauderdale, FL
City Project No.: 11589
N&A Project No. H5115037

8.5 Foundation Construction for Shallow Foundations

After completion of site preparation procedures as noted in Section 8.0 of the report, the soils exposed at the bottom of the footing excavations should be compacted to at least 95 percent of the Modified Proctor maximum dry density just before pouring concrete. If the footing bearing materials become disturbed due to surface water resulting from precipitation and runoff, the disturbed soils should be overexcavated and replaced with compacted limerock which is densified to at least 95 percent of the Modified Proctor maximum dry density as determined by ASTM designation D-1557.

9.0 CLOSURE

Our professional services have been performed, our findings obtained, and our recommendations prepared in accordance with generally accepted geotechnical engineering principles and practices. This company is not responsible for the conclusions, opinions or recommendations made by others based on these data. No other warranties are implied or expressed.

The analyses and recommendations submitted in this report are based upon the data obtained from the soil borings performed at the locations indicated. If any subsoil variations become evident during the course of this project, a re-evaluation of the recommendations contained in this report will be necessary after we have had an opportunity to observe the characteristics of the conditions encountered.

This report has been prepared for the exclusive use of the City of Fort Lauderdale and its design consultants, for the specific application to Fiveash Water Treatment Plant Disinfection System Replacement in City of Fort Lauderdale, Broward County, Florida.

APPENDIX

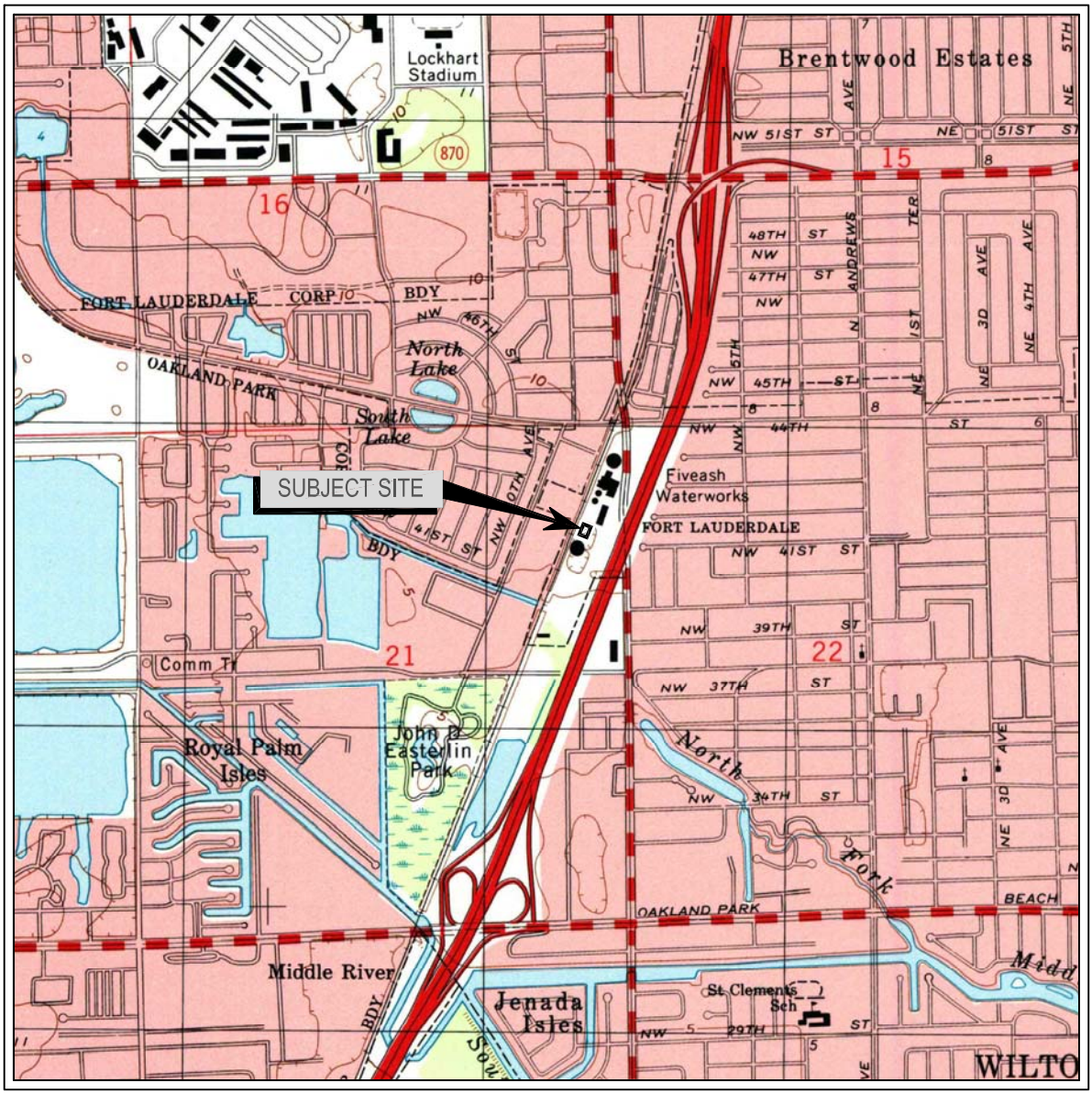
Exhibit A-1 Site Location Plan

Exhibit A-2 Boring Location Plan

gINT Boring Profiles (B-1 to B-4)

Exfiltration Test Logs (EX-1 and EX-2)

UNITED STATES – DEPARTMENT OF THE INTERIOR – GEOLOGICAL SURVEY



SCALE 1:24 000

1 .5 0 KILOMETERS 1 2

1000 0 METERS 1000 2000

1 .5 0 1

MILES

1000 0 1000 2000 3000 4000 5000 6000 7000 8000 9000 10 000

FEET

CONTOUR INTERVAL 5 FEET

NATIONAL GEODETIC VERTICAL DATUM OF 1929

TOPO LINES REPRESENT 10–FOOT CONTOURS

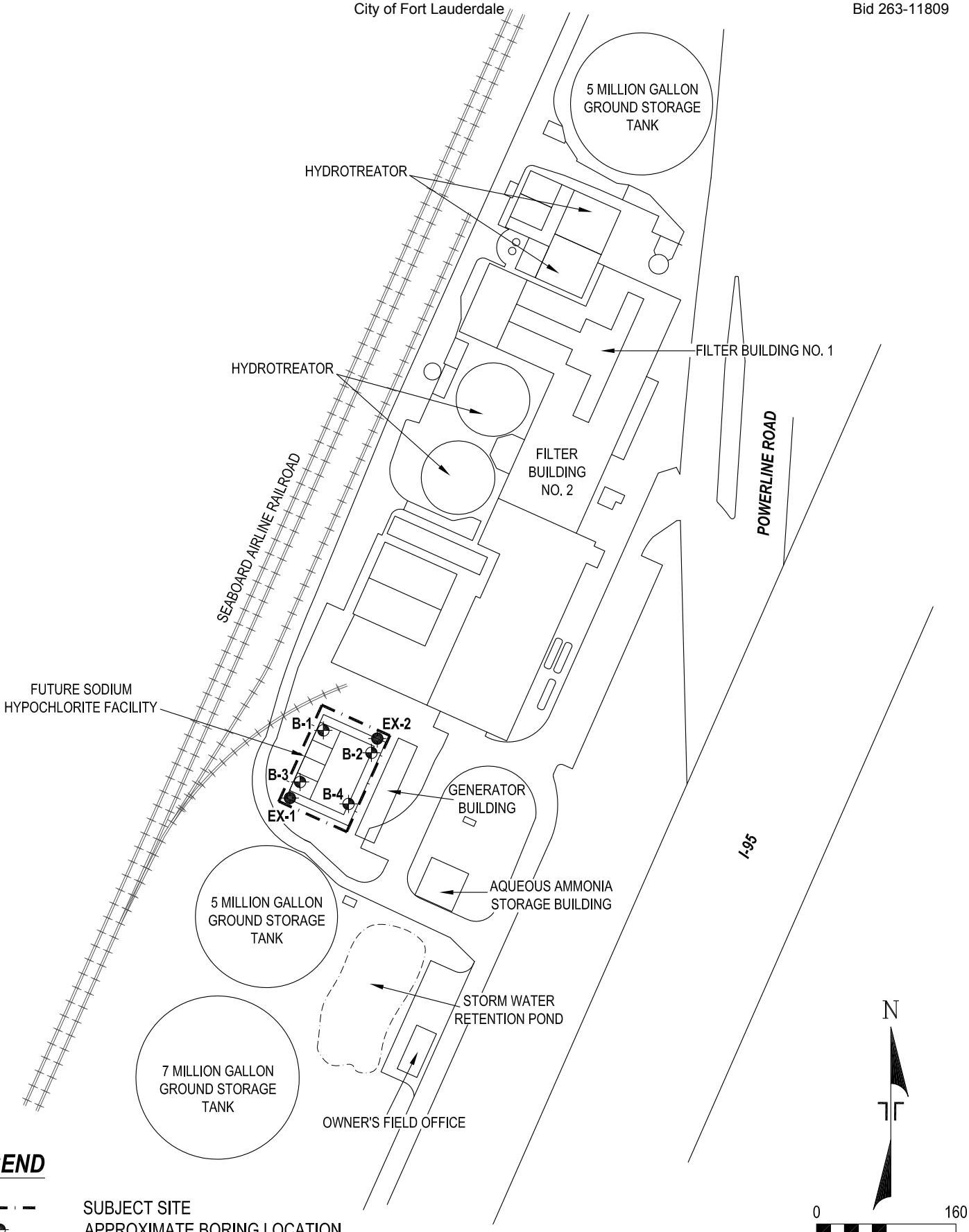
N

QUADRANGLE
FORT LAUDERDALE NORTH, FL
1995
7.5 MINUTE SERIES (TOPOGRAPHIC)

Project Mngr: TPI	Project No. H5115037	NODARSE A Terracon COMPANY	SITE LOCATION PLAN
Drawn By: DWD	Scale: AS SHOWN	10080 NW 53rd Street Sunrise, Florida 33351	GEOTECHNICAL ENGINEERING REPORT
Checked By: TPI/MRF	File No. GEOH5115037-1	(954) 741-8282 (954) 741-8240	FIVEASH PLANT - DISINFECTION SYSTEM REPLACEMENT
Approved By: BHW	Date: SEPT. 2011		4321 NW 9TH AVENUE FORT LAUDERDALE, BROWARD COUNTY, FL

EXHIBIT A-1

CAM 16-1217 EXHIBIT 3 p. 345



LEGEND

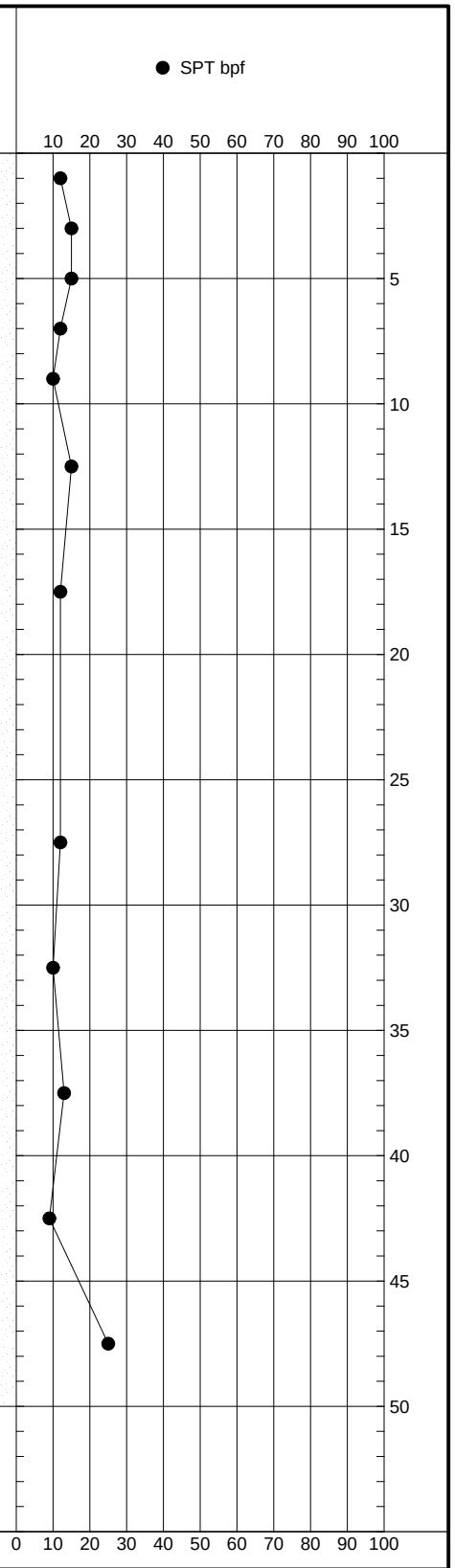
SUBJECT SITE
APPROXIMATE BORING LOCATION
APPROXIMATE EXFILTRATION TEST LOCATION

THIS DIAGRAM IS FOR GENERAL LOCATION ONLY, AND IS NOT INTENDED FOR CONSTRUCTION PURPOSES

Project Mngr: TPI	Project No. H5115037	NODARSE A Terracon COMPANY	BORING LOCATION PLAN
Drawn By: DWD	Scale: AS SHOWN	10080 NW 53rd Street Sunrise, Florida 33351	GEOTECHNICAL ENGINEERING REPORT
Checked By: TPI/MRF	File No. GEOH5115037-2	(954) 741-8282 (954) 741-8240	FIVEASH PLANT - DISINFECTION SYSTEM REPLACEMENT
Approved By: BHW	Date: SEPT. 2011		4321 NW 9TH AVENUE CAM 16-1217
			FORT LAUDERDALE, BROWARD COUNTY, FL EXHIBIT 3

EXHIBIT A-2

DEPTH (ft)	ELEV (ft)	TYPE	N-COUNT 1st 6" 2nd 6" 3rd 6" 4th 6" / RQD % REC	N-VALUE	SOIL CLASSIFICATION AND REMARKS
0	NATURAL GROUND SURFACE ELEVATION NOT AVAILABLE AT TIME OF DRILLING				Light brown Fine to Medium SAND (SP)
1			5-5-7-8	12	
2					
3			7-7-8-8	15	
4					
5			6-7-8-10	15	
6					
7			8-7-5-7	12	
8					
9			4-5-5-6	10	
10					
11					
12			5-7-8	15	
13					
14					
15					
16					
17			5-6-6	12	
18					
19					
20					
21					
22					
23					
24					
25					
26					
27			5-6-6	12	
28					
29					
30					
31					
32			5-5-5	10	
33					
34					
35					
36					
37			5-6-7	13	
38					
39					
40					
41					
42			4-4-5	9	
43					
44					
45					
46					
47			10-12-13	25	
48					
49					
50					End of Boring @50 ft
51					
52					
53					
54					
55					



DRILLER: Oscar
EQUIPMENT: CME-45
METHOD: Automatic
HOLE DIA.: 3 inch
GROUND WATER LEVEL: 9'
REMARKS: City of Ft. Ladurdale, Public Works-Utilities Eng.

THIS RECORD IS A REASONABLE INTERPRETATION OF SUBSURFACE CONDITIONS AT THE EXPLORATION LOCATION. SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND AT OTHER TIMES MAY DIFFER. INTERFACES BETWEEN STRATA ARE APPROXIMATE. TRANSITIONS BETWEEN STRATA MAY BE GRADUAL.

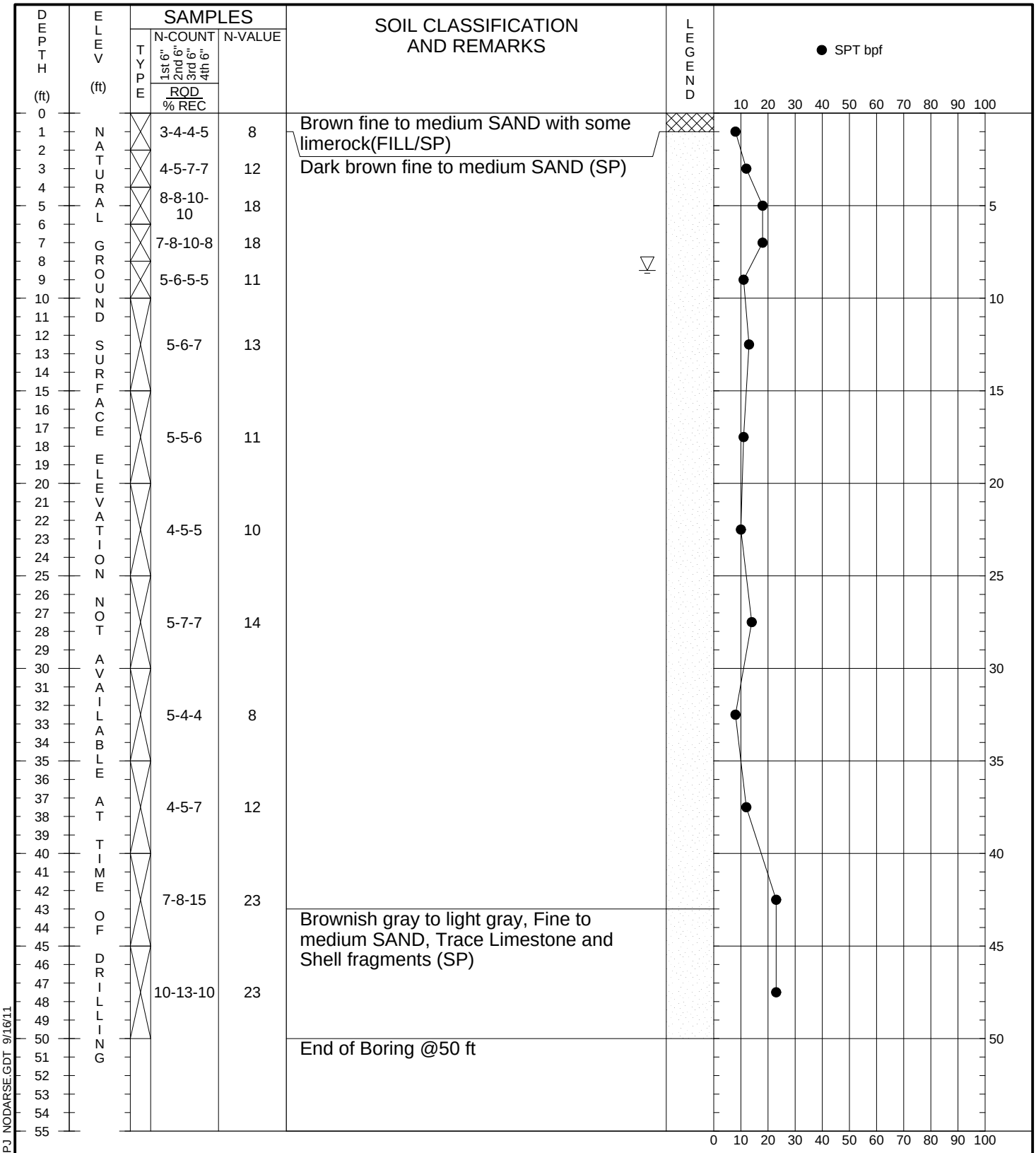
TEST BORING RECORD

Project Name:	Fiveash Plant-Disinfection Sys. Replace.
Project Loc.:	4321 NW 9th Avenue,Ft. Lauderdale, FL
Project No:	H5115037
Drilled:	8/29/11
Boring No.:	B-1

Page 1 of 1

NODARSE & ASSOCIATES, INC

TEST BORING RECORD H5115037-CITY.GPJ NODARSE.GDT 9/16/11



DRILLER: Oscar
EQUIPMENT: CME-45
METHOD: Automatic
HOLE DIA.: 3 inch
GROUND WATER LEVEL: 8.5'
REMARKS: City of Ft. Ladurdale, Public Works-Utilities Eng.

THIS RECORD IS A REASONABLE INTERPRETATION OF SUBSURFACE CONDITIONS AT THE EXPLORATION LOCATION. SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND AT OTHER TIMES MAY DIFFER. INTERFACES BETWEEN STRATA ARE APPROXIMATE. TRANSITIONS BETWEEN STRATA MAY BE GRADUAL.

TEST BORING RECORD

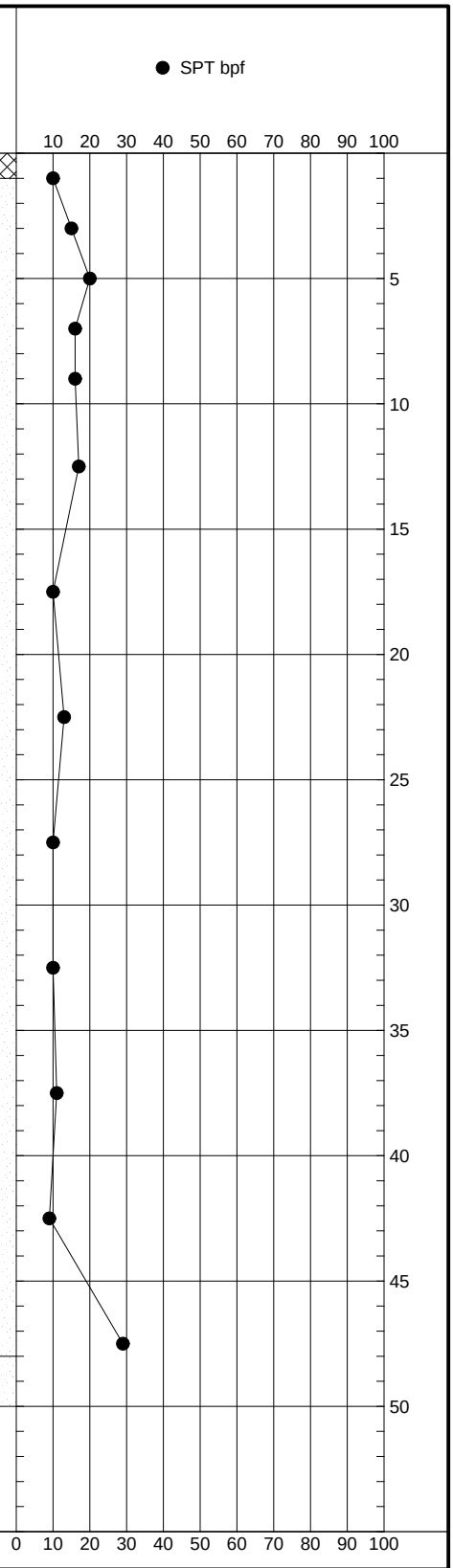
Project Name:	Fiveash Plant-Disinfection Sys. Replace.
Project Loc.:	4321 NW 9th Avenue,Ft. Lauderdale, FL
Project No:	H5115037
Drilled:	8/29/11
Boring No.:	B-2

Page 1 of 1

NODARSE & ASSOCIATES, INC

TEST BORING RECORD H5115037-CITY.GPJ NODARSE.GDT 9/16/11

DEPTH (ft)	ELEV (ft)	TYPE	N-COUNT 1st 6" 2nd 6" 3rd 6" 4th 6" / RQD % REC	N-VALUE	SOIL CLASSIFICATION AND REMARKS
0	NATURAL GROUND SURFACE ELEVATION NOT AVAILABLE AT TIME OF DRILLING				Brown to tan fine to medium SAND with trace limerock(FILL/SP)
1			4-5-5-7	10	
2					
3			7-7-8-10	15	Tan to brown to greenish gray Fine to medium SAND (SP)
4					
5			8-10-10-10	20	
6					
7			7-8-8-10	16	
8					
9			7-7-9-9	16	
10					
11					
12			7-8-9	17	
13					
14					
15					
16					
17			4-5-5	10	
18					
19					
20					
21					
22			5-6-7	13	
23					
24					
25					
26					
27			5-5-5	10	
28					
29					
30					
31					
32			4-5-5	10	
33					
34					
35					
36					
37			4-5-6	11	
38					
39					
40					
41					
42			4-5-4	9	
43					
44					
45					
46					
47			10-13-16	29	
48					
49					Brownish gray to light gray, Fine to medium SAND, Trace Limestone and Shell fragments (SP)
50					End of Boring @50 ft
51					
52					
53					
54					
55					



DRILLER: Oscar
EQUIPMENT: CME-45
METHOD: Automatic
HOLE DIA.: 3 inch
GROUND WATER LEVEL: 9'
REMARKS: City of Ft. Ladurdale, Public Works-Utilities Eng.

THIS RECORD IS A REASONABLE INTERPRETATION OF SUBSURFACE CONDITIONS AT THE EXPLORATION LOCATION. SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND AT OTHER TIMES MAY DIFFER. INTERFACES BETWEEN STRATA ARE APPROXIMATE. TRANSITIONS BETWEEN STRATA MAY BE GRADUAL.

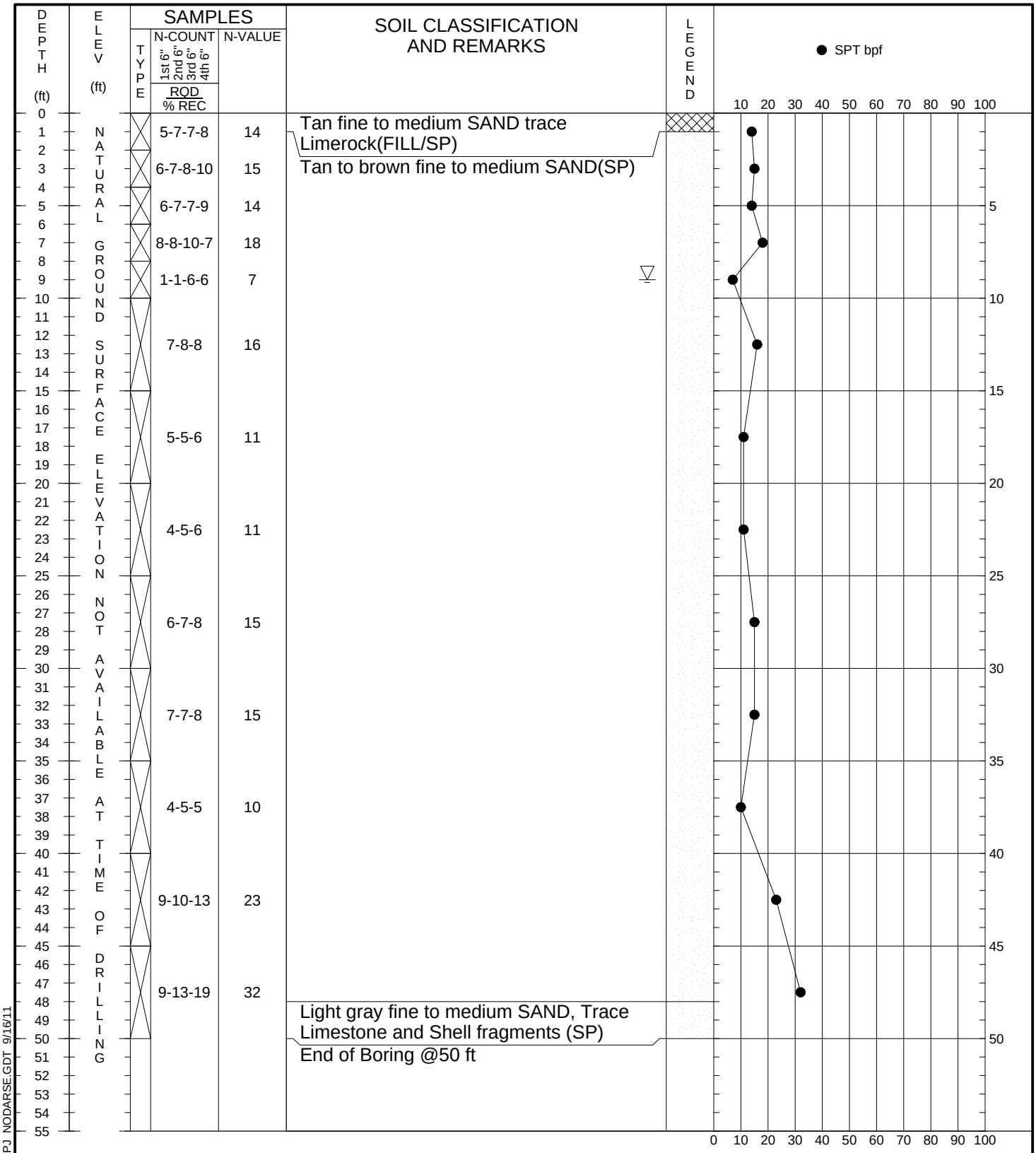
TEST BORING RECORD

Project Name:	Fiveash Plant-Disinfection Sys. Replace.
Project Loc.:	4321 NW 9th Avenue,Ft. Lauderdale, FL
Project No:	H5115037
Drilled:	8/29/11
Boring No.:	B-3

Page 1 of 1

NODARSE & ASSOCIATES, INC

TEST BORING RECORD H5115037-CITY.GPJ NODARSE.GDT 9/16/11



DRILLER: Oscar
EQUIPMENT: CME-45
METHOD: Automatic
HOLE DIA.: 3 inch
GROUND WATER LEVEL: 9'
REMARKS: City of Ft. Ladurdale, Public Works-Utilities Eng.

THIS RECORD IS A REASONABLE INTERPRETATION OF SUBSURFACE CONDITIONS AT THE EXPLORATION LOCATION. SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND AT OTHER TIMES MAY DIFFER. INTERFACES BETWEEN STRATA ARE APPROXIMATE. TRANSITIONS BETWEEN STRATA MAY BE GRADUAL.

TEST BORING RECORD

Project Name:	Fiveash Plant-Disinfection Sys. Replace.
Project Loc.:	4321 NW 9th Avenue,Ft. Lauderdale, FL
Project No:	H5115037
Drilled:	8/29/11
Boring No.:	B-4

Page 1 of 1

NODARSE & ASSOCIATES, INC

TEST BORING RECORD H5115037-CITY.GPJ NODARSE.GDT 9/16/11

NODARSE
A Terracon COMPANY

EXFILTRATION TEST LOG - EX-1

Client:	City of Fort Lauderdale Public Works - Utilities Engineering		Job # H5115037
Site:	4321 NW 9th Avenue, Fort Lauderdale, Florida		Test # 1
Project:	Fiveash Water Plant - Disinfection System Replacement		Date: 8/29/2011
Test:	Usual Type Open Hole Exfiltration Test		
Surface Elevation:	Ground Surface	Water table from ground surface: (ft)	9.00

Casing Diameter: 4 inches

Tube Depth: 10 Ft

Sample Location: As shown on Boring Location Diagram

Subsurface Profile:

Depth (ft)		Soil Description
0 - 2.0	**SAND**	with limerock, fine, light brown
2.0 - 10.0	**SAND**	fine, light brown

One Minute Increment	Pumping Rate in Gal/Min
1	1.25
2	1.25
3	1.25
4	1.25
5	1.25
6	1.25
7	1.25
8	1.25
9	1.25
10	1.25

$$K = \frac{4Q}{\Pi d(2H^2 + 4HDs + dH)} \times \frac{1}{448.83}$$

(Conversion Factor gpm to csf)

Q =	Average Stabilized Rate:	1.25	Gal/Min
H =	Depth to Groundwater Level:	9	Ft
Ds =	Saturated Depth:	1	Ft
d =	Diameter of Test Hole:	4	Inches
D =	Depth of Hole:	10	Ft
K =	Hydraulic Conductivity	**K =**	**5.29E-05** **cfs/ft^{2}ft.head**

EXFILTRATION TEST LOG - EX-2

Client:	City of Fort Lauderdale Public Works - Utilities Engineering		Job # H5115037
Site:	4321 NW 9th Avenue, Fort Lauderdale, Florida		Test # 2
Project:	Fiveash Water Plant - Disinfection System Replacement		Date: 8/30/2011
Test:	Usual Type Open Hole Exfiltration Test		
Surface Elevation:	Ground Surface	Water table from ground surface: (ft)	8.75

Casing Diameter: 4 inches

Tube Depth: 10 Ft

Sample Location: As shown on Boring Location Diagram

Subsurface Profile:

Depth (ft)		Soil Description
0 - 2.0	**SAND**	with limerock, fine, light brown
2.0 - 10.0	**SAND**	fine, light brown

One Minute Increment	Pumping Rate in Gal/Min
1	1.30
2	1.30
3	1.30
4	1.30
5	1.30
6	1.30
7	1.30
8	1.30
9	1.30
10	1.30

$$K = \frac{4Q}{\Pi d(2H^2 + 4HDs + dH)} \times \frac{1}{448.83}$$

(Conversion Factor gpm to csf)

Q =	Average Stabilized Rate:	1.30	Gal/Min	
H =	Depth to Groundwater Level:	8.75	Ft	
Ds =	Saturated Depth:	1.25	Ft	
d =	Diameter of Test Hole:	4	Inches	
D =	Depth of Hole:	10	Ft	
K =	Hydraulic Conductivity	**K =**	**5.54E-05**	**cfs/ft^{2}ft.head**

APPENDIX C

Yard Piping Drawings

Note: These drawings are a part of the Contract Documents for City of Fort Lauderdale Project Number 12197. These drawings represent the best available information regarding underground utilities. All utilities are not necessarily shown. Neither the Owner nor the Engineer warrant the accuracy of the information contained herein. The Contractor shall perform exploratory excavations as required to verify the location and elevation of existing underground utilities that may interfere with the work. Protect all utilities.

CITY OF FORT LAUDERDALE

PROJECT NO. 10338

FIVEASH WATER TREATMENT PLANT YARD PIPING CONSOLIDATION

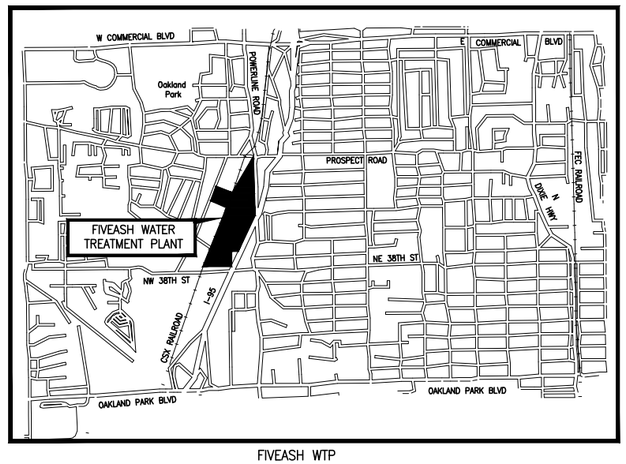
MAY 2001

SHEET No. TITLE

GENERAL

000	TITLE SHEET AND LOCATION MAP
G-1	ABBREVIATIONS, LEGENDS AND NOTES
M-1	YARD PIPING KEYPLAN
M-2	YARD PIPING PLAN – SHEET 1
M-3	YARD PIPING PLAN – SHEET 2
M-4	YARD PIPING PLAN – SHEET 3
M-5	YARD PIPING PLAN – SHEET 4
M-6	YARD PIPING PLAN – SHEET 5
M-7	YARD PIPING PLAN – SHEET 6

HAZEN AND SAWYER
Environmental Engineers & Scientists
4000 Hollywood Boulevard, Suite 750N
Hollywood, Florida 33021
(954) 987-0066



FIVEASH WTP
4321 NW 9TH AVENUE
FORT LAUDERDALE, FL 33309

NORTH

LOCATION MAP

NOT TO SCALE

FORT LAUDERDALE CITY COMMISSION

JIM NAUGLE	MAYOR – COMMISSIONER
GLORIA KATZ	COMMISSIONER – DISTRICT I
TIM SMITH	COMMISSIONER – DISTRICT II
CARLTON MOORE	COMMISSIONER – DISTRICT III
CINDI HUTCHINSON	COMMISSIONER – DISTRICT IV

PREPARED IN THE OFFICE OF
THE CITY ENGINEER
under the direct supervision
of _____
GEORGE A. BROWN, P.E.
FLA. REG. ENG. NO. 56076

SYMBOLS

WV	WATER VALVE
E	ELECTRIC MANHOLE COVER (CIRCULAR)
E	ELECTRIC MANHOLE COVER (SQUARE)
S	SANITARY MANHOLE
T	TELEPHONE MANHOLE
D	DRAINAGE MANHOLE
	POWER POLE
	CATCH BASIN
	FIRE HYDRANT
	POST TYPE HYDRANT
	LIGHT POLE
o WV	WATER VALVE BOX
o CO	CLEAN OUT
	FORCE MAIN VALVE
C.U.P.	CONCRETE UTILITY POLE
E.B.	ELECTRIC BOX
	SIGNS
	TREE (MISC. SPECIES)
	SPRINKLER
6' CL W/BW	FENCE, 6' CHAIN LINK WITH BARBED WIRE
	GUARD RAIL
	TREE CLUSTER
	BRUSH, SHRUBBERY
+ 7.17	EXISTING ELEVATION (IN FEET)
	SOIL BORING LOCATION
	BENCH MARK ELEVATION
	EXISTING PIPELINE (SINGLE LINE FOR DIA. ≤ 10")
	EXISTING PIPELINE (DOUBLE LINE FOR DIA. ≥ 12")
MW	MONITOR WELL
	CHECK VALVE
	MECHANICAL COUPLING
	HARNESSED MECHANICAL COUPLING
	GROOVED COUPLING
	HARNESSED EXPANSION JOINT
	EXPANSION JOINT
	REDUCER (DOUBLE LINE)

ABBREVIATIONS

VALVES, FITTINGS, ETC.

A.R.V.	AIR RELIEF VALVE
B.V.	BALL VALVE
B.F.	BLIND FLANGE
BF.V.	BUTTERFLY VALVE
C.V.	CHECK VALVE
CPLG.	COUPLING
E.D.	EQUIPMENT DRAIN
EXP.JT.	EXPANSION JOINT
F.H.	FIRE HYDRANT
FTG.	FITTING
FLG.	FLANGE
F.D.	FLOOR DRAIN
G.V.	GATE VALVE
H.B.	HOSE BIBB
L.R.	LONG RADIUS
MJ	MECHANICAL JOINT
NPT	NATIONAL PIPE THREAD
P.E.	PLAIN END
P.V.	PLUG VALVE
P.R.V.	PRESSURE RELIEF VALVE
R.D.	ROOF DRAIN
RED.	REDUCER
S.O.V.	SOLENOID OPERATED VALVE
THD.	THREADED

PIPING

A.G.P.	AMMONIA GAS PRESSURE
A.G.V.	AMMONIA GAS VACUUM
A.S.	AMMONIA SULUTION
B.S.P.	BLACK STEEL PIPE
C.G.P.	CHLORINE GAS PRESSURE
C.G.V.	CHLORINE GAS VACUUM
C.L.	CHLORINE LIQUID (ANHYDROUS)
C.S.	CHLORINE SOLUTION
CU	COPPER OR CUBIC
D.I.P.	DUCTILE IRON PIPE
F.M.	FORCE MAIN
F.W.	FINISHED WATER
G.S.P.	GALVANIZED STEEL PIPE
I.P.S.	IRON PIPE SIZE
POLY	POLYMER
PVC	POLYVINYLCHLORIDE
P.W.	POTABLE WATER
P.C.C.P.	PRECAST CONCRETE CYLINDER PIPE
R.C.P.	REINFORCED CONCRETE PIPE
R.W.	RAW WATER
S.D.	SLUDGE DISCHARGE
W.B.D.	WASHWATER BASIN DISCHARGE
W.B.I.	WASHWATER BASIN INFLUENT

GENERAL

AL., ALUM.	ALUMINUM
APPROX.	APPROXIMATE
BOT.	BOTTOM
C.B.	CATCH BASIN
C.L., |	CENTER LINE
C.C.	CENTER TO CENTER
C.O.	CLEAN OUT
COND.	CONDUIT
CN	CONCENTRATE WATER
CONC.	CONCRETE
DIA.	DIAMETER
DISCH.	DISCHARGE
EFF.	EFFLUENT
ELEC.	ELECTRIC
EL., ELEV.	ELEVATION
E.M.H.	ELECTRIC MANHOLE
EXIST.	EXISTING
FR	FUEL RETURN
FS	FUEL SUPPLY
GALV.	GALVANIZED
GD	GRAVITY DRAIN
GR.	GRADE
H.S.	HIGH SERVICE
INFL.	INFLUENT
I.D.	INSIDE DIAMETER
INV.	INVERT
M.G.	MILLION GALLON
M.H.	MANHOLE
M.W.	MONITOR WELL
N.T.S.	NOT TO SCALE
POT.	POTABLE
P.S.	PUMP STATION
P.W.	POTABLE WATER
R/W, R.O.W.	RIGHT OF WAY
RW	RAW WATER
SAN.	SANITARY
S.A.	SULFURIC ACID
SCH	SCHEDULE
S.H.	SODIUM HYDROXIDE
SOFT.	SOFTENED WATER
S.S.	STAINLESS STEEL OR SANITARY SEWER
STL.	STEEL
T.O.P.	TOP OF PIPE
TYP.	TYPICAL
VAC.	VACUUM
XFER.	TRANSFER
WTR.	WATER

NOTES

THESE DRAWINGS WERE REPRODUCED FROM THE BEST AVAILABLE INFORMATION IN THE FOLLOWING RECORD DRAWINGS PROVIDED BY THE CITY OF FORT LAUDERDALE PUBLIC SERVICES DEPARTMENT:

	PROJECT NAME	DESIGN FIRM	RECORD DRAWING DATE	CITY PROJECT No.
1.	7 MG STORAGE TANK	MONTGOMERY WATSON	AUG., 1999	9854
2.	AQUIFER STORAGE AND RECOVERY SYSTEM	MONTGOMERY WATSON	FEB., 1999	P-9771
3.	FILTER WASHWATER RECOVERY FACILITY	MONTGOMERY WATSON	AUG., 1994	8143-H
4.	PHASE 2 INTERIM PLANT IMPROVEMENTS	MONTGOMERY WATSON	JUL., 1994	8143-B
5.	PLANT EXPANSION - PHASE 1	MALCOLM PIRNIE INC.	MAR. 24, 1988	7778
6.	FLOURIDATION & ADDITIONAL CHEMICAL FEED FACILITIES	MALCOLM PIRNIE INC.	JAN. 16, 1987	7642
7.	TREATMENT UNIT ADDITION AND MISCELLANEOUS WORK	MALCOLM PIRNIE INC.	JUL. 1, 1983	7532
8.	YARD PIPING - PART 1 ADDITIONS	ROSS, SAARINEN, BOLTON & WILDER, INC.	FEB., 1977	100-73-06
9.	FIRST ADDITION TO FIVEASH WTP	PHILPOTT, ROSS & SAARINEN	AUG., 1958	630

THE ENGINEER HAS NOT VERIFIED THE ACCURACY OF SUCH INFORMATION AND SHALL NOT BE RESPONSIBLE FOR ANY ERRORS OR OMISSIONS WHICH MAY BE INCORPORATED HEREIN AS A RESULT.

HAZEN AND SAWYER
Environmental Engineers & Scientists
4000 Hollywood Boulevard, Suite 750N
Hollywood, Florida 33021
(954) 987-0066

02/22/01

FINAL APPROVAL
FLA. REG. ENG. NO.
Bid 263-11809

SCALE: N.T.S.
DATE: 02/22/01
FIELD BOOK:
DRAWN BY: JC
DESIGNED BY:
CHECKED BY: G.A.B.

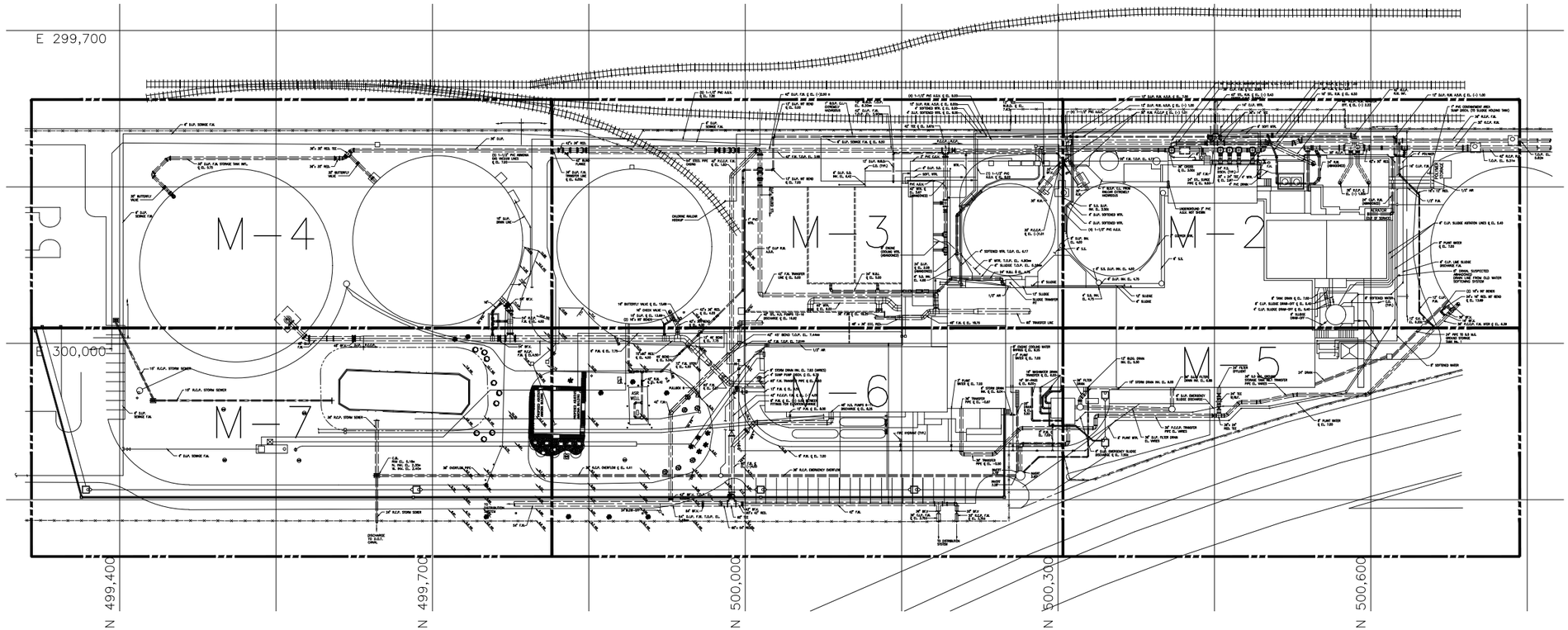
CITY OF FORT LAUDERDALE
PUBLIC SERVICES DEPARTMENT
ENGINEERING DIVISION
FORT LAUDERDALE, FLORIDA

REVISIONS

NO.	DATE	BY	CHK'D	DESCRIPTION

PROJECT #10338
FIVEASH WTP
YARD PIPING CONSOLIDATION
ABBREVIATIONS, LEGENDS, AND NOTES

NO. OF SHEETS: 09
SHEET NO.: G-1
CAD FILE NO. 10338-G01-009NOTE
FILE NO.



KEY PLAN
1" = 60'

HAZEN AND SAWYER
Environmental Engineers & Scientists
4000 Hollywood Boulevard, Suite 750N
Hollywood, Florida 33021
(954) 987-0066

02/22/01

FINAL APPROVAL	Bid 265-11809
	FLA. REG. ENG. NO.

DRAWN BY: J.C.	SCALE: 1" = 60'
DESIGNED BY:	DATE: 02/22/01
CHECKED BY: G.A.B.	FIELD BOOK:

CITY OF FORT LAUDERDALE
PUBLIC SERVICES DEPARTMENT
ENGINEERING DIVISION
FORT LAUDERDALE, FLORIDA

REVISIONS				
NO.	DATE	BY	CHK'D	DESCRIPTION

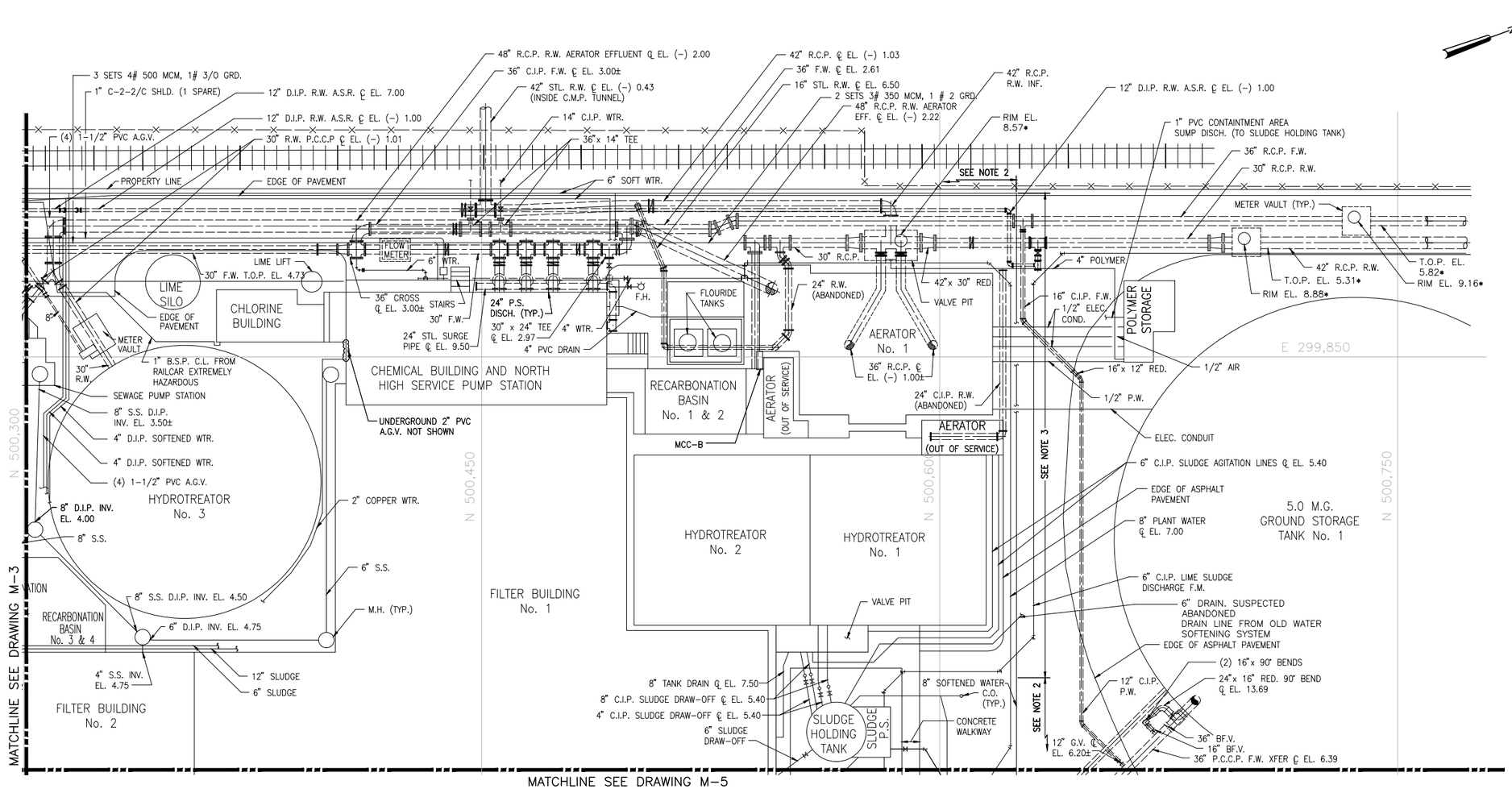
PROJECT #10338
FIVEASH WTP
YARD PIPING CONSOLIDATION
YARD PIPING KEYPLAN

NO. OF SHEETS: 09

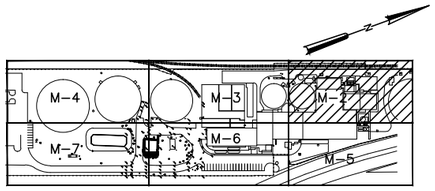
SHEET NO.: M-1

CAD FILE NO. 10338-M01-009KEYP

FILE NO.



EXISTING YARD PIPING PARTIAL PLAN
1"=20'



KEY-PLAN
N.T.S.

NOTES:

1. BASED ON INFORMATION FROM CITY STAFF.
2. THE LINE ILLUSTRATED ON THIS DRAWING IN THIS DIRECTION IS BASED ON RECORD DRAWING INFORMATION. THIS INFORMATION HAS NOT BEEN VERIFIED.
3. THE LINE ILLUSTRATED ON THIS DRAWING WITHIN THE LIMITS SHOWN IS BASED ON INFORMATION PROVIDED BY CITY STAFF. THIS INFORMATION HAS NOT BEEN VERIFIED.
4. ELEVATIONS MARKED WITH AN * ARE BASED ON INFORMATION PROVIDED BY KATHLEEN L. HALL LAND SURVEYING, INC.

HAZEN AND SAWYER
Environmental Engineers & Scientists
4000 Hollywood Boulevard, Suite 750N
Hollywood, Florida 33021
(954) 987-0066

02/22/01

7/22/2016 10:00 AM

FINAL APPROVAL | FLA. REG. ENG. NO. | Bid 203-11809

DRAWN BY: J.C.	DESIGNED BY:	SCALE: 1" = 20'	DATE: 02/22/01	CHECKED BY: G.A.B.	FIELD BOOK:

CITY OF FORT LAUDERDALE
PUBLIC SERVICES DEPARTMENT
ENGINEERING DIVISION
FORT LAUDERDALE, FLORIDA

REVISIONS

NO.	DATE	BY	CHK'D	DESCRIPTION

PROJECT #10338
FIVEASH WTP
YARD PIPING CONSOLIDATION
YARD PIPING PLAN
SHEET 1

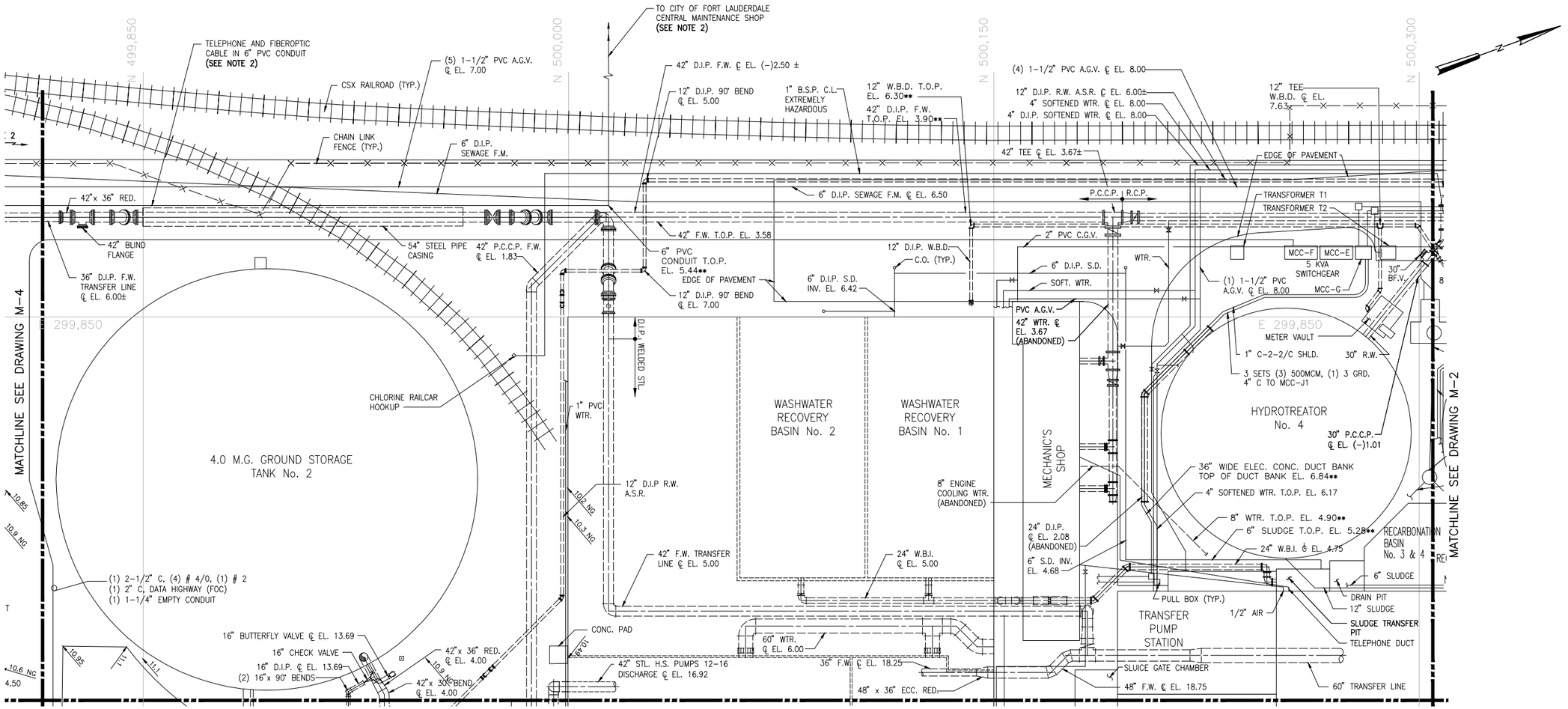
NO. OF SHEETS: 09

SHEET NO.: M-2

CAD FILE NO. 10338-M02-009PIPE

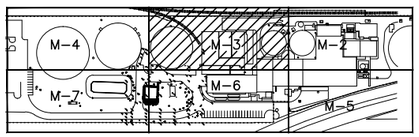
FILE NO.

CAM 16-1217
EXHIBIT 3 p. 357
125-15



MATCHLINE SEE DRAWING M-6

EXISTING YARD PIPING PARTIAL PLAN
1"=20'



KEY-PLAN
N.T.S.

NOTES:

1. ELEVATIONS MARKED WITH ** ARE BASED ON TEST PIT (i.e., POTHOLING) INFORMATION PROVIDED BY UNDERGROUND SERVICES, INC.
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Environmental Engineers & Scientists
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Hollywood, Florida 33021
(954) 987-0066

02/22/01

7/22/2016 10:00 AM

FINAL APPROVAL | FLA. REG. ENG. NO.

DRAWN BY: J.C. | SCALE: 1" = 20' | FIELD BOOK:
DESIGNED BY: | DATE: 02/22/01
CHECKED BY: G.A.B.

CITY OF FORT LAUDERDALE
PUBLIC SERVICES DEPARTMENT
ENGINEERING DIVISION
FORT LAUDERDALE, FLORIDA

REVISIONS

NO.	DATE	BY	CHK'D	DESCRIPTION

PROJECT #10338
FIVEASH WTP
YARD PIPING CONSOLIDATION
YARD PIPING PLAN
SHEET 2

NO. OF SHEETS: 09

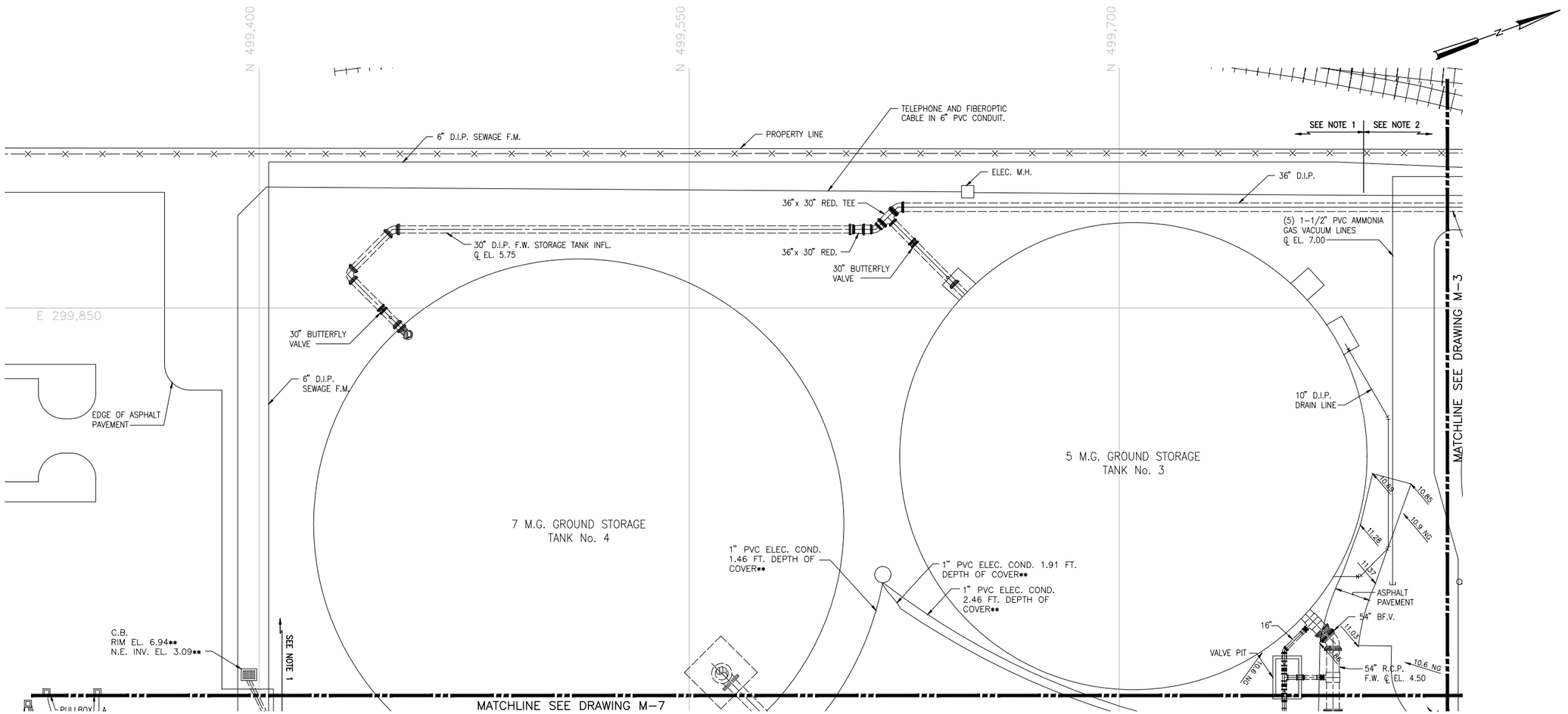
SHEET NO.: M-3

CAD FILE NO. 10338-M03-009PIPE

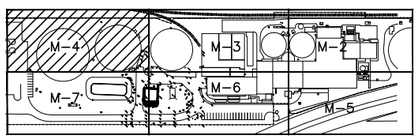
FILE NO.

Bid 263-11809

CAM 16-1217
EXHIBIT 3
p 358



EXISTING YARD PIPING PARTIAL PLAN
1"=20'



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FLA. REG. ENG. NO.

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SCALE: 1" = 20'
DATE: 02/22/01
FIELD BOOK:

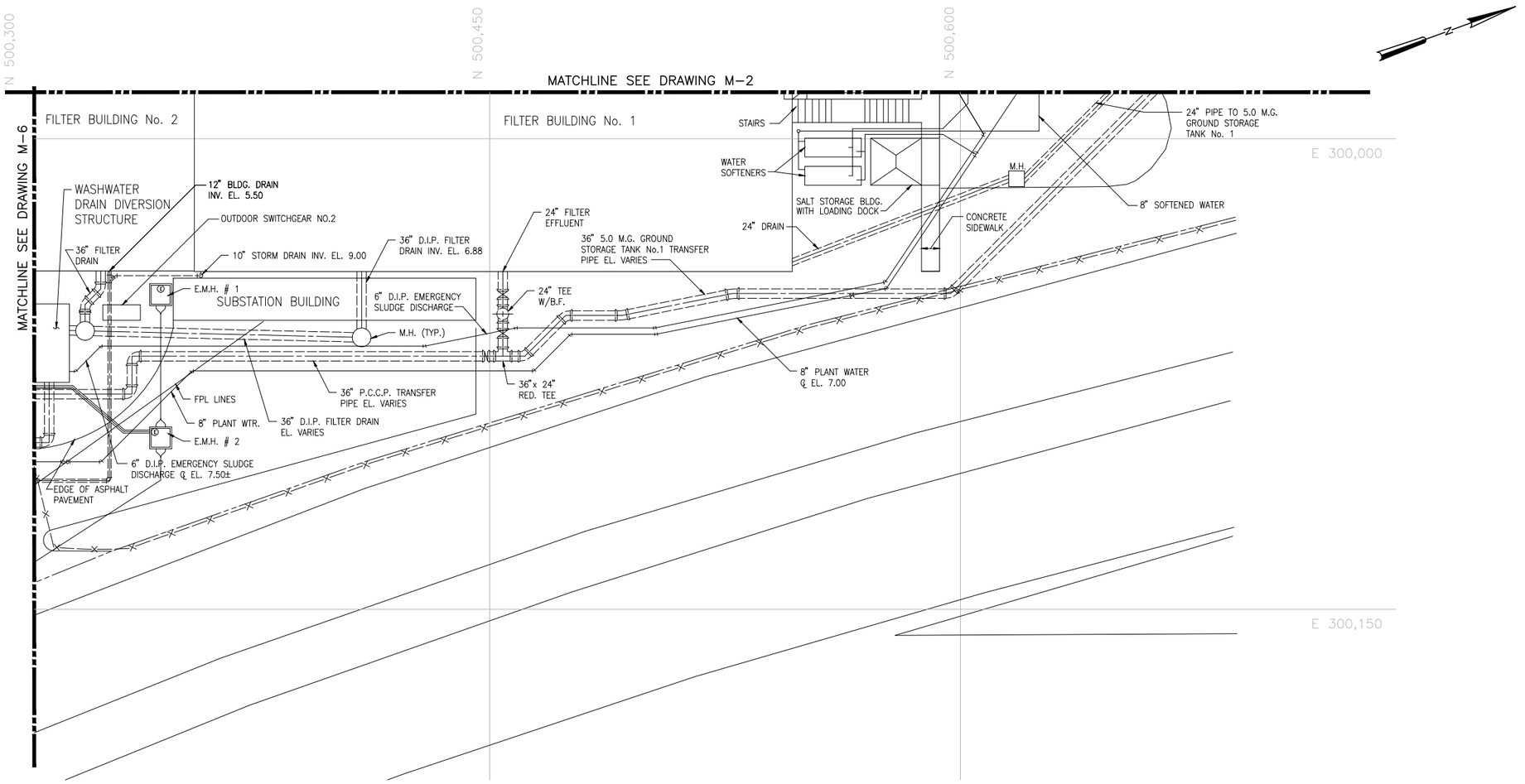
CITY OF FORT LAUDERDALE
PUBLIC SERVICES DEPARTMENT
ENGINEERING DIVISION
FORT LAUDERDALE, FLORIDA

REVISIONS

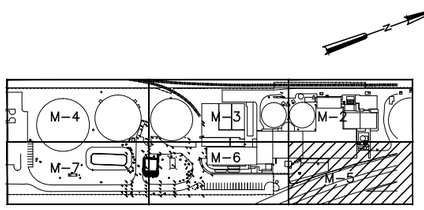
NO.	DATE	BY	CHK'D	DESCRIPTION

PROJECT #10338
FIVEASH WTP
YARD PIPING CONSOLIDATION
YARD PIPING PLAN
SHEET 3

NO. OF SHEETS: 09
SHEET NO.: M-4
CAD FILE NO. 10338-M04-009PIPE
FILE NO.



EXISTING YARD PIPING PARTIAL PLAN
1"=20'



KEY-PLAN
N.T.S.

HAZEN AND SAWYER
Environmental Engineers & Scientists
4000 Hollywood Boulevard, Suite 750N
Hollywood, Florida 33021
(954) 987-0066

02/22/01

7/22/2016 10:00 AM

FINAL APPROVAL
FLA. REG. ENG. NO.
Bid 263-11809

SCALE: 1" = 20'
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CHECKED BY: G.A.B.

CITY OF FORT LAUDERDALE
PUBLIC SERVICES DEPARTMENT
ENGINEERING DIVISION
FORT LAUDERDALE, FLORIDA

REVISIONS

NO.	DATE	BY	CHK'D	DESCRIPTION

PROJECT #10338
FIVEASH WTP
YARD PIPING CONSOLIDATION
YARD PIPING PLAN
SHEET 4

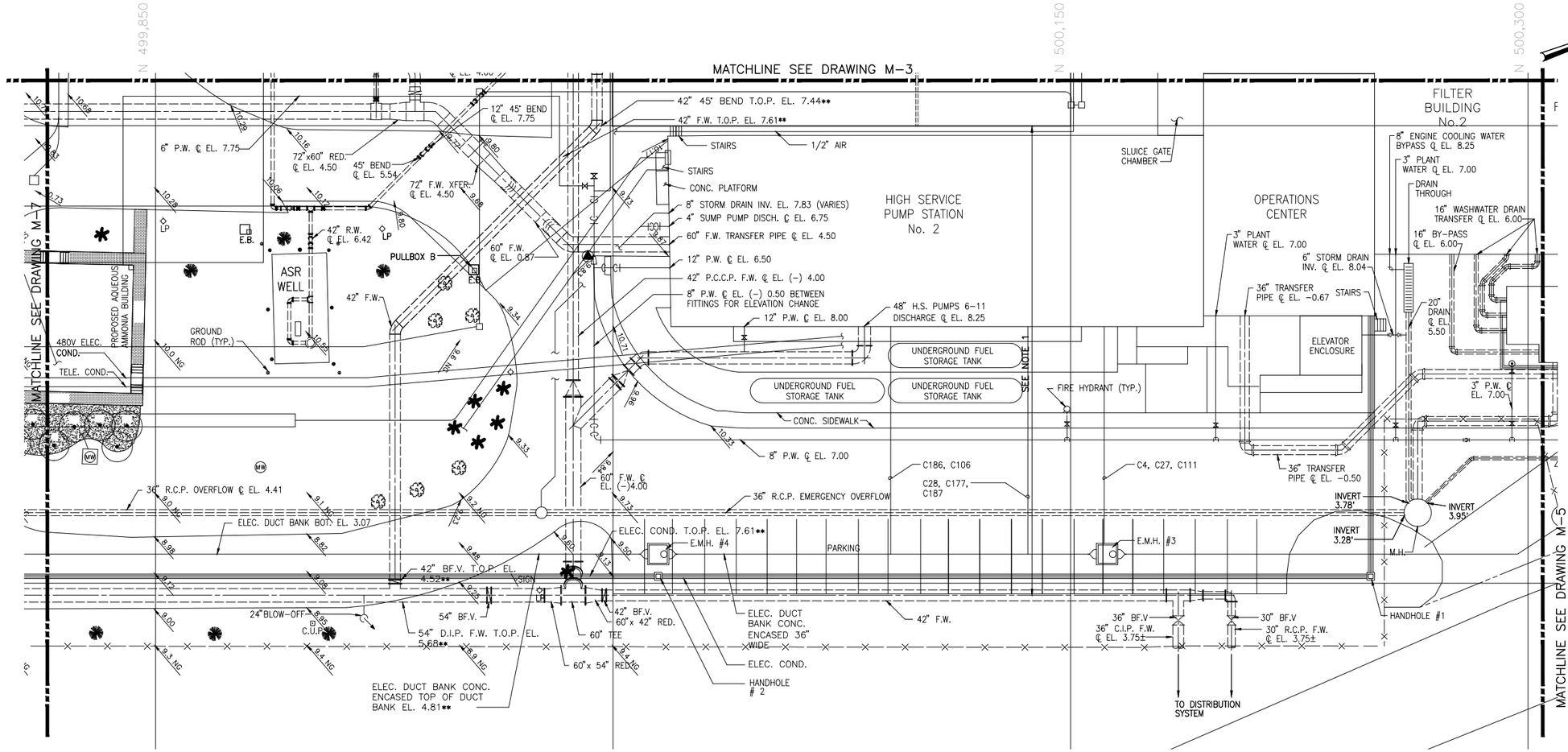
NO. OF SHEETS: 09

SHEET NO.: M-5

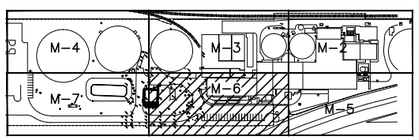
CAD FILE NO. 10338-M05-009PIPE

FILE NO.

CAM 16-1217
EXHIBIT 3
p. 365



EXISTING YARD PIPING PARTIAL PLAN
1"=20'



KEY–PLAN
N.T.S.

CONDUIT & CABLE SCHEDULE

CONDUIT NO.	CONDUIT SIZE	CABLE NO.	CABLE SIZE	FROM	TO	PURPOSE	REMARKS
C4	(2)4"	6	500 MCM	EXIST. 5KV SPARE SW #D	HIGH SERVICE PUMP SWITCHGEAR "HSP–SW)	POWER GROUND	5KV CABLE 600 V CABLE
C27	4"	–	–	SWITCH "D"	HSP SW	EMPTY CONDUIT	
C28	(2)4"	–	–	SWITCH "B"	HSP SW1	EMPTY CONDUIT	
C106	3"	4 1	#500 #4/0	MCC # J	EXIST. UTIL. BLD. ATS.	POWER & NEUTRAL GROUND	UTILIZE EXIST. CONDUIT FROM PBA TO ATS.
C111	1"	4 3	8 10	LP–HS3	JB # 111	POWER & NEUTRAL PWR, NEUTRAL GRD.	POWER FOR SUMP PUMPS (120V)
a	1"	2 1	8 10	JB # 111 IN M.H. # 3	JB IN M.H. # 4	POWER & NEUTRAL GRD.	
b	1"	2 1	8 10	JB # 111	JB IN M.H. # 2	POWER & NEUTRAL GRD.	
c	1"	2 1	8 10	JB # 111 IN M.H. # 3	JB IN M.H. # 1	POWER & NEUTRAL GRD.	
C177	2"	3 1	# 2/0 # 2	MCC # K	JB # 177 FOR WASH–WATER TRANS. PUMP # 1	POWER & NEUTRAL PWR, NEUTRAL GRD.	POWER GROUND
C186	(2)2"	–	–	MCC # K	MH # 6	EMPTY CONDUIT FOR FUTURE CALCINING FACILITIES.	
C187	1"	18	# 14	MCC # K	WASHWATER TRANSFER PUMP. CONT. PNL.	CONTROL	

NOTES:

1. AS INDICATED ON SHEET No. 6 FOR THE "YARD PIPING – PART 1 ADDITIONS" PROJECT No. 100–73–06 THIS PIPE C (42" F.W.) LOCATION WAS FIELD VERIFIED AS 152'± FROM THE FACE OF THE INDICATED STRUCTURE (i.e., THE OLD 2.0 MILLION GALLON RESERVOIR).
2. ELEVATIONS MARKED WITH ** ARE BASED ON TEST PIT (i.e., POTHOLING) INFORMATION PROVIDED BY UNDERGROUND SERVICES, INC.

HAZEN AND SAWYER
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4000 Hollywood Boulevard, Suite 750N
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FINAL APPROVAL
FLA. REG. ENG. NO.

SCALE: 1" = 20'
DATE: 02/22/01
FIELD BOOK:
DRAWN BY: J.C.
DESIGNED BY:
CHECKED BY: G.A.B.

CITY OF FORT LAUDERDALE
PUBLIC SERVICES DEPARTMENT
ENGINEERING DIVISION
FORT LAUDERDALE, FLORIDA

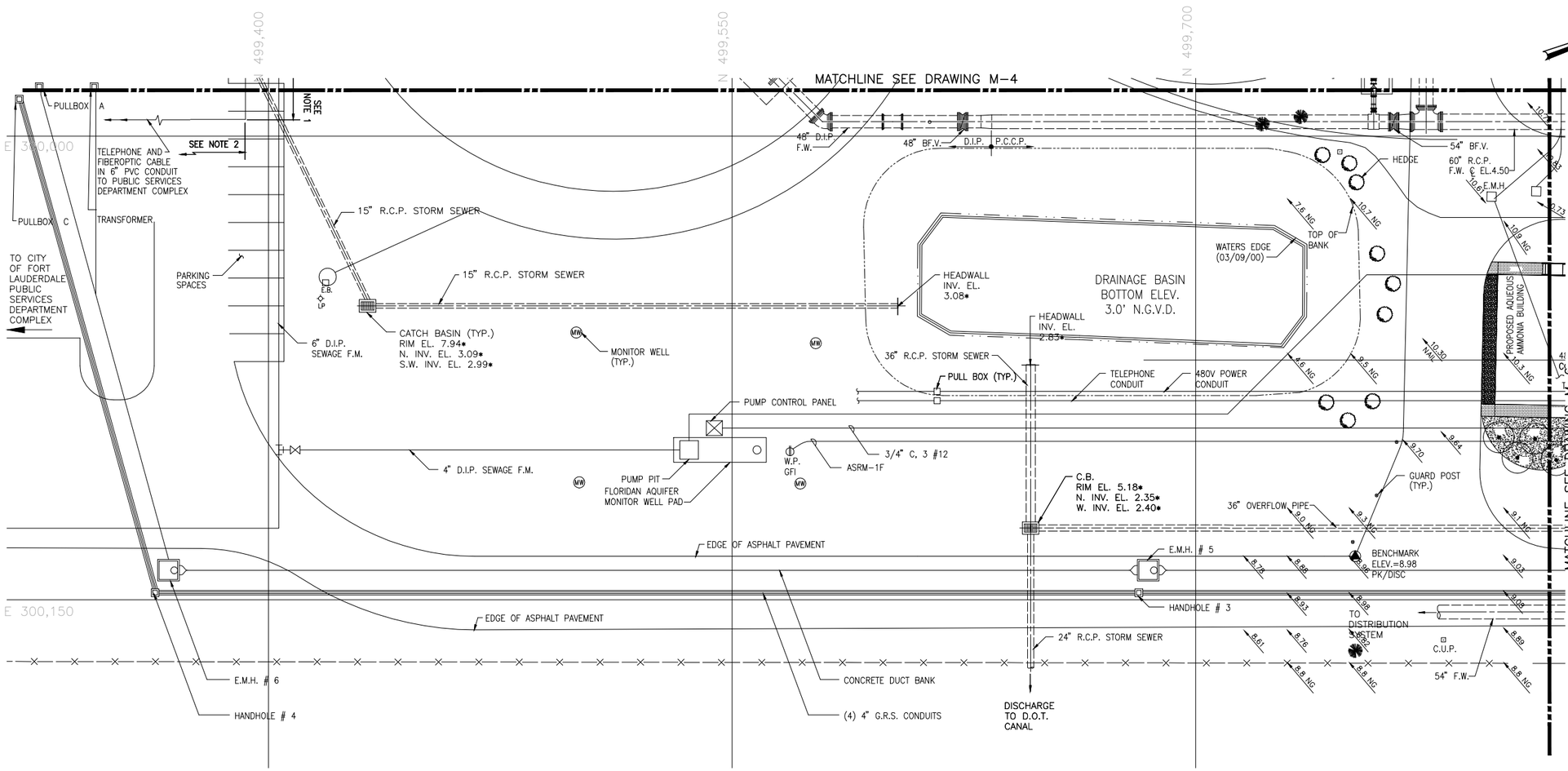
REVISIONS

NO.	DATE	BY	CHK'D	DESCRIPTION

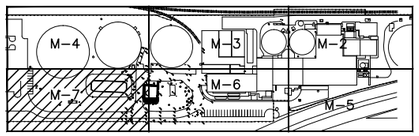
PROJECT #10338
FIVEASH WTP
YARD PIPING CONSOLIDATION
YARD PIPING PLAN
SHEET 5

NO. OF SHEETS: 09
SHEET NO.: M–6
CAD FILE NO. 10338–M06–009PIPE
FILE NO.

02/22/01



EXISTING YARD PIPING PARTIAL PLAN
1"=20'



KEY-PLAN
N.T.S.

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02/22/01

7/22/2016 10:00 AM

FINAL APPROVAL
FLA. REG. ENG. NO.
Bid 263-11809

DRAWN BY:	SCALE: 1" = 20'
J.C.	
DESIGNED BY:	DATE: 02/22/01
CHECKED BY: G.A.B.	FIELD BOOK:

CITY OF FORT LAUDERDALE
PUBLIC SERVICES DEPARTMENT
ENGINEERING DIVISION
FORT LAUDERDALE, FLORIDA

REVISIONS

NO.	DATE	BY	CH'D	DESCRIPTION

PROJECT #10338
FIVEASH WTP
YARD PIPING CONSOLIDATION
YARD PIPING PLAN
SHEET 6

NO. OF SHEETS: 09

SHEET NO.: M-7

CAD FILE NO. 10338-M07-009PIPE

FILE NO.

CAM 16-1217
EXHIBIT 3
P. 125-15
P. 362

BID 263-11809 / PROJECT 12197 SPECIFIC REFERENCES

Submit proof of the construction of a minimum of three projects that include repair/replacement of concrete pressure pipe 24-inch nominal diameter and larger at an operating water or wastewater treatment plant within the past 10 years.

PROJECT:

WORK PERFORMED:

DATES OF PROJECT – START / COMPLETION

OWNER:

ADDRESS:

CONTACT NAME:

CURRENT E-MAIL ADDRESS:

PHONE / FAX NUMBER:

PROJECT:

WORK PERFORMED:

DATES OF PROJECT – START / COMPLETION

OWNER:

ADDRESS:

CONTACT NAME:

CURRENT E-MAIL ADDRESS:

PHONE / FAX NUMBER:

PROJECT:

WORK PERFORMED:

DATES OF PROJECT – START / COMPLETION

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PHONE / FAX NUMBER:

PROJECT:

WORK PERFORMED:

DATES OF PROJECT – START / COMPLETION

OWNER:

ADDRESS:

CONTACT NAME:

CURRENT E-MAIL ADDRESS:

PHONE / FAX NUMBER:

CITY OF FORT LAUDERDALE
PUBLIC WORKS DEPARTMENT

MINORITY BUSINESS ENTERPRISE (MBE) - WOMEN BUSINESS ENTERPRISE (WBE)

PRIME CONTRACTOR IDENTIFICATION FORM

In order to assist us in identifying the status of those companies doing business with the City of Fort Lauderdale, this form must be completed and returned with your bid package.

Name of Firm:	
Address of Firm:	
Telephone Number:	
Name of Person Completing Form:	
Title:	
Signature:	
Date:	
City Project Number:	
City Project Description:	

Please check the item(s) which properly identify the status of your firm:

☐ Our firm is not a MBE or WBE.

☐ Our firm is a MBE, as at least 51 percent is owned and operated by one or more socially and economically disadvantaged individuals.

☐ American Indian ☐ Asian ☐ Black ☐ Hispanic

☐ Our firm is a WBE, as at least 51 percent is owned and operated by one or more women.

☐ American Indian ☐ Asian ☐ Black ☐ Hispanic

MBE/WBE CONTRACTOR INFORMATION

The City, in a continuing effort, is encouraging the increased participation of minority and women-owned businesses in Public Works Department related contracts. Along those lines, we are requiring that each firm provide documentation detailing their own programs for utilizing minority and women-owned businesses.

Submit this information as a part of this bid package and refer to the checklist, to ensure that all areas of concern are covered. The low responsive bidder may be contacted to schedule a meeting to discuss these objectives. It is our intention to proceed as quickly as possible with this project, so your cooperation in this matter is appreciated.

CONTRACTOR CHECKLIST

☐ List Previous City of Fort Lauderdale Contracts

☐ Number of Employees in your firm

--Percent (%) Women

--Percent (%) Minorities

--Job Classifications of Women and Minorities

☐ Use of minority and/or women subcontractors on past projects.

☐ Nature of the work subcontracted to minority and/or women-owned firms.

☐ How are subcontractors notified of available opportunities with your firm?

☐ Anticipated amount to be subcontracted on this project.

☐ Anticipated amount to be subcontracted to minority and/or women-owned businesses on this project.

TRENCH SAFETY

Bidder acknowledges that included in the appropriate bid items of his bid and in the Total Bid Price are costs for complying with the Florida Trench Safety Act, Florida Statutes 553.60 – 553.64. The bidder further identifies the costs of such compliance to be summarized below:

Trench Safety Measure (Description)	Units of Measure (LF/SF)	Unit (Quantity)	Unit Cost	Extended Cost
A.			$	$
B.			$	$
C.			$	$
D.			$	$

Total: $

The bidder certifies that all trench excavation done within his control in excess of five feet (5') in depth shall be in accordance with the Occupational Safety and Health Administration's excavation safety standards, C.F.R. s. 1926.650 Subpart P., and the Florida Trench Safety Act, Florida Statutes 553.60-553.64.

Failure to complete the above may result in the bid being declared non-responsive.

DATE: (SIGNATURE)

STATE OF: COUNTY OF:

PERSONALLY APPEARED BEFORE ME, the undersigned authority,

(Name of Individual Signing)

who, after first being duly sworn by me, affixed his/her signature in the space provided above on this day of , 20 .

NOTARY PUBLIC

My Commission Expires:

NON-COLLUSION STATEMENT:

By signing this offer, the vendor/contractor certifies that this offer is made independently and *free* from collusion. Vendor shall disclose below any City of Fort Lauderdale, FL officer or employee, or any relative of any such officer or employee who is an officer or director of, or has a material interest in, the vendor's business, who is in a position to influence this procurement.

Any City of Fort Lauderdale, FL officer or employee who has any input into the writing of specifications or requirements, solicitation of offers, decision to award, evaluation of offers, or any other activity pertinent to this procurement is presumed, for purposes hereof, to be in a position to influence this procurement.

For purposes hereof, a person has a material interest if they directly or indirectly own more than 5 percent of the total assets or capital stock of any business entity, or if they otherwise stand to personally gain if the contract is awarded to this vendor.

In accordance with City of Fort Lauderdale, FL Policy and Standards Manual, 6.10.8.3,

3.3. City employees may not contract with the City through any corporation or business entity in which they or their immediate family members hold a controlling financial interest (e.g. ownership of five (5) percent or more).

3.4. Immediate family members (spouse, parents and children) are also prohibited from contracting with the City subject to the same general rules.

Failure of a vendor to disclose any relationship described herein shall be reason for debarment in accordance with the provisions of the City Procurement Code.

NAME	RELATIONSHIPS

In the event the vendor does not indicate any names, the City shall interpret this to mean that the vendor has indicated that no such relationships exist.

QUESTIONNAIRE SHEET

PLEASE PRINT OR TYPE:

Firm Name:

President

Business Address:

Telephone:

Fax:

E-Mail Address:

What was the last project of this nature which you completed?

The following are named as three corporations and representatives of those corporations for which you have performed work similar to that required by this contract, and which the City may contact as your references (include addresses and telephone numbers):

How many years has your organization been in business?

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

The name of the qualifying agent for the firm and his position is:

Certificate of Competency Number of Qualifying Agent:

Effective Date: Expiration Date:

Licensed in: Contractor's License #(s)

(County/State)

Expiration Date:

NOTE: To be considered for award of this contract, the bidder must submit a financial statement upon request.

Contractor must have proper licensing prior to submitting bid and must submit evidence of same with bid.

QUESTIONNAIRE SHEET

1. Have you personally inspected the proposed work and have you a complete plan for its performance?

2. Will you sublet any part of this work? If so, list the portions or specialties of the work that you will.

a)
b)
c)
d)
e)
f)
g)

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

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

5. What equipment will you rent for the proposed work?

LOCAL BUSINESS PREFERENCE

Section 2-199.2, Code of Ordinances of the City of Fort Lauderdale, (Ordinance No. C-12-04), provides for a local business preference.

In order to be considered for a local business preference, a bidder must include the Local Business Preference Certification Statement of this ITB, as applicable to the local business preference class claimed **at the time of bid submittal**:

Upon formal request of the City, based on the application of a Local Business Preference the Bidder shall within ten (10) calendar days submit the following documentation to the Local Business Preference Class claimed:

A) Copy of City of Fort Lauderdale current year business tax receipt, **or** Broward County current year business tax receipt, **and**

B) List of the names of all employees of the bidder and evidence of employees' residence within the geographic bounds of the City of Fort Lauderdale or Broward County, as the case may be, such as current Florida driver license, residential utility bill (water, electric, telephone, cable television), or other type of similar documentation acceptable to the City.

Failure to comply at time of bid submittal shall result in the bidder being found ineligible for the local business preference.

THE COMPLETE LOCAL BUSINESS PREFERENCE ORDINANCE MAY BE FOUND ON THE CITY'S WEB SITE AT THE FOLLOWING LINK:
http:/www.fortlauderdale.gov/purchasing/index.htm

Definitions: The term "Business" shall mean a person, firm, corporation or other business entity which is duly licensed and authorized to engage in a particular work in the State of Florida. Business shall be broken down into four (4) types of classes:

1. Class A Business – shall mean any Business that has established and agrees to maintain a permanent place of business located in a non-residential zone and staffed with full-time employees within the limits of the City **and** shall maintain a staffing level of the prime contractor for the proposed work of at least fifty percent (50%) who are residents of the City.
2. Class B Business - shall mean any Business that has established and agrees to maintain a permanent place of business located in a non-residential zone and staffed with full-time employees within the limits of the City **or** shall maintain a staffing level of the prime contractor for the proposed work of at least fifty percent (50%) who are residents of the City.
3. Class C Business - shall mean any Business that has established and agrees to maintain a permanent place of business located in a non-residential zone **and** staffed with full-time employees within the limits of Broward County.
4. Class D Business – shall mean any Business that does not qualify as either a Class A, Class B, or Class C business.

LOCAL BUSINESS PREFERENCE CERTIFICATION STATEMENT

The Business identified below certifies that it qualifies for the local BUSINESS preference classification as indicated herein, and further certifies and agrees that it will re-affirm its local preference classification annually no later than thirty (30) calendar days prior to the anniversary of the date of a contract awarded pursuant to this ITB. Violation of the foregoing provision may result in contract termination.

(1) _____ Business Name is a **Class A** Business as defined in City of Fort Lauderdale Ordinance No. C-12-04, Sec.2-199.2. A copy of the City of Fort Lauderdale current year Business Tax Receipt **and** a complete list of full-time employees and their addresses shall be provided within 10 calendar days of a formal request by the City.

(2) _____ Business Name is a **Class B** Business as defined in the City of Fort Lauderdale Ordinance No. C-12-04, Sec.2-199.2. A copy of the Business Tax Receipt **or** a complete list of full-time employees and their addresses shall be provided within 10 calendar days of a formal request by the City.

(3) _____ Business Name is a **Class C** Business as defined in the City of Fort Lauderdale Ordinance No. C-12-04, Sec.2-199.2. A copy of the Broward County Business Tax Receipt shall be provided within 10 calendar days of a formal request by the City.

(4) _____ Business Name requests a **Conditional Class A** classification as defined in the City of Fort Lauderdale Ordinance No. C-12-04, Sec.2-199.2. Written certification of intent shall be provided within 10 calendar days of a formal request by the City.

(5) _____ Business Name requests a **Conditional Class B** classification as defined in the City of Fort Lauderdale Ordinance No. C-12-04, Sec.2-199.2. Written certification of intent shall be provided within 10 calendar days of a formal request by the City.

(6) _____ Business Name is considered a **Class D** Business as defined in the City of Fort Lauderdale Ordinance No. C-12-04, Sec.2-199.2. and does not qualify for Local Preference consideration.

BIDDER'S COMPANY: _____

AUTHORIZED COMPANY PERSON: _____

NAME SIGNATURE DATE

CONTRACT PAYMENT METHOD

The City of Fort Lauderdale has implemented a Procurement Card (P-Card) program which changes how payments are remitted to its vendors. The City is transitioning from traditional paper checks to credit card payments via MasterCard or Visa as part of this program.

This allows you as a vendor of the City of Fort Lauderdale, to receive your payment fast and safely. No more waiting for checks to be printed and mailed.

In accordance with Article 7, item 7.6 of the contract, payments on this contract will be made utilizing the City's P-Card. Accordingly, bidders must presently have the ability to accept these credit cards or take whatever steps necessary to implement acceptance of a card before the start of the contract term, or contract award by the City.

Please indicate with which credit card you prefer to be paid:

☐ Master Card

☐ Visa Card

Company Name:	
Signature:	
Print Name Title:	

PROJECT NO. 12197

SECTION 00307 - CONTRACTOR SAFETY QUALIFICATION FORM

March 17, 2016

Contractor Safety Qualification
form for Existing
Chlorine Process Areas

Ladies and/or Gentlemen

The existing chlorine system at the City of Fort Lauderdale Fiveash Water Treatment Plant is subject to the Environmental Protection Agency's Risk Management Program (40 CFR 68) regulation. As part of the City's efforts to comply with these regulations and prevent the accidental release of hazardous gas, the City requires all contractors who propose to work on or adjacent to these systems to complete the attached *Contractor Safety Qualification Form*. The completed form should be returned with the bid proposal.

The information contained on this form will be evaluated as part of the overall selection process. Initially the City will disqualify contractors from work on or adjacent to the existing anhydrous ammonia and chlorine systems under any one of the following conditions:

- The contractor fails to complete and submit the *Contractor Safety Qualification Form*. The contractor will then be considered non-responsive and will not be considered for the work.
- The contractor reports a workman's compensation experience modification ratio (EMR) greater than 1.0 on two or more consecutive years, unless the contractor substantiates that the factors that caused the high EMR ratio were outside of the contractor's control.
- The contractor cannot document that its employees have adequate training for working on or around the hazards associated with anhydrous ammonia and/or chlorine.
- The contractor has experienced a workplace fatality in the last three years, unless the contractor substantiates that the factors that caused the fatality were outside of the contractor's control.

The contractors that are not disqualified from the work will be further evaluated based on the information contained in the *Contractor Safety Qualification Form*.

Very truly yours,

Daniel Lizarazo, P.E.
Project Manager II

Contractor Safety Qualification Form

SECTION 1: GENERAL INFORMATION

Project Name: City of Fort Lauderdale Fiveash Water Treatment Plant Hydrotreator 3 and 4 Influent Vault Modifications

Project No.: 12197

SECTION 2: COMPANY INFORMATION

Company Name:

Address1:

Address2:

City, State, Zip:

Telephone No.:

Fax No.:

SECTION 3: NAME(S) AND RELATIONSHIPS OF PARENT COMPANY, AFFILIATES, SUBSIDIARIES, PARTNERS

Company Name:

Address:

City, State, Zip:

Relationship:

Company Name:

Address:

City, State, Zip:

Relationship:

SECTION 4: INSURANCE COVERAGE

4.1 Please attach certificates showing the extent of coverage, exclusions and deductibles for the following:

- General Business Liability Insurance
- Professional Liability Insurance
- Contractors Pollution Liability Insurance
- Workman's Compensation Insurance

4.2 How long have you been covered by your current provider of Workman's Compensation Insurance?

Contractor Safety Qualification Form

4.3 List the Experience Modification Ratio (EMR) that has been applied to your company's workman's compensation insurance policy for the past five years:

Year	Intrastate EMR	Interstate EMR	Comments

4.4 List the contact information for an insurance broker who can verify your EMR's:

Name:

Address1:

Address2:

City, State, Zip:

Telephone No.:

If you do not have an EMR, please explain:

SECTION 5: INJURY AND FATALITY INFORMATION

5.1 Please transfer the numbers and rates of injuries and illnesses from your firm's OSHA No. 200 Logs to the table below:

	Year:		**Year:**		**Year:**	
Statistic	No.	Rate	No.	Rate	No.	Rate
Lost Workday Cases						
Restricted Workday Cases						
Medical Treatment (not First Aid) Cases						

Total Illness Cases						
Total Recordable Cases						
Fatalities						

5.2 If your company has had fatalities in the past three years include location, cause, and corrective actions in the space below:

SECTION 6: SAFETY MEETINGS

6.1 Do you require that *documented* safety meetings be held for:

- Field Supervisors? ☐ Yes ☐ No Frequency:
- Employees? ☐ Yes ☐ No Frequency:
- New Hires? ☐ Yes ☐ No Frequency:
- Subcontractors? ☐ Yes ☐ No Frequency:

SECTION 7: SAFETY AUDITS

7.1 Will a representative of your company audit safety practices on this job?

☐ Yes ☐ No

Name: Title:

How frequently will the representative visit the project site?

SECTION 8: HEALTH AND SAFETY PROGRAM

8.1 Does the company have a health and safety program? If yes, please give details below. (The contractor is encouraged to attach a copy of the program to satisfy this requirement).

8.2 Please give the name and telephone number of your company's health and safety officer, if any:

8.3 Name: Title:

Telephone No.:

SECTION 9: HEALTH AND SAFETY CITATIONS

9.1 Attach a list of any State or Federal Health and Safety citations received during the past three years. If no citations were received during this period, indicate by checking box: ‘

SECTION 10: SIGNATURE OF COMPANY OFFICER

I certify that to the best of my knowledge, information, and belief formed after reasonable inquiry, the information submitted is true, accurate, and complete.

Name (print): Title:

Signature: Date:

-END OF SECTION -

CONSTRUCTION BID CERTIFICATION

Please Note: All fields below must be completed. If the field does not apply to you, please note N/A in that field. If you are a foreign corporation, you may be required to obtain a certificate of authority from the department of state, in accordance with Florida Statute §607.1501 (visit http://www.dos.state.fl.us/).

Company: (Legal Registration)

Address:

City: State: Zip:

Telephone No. FAX No. Email:

Does your firm qualify for MBE or WBE status: MBE ☐ WBE ☐

If a corporation, state the name of the President, Secretary and Resident Agent. If a partnership, state the names of all partners. If a trade name, state the names of the individuals who do business under the trade name.

Name	Title	Name	Title
Name	Title	Name	Name

ADDENDUM ACKNOWLEDGEMENT - Bidder acknowledges that the following addenda have been received and are included in the bid:

Addendum No.	Date Received	Addendum No.	Date Received	Addendum No.	Date Received	Addendum No.	Date Received

VARIANCES: If you take exception or have variances to any term, condition, specification, or requirement in this bid you must specify such variance in the space provided below or reference in the space provided below all variances contained on other pages within your bid. Additional pages may be attached if necessary. No variances will be deemed to be part of the bid submitted unless such is listed and contained in the space provided below. The City does not, by virtue of submitting a variance, necessarily accept any variances. If no statement is contained in the below space, it is hereby implied that your response is in full compliance with this competitive solicitation. If you do not have variances, simply mark N/A. If submitting your response electronically through BIDSYNC you must also click the "Take Exception" button.

The below signatory affirms that he has or will obtain all required permits and licenses from the appropriate agencies, and that his firm is authorized to do business in the State of Florida. The below signatory agrees to furnish all labor, tools, material, equipment and supplies, and to sustain all the expense incurred in doing the work set forth in strict accordance with the bid plans and contract documents at the unit prices indicated if awarded a contract. The below signatory has not divulged to, discussed, or compared this bid with other bidders, and has not colluded with any other bidder or parties to this bid whatsoever. Furthermore, the undersigned guarantees the truth and accuracy of all statements and answers contained in this bid. The below signatory also hereby agrees, by virtue of submitting or attempting to submit a bid, that in no event shall the City's liability for bodder's direct, indirect, incidental, consequential, special or exemplary damages, expenses, or lost profits arising out of this competitive solicitation process, including but not limited to public advertisement, bid conferences, site visits, evaluations, oral presentations, or award proceedings exceed the amount of Five Hundred Dollars ($500.00). This limitation shall not apply to claims arising under any provision of indemnification or the City protest ordinance contained in this competitive solicitation.

Submitted by:

Name (printed)

Date:

Signature

Date:

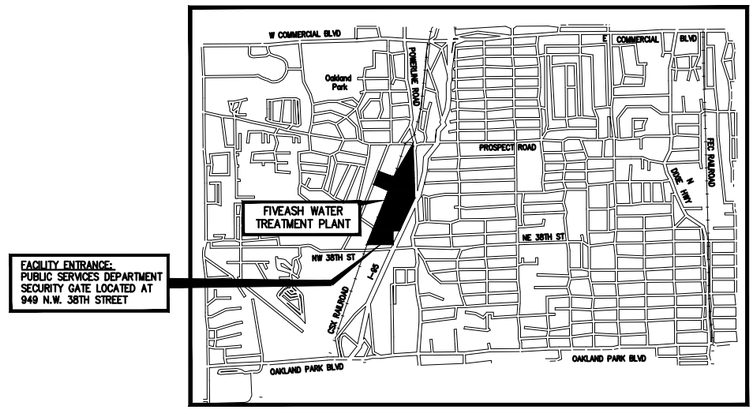
CITY OF FORT LAUDERDALE
PROJECT No. 12197

FIVEASH WATER TREATMENT PLANT
HYDROTREATORS 3 AND 4 INFLUENT VAULT MODIFICATIONS

BID SET
ISSUED: MARCH 2016

Hazen

HAZEN AND SAWYER
4000 HOLLYWOOD BOULEVARD, SUITE 750N
HOLLYWOOD, FLORIDA 33021
CERTIFICATE OF AUTHORIZATION NO. : 2771



FIVEASH WTP
4321 NW 9TH AVENUE
FORT LAUDERDALE, FL 33309
CONTROL ROOM: (954) 828-7838

NORTH

LOCATION MAP
NOT TO SCALE

FORT LAUDERDALE CITY COMMISSION

JOHN P. "JACK" SEILER	MAYOR
BRUCE G. ROBERTS	COMMISSIONER - DISTRICT I
DEAN J. TRANTALIS	COMMISSIONER - DISTRICT II
ROBERT L. McKINZIE	COMMISSIONER - DISTRICT III
ROMNEY ROGERS	COMMISSIONER - DISTRICT IV

PREPARED FOR THE OFFICE OF
THE CITY ENGINEER
under the direct supervision
of _____
GEORGE A. BROWN
FLA. P.E. NO. 56076

CITY OF FORT LAUDERDALE

PLOT DATE: 5/27/2016 3:28 PM BY: USER XREFs=

File = L:\AA-BACK GINNA\43190-027 Fiveash WTP Hydrotreator Influent Pipes\Drawings\General\G-01 - 3/17/2016 2:21 PM

GENERAL NOTES:

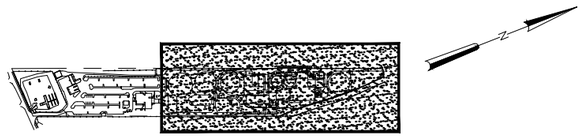
1. CONTRACTOR SHALL MAINTAIN ACCESS TO PRIVATE PROPERTY AT ALL TIMES.
2. CONTRACTOR SHALL MAINTAIN HIS WORK WITHIN THE LIMITS AS SHOWN ON THE STAGING PLAN.
3. THE CONTRACTOR SHALL TAKE ALL PRECAUTIONARY MEASURES TO PROTECT EXISTING PIPELINES OR UTILITIES WHETHER SHOWN OR NOT.
4. THE LOCATION OF EXISTING UTILITIES HAS BEEN PREPARED FROM THE MOST RELIABLE INFORMATION AVAILABLE TO THE ENGINEER. THE INFORMATION IS NOT GUARANTEED. THEREFORE THE CONTRACTOR SHALL VERIFY THE LOCATION AND ELEVATION OF ALL UTILITIES IN THE FIELD PRIOR TO THE START OF ANY CONSTRUCTION ACTIVITIES.
5. THE CONTRACTOR IS RESPONSIBLE FOR REPAIRING ALL UTILITY LINES AND SERVICES DAMAGED DURING CONSTRUCTION. ALL NECESSARY REPAIRS SHALL BE PERFORMED IMMEDIATELY UPON DAMAGE.
6. ALL ELEVATIONS ARE BASED ON NATIONAL GEODETIC VERTICAL DATUM (NGVD).
7. THE CONTRACTOR IS REQUIRED TO OBTAIN WRITTEN APPROVAL FROM THE ENGINEER FOR ANY DEVIATIONS FROM THE PLANS AND/OR SPECIFICATIONS.
8. THE CONTRACTOR SHALL FIELD VERIFY ALL DIMENSIONS AND ELEVATIONS PRIOR TO COMMENCEMENT OF CONSTRUCTION AND NOTIFY THE ENGINEER IMMEDIATELY OF ANY REQUIRED PLAN DEVIATIONS.
9. THE WORK LOCATION IS A CONFINED SPACE DUE TO LIMITED MEANS OF ENTRY/EXIT. THE CONTRACTOR SHALL ASSUME THE WORK LOCATION IS A PERMIT-REQUIRED CONFINED SPACE AND CONDUCT ITS WORK IN ACCORDANCE WITH APPLICABLE UNITED STATES DEPARTMENT OF LABOR OCCUPATIONAL SAFETY AND HEALTH ADMINISTRATION (OSHA) STANDARDS.

CHLORINE HAZARD NOTES:

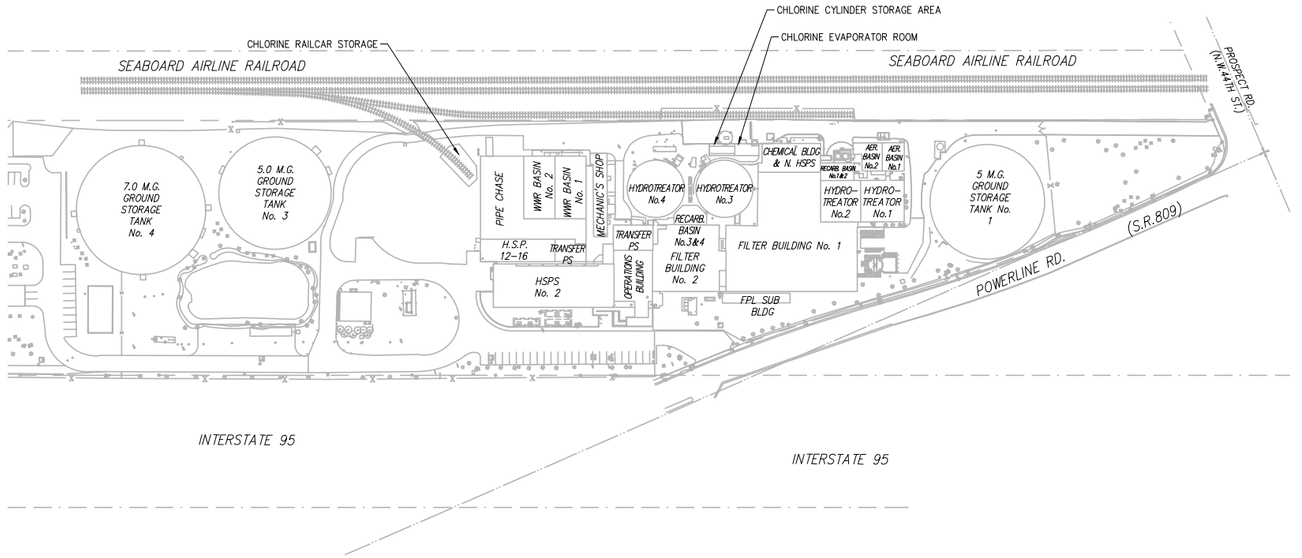
1. THE FACILITY STORES AND USES ANHYDROUS CHLORINE. THIS CHEMICAL IS HIGHLY TOXIC. EXPOSURE TO THIS CHEMICAL CAN CAUSE SEVERE INJURY AND DEATH.
2. THE CONTRACTOR AND THE OWNER ARE REGULATED UNDER VOLUME 40 CODE OF FEDERAL REGULATION PART 68.
3. PRIOR TO INITIATING CONSTRUCTION ACTIVITIES:
   A) COORDINATE WITH THE OWNER TO OBTAIN A COPY OF THE OWNER'S FACILITY EMERGENCY RESPONSE PLAN.
   B) COORDINATE WITH THE OWNER TO TRAIN ALL CONSTRUCTION STAFF ON THE OWNER'S PLANT EVACUATION PROCEDURES.

STRUCTURAL NOTES:

1. THESE NOTES ARE GENERAL AND SUPPLEMENT THE SPECIFICATIONS. THESE NOTES APPLY TO THE ENTIRE PROJECT UNLESS MODIFIED OR NOTED OTHERWISE IN THE CONTRACT DOCUMENTS.
2. DESIGN IS IN ACCORDANCE WITH AND CONSTRUCTION SHALL COMPLY WITH THE PROVISIONS OF THE FLORIDA BUILDING CODE 2014.
3. SCOPE OF PROJECT IS CONSIDERED TO BE A REPAIR IN ACCORDANCE TO FBC-EXISTING BUILDING SECTION 202 IN COMPLIANCE WITH FBC-EXISTING BUILDING CHAPTER 5.
4. ALL DIMENSIONS INDICATED (•) SHALL BE VERIFIED EITHER BY FIELD MEASUREMENTS FOR EXISTING STRUCTURES OR BY SHOP DRAWINGS FOR EQUIPMENT FURNISHED. STRUCTURAL DIMENSIONS NOT SHOWN BUT CONTROLLED BY OR RELATED TO EQUIPMENT SHALL BE VERIFIED BY THE CONTRACTOR WITH THE MANUFACTURER PRIOR TO CONSTRUCTION.
5. THE CONTRACTOR IS RESPONSIBLE FOR VERIFYING ALL EXISTING INFORMATION IN THE FIELD AS REQUIRED FOR NEW WORK.
6. IF A CONFLICT IS FOUND BETWEEN DIFFERENT PORTIONS OF THE CONTRACT DOCUMENTS, THE CONTRACTOR SHALL NOTIFY THE ENGINEER IMMEDIATELY. CONTINUED CONSTRUCTION OF THE AREA IN CONFLICT SHALL BE AT THE CONTRACTOR'S OWN RISK UNTIL THE CONFLICT IS RESOLVED.
7. STRUCTURES HAVE BEEN DESIGNED FOR OPERATIONAL LOADS ON THE COMPLETED STRUCTURE. DURING CONSTRUCTION, THE STRUCTURES SHALL BE PROTECTED BY BRACING AND TEMPORARY SUPPORTS WHEREVER EXCESSIVE CONSTRUCTION LOADS MAY OCCUR. OVERSTRESSING OF ANY STRUCTURAL ELEMENT IS PROHIBITED.
8. ALL BAR REINFORCING SHALL CONFORM TO ASTM A615, GRADE 60, OR ASTM A706, GRADE 60 WHERE REINFORCEMENT IS TO BE WELDED IN ACCORDANCE WITH AWS 01.4. WELDED WIRE FABRIC SHALL CONFORM TO ASTM A185.
9. SPLICES SHALL BE CLASS "B" CONFORMING TO THE PROVISIONS OF ACI 318 UNLESS NOTED OTHERWISE.
10. DRILLED ADHESIVE DOWELS (WHERE DOWELS ARE SHOWN TO BE PLACED INTO HARDENED CONCRETE):
    A) THE HOLE DIAMETER SHALL BE NO LARGER THAN 1/8" GREATER THAN THE DIAMETER OF THE REINFORCING BAR AT THE DEFORMATIONS.
    B) THE DEPTH OF EMBEDMENT SHALL BE 12 BAR DIAMETERS, UNLESS NOTED OTHERWISE.
    C) ADJUST THE DOWEL LOCATIONS AS NEEDED TO AVOID DRILLING THROUGH ANY REINFORCING BARS. IF THE LOCATION NEEDS TO BE MODIFIED, CONTACT THE ENGINEER.
11. CONCRETE DEMOLITION WITHIN STRUCTURES BEING MODIFIED SHALL BE SELECTIVE DEMOLITION BY CORE DRILLING, SAWCUTTING OR IMPACTING METHODS AND CAREFUL REMOVAL OF CONCRETE SHOWN TO BE REMOVED. NO OVER CUTTING OF AREAS TO BE DEMOLISHED SHALL BE PERMITTED. EXPLOSIVES SHALL NOT BE USED FOR DEMOLITION WORK. ALL DEMOLITION METHODS SHALL BE APPROVED BY THE ENGINEER.
12. UNLESS ANCHORING DEVICES AND/OR REINFORCEMENT IS NOTED TO REMAIN FOLLOWING DEMOLITION, REMOVE AND/OR BURN BACK ANCHORS AND REINFORCEMENT STEEL 1/2" MIN. BELOW SURFACE AND VOIDS CREATED SHALL BE FILLED WITH EPOXY RESIN BINDER.
13. ALL EXISTING INFORMATION SHOWN ON THESE DRAWINGS INCLUDING LOCATION, DIMENSIONS, ELEVATIONS AND CONFIGURATIONS IS DERIVED FROM RECORD DRAWINGS "FIRST ADDITION TO FIVEASH WATER TREATMENT PLANT" AND IS NOT GUARANTEED TO BE COMPLETE OR CORRECT. RECORD DRAWINGS ARE AVAILABLE FOR REVIEW AT THE CITY'S OFFICES.



KEY PLAN – SITE



CHLORINE LOCATION MAP
1"=100'-0"

LIST OF DRAWINGS

SHEET NUMBER	SHEET TITLE	SHEET DESCRIPTION
		GENERAL
01	G-01	TITLE SHEET
02	G-02	GENERAL NOTES AND LIST OF DRAWINGS
03	G-03	STAGING PLAN
04	G-04	VAULT ISOLATION PLAN
		MECHANICAL
05	M-01	HYDROTREATOR 3 DEMO PLANS AND SECTION
06	M-02	HYDROTREATOR 3 DEMOLITION PHOTOS
07	M-03	HYDROTREATOR 3 PROPOSED MODIFICATIONS
08	M-04	HYDROTREATOR 4 DEMO PLANS AND SECTION
09	M-05	HYDROTREATOR 4 DEMOLITION PHOTOS
10	M-06	HYDROTREATOR 4 PROPOSED PLANS AND SECTIONS
11	M-07	MECHANICAL DETAILS
		ELECTRICAL
12	E-01	ELECTRICAL LEGEND AND SYMBOLS
13	E-02	ELECTRICAL SITE PLAN
14	E-03	EXISTING ONE-LINE DIAGRAM
15	E-04	RISER DIAGRAMS
16	E-05	SCHEDULES
17	E-06	HYDROTREATOR 3 AND 4 ELECTRICAL PLANS
		STRUCTURAL
18	S-01	HYDROTREATOR 3 PLANS AND SECTIONS
19	S-02	HYDROTREATOR 4 PLANS AND SECTIONS
20	S-03	STRUCTURAL DETAILS
		PLUMBING
21	P-01	PLUMBING PLAN

1"=100'-0" 100 50 0 100'

Hazen
HAZEN AND SAWYER
4000 HOLLYWOOD BOULEVARD, SUITE 750N
HOLLYWOOD, FLORIDA 33021
CERTIFICATE OF AUTHORIZATION NO. : 2771

GEORGE A. BROWN P.E.
No. 56076

State of Florida
Professional Engineer
License No. 56076
GEORGE A. BROWN

7/22/2016 10:00 AM

DRAWN BY:	DATE:
GHD	JAN. 2016
DESIGNED BY:	SCALE:
GAB	1"=100'
CHECKED BY:	
GWB	
FIELD BOOK:	N/A

CITY OF FORT LAUDERDALE
PUBLIC WORKS DEPARTMENT
ENGINEERING & ARCHITECTURE
100 North Andrews Avenue, Fort Lauderdale, Florida 33301

REVISIONS			
NO.	DATE	BY	CHK'D	DESCRIPTION

FIVEASH WTP
HYDROTREATORS INFLUENT VAULT
GENERAL NOTES AND LIST OF DRAWINGS

SHEET NO.	OF
G-02	02
TOTAL:	21
CAD FILE: G-02	DRAWING FILE NO. 339-40

Bid 263-11809

City of Fort Lauderdale

CAM 16-1217
EXHIBIT 3
Page 383 of 403

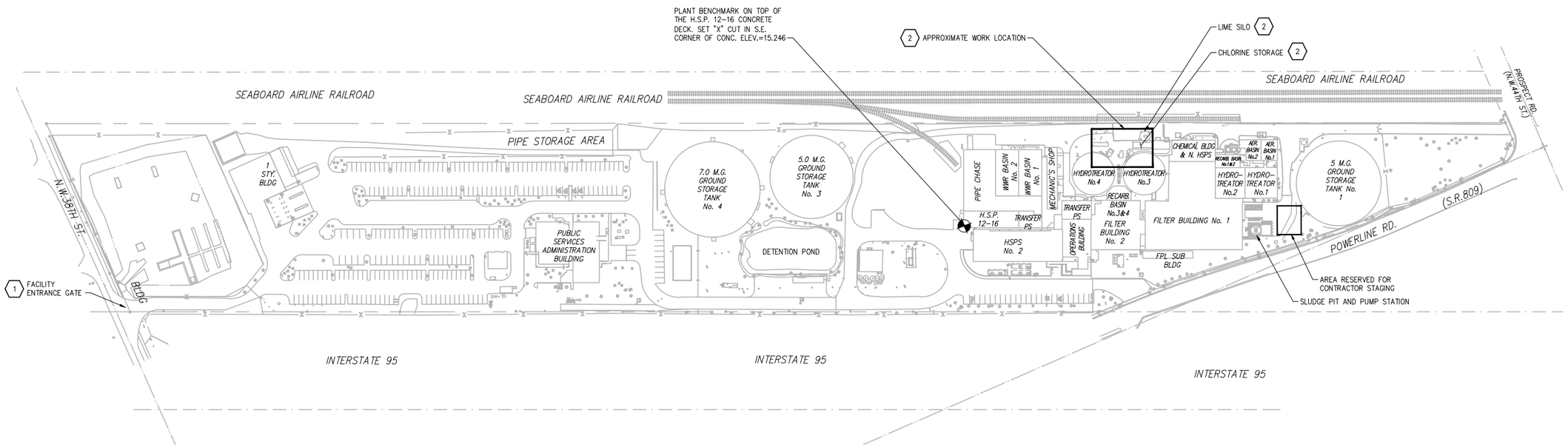
PLOT DATE: 5/27/2016 3:28 PM BY: USER XREFs= ..\Tblock\TBlock...\Base\SP-ST-X

File = L:\AA-BACK GINNA\43190-027 Fiveash WTP Hydrotreator Influent Pipes\Drawings\General\G-02 Saved by USER on 5/27/2016 11:03 AM

LOCATION:

SECTION:	21
TOWNSHIP:	49S
RANGE:	42E
LATITUDE:	26°10'42"N
LONGITUDE:	80°09'20"W

PROPERTY FOLIO No.: 494221000010



FACILITY ADDRESS:

4321 N.W. 9th AVENUE
FORT LAUDERDALE, FL 33309

FACILITY CONTACT:

CONTROL ROOM OPERATOR
PHONE: (954)828-7838

KEYED NOTES:

1. THE CONTRACTOR SHALL ENTER THE WATER TREATMENT PLANT THROUGH THE PUBLIC SERVICES DEPARTMENT SECURITY GATE LOCATED AT 949 N.W. 38TH STREET.
2. THE CONTRACTOR SHALL NOT BLOCK ACCESS TO THE CHLORINE STORAGE AND LIME SILO AREAS. LIME DELIVERY TRUCKS REQUIRE DAILY ACCESS AND CHLORINE DELIVERY TRUCKS REQUIRE MONTHLY ACCESS.

1"=100'-0" 100 50 0 100'

Hazen
HAZEN AND SAWYER
4000 HOLLYWOOD BOULEVARD, SUITE 750N
HOLLYWOOD, FLORIDA 33021
CERTIFICATE OF AUTHORIZATION NO. : 2771

GEORGE A. BROWN P.E.
No. 56076

7/22/2016 10:00 AM

State of Florida
Professional Engineer
License No. 56076
GEORGE A. BROWN

DRAWN BY: GHD
DESIGNED BY: GAB
CHECKED BY: GWB
DATE: JAN. 2016
SCALE: 1"=100'
FIELD BOOK: N/A

CITY OF FORT LAUDERDALE
PUBLIC WORKS DEPARTMENT
ENGINEERING & ARCHITECTURE
100 North Andrews Avenue, Fort Lauderdale, Florida 33301

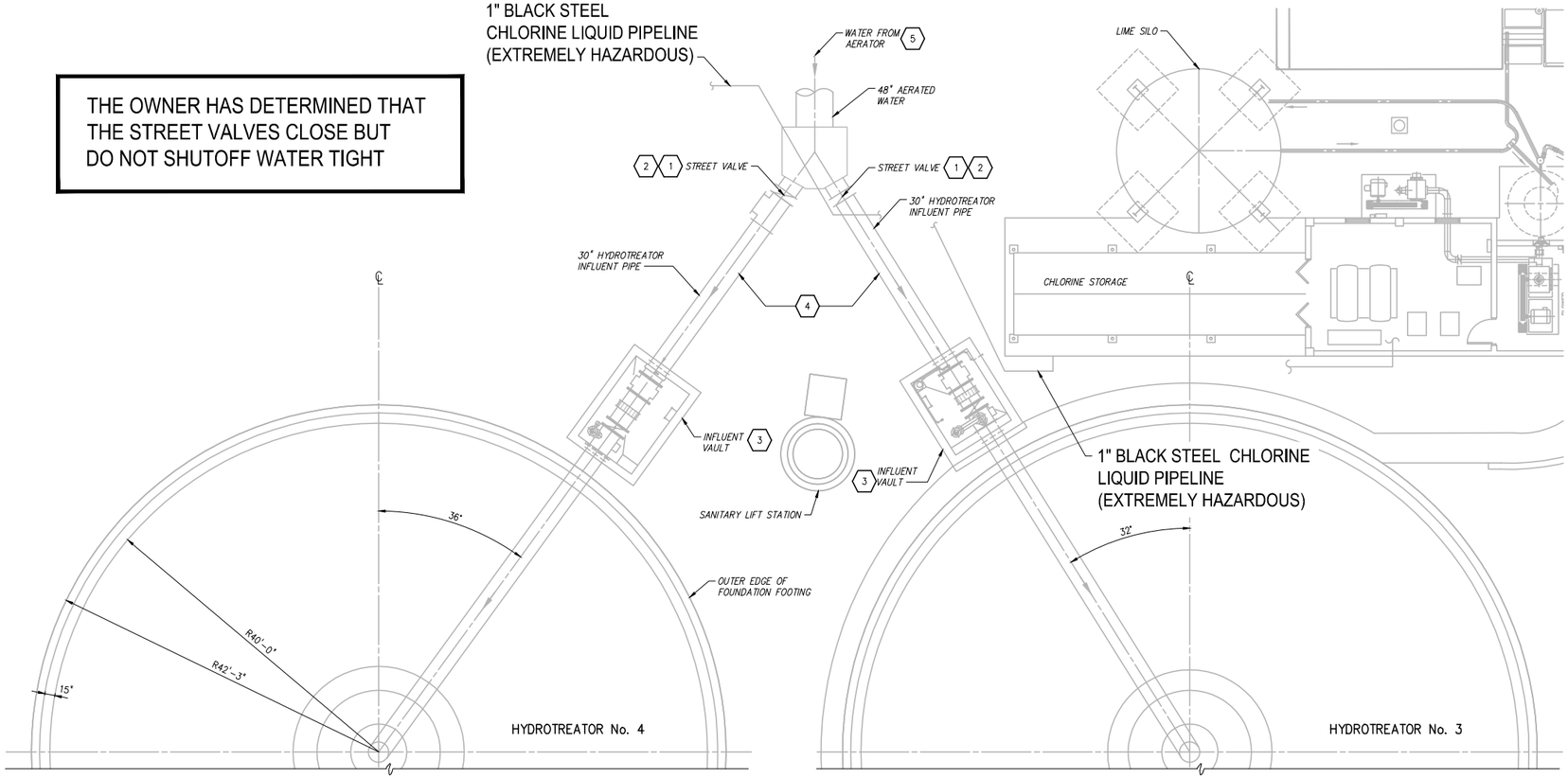
REVISIONS

NO.	DATE	BY	CHK'D	DESCRIPTION

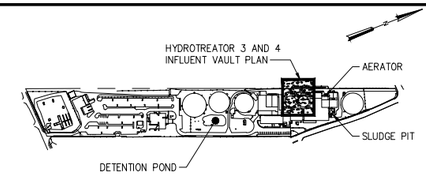
FIVEASH WTP
HYDROTREATORS INFLUENT VAULT
STAGING PLAN

SHEET NO. G-03 OF 03
TOTAL: 21
CAD FILE: G-03
DRAWING FILE NO. 39-40

THE OWNER HAS DETERMINED THAT THE STREET VALVES CLOSE BUT DO NOT SHUTOFF WATER TIGHT



PLAN
1/8" = 1'-0"



KEY PLAN – SITE

GENERAL NOTES:

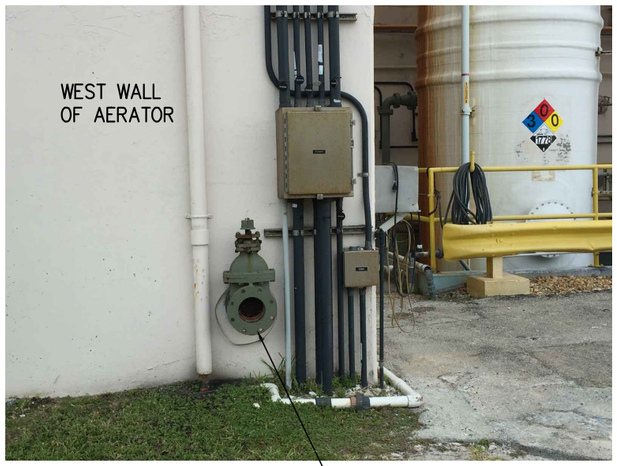
1. THREE OF THE CITY'S FOUR HYDROTREATORS MUST REMAIN IN SERVICE AT ALL TIMES.
2. ONCE A HYDROTREATOR IS REMOVED FROM SERVICE ALL WORK DESCRIBED IN THE CONTRACT DOCUMENTS WITHIN AND AROUND THE ASSOCIATED INFLUENT VAULT SHALL BE PERFORMED. UPON SUCCESSFUL STARTUP AND OWNER ACCEPTANCE OF THE MODIFIED VAULT, THE CONTRACTOR MAY REQUEST THE OWNER IN WRITING TO REMOVE THE OTHER HYDROTREATOR FROM SERVICE.
3. THE CONTRACTOR SHALL NOT BLOCK ACCESS TO THE CHLORINE STORAGE AND LIME SILO AREAS. LIME DELIVERY TRUCKS REQUIRE DAILY ACCESS AND CHLORINE DELIVERY TRUCKS REQUIRE MONTHLY ACCESS.

KEYED NOTES:

1. THE OWNER WILL BE RESPONSIBLE FOR OPERATING THE SHUT-OFF VALVE UPSTREAM OF THE INFLUENT VAULT TO REMOVE A HYDROTREATOR FROM SERVICE.
2. SEE THE ARTICLE TITLED "HYDROTREATOR ISOLATION" IN THE SPECIFICATION SECTION TITLED "SUMMARY OF WORK".
3. REMOVAL OF THE VAULT WALL PIPE MAY RESULT IN GROUND WATER ENTERING THE VAULT. WET SEASON GROUND WATER IS ESTIMATED TO BE ABOUT FOUR FEET BELOW GROUND SURFACE. HISTORICAL SOIL BORING REPORTS AT THE PLANT ARE INCLUDED WITH THE SPECIFICATIONS. FURNISH ALL EQUIPMENT, LABOR, AND MATERIALS AS NEEDED TO PREVENT GROUND WATER FROM ENTERING THE VAULT WHEN REQUIRED FOR CONSTRUCTION OF PROPOSED IMPROVEMENTS.
4. BASED ON DATA SUPPLIED BY FORTERRA PRESSURE PIPE THE JOINTS FOR THIS PIPE WERE MANUFACTURED FOR A TEST PRESSURE OF 20 PSI.
5. THERE ARE NO VALVES UPSTREAM OF THE STREET VALVES NOR OPERABLE GATES WITHIN THE AERATOR TO SHUT DOWN THE FLOW TO HYDROTREATORS 3 AND 4.
6. FURNISH AND INSTALL A 6-INCH NON-RISING STEM GATE VALVE ONTO THE EXISTING GATE VALVE.

LEGEND:

EXISTING



AERATOR EFFLUENT BOX DRAIN VALVE
NTS

1/8"=1'-0"

Hazen
HAZEN AND SAWYER
4000 HOLLYWOOD BOULEVARD, SUITE 750N
HOLLYWOOD, FLORIDA 33021
CERTIFICATE OF AUTHORIZATION NO. : 2771

GEORGE A. BROWN P.E.
No. 56076

State of Florida
Professional Engineer
License No. 56076
GEORGE A. BROWN

DRAWN BY: GHD | DATE: JAN. 2016
DESIGNED BY: GAB | SCALE: 1/8"=1'
CHECKED BY: GWB | FIELD BOOK: N/A

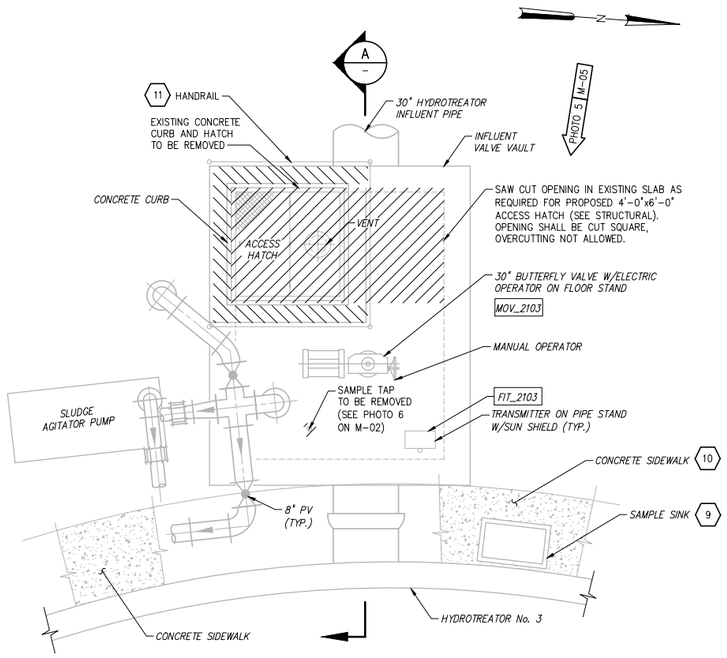
CITY OF FORT LAUDERDALE
PUBLIC WORKS DEPARTMENT
ENGINEERING & ARCHITECTURE
100 North Andrews Avenue, Fort Lauderdale, Florida 33301

REVISIONS

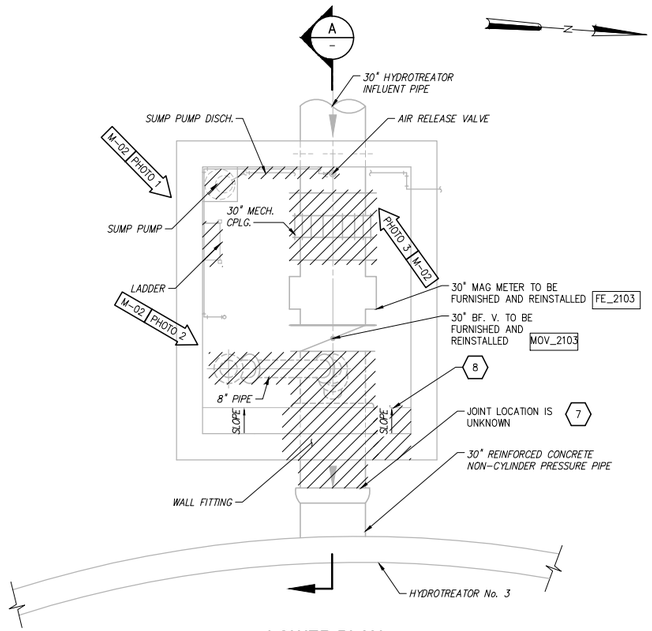
NO.	DESCRIPTION	DATE	BY	CHK'D

FIVEASH WTP
HYDROTREATORS INFLUENT VAULT
VAULT ISOLATION PLAN

SHEET NO. G-04 OF 04
TOTAL: 21
CAD FILE:
DRAWING FILE NO. G-04
PROJECT NO. 43190-039-40

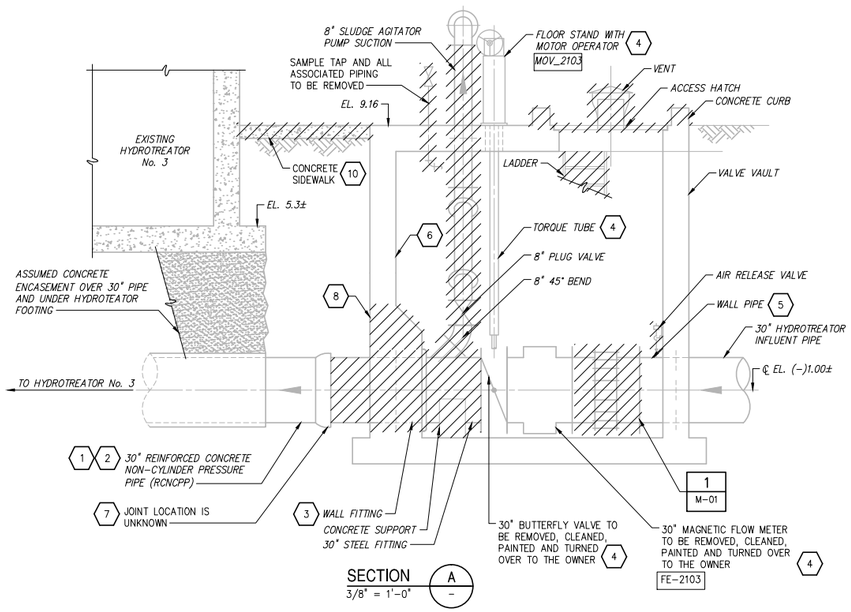


UPPER PLAN
3/8" = 1'-0"

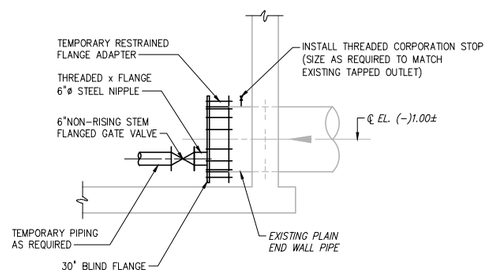


LOWER PLAN
3/8" = 1'-0"

HYDROTREATOR No. 3 INFLUENT VAULT - DEMOLITION
3/8"=1'-0"



SECTION A
3/8" = 1'-0"



DETAIL 1
3/8" = 1'-0" M-01

KEYED NOTES:

1. PIPE WAS REPORTEDLY SUPPLIED BY LOCK JOINT PIPE COMPANY ON PROJECT No. WPB-P-64. CONTACT RICK DEREMIAH AT FORTERRA PRESSURE PIPE FOR CONSTRUCTION RECORDS.
2. THE CURRENT STANDARD FOR THIS PIPE IS AWWA C302.
3. PIPE LAYING SCHEDULE FROM INTERNATIONAL PIPE AND CERAMICS CORPORATION INDICATE THIS IS A 30" SP-1 SPIGOT X TAPPED FLANGE WALL FITTING. EXPOSE PIPE AND CONFIRM PIPE MATERIAL WITH PIPE SUPPLIER PRIOR TO ORDERING WALL FITTING.
4. REMOVE, STORE, AND PROTECT THE EXISTING 30" BUTTERFLY VALVE, TORQUE TUBE, FLOOR STAND, ELECTRIC OPERATOR, AND MAGNETIC FLOW METER. CLEAN AND PAINT THE EXTERIOR OF THE 30" BUTTERFLY VALVE, FLOOR STAND, AND MAGNETIC FLOW METER. REINSTALL ITEMS AS INDICATED IN THE PROPOSED DRAWINGS. CLEAN TORQUE TUBE AND REINSTALL AS INDICATED IN THE PROPOSED DRAWINGS.
5. PREPARE WALL PIPE EXTERIOR SURFACE FOR PAINTING.
6. PREPARE ALL CONCRETE SURFACES WITHIN THE VALVE VAULT FOR PAINTING.
7. LOCATION SHOWN IS FOR CONCEPTUAL PURPOSES. EXPOSE JOINT TO CONFIRM LOCATION. RETAIN CONCRETE PIPE SUPPLIER TO CONFIRM JOINT TYPE.
8. REMOVE PORTION OF REINFORCED CONCRETE WALL AS REQUIRED TO REMOVE THE WALL FITTINGS AND CONFIRM JOINT TYPE AT CONNECTION WITH RCNCPP.
9. TEMPORARILY REMOVE SAMPLE SINK AND REINSTALL AFTER COMPLETION OF PIPE MODIFICATIONS.
10. REMOVE AND REPLACE EXISTING SIDEWALK AS REQUIRED TO CONSTRUCT THE PIPING IMPROVEMENTS.
11. TEMPORARILY REMOVE EXISTING HANDRAILS AND REINSTALL AFTER COMPLETION OF PIPING MODIFICATIONS.

GENERAL NOTES:

1. HYDROTREATOR NO. 3 WILL BE SHUT DOWN AND DEWATERED BY THE OWNER. THE CONTRACTOR SHALL NOTIFY THE OWNER IN WRITING 48 HOURS IN ADVANCE TO REQUEST THE OWNER TO REMOVE A HYDROTREATOR FROM SERVICE. REFER TO CONTRACT DOCUMENTS FOR FURTHER LIMITATIONS.
2. REMOVE ALL DEBRIS, ABANDONED CONDUITS AND ABANDONED PIPING WITHIN THE VALVE VAULT.

NOTES FOR DETAIL 1:

1. THE UPSTREAM STREET VALVE DOES NOT SHUT-OFF WATER TIGHT.
2. FURNISH AND INSTALL TEMPORARY RESTRAINED FLANGE ADAPTER WITH BLIND FLANGE TO ISOLATE THE VALVE VAULT FOLLOWING REMOVAL OF EQUIPMENT AND PIPING SHOWN ON THIS DRAWING.
3. ESTIMATED STATIC HEAD ON THE BLIND FLANGE = 14.3 PSI.
4. ESTIMATED THRUST ON THE BLIND FLANGE = 11,000 POUNDS
5. SEE THE ARTICLE TITLED "HYDROTREATOR ISOLATION" IN THE SPECIFICATION TITLED "SUMMARY OF WORK".

LEGEND:

- EXISTING
- PROPOSED
- TO BE REMOVED
- PHOTOGRAPH No.
- ## PHOTO 1 — ORIENTATION OF PHOTOGRAPH
- DRAWING WHERE PHOTO IS LOCATED

Hazen
HAZEN AND SAWYER
4000 HOLLYWOOD BOULEVARD, SUITE 750N
HOLLYWOOD, FLORIDA 33021
CERTIFICATE OF AUTHORIZATION NO. : 2771

3/8"=1'-0" 12" 0 1 2 4'

GEORGE A. BROWN P.E.
No. 56076

State of Florida
Professional Engineer
License No. 56076
GEORGE A. BROWN

DRAWN BY: GHD | DESIGNED BY: GAB | CHECKED BY: JOH | DATE: JAN. 2016 | SCALE: 3/8"=1'-0" | FIELD BOOK: N/A

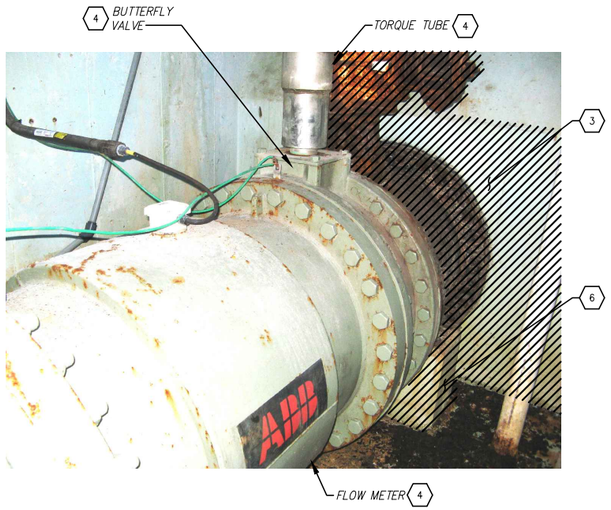
CITY OF FORT LAUDERDALE
PUBLIC WORKS DEPARTMENT
ENGINEERING & ARCHITECTURE
100 North Andrews Avenue, Fort Lauderdale, Florida 33301

REVISIONS

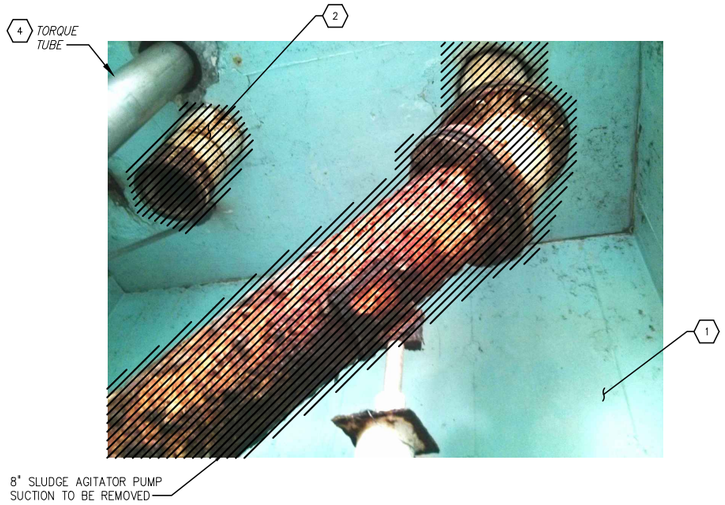
NO.	DATE	BY	CHKD	DESCRIPTION

FIVEASH WTP
HYDROTREATORS INFLUENT VAULT
HYDROTREATOR 3
DEMO PLANS AND SECTION

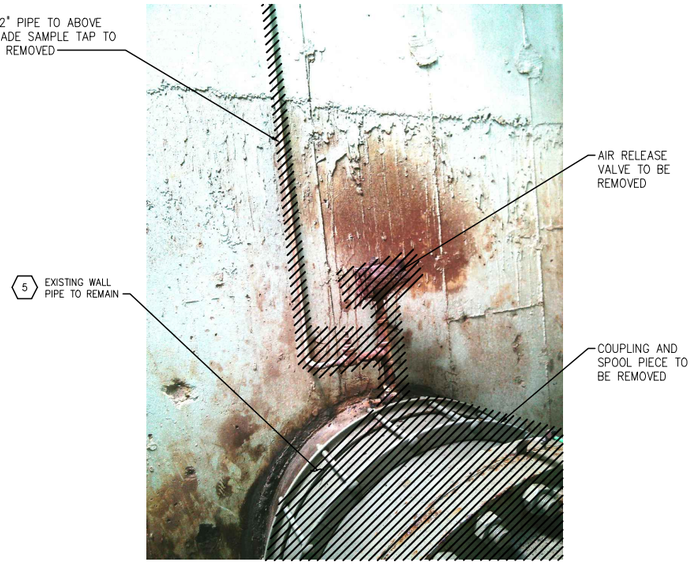
SHEET NO. M-01 OF 05
TOTAL: 21
CAD FILE: M-01
DRAWING FILE NO. 39-40



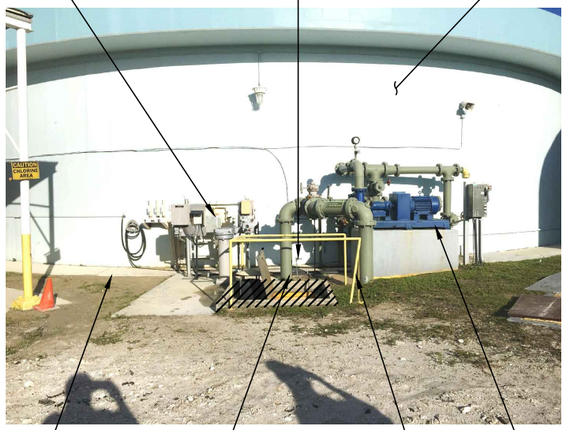
HYDROTREATOR No. 3
PHOTO 1
NTS



HYDROTREATOR No. 3
PHOTO 2
NTS



HYDROTREATOR No. 3
PHOTO 3
NTS



HYDROTREATOR No. 3
PHOTO 4
NTS

HYDROTREATOR No. 3
PHOTO 5
NTS

HYDROTREATOR No. 3
PHOTO 6
NTS

KEYED NOTES:

1. PREPARE ALL CONCRETE FOR PAINTING.
2. REMOVE VAULT PENETRATION AND GROUT HOLE.
3. REMOVE PORTION OF REINFORCED CONCRETE WALL AS REQUIRED TO REMOVE THE WALL FITTINGS AND CONFIRM JOINT TYPE AT CONNECTION WITH RCNCPP.
4. REMOVE, STORE, AND PROTECT THE EXISTING 30" BUTTERFLY VALVE, TORQUE TUBE, FLOOR STAND, ELECTRIC OPERATOR, AND MAGNETIC FLOW METER. CLEAN AND PAINT THE EXTERIOR OF THE 30" BUTTERFLY VALVE, FLOOR STAND, AND MAGNETIC FLOW METER. REINSTALL ITEMS AS INDICATED IN THE PROPOSED DRAWINGS.
5. PREPARE WALL PIPE EXTERIOR SURFACE FOR PAINTING.
6. CONCRETE SUPPORT TO BE REMOVED.
7. TEMPORARILY REMOVE EXISTING HANDRAIL AND REINSTALL AFTER COMPLETION OF PIPING IMPROVEMENTS.
8. REMOVE AND REPLACE EXISTING SIDEWALK AS REQUIRED TO CONSTRUCT THE PIPING IMPROVEMENTS.
9. TEMPORARILY REMOVE SAMPLE SINK AND REINSTALL AFTER COMPLETION OF PIPE MODIFICATIONS.

LEGEND:

EXISTING
PROPOSED
TO BE REMOVED

Hazen
HAZEN AND SAWYER
4000 HOLLYWOOD BOULEVARD, SUITE 750N
HOLLYWOOD, FLORIDA 33021
CERTIFICATE OF AUTHORIZATION NO. : 2771

GEORGE A. BROWN P.E.
No. 56076

State of Florida
Professional Engineer
License No. 56076
GEORGE A. BROWN

DRAWN BY: GHD | DESIGNED BY: GAB | CHECKED BY: JOH | DATE: JAN. 2016 | SCALE: NONE | FIELD BOOK: N/A

CITY OF FORT LAUDERDALE
PUBLIC WORKS DEPARTMENT
ENGINEERING & ARCHITECTURE
100 North Andrews Avenue, Fort Lauderdale, Florida 33301

REVISIONS

NO.	DATE	BY	CHK'D

FIVEASH WTP
HYDROTREATORS INFLUENT VAULT
HYDROTREATOR 3
DEMOLITION PHOTOS

SHEET NO. M-02 OF 06
TOTAL: 21
CAD FILE: M-02
DRAWING FILE NO. 39-40

Bid 263-11809

PLOT DATE: 5/27/2016 3:28 PM BY: USER XREFs= ..\Tblock\TBlock

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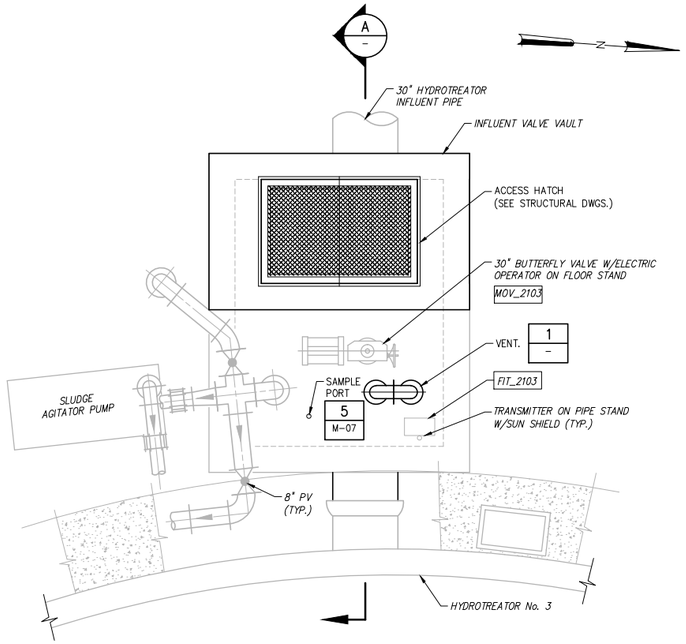
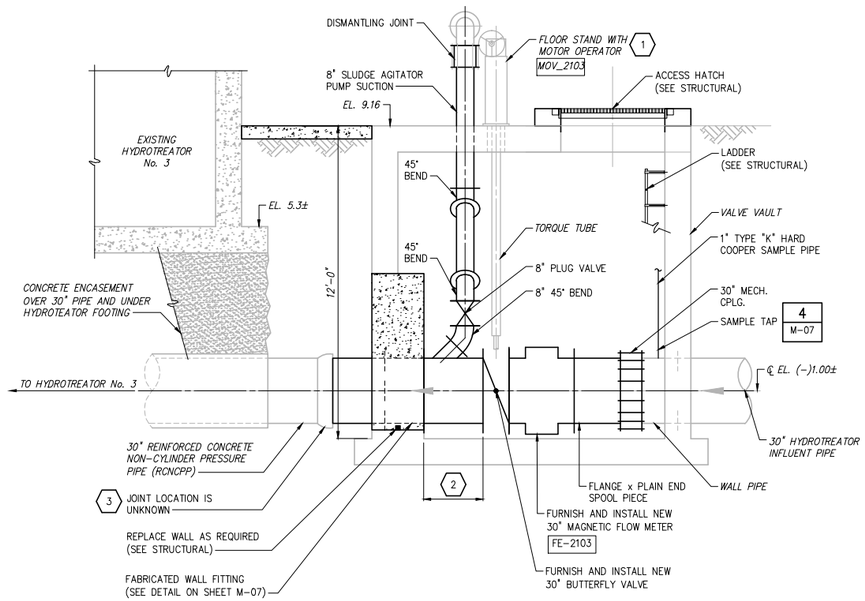
City of Fort Lauderdale

CAM 16-1217
EXHIBIT 3
Page 387 of 403

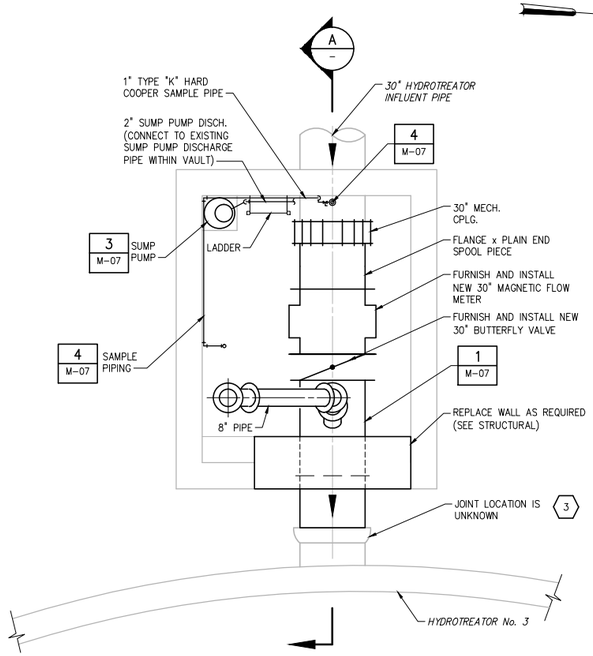
7/22/2016 10:00 AM



UPPER PLAN
3/8" = 1'-0"

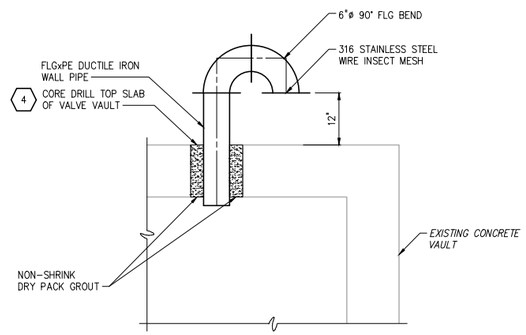


SECTION
3/8" = 1'-0"
A
–



LOWER PLAN
3/8" = 1'-0"

HYDROTREATOR No. 3 INFLUENT VAULT - PROPOSED
3/8"=1'-0"



SECTION VIEW
DETAIL 1
NTS
–

GENERAL NOTE:

1. DELIVER EXISTING 30" BUTTERFLY VALVE AND 30" MAGNETIC FLOW METER TO OWNER.

KEYED NOTES:

1. REINSTALL AND TEST EXISTING MOTOR OPERATOR AND ALL OTHER ACCESSORIES FOR A COMPLETE AND OPERABLE SYSTEM.
2. THE CONTRACTOR SHALL DETERMINE THE DIMENSION REQUIRED TO SUIT FIELD CONDITIONS.
3. LOCATION SHOWN IS FOR CONCEPTUAL PURPOSES. EXPOSE JOINT TO CONFIRM LOCATION. RETAIN CONCRETE PIPE SUPPLIER TO CONFIRM JOINT TYPE.
4. CONTRACTOR SHALL FIELD LOCATE CORING LOCATION WITH OWNER.

LEGEND:

EXISTING

PROPOSED

3/8"=1'-0"

12" 0 1 2 4'

Hazen
HAZEN AND SAWYER
4000 HOLLYWOOD BOULEVARD, SUITE 750N
HOLLYWOOD, FLORIDA 33021
CERTIFICATE OF AUTHORIZATION NO. : 2771

GEORGE A. BROWN P.E.
No. 56076

State of Florida
Professional Engineer
License No. 56076
GEORGE A. BROWN

DRAWN BY: GHD | DESIGNED BY: GAB | CHECKED BY: JOH | DATE: JAN. 2016 | SCALE: 3/8"=1'-0" | FIELD BOOK: N/A

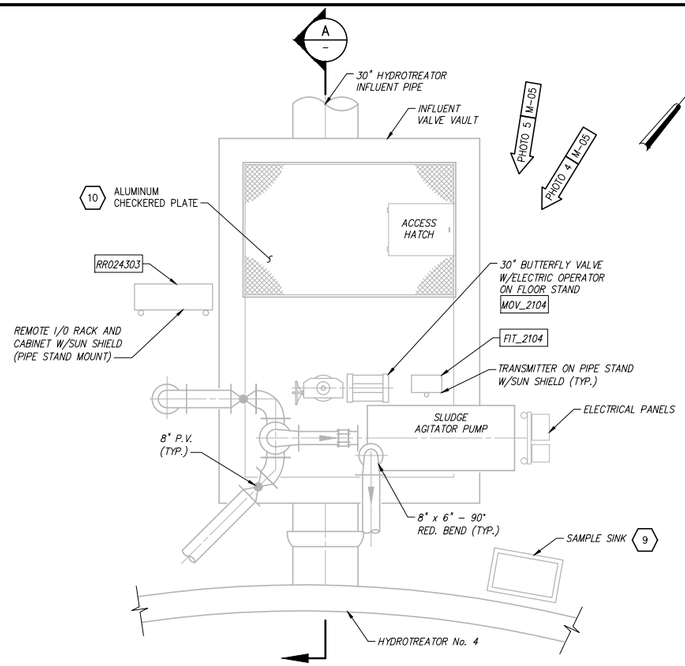
CITY OF FORT LAUDERDALE
PUBLIC WORKS DEPARTMENT
ENGINEERING & ARCHITECTURE
100 North Andrews Avenue, Fort Lauderdale, Florida 33301

REVISIONS

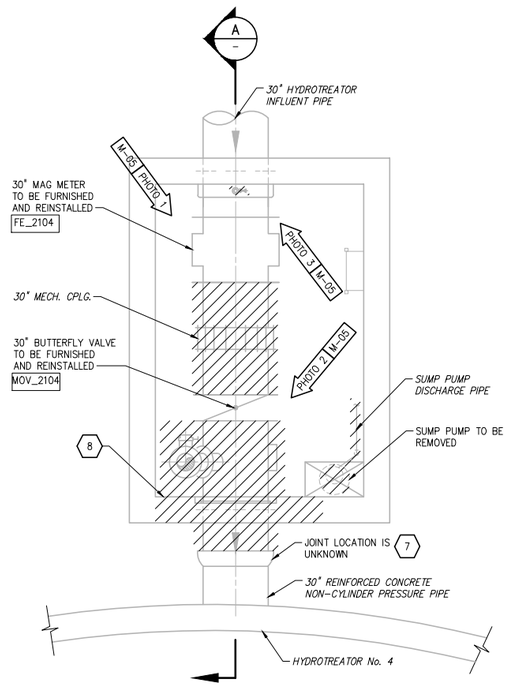
NO.	DATE	BY	CHK'D

FIVEASH WTP
HYDROTREATORS INFLUENT VAULT
HYDROTREATOR 3
PROPOSED MODIFICATIONS

SHEET NO. M-03 OF 07
TOTAL: 21
CAD FILE:
DRAWING FILE NO. M-03

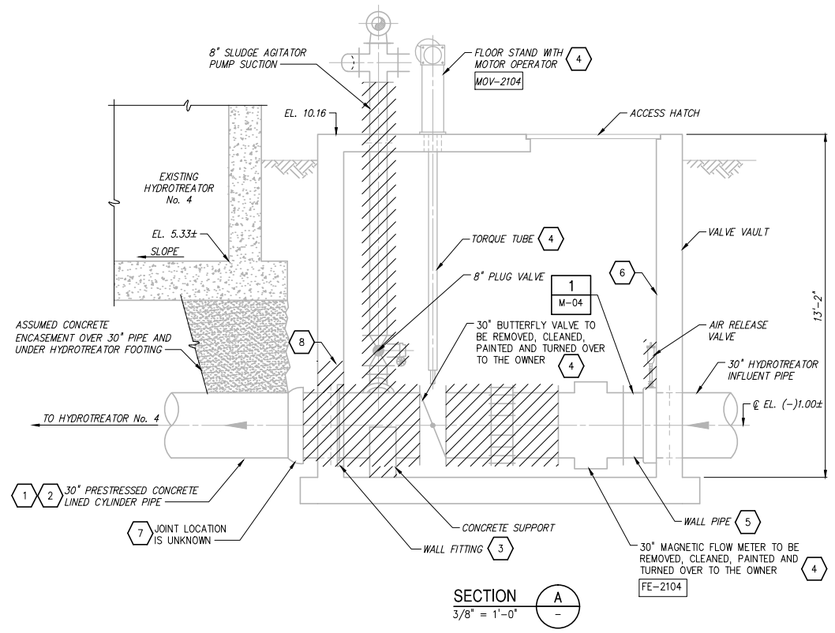


UPPER PLAN
3/8" = 1'-0"

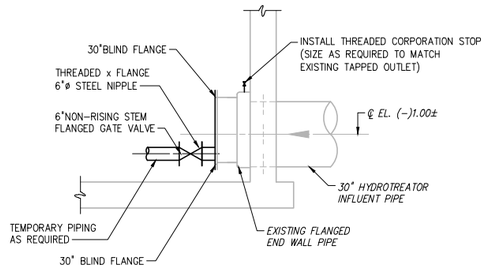


LOWER PLAN
3/8" = 1'-0"

HYDROTREATOR No. 4 INFLUENT VAULT - DEMOLITION
3/8"=1'-0"



SECTION A
3/8" = 1'-0"



DETAIL 1 / M-04
3/8" = 1'-0"

KEYED NOTES:

1. PIPE WAS REPORTEDLY SUPPLIED BY INTERPACE (PROJECT No. LC-80-16) AND PIPE MATERIAL IS REPORTEDLY PRESTRESSED CONCRETE LINED CYLINDER PIPE (LCP).
2. THE STANDARD FOR THIS PIPE IS AWWA C301.
3. RICK DEREMIAH AT FORTERRA PRESSURE PIPE (FORMERLY HANSON PIPE) INDICATED THAT A SEARCH OF ITS RECORDS FOUND NO DATA FOR THE EXISTING LCP NOR WALL FITTING. EXPOSE THE JOINT BETWEEN THE WALL FITTING AND THE LCP AND CONFIRM JOINT TYPE AND PIPE MATERIAL WITH PIPE SUPPLIER PRIOR TO ORDERING WALL FITTING.
4. REMOVE, STORE, AND PROTECT THE EXISTING 30" BUTTERFLY VALVE, TORQUE TUBE, FLOOR STAND, ELECTRIC OPERATOR, AND MAGNETIC FLOW METER. CLEAN AND PAINT THE EXTERIOR OF THE 30" BUTTERFLY VALVE, FLOOR STAND, AND MAGNETIC FLOW METER. REINSTALL ITEMS AS INDICATED IN THE PROPOSED DRAWINGS. CLEAN TORQUE TUBE AND REINSTALL AS INDICATED IN THE PROPOSED DRAWINGS.
5. PREPARE WALL PIPE EXTERIOR SURFACE FOR PAINTING.
6. PREPARE ALL CONCRETE SURFACES WITHIN THE VALVE CHAMBER FOR PAINTING.
7. LOCATION SHOWN IS FOR CONCEPTUAL PURPOSES. EXPOSE JOINT TO CONFIRM LOCATION. RETAIN CONCRETE PIPE SUPPLIER TO CONFIRM JOINT TYPE.
8. REMOVE PORTION OF REINFORCED CONCRETE WALL AS REQUIRED TO REMOVE THE WALL FITTINGS AND CONFIRM JOINT TYPE AT CONNECTION WITH RCNCPP.
9. TEMPORARILY REMOVE SAMPLE SINK AND REINSTALL AFTER COMPLETION OF PIPE MODIFICATIONS.
10. TEMPORARILY REMOVE EXISTING CHECKERED PLATE TO GAIN ACCESS TO VAULT FOR CONSTRUCTION OF IMPROVEMENTS. REINSTALL CHECKERED PLATE FOLLOWING COMPLETION OF PIPING IMPROVEMENTS.

GENERAL NOTES:

1. HYDROTREATOR NO. 4 WILL BE SHUT DOWN AND DEWATERED BY THE OWNER. THE CONTRACTOR SHALL NOTIFY THE OWNER IN WRITING 48 HOURS IN ADVANCE TO REQUEST THE OWNER TO REMOVE A HYDROTREATOR FROM SERVICE. REFER TO CONTRACT DOCUMENTS FOR FURTHER LIMITATIONS.
2. REMOVE ALL DEBRIS, ABANDONED CONDUITS AND ABANDONED PIPING WITHIN THE VALVE VAULT.

NOTES FOR DETAIL 1:

1. THE UPSTREAM STREET VALVE DOES NOT SHUT-OFF WATER TIGHT.
2. FURNISH AND INSTALL TEMPORARY RESTRAINED FLANGE ADAPTER WITH BLIND FLANGE TO ISOLATE THE VALVE VAULT FOLLOWING REMOVAL OF EQUIPMENT AND PIPING SHOWN ON THIS DRAWING.
3. ESTIMATED STATIC HEAD ON THE BLIND FLANGE = 14.3 PSI.
4. ESTIMATED THRUST ON THE BLIND FLANGE = 11,000 POUNDS.
5. SEE THE ARTICLE TITLED "HYDROTREATOR ISOLATION" IN THE SPECIFICATION TITLED "SUMMARY OF WORK".

LEGEND:

EXISTING

PROPOSED

TO BE REMOVED

PHOTOGRAPH No.

PHOTO 1

ORIENTATION OF PHOTOGRAPH

DRAWING WHERE PHOTO IS LOCATED

3/8"=1'-0"

12" 0 1 2 4'

Hazen

HAZEN AND SAWYER
4000 HOLLYWOOD BOULEVARD, SUITE 750N
HOLLYWOOD, FLORIDA 33021
CERTIFICATE OF AUTHORIZATION NO. : 2771

GEORGE A. BROWN P.E.
No. 56076

DRAWING FILE NO. M-04

State of Florida
Professional Engineer
License No. 56076
GEORGE A. BROWN

DRAWN BY: GHD | DESIGNED BY: GAB | CHECKED BY: JOH | DATE: JAN. 2016 | SCALE: 3/8"=1'-0" | FIELD BOOK: N/A

CITY OF FORT LAUDERDALE
PUBLIC WORKS DEPARTMENT
ENGINEERING & ARCHITECTURE
100 North Andrews Avenue, Fort Lauderdale, Florida 33301

REVISIONS

NO.	DATE	BY	CHK'D

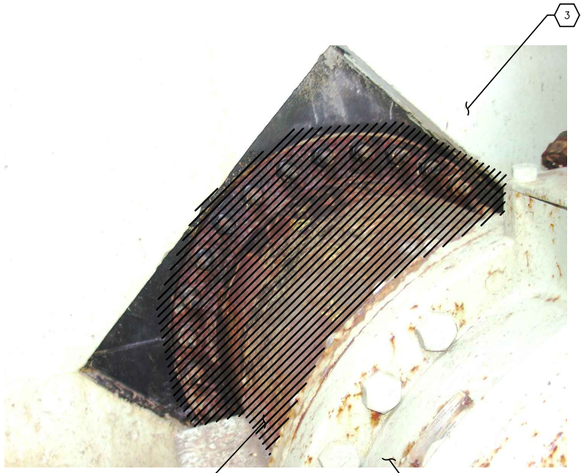
FIVEASH WTP
HYDROTREATORS INFLUENT VAULT
HYDROTREATOR 4
DEMO PLANS AND SECTION

SHEET NO. M-04 OF 08

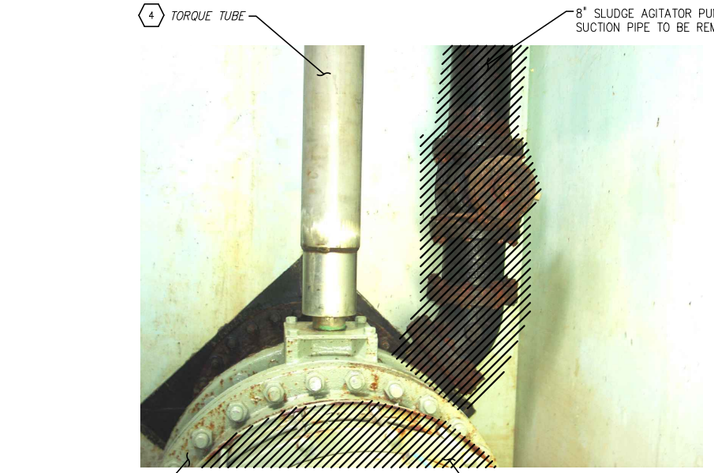
TOTAL: 21

CAD FILE:

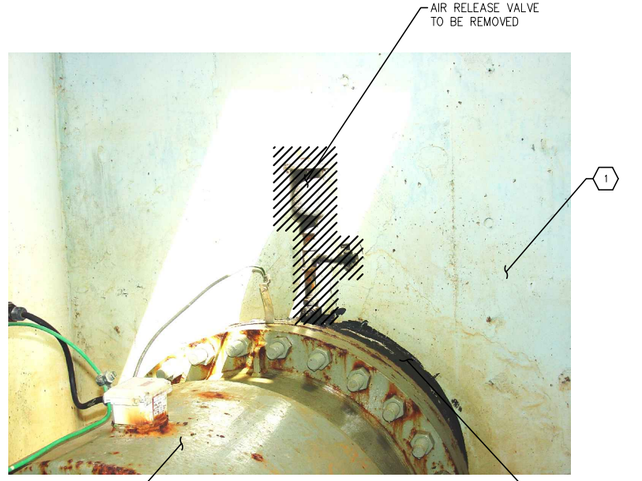
CAM 16-1247
EXHIBIT 3
Page 389 of 403



HYDROTREATOR No. 4
PHOTO 1
NTS



HYDROTREATOR No. 4
PHOTO 2
NTS



HYDROTREATOR No. 4
PHOTO 3
NTS

HYDROTREATOR No. 4
PHOTO 4
NTS

HYDROTREATOR No. 4
PHOTO 5
NTS

KEYED NOTES:

1. PREPARE ALL CONCRETE PAINTING.
2. REMOVE VAULT PENETRATION AND GROUT HOLE.
3. REMOVE PORTION OF REINFORCED CONCRETE WALL AS REQUIRED TO REMOVE THE WALL FITTINGS AND CONFIRM JOINT TYPE AT CONNECTION WITH RCN CPP.
4. REMOVE, STORE, AND PROTECT THE EXISTING 30" BUTTERFLY VALVE, TORQUE TUBE, FLOOR STAND, ELECTRIC OPERATOR, AND MAGNETIC FLOW METER. CLEAN AND PAINT THE EXTERIOR OF THE 30" BUTTERFLY VALVE, FLOOR STAND, AND MAGNETIC FLOW METER. REINSTALL ITEMS AS INDICATED IN THE PROPOSED DRAWINGS.
5. PREPARE WALL PIPE EXTERIOR SURFACE FOR PAINTING.
6. CONCRETE SUPPORT TO BE REMOVED.
7. TEMPORARILY REMOVE SAMPLE SINK AND REINSTALL AFTER COMPLETION OF PIPE MODIFICATIONS.

LEGEND:

- EXISTING
- PROPOSED
- TO BE REMOVED

Hazen
HAZEN AND SAWYER
4000 HOLLYWOOD BOULEVARD, SUITE 750N
HOLLYWOOD, FLORIDA 33021
CERTIFICATE OF AUTHORIZATION NO. : 2771

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No. 56076

State of Florida
Professional Engineer
License No. 56076
GEORGE A. BROWN

DRAWN BY: GHD | DESIGNED BY: GAB | CHECKED BY: JOH
DATE: JAN. 2016 | SCALE: NONE | FIELD BOOK: N/A

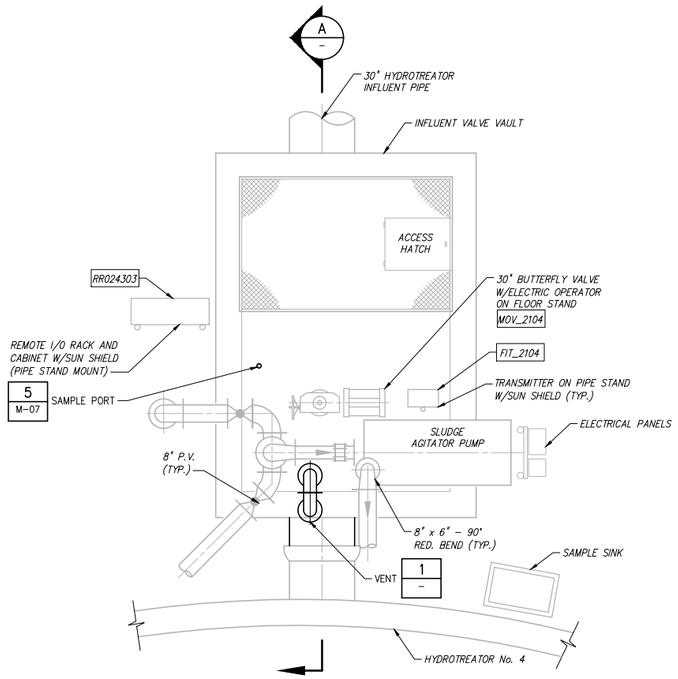
CITY OF FORT LAUDERDALE
PUBLIC WORKS DEPARTMENT
ENGINEERING & ARCHITECTURE
100 North Andrews Avenue, Fort Lauderdale, Florida 33301

REVISIONS

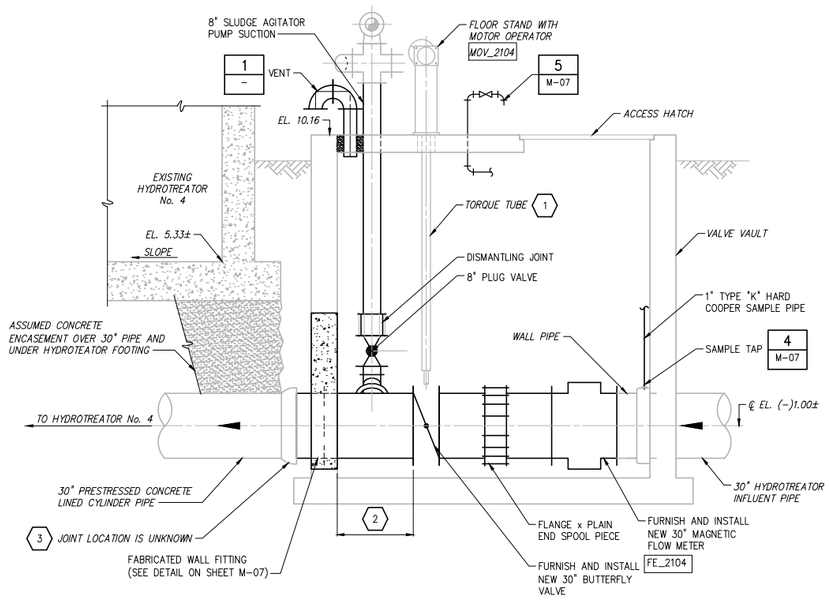
NO.	DATE	BY	CHK'D	DESCRIPTION

FIVEASH WTP
HYDROTREATORS INFLUENT VAULT
HYDROTREATOR 4
DEMOLITION PHOTOS

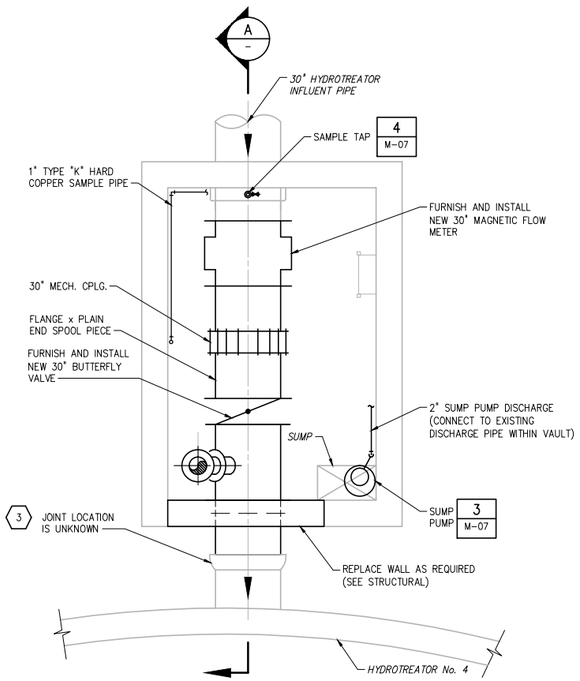
SHEET NO. M-05 OF 09
TOTAL: 21
CAD FILE:
DRAWING FILE NO. M-05
339-40



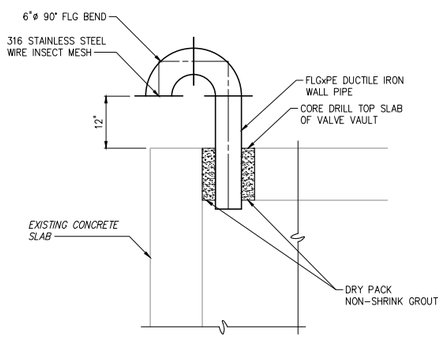
UPPER PLAN
3/8" = 1'-0"



SECTION A
3/8" = 1'-0"



LOWER PLAN
3/8" = 1'-0"



SECTION VIEW
DETAIL 1
NTS

GENERAL NOTE:

1. DELIVER EXISTING 30" BUTTERFLY VALVE AND 30" MAGNETIC FLOW METER TO OWNER.

KEYED NOTES:

1. REINSTALL AND TEST EXISTING MOTOR OPERATOR AND ALL OTHER ACCESSORIES FOR A COMPLETE AND OPERABLE SYSTEM.
2. THE CONTRACTOR SHALL DETERMINE THE DIMENSION REQUIRED TO SUIT FIELD CONDITIONS.
3. LOCATION SHOWN IS FOR CONCEPTUAL PURPOSES. EXPOSE JOINT TO CONFIRM LOCATION. RETAIN CONCRETE PIPE SUPPLIER TO CONFIRM JOINT TYPE.
4. CONTRACTOR SHALL FIELD LOCATE CORING LOCATION WITH OWNER.

LEGEND:

EXISTING

PROPOSED

3/8"=1'-0" 12" 0 1 2 4'

Hazen
HAZEN AND SAWYER
4000 HOLLYWOOD BOULEVARD, SUITE 750N
HOLLYWOOD, FLORIDA 33021
CERTIFICATE OF AUTHORIZATION NO. : 2771

GEORGE A. BROWN P.E.
No. 56076

State of Florida
Professional Engineer
License No. 56076
GEORGE A. BROWN

DRAWN BY: GHD | DESIGNED BY: GAB | CHECKED BY: JOH | DATE: JAN. 2016 | SCALE: 3/8"=1'-0" | FIELD BOOK: N/A

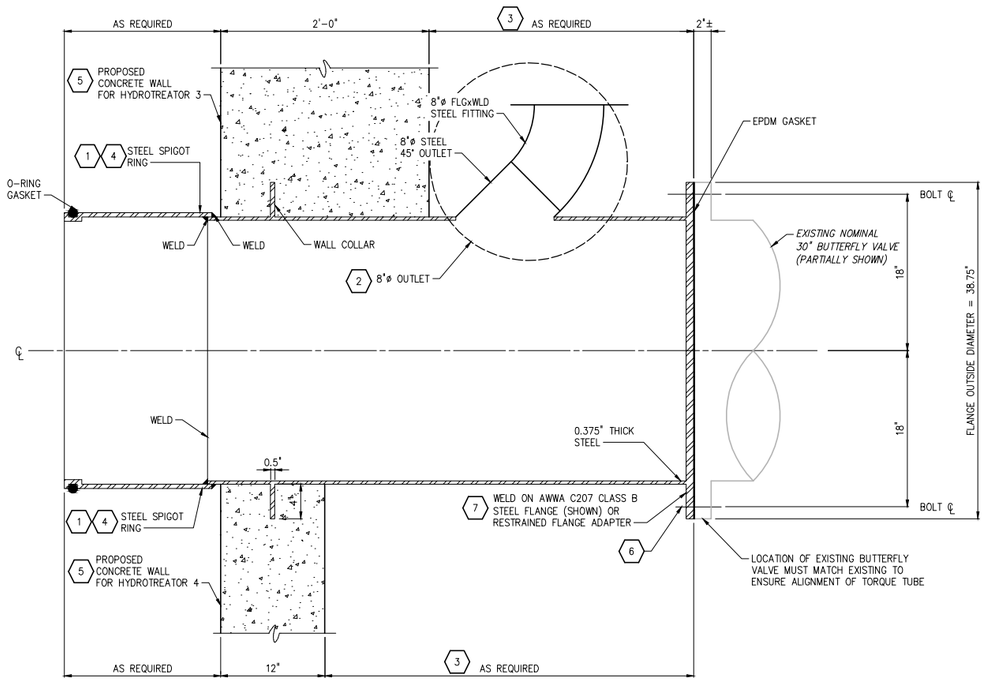
CITY OF FORT LAUDERDALE
PUBLIC WORKS DEPARTMENT
ENGINEERING & ARCHITECTURE
100 North Andrews Avenue, Fort Lauderdale, Florida 33301

REVISIONS

NO.	DESCRIPTION	DATE	BY	CHK'D

FIVEASH WTP
HYDROTREATORS INFLUENT VAULT
HYDROTREATOR 4
PROPOSED PLANS AND SECTIONS

SHEET NO. M-06 OF 10
TOTAL: 21
CAD FILE: M-06
DRAWING FILE NO. 39-40



LEGEND:

EXISTING

PROPOSED

FABRICATED WALL FITTING

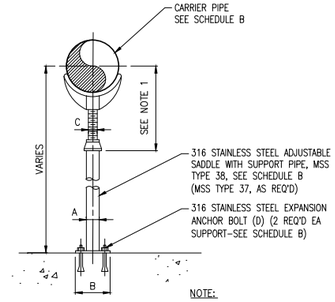
DETAIL	1
1 1/2" = 1'-0"	–

GENERAL NOTES:

1. THE FABRICATED FITTING SHOWN IS ILLUSTRATED FOR CONCEPTUAL PURPOSES. THE FITTING SHALL BE DESIGNED AND SUPPLIED BY A REINFORCED CONCRETE PIPE MANUFACTURER TO ENSURE SPIGOT RING JOINT COMPATIBILITY WITH THE EXISTING CONCRETE PIPE. THE PROPOSED FABRICATED FITTING SHALL BE DESIGNED AND SUPPLIED BY FORTERRA PRESSURE PIPE, OR EQUAL.
2. THE CONTRACTOR SHALL PROVIDE SHOP DRAWINGS FOR THE FABRICATED FITTINGS. EXISTING JOINT TYPES AT HYDROTREATOR 3 AND 4 SHALL BE CONFIRMED PRIOR TO PREPARING SHOP DRAWINGS. SHOP DRAWINGS SHALL DETAIL ALL DIMENSIONS, MATERIALS, COATINGS AND FABRICATION REQUIREMENTS.
3. WALL PIPE MATERIAL SHALL BE ASTM A53 GRADE B OR ASTM A139 GRADE B. STEEL SPIGOT RING SHALL BE JOINT MANUFACTURER'S RECOMMENDED MATERIAL.
4. THE INTERIOR AND EXTERIOR OF THE FABRICATED FITTING SHALL BE FACTORY COATED PER AWWA C210 WITH 16 MILS MINIMUM DRY FILM THICKNESS EPOXY MEETING THE REQUIREMENT OF NSF 61.

KEYED NOTES:

1. CONNECTION BETWEEN THE PROPOSED SPIGOT RING AND THE EXISTING CONCRETE PIPE IS NOT SHOWN FOR CLARITY.
2. LOCATION, ORIENTATION AND ROTATION OF 8-INCH OUTLET SHOWN FOR CONCEPTUAL PURPOSES. THE ACTUAL LOCATION, ORIENTATION AND ROTATION OF THE 8-INCH OUTLET SHALL BE DETERMINED BY THE CONTRACTOR TO MATCH EXISTING FIELD CONDITIONS.
3. ADJUST DIMENSION AS REQUIRED TO SUIT FIELD CONDITIONS FOR THE PURPOSES OF BIDDING ASSUME A MAXIMUM OF 4'-0".
4. THE PROPOSED SPIGOT RING SHALL BE SUITABLE FOR THE EXISTING CONCRETE PIPE JOINT IT IS CONNECTING TO. THE JOINT TYPE AT EACH HYDROTREATOR DIFFER. EXPOSE THE JOINT AND CONFIRM JOINT TYPE WITH PIPE SUPPLIER (FORTERRA PRESSURE PIPE) PRIOR TO PREPARATION OF FABRICATED FITTING SHOP DRAWING.
5. REINFORCING NOT SHOWN FOR CLARITY (SEE STRUCTURAL)
6. FURNISH AND INSTALL NEW NUTS AND BOLTS (SIZE AND NUMBER AS REQUIRED PER AWWA C207) CONFORMING TO ASTM A307.
7. THE CONTRACTOR MAY PROVIDE EITHER A FLANGED END FITTING AS SHOWN OR A PLAIN END FITTING THAT IS CUT TO LENGTH IN THE FIELD TO SUIT EXISTING CONDITIONS ALONG WITH A RESTRAINED FLANGE ADAPTER. IF THE CONTRACTOR SELECTS THE PLAIN END / RESTRAINED FLANGE ADAPTER OPTION, THE FLANGE ADAPTER SHALL BE A SERIES 2100 BY EBAA IRON OR EQUAL.



NOTE:

1. VARIES ACCORDING TO PIPE SIZE (APPROX 4 1/2" TOTAL ADJUSTMENT)

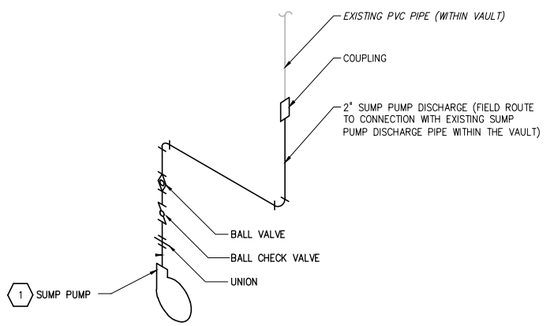
SCHEDULE B

ADJUSTABLE FLOOR MOUNTED PIPE SUPPORT SADDLE (DIM IN INCHES)

PIPE SIZE	A	B	C	D DIA x LG
2-3	2 1/2	7	1 1/2	5/8 x 5
4-12	3	7 1/2	2 1/2	5/8 x 5
14-16	4	9	3	5/8 x 5
18-20	6	11	3 1/2	3/4 x 6
24-36	6	11	4	3/4 x 6

ADJUSTABLE PIPE SUPPORT

DETAIL	2
NTS	–



KEYED NOTES:

1. CONNECT PROPOSED PUMP TO POWER SUPPLY FOR EXISTING SAMPLE PUMP.

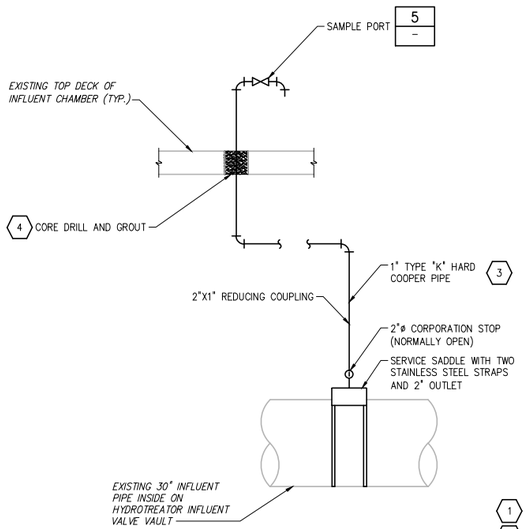
LEGEND:

EXISTING

PROPOSED

SUMP PUMP SCHEMATIC

DETAIL	3
NTS	–



LEGEND:

EXISTING

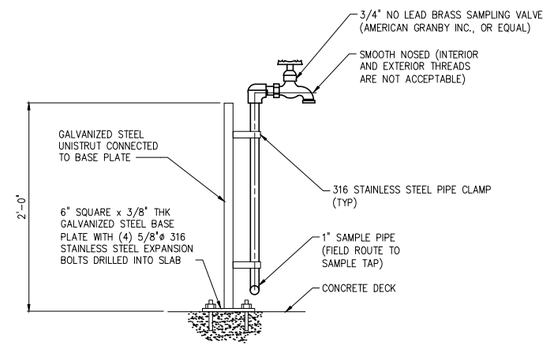
PROPOSED

SAMPLE TAP AND PIPE SCHEMATIC

DETAIL	4
NTS	–

KEYED NOTES:

1. ROMAC MODEL 202S, OR EQUAL.
2. NO-LEAD BRASS 2" AWWA/CC THREAD INLET CORPORATION STOP WITH FEMALE NATIONAL PIPE THREAD OUTLET. A.Y. MCDONALD MODEL No. 74101BCAPF, OR EQUAL.
3. FURNISH AND INSTALL PIPE SUPPORTS AT 5'-0" ON CENTER. SECURE PIPE TO WALLS AND CEILING. FIELD ROUTE PIPE TO SAMPLE PORT LOCATION WITH CITY ASSISTANCE.
4. CITY WILL SELECT THE LOCATION FOR PIPING PENETRATION DURING FIELD MEETING WITH THE CONTRACTOR.



SAMPLE PORT

DETAIL	5
NTS	–

LEGEND:

EXISTING

PROPOSED

Hazen

HAZEN AND SAWYER
4000 HOLLYWOOD BOULEVARD, SUITE 750N
HOLLYWOOD, FLORIDA 33021
CERTIFICATE OF AUTHORIZATION NO. : 2771

1 1/2"=1'-0"

4" 0 1'

GEORGE A. BROWN P.E.
No. 56076

State of Florida
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GEORGE A. BROWN

DRAWN BY:	DATE:
GHD	JAN. 2016
DESIGNED BY:	SCALE:
GAB	INDICATED
CHECKED BY:	
JOH	
FIELD BOOK:	N/A

CITY OF FORT LAUDERDALE
PUBLIC WORKS DEPARTMENT
ENGINEERING & ARCHITECTURE
100 North Andrews Avenue, Fort Lauderdale, Florida 33301

REVISIONS

NO.	DATE	BY	CHK'D	DESCRIPTION

FIVEASH WTP
HYDROTREATORS INFLUENT VAULT
MECHANICAL DETAILS

SHEET NO.	OF
M-07	11
TOTAL:	21

CAD FILE: M-07

DRAWING FILE NO. 39-40

ELECTRICAL LEGEND

SYMBOL	DESCRIPTION
	CONNECTION POINT TO EQUIPMENT SPECIFIED, FURNISHED AND INSTALLED UNDER OTHER SECTIONS. RACEWAY, CONDUCTOR AND CONNECTION IN THIS SECTION.
[°C,2#12, 1#12G]	INDICATES RACEWAY AND CIRCUIT CONDUCTORS. FIRST NUMBER IS RACEWAY SIZE. THE FOLLOWING NUMBERS ARE THE CONDUCTOR QUANTITIES, SIZES, AND TYPES.
[°C,1–25/C TYPE 1]	
[A1]YX	INDICATES RACEWAY AND CIRCUIT CONDUCTORS IN CIRCUIT SCHEDULE. YX INDICATES CIRCUIT TYPE REPEATED Y TIMES.
MCC–A	MAJOR ELECTRICAL COMPONENT OR DEVICE – NAME OR IDENTIFYING SYMBOL AS SHOWN.
	BRANCH CIRCUIT PANEL BOARD
UH1	UNIT HEATER NO.1 SEE SCHEDULE
TTC	TELEPHONE TERMINAL CABINET
	TERMINAL JUNCTION BOX
10	WOUND–ROTOR MOTOR, HORSEPOWER INDICATED
5	MOTOR, SQUIRREL CAGE INDUCTION – HORSEPOWER INDICATED
1	LUMINAIRE – SEE SCHEDULE
2	LUMINAIRE – SEE SCHEDULE
3	LUMINAIRE AND POLE – SEE SCHEDULE
4	WALL MOUNTED LUMINAIRE – SEE SCHEDULE
5	FLOOD LIGHTS – AIM IN THE DIRECTION SHOWN
	EXIT LIGHTS – SEE SCHEDULE
X Y Z (TYP)	X=FIXTURE TYPE Y=PANEL–CIRCUIT BRKR Z=SWITCH IF NO Z INDICATED, CONNECT DIRECTLY TO CIRCUIT BREAKER.
LA–2	HOME RUN – DESTINATION SHOWN
or G	EXPOSED CONDUIT AND CONDUCTORS*
or G	CONCEALED CONDUIT AND CONDUCTORS*
	NOTE: * ALL UNMARKED CONDUIT RUNS CONSIST OF TWO NO.12 CONDUCTORS W/#12G IN CONDUIT. RUNS MARKED WITH CROSSHATCHES INDICATE NUMBER OF NO.12 CONDUCTORS. CROSSHATCH WITH SUBSCRIPT "G" INDICATES GREEN GROUND WIRE. SIZE CONDUIT ACCORDING TO SPECIFICATIONS AND APPLICABLE CODE.
	CROSSHATCHES WITH BAR INDICATE #10 CONDUCTOR. SIZE CONDUIT ACCORDING TO SPECIFICATIONS AND APPLICABLE CODE.
	CONDUIT DOWN
	CONDUIT UP
	CONDUIT, STUBBED AND CAPPED AS SHOWN
C	CABLE TRAY – SEE SPECIFICATIONS
B	BUS DUCT – SEE SPECIFICATIONS
P	TRENCHING FOR UTILITY COMPANY PRIMARY POWER CUTS
T	TRENCHING FOR TELEPHONE COMPANY CIRCUITS
CE	CONCRETE ENCASED CONDUIT
DB	DIRECT BURIED CONDUIT
G	GROUND WIRE, 4/0 UNLESS OTHERWISE NOTED
	TO BE REMOVED
	GROUND ROD, 3/4" x 20' COPPER CLAD UNLESS OTHERWISE NOTED
S	WALL SWITCH: 2– DOUBLE POLE, 3– THREE WAY, 4– FOUR WAY, 4X– WEATHERPROOF, P– PILOT LIGHT, K– KEY OPERATED, D– DIMMER, CRE– CORROSION RESISTANT
S M	MANUAL MOTOR STARTER SWITCH NEMA 4X, OTHERWISE NOTED. NUMBER OF POLES AS REQUIRED
PX	POWER CONDUIT X
CX	CONTROL/INSTRUMENTATION CONDUIT X
RTU	REMOTE TEST UNIT

SYMBOL	DESCRIPTION
	CONVENIENCE RECEPTACLE – DUPLEX UNLESS SPECIFIED OTHERWISE WP– WEATHERPROOF C– CLOCK HANGER TL– TWIST LOCK CRE– CORROSION RESISTANT
	CONVENIENCE RECEPTACLE, PEDESTAL OR ABOVE COUNTER DUPLEX, UNLESS INDICATED OTHERWISE
30	RECEPTACLE – 240V., 1∅, AMPERAGE INDICATED
30	RECEPTACLE, SPECIAL PURPOSE – AMPERAGE AS INDICATED
	DUPLEX CONVENIENCE RECEPTACLE – FLUSH IN FLOOR
	MULTI OUTLET ASSEMBLY
	TELEPHONE RECEPTACLE (OUTLET BOX ONLY) FLUSH IN FLOOR
	TELEPHONE RECEPTACLE (OUTLET BOX, 18" AFF) W – WALL MOUNTED, 48" AFF
	DATA RECEPTACLE (OUTLET BOX ONLY) FLUSH IN FLOOR
	DATA RECEPTACLE (OUTLET BOX, 18" AFF) W – WALL MOUNTED, 48" AFF
J	GENERAL CONTROL OR WIRING DEVICE. NEMA 4X ENCLOSURE UNLESS INDICATED OTHERWISE. LETTER SYMBOLS OR ABBREVIATIONS INDICATE TYPE OF DEVICE.
PB	PUSH–BUTTON STATION, NEMA 1 ENCLOSURE UNLESS INDICATED OTHERWISE. (4X = NEMA 4X ENCLOSURE) SEE CONTROL DIAGRAMS FOR TYPE PUSH BUTTON REQUIRED.
30	NONFUSED DISCONNECT SWITCH, SIZE INDICATED, 3 POLE UNLESS INDICATED OTHERWISE, NEMA 1 ENCLOSURE, 4X = WEATHERPROOF NEMA 4X)
60/40 F	FUSED DISCONNECT SWITCH, SIZE INDICATED (60/40, 60 = SWITCH RATING: 40 = FUSE RATING) 3 POLE UNLESS INDICATED OTHERWISE, NEMA 1 ENCLOSURE, 4X = WEATHERPROOF (NEMA 4X)
2	CONTACTOR, MAGNETIC, NEMA SIZE INDICATED, NEMA 1 ENCLOSURE, UNLESS INDICATED OTHERWISE.
30 LC	LIGHTING CONTACTOR, CURRENT RATING INDICATED, NEMA 1 ENCLOSURE UNLESS INDICATED OTHERWISE. SEE CONTROL DIAGRAM FOR NUMBER OF POLES.
2	STARTER MAGNETIC NEMA SIZE INDICATED, NEMA 1 ENCLOSURE UNLESS INDICATED OTHERWISE. SEE CONTROL DIAGRAM.
2	COMBINATION (FUSE OR CIRCUIT BREAKER AS INDICATED) MAGNETIC STARTER, NEMA SIZE INDICATED, NEMA 1 ENCLOSURE UNLESS INDICATED OTHERWISE. SEE CONTROL DIAGRAM.
	METERING FACILITIES
	MULTI–PARTY DESK TOP COMMUNICATIONS SYSTEM STATION
W	MULTI–PARTY WALL MOUNTED COMMUNICATIONS SYSTEM STATION
	CONE TYPE PAGING SPEAKER, CEILING MOUNTED
	INTERIOR PAGING TRUMPET SOUND REPRODUCER, 120" x 60" WITH REMOTE AMPLIFIER, SURFACE MOUNTED.
	OUTDOOR PAGING TRUMPET SOUND REPRODUCER, 120" x 60" WITH REMOTE AMPLIFIER, SURFACE MOUNTED.
	CENTRAL CONTROL STATION FOR COMMUNICATIONS SYSTEM
F	FIRE ALARM STATION, MANUAL
HD F	FIRE ALARM HEAT DETECTOR, F=FIXED TEMPERATURE
F	FIRE ALARM STROBE LIGHT
F	FIRE ALARM BELL, WITH STROBE LIGHT
SD	FIRE ALARM IONIZATION DETECTOR
D S OR R	AIR DUCT IONIZATION DETECTOR S = SUPPLY R = RETURN
A	INDICATING LIGHT, LETTER INDICATES COLOR
A	INDICATING LIGHT – LETTER INDICATES COLOR A – AMBER G – GREEN B – BLUE R – RED C – CLEAR W – WHITE
G	GENERATOR
K	KIRK–KEY INTERLOCK
PT	POTENTIAL TRANSFORMER

LINE WEIGHTS

EXISTING

NEW

SYMBOL	DESCRIPTION
1	CONTACT – NORMALLY OPEN WITH NEMA SIZE INDICATED AS APPLICABLE
1	CONTACT – NORMALLY CLOSED WITH NEMA SIZE INDICATED AS APPLICABLE
	OVERLOAD RELAY HEATER
1	MAGNETIC STARTER WITH NEMA SIZE INDICATED
M	CIRCUIT BREAKER, MAGNETIC, TRIP SHOWN, 3 POLE UNLESS INDICATED OTHERWISE
400	CIRCUIT BREAKER, THERMAL MAGNETIC TRIP SHOWN, 3 POLE UNLESS INDICATED OTHERWISE.
400 400	CIRCUIT BREAKER WITH CURRENT LIMITING FUSES, TRIP AND FUSE RATING INDICATED, 3 POLE UNLESS INDICATED OTHERWISE.
400 225	FUSED SWITCH, SWITCH AND FUSE CURRENT RATING INDICATED, 3 POLE UNLESS INDICATED OTHERWISE.
100	SWITCH – CURRENT RATING INDICATED, 3 POLE UNLESS INDICATED OTHERWISE.
	DRAWOUT CIRCUIT BREAKER, LOW VOLTAGE
	DRAWOUT CIRCUIT BREAKER, MEDIUM AND HIGH VOLTAGE
	DRAWOUT FUSED SWITCH, MEDIUM VOLTAGE
	LIGHTNING ARRESTER
	FUSE
10	CAPACITOR – KVAR INDICATED, OR SURGE CAPACITOR
V SW 0–600V	METER WITH SWITCH – SCALE RANGE SHOWN
	GROUND
120V or 120/240V 15 KVA 1 PH	TRANSFORMER, SECONDARY VOLTAGES, PHASE AND RATING INDICATED AS APPLICABLE
GFR 25A 0.1	PICK–UP SETTING TIME CURRENT CHARACTERISTIC } GROUND FAULT RELAY WITH C.T.
	PUSH–BUTTON SWITCH, MOMENTARY CONTACT, NORMALLY OPEN
	PUSH–BUTTON SWITCH, MOMENTARY CONTACT, NORMALLY CLOSED
	PUSH BUTTON SWITCH, MAINTAINED CONTACTS WITH MECHANICAL INTERLOCK
	3 POSITION SELECTOR SWITCH MAINTAINED CONTACT
TDR TC	TIME DELAY RELAY CONTACT (TIME ACTION INDICATED)
or TDR TO	
	REMOTE DEVICE
O H A 1 2	SELECTOR SWITCH – MAINTAINED CONTACT – CHART IDENTIFIES OPERATION:

	POSITION		
CKT.	HAND	OFF	AUTO
1	X	0	0
2	0	0	X

X – CLOSED CONTACT
O – OPEN CONTACT

3 XXX:Y	CURRENT TRANSFORMER, NUMBER INDICATED XXX: Y=RATIO OF PRIMARY TO SECONDARY CURRENT

TEMPERATURE

	OPENS ON RISING TEMPERATURE, CLOSES ON FALLING TEMPERATURE
	CLOSES ON RISING TEMPERATURE, OPENS ON FALLING TEMPERATURE

RELAYS

50	INSTANTANEOUS OVERCURRENT RELAY
51	AC TIME OVERCURRENT RELAY
64	GROUND FAULT RELAY
86	LOCKOUT RELAY
PM	POWER MONITOR
AM	AMP METER

ABBREVIATIONS

ABBREVIATIONS	DESCRIPTION
A	AMPERE
AC	ALTERNATING CURRENT
ACB	AIR CIRCUIT BREAKER
AF	AMPERE FRAME
AFD	ADJUSTABLE FREQUENCY DRIVE (SAME AS VFD)
AFF	ABOVE FINISHED FLOOR
AM	AMMETER
AS	AMMETER SWITCH, AMPERE SENSOR
ASU	AIR SUPPLY UNIT
ATS	AUTOMATIC TRANSFER SWITCH
BC	BARE COPPER
BRKR	BREAKER
C	CONDUIT, CONTACTOR
CB	CIRCUIT BREAKER
CKT	CIRCUIT
CMS	COMBINATION MOTOR STARTER
CPT	CONTROL POWER TRANSFORMER
CR	CONTROL RELAY
CT	CURRENT TRANSFORMER
DC	DIRECT CURRENT
DIV	DIVISION
E	EMPTY
EF	EXHAUST FAN
ETM	ELAPSED TIME METER
EXST	EXISTING
FDR	FEEDER
F, FU	FUSE
FI	FLOW INDICATOR
FLR	FLOOR
FLUOR	FLUORESCENT
FM	FLOW METER
FS	FLOAT SWITCH
FT	FLOW TRANSMITTER
FUT	FUTURE
FVNR	FULL VOLTAGE NON–REVERSING STARTER
G	GREEN, GROUND
GALV	GALVANIZED
GEN	GENERATOR
GFI	GROUND FAULT INTERRUPTER
GFR	GROUND FAULT RELAY
GND	GROUND
GRS	GALVANIZED RIGID STEEL
HH	HANDHOLE
HID	HIGH INTENSITY DISCHARGE
HOA	HAND/OFF/AUTO
HOR	HAND/OFF/REMOTE
HPS	HIGH PRESSURE SODIUM
HVAC	HEATING, VENTILATING & AIR CONDITIONING
IC	INTERRUPTING CAPACITY
I & C	INSTRUMENTATION AND CONTROL
INCAND	INCANDESCENT
INST	INSTANTANEOUS
IP	INSTRUMENT PANEL (PANELBOARD)
J, J–BOX	JUNCTION BOX
K	KIRK KEY INTERLOCK
LA	LIGHTNING ARRESTER
LC	LIGHTING CONTACTOR
LP	LIGHTING PANEL (PANELBOARD)
LR	LOCAL REMOTE
LS	LIMIT SWITCH
LT FLEX	LIQUID TIGHT FLEX CONDUIT
LTG	LIGHTING

ABBREVIATIONS	DESCRIPTION
M	MAGNETIC CONTACTOR COIL OR MOTORIZED
MCC	MOTOR CONTROL CENTER
MDP	MAIN DISTRIBUTION PANEL
MERC	MERCURY VAPOR
MH	MOTOR HEATER, MANHOLE
MLO	MAIN LUGS ONLY
MPC	MINI POWER CENTER
MS	MOTOR STARTER
MSC	MANUFACTURER SUPPLIED CABLE
MPU	MOTOR PROTECTION UNIT
MT	MOUNT
MTD	MOTOR TEMPERATURE DETECTOR
MVA	MEGAVOLT AMPERES
N	NEUTRAL
NC	NORMALLY CLOSED
NEMA	NATIONAL ELECTRIC MANUFACTURER'S ASSOCIATION
NO	NORMALLY OPEN
NP	NAMEPLATE
OL	OVERLOAD RELAY
P	POLE
PB	PULL BOX
PC	PHOTOCELL
PH	PHASE
PM	POWER MONITOR
PNL	PANEL
PP	POWER PANEL (480VAC)
PS	PRESSURE SWITCH
PT	POTENTIAL TRANSFORMER
PVC	POLYVINYL CHLORIDE CONDUIT
R	RED
RCPT	RECEPTACLE
RM	REMOTE MULTIPLEXER
RMS	ROOT MEAN SQUARE
RS	RIGID STEEL CONDUIT
RTU	REMOTE TELEMETRY UNIT
RVAT	REDUCED VOLTAGE AUTO TRANSFORMER
SC	SURGE CAPACITOR
SF	SUPPLY FAN
SH	SPACE HEATER
S/N	SOLID NEUTRAL
SPD	SPEED
SSRVS	SOLID STATE REDUCED VOLTAGE STARTER
SST	STAINLESS STEEL
SV	SOLENOID VALVE
SW	SWITCH
SWBD	SWITCHBOARD
SWGR	SWITCHGEAR
SYM	SYMMETRICAL
T	THERMOSTAT
TB	TERMINAL BOARD
TDR	TIME DELAY RELAY
TJB	TERMINAL JUNCTION BOX
TS	THERMAL SWITCH
TSP	TWISTED SHIELDED PAIR
TX	TRANSFORMER
TYP	TYPICAL
UH	UNIT HEATER
UVR	UNDER VOLTAGE RELAY
V	VOLT
VFD	VARIABLE FREQUENCY DRIVE (SAME AS AFD)
VCB	VACUUM CIRCUIT BREAKER
VM	VOLTMETER
VS	VOLTMETER SWITCH
W	WATT
WM	WATTHOUR METER
WHD	WATTHOUR DEMAND METER
WP	WEATHERPROOF
XFMR	TRANSFORMER

TIME DELAY CONTACTS

- NORMALLY OPEN, TIMED OPEN
- NORMALLY OPEN, TIMED CLOSED
- NORMALLY CLOSED, TIMED OPEN
- NORMALLY CLOSED, TIMED CLOSED

PRESSURE OR VACCUUM

- OPENS ON RISING PRESSURE, CLOSES ON FALLING PRESSURE
- CLOSES ON RISING PRESSURE, OPENS ON FALLING PRESSURE

NOTE:
THIS IS A STANDARD LEGEND SHEET. SOME SYMBOLS OR ABBREVIATIONS MAY APPEAR ON THIS SHEET AND NOT BE UTILIZED ON PROJECT.

Hazen
HAZEN AND SAWYER
4000 HOLLYWOOD BOULEVARD, SUITE 750N
HOLLYWOOD, FLORIDA 33021
CERTIFICATE OF AUTHORIZATION NO. : 2771

KEITH DINNEN P.E.
No. 78757

State of Florida
Professional Engineer
License No. 78757
KEITH DINNEN

7/22/2016 10:00 AM

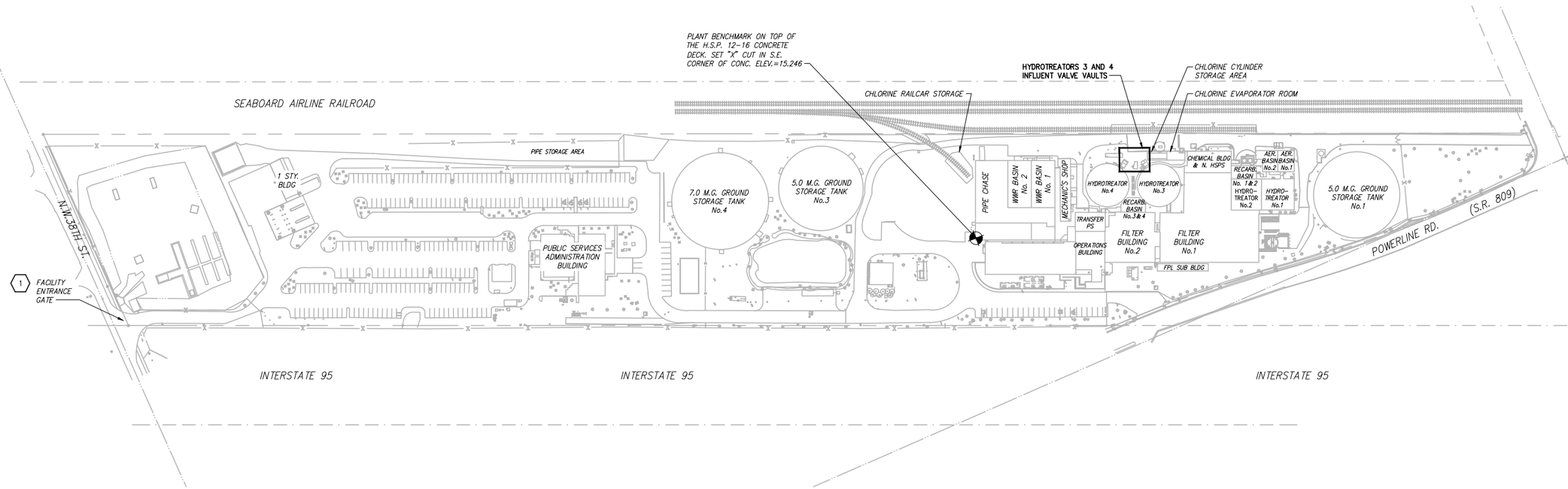
DRAWN BY: GHD | DESIGNED BY: GAB | CHECKED BY: GWB | DATE: JAN. 2016 | SCALE: NTS | FIELD BOOK: N/A

CITY OF FORT LAUDERDALE
PUBLIC WORKS DEPARTMENT
ENGINEERING & ARCHITECTURE
100 North Andrews Avenue, Fort Lauderdale, Florida 33301

REVISIONS NO.	DATE	BY	CHK'D	DESCRIPTION

FIVEASH WTP
HYDROTREATORS INFLUENT VAULT
ELECTRICAL LEGEND AND SYMBOLS

SHEET NO. E-01 OF 12
TOTAL: 21
CAD FILE:
DRAWING FILE NO. E-01
339–40



FACILITY ADDRESS:

4321 N.W. 9th AVENUE
FORT LAUDERDALE, FL 33309

KEYED NOTES:

1. THE CONTRACTOR SHALL ENTER THE WATER TREATMENT PLANT THROUGH THE PUBLIC SERVICES DEPARTMENT SECURITY GATE LOCATED AT 949 N.W. 38TH STREET.

GENERAL DESCRIPTION OF ELECTRICAL WORK:

1. TEMPORARILY REMOVE EXISTING 30" MAGNETIC FLOW METERS FROM THE HYDROTREATORS 3 AND 4 INFLUENT VAULTS AND REINSTALL FOLLOWING COMPLETION OF PIPING MODIFICATIONS.
2. TEST FUNCTION OF FLOW METERS AND ASSOCIATED MOTOR OPERATED VALVES.

1"=100'-0" 100 50 0 100'

Hazen
HAZEN AND SAWYER
4000 HOLLYWOOD BOULEVARD, SUITE 750N
HOLLYWOOD, FLORIDA 33021
CERTIFICATE OF AUTHORIZATION NO. : 2771

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License No. 78757
KEITH DINNEN

DRAWN BY:	DATE:	DESIGNED BY:	SCALE:
GHD	JAN. 2016	GAB	1"=100'
CHECKED BY:		FIELD BOOK:	
GWB		N/A	

CITY OF FORT LAUDERDALE
PUBLIC WORKS DEPARTMENT
ENGINEERING & ARCHITECTURE
100 North Andrews Avenue, Fort Lauderdale, Florida 33301

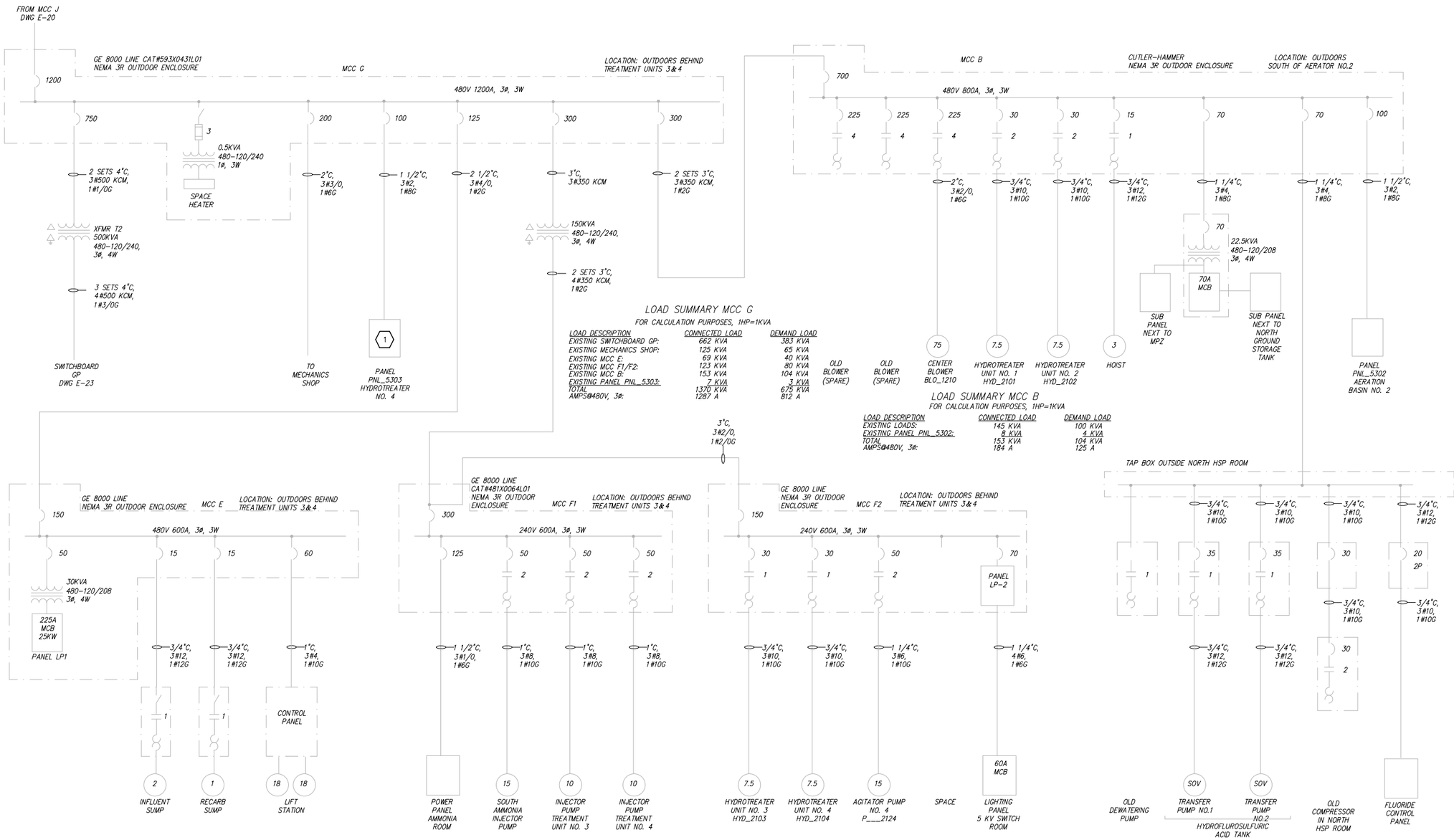
REVISIONS

NO.	DATE	BY	CHK'D	DESCRIPTION

FIVEASH WTP
HYDROTREATORS INFLUENT VAULT
ELECTRICAL SITE PLAN

SHEET NO.	OF
E-02	13
TOTAL:	21

CAD FILE: E-02
DRAWING FILE NO. 39-40



KEYED NOTES:

(1) PANEL PNL-5303 PROVIDES POWER TO THE MOTOR OPERATORS FOR HYDROTREATORS 3 AND 4 INFLUENT VALVE OPERATORS.

GENERAL NOTES:

1. THIS DRAWING FOR REFERENCE PURPOSES ONLY. NO PROPOSED WORK IS SHOWN ON THIS SHEET.

LEGEND:

EXISTING

PROPOSED

Hazen

HAZEN AND SAWYER
4000 HOLLYWOOD BOULEVARD, SUITE 750N
HOLLYWOOD, FLORIDA 33021
CERTIFICATE OF AUTHORIZATION NO. : 2771

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No. 78757

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KEITH DINNEN

DRAWN BY: GHD
DESIGNED BY: GAB
CHECKED BY: GWB
DATE: JAN. 2016
SCALE: N.T.S
FIELD BOOK: N/A

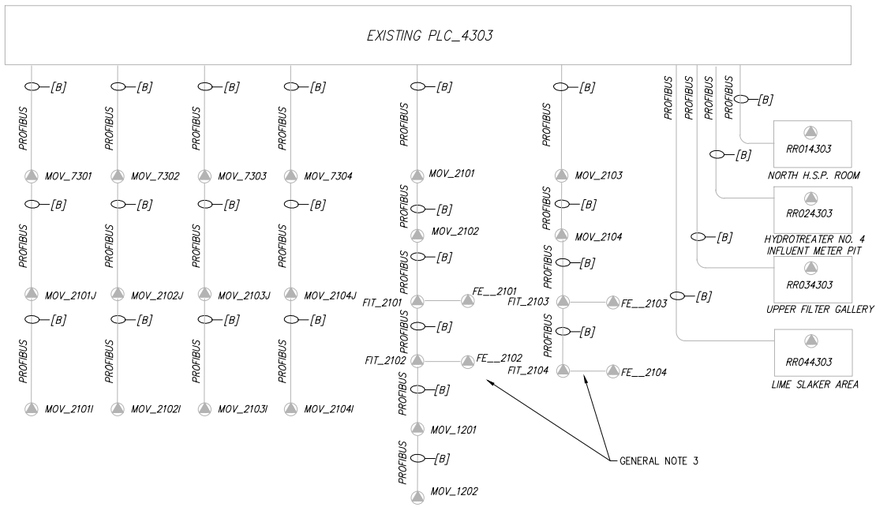
CITY OF FORT LAUDERDALE
PUBLIC WORKS DEPARTMENT
ENGINEERING & ARCHITECTURE
100 North Andrews Avenue, Fort Lauderdale, Florida 33301

REVISIONS

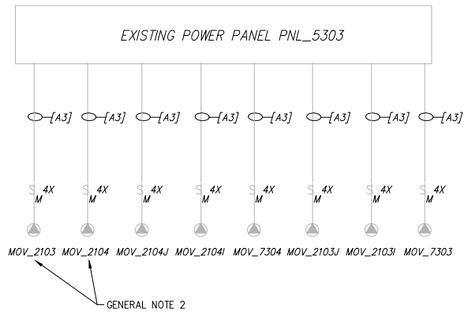
NO.	DATE	BY	CHK'D	DESCRIPTION

FIVEASH WTP
HYDROTREATORS INFLUENT VAULT
EXISTING ONE-LINE DIAGRAM

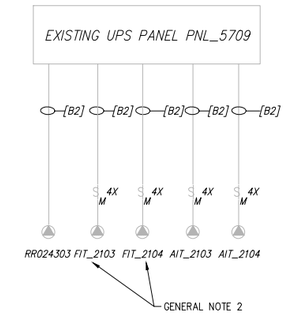
SHEET NO. E-03 OF 14
TOTAL: 21
CAD FILE: E-03
DRAWING FILE NO. 39-40



PLC_4303 RISER
NOT TO SCALE



POWER PANEL PNL_5303 RISER
NOT TO SCALE



UPS PANEL PNL_5709 RISER
NOT TO SCALE

GENERAL NOTES:

1. THIS DRAWING IS FOR REFERENCE PURPOSES ONLY. NO PROPOSED WORK IS SHOWN IN THIS SHEET.
2. THIS SHEET SHOWS HOW POWER IS SUPPLIED TO THE EXISTING MOTOR OPERATORS MOV-2103 AND MOV-2104 AT HYDROTREATORS 3 AND 4.
3. THIS SHEET SHOWS SIGNAL RISERS FOR THE MOTOR OPERATORS (MOV-2103 AND MOV-2104) AND FLOW METER (FE/FIT 2103 AND FE/FIT 2104) IN THE HYDROTREATORS 3 AND 4 INFLUENT VALVE VAULTS.

LEGEND:

EXISTING

PROPOSED

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DRAWN BY: GHD
DESIGNED BY: GAB
CHECKED BY: GWB
DATE: JAN. 2016
SCALE: NTS
FIELD BOOK: N/A

CITY OF FORT LAUDERDALE
PUBLIC WORKS DEPARTMENT
ENGINEERING & ARCHITECTURE
100 North Andrews Avenue, Fort Lauderdale, Florida 33301

REVISIONS

NO.	DATE	BY	CHK'D	DESCRIPTION

FIVEASH WTP
HYDROTREATORS INFLUENT VAULT
RISER DIAGRAMS

SHEET NO. E-04 OF 15
TOTAL: 21
CAD FILE: E-04
DRAWING FILE NO. 39-40

EXISTING PANELBOARD SCHEDULE "PNL_5303"

BUS AMPS A	B	C	LOAD	POLES	AMPS	BUS A B C	AMPS	POLES	LOAD	BUS AMPS A	B	C
1.0			MOV_2103	3	20	1 – 2	3	20	MOV_7304	1.0		
	1.0		(TOTAL 0.5 HP)			3 – 4			(TOTAL 0.5 HP)		1.0	
		1.0				5 – 6						1.0
1.0			MOV_2104	3	20	7 – 8	3	20	SPARE			
	1.0		(TOTAL 0.5 HP)			9 – 10						
		1.0				11 – 12						
1.0			MOV_2103J	3	20	13 – 14	3	20	SPARE			
	1.0		(TOTAL 0.5 HP)			15 – 16						
		1.0				17 – 18						
1.0			MOV_2103I	3	20	19 – 20	3	20	SPARE			
	1.0		(TOTAL 0.5 HP)			21 – 22						
		1.0				23 – 24						
1.0			MOV_2104J	3	20	25 – 26	3	20	SPARE			
	1.0		(TOTAL 0.5 HP)			27 – 28						
		1.0				29 – 30						
1.0			MOV_2104I	3	20	31 – 32	3	20	SPARE			
	1.0		(TOTAL 0.5 HP)			33 – 34						
		1.0				35 – 36						
1.0			MOV_7303	3	20	37 – 38	3	20	SPARE			
	1.0		(TOTAL 0.5 HP)			39 – 40						
		1.0				41 – 42						

TOTAL CONNECTED AMPS: BUS A_8.0 BUS B_8.0 BUS C_8.0 CONNECTED Kva_6.6 — TOTAL DEMAND AMPS: BUS A_4.0 BUS B_4.0 BUS C_4.0 DEMAND Kva_3.3

RATED VOLTAGE: ☐ 120/240 ■ 480 — 3 PHASE, 3 WIRE — BRANCH POLES ☐ 12 ☐ 24 ☐ 30 ■ 42

RATED AMPS: ■ 100 ☐ 225 ☐ 400 ☐ _____ — CABINET: ■ SURFACE ☐ FLUSH

NEUTRAL BUS ☐ 100% ☐ 150% ☐ 200% — ■ GROUND BUS — ■ HINGED DOOR — ■ KEYED DOOR LATCH — LOCATION: HYDROTREATER UNITS 3&4

■ CIRCUIT BREAKER (BOLT–IN) BRANCH DEVICES — ☐ TVSS — ENCLOSURE TYPE ☐ NEMA 1 ☐ NEMA 3R ■ NEMA 4X ☐ _____

■ MAIN LUGS ONLY — MAIN ____AMPS ☐ BREAKER — ☐ _____ TO BE GFI BREAKERS

PANELBOARD MUST BE RATED TO INTERRUPT A SHORT CIRCUIT ISC OF ___42,000 AMPS SYMMETRICAL.

GE, SQUARE D, CUTLER–HAMMER, SIEMENS — COPPER BUSSES — MAIN LUGS ____1____ SETS SIZE: _____100__

EXISTING UPS PANEL "PNL_5709" SCHEDULE

BUS AMPS A	B	C	LOAD	POLES	AMPS	BUS A B C	AMPS	POLES	LOAD	BUS AMPS A	B	C
0.5			FIT_2103	1	15	1 – 2	15	1	SPARE			
	0.5		FIT_2104	1	15	3 – 4	15	1	SPARE			
		0.5	AIT_2103	1	15	5 – 6	15	1	SPARE			
0.5			AIT_2104	1	15	7 – 8	15	1	SPARE			
	3.0		RR024303	1	15	9 – 10	15	1	SPARE			
			SPARE	1	15	11 – 12	15	1	SPARE			
			SPARE	1	15	13 – 14	15	1	SPARE			
			SPARE	1	15	15 – 16	15	1	SPARE			
			SPARE	1	15	17 – 18	15	1	SPARE			
			SPARE	1	15	19 – 20	15	1	SPARE			
			SPARE	1	15	21 – 22	15	1	SPARE			
			SPARE	1	15	23 – 24	15	1	SPARE			
			SPARE	1	15	25 – 26	15	1	SPARE			
			SPARE	1	15	27 – 28	15	1	SPARE			
			SPARE	1	15	29 – 30	15	1	SPARE			
			SPARE	1	15	31 – 32	15	1	SPARE			
			SPARE	1	15	33 – 34	15	1	SPARE			
			SPARE	1	15	35 – 36	15	1	SPARE			
			SPARE	1	15	37 – 38	15	1	SPARE			
			SPARE	1	15	39 – 40	15	1	SPARE			
			SPARE	1	15	41 – 42	15	1	SPARE			

TOTAL AMPS: BUS A1.0 BUS B3.5 BUS C0.5 CONNECTED Kva_0.6

RATED VOLTAGE: ■ 120/208 ☐ 277/480 — 3 PHASE, 4 WIRE — BRANCH POLES ☐ 12 ☐ 20 ☐ 30 ■ 42

RATED AMPS: ■ 100 ☐ 225 ☐ 400 ☐ _____ — CABINET: ■ SURFACE ☐ FLUSH

NEUTRAL BUS ■ 100% ☐ 150% ☐ 200% — ■ GROUND BUS — ■ HINGED DOOR — ■ KEYED DOOR LATCH — LOCATION: TREATMENT UNITS 3&4

■ CIRCUIT BREAKER (BOLT–IN) BRANCH DEVICES — ■ TVSS — ENCLOSURE TYPE ☐ NEMA 1 ☐ NEMA 3R ■ NEMA 4X ☐ _____

☐ MAIN LUGS ONLY — MAIN 50_AMPS ■ BREAKER — ☐ _____ TO BE GFI BREAKERS

PANELBOARD MUST BE RATED TO INTERRUPT A SHORT CIRCUIT ISC OF _____10,000 AMPS SYMMETRICAL.

APPROVED MF'RS. SQUARE D, GE, CUTLER–HAMMER, ALLEN–BRADLEY, SIEMENS — COPPER BUSSES — MAIN LUGS _____1___ SETS SIZE: _____ 100

CIRCUIT SCHEDULE
CONTROL, INSTRUMENTATION

CKT I.D.	CONDUIT AND CONDUCTOR SIZE
[A1]	[1"C, 2#14, 1#14G]
[B1]	[1"C, 3#14, 1#14G]
[C1]	[1"C, 4#14, 1#14G]
[D1]	[1"C, 5#14, 1#14G]
[E1]	[1"C, 6#14, 1#14G]
[F1]	[1"C, 7#14, 1#14G]
[G1]	[1"C, 9#14, 1#14G]
[H1]	[1"C, 11#14, 1#14G]
[J1]	[1 1/4"C, 30#14, 1#14G]
[K1]	[1"C, 7/C TYPE 1]
[L1]	[1 1/4"C, 12/C TYPE 1]
[M1]	[1 1/2 "C, 19/C TYPE 1]
[N1]	[2"C, 25/C TYPE 1]
[P1]	[2"C, 37/C TYPE 1]
[Q1]	[2"C, 40#14, 1#12G]
[R1]	[1"C, 1–TYPE B, TW SHLD PR]
[S1]	[1"C, 2–TYPE B, TW SHLD PR]
[T1]	[1"C, 3–TYPE B, TW SHLD PR]
[U1]	[1 1/4 "C, 4–TYPE B, TW SHLD PR]
[V1]	[1 1/2 "C, 8–TYPE B, TW SHLD PR]
[W1]	[1"C, 1–RTD TYPE CABLE]
[X1]	[1"C, 20#14, 1#14G]
[Y1]	[1 1/2"C, 6–TYPE B, TW SHLD PR]
[Z1]	[2 1/2"C, 6–RTD TYPE CABLE]
[A]	[1"C, CAT.5, 4 PAIR ETHERNET CABLE, 1#6 INSULATED GROUND]
[B]	[1"C, FOR FIBER OPTIC CABLE]

CIRCUIT SCHEDULE
3Ø, 4W

CKT I.D.	CONDUIT AND CONDUCTOR SIZE	CKT AMPS
[A4]	[1"C, 4#12, 1#12G]	20
[B4]	[1"C, 4#10, 1#10G]	30
[C4]	[1"C, 4#8, 1#10G]	40
[D4]	[1"C, 4#6, 1#10G]	50
[E4]	[1 1/4 "C, 4#4, 1#10G]	60
[F4]	[1 1/4 "C, 4#4, 1#8G]	70
[G4]	[1 1/2 "C, 4#3, 1#8G]	80
[H4]	[1 1/2"C, 4#2, 1#8G]	100
[J4]	[2"C, 3#2, 1#8G, 1#1/0 NEUT.]	100
[K4]	[2"C, 4#1/0, 1#6G]	150
[L4]	[2"C, 4#2/0, 1#6G]	175
[M4]	[2 1/2 "C, 4#3/0, 1#6G]	200
[N4]	[3"C, 4#4/0, 1#2G]	225
[P4]	[3"C, 4–250KCMIL, 1#4G]	250
[Q4]	[3 1/2"C, 4–350KCMIL, 1#3G]	300
[R4]	2 EA.[2 1/2 "C, 4#3/0, 1#3G]	400
[S4]	2 EA.[3"C, 4–250KCMIL, 1#2G]	500
[T4]	2 EA.[3 1/2"C, 4–350KCMIL, 1#1G]	600
[U4]	2 EA.[4"C, 4–500KCMIL, 1#1/0 G]	700
[V4]	3 EA.[3 1/2"C, 4–350KCMIL, 1#1/0 G]	800
[W4]	3 EA.[4"C, 4–500KCMIL, 1#2/0 G]	1000
[X4]	4 EA.[3 1/2"C, 4–350KCMIL, 1#3/0 G]	1200
[Y4]	5 EA.[4"C, 4–500KCMIL, 1#4/0 G]	1600
[Z4]	6 EA.[4"C, 4–500KCMIL, 1–250KCMIL G]	2000

CIRCUIT SCHEDULE
1Ø, 2W

CKT I.D.	CONDUIT AND CONDUCTOR SIZE	CKT AMPS
[A2]	[1"C, 2#14, 1#14G]	15
[B2]	[1"C, 2#12, 1#12G]	20
[C2]	[1"C, 2#10, 1#10G]	30
[D2]	[1"C, 2#8, 1#10G]	40
[E2]	[1"C, 2#6, 1#10G]	50
[F2]	[1"C, 2#4, 1#10G]	60
[G2]	[1"C, 2#4, 1#8G]	70
[H2]	[1 1/4 "C, 2#3, 1#8G]	80
[J2]	[1 1/4 "C, 2#2, 1#8G]	90
[K2]	[1 1/4 "C, 2#2, 1#8G]	100
[L2]	[1 1/2 "C, 2#1/0, 1#6G]	150
[M2]	[1 1/2 "C, 2#2/0, 1#6G]	175
[N2]	[2"C, 2#3/0, 1#6G]	200
[P2]	[2"C, 2#4/0, 1#4G]	225
[Q2]	[2 1/2 "C, 2–250KCMIL, 1#4G]	250
[R2]	[2 1/2 "C, 2–350KCMIL, 1#4G]	300
[S2]		
[T2]		
[U2]		
[V2]		
[W2]		
[X2]		
[Y2]		
[Z2]		

CIRCUIT SCHEDULE
3Ø, 3W OR 1Ø, 3W

CKT I.D.	CONDUIT AND CONDUCTOR SIZE	CKT AMPS
[A3]	[1"C, 3#12, 1#12G]	20
[B3]	[1"C, 3#10, 1#10G]	30
[C3]	[1"C, 3#8, 1#10G]	40
[D3]	[1"C, 3#6, 1#10G]	50
[E3]	[1 1/4 "C, 3#4, 1#10G]	60
[F3]	[1 1/4 "C, 3#4, 1#8G]	70
[G3]	[1 1/4 "C, 3#3, 1#8G]	80
[H3]	[1 1/2 "C, 3#2, 1#8G]	90
[J3]	[1 1/2 "C, 3#2, 1#8G]	100
[K3]	[1 1/2 "C, 3# 1/0, 1#6G]	150
[L3]	[2"C, 3#2/0, 1#6G]	175
[M3]	[2"C, 3#3/0, 1#6G]	200
[N3]	[2 1/2 "C, 3#4/0, 1#4G]	225
[P3]	[2 1/2 "C, 3–250KCMIL, 1#4G]	250
[Q3]	[3"C, 3–350KCMIL, 1#3G]	300
[R3]	2 EA.[2 "C, 3–3/0, 1#3G]	400
[S3]	2 EA.[2 1/2 "C, 3–250KCMIL, 1#2G]	500
[T3]	2 EA.[3"C, 3–350KCMIL, 1#1G]	600
[U3]	2 EA.[3 1/2"C, 3–500KCMIL, 1#1/0G]	700
[V3]	3 EA.[3"C, 3–350KCMIL, 1#1/0G]	800
[W3]	3 EA.[3 1/2"C, 3–500KCMIL, 1#2/0G]	1000
[X3]	4 EA.[3"C, 3–350KCMIL, 1#3/0G]	1200
[Y3]	5 EA.[3 1/2"C, 3–500KCMIL, 1#4/0G]	1600
[Z3]	6 EA.[3 1/2"C,3–500KCMIL,1–250KCMILG]	2000

GENERAL NOTES:

1. THIS DRAWING IS FOR REFERENCE PURPOSES ONLY. NO PROPOSED WORK IS SHOWN ON THIS SHEET.
2. THIS DRAWING ILLUSTRATES THE PANEL SCHEDULES FOR POWER TO THE MOTOR OPERATORS AT HYDROTREATORS 3 AND 4 (MOV–2103 AND MOV–2104) AND SIGNAL TO THE FLOW TRANSMITTERS (FIT–2103 AND FIT–2104).

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CERTIFICATE OF AUTHORIZATION NO. : 2771

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DRAWN BY: GHD | DESIGNED BY: GAB | CHECKED BY: GWB | DATE: JAN. 2016 | SCALE: NTS | FIELD BOOK: N/A

CITY OF FORT LAUDERDALE
PUBLIC WORKS DEPARTMENT
ENGINEERING & ARCHITECTURE
100 North Andrews Avenue, Fort Lauderdale, Florida 33301

REVISIONS

NO.	DATE	BY	DESCRIPTION
		CHK'D	

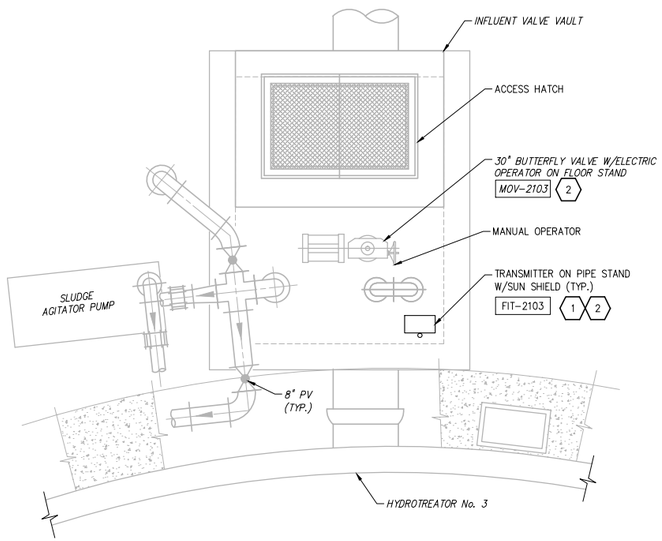
FIVEASH WTP
HYDROTREATORS INFLUENT VAULT
SCHEDULES

SHEET NO. E-05 OF 16

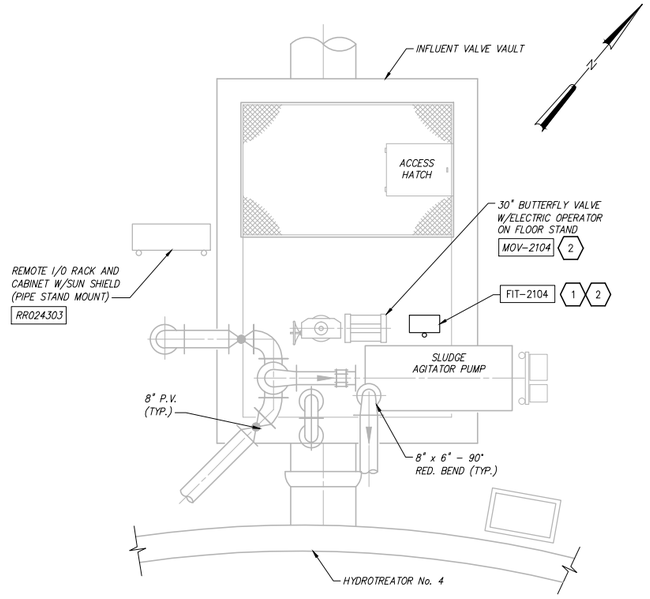
TOTAL: 21

CAD FILE: E-05

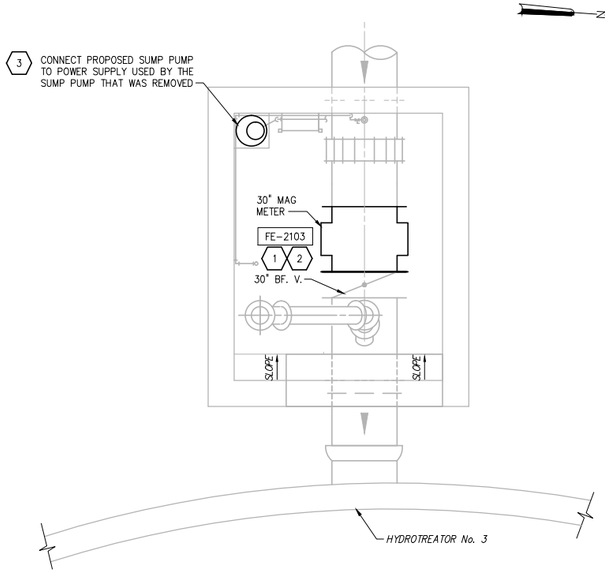
DRAWING FILE NO. 39–40



UPPER PLAN
3/8" = 1'-0"

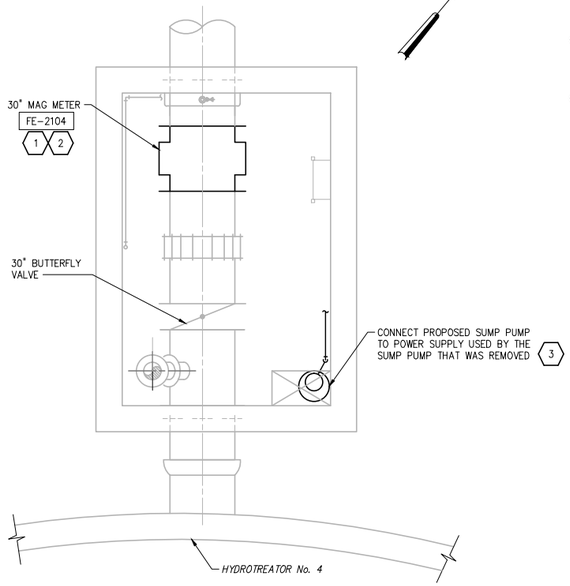


UPPER PLAN
3/8" = 1'-0"



LOWER PLAN
3/8" = 1'-0"

HYDROTREATOR No. 3



LOWER PLAN
3/8" = 1'-0"

HYDROTREATOR No. 4

KEYED NOTES:

1. DISCONNECT EXISTING FLOW METER ELEMENT SIGNAL CABLE AT TRANSMITTER AND TEMPORARILY REMOVE, STORE AND PROTECT EXISTING FLOW METER AND CABLE. FURNISH AND INSTALL NEW 30" MAGNETIC FLOW METER, CABLE, AND TERMINATIONS TO MATCH EXISTING.
2. UPON RETURNING THE HYDROTREATOR TO SERVICE, TEST THE FLOW METER AND ASSOCIATED MOTOR OPERATED VALVE AS DESCRIBED IN THE SPECIFICATIONS.
3. EXISTING SUMP PUMP IS 0.5 HORSE POWER, SINGLE PHASE, 115 VOLT POWER. PROPOSED SUMP PUMP SHALL MATCH EXISTING.

GENERAL NOTES:

1. ONLY ONE HYDROTREATOR MAY BE REMOVED FROM SERVICE AT A TIME.

LEGEND:

EXISTING

PROPOSED

3/8"=1'-0" 12" 0 1 2 4'

Hazen

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4000 HOLLYWOOD BOULEVARD, SUITE 750N
HOLLYWOOD, FLORIDA 33021
CERTIFICATE OF AUTHORIZATION NO. : 2771

KEITH DINNEN P.E.
No. 78757

7/22/2016 10:00 AM

State of Florida
Professional Engineer
License No. 78757
KEITH DINNEN

DRAWN BY: GHD
DESIGNED BY: GAB
CHECKED BY: GWB
DATE: JAN. 2016
SCALE: 3/8"=1'-0"
FIELD BOOK: N/A

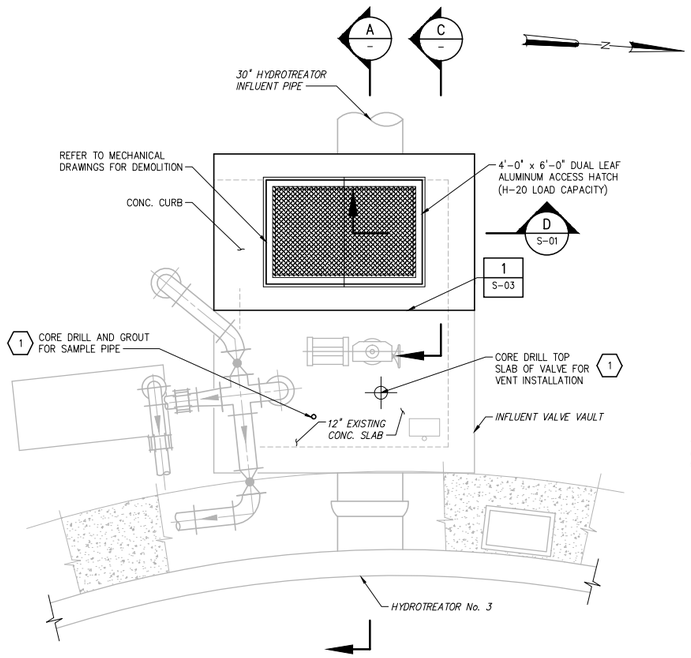
CITY OF FORT LAUDERDALE
PUBLIC WORKS DEPARTMENT
ENGINEERING & ARCHITECTURE
100 North Andrews Avenue, Fort Lauderdale, Florida 33301

REVISIONS

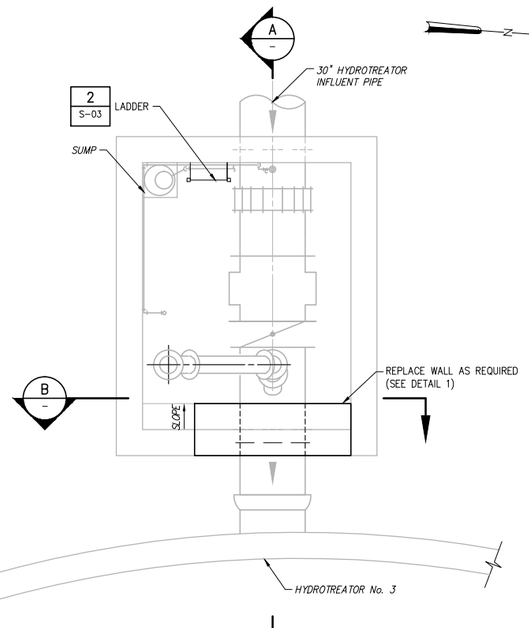
NO.	DATE	BY	CHK'D	DESCRIPTION

FIVEASH WTP
HYDROTREATORS INFLUENT VAULT
HYDROTREATOR 3 AND 4
ELECTRICAL PLANS

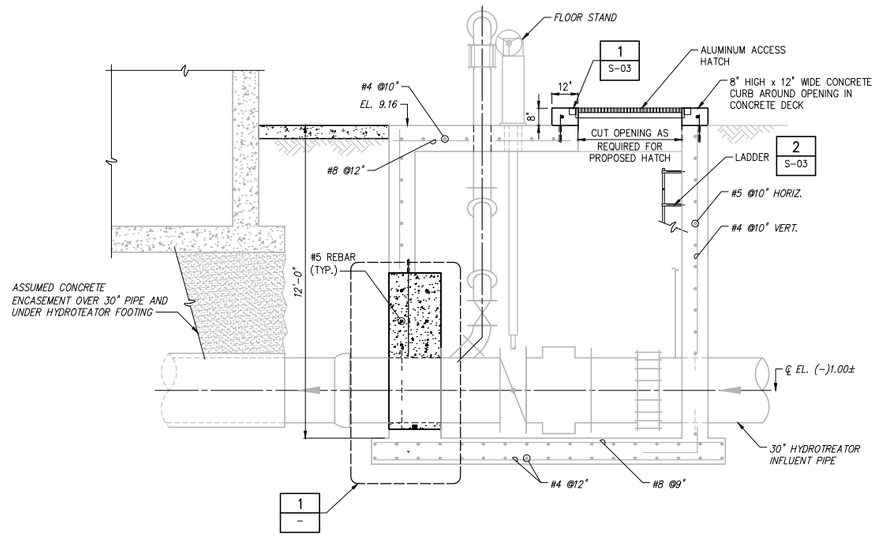
SHEET NO. E-06 OF 17
TOTAL: 21
CAD FILE: E-06
DRAWING FILE NO. 39-40



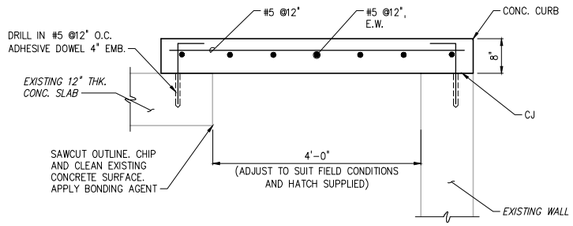
UPPER PLAN
3/8" = 1'-0"



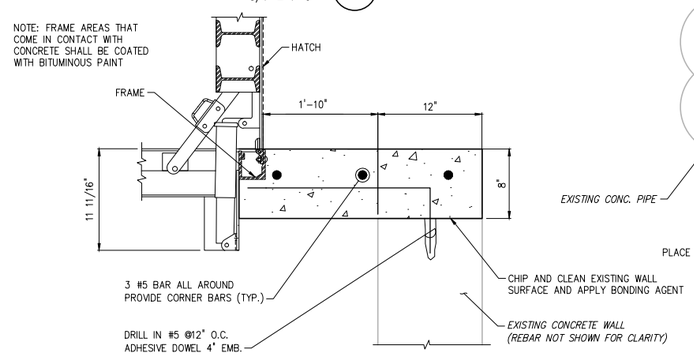
LOWER PLAN
3/8" = 1'-0"



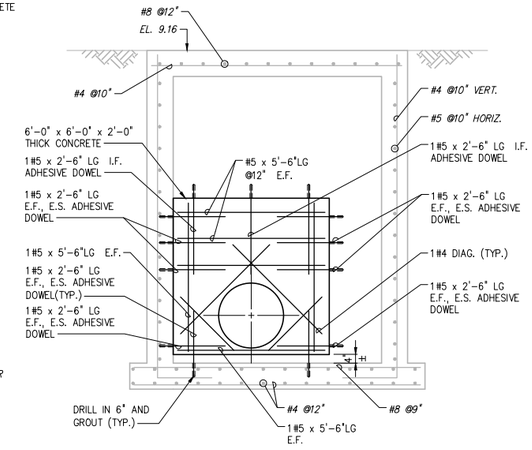
SECTION A
3/8" = 1'-0"



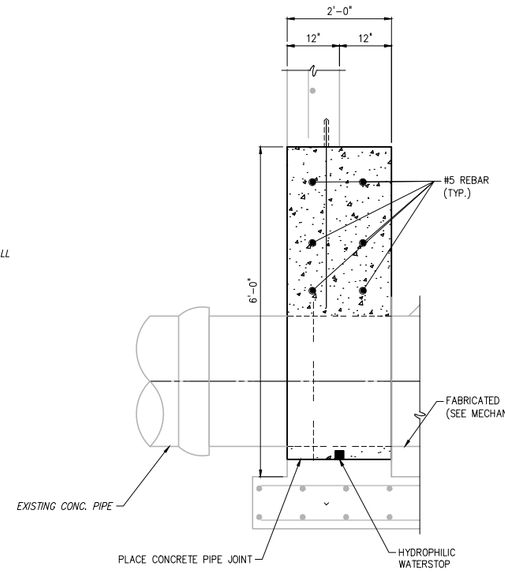
SECTION C
3/4" = 1'-0"



SECTION D
1 1/2" = 1'-0"



SECTION B
3/8" = 1'-0"



DETAIL 1
3/4" = 1'-0"

1 1/2"=1'-0" | 3/4"=1'-0" | 3/8"=1'-0"

KEYED NOTES:

1. CONTRACTOR SHALL FIELD LOCATE CORING LOCATION WITH OWNER.

NOTES:

1. EXISTING REBAR SHOWN IS BASED UPON BEST AVAILABLE INFORMATION FROM RECORD DRAWINGS TITLED "FIVEASH WATER TREATMENT PLANT AND ASSOCIATED WORKS" BY MALCOM PIRNIE. ISSUED IN 1963.

LEGEND:

EXISTING

PROPOSED

Hazen
HAZEN AND SAWYER
4000 HOLLYWOOD BOULEVARD, SUITE 750N
HOLLYWOOD, FLORIDA 33021
CERTIFICATE OF AUTHORIZATION NO. : 2771

SHAJAN JOYKUTTY P.E.
No. 43323

7/22/2016 10:00 AM

State of Florida
Professional Engineer
License No.43323
SHAJAN JOYKUTTY

DRAWN BY: GHD | DESIGNED BY: GAB | CHECKED BY: GWB | DATE: JAN. 2016 | SCALE: AS NOTED | FIELD BOOK: N/A

CITY OF FORT LAUDERDALE
PUBLIC WORKS DEPARTMENT
ENGINEERING & ARCHITECTURE
100 North Andrews Avenue, Fort Lauderdale, Florida 33301

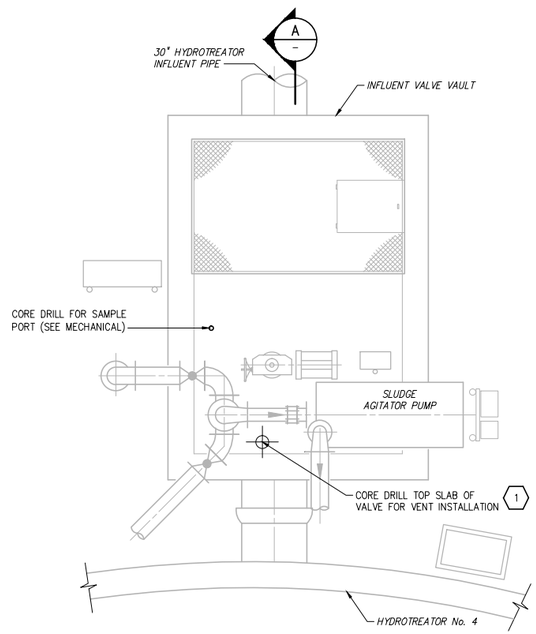
NO.	DESCRIPTION	DATE	BY	CHK'D
REVISIONS				

FIVEASH WTP
HYDROTREATORS INFLUENT VAULT
HYDROTREATOR 3
PLANS AND SECTIONS

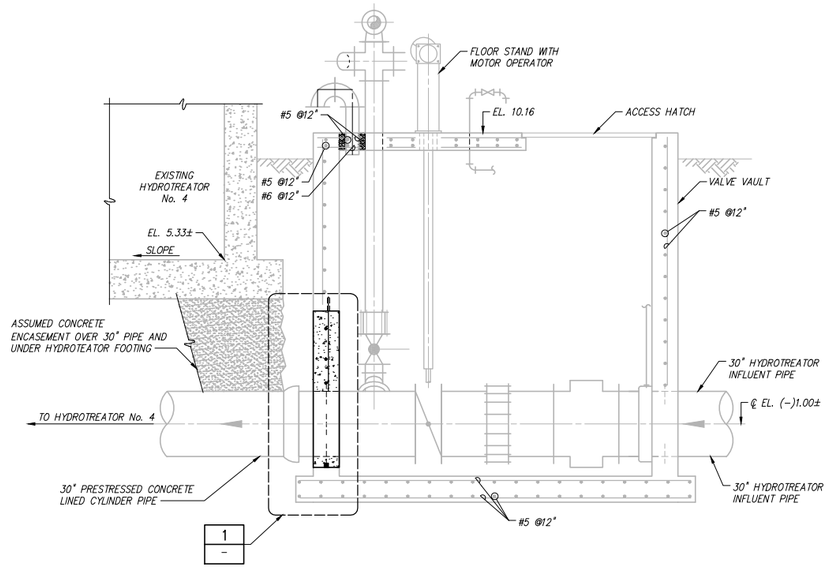
SHEET NO. S-01 OF 18
TOTAL: 21
CAD FILE: S-01
DRAWING FILE NO. 339-40

City of Fort Lauderdale
Bid 263-11809

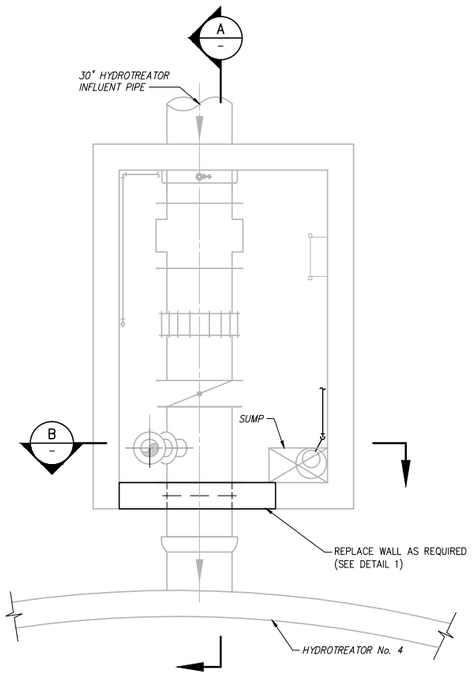
CAM 16-1212
EXHIBIT 3
Page 399 of 403



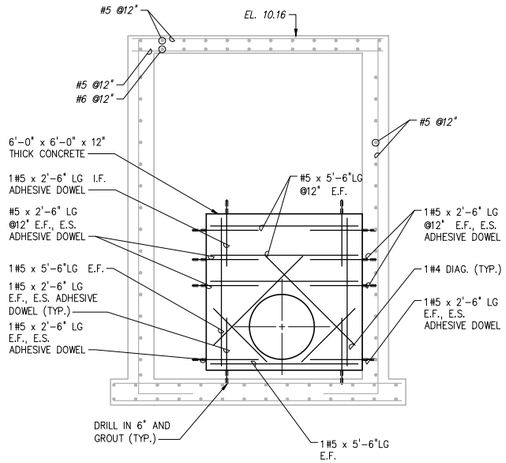
UPPER PLAN
3/8" = 1'-0"



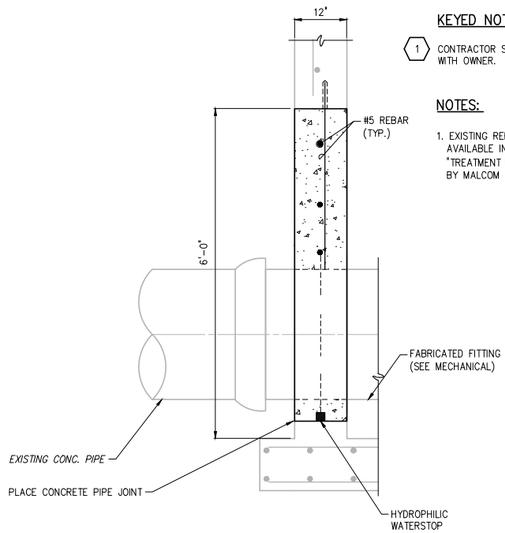
SECTION A
3/8" = 1'-0"



LOWER PLAN
3/8" = 1'-0"



SECTION B
3/8" = 1'-0"



DETAIL 1
3/4" = 1'-0"

KEYED NOTES:

1 CONTRACTOR SHALL FIELD LOCATE CORING LOCATION WITH OWNER.

NOTES:

1. EXISTING REBAR SHOWN IS BASED UPON BEST AVAILABLE INFORMATION FROM RECORD DRAWINGS TITLED "TREATMENT UNIT ADDITION AND MISCELLANEOUS WORK" BY MALCOM PIRNIE. ISSUED IN 1980.

LEGEND:

EXISTING

PROPOSED

3/4"=1'-0" 6" 0 1 2'

3/8"=1'-0" 12" 0 1 2 4'

Hazen

HAZEN AND SAWYER
4000 HOLLYWOOD BOULEVARD, SUITE 750N
HOLLYWOOD, FLORIDA 33021
CERTIFICATE OF AUTHORIZATION NO. : 2771

SHAJAN JOYKUTTY P.E.
No. 43323

DRAWING FILE NO. 339-40

REVISIONS

NO.	DATE	BY	CHK'D	DESCRIPTION

CITY OF FORT LAUDERDALE
PUBLIC WORKS DEPARTMENT
ENGINEERING & ARCHITECTURE
100 North Andrews Avenue, Fort Lauderdale, Florida 33301

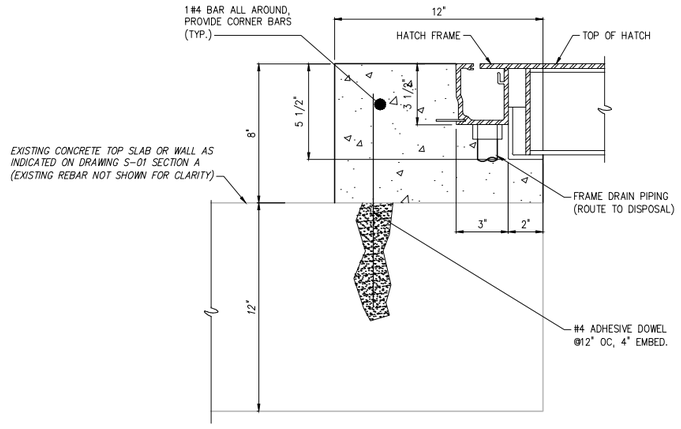
DRAWN BY: GHD | DESIGNED BY: GAB | CHECKED BY: GWB
DATE: JAN. 2016 | SCALE: AS NOTED
FIELD BOOK: N/A

State of Florida
Professional Engineer
License No.43323
SHAJAN JOYKUTTY

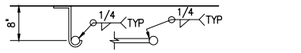
7/22/2016 10:00 AM

FIVEASH WTP
HYDROTREATORS INFLUENT VAULT
HYDROTREATOR 4
PLANS AND SECTIONS

SHEET NO. S-02 OF 19
TOTAL: 21
CAD FILE: S-02



DETAIL 1
3" = 1'-0" S-01



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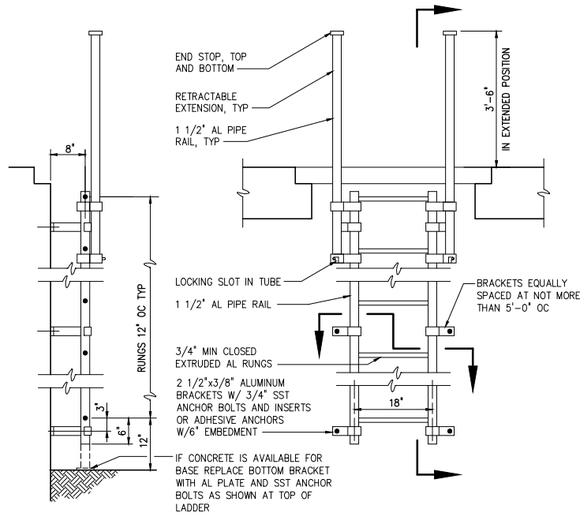


SECTION ELEVATION

ALUMINUM LADDER WITH RETRACTABLE EXTENSION

DETAIL 2
NTS S-01

3"=1'-0"

2" 0 2 4 6"

Hazen
HAZEN AND SAWYER
4000 HOLLYWOOD BOULEVARD, SUITE 750N
HOLLYWOOD, FLORIDA 33021
CERTIFICATE OF AUTHORIZATION NO. : 2771

SHAJAN JOYKUTTY P.E.
No. 43323

State of Florida
Professional Engineer
License No.43323
SHAJAN JOYKUTTY

DRAWN BY: GHD | DATE: JAN. 2016
DESIGNED BY: GAB | SCALE: INDICATED
CHECKED BY: GWB | FIELD BOOK: N/A

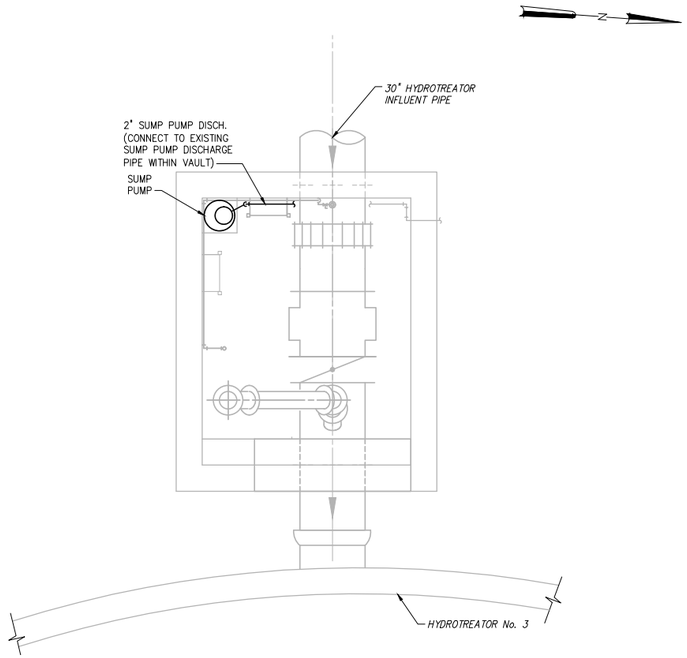
CITY OF FORT LAUDERDALE
PUBLIC WORKS DEPARTMENT
ENGINEERING & ARCHITECTURE
100 North Andrews Avenue, Fort Lauderdale, Florida 33301

REVISIONS

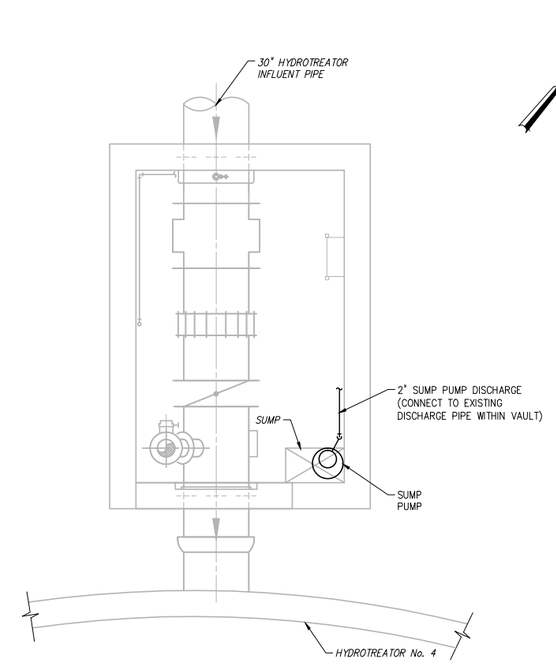
NO.	DATE	BY	CHK'D	DESCRIPTION

FIVEASH WTP
HYDROTREATORS INFLUENT VAULT
STRUCTURAL DETAILS

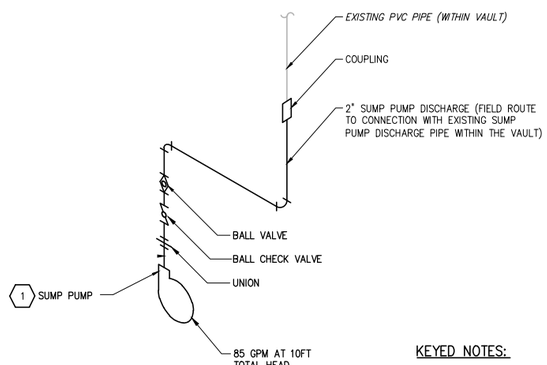
SHEET NO. S-03 OF 20
TOTAL: 21
CAD FILE: S-03
DRAWING FILE NO. 39-40



HYDROTREATOR NO. 3 INFLUENT VAULT - PROPOSED
3/8" = 1'-0"



HYDROTREATOR NO. 4 INFLUENT VAULT - PROPOSED
3/8" = 1'-0"



KEYED NOTES:

1 CONNECT PROPOSED PUMP TO POWER SUPPLY FOR EXISTING SAMPLE PUMP.

SUMP PUMP SCHEMATIC

DETAIL	1
NTS	–

LEGEND:

EXISTING

PROPOSED

Hazen

HAZEN AND SAWYER
4000 HOLLYWOOD BOULEVARD, SUITE 750N
HOLLYWOOD, FLORIDA 33021
CERTIFICATE OF AUTHORIZATION NO. : 2771

3/8"=1'-0"

12" 0 1 2 4'

GEORGE A. BROWN P.E.
No. 56076

State of Florida
Professional Engineer
License No. 56076
GEORGE A. BROWN

DRAWN BY:	GHD
DATE:	JAN. 2016
DESIGNED BY:	GAB
SCALE:	AS NOTED
CHECKED BY:	GWB
FIELD BOOK:	N/A

CITY OF FORT LAUDERDALE
PUBLIC WORKS DEPARTMENT
ENGINEERING & ARCHITECTURE
100 North Andrews Avenue, Fort Lauderdale, Florida 33301

REVISIONS

NO.	DATE	BY	CHK'D	DESCRIPTION

FIVEASH WTP
HYDROTREATORS INFLUENT VAULT
PLUMBING PLAN

SHEET NO.	OF
P-01	1
TOTAL:	21

CAD FILE: P-01
DRAWING FILE NO. 39-40

Question and Answers for Bid #263-11809 - Fiveash Water Treatment Plant Hydrotreators 3 & 4 Influent Pipe Modifications

Overall Bid Questions
There are no questions associated with this bid.